SUNSTAR 商斯达实业集团是集研发、生产、工程、销售、代理经销 、技术咨询、信息服务等为一体的高科技企业，是专业高科技电子产品生产厂家，是具有10 多年历史的专业电子元器件供应商，是中国最早和最大的仓储式连锁规模经营大型综合电子零部件代理分销商之一,是一家专业代理和分銷世界各大品牌IC 芯片和電子元器件的连锁经营綜合性国际公司，专业经营进口、国产名厂名牌电子元件，型号、种类齐全。在香港、北京、深圳、上海、西安、成都等全国主要电子市场设有直属分公司和产品展示展销窗口门市部专卖店及代理分销商,已在全国范围内建成强大统一的供货和代理分销网络。 我们专业代理经销、开发生产电子元器件、集成电路、传感器、微波光电元器件、工控机/DOC/DOM 电子盘、专用电路、单片机开发、MCU/DSP/ARM/FPGA 软件硬件、二极管、三极管、模块等，是您可靠的一站式现货配套供应商、方案提供商、部件功能模块开发配套商。商斯达实业公司拥有庞大的资料库，有数位毕业于著名高校——有中国电子工业摇篮之称的西安电子科技大学（西军电）并长期从事国防尖端科技研究的高级工程师为您精挑细选、量身订做各种高科技电子元器件，并解决各种技术问题。

微波光电部专业研制、代理经销高频、微波、光纤、光电元器件、组件、部件、模块、整机；电磁兼容元器件、材料、设备；微波CAD、EDA 软件、开发测试仿真工具；微波、光纤仪器仪表。欢迎国外高科技微波、光纤厂商将优秀产品介绍到中国、共同开拓市场。长期大量现货专业批发高频、微波、卫星、光纤、电视、CATV 器件：晶振、VCO、连接器、PIN 开关、变容二极管、开关二极管、低噪晶体管、功率电阻及电容、放大器、功率管、MMIC、混频器、耦合器、功分器、振荡器、合成器、衰减器、滤波器、隔离器、环行器、移相器、调制解调器；光电子元器件和组件：红外发射管、红外接收管、光电开关、光敏管、发光二极管和发光二极管组件、半导体激光二极管和激光器组件、光电探测器和光接收组件、光发射接收模块、光纤激光器和光放大器、光调制器、光开关、DWDM 用光发射和接收器件、用户接入系统光光收发器件与模块、光纤连接器、光纤跳线/尾纤、光衰减器、光纤适 配器、光隔离器、光耦合器、光环行器、光复用器/转换器；无线收发芯片和模组、蓝牙芯片和模组。

更多产品请看本公司产品专用销售网站：欢迎索取免费详细资料、设计指南和光盘；产品凡多，未能尽录，欢迎来电查询

商斯达中国传感器科技信息网：http://www.sensor-ic.com/

商斯达工控安防网：http://www.pc-ps.net/

商斯达电子元器件网：http://www.sunstare.com/

商斯达微波光电产品网:HTTP://www.rfoe.net/

商斯达消费电子产品网://www.icasic.com/

商斯达实业科技产品网://www.sunstars.cn/ 微波元器件销售热线：

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电话：0755-82884100 83397033 83396822 83398585

传真：0755-83376182 （0）13823648918 MSN: SUNS8888@hotmail.com

邮编：518033 E-mail:szss20@163.com QQ: 195847376

深圳赛格展销部：深圳华强北路赛格电子市场2583 号 电话：0755-83665529

技术支持: 0755-83394033 13501568376

TOSHIBA
Leading Innovation

SEMICONDUCTOR GENERAL CATALOG

Transistors

Bipolar Small-Signal Transistors
Junction FETs
Combination Products of Different Type Devices
MOSFETs
Bipolar Power Transistors
Radio-Frequency Bipolar Small-Signal Transistors
Radio-Frequency Small-Signal FETs
Radio-Frequency Power MOSFETs
Radio-Frequency Bipolar Power Transistors
IGBTs
Phototransistors (for Optical Sensors)

2009-8 SCE0004I

Bipolar Small-Signal Transistors

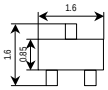
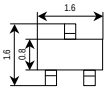
General-Purpose Transistors (Leaded Type)

Classification	V_{CEO} (V) Max	I_C (A) Max	h_{FE}	$V_{CE(sat)}$ (V) Max	Package: TO-92 (SC-43) (mm) NPN	Package: TO-92 (SC-43) (mm) PNP
General-purpose	50	0.15	70 to 700	0.25	**2SC1815**	
	−50	−0.15	70 to 400	−0.3		**2SA1015**
	120	0.1	200 to 700	0.3	**2SC2240**	
	−120	−0.1	200 to 700	−0.3		**2SA970**
Low noise	50	0.15	70 to 700	0.25	**2SC1815(L)**	
	−50	−0.15	70 to 400	−0.3		**2SA1015(L)**
	50	0.15	200 to 700	0.3	**2SC732TM**	—
	30	0.5	70 to 400	0.25	**2SC1959**	
	−30	−0.5	70 to 240	−0.25		**2SA562TM**
Audio drivers	80	0.3	70 to 240	0.5	**2SC1627**	
	−80	−0.3	70 to 240	−0.4		**2SA817**
High current	30	0.8	100 to 320	0.5	**2SC2120**	
	−30	−0.8	100 to 320	−0.7		**2SA950**
	20	2	120 to 700	0.5	**2SC3266**	
	−20	−2	120 to 400	−0.5		**2SA1296**
	10	2	140 to 600	0.5	**2SC3279**	
	−10	−2	140 to 600	−0.5		**2SA1300**
	10	5	700 to 2000	0.25	2SC5853	—
	10	5	450 to 700	0.27	2SC5854	—
	10	5	450 to 700	0.3	—	—
	80	1.2	100 to 200	0.09	2SC6132 *	—
Darlington	40	0.3	10000 min	1.3	2SC982TM	—
Muting	20	0.3	200 to 1200	0.1	**2SC2878**	—
High breakdown voltage	300	0.1	30 to 150	0.5	**2SC2551**	
	−300	−0.1	30 to 150	−0.5		**2SA1091**
	250	0.05	50 min	1.5	2SC3333	
	−250	−0.05	50 min	−1.5		2SA1320
High-speed switching	15	0.2	40 to 240	0.3	2SC752(G)TM	—
High h_{FE}	50	0.15	600 to 3600	0.25	**2SC3112**	—

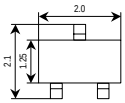
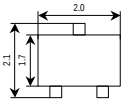
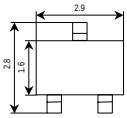
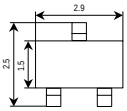
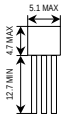
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*: New product

General-Purpose Transistors (Single)

Classification	V_{CEO} (V) Max	I_C (mA) Max	(Surface-Mount Type)									
			CST3  (mm)		fSM  (mm)		VESM  (mm)		ESM  (mm)		SSM  (mm)	
			NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP
General-purpose	50	100	2SC6026CT	2SA2154CT	2SC6026	2SA2154						
		150					2SC6026MFV	2SA2154MFV	2SC4738F	2SA1832F	2SC4738	2SA1832
	30	500										
	50	500										
Low noise	120	100										
High current	12	400	2SC5376CT	2SA1955CT			2SC5376FV	2SA1955FV	2SC5376F	2SA1955F	2SC5376	2SA1955
	12	500										
	15	800										
	25	800										
	30	800										
	10	2000										
	20	2000										
	20	1500										
	20	2500										
	30	3000										
	50	1000										
	50	1700										
	50	2500										
Strobe	10	5000 (3000)										
High breakdown voltage	80	300										
High h_{FE}	50	150										
Muting	20	300										
High-speed switching	15	200										
High-voltage switching	200	50										
High breakdown voltage	250	50										
	300	100										
Darlington	40	300										

- For the PNP transistors, the minus sign (–) indicating a negative voltage is omitted.
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

								Leaded Type	
USM  (mm)		UFM  (mm)		TSM  (mm)		S-MINI  (mm)		TO-92  (mm)	
NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP
2SC4116	**2SA1586**					**2SC2712**	**2SA1162**	**2SC1815**	**2SA1015**
2SC4118	**2SA1588**					**2SC2859**	**2SA1182**	**2SC1959**	**2SA562TM**
						2SC3325	**2SA1313**		
2SC4117	**2SA1587**					**2SC2713**	**2SA1163**	**2SC2240**	**2SA970**
						2SC3324	2SA1312		
2SC5233	2SA1954					2SC5232	2SA1953		
							2SA1362		
						2SC3265	**2SA1298**		
						2SC4210	2SA1621	**2SC2120**	**2SA950**
								2SC3279	**2SA1300**
								2SC3266	**2SA1296**
		2SC6133 *	2SA2214 *						
			2SA2215 *						
		2SC6134 *							
		2SC6135 *							
			2SA2195 *						
		2SC6100 *							
				(2SC5766)				2SC5853	
								2SC5471	
								2SC5854	
								2SC6067 *	
						2SC4209	2SA1620	**2SC1627**	**2SA817**
2SC4666						**2SC3295**		**2SC3112**	
2SC4213						**2SC3326**		**2SC2878**	
2SC4667						2SC3437		2SC752(G)TM	
						2SC3138	2SA1255		
								2SC3333	2SA1320
						2SC4497	2SA1721	**2SC2551**	**2SA1091**
						2SC2532		2SC982TM	

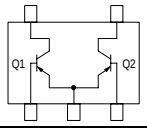
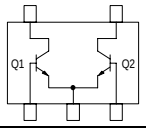
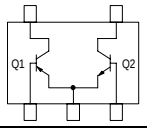
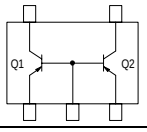
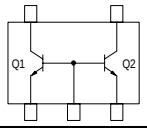
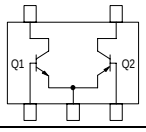
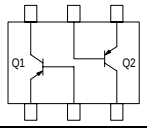
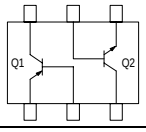
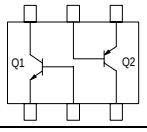
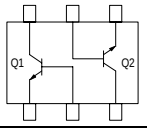
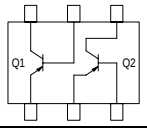
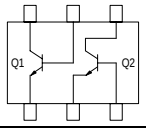
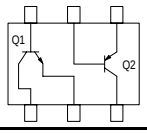
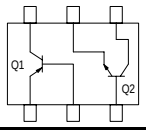
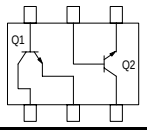
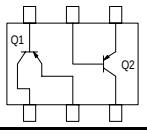
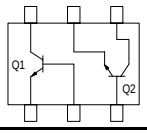
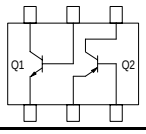
*: New product

General-Purpose Transistors (Dual)

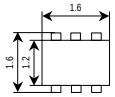
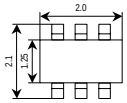
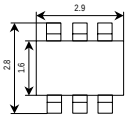
Classification	V_{CEO} (V) Max	I_C (mA) Max	Dual Type									
			CST6 (mm)	fS6 (mm)			ESV (mm)	USV (mm)		SMV (mm)		
			NPN + PNP	NPN	PNP	NPN + PNP	PNP + NPN	NPN	PNP	NPN	PNP	PNP + NPN
General -purpose	50	150 (100)	(HN2B26CT) (▲18) **	(HN1C26FS) (▲10) (HN2C26FS) (▲12)	(HN1A26FS) (▲7) (HN2A26FS) (▲11)	(HN1B26FS) (▲9)	HN4B01JE (▲6)	2SC4944 (▲2)	2SA1873 (▲1) HN4A56JU (▲4)	2SC4207 (▲2)	2SA1618 (▲1)	
	30	500										HN4B04J (▲3) *
	50	500										
Low noise	120	100								HN4C06J (▲2) HN4C51J (▲5)	HN4A06J (▲1) HN4A51J (▲4)	HN4B06J (▲3)
High current	12	400						HN4C05JU (▲2)				
	12	500										
	15	800										
	25	800								HN4C08J (▲2)	HN4A08J (▲1)	
	30	800										
	10	2000										
	20	2000										
Strobe	10	5000										
High breakdown voltage	80	300										
High h_{FE}	50	150										
Muting	20	300										
High-speed switching	15	200										
High-voltage switching	200	50										
High breakdown voltage	250	50										
	300	100										
Darlington	40	300										

- For the PNP transistors, the minus sign (−) indicating a negative voltage is omitted.
- The ratings enclosed in parenthesis are for those devices whose part numbers are enclosed in parentheses.
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

♦Internal Connections

Number of Pins	▲1	▲2	▲3	▲4	▲5	▲6
5						
	▲7	▲8	▲9	▲10	▲11	▲12
6						
	▲13	▲14	▲15	▲16	▲17	▲18
6						

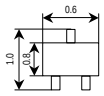
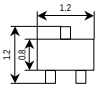
♦The internal connection diagrams only show the general configurations of the circuits.

ES6			US6			SM6		
 (mm)			 (mm)			 (mm)		
NPN	PNP	PNP + NPN	NPN	PNP	PNP + NPN	NPN	PNP	PNP + NPN
HN1C01FE (▲10) HN2C01FE (▲12) HN3C67FE (▲17)	HN1A01FE (▲7) HN2A01FE (▲11)	HN1B04FE (▲9)	**HN1C01FU** (▲10) HN2C01FU (▲12) HN3C56FU (▲15)	**HN1A01FU** (▲7) HN2A01FU (▲11)	HN1B01FU (▲8) **HN1B04FU** (▲9) HN3B02FU (▲14)	**HN1C01F** (▲10)	**HN1A01F** (▲7) HN3A56F (▲16)	**HN1B01F** (▲8) **HN3B01F** (▲13)
								HN1B04F (▲8)
						HN1C07F (▲10)	HN1A07F (▲7)	
						HN3C51F (▲15)	HN3A51F (▲16)	
HN1C05FE (▲10)								
							HN1A02F (▲7)	
			HN1C03FU (▲10)			**HN1C03F** (▲10)		
			HN3C61FU (▲15)					

*: New product

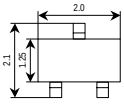
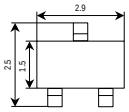
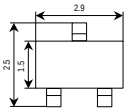
**: Under development

Bias Resistor Built-in Transistors (Single, General-Purpose)

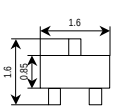
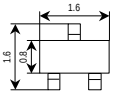
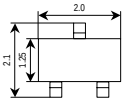
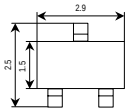
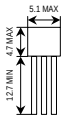
Ratings												
	V_{CEO}(V)	20							50			
	I_C(mA)	50							100			
Internal Resistors (kΩ)		fSM  (mm)		CST3  (mm)		CST6  (mm)			CST3  (mm)		VESM  (mm)	
R1	R2	NPN	PNP	NPN	PNP	NPN	PNP	NPN + PNP	NPN	PNP	NPN	PNP
4.7	4.7	RN1101FS	RN2101FS	RN1101CT	RN2101CT	RN1961CT	RN2961CT		RN1101ACT	RN2101ACT	RN1101MFV	RN2101MFV
10	10	RN1102FS	RN2102FS	RN1102CT	RN2102CT	RN1962CT	RN2962CT		RN1102ACT	RN2102ACT	RN1102MFV	RN2102MFV
22	22	RN1103FS	RN2103FS	RN1103CT	RN2103CT	RN1963CT	RN2963CT		RN1103ACT	RN2103ACT	RN1103MFV	RN2103MFV
47	47	RN1104FS	RN2104FS	RN1104CT	RN2104CT	RN1964CT	RN2964CT		RN1104ACT	RN2104ACT	RN1104MFV	RN2104MFV
2.2	47	RN1105FS	RN2105FS	RN1105CT	RN2105CT	RN1965CT	RN2965CT		RN1105ACT	RN2105ACT	RN1105MFV	RN2105MFV
4.7	47	RN1106FS	RN2106FS	RN1106CT	RN2106CT	RN1966CT	RN2966CT	RN49P2ACT	RN1106ACT	RN2106ACT	RN1106MFV	RN2106MFV
10	47	RN1107FS	RN2107FS	RN1107CT	RN2107CT	RN1967CT	RN2967CT		RN1107ACT	RN2107ACT	RN1107MFV	RN2107MFV
22	47	RN1108FS	RN2108FS	RN1108CT	RN2108CT	RN1968CT	RN2968CT		RN1108ACT	RN2108ACT	RN1108MFV	RN2108MFV
47	22	RN1109FS	RN2109FS	RN1109CT	RN2109CT	RN1969CT	RN2969CT		RN1109ACT	RN2109ACT	RN1109MFV	RN2109MFV
4.7	∞	RN1110FS	RN2110FS	RN1110CT	RN2110CT	RN1970CT	RN2970CT		RN1110ACT	RN2110ACT	RN1110MFV	RN2110MFV
10	∞	RN1111FS	RN2111FS	RN1111CT	RN2111CT	RN1971CT	RN2971CT		RN1111ACT	RN2111ACT	RN1111MFV	RN2111MFV
22	∞	RN1112FS	RN2112FS	RN1112CT	RN2112CT	RN1972CT	RN2972CT		RN1112ACT	RN2112ACT	RN1112MFV	RN2112MFV
47	∞	RN1113FS	RN2113FS	RN1113CT	RN2113CT	RN1973CT	RN2973CT		RN1113ACT	RN2113ACT	RN1113MFV	RN2113MFV
1	10										RN1114MFV	RN2114MFV
2.2	10										RN1115MFV	RN2115MFV
4.7	10										RN1116MFV	RN2116MFV
10	4.7										RN1117MFV	RN2117MFV
47	10										RN1118MFV	RN2118MFV
1	—										RN1119MFV	RN2119MFV
100	100										RN1130MFV	RN2130MFV
100	∞										RN1131MFV	RN2131MFV
200	∞										RN1132MFV	RN2132MFV

- For the PNP transistors, the minus sign (–) indicating a negative voltage is omitted.
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

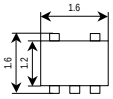
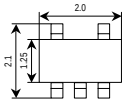
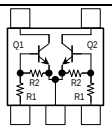
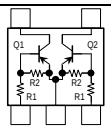
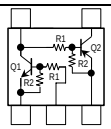
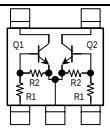
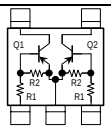
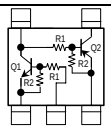
(Single, High-Current/Muting Switch)

		High Current				Muting
Ratings	V_{CEO}(V)	12		50		20
	I_C(mA)	500		800		300
Internal Resistors (kΩ)		USM  (mm)		S-MINI  (mm)		S-MINI  (mm)
R1	R2	NPN	PNP	NPN	PNP	NPN
1	1	RN1321A	RN2321A	RN1421	RN2421	
2.2	2.2	RN1322A	RN2322A	RN1422	RN2422	
4.7	4.7	RN1323A	RN2323A	RN1423	RN2423	
10	10	RN1324A	RN2324A	RN1424	RN2424	
0.47	10	RN1325A	RN2325A	RN1425	RN2425	
1	10	RN1326A	RN2326A	RN1426	RN2426	
2.2	10	RN1327A	RN2327A	RN1427	RN2427	
5.6	∞					RN1441
10	∞					RN1442
22	∞					RN1443
2.2	∞					RN1444

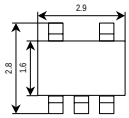
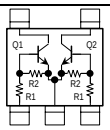
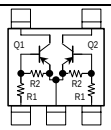
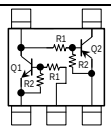
- For the PNP transistors, the minus sign (–) indicating a negative voltage is omitted.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

	50										
	100										
	ESM  (mm)		SSM  (mm)		USM  (mm)		S-MINI  (mm)		TO-92  (mm)		
	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	
	RN1101F	RN2101F	RN1101	RN2101	**RN1301**	**RN2301**	**RN1401**	**RN2401**	**RN1001**	**RN2001**	
	RN1102F	RN2102F	RN1102	RN2102	**RN1302**	**RN2302**	**RN1402**	**RN2402**	**RN1002**	**RN2002**	
	RN1103F	RN2103F	RN1103	RN2103	**RN1303**	**RN2303**	**RN1403**	**RN2403**	**RN1003**	**RN2003**	
	RN1104F	RN2104F	RN1104	RN2104	**RN1304**	**RN2304**	**RN1404**	**RN2404**	**RN1004**	**RN2004**	
	RN1105F	RN2105F	RN1105	RN2105	**RN1305**	**RN2305**	**RN1405**	**RN2405**	**RN1005**	**RN2005**	
	RN1106F	RN2106F	RN1106	RN2106	**RN1306**	**RN2306**	**RN1406**	**RN2406**	**RN1006**	**RN2006**	
	RN1107F	RN2107F	RN1107	RN2107	**RN1307**	**RN2307**	**RN1407**	**RN2407**	**RN1007**	**RN2007**	
	RN1108F	RN2108F	RN1108	RN2108	**RN1308**	**RN2308**	**RN1408**	**RN2408**	**RN1008**	**RN2008**	
	RN1109F	RN2109F	RN1109	RN2109	**RN1309**	**RN2309**	**RN1409**	**RN2409**	**RN1009**	**RN2009**	
	RN1110F	RN2110F	RN1110	RN2110	**RN1310**	**RN2310**	**RN1410**	**RN2410**	**RN1010**	**RN2010**	
	RN1111F	RN2111F	RN1111	RN2111	**RN1311**	**RN2311**	**RN1411**	**RN2411**	**RN1011**	**RN2011**	
	RN1112F	RN2112F	RN1112	RN2112	RN1312	RN2312	RN1412	RN2412			
	RN1113F	RN2113F	RN1113	RN2113	RN1313	RN2313	RN1413	RN2413			
	RN1114F	RN2114F	RN1114	RN2114	RN1314	RN2314	RN1414	RN2414			
	RN1115F	RN2115F	RN1115	RN2115	RN1315	RN2315	RN1415	RN2415			
	RN1116F	RN2116F	RN1116	RN2116	RN1316	RN2316	RN1416	RN2416			
	RN1117F	RN2117F	RN1117	RN2117	RN1317	RN2317	RN1417	RN2417			
	RN1118F	RN2118F	RN1118	RN2118	RN1318	RN2318	RN1418	RN2418			
	RN1130F	RN2130F									
	RN1131F	RN2131F									
	RN1132F	RN2132F									

Bias Resistor Built-in Transistors (Dual, General-Purpose (5 Pin))

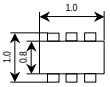
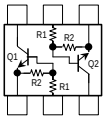
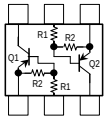
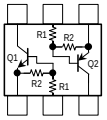
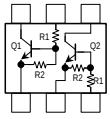
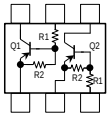
Classification	Absolute Maximum Ratings		Internal Resistors				ESV			USV		
	V_{CEO}	I_C	Q1 (kΩ)		Q2 (kΩ)		 (mm)			 (mm)		
							NPN x 2	PNP x 2	NPN + PNP	NPN x 2	PNP x 2	NPN + PNP
			R1	R2	R1	R2	 Common emitter	 Common emitter	 Collector-base connection	 Common emitter	 Common emitter	 Collector-base connection
	(V)	(mA)										
General-purpose	50	100	4.7	4.7	4.7	4.7	RN1701JE	RN2701JE		RN1701	RN2701	
			10	10	10	10	RN1702JE	RN2702JE	RN47A3JE	RN1702	RN2702	RN47A3
			22	22	22	22	RN1703JE	RN2703JE	RN47A2JE	RN1703	RN2703	RN47A2
			47	47	47	47	RN1704JE	RN2704JE		RN1704	RN2704	
			2.2	47	2.2	47	RN1705JE	RN2705JE		RN1705	RN2705	
			4.7	47	4.7	47	RN1706JE	RN2706JE		RN1706	RN2706	
			10	47	10	47	RN1707JE	RN2707JE		RN1707	RN2707	
			22	47	22	47	RN1708JE	RN2708JE		RN1708	RN2708	
			47	22	47	22	RN1709JE	RN2709JE		RN1709	RN2709	
			4.7	—	4.7	—	RN1710JE	RN2710JE	RN47A1JE	RN1710	RN2710	RN47A1
			10	—	10	—	RN1711JE	RN2711JE		RN1711	RN2711	
			22	—	22	—		RN2712JE				
			47	—	47	—		RN2713JE				
			1	10	1	10					RN2714	
			2.2	10	2.2	10						
			4.7	10	4.7	10						
			10	4.7	10	4.7						
			47	10	47	10						
			47	47	10	47			RN47A4JE			RN47A4
			47	47	4.7	10			RN47A5JE			RN47A5
			100	100	100	100						RN47A6
			10	10	47	10						RN47A7
	Q1: 50	Q1: 100	10	10	4.7	10			RN47A7JE			
	Q2: 12	Q2: 100 (Lowsat)										
	Q1: 50	Q1: 100	10	10	10	47			RN47A8JE			
	Q2: 30	Q2: 100 (High h_{FE})										
Muting	20	300	2.2	—	2.2	—						

- For the PNP transistors, the minus sign (–) indicating a negative voltage is omitted.
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

	SMV		
	 (mm)		
	NPN x 2	PNP x 2	NPN + PNP
			
	Common emitter	Common emitter	Collector-base connection
	RN1501	**RN2501**	
	RN1502	**RN2502**	
	RN1503	**RN2503**	
	RN1504	**RN2504**	
	RN1505	**RN2505**	
	RN1506	**RN2506**	
	RN1507	**RN2507**	
	RN1508	**RN2508**	
	RN1509	**RN2509**	
	RN1510	**RN2510**	
	RN1511	**RN2511**	
	RN1544		

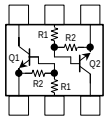
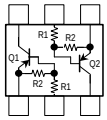
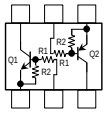
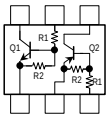
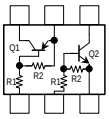
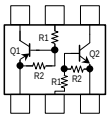
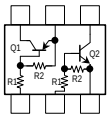
The internal connection diagrams only show the general configurations of the circuits.

(Dual, General-Purpose (6 Pin))

Classification	fS6																	
																		
	Absolute Maximum Ratings		Internal Resistors				NPN	PNP	PNP + NPN	Absolute Maximum Ratings		Internal Resistors				NPN x 2	PNP x 2
	V_{CEO}	I_C	Q1 (kΩ)		Q2 (kΩ)					V_{CEO}	I_C	Q1 (kΩ)		Q2 (kΩ)			
	(V)	(mA)	R1	R2	R1	R2				(V)	(mA)	R1	R2	R1	R2		
General -purpose	50	80	4.7	4.7	4.7	4.7	RN1901AFS	RN2901AFS	RN4981AFS	20	50	4.7	4.7	4.7	4.7	RN1961FS	RN2961FS
			10	10	10	10	RN1902AFS	RN2902AFS	RN4982AFS			10	10	10	10	RN1962FS	RN2962FS
			22	22	22	22	RN1903AFS	RN2903AFS	RN4983AFS			22	22	22	22	RN1963FS	RN2963FS
			47	47	47	47	RN1904AFS	RN2904AFS	RN4984AFS			47	47	47	47	RN1964FS	RN2964FS
			2.2	47	2.2	47	RN1905AFS	RN2905AFS	RN4985AFS			2.2	47	2.2	47	RN1965FS	RN2965FS
			4.7	47	4.7	47	RN1906AFS	RN2906AFS	RN4986AFS			4.7	47	4.7	47	RN1966FS	RN2966FS
			10	47	10	47	RN1907AFS	RN2907AFS	RN4987AFS			10	47	10	47	RN1967FS	RN2967FS
			22	47	22	47	RN1908AFS	RN2908AFS	RN4988AFS			22	47	22	47	RN1968FS	RN2968FS
			47	22	47	22	RN1909AFS	RN2909AFS	RN4989AFS			47	22	47	22	RN1969FS	RN2969FS
			4.7	—	4.7	—	RN1910AFS	RN2910AFS	RN4990AFS			4.7	—	4.7	—	RN1970FS	RN2970FS
			10	—	10	—	RN1911AFS	RN2911AFS	RN4991AFS			10	—	10	—	RN1971FS	RN2971FS
			22	—	22	—	RN1912AFS	RN2912AFS	RN4992AFS			22	—	22	—	RN1972FS	RN2972FS
			47	—	47	—	RN1913AFS	RN2913AFS	RN4993AFS			47	—	47	—	RN1973FS	RN2973FS
			1	10	1	10						1	10	1	10		
			2.2	10	2.2	10						2.2	10	2.2	10		
			4.7	10	4.7	10						4.7	10	4.7	10		
			10	4.7	10	4.7						10	4.7	10	4.7		
			47	10	47	10						47	10	47	10		
			2.2	47	22	47						2.2	47	22	47		
			2.2	47	47	47						2.2	47	47	47		
			22	22	10	10						22	22	10	10		
			10	10	10	—						10	10	10	—		
			47	47	4.7	47						47	47	4.7	47		
General -purpose (Hiβ)	40 (−30)	100	4.7	—	4.7	—				40 (−30)	100	4.7	—	4.7	—		
			10	—	10	—						10	—	10	—		
			22	—	22	—						22	—	22	—		
Power SW	50 (−12)	100 (−500)	10	47	2.0	10				50 (−12)	100 (−500)	10	47	2.0	10		

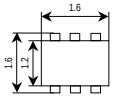
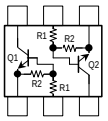
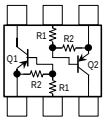
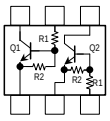
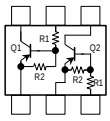
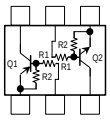
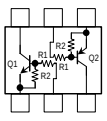
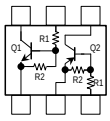
- For the PNP transistors, the minus sign (−) indicating a negative voltage is omitted.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

(mm)

NPN x 2	PNP x 2	NPN + PNP	NPN + PNP	NPN + PNP	NPN + PNP	Absolute Maximum Ratings		Internal Resistors				NPN + PNP
						V_{CEO}	I_C	Q1 (kΩ)		Q2 (kΩ)		
						(V)	(mA)	R1	R2	R1	R2	
RN1901FS	RN2901FS	RN4981FS						4.7	4.7	4.7	4.7	
RN1902FS	RN2902FS	RN4982FS						10	10	10	10	
RN1903FS	RN2903FS	RN4983FS						22	22	22	22	
RN1904FS	RN2904FS	RN4984FS		RN49J2FS	RN49J7FS			47	47	47	47	RN49J2AFS
RN1905FS	RN2905FS	RN4985FS						2.2	47	2.2	47	
RN1906FS	RN2906FS	RN4986FS						4.7	47	4.7	47	
RN1907FS	RN2907FS	RN4987FS						10	47	10	47	
RN1908FS	RN2908FS	RN4988FS						22	47	22	47	
RN1909FS	RN2909FS	RN4989FS						47	22	47	22	
RN1910FS	RN2910FS	RN4990FS						4.7	—	4.7	—	
RN1911FS	RN2911FS	RN4991FS						10	—	10	—	
RN1912FS	RN2912FS	RN4992FS				50	50	22	—	22	—	
RN1913FS	RN2913FS	RN4993FS						47	—	47	—	
								1	10	1	10	
								2.2	10	2.2	10	
								4.7	10	4.7	10	
								10	4.7	10	4.7	
								47	10	47	10	
								2.2	47	22	47	
								2.2	47	47	47	
								22	22	10	10	
			RN49P1FS					10	10	10	—	
		RN49A6FS						47	47	4.7	47	
								4.7	—	4.7	—	
						40 (−30)	100	10	—	10	—	
								22	—	22	—	
						50 (−12)	100 (−500)	10	47	2.0	10	

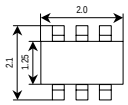
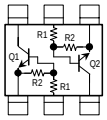
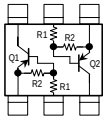
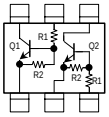
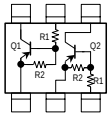
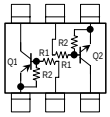
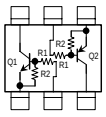
The internal connection diagrams only show the general configurations of the circuits.

(Dual, General-Purpose (6 Pin)) (Continued)

Classification	Absolute Maximum Ratings		Internal Resistors				ES6						
	V_{CEO}	I_C	Q1 (kΩ)		Q2 (kΩ)		 (mm)						
							NPN x 2	PNP x 2	NPN x 2	PNP x 2	PNP + NPN	NPN + PNP	NPN + PNP
													
	(V)	(mA)	R1	R2	R1	R2							
General -purpose	50	100	4.7	4.7	4.7	4.7	RN1901FE	RN2901FE	RN1961FE	RN2961FE	RN4901FE	RN4981FE	
			10	10	10	10	RN1902FE	RN2902FE	RN1962FE	RN2962FE	RN4902FE	RN4982FE	RN4962FE
			22	22	22	22	RN1903FE	RN2903FE	RN1963FE	RN2963FE	RN4903FE	RN4983FE	
			47	47	47	47	RN1904FE	RN2904FE	RN1964FE	RN2964FE	RN4904FE	RN4984FE	
			2.2	47	2.2	47	RN1905FE	RN2905FE	RN1965FE	RN2965FE	RN4905FE	RN4985FE	
			4.7	47	4.7	47	RN1906FE	RN2906FE	RN1966FE	RN2966FE	RN4906FE	RN4986FE	
			10	47	10	47	RN1907FE	RN2907FE	RN1967FE	RN2967FE	RN4907FE	RN4987FE	
			22	47	22	47	RN1908FE	RN2908FE	RN1968FE	RN2968FE	RN4908FE	RN4988FE	
			47	22	47	22	RN1909FE	RN2909FE	RN1969FE	RN2969FE	RN4909FE	RN4989FE	
			4.7	—	4.7	—	RN1910FE	RN2910FE	RN1970FE	RN2970FE	RN4910FE	RN4990FE	
			10	—	10	—	RN1911FE	RN2911FE	RN1971FE	RN2971FE	RN4911FE	RN4991FE	
			22	—	22	—							
			47	—	47	—							
			1	10	1	10							
			2.2	10	2.2	10							
			4.7	10	4.7	10							
			10	4.7	10	4.7							
			47	10	47	10							
			2.2	47	22	47					RN49A1FE		
			2.2	47	47	47							
			22	22	10	10							
			10	10	10	—							
General -purpose (Hiβ)	40 (−30)	100	4.7	—	4.7	—			RN1970HFE	RN2970HFE		RN4990HFE	
			10	—	10	—			RN1971HFE	RN2971HFE		RN4991HFE	
			22	—	22	—			RN1972HFE	RN2972HFE		RN4992HFE	
Power SW	50 (−12)	100 (−500)	10	47	2.0	10							

- For the PNP transistors, the minus sign (−) indicating a negative voltage is omitted.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

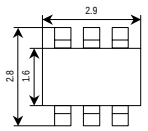
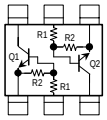
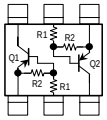
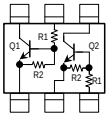
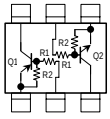
The internal connection diagrams only show the general configurations of the circuits.

Classification	Absolute Maximum Ratings		Internal Resistors				US6					
	V_{CEO}	I_C	Q1		Q2		 (mm)					
			(kΩ)		(kΩ)		NPN x 2	PNP x 2	NPN x 2	PNP x 2	PNP + NPN	NPN + PNP
												
	(V)	(mA)	R1	R2	R1	R2						
General -purpose	50	100	4.7	4.7	4.7	4.7	**RN1901**	**RN2901**	RN1961	RN2961	**RN4901**	**RN4981**
			10	10	10	10	**RN1902**	**RN2902**	RN1962	RN2962	**RN4902**	**RN4982**
			22	22	22	22	**RN1903**	**RN2903**	RN1963	RN2963	**RN4903**	**RN4983**
			47	47	47	47	**RN1904**	**RN2904**	RN1964	RN2964	**RN4904**	**RN4984**
			2.2	47	2.2	47	**RN1905**	**RN2905**	RN1965	RN2965	**RN4905**	**RN4985**
			4.7	47	4.7	47	**RN1906**	**RN2906**	RN1966	RN2966	**RN4906**	**RN4986**
			10	47	10	47	**RN1907**	**RN2907**	RN1967	RN2967	**RN4907**	**RN4987**
			22	47	22	47	**RN1908**	**RN2908**	RN1968	RN2968	**RN4908**	**RN4988**
			47	22	47	22	**RN1909**	**RN2909**	RN1969	RN2969	**RN4909**	**RN4989**
			4.7	—	4.7	—	**RN1910**	**RN2910**	RN1970	RN2970	**RN4910**	**RN4990**
			10	—	10	—	**RN1911**	**RN2911**	RN1971	RN2971	**RN4911**	**RN4991**
			22	—	22	—						
			47	—	47	—			RN1973			
			1	10	1	10						
			2.2	10	2.2	10				RN2975		
			4.7	10	4.7	10						
			10	4.7	10	4.7						
			47	10	47	10						
			2.2	47	22	47					**RN49A1**	
			2.2	47	47	47					RN49A2	
			22	22	10	10						
			10	10	10	—						
General -purpose (Hiβ)	40 (−30)	100	4.7	—	4.7	—						
			10	—	10	—						
			22	—	22	—						
Power SW	50 (−12)	100 (−500)	10	47	2.0	10						RN49A5

- For the PNP transistors, the minus sign (−) indicating a negative voltage is omitted.
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

The internal connection diagrams only show the general configurations of the circuits.

(Dual, General-Purpose (6 Pin)) (Continued)

Classification	Absolute Maximum Ratings		Internal Resistors				SM6			
	V_{CEO}	I_C	Q1 (kΩ)		Q2 (kΩ)		 (mm)			
							NPN x 2	PNP x 2	NPN x 2	PNP + NPN
										
	(V)	(mA)	R1	R2	R1	R2				
General -purpose	50	100	4.7	4.7	4.7	4.7	**RN1601**	**RN2601**		**RN4601**
			10	10	10	10	**RN1602**	**RN2602**		**RN4602**
			22	22	22	22	**RN1603**	**RN2603**		**RN4603**
			47	47	47	47	**RN1604**	**RN2604**		**RN4604**
			2.2	47	2.2	47	**RN1605**	**RN2605**		**RN4605**
			4.7	47	4.7	47	**RN1606**	**RN2606**		**RN4606**
			10	47	10	47	**RN1607**	**RN2607**		**RN4607**
			22	47	22	47	**RN1608**	**RN2608**		**RN4608**
			47	22	47	22	**RN1609**	**RN2609**		**RN4609**
			4.7	—	4.7	—	**RN1610**	**RN2610**		**RN4610**
			10	—	10	—	**RN1611**	**RN2611**		**RN4611**
			22	—	22	—				RN4612
			47	—	47	—			RN1673	
			1	10	1	10				
			2.2	10	2.2	10				
			4.7	10	4.7	10				
			10	4.7	10	4.7				
			47	10	47	10				
			2.2	47	22	47				
			2.2	47	47	47				
			22	22	10	10				RN46A1
			10	10	10	—				
General -purpose (Hiβ)	40 (−30)	100	4.7	—	4.7	—				
			10	—	10	—				
			22	—	22	—				
Power SW	50 (−12)	100 (−500)	10	47	2.0	10				

- For the PNP transistors, the minus sign (−) indicating a negative voltage is omitted.
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

The internal connection diagrams only show the general configurations of the circuits.

Junction FETs

Junction FETs (Leaded Type)

Classification	V_{GDS} (V) Max	I_G (mA) Max	I_{DSS} (mA)	$\|Yfs\|$ (mS) Min	Package: TO-92 (SC-43) (mm) Nch	Package: TO-92 (SC-43) (mm) Pch
General-purpose	−50	10	1.2 to 14	1.5	**2SK246**	
	50	−10	−1.2 to −14	1		**2SJ103**
	−50	10	1.2 to 14	4	2SK117	—
	−50	10	1.2 to 14	5	**2SK362**	—
	−40	10	5 to 30	25	2SK363	—
	−40	10	2.6 to 20	12	2SK364	
Low noise	−50	10	0.3 to 6.5	1.2	**2SK30ATM**	—
	−40	10	2.6 to 20	—	2SK170	
	−40	10	2.6 to 20	25	2SK369	—

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

(Surface-Mount Type)

Classification	V_{GDS} (V) Max	I_G (mA) Max	I_{DSS} (mA)	$\|Yfs\|$ (mS) Min	Package: S-MINI (SC-59) (mm) Nch	Package: S-MINI (SC-59) (mm) Pch	Package: USM (SC-70) (mm) Nch	Package: USM (SC-70) (mm) Pch
General-purpose	−50	10	0.3 to 6.5	1.2	**2SK208**		**2SK879**	
	50	−10	−1.2 to −14	1		2SJ106		2SJ144
	−50	10	1.2 to 14	4	**2SK209**	—	**2SK880**	—

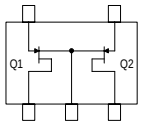
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

(Surface-Mount Type) (Electret Condense Microphone)

Characteristics	V_{GDS} (V) Max	I_G (mA) Max	I_{DSS} Rank (μA)	$\|Y_{fs}\|$ (mS) Min	Ciss (pF) Typ.	Package VESM (mm)	Package TESM3 (mm)	Package VESM2 (mm)	Package CST3 (mm)
High gain Low THD Low Noise Small Ciss	−20	10	A = 80 to 200 B = 170 to 300	0.55	3.6	2SK3582MFV	2SK3582TK	2SK3582TV	2SK3582CT
High gain Low THD Small Ciss	−20	10	A = 140 to 240 B = 210 to 350	0.9	3.5	2SK3857MFV	2SK3857TK	2SK3857TV	2SK3857CT
High gain Small Ciss	−20	10	A = 140 to 240 B = 210 to 350 BK = 210 to 400 C = 320 to 500	1.35	4.0	2SK4059MFV	2SK4059TK	2SK4059TV	2SK4059CT
Very Low Noise Very Small Ciss	−20	10	A = 140 to 240 B = 210 to 350	0.65	1.8	TTK101MFV	—	—	—

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

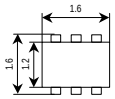
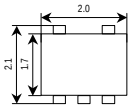
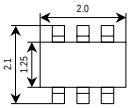
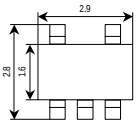
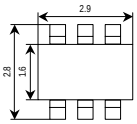
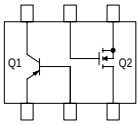
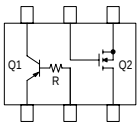
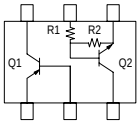
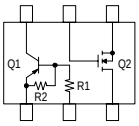
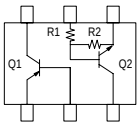
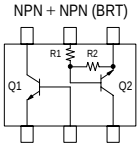
Junction FETs (Dual) (Surface-Mount Type)

Classification	V_{GDS} (V)	I_G (mA)	I_{DSS} (mA)	$\|Y_{fs}\|$ (mS) Min	Package SMV (mm) Nch x 2	Package SMV (mm) Pch x 2	Package USV (mm) Nch x 2	Package USV (mm) Pch x 2	♦Internal Connections
General-purpose	−50	10	1.2 to 14	4	2SK2145	—	2SK3320	—	

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.
♦The internal connection diagrams only show the general configurations of the circuits.

Combination Products of Different Type Devices

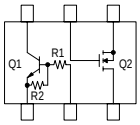
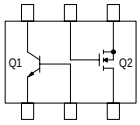
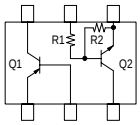
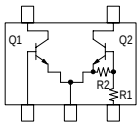
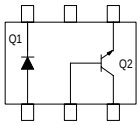
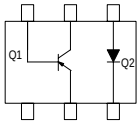
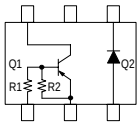
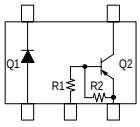
Combination Products of Different Type Devices (5-Pin Packages (UFV, SMV), 6-Pin Packages (ES6, US6, SM6))

Internal Connections	Part Number					Component Devices		Ratings				Features
	ES6 Package  (mm)	UFV Package  (mm)	US6 Package  (mm)	SMV Package  (mm)	SM6 Package  (mm)			Breakdown Voltage (V)		Current (mA)		
PNP + Nch 	—	—	**HN7G01FU**	—	—	Q1	2SA1955	V_{CEO}	−12	I_C	−400	PNP Low $V_{CE(SAT)}$, suitable for power supply switches
						Q2	2SK1829	V_{DS}	20	I_D	50	2.5-V gate drive (Vth = 1.5 V max), Ron = 20 Ω typ.
	HN7G01FE	—	—	—	—	Q1	2SA1955	V_{CEO}	−12	I_C	−400	PNP Low $V_{CE(SAT)}$, suitable for power supply switches
						Q2	SSM3K03FE	V_{DS}	20	I_D	50	2.5-V gate drive (Vth = 1.3 V max), Ron = 4 Ω typ.
	—	—	HN7G03FU	—	—	Q1	2SA1955	V_{CEO}	−12	I_C	−400	PNP Low $V_{CE(SAT)}$, suitable for power supply switches
						Q2	SSM3K04FU	V_{DS}	20	I_D	100	Internal 1-MΩ resistor (R_{GS}) 2.5-V gate drive (Vth = 1.3 V max), Ron = 4 Ω typ.
PNP (BRT) + Nch 	—	—	HN7G02FU	—	—	Q1	RN2310	V_{CEO}	−50	I_C	−100	PNP (Internal resisters), R = 4.7 kΩ
						Q2	2SK1829	V_{DS}	20	I_D	50	2.5-V gate drive (Vth = 1.5 V max), Ron = 20 Ω typ.
	HN7G02FE	—	—	—	—	Q1	RN2310	V_{CEO}	−50	I_C	−100	PNP (Internal resisters), R = 4.7 kΩ
						Q2	SSM3K03FE	V_{DS}	20	I_D	50	2.5-V gate drive (Vth = 1.3 V max), Ron = 4 Ω typ.
PNP + NPN (BRT) 	—	—	HN7G04FU	—	—	Q1	2SA1955	V_{CEO}	−12	I_C	−400	PNP Low $V_{CE(SAT)}$, suitable for power supply switches
						Q2	RN1307	V_{CEO}	50	I_C	100	NPN (Internal resisters), R1 = 10 kΩ, R2 = 47 kΩ
PNP (BRT) + Nch 	—	—	HN7G05FU	—	—	Q1	RN2101	V_{CEO}	−50	I_C	−100	PNP (Internal resisters), R1 = 4.7 kΩ, R2 = 4.7 kΩ
						Q2	2SK1830	V_{DS}	20	I_D	50	2.5-V gate drive (Vth = 1.5 V max), Ron = 20 Ω typ.
PNP + NPN (BRT) 	HN7G06FE	—	HN7G06FU	—	—	Q1	2SA1955	V_{CEO}	−12	I_C	−400	PNP Low $V_{CE(SAT)}$, suitable for power supply switches
						Q2	RN1104	V_{CEO}	50	I_C	100	NPN (Internal resisters), R1 = 47 kΩ, R2 = 47 kΩ
	HN7G08FE	—	—	—	—	Q1	2SA1955	V_{CEO}	−12	I_C	−400	PNP Low $V_{CE(SAT)}$, suitable for power supply switches
						Q2	RN1306	V_{CEO}	50	I_C	100	NPN (Internal resisters), R1 = 4.7 kΩ, R2 = 47 kΩ
NPN + NPN (BRT) 	—	—	HN7G07FU	—	—	Q1	2SC5376	V_{CEO}	12	I_C	400	NPN Low $V_{CE(SAT)}$, suitable for power supply switches
						Q2	RN1115	V_{CEO}	50	I_C	100	NPN (Internal resisters), R1 = 2.2 kΩ, R2 = 10 kΩ

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

The internal connection diagrams only show the general configurations of the circuits.

Combination Products of Different Type Devices (5-Pin Packages (UFV, SMV), 6-Pin Packages (ES6, US6, SM6)) (Continued)

Internal Connections	Part Number						Component Devices			Ratings				Features
	ESV Package (mm)	ES6 Package (mm)	UFV Package (mm)	USV Package (mm)	SMV Package (mm)	SM6 Package (mm)				Breakdown Voltage (V)		Current (mA)		
NPN (BRT) + Nch 	—	HN7G09FE	—	—	—	—	Q1	RN1104F	V_{CEO}	50	I_C	100	NPN (Internal resisters), R1 = 47 kΩ, R2 = 47 kΩ
							Q2	SSM3K15FS	V_{DS}	30	I_D	100	2.5-V gate drive (Vth = 1.5 V max), Ron = 4 Ω typ..
NPN + Nch 	—	HN7G10FE	—	—	—	—	Q1	2SC5376F	V_{CEO}	12	I_C	400	NPN Low $V_{CE(SAT)}$, suitable for power supply switches
							Q2	SSM3K03FE	V_{DS}	20	I_D	50	2.5-V gate drive (Vth = 1.3 V max), Ron = 4 Ω typ.
PNP + NPN (BRT) 	—	—	—	—	—	HN7G11F *	Q1	2SA2214	V_{CEO}	20	I_C	1500	PNP, high-current
							Q2	RN1102	V_{CEO}	100	I_C	100	NPN (Internal resisters), R1 = 10 kΩ, R2 = 10 kΩ
Common emitter NPN + NPN (BRT) 	—	—	—	—	HN4G01J	—	Q1	2SC4116	V_{CEO}	50	I_C	150	General-purpose NPN transistor
							Q2	RN1303	V_{CEO}	50	I_C	100	NPN (Internal resisters), R1 = 22 kΩ, R2 = 22 kΩ
Independent small-signal diode + NPN 	—	—	—	—	—	HN2E01F	Q1	1SS352	V_R	80	I_O	100	Standard high-speed switching
							Q2	2SC4666	V_{CEO}	50	I_C	150	High-h_{FE}-type NPN
						HN2E02F	Q1	1SS352	V_R	80	I_O	100	Standard high-speed switching
							Q2	2SC4116	V_{CEO}	50	I_C	150	General-purpose NPN transistor
Independent PNP + small-signal diode 	—	—	—	—	—	HN2E04F	Q1	2SA1587	V_{CEO}	−120	I_C	−100	High breakdown voltage PNP
							Q2	1SS352	V_R	80	I_O	100	Standard high-speed switching
Independent BRT (PNP) + small-signal diode 	—	—	—	—	HN2E05J	—	Q1	RN2304	V_{CEO}	−50	I_C	−100	PNP (Internal resisters), R1 = 47 kΩ, R2 = 47 kΩ
							Q2	1SS352	V_R	80	I_O	100	Standard high-speed switching
SBD + PNP (BRT) 	HN2E07JE	—	—	—	—	—	Q1	1SS417	V_R	40	I_O	100	Schottky barrier diodes
							Q2	RN2104MFV	V_{CEO}	−50	I_C	100	PNP (Internal resisters), R1 = 47 kΩ, R2 = 47 kΩ

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*: New product

The internal connection diagrams only show the general configurations of the circuits.

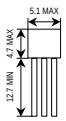
Standard Family (Small-Signal MOSFETs) (Single-Type)

Polarity	Absolute Maximum Ratings			Package					
	V_{DS} (V)	V_{GSS} (V)	I_D (mA)	CST3 (mm)	VESM (mm)	SSM (mm)	USM (SC-70) (mm)	UFM (mm)	S-MINI (SC-59) (mm)
N-ch	20	10	100		SSM3K03FV				
	20	10	100		SSM3K04FV ★	SSM3K04FS ★	SSM3K04FU ★		
	20	±10	100	SSM3K16CT	SSM3K16FV	SSM3K16FS	SSM3K16FU		
	20	±10	180	SSM3K35CT	SSM3K35MFV	SSM3K35FS			
	20	±10	500		SSM3K36MFV	SSM3K36FS		SSM3K36TU	
	20	±10	500			SSM3K43FS # *			
	20	±12	400				SSM3K05FU		
	30	±20	100	SSM3K15CT	SSM3K15FV	SSM3K15FS	SSM3K15FU		SSM3K15F
	30	±20	100		SSM3K44MFV # *	SSM3K44FS # *			
	30	±20	200						2SK2009
	30	±20	400				SSM3K09FU		
	50	±7	100				SSM3K17FU		
	50	10	50				2SK1827		2SK1826
	60	±20	200				SSM3K7002FU		SSM3K7002F
	60	±20	200				SSM3K7002AFU		SSM3K7002AF
	60	±20	200				SSM3K7002BFU *		SSM3K7002BF *
	60	±20	200						2SK1062
P-ch	−20	±8	−330		SSM3J36MFV	SSM3J36FS		SSM3J36TU	
	−20	±12	−200				SSM3J05FU		
	−20	±10	−100	SSM3J16CT	SSM3J16FV	SSM3J16FS	SSM3J16FU		
	−20	±10	−100	SSM3J35CT	SSM3J35MFV	SSM3J35FS			
	−30	±20	−100	SSM3J15CT	SSM3J15FV	SSM3J15FS	SSM3J15FU		SSM3J15F
	−30	±20	−200						2SJ305
	−30	±20	−200				SSM3J09FU		
	−50	−7	−50				2SJ344		2SJ343
	−60	±20	−200						2SJ168

★: Internal 1-MΩ resistor (R_{GS})

#: High ESD protection

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TO-92  (mm)	Vth (V)		Ron (Ω)		@VGS (V)	ton (ns) Typ.	toff (ns) Typ.
	Min	Max	Typ.	Max			
	0.7	1.3	4	12	2.5	160	190
	0.7	1.3	4	12	2.5	160	190
	0.6	1.1	5.2	15	1.5	70	125
	0.4	1.0	5	20	1.2	115	300
	0.35	1.0	0.95	1.52	1.5	30	75
	0.35	1.0	0.95	1.52	1.5	30	75
	0.6	1.1	0.85	1.2	2.5	60	70
	0.8	1.5	4	7	2.5	50	180
	0.8	1.5	4.0	7.0	2.5	50	200
	0.5	1.5	1.2	2.0	2.5	60	120
	1.1	1.8	0.8	1.2	4	72	68
	0.9	1.5	22	40	2.5	100	40
	0.8	2.5	20	50	4	110	150
	1.0	2.5	2.2	3.3	4.5	24	26
	1.0	2.5	1.8	3.3	4.5	3	7
	1.0	3.1	2.1	3.3	4.5	3	16
2SK982	2.0	3.5	0.6	1.0	10	14	75
	–0.3	–1.0	2.23	3.60	–1.5	90	200
	–0.6	–1.1	3.2	4.0	–2.5	70	70
	–0.6	–1.1	18	45	–1.5	130	190
	–0.4	–1.0	11	44	–1.2	175	251
	–1.1	–1.7	14	32	–2.5	65	175
	–0.5	–1.5	2.4	4.0	–2.5	60	150
	–1.1	–1.8	3.3	4.2	–4	85	85
	–0.8	–2.5	20	50	–4	150	130
2SJ148	–2.0	–3.5	1.3	2.0	–10	14	100

*: New product

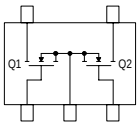
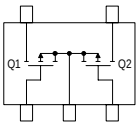
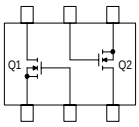
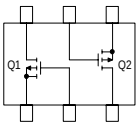
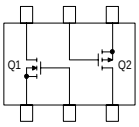
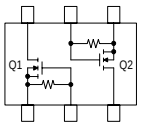
Standard Family (Small-Signal MOSFETs) (Dual Type)

Polarity	Absolute Maximum Ratings			Package					Internal FETs	Vth (V)		Ron (Ω)		
				ESV	ES6	USV	US6	UF6						
	V_{DS} (V)	V_{GSS} (V)	I_D (mA)	(mm)	(mm)	(mm)	(mm)	(mm)		Min	Max	Typ.	Max	@V_{GS} (V)
N-ch x 2	20	10	100			HN4K03JU ▲1			2SK2034 x 2	0.5	1.5	8	12	2.5
	20	10	100				SSM6N04FU ★ ▲4		SSM3K04FU x 2	0.7	1.3	4	12	2.5
	20	10	100	SSM5N03FE ▲1	SSM6N03FE ▲1				SSM3K03FE x 2	0.7	1.3	4	12	2.5
	20	±10	100	SSM5N16FE ▲1	SSM6N16FE ▲1	SSM5N16FU ▲1	SSM6N16FU ▲1		SSM3K16FU x 2	0.6	1.1	5.2	15	1.5
	20	±10	180		SSM6N35FE ▲1		SSM6N35FU ▲1		SSM3K35MFV x 2	0.4	1.0	5	20	1.2
	20	±10	500		SSM6N36FE ▲1			SSM6N36TU ▲1	SSM3K36TU x 2	0.35	1.0	0.95	1.52	1.5
	20	±10	500				SSM6N43FU ▲1		SSM3K43FS x 2	0.35	1.0	0.95	1.52	1.5
	20	±12	400			SSM5N05FU ▲1	SSM6N05FU ▲1		SSM3K05FU x 2	0.6	1.1	0.85	1.2	2.5
	30	±20	100	SSM5N15FE ▲1	SSM6N15FE ▲1	SSM5N15FU ▲1	**SSM6N15FU** ▲1		SSM3K15FU x 2	0.8	1.5	4	7	2.5
	30	±20	100		SSM6N44FE ▲1		SSM6N44FU ▲1		SSM3K44FS x 2	0.8	1.5	4.0	7.0	2.5
	30	±20	400				SSM6N09FU ▲1		SSM3K09FU x 2	1.1	1.8	0.8	1.2	4
	50	10	50				HN1K04FU ▲1		2SK1827 x 2	0.8	2.5	20	50	4
	50	±7	100				SSM6N17FU ▲1		SSM3K17FU x 2	0.9	1.5	22	40	2.5
	60	±20	200				**SSM6N7002FU** ▲1		SSM3K7002FU x 2	1.0	2.5	2.2	3.3	4.5
	60	±20	200				SSM6N7002AFU ▲1		SSM3K7002AFU x 2	1.0	2.5	1.8	3.3	4.5
	60	±20	200				SSM6N7002BFU ▲1		SSM3K7002BF x 2	1.0	3.1	2.1	3.3	4.5
P-ch x 2	−20	±10	−100	SSM5P16FE ▲2	SSM6P16FE ▲2	SSM5P16FU ▲2	SSM6P16FU ▲2		SSM3J16FU x 2	−0.6	−1.1	18	45	−1.5
	−20	±10	−100		SSM6P35FE ▲2		SSM6P35FU ▲2		SSM3J35FU x 2	−0.4	−1.0	11	44	−1.2
	−20	±8	−330		SSM6P36FE ▲2 *			SSM6P36TU ▲2 *	SSM3J36TU x 2	−0.3	−1.0	2.23	3.6	−1.5
	−20	±12	−200			SSM5P05FU ▲2	SSM6P05FU ▲2		SSM3J05FU x 2	−0.6	−1.1	3.2	4	−2.5
	−30	±20	−200				SSM6P09FU ▲2		SSM3J09FU x 2	−1.1	−1.8	3.3	4.2	−4
	−30	±20	−100	SSM5P15FE ▲2	SSM6P15FE ▲2	SSM5P15FU ▲2	SSM6P15FU ▲2		SSM3J15FU x 2	−1.1	−1.7	14	32	−2.5
N-ch + P-ch	20	10	50				**HN1L02FU** ▲3		2SK1829	0.5	1.5	20	40	2.5
	−20	−7	−50						+ 2SJ346	−0.5	−1.5	20	40	−2.5
	50	10	50				HN1L03FU ▲3		2SK1827	0.8	2.5	20	50	4
	−20	−7	−50						+ 2SJ346	−0.5	−1.5	20	40	−2.5
	20	±10	100		SSM6L16FE ▲3				SSM3K16FS	0.6	1.1	5.2	15	1.5
	−20	±10	−100						SSM3J16FS	−0.6	−1.1	18	45	−1.5
	20	±10	180		SSM6L35FE ▲3		SSM6L35FU ▲3		SSM3K35FU	0.4	1.0	5	20	1.2
	−20	±10	−100						+ SSM3J35FU	−0.4	−1.0	11	4.4	−1.2
	20	±10	500		SSM6L36FE ▲3 *			SSM6L36TU ▲3 *	SSM3K36TU	0.35	1.0	0.95	1.52	1.5
	−20	±8	−330						+ SSM3J36TU	−0.3	−1.0	2.23	3.6	−1.5
	20	±12	400				SSM6L05FU ▲3		SSM3K05FU	0.6	1.1	0.85	1.2	2.5
	−20	±12	−200						SSM3J05FU	−0.6	−1.1	3.2	4	−2.5
	30	±20	400				SSM6L09FU ▲3		SSM3K09FU	1.1	1.8	0.8	1.2	4
	−30	±20	−200						SSM3J09FU	−1.1	−1.8	3.3	4.2	−4

★: Internal 1-MΩ resistor (R_{GS}) *: New product

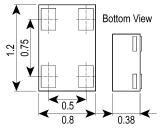
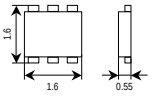
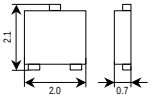
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

♦Internal Connections

Number of Pins	▲1	▲2	▲3	▲4
5-pin ESV/USV				
6-pin ES6/US6/UF6				

♦The internal connection diagrams only show the general configurations of the circuits.

$V_{DSS} \leq 60$ V (Small-Signal MOSFETs/Power MOSFETs) (N-ch MOSFETs, Complementary N-ch/P-ch MOSFETs)

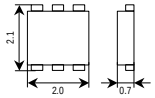
Package	Polarity	Part Number	V_{DSS} (V)	V_{GS} (V)	I_D (A)	$R_{DS(ON)}$ Max (mΩ)				Ciss (pF)	Internal FETs	Internal Connections
						V_{GS} = 1.5 V	V_{GS} = 1.8 V	V_{GS} = 2.5 V	V_{GS} = 4.0 V			
CST4  (mm)	N-ch	SSM4K27CT	20	±12	0.5	—	390	260	205 (@4 V)	174	—	—
ES6  (mm)	N-ch	SSM6K211FE *	20	±10	3.2	118	82	59	47	510	—	—
		SSM6K203FE	20	±10	2.8	153	106	76	61	400	—	—
		SSM6K202FE	30	±12	2.3	—	145	101	85	270	—	—
		SSM6K204FE	20	±10	2.0	307	214	164	126	195	—	—
		SSM6K208FE	30	±12	1.9	—	296	177	133	123	—	—
		SSM6K25FE	20	±12	0.5	—	395	190	145	268	—	—
		SSM6K24FE	30	±12	0.5	—	—	180	145	245	—	—
		SSM6K22FE	20	±12	1.4	—	—	230	170	125	—	—
		SSM6K210FE	30	±20	1.4	—	—	—	371	57	—	—
		SSM6K30FE	20	±20	1.2	—	—	—	420	60	—	—
		SSM6K31FE	20	±20	1.2	—	—	—	540	36	—	—
		SSM6N42FE	20	±10	1.5	630	455	337	252	95	—	—
UFM  (mm)	N-ch	SSM3K123TU	20	±10	4.2	66	43	32	28	1010	—	—
		SSM3K121TU	20	±10	3.2	140	93	63	48	400	—	—
		SSM3K104TU	20	±12	3.0	—	110	74	56	320	—	—
		SSM3K119TU	30	±12	2.5	—	134	90	74	270	—	—
		SSM3K102TU	20	±12	2.6	—	154	99	71	268	—	—
		SSM3K116TU	30	±12	2.2	—	—	135	100	245	—	—
		SSM3K122TU	20	±10	2.0	304	211	161	123	195	—	—
		SSM3K101TU	20	±12	2.2	—	230	138	103	125	—	—
		SSM3K127TU	30	±12	2.0	—	286	167	123	123	—	—
		SSM3K36TU	20	±10	0.5	1.52 Ω	1.14 Ω	0.85 Ω	0.66Ω (@4.5 V)	46	—	—
		SSM3K131TU	30	±20	6.0	—	—	—	41.5 (@4.5 V)	450	—	—
		SSM3K124TU	30	±20	2.4	—	—	—	120	180	—	—
		SSM3K105TU	30	±20	2.1	—	—	—	200	102	—	—
		SSM3K107TU	20	±20	1.5	—	—	—	410	60	—	—
		SSM3K128TU	30	±20	1.5	—	—	—	360	57	—	—
		SSM3K106TU	20	±20	1.2	—	—	—	530	36	—	—

△: Complementary N-ch/P-ch MOSFETs

*: New product

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

$V_{DSS} \leq 60$ V (Small-Signal MOSFETs/Power MOSFETs) (N-ch MOSFETs, Complementary N-ch/P-ch MOSFETs) (Continued)

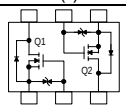
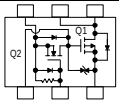
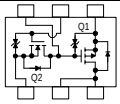
Package	Polarity	Part Number	V_{DSS} (V)	V_{GS} (V)	I_D (A)	$R_{DS(ON)}$ Max (mΩ) V_{GS} = 1.5 V	V_{GS} = 1.8 V	V_{GS} = 2.5 V	V_{GS} = 4.0 V	Ciss (pF)	Internal FETs	Internal Connections
UF6  (mm)	N-ch	SSM6K403TU	20	±10	4.2	66	43	32	28	1050	—	—
		SSM6K18TU	20	±12	4.0	—	—	54	40	1100	—	—
		SSM6K404TU	20	±10	3.0	147	100	70	55	400	—	—
		SSM6K405TU	20	±10	2.0	307	214	164	126	195	—	—
		SSM6K406TU	30	±20	4.4	—	—	—	38.5 (@4.5 V)	490	—	—
		SSM6K34TU	30	±20	3.0	—	—	—	77 (@4.5 V)	470	—	—
		SSM6K32TU	60	±20	2.0	—	—	—	440	140	—	—
		SSM6K407TU #	60	±20	2.0	—	—	—	440	150	—	—
	N-ch x 2	SSM6N39TU	20	±10	1.6	247	190	139	119	260	—	(1)
		SSM6N29TU	20	±12	0.8	—	235	178	143	268	SSM3K102TU x 2	(1)
		SSM6N25TU	20	±12	0.5	—	395	190	145	268	SSM6K25FE x 2	(1)
		SSM6N24TU	30	±12	0.5	—	—	180	145	245	SSM6K24FE x 2	(1)
		SSM6N36TU	20	±10	0.5	1520	1140	850	660 (@4.5 V)	46	SSM3K36TU x 2	(1)
		SSM6N40TU	30	±20	1.6	—	—	—	182	180	—	(1)
	N-ch + P-ch	SSM6L39TU △	20	±10	1.6	247	190	139	119	265	SSM6N39TU	(1)
			−20	±8	−1.5	—	430	294	213	250	+ SSM6P39TU	(1)
		SSM6L13TU △	20	±12	0.8	—	235	178	143	268	SSM3K102TU	(1)
			−20	±8	−0.8	—	460	306	234	250	+ SSM3J108TU	(1)
		SSM6L10TU △	20	±12	0.5	—	395	190	145	268	SSM6K25FE	(1)
			−20	±8	−0.5	—	980	330	230	250	+ SSM6J26FE	(1)
		SSM6L11TU △	20	±12	0.5	—	395	190	145	268	SSM6K25FE	(1)
			−20	±12	−0.5	—	—	430	260	218	+ SSM6J25FE	(1)
		SSM6L12TU △	30	±12	0.5	—	—	180	145	245	SSM6K24FE	(1)
			−20	±12	−0.5	—	—	430	260	218	+ SSM6J25FE	(1)
		SSM6L36TU △	20	±10	0.5	1520	1140	850	660 (@4.5 V)	46	SSM3K36TU	(1)
			−20	±8	−0.33	3600	2700	1600 (@2.8 V)	1310 (@4.5 V)	43	+ SSM3J36TU	(1)
		SSM6L40TU △	30	±20	1.6	—	—	—	182	180	SSM6N40TU	(1)
			−30	±20	−1.4	—	—	—	403	120	+ SSM6P40TU	(1)
	N-ch + P-ch	SSM6E03TU △	20	±10	0.1	15000	—	4000	3000	9.3	SSM3K16FU	(2)
			−20	±8	−1.8	—	320	186	130	335	SSM3J109TU	(2)
		SSM6E02TU △	20	±10	0.1	15 Ω	—	4.0 Ω	3.0 Ω	9.3	SSM3K16FU	(3)
			−20	±8	−1.8	364	204	136	—	568	—	(3)
		SSM6E01TU △	20	±10	0.05	—	—	10000	—	11	SSM3K04FE	(3)
			−12	±12	−1	—	—	240	160	310	—	(3)

△: Complementary N-ch/P-ch MOSFETs

#: High ESD protection

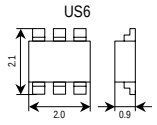
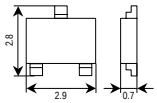
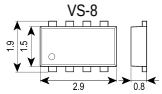
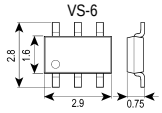
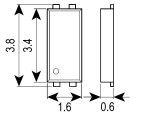
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

♦Internal Connections

(1)	(2)	(3)
		

♦The internal connection diagrams only show the general configurations of the circuits.

$V_{DSS} \leq 60$ V (Small-Signal MOSFETs/Power MOSFETs) (N-ch MOSFETs, Complementary N-ch/P-ch MOSFETs) (Continued)

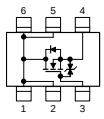
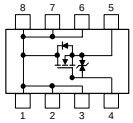
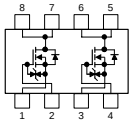
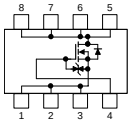
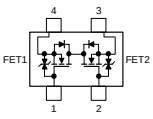
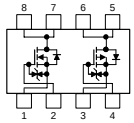
Package	Polarity	Part Number	V_{DSS} (V)	V_{GSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (mΩ)							Ciss (pF)	Qg (nC) (typ.)	Internal Connections
							V_{GS} = 1.5 V	V_{GS} = 1.8 V	V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4 V	V_{GS} = 4.5 V	V_{GS} = 10 V			
US6  (mm)	N-ch	SSM6K08FU	20	±12	1.6	0.3	—	—	210	140	105	—	—	306	—	—
		SSM6K06FU	20	±12	1.1	0.3	—	—	—	210	160	—	—	125	—	—
		SSM6K07FU	30	±20	1.5	0.3	—	—	—	—	220	—	120	102	—	—
TSM  (mm)	N-ch	SSM3K310T	20	±10	5.0	0.7	66	43	—	32	28	—	—	1120	14.8	—
		SSM3K309T	20	±12	4.7	0.7	—	47	—	35	31	—	—	1020	—	—
		SSM3K301T	20	±12	3.5	0.7	—	110	—	74	56	—	—	320	4.8	—
		SSM3K01T	30	±10	3.2	1.25	—	—	—	150	120	—	—	152	—	—
		SSM3K02T	30	±10	2.5	1.25	—	—	—	250	200	—	—	115	—	—
		SSM3K316T	30	±12	4.0	1.25	—	131	—	87	—	65	53	270	4.3	—
		SSM3K315T	30	±20	6.0	1.25	—	—	—	—	—	41.5	27.6	450	10.1	—
		SSM3K14T	30	±20	4.0	1.25	—	—	—	—	67	57	39	460	5	—
		SSM3K320T	30	±20	4.2	1.4	—	—	—	—	—	77	50	190	4.6	—
		SSM3K303T	30	±20	2.9	0.7	—	—	—	—	120	—	83	180	3.3	—
		SSM3K318T *	60	±20	2.5	0.7	—	—	—	—	—	145	107	235	7	—
VS-8  (mm)	N-ch Single	TPCF8002	30	±20	6	2.5	—	—	—	—	—	31	23	—	12	(2)
	N-ch Dual	TPCF8201	20	±12	3	1.35	—	—	100	66	—	49	—	—	7.5	(3)
	N-ch + P-ch	TPCF8402 △	30/−30	±20/±20	4/−3.2	1.35	—	—	—	—	77/105	—	50/72	—	10/14	(6)
VS-6  (mm)	N-ch Single	**TPC6004**	20	±12	6	2.2	—	—	37	32	—	24	—	—	17	(1)
		TPC6007-H	30	±20	5	2.2	—	—	—	—	—	79	54	—	4.6	(1)
		TPC6011	30	±20	6	2.2	—	—	—	—	—	32	21	—	14	(1)
		TPC6005	30	±12	6	2.2	—	—	41	35	—	28	—	—	19	(1)
		TPC6006-H	40	±20	3.9	2.2	—	—	—	—	—	100	75	—	4.4	(1)
	N-ch Single	TPCP8006	20	±12	9.1	1.68	—	—	—	13.7	—	10	—	—	22	(4)
		TPCP8001-H	30	±20	7.2	1.68	—	—	—	—	—	25	16	—	11	(4)
		TPCP8004	30	±20	8.3	1.68	—	—	—	—	—	14	8.5	—	26	(4)
		TPCP8005-H	30	±20	11	1.68	—	—	—	—	—	15.7	12.9	—	20	(4)
	N-ch Dual	**TPCP8201**	30	±20	4.2	1.48	—	—	—	—	—	77	50	—	10	(3)
		TPCP8202	30	±12	5.5	1.48	—	—	—	39	—	23	—	—	28	(3)
		TPCP8203	40	±20	4.7	1.48	—	—	—	—	—	60	40	—	16	(3)
	N-ch + P-ch	**TPCP8402** △	30/−30	±20/±20	4.2/−3.4	1.48	—	—	—	—	—	77/105	50/72	—	10/14	(6)
		TPCP8404 △	30/−30	±20/±20	4/−4	1.48	—	—	—	—	—	100/100	50/50	—	4.6/13	(6)
		TPCP8403 △	40/−40	±20/±20	4.7/−3.4	1.48	—	—	—	—	—	60/105	40/70	—	16/15	(6)
STP2  (mm)	N-ch Dual	TPCT4203	20	±12	6	1.47	—	—	—	49	32	31	—	—	12	(5)
		TPCT4204	30	±12	6	1.47	—	—	—	52	39	38	—	—	12	(5)

△: Complementary N-ch/P-ch MOSFETs

*: New product

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

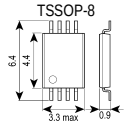
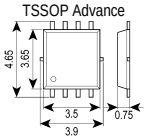
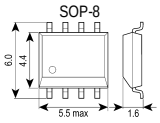
♦Internal Connections

(1)	(2)	(3)	(4)	(5)	(6)
					

Note: Some MOSFETs do not have a Zener diode between gate and source.

♦The internal connection diagrams only show the general configurations of the circuits.

$V_{DSS} \leq 60$ V (Small-Signal MOSFETs/Power MOSFETs) (N-ch MOSFETs, Complementary N-ch/P-ch MOSFETs) (Continued)

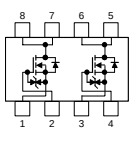
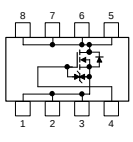
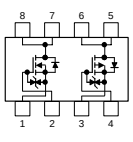
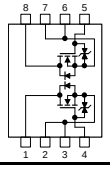
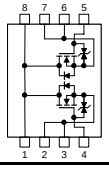
Package	Polarity	Part Number	V_{DSS} (V)	V_{GSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω)					Qg (nC)	Internal Connections
							V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4 V	V_{GS} = 4.5 V	V_{GS} = 10 V	(typ.)	
 TSSOP-8 (mm)	N-ch Dual	**TPCS8209**	20	±12	5	1.1	—	0.04	0.03	—	—	15	(4)
		TPCS8210 ◎	20	±12	5	1.1	—	0.04	0.03	—	—	15	(5)
		TPCS8204	20	±12	6	1.1	—	0.022	0.017	—	—	22	(4)
		TPCS8208 ◎	20	±12	6	1.1	—	0.022	0.017	—	—	22	(5)
		TPCS8211	20	±12	6	1.1	—	0.029	0.024	—	—	20	(4)
		TPCS8212 ◎	20	±12	6	1.1	—	0.029	0.024	—	—	20	(5)
		TPCS8213	20	±12	6	1.1	0.018	0.013	—	—	—	49	(4)
		TPCS8214	30	±12	6	1.1	—	0.0185	0.0135	0.013	—	42	(4)
 TSSOP Advance (mm)	N-ch Single	**TPCM8001-H**	30	±20	20	30	—	—	—	0.014	0.0095	19	(2)
		TPCM8003-H	30	±20	21	30	—	—	—	0.0157	0.0129	21	(2)
		TPCM8004-H	30	±20	24	30	—	—	—	0.0134	0.0110	21	(2)
		TPCM8006	30	±20	25	30	—	—	—	0.0135	0.007	26	(2)
		TPCM8002-H	30	±20	30	30	—	—	—	0.0082	0.0062	34	(2)
 SOP-8 (mm)	N-ch Single	**TPC8014**	30	±20	11	1.9	—	—	0.022	—	0.014	39	(2)
		TPC8021-H	30	±20	11	1.9	—	—	—	0.025	0.017	11	(2)
		TPC8025	30	±20	11	1.9	—	—	—	0.0145	0.009	26	(2)
		TPC8030	30	±25	11	1.9	—	—	—	0.017	0.009	24	(2)
		TPC8031-H	30	±20	11	1.9	—	—	—	0.0161	0.0133	21	(2)
		TPC8037-H	30	±20	12	1.9	—	—	—	0.0139	0.0114	21	(2)
		TPC8038-H	30	±20	12	1.9	—	—	—	0.0139	0.0114	21	(2)
		TPC8020-H	30	±20	13	1.9	—	—	—	0.013	0.009	23	(2)
		TPC8024-H	30	±20	13	1.9	—	—	—	0.013	0.009	23	(2)
		TPC8026	30	±20	13	1.9	—	—	—	0.01	0.0066	42	(2)
		TPC8040-H	30	±20	13	1.9	—	—	—	0.0111	0.0097	24	(2)
		TPC8041	30	±20	13	1.9	—	—	—	0.0135	0.007	27	(2)
		TPC8017-H	30	±20	15	1.9	—	—	—	0.0095	0.0066	25	(2)
		TPC8032-H	30	±20	15	1.9	—	—	—	0.0086	0.0065	33	(2)
		TPC8033-H	30	±20	17	1.9	—	—	—	0.0072	0.0053	42	(2)
		TPC8039-H	30	±20	17	1.9	—	—	—	0.0069	0.0060	36	(2)
		TPC8018-H	30	±20	18	1.9	—	—	—	0.0062	0.0046	38	(2)
		TPC8027	30	±20	18	1.9	—	—	—	0.0055	0.0027	113	(2)
		TPC8028	30	±20	18	1.9	—	—	—	0.008	0.0043	45	(2)
		TPC8029	30	±20	18	1.9	—	—	—	0.007	0.0038	49	(2)
		TPC8035-H	30	±20	18	1.9	—	—	—	0.0036	0.0032	82	(2)
		TPC8036-H	30	±20	18	1.9	—	—	—	0.0051	0.0045	49	(2)
		TPC8042	30	±20	18	1.9	—	—	—	0.0065	0.0034	56	(2)
		TPC8034-H	30	±20	20	1.9	—	—	—	0.0045	0.0035	68	(2)
		TPC8022-H	40	±20	7.5	1.9	—	—	—	0.035	0.027	11	(2)
	N-ch Dual	**TPC8208**	20	±12	5	1.5	—	0.07	0.05	—	—	9.5	(1)
		TPC8207	20	±12	6	1.5	—	0.03	0.02	—	—	22	(1)
		TPC8211	30	±20	5.5	1.5	—	—	—	0.044	0.036	25	(1)
		TPC8212-H	30	±20	6	1.5	—	—	—	0.027	0.021	16	(1)
		TPC8216-H	30	±20	6.4	1.5	—	—	—	0.023	0.020	14	(1)
		TPC8210	30	±20	8	1.5	—	—	—	0.02	0.015	75	(1)
		TPC8213-H	60	±20	5	1.5	—	—	—	0.056	0.050	6	(1)
	N-ch + P-ch	**TPC8405** △	30/−30	±20/±20	6/−4.5	1.5	—	—	—	0.033/0.042	0.026/0.033	27/40	(3)
		TPC8406-H △	40/−40	±20/±20	6.5/−6.5	1.5	—	—	—	0.035/0.037	0.027/0.030	11/27	(3)

◎: Common-drain type

△: Complementary N-ch/P-ch MOSFETs

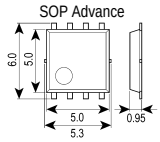
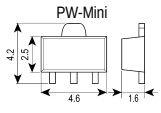
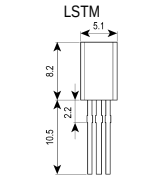
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

♦Internal Connections

(1)	(2)	(3)	(4)	(5)
				

Note: Some MOSFETs do not have a Zener diode between gate and source.

♦The internal connection diagrams only show the general configurations of the circuits.

Package	Polarity	Part Number	V_{DSS} (V)	V_{GSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω)					Qg (nC) (typ.)	Internal Connections
							V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4 V	V_{GS} = 4.5 V	V_{GS} = 10 V		
 SOP Advance (mm)	N-ch Single	**TPCA8011-H**	20	±12	40	45	—	0.0075	—	0.0035	—	32	(1)
		TPCA8023-H	30	±20	21	30	—	—	—	0.0157	0.0129	21	(1)
		TPCA8040-H	30	±20	23	30	—	—	—	0.0108	0.0094	23	(1)
		TPCA8030-H	30	±20	24	30	—	—	—	0.0134	0.0110	21	(1)
		TPCA8031-H	30	±20	24	30	—	—	—	0.0134	0.0110	21	(1)
		TPCA8005-H	30	±20	27	45	—	—	—	0.013	0.009	24	(1)
		TPCA8021-H	30	±20	27	45	—	—	—	0.013	0.009	23	(1)
		TPCA8018-H	30	±20	30	45	—	—	—	0.0082	0.0062	34	(1)
		TPCA8039-H	30	±20	34	45	—	—	—	0.0066	0.0057	36	(1)
		TPCA8003-H	30	±20	35	45	—	—	—	0.0095	0.0066	25	(1)
		TPCA8024	30	±20	35	45	—	—	—	0.0078	0.0043	45	(1)
		TPCA8036-H	30	±20	38	45	—	—	—	0.0048	0.0042	50	(1)
		TPCA8004-H	30	±20	40	45	—	—	—	0.0062	0.0046	37	(1)
		TPCA8012-H	30	±20	40	45	—	—	—	0.0068	0.0049	42	(1)
		TPCA8025	30	±20	40	45	—	—	—	0.006	0.0035	49	(1)
		TPCA8019-H	30	±20	45	45	—	—	—	0.0041	0.0031	66	(1)
		TPCA8026	30	±20	45	45	—	—	—	0.0045	0.0022	113	(1)
		TPCA8042	30	±20	45	45	—	—	—	0.0057	0.0033	56	(1)
		TPCA8028-H	30	±20	50	45	—	—	—	0.0032	0.0028	88	(1)
		TPCA8020-H	40	±20	7.5	30	—	—	—	0.035	0.027	11	(1)
		TPCA8014-H	40	±20	30	45	—	—	—	0.014	0.009	22	(1)
		TPCA8027-H	40	±20	30	45	—	—	—	—	0.01	23	(1)
		TPCA8015-H	40	±20	35	45	—	—	—	0.0079	0.0054	37	(1)
		TPCA8016-H	60	±20	25	45	—	—	—	0.026	0.021	22	(1)
 PW-Mini (mm)	N-ch Single	2SK2615	60	—	2	1.5	—	—	0.44	—	0.3	6	
		2SK3658	60	—	2	1.5	—	—	0.44	—	0.3	5.0	
 LSTM (mm)	N-ch Single	2SK2989	50	—	5	0.9	—	—	0.33	—	0.15	6.5	
		2SK2961	60	—	2	0.9	—	—	0.38	—	0.27	5.8	

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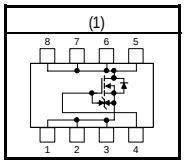
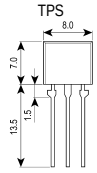
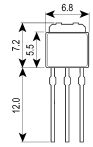
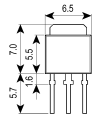
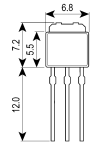
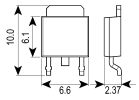
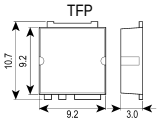
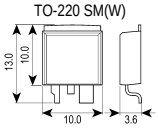
♦Internal Connections



Note: Some MOSFETs do not have a Zener diode between gate and source.

♦The internal connection diagrams only show the general configurations of the circuits.

$V_{DSS} \leq 60$ V (Small-Signal MOSFETs/Power MOSFETs) (N-ch MOSFETs, Complementary N-ch/P-ch MOSFETs) (Continued)

Package	Polarity	Part Number	V_{DSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω)					Qg (nC) (typ.)	Internal Connections
						V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4 V	V_{GS} = 4.5 V	V_{GS} = 10 V		
TPS  (mm)	N-ch Single	2SK2229	60	5	1.3	—	—	0.3	—	0.16	12	
PW-Mold  (mm)	N-ch Single	2SK2493	16	5	20	—	0.12	0.1	—	—	23	
		2SK4033	60	5	20	—	—	0.15	—	0.1	15	
New PW-Mold2  (mm)	N-ch Single	2SK4017	60	5	20	—	—	0.15	—	0.1	15	
DP  (mm)	N-ch Single	2SK2614	50	20	40	—	—	0.08	—	0.046	25	
		2SK2782	60	20	40	—	—	0.09	—	0.055	25	
D-PAK  (mm)	N-ch Single	TK40P03M1	30	40	40	—	—	—	0.0144	0.0108	9.4	
		TK50P03M1	30	50	60	—	—	—	0.0098	0.0075	13.3	
		TK40P04M1	40	40	60	—	—	—	0.0134	0.0103	29	
		TK50P04M1	40	50	60	—	—	—	0.0102	0.0087	38	
TFP  (mm)	N-ch Single	2SK3843	40	75	125	—	—	—	0.008	0.0035	210	
		TK80X04K3	40	80	125	—	—	—	—	0.0035	100	
		2SK3440	60	50	125	—	—	—	—	0.008	55	
		2SK3842	60	75	125	—	—	—	—	0.0058	196	
		2SK4034	60	75	125	—	—	—	0.01	0.0058	196	
TO-220 SM(W)  (mm)	N-ch Single	TK100F04K3	40	100	200	—	—	—	—	0.003	102	
		TK150F04K3	40	150	300	—	—	—	—	0.0021	166	
		TK100F06K3	60	100	200	—	—	—	—	0.005	98	
		TK130F06K3	60	130	300	—	—	—	—	0.0034	170	

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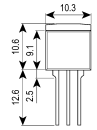
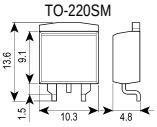
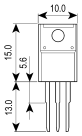
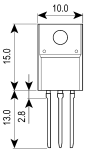
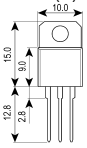
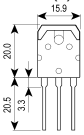
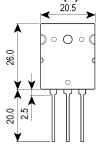
Package	Polarity	Part Number	V_{DSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω)					Qg (nC) (typ.)	Internal Connections
						V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4 V	V_{GS} = 4.5 V	V_{GS} = 10 V		
TO-220FL  (mm)	N-ch Single	2SK3847	40	32	30	—	—	—	0.028	0.018	40	
		2SK3051	50	45	40	—	—	—	—	0.03	36	
		2SK2311	60	25	40	—	—	0.08	—	0.046	38	
TO-220SM  (mm)		2SK2266	60	45	65	—	—	0.055	—	0.03	60	
		2SK2376	60	45	100	—	—	0.025	—	0.017	110	
TO-220NIS  (mm)	N-ch Single	2SK3846	40	26	25	—	—	—	0.028	0.018	40	
		2SK2507	50	25	30	—	—	0.08	—	0.046	25	
		2SK2886	50	45	40	—	—	0.036	—	0.02	66	
		2SK2232	60	25	35	—	—	0.08	—	0.046	38	
		2SK3662	60	35	35	—	—	0.019	—	0.0125	91	
		2SK2385	60	36	40	—	—	0.055	—	0.03	60	
		2SK3844	60	45	45	—	—	—	—	0.0058	196	
TO-220SIS  (mm)	N-ch Single	TK30A06J3A	60	30	25	—	—	—	0.035	0.026	36	
		TK70A06J1	60	70	45	—	—	—	0.0076	0.0064	87	
TO-220(W)  (mm)	N-ch Single	TK70D06J1	60	70	140	—	—	—	0.0076	0.0064	87	
TO-3P(N)  (mm)	N-ch Single	2SK3506	30	45	100	—	—	—	—	0.02	39	
		TK70J04J3	40	70	150	—	—	—	0.0083	0.0038	210	
		2SK2550	50	45	100	—	—	—	—	0.03	36	
		2SK2744	50	45	125	—	—	—	—	0.02	68	
		2SK2551	50	50	150	—	—	—	—	0.011	130	
		2SK2745	50	50	150	—	—	0.016	—	0.0095	130	
		2SK3129	50	60	150	—	—	—	—	0.007	135	
		2SK2233	60	45	100	—	—	0.055	—	0.03	60	
		2SK2398	60	45	100	—	—	—	—	0.03	60	
		2SK2173	60	50	125	—	—	0.025	—	0.017	110	
		2SK2445	60	50	125	—	—	—	—	0.018	110	
		2SK2313	60	60	150	—	—	0.015	—	0.011	170	
		2SK3845	60	70	125	—	—	—	—	0.0058	196	
TO-3P(L)  (mm)	N-ch Single	2SK2267	60	60	150	—	—	0.015	—	0.011	170	

- The products shown in bold are also manufactured in offshore fabs.
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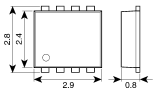
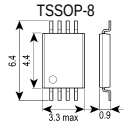
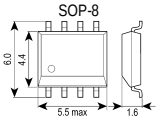
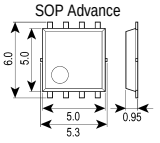
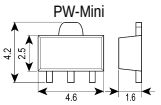
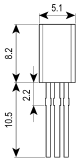
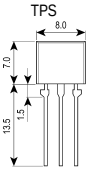
60 V < V_{DSS} ≤ 250 V (Power MOSFETs) (N-ch MOSFETs)

Package	Polarity	Part Number	V_{DSS} (V)	V_{GSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω)							Qg (nC) (typ.)	Internal Connections
							V_{GS} = 1.8 V	V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4 V	V_{GS} = 4.5 V	V_{GS} = 7 V	V_{GS} = 10 V		
PS-8  (mm)	N-ch Single	TPCP8003-H	100	±20	2.2	1.68	—	—	—	—	0.19	—	0.18	7.5	(2)
TSSOP-8  (mm)	N-ch Single	TPCS8009-H	150	±20	2.1	1.5	—	—	—	—	—	—	0.35	10	(2)
		TPCS8004	200	±20	1.3	1.5	—	—	—	—	—	—	0.8	12	(3)
		TPCS8007-H	200	±20	1.9	1.5	—	—	—	—	—	—	0.45	10	(2)
		TPCS8006	250	±20	1.1	1.5	—	—	—	—	—	—	1.0	11	(2)
		TPCS8008-H	250	±20	1.7	1.5	—	—	—	—	—	—	0.58	10	(2)
SOP-8  (mm)	N-ch Single	TPC8012-H	200	±20	1.8	1.9	—	—	—	—	—	—	0.4	11	(2)
	N-ch Dual	TPC8214-H	100	±20	2.2	1.5	—	—	—	—	0.19	—	0.180	7.5	(1)
SOP Advance  (mm)	N-ch Single	**TPCA8006-H**	100	±20	18	45	—	—	—	—	—	—	0.067	12	(2)
		TPCA8022-H	100	±20	22	45	—	—	—	—	—	—	0.026	38	(2)
		TPCA8009-H	150	±20	7	45	—	—	—	—	—	—	0.35	10	(2)
		TPCA8010-H	200	±20	5.5	45	—	—	—	—	—	—	0.45	10	(2)
		TPCA8008-H	250	±20	4	45	—	—	—	—	—	—	0.58	10	(2)
PW-Mini  (mm)	N-ch Single	2SK2963	100	—	1	1.5	—	—	—	0.95	—	—	0.7	6.3	
		2SK2992	200	—	1	1.5	—	—	—	—	—	—	3.5	3	
LSTM  (mm)	N-ch Single	**2SK2962**	100	—	1	0.9	—	—	—	0.95	—	—	0.7	6.3	
		2SK3670	150	—	0.67	0.9	—	—	—	1.7	—	—	—	4.6	
TPS  (mm)	N-ch Single	2SK2200	100	—	3	1.3	—	—	—	0.45	—	—	0.35	13.5	
		2SK2400	100	—	5	1.3	—	—	—	0.3	—	—	0.23	22	
		2SK2835	200	—	5	1.3	—	—	—	—	—	—	0.8	10	

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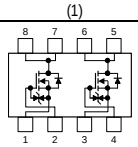
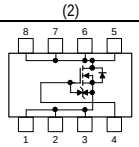
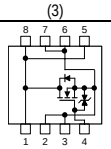
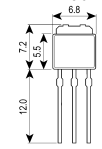
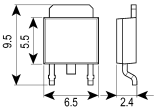
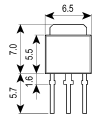
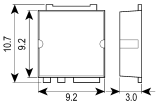
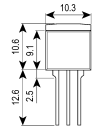
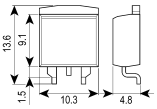
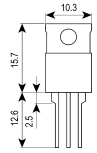
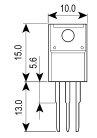
♦Internal Connections

(1)	(2)	(3)
		

Note: Some MOSFETs do not have a Zener diode between gate and source.

♦The internal connection diagrams only show the general configurations of the circuits.

Package	Polarity	Part Number	V_{DSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω)							Qg (nC) (typ.)	Internal Connections
						V_{GS} = 1.8 V	V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4 V	V_{GS} = 4.5 V	V_{GS} = 7 V	V_{GS} = 10 V		
PW-Mold  (mm)	N-ch Single	2SK2201	100	3	20	—	—	—	0.45	—	—	0.35	13.5	
		2SK2399	100	5	20	—	—	—	0.3	—	—	0.23	22	
		2SK3669	100	10	20	—	—	—	—	—	—	0.125	8.0	
		2SK3205	150	5	20	—	—	—	0.75	—	—	0.5	12	
		2SK2162	180	1	20	—	—	—	—	—	—	5	—	
		2SK2920	200	5	20	—	—	—	—	—	—	0.8	10	
		2SK3462	250	3	20	—	—	—	—	—	—	1.7	12	
		2SK3342	250	4.5	20	—	—	—	—	—	—	1	10	
New PW-Mold  (mm)	N-ch Single	TK05N10J1	100	5	20	—	—	—	—	—	—	0.225	6.6	
New PW-Mold2  (mm)	N-ch Single	2SK4018	100	3	20	—	—	—	0.45	—	—	0.35	13.5	
		2SK4019	100	5	20	—	—	—	0.3	—	—	0.23	22	
		2SK4020	200	5	20	—	—	—	—	—	—	0.8	10	
		2SK4022	250	3	20	—	—	—	—	—	—	1.7	12	
		2SK4021	250	4.5	20	—	—	—	—	—	—	1	10	
TFP  (mm)	N-ch Single	2SK3387	150	18	100	—	—	—	—	—	—	0.12	57	
		2SK3443	150	30	125	—	—	—	—	—	—	0.055	45	
		TK50X15J1	150	50	125	—	—	—	—	—	—	0.03	75	
		2SK3444	200	25	125	—	—	—	—	—	—	0.082	44	
		2SK3388	250	20	125	—	—	—	—	—	—	0.105	100	
		2SK3445	250	20	125	—	—	—	—	—	—	0.105	45	
TO-220FL  (mm)	N-ch Single	2SK2789	100	27	60	—	—	—	0.13	—	—	0.085	50	
		2SK2401	200	15	75	—	—	—	—	—	—	0.18	40	
		2SK3625	200	25	125	—	—	—	—	—	—	0.082	44	
TO-220SM  (mm)		2SK2598	250	13	60	—	—	—	—	—	—	0.25	40	
		2SK2993	250	20	100	—	—	—	—	—	—	0.105	100	
TO-220AB  (mm)	N-ch Single	2SK2314	100	27	75	—	—	—	0.13	—	—	0.085	50	
		2SK2914	250	7.5	20	—	—	—	—	—	—	0.5	20	
TO-220NIS  (mm)	N-ch Single	**2SK2391**	100	20	35	—	—	—	0.13	—	—	0.085	50	
		2SK2882	150	18	45	—	—	—	0.18	—	—	0.12	57	
		2SK2013	180	1	25	—	—	—	—	—	—	5	—	
		2SK2381	200	5	25	—	—	—	—	—	—	0.8	10	
		2SK2350	200	8.5	30	—	—	—	—	—	—	0.4	17	
		2SK2965	200	11	35	—	—	—	—	—	—	0.26	30	
		2SK2382	200	15	45	—	—	—	—	—	—	0.18	40	
		2SK2417	250	7.5	30	—	—	—	—	—	—	0.5	20	
		2SK2508	250	13	45	—	—	—	—	—	—	0.25	40	
		2SK3994	250	20	45	—	—	—	—	—	—	0.105	45	

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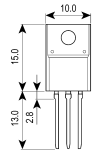
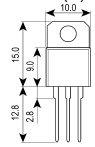
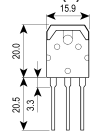
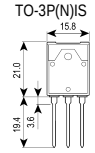
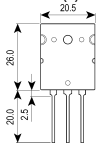
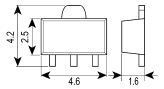
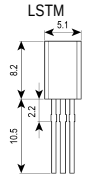
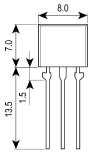
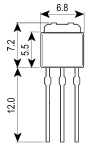
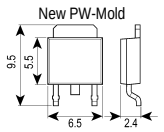
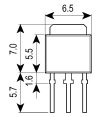
60 V < V_{DSS} ≤ 250 V (Power MOSFETs) (N-ch MOSFETs) (Continued)

Package	Polarity	Part Number	V_{DSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω)							Qg (nC) (typ.)	Internal Connections
						V_{GS} = 1.8 V	V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4 V	V_{GS} = 4.5 V	V_{GS} = 7 V	V_{GS} = 10 V		
TO-220SIS  (mm)	N-ch Single	TK40A08K3	75	40	35	—	—	—	—	—	—	0.009	80	
		TK60A08J1	75	60	45	—	—	—	—	0.0093	—	0.0078	86	
		TK80A08K3	75	80	40	—	—	—	—	—	—	0.0045	175	
		TK25A10K3	100	25	25	—	—	—	—	—	—	40	34	
		TK40A10J1	100	40	40	—	—	—	—	0.017	—	0.015	76	
		TK40A10K3	100	40	40	—	—	—	—	—	—	0.015	85	
		TK55A10J1	100	55	45	—	—	—	—	0.012	—	0.0105	110	
TO-220(W)  (mm)	N-ch Single	TK60D08J1	75	60	140	—	—	—	—	0.0093	—	0.0078	86	
		TK80D08K3	75	80	100	—	—	—	—	—	—	0.0045	175	
		TK40D10J1	100	40	100	—	—	—	—	0.017	—	0.015	76	
		TK55D10J1	100	55	140	—	—	—	—	0.012	—	0.0105	110	
TO-3P(N)  (mm)	N-ch Single	2SK3940	75	70	150	—	—	—	—	—	—	0.007	200	
		2SK1381	100	50	150	—	—	—	0.046	—	—	0.032	88	
		2SK1529	180	10	120	—	—	—	—	—	—	0.83	—	
		2SK3497	180	10	130	—	—	—	—	—	0.15	—	36	
		2SK3176	200	30	150	—	—	—	—	—	—	0.052	125	
		2SK2967	250	30	150	—	—	—	—	—	—	0.068	132	
TO-3P(N)IS  (mm)	N-ch Single	2SK2467	180	9	80	—	—	—	—	—	—	0.83	—	
		2SK2995	250	30	90	—	—	—	—	—	—	0.068	132	
TO-3P(L)  (mm)	N-ch Single	2SK1382	100	60	200	—	—	—	0.029	—	—	0.02	176	
		2SK1530	200	12	150	—	—	—	—	—	—	0.625	—	

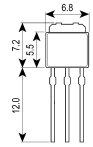
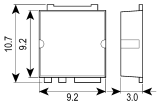
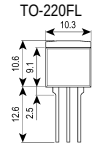
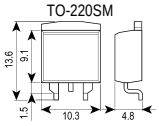
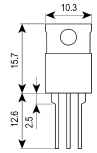
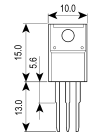
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

250 V < V_{DSS} ≤ 700 V (Power MOSFETs) (N-ch MOSFETs)

Package	Polarity	Part Number	V_{DSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω) V_{GS} = 10 V	Qg (nC) (typ.)	Internal Connections
PW-Mini  (mm)	N-ch Single	2SK3471	500	0.5	1.5	18	3.8	
LSTM  (mm)	N-ch Single	**2SK2998**	500	0.5	0.9	18	3.8	
TPS  (mm)	N-ch Single	2SK3374	450	1	1.3	4.6	5	
		2SK3302	500	0.5	1.3	18	3.8	
		2SK2599	500	2	1.3	3.2	9	
		2SK2846	600	2	1.3	5.0	9	
PW-Mold  (mm)	N-ch Single	2SK3498	400	1	20	5.5	5.7	
		2SK3472	450	1	20	4.6	5	
		2SK3373	500	2	20	3.2	9	
		2SK3371	600	1	20	9.0	9	
		2SK2865	600	2	20	5.0	9	
New PW-Mold  (mm)	N-ch Single	2SK4103	500	5	40	1.5	16	
New PW-Mold2  (mm)	N-ch Single	2SK4023	450	1	20	4.6	5	
		2SK4026	600	1	20	9.0	9	
		2SK4002	600	2	20	5.0	9	
		TK2Q60D	600	2	60	4.3	7	
		2SK4003	600	3	20	2.2	15	

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

250 V < V_{DSS} ≤ 700 V (Power MOSFETs) (N-ch MOSFETs) (Continued)

Package	Polarity	Part Number	V_{DSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω) V_{GS} = 10 V	Qg (nC) (typ.)	Internal Connections
DP  (mm)	N-ch Single	2SK3863	500	5	35	1.5	16	
TFP  (mm)	N-ch Single	2SK3499	400	10	80	0.55	34	
		2SK3544	450	13	100	0.4	34	
		2SK3466	500	5	50	1.5	17	
		2SK3538	500	8	65	0.85	30	
		2SK3398	500	12	100	0.52	45	
		TK12X53D	525	12	150	0.58	25	
		2SK3438	600	10	80	1.0	28	
		TK12X60U	600	12	100	0.4	14	
		TK15X60U	600	15	125	0.3	17	
		TK20X60U	600	20	150	0.19	27	
TO-220FL  (mm)	N-ch Single	2SK2838	400	5.5	40	1.2	17	
		2SK2949	400	10	80	0.55	34	
		2SK3309	450	10	65	0.65	23	
		2SK3403	450	13	100	0.4	34	
		2SK2991	500	5	50	1.5	17	
		2SK3417 #	500	5	50	1.8	17	
TO-220SM  (mm)		2SK2776	500	8	65	0.85	30	
		2SK3068	500	12	100	0.52	45	
		2SK2777	600	6	65	1.25	30	
		2SK3312	600	6	65	1.25	22	
		2SK2889	600	10	100	0.75	45	
		2SK3399	600	10	100	0.75	35	
		2SK3437	600	10	80	1.0	28	
TO-220AB  (mm)	N-ch Single	2SK2841	400	10	80	0.55	34	
		2SK2542	500	8	80	0.85	30	
		2SK3085	600	3.5	75	2.2	20	
		2SK2866	600	10	125	0.75	45	
TO-220NIS  (mm)	N-ch Single	**2SK2679**	400	5.5	35	1.2	17	
		2SK2952	400	8.5	40	0.55	34	
		2SK3310	450	10	40	0.65	23	
		2SK3743	450	13	40	0.4	34	
		2SK3313 #	500	12	40	0.62	45	
		2SK3265	700	10	45	1.0	53	

#: HSD type

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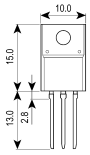
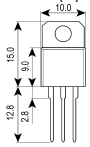
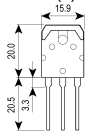
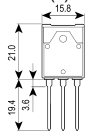
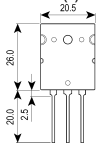
Package	Polarity	Part Number	V_{DSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω) V_{GS} = 10 V	Qg (nC) (typ.)	Internal Connections
TO-220SIS  (mm)	N-ch Single	**2SK3757**	450	2	30	2.45	9	
		2SK3766	450	2	30	2.45	8	
		2SK3869	450	10	40	0.68	28	
		TK13A45D	450	13	45	0.46	25	
		2SK3935	450	17	50	0.25	62	
		TK4A50D	500	4	30	2.0	9	
		2SK3563	500	5	35	1.5	16	
		2SK3868 #	500	5	35	1.7	16	
		TK5A50D	500	5	35	1.5	11	
		TK6A50D	500	6	35	1.4	11	
		TK7A50D	500	7	35	1.22	12	
		2SK3561	500	8	40	0.85	28	
		2SK4042 #	500	8	40	0.97	28	
		TK8A50D	500	8	40	0.85	16	
		TK10A50D	500	10	45	0.72	20	
		TK11A50D	500	11	45	0.6	38	
		2SK3568	500	12	40	0.52	42	
		TK12A50D	500	12	45	0.52	25	
		TK13A50DA	500	12.5	45	0.47	28	
		2SK4012	500	13	45	0.4	50	
		TK13A50D	500	13	45	0.4	32	
		2SK3934	500	15	50	0.3	62	
		TK15A50D	500	15	50	0.3	40	
		TK18A50D	500	18	50	0.27	45	
		TK6A53D	525	6	35	1.3	12	
		TK12A53D	525	12	45	0.58	25	
		TK4A55DA	550	3.5	30	2.45	9	
		TK4A55D	550	4	35	1.88	11	
		TK5A55D	550	5	35	1.7	11	
		TK6A55DA	550	5.5	35	1.48	12	
		TK8A55DA	550	7.5	40	1.07	16	
		TK11A55D	550	11	45	0.63	25	
		TK12A55D	550	12	45	0.57	28	
		TK14A55D	550	14	50	0.37	40	
		2SK3767	600	2	25	4.5	9	
		TK3A60DA	600	2.5	30	2.8	9	
		2SK3567	600	3.5	35	2.2	16	
		TK4A60DA	600	3.5	35	2.2	11	
		TK4A60DB	600	3.7	35	2	11	
		TK4A60D	600	4	35	1.7	12	
		2SK3562	600	6	40	1.25	28	
		2SK3947 #	600	6	40	1.4	28	
		TK6A60D	600	6	40	1.25	16	
		2SK3667	600	7.5	45	1.0	33	
		TK8A60DA	600	7.5	45	1.0	20	
		2SK3569	600	10	45	0.75	42	
		2SK4015 #	600	10	45	0.86	42	
		TK10A60D	600	10	45	0.75	25	
		TK11A60D	600	11	45	0.65	28	
		TK12A60D	600	12	45	0.55	38	
		TK12A60U	600	12	35	0.4	14	
		2SK3797	600	13	50	0.43	62	
		2SK4016 #	600	13	50	0.5	62	
		TK13A60D	600	13	40	0.43	40	
		TK15A60D	600	15	50	0.37	45	
		TK15A60U	600	15	40	0.30	17	
		TK20A60T	600	20	45	0.19	30	
		TK20A60U	600	20	45	0.19	27	
		TK5A65D	650	5	40	1.43	16	
		TK6A65D	650	6	45	1.11	20	
		TK8A65D	650	8	45	0.84	25	
		TK13A65U	650	13	40	0.38	17	

#: HSD type

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

250 V < V_{DSS} ≤ 700 V (Power MOSFETs) (N-ch MOSFETs) (Continued)

Package	Polarity	Part Number	V_{DSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω) V_{GS} = 10 V	Qg (nC) (typ.)	Internal Connections
TO-220(W)  (mm)	N-ch Single	TK12D60U	600	12	144	0.4	14	
		TK15D60U	600	15	170	0.3	17	
		TK20D60T	600	20	190	0.19	30	
		TK20D60U	600	20	190	0.19	27	
TO-3P(N)  (mm)	N-ch Single	2SK3904	450	19	150	0.26	62	
		2SK2601	500	10	125	1.0	30	
		2SK3314 #	500	15	150	0.49	58	
		2SK4107	500	15	150	0.4	48	
		TK15J50D	500	15	210	0.4	32	
		2SK3905	500	17	150	0.31	62	
		2SK4108	500	20	150	0.27	62	
		TK20J50D	500	20	280	0.27	45	
		2SK3907	500	23	150	0.24	60	
		2SK3936 #	500	23	150	0.25	60	
		TK12J55D	550	12	190	0.57	28	
		TK16J55D	550	16	250	0.37	40	
		2SK2602	600	6	125	1.25	30	
		2SK2699	600	12	150	0.65	58	
		TK12J60U	600	12	144	0.4	14	
		2SK3903	600	14	150	0.44	62	
		TK15J60T	600	15	170	0.30	21	
		TK15J60U	600	15	170	0.3	17	
		2SK3906 #	600	20	150	0.33	60	
		2SK3911	600	20	150	0.30	60	
		TK20J60T	600	20	190	0.19	30	
		TK20J60U	600	20	190	0.19	27	
		TK40J60T	600	40	400	0.08	67	
TO-3P(N)IS  (mm)	N-ch Single	2SK2916	500	14	80	0.4	58	
		2SK2917	500	18	90	0.27	80	
		2SK2953	600	15	90	0.4	80	
		2SK3453	700	10	80	1.0	53	
TO-3P(L)  (mm)	N-ch Single	2SK1486	300	32	200	0.095	140	
		2SK1544	500	25	200	0.2	150	
		2SK3131 #	500	50	250	0.11	280	
		2SK3132	500	50	250	0.095	280	

#: HSD type

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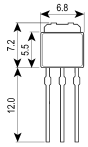
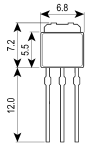
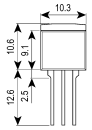
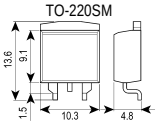
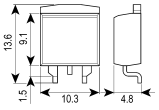
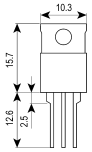
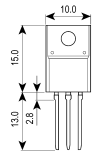
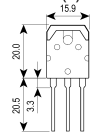
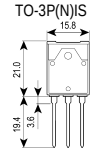
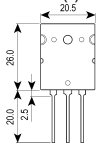
700 V < V_{DSS} (Power MOSFETs) (N-ch MOSFETs)

Package	Polarity	Part Number	V_{DSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω) V_{GS} = 10 V	Qg (nC) (typ.)	Internal Connections
PW-Mold  (mm)	N-ch Single	2SK3301	900	1	20	20	6	
DP  (mm)	N-ch Single	2SK2845	900	1	40	9.0	15	
TO-220FL  (mm)	N-ch Single	2SK2883	800	3	75	3.6	25	
		2SK2884	800	5	100	2.2	34	
TO-220SM  (mm)		2SK1930	1000	4	80	3.8	60	
TO-220SM  (mm)	N-ch Single	**2SK3879**	800	6.5	80	1.7	35	
TO-220AB  (mm)	N-ch Single	2SK2603	800	3	100	3.6	25	
		2SK2733	900	1	60	9.0	15	
		2SK2608	900	3	100	4.3	25	
		2SK1119	1000	4	100	3.8	60	

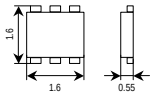
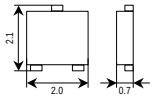
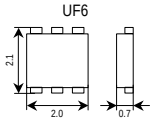
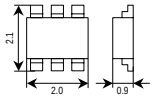
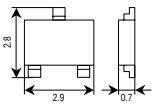
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

700 V < V_{DSS} (Power MOSFETs) (N-ch MOSFETs) (Continued)

Package	Polarity	Part Number	V_{DSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω) V_{GS} = 10 V	Qg (nC) (typ.)	Internal Connections
TO-220SIS  (mm)	N-ch Single	**2SK4013**	800	6	45	1.7	45	
		2SK3566	900	2.5	40	6.4	12	
		2SK3564	900	3	40	4.3	17	
		2SK3798	900	4	40	3.5	26	
		2SK3565	900	5	45	2.5	28	
		2SK3742	900	5	45	2.5	25	
		2SK4014	900	6	45	2.0	45	
		2SK3799	900	8	50	1.3	62	
TO-3P(N)  (mm)	N-ch Single	2SK3633	800	7	150	1.7	35	
		2SK2607	800	9	150	1.2	68	
		2SK2719	900	3	125	4.3	25	
		2SK3700	900	5	150	2.5	28	
		2SK4115	900	7	150	2.0	45	
		2SK3473	900	9	150	1.6	38	
		2SK3878	900	9	150	1.3	62	
		2SK2968	900	10	150	1.25	70	
		2SK4207	900	13	150	0.95	45	
		2SK1359	1000	5	125	3.8	60	
		2SK2613	1000	8	150	1.7	65	
TO-3P(N)IS  (mm)	N-ch Single	2SK3880	800	6.5	80	1.7	35	
		2SK2606	800	8	85	1.2	68	
		2SK2847	900	8	85	1.4	58	
		2SK3017	900	8.5	90	1.25	70	
		2SK1365	1000	7	90	1.8	120	
TO-3P(L)  (mm)	N-ch Single	2SK1489	1000	12	200	1.0	110	

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

$V_{DSS} \leq 250$ V (Small-Signal MOSFETs/Power MOSFETs) (P-ch MOSFETs)

Package	Polarity	Part Number	V_{DSS} (V)	V_{GS} (V)	I_D (A)	$R_{DS(ON)}$ Max (mΩ)						Ciss (pF)	Internal FETs	Internal Connections
						V_{GS} = 1.2 V	V_{GS} = 1.5 V	V_{GS} = 1.8 V	V_{GS} = 2.5 V	V_{GS} = 4.0 V	V_{GS} = 4.5 V			
ES6  (mm)	P-ch	SSM6J212FE **	−20	±8	−3.3	—	108	73.7	45.6	—	43.4	834	—	—
		SSM6J53FE	−20	±8	−1.8	—	364	204	136	—	—	568	—	—
		SSM6J206FE	−20	±8	−2.0	—	—	320	186	130	—	335	—	—
		SSM6J205FE	−20	±8	−0.8	—	—	460	306	234	—	250	—	—
		SSM6J26FE	−20	±8	−0.5	—	—	980	330	230	—	250	—	—
		SSM6J23FE	−12	±8	−1.2	—	—	—	210	160	—	420	—	—
		SSM6J25FE	−20	±12	−0.5	—	—	—	430	260	—	218	—	—
		SSM6J207FE	−30	±20	−1.4	—	—	—	—	491	—	137	—	—
	P-ch + P-ch	SSM6P41FE *	−20	±8	−0.72	—	1040	670	440	—	300	110	—	(1)
UFM  (mm)	P-ch	SSM3J132TU **	−12	±5	−5	100	40.4	28.3	21.4	—	17.8	2700	—	—
		SSM3J130TU *	−20	±8	−4.4	—	63.2	41.1	31.0	—	25.8	1800	—	—
		SSM3J120TU	−20	±8	−4.0	—	140	78	49	38	—	1484	—	—
		SSM3J129TU *	−20	±8	−4.6	—	137	88	62	—	46	640	—	—
		SSM3J115TU	−20	±8	−2.2	—	353	193	125	98	—	568	—	—
		SSM3J110TU	−12	±8	−2.3	—	—	240	145	94	—	550	—	—
		SSM3J109TU	−20	±8	−2.0	—	—	300	172	130	—	335	—	—
		SSM3J114TU *	−20	±8	−1.8	—	526	321	199	149	—	331	—	—
		SSM3J108TU	−20	±8	−1.8	—	—	363	230	158	—	250	—	—
		SSM3J113TU	−20	±12	−1.7	—	—	449 (@2.0 V)	249	169	—	370	—	—
		SSM3J111TU	−20	±12	−1.0	—	—	—	680	480	—	160	—	—
		SSM3J36TU *	−20	±8	−0.33	—	3600	2700	1600 (@2.8 V)	—	1310	43	—	—
		SSM3J117TU	−30	±20	−2.0	—	—	—	—	225	—	280	—	—
		SSM3J118TU	−30	±20	−1.4	—	—	—	—	480	—	137	—	—
		SSM3J112TU	−30	±20	−1.1	—	—	—	—	790	—	86	—	—
UF6  (mm)	P-ch	SSM6J409TU **	−20	±8	−9.5	—	72.3	46.2	30.2	—	22.1	1100	—	—
		SSM6J51TU	−12	±8	−4.0	—	150	85	54	—	—	1700	—	—
		SSM6J21TU	−12	±12	−3.0	—	—	—	88	50	—	1300	—	—
		SSM6J50TU	−20	±10	−2.5	—	—	205 (@2.0 V)	100	—	64	800	—	—
		SSM6J401TU	−30	±20	−2.5	—	—	—	—	145	—	730	—	—
		SSM6J402TU	−30	±20	−2.0	—	—	—	—	225	—	280	—	—
	P-ch x 2	SSM6P54TU	−20	±8	−1.2	—	555	350	228	—	—	331	—	(1)
		SSM6P39TU	−20	±8	−1.5	—	—	430	294	213	—	250	—	
		SSM6P28TU	−20	±8	−0.8	—	—	460	306	234	—	250	SSM6J205FE x 2	
		SSM6P26TU	−20	±8	−0.5	—	—	980	330	230	—	250	SSM6J26FE x 2	
		SSM6P25TU	−20	±12	−0.5	—	—	—	430	260	—	218	SSM6J25FE x 2	
		SSM6P36TU	−20	±8	−0.33	—	3600	2700	1600 (@2.8 V)	—	1310	43	SSM3J36TU x 2	
		SSM6P40TU	−30	±20	−1.4	—	—	—	—	403	—	120	—	
US6  (mm)	P-ch	SSM6J08FU	−20	±12	−1.3	—	—	460 (@2.0 V)	260	180	—	370	—	—
		SSM6J06FU	−20	±12	−0.65	—	—	—	700	500	—	160	—	—
		SSM6J07FU	−30	±20	−0.8	—	—	—	—	800	—	130	—	—
TSM  (mm)	P-ch	SSM3J307T *	−20	±8	−5	—	83	56	40	—	31	1170	—	—
		SSM3J321T *	−20	±8	−5.2	—	137	88	62	—	46	640	—	—
		SSM3J326T **	−30	±12	−3	—	—	—	80	—	TBD	TBD	—	—
		SSM3J13T	−12	±8	−3	—	—	180 (@2.0 V)	95	70	—	890	—	—
		SSM3J312T	−12	±8	−2.7	—	—	237	142	91	—	550	—	—
		SSM3J304T	−20	±8	−2.3	—	—	297	169	127	—	335	—	—
		SSM3J317T *	−20	±8	−3.6	—	—	306	144	—	107	390	—	—
		SSM3J313T	−20	±8	−1.6	—	—	640	396	268	—	170	—	—
		SSM3J01T	−30	±10	−1.7	—	—	—	600	400	—	240	—	—
		SSM3J02T	−30	±10	−1.5	—	—	—	700	500	—	150	—	—
		SSM3J314T	−30	±20	−3.5	—	—	—	—	100	—	505	—	—
		SSM3J14T	−30	±20	−2.7	—	—	—	—	170	—	413	—	—
		SSM3J306T	−30	±20	−2.4	—	—	—	—	225	—	280	—	—
		SSM3J305T	−30	±20	−1.7	—	—	—	—	477	—	137	—	—

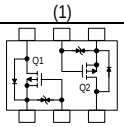
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*: New product

**: Under development

♦Internal Connections

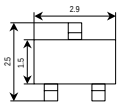
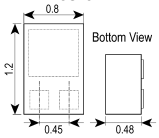
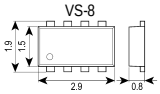
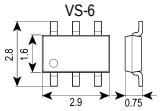
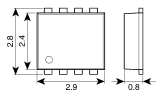
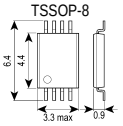
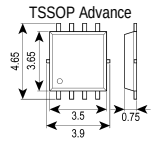
(1)



Note: Some MOSFETs do not have a Zener diode between gate and source.

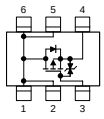
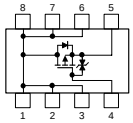
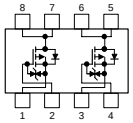
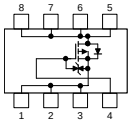
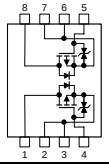
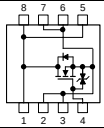
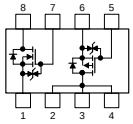
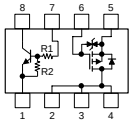
♦The internal connection diagrams only show the general configurations of the circuits.

$V_{DSS} \leq 250$ V (Small-Signal MOSFETs/Power MOSFETs) (P-ch MOSFETs) (Continued)

Package	Polarity	Part Number	V_{DSS} (V)	V_{GSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (mΩ)								Ciss (pF)	Qg (nC) (typ.)	Internal Connections
							V_{GS} = 1.5 V	V_{GS} = 1.8 V	V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4 V	V_{GS} = 4.5 V	V_{GS} = 7 V	V_{GS} = 10 V			
S-MINI  (mm)	P-ch	SSM3J327F **	−20	±8	−2	—	250	178	—	133	—	103	—	—	290	—	—
		SSM3J325F **	−20	±8	−3.6	—	TBD	300	—	200	—	TBD	—	—	TBD	—	—
CST3B  (mm)	P-ch	SSM3J46CTB **	−20	±8	−2	—	250	178	—	133	—	103	—	—	290	—	—
VS-8  (mm)	P-ch Single	TPCF8101	−12	±8	−6	2.5	—	85	—	40	—	28	—	—	—	18	(2)
		TPCF8103	−20	±8	−2.7	2.5	—	300	—	160	—	110	—	—	—	6	(2)
		TPCF8102	−20	±8	−6	2.5	—	90	—	41	—	30	—	—	—	19	(2)
		TPCF8104	−30	±20	−6	2.5	—	—	—	—	—	38	—	28	—	34	(2)
	P-ch Dual	TPCF8301	−20	±8	−2.7	1.35	—	300	—	160	—	110	—	—	—	6	(3)
		TPCF8302	−20	±10	−3	1.35	—	200	—	95	—	59	—	—	—	11	(3)
		TPCF8303	−20	±8	−3	1.35	—	250	—	87	—	58	—	—	—	11	(3)
		TPCF8304	−30	±20	−3.2	1.35	—	—	—	—	—	105	—	72	—	14	(3)
VS-6  (mm)	P-ch Single	**TPC6103**	−12	±8	−5.5	2.2	—	90	—	55	—	35	—	—	—	20	(1)
		TPC6105	−20	±8	−2.7	2.2	—	300	—	160	—	110	—	—	—	6	(1)
		TPC6107	−20	±12	−4.5	2.2	—	—	180	100	—	55	—	—	—	9.8	(1)
		TPC6111	−20	±8	−5.5	2.2	—	80	—	57	—	40	—	—	—	10	(1)
		TPC6108	−30	±20	−4.5	2.2	—	—	—	—	—	100	—	60	—	13	(1)
		TPC6109-H	−30	±20	−5	2.2	—	—	—	—	—	83	—	59	—	12.6	(1)
PS-8  (mm)	P-ch Single	**TPCP8101**	−20	±8	−5.6	1.68	—	90	—	41	—	30	—	—	—	19	(4)
		TPCP8102	−20	±12	−7.2	1.68	—	—	80	30	—	18	—	—	—	33	(4)
		TPCP8103-H	−40	±20	−4.8	1.68	—	—	—	—	—	54	—	40	—	19	(4)
	P-ch Dual	**TPCP8301**	−20	±12	−5	1.48	—	—	—	60	—	31	—	—	—	20	(3)
		TPCP8302	−20	±12	−5	1.48	—	95	—	45	33	—	—	—	—	20	(3)
	Load SW	**TPCP8401**	−12	±8	−5.5	1.96	—	103	—	58	—	38	—	—	—	20	(7)
	P-ch + BipTr	**TPCP8J01**	−32	±20	−5.5	2.14	—	—	—	—	49	—	—	35	—	34	(8)
TSSOP-8  (mm)	P-ch Single	**TPCS8105**	−30	±20	−10	1.1	—	—	—	—	19.5	—	—	13.5	—	107	(4)
		TPCS8104	−30	±20	−11	1.1	—	—	—	—	18	—	—	12	—	107	(6)
	P-ch Dual	**TPCS8302**	−20	±12	−5	1.1	—	—	95	60	35	—	—	—	—	28.5	(5)
		TPCS8303	−20	±12	−5	1.1	—	—	80	30	—	21	—	—	—	33	(5)
TSSOP Advance  (mm)	P-ch Single	TPCM8102	−30	±20	−25	30	—	—	—	—	16	—	—	7.7	—	60	(4)

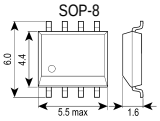
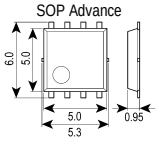
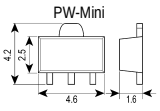
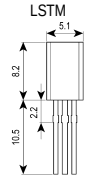
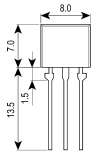
- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

♦Internal Connections

(1)	(2)	(3)	(4)	(5)
				
(6)	**(7)**	**(8)**		
				

Note: Some MOSFETs do not have a Zener diode between gate and source.

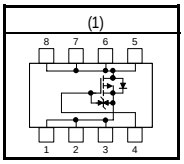
♦The internal connection diagrams only show the general configurations of the circuits.

Package	Polarity	Part Number	V_{DSS} (V)	V_{GSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω)							Qg (nC) (typ.)	Internal Connections
							V_{GS} = 1.8 V	V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4 V	V_{GS} = 4.5 V	V_{GS} = 7 V	V_{GS} = 10 V		
SOP-8  (mm)	P-ch Single	**TPC8115**	−20	±8	−10	1.9	0.03	—	0.014	—	0.01	—	—	115	(1)
		TPC8109	−30	±20	−10	1.9	—	—	—	0.03	—	—	0.02	45	(1)
		TPC8119	−30	±20	−10	1.9	—	—	—	0.028	—	—	0.013	40	(1)
		TPC8111	−30	±20	−11	1.9	—	—	—	0.018	—	—	0.012	107	(1)
		TPC8113	−30	±20	−11	1.9	—	—	—	0.018	—	—	0.01	107	(1)
		TPC8121	−30	±20	−11	1.9	—	—	—	0.024	—	—	0.012	42	(1)
		TPC8123	−30	−25/+20	−11	1.9	—	—	—	—	0.0125	—	0.009	68	(1)
		TPC8122	−30	±20	−12	1.9	—	—	—	0.0165	—	—	0.008	62	(1)
		TPC8107	−30	±20	−13	1.9	—	—	—	0.015	—	—	0.007	130	(1)
		TPC8112	−30	±20	−13	1.9	—	—	—	0.014	—	—	0.006	130	(1)
		TPC8118	−30	±20	−13	1.9	—	—	—	0.015	—	—	0.007	65	(1)
		TPC8114	−30	±20	−18	1.9	—	—	—	0.0068	—	—	0.0045	180	(1)
		TPC8117	−30	±20	−18	1.9	—	—	—	0.0079	—	—	0.0039	130	(1)
		TPC8120	−30	−25/+20	−18	1.9	—	—	—	—	0.042	—	0.0032	180	(1)
		TPC8116-H	−40	±20	−7.5	1.9	—	—	—	—	0.037	—	0.030	27	(1)
		TPC8110	−40	±20	−8	1.9	—	—	—	0.035	—	—	0.025	48	(1)
SOP Advance  (mm)	P-ch Single	**TPCA8105**	−12	±8	−6	20	0.092	—	0.051	—	0.033	—	—	18	(1)
		TPCA8102	−30	±20	−40	45	—	—	—	0.014	—	—	0.006	109	(1)
		TPCA8103	−30	±20	−40	45	—	—	—	0.0068	—	—	0.0042	184	(1)
		TPCA8106	−30	±20	−40	45	—	—	—	0.0078	—	—	0.0037	130	(1)
		TPCA8107-H	−40	±20	−7.5	30	—	—	—	—	0.037	—	0.030	27	(1)
		TPCA8108	−40	±20	−40	45	—	—	—	—	—	—	0.0095	100	(1)
		TPCA8104	−60	±20	−40	45	—	—	—	0.024	—	—	0.016	90	(1)
PW-Mini  (mm)	P-ch Single	2SJ360	−60	—	−1	1.5	—	—	—	1.2	—	—	0.73	6.5	
		2SJ508	−100	—	−1	1.5	—	—	—	2.5	—	—	1.9	6.3	
LSTM  (mm)	P-ch Single	2SJ537	−50	—	−5	0.9	—	—	—	0.34	—	—	0.19	18	
		2SJ507	−60	—	−1	0.9	—	—	—	1.0	—	—	0.7	5.6	
		2SJ509	−100	—	−1	0.9	—	—	—	2.5	—	—	1.9	6.3	
TPS  (mm)	P-ch Single	2SJ378	−60	—	−5	1.3	—	—	—	0.28	—	—	0.19	22	
		2SJ669	−60	—	−5	1.2	—	—	—	0.25	—	—	0.17	15	

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

♦Internal Connections

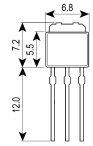
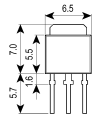
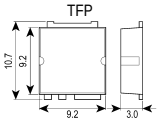
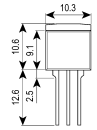
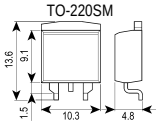
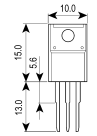
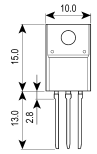
(1)



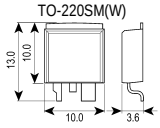
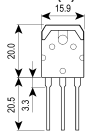
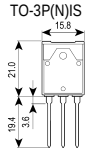
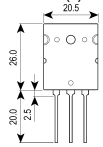
Note: Some MOSFETs do not have a Zener diode between gate and source.

♦The internal connection diagrams only show the general configurations of the circuits.

$V_{DSS} \leq 250$ V (Small-Signal MOSFETs/Power MOSFETs) (P-ch MOSFETs) (Continued)

Package	Polarity	Part Number	V_{DSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω)							Qg (nC) (typ.)	Internal Connections
						V_{GS} = 1.8 V	V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4 V	V_{GS} = 4.5 V	V_{GS} = 7 V	V_{GS} = 10 V		
PW-Mold  (mm)	P-ch Single	2SJ439	−16	−5	20	—	—	0.28	0.2	—	—	—	24	
		2SJ668	−60	−5	20	—	—	—	0.25	—	—	0.17	15	
		2SJ338	−180	−1	20	—	—	—	—	—	—	5	—	
		2SJ567	−200	−2.5	20	—	—	—	—	—	—	2	10	
		2SJ610	−250	−2	20	—	—	—	—	—	—	2.55	24	
New PW-Mold2  (mm)	P-ch Single	2SJ680	−200	−2.5	20	—	—	—	—	—	—	2	10	
TFP  (mm)	P-ch Single	2SJ619	−100	−16	75	—	—	—	0.32	—	—	0.21	48	
		2SJ620	−100	−18	125	—	—	—	0.12	—	—	0.09	140	
TO-220FL  (mm)	P-ch Single	2SJ312	−60	−14	40	—	—	—	0.19	—	—	0.12	45	
		2SJ401	−60	−20	100	—	—	—	0.09	—	—	0.045	90	
TO-220SM  (mm)		2SJ402	−60	−30	100	—	—	—	0.06	—	—	0.038	110	
		2SJ412	−100	−16	60	—	—	—	0.32	—	—	0.21	48	
TO-220NIS  (mm)	P-ch Single	2SJ438	−60	−5	25	—	—	—	0.28	—	—	0.19	22	
		2SJ304	−60	−14	40	—	—	—	0.19	—	—	0.12	45	
		2SJ349	−60	−20	35	—	—	—	0.09	—	—	0.045	90	
		2SJ334	−60	−30	45	—	—	—	0.06	—	—	0.038	110	
		2SJ380	−100	−12	35	—	—	—	0.32	—	—	0.21	48	
		2SJ464	−100	−18	45	—	—	—	0.12	—	—	0.09	140	
		2SJ313	−180	−1	25	—	—	—	—	—	—	5	—	
		2SJ407	−200	−5	30	—	—	—	—	—	—	1	20	
		2SJ512	−250	−5	30	—	—	—	—	—	—	1.25	22	
		2SJ516	−250	−6.5	35	—	—	—	—	—	—	0.8	29	
TO-220SIS  (mm)	P-ch Single	TJ70A06J3	−60	−70	54	—	—	—	—	10	—	8.0	246	
		TJ20A10M3	−100	−20	35	—	—	—	—	—	—	90	120	

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Package	Polarity	Part Number	V_{DSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (Ω)							Qg (nC) (typ.)	Internal Connections
						V_{GS} = 1.8 V	V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4 V	V_{GS} = 4.5 V	V_{GS} = 7 V	V_{GS} = 10 V		
TO-220SM(W)  (mm)	P-ch Single	TJ120F06J3	−60	−120	300	—	—	—	—	—	—	0.008	258	
TO-3P(N)  (mm)	P-ch Single	2SJ200	−180	−10	120	—	—	—	—	—	—	0.83	—	
		2SJ618	−180	−10	130	—	—	—	—	—	—	0.37 (7 V)	35	
TO-3P(N)IS  (mm)	P-ch Single	2SJ440	−180	−9	80	—	—	—	—	—	—	0.83	—	
TO-3P(L)  (mm)	P-ch Single	2SJ201	−200	−12	150	—	—	—	—	—	—	0.625	—	

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

(MOSFET + SBD)

Package	Polarity	Part Number	MOSFET											SBD						Qg (nC) (typ.)	Internal Connections
			V_{DSS} (V)	V_{GSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (mΩ) V_{GS} = 1.8 V	V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4.0 V	V_{GS} = 4.5 V	V_{GS} = 10 V	Ciss (pF)	V_R (V)	I_O (A)	V_F Max (V) I_F = 1.0 A	I_F = 0.5 A	I_F = 0.3 A	I_F = 0.1 A		
UFV (mm)	P-ch + SBD	SSM5G10TU	−20	±8	−1.5	—	430	—	294	213	—	—	250	20	0.7	—	0.39	—	—	—	(1)
		SSM5G09TU	−12	±8	−1.5	—	—	—	200	130	—	—	550	12	0.5	—	0.43	0.39	—	—	(1)
		SSM5G02TU	−12	±12	−1	—	—	—	240	160	—	—	310	12	0.5	—	0.43	0.39	—	—	(1)
		SSM5G04TU	−12	±12	−1	—	—	—	420	240	—	—	170	12	0.5	—	0.43	0.39	—	—	(1)
		SSM5G11TU	−30	±20	−1.4	—	—	—	—	403	—	226	120	30	0.7	—	0.41	—	—	—	(1)
		SSM5G01TU	−30	±20	−1	—	—	—	—	800	—	400	86	20	0.5	—	—	0.45	—	—	(1)
VS-8 (mm)		TPCF8B01	−20	±8	−2.7	1.35	0.3	—	0.16	—	0.11	—	—	20	1	0.49	—	—	—	6	(8)
PS8 (mm)		TPCP8BA1	−20	±12	−1.3	—	—	—	260	180	—	—	370	25	0.7	—	0.41	—	—	—	(2)
UFV (mm)	N-ch + SBD	SSM5H10TU	20	±10	1.6	—	190	—	139	119	—	—	260	20	0.7	—	0.39	—	—	—	(3)
		SSM5H05TU	20	±12	1.5	—	—	—	220	160	—	—	125	12	0.5	—	0.43	0.39	—	—	(3)
		SSM5H08TU	20	±12	1.5	—	—	—	220	160	—	—	125	20	0.5	—	—	0.45	—	—	(3)
		SSM5H03TU	12	±12	1.4	—	—	—	—	300	—	150	125	12	0.5	—	0.43	0.39	—	—	(3)
		SSM5H11TU	30	±20	1.6	—	—	—	—	182	—	122	180	30	0.7	—	0.41	—	—	—	(3)
		SSM5H12TU	30	±12	1.9	—	296	—	177	133	—	—	123	30	0.7	—	0.41	—	—	—	(3)
		SSM5H01TU	30	±20	1.4	—	—	—	—	450	—	200	106	20	0.5	—	—	0.45	—	—	(3)
		SSM5H07TU	20	±20	1.2	—	—	—	—	540	—	300	36	12	0.5	—	0.43	0.39	—	—	(3)
SMV (mm)		SSM5H14F	30	±12	3	—	138	—	94	78	—	—	270	45	0.1	—	—	—	0.6	—	(3)
PS8 (mm)		TPCP8AA1	20	±12	1.6	—	—	—	140	105	—	—	306	25	0.7	—	0.41	—	—	—	(4)
TSSOP Advance (mm)		TPCM8A05-H ◇	30	±20	20	30	—	—	—	—	17.2	12.9	—	—	—	—	—	—	—	15	(6)
SOP-8 (mm)		TPC8A01 ◇	30	±20	6/8.5	1.5	—	—	—	—	30/21	25/18	—	—	—	—	—	—	—	17/49	(5)
		TPC8A05-H ◇	30	±20	10	1.9	—	—	—	—	17.6	13.3	—	—	—	—	—	—	—	15	(6)
		TPC8A02-H ◇	30	±20	16	1.9	—	—	—	—	8.5	5.6	—	—	—	—	—	—	—	34	(6)
		TPC8A03-H ◇	30	±20	17	1.9	—	—	—	—	7	5.6	—	—	—	—	—	—	—	36	(6)
		TPC8A04-H ◇	30	±20	18	1.9	—	—	—	—	4.5	3.6	—	—	—	—	—	—	—	56	(6)

◇: Monolithic

- The products shown in bold are also manufactured in offshore fabs.
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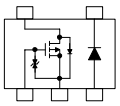
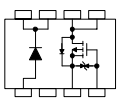
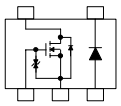
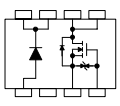
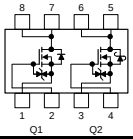
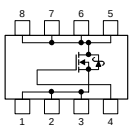
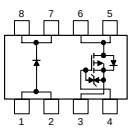
♦Internal Connections

(1)	(2)	(3)	(4)	(5)	(6)	(8)
						

Note: Some MOSFETs do not have a Zener diode between gate and source.

♦The internal connection diagrams only show the general configurations of the circuits.

(MOSFET + SBD) (Continued)

Package	Polarity	Part Number	MOSFET										Ciss (pF)	SBD							Qg (nC) (typ.)	Internal Connections
			V_{DSS} (V)	V_{GSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (mΩ)							V_R (V)	I_O (A)	V_F Max (V)						
							V_{GS} = 1.8 V	V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4.0 V	V_{GS} = 4.5 V	V_{GS} = 10 V				I_F = 1.0 A	I_F = 0.5 A	I_F = 0.3 A	I_F = 0.1 A			
SOP Advance (mm)	N-ch + SBD	TPCA8A05-H ◇	30	±20	20	30	—	—	—	—	17.2	12.9	—	—	—	—	—	—	—	15	(1)
		TPCA8A02-H ◇	30	±20	34	45	—	—	—	—	6.7	5.3	—	—	—	—	—	—	—	36	(1)
		TPCA8A01-H ◇	30	±20	36	45	—	—	—	—	8.5	5.6	—	—	—	—	—	—	—	19	(1)
		TPCA8A04-H ◇	30	±20	44	45	—	—	—	—	4.1	3.2	—	—	—	—	—	—	—	59	(1)

◇: Monolithic

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

(MOSFET + Switching Diodes)

Package	Polarity	Part Number	MOSFET										Ciss (pF)	Di						Qg (nC) (typ.)	Internal Connections
			V_{DSS} (V)	V_{GSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (mΩ)							V_R (V)	I_O (A)	trr (ns)	V_F Max (V)				
							V_{GS} = 1.5 V	V_{GS} = 1.8 V	V_{GS} = 2.5 V	V_{GS} = 4.0 V	V_{GS} = 4.5 V	V_{GS} = 10 V					I_F = 1 mA	I_F = 10 mA	I_F = 0.1 A		
UFV (mm)	N-ch + Switching diodes	SSM5H90TU	20	±10	2.4	—	157	110	80	65	—	—	400	80	0.1	1.6	—	—	1.2	—	(2)

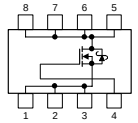
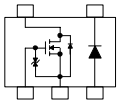
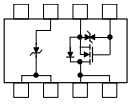
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

(MOSFET + Zener Diodes)

Package	Polarity	Part Number	MOSFET										Ciss (pF)	Ze-Di								Qg (nC) (typ.)	Internal Connections
			V_{DSS} (V)	V_{GSS} (V)	I_D (A)	P_D (W)	$R_{DS(ON)}$ Max (mΩ)							V_Z (V)		I_R (μA)		V_F Max (V)				
							V_{GS} = 1.8 V	V_{GS} = 2.0 V	V_{GS} = 2.5 V	V_{GS} = 4.0 V	V_{GS} = 4.5 V	V_{GS} = 10 V			@I_Z (mA)		@V_R (V)	I_F = 1.0 A	I_F = 0.5 A	I_F = 0.3 A		
PS8 (mm)	N-ch + Zener diodes	TPCP8R01	60	±20	2.0	—	—	—	—	440	—	300	140	43	2	0.5	33	—	—	—	—	(3)

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

♦Internal Connections

(1)	(2)	(3)
		

Note: Some MOSFETs do not have a Zener diode between gate and source.

♦The internal connection diagrams only show the general configurations of the circuits.

Bipolar Power Transistors

Radio-Frequency Switching Power Transistors (2SA/2SC/TTA/TTC Series)

V_{CEO} (V) / I_C (A)	10/(15)	(18)/20	(25)/30	40/(45)	50/(60)
0.2				2SA1483 (45 V) 2SC3803 (45 V) (◎)	
0.8			2SA1426 (§) 2SA1204 2SC2884 (◎)	2SA1356 2SC3419 (@)	
1	TPC6D02 (15 V) (&)(△)		2SC2703 (♣) 2SC3666 (§) HN4B101J (NPN: 1.2 A) (M)(V)		2SA2070 (◎) TPC6701 (W)(△) 2SC5810 (◎) TPC6901A (PNP: 0.7 A) (M)(△) TPCP8901 (PNP: 0.8 A) (M)(P) S3C83 ++ (♠) S3C82 ++ (♠) TPC6604 * (△) TPC6504 * (△)
1.2		TPC6D03 (&)(△)	2SA1734 (◎) TPCP8801 (W)(P)		
1.5	2SA2058 (♠)	2SA2065 (♠) 2SC5784 (♠) 2SA2069 (◎) 2SC5819 (◎) TPC6503 (△) S3F56 ++ (△)	**2SA966 2SC2236** (♣) 2SA1203 2SC2883 (◎)		
2	**2SA1160 2SC2500** (♣) 2SA1430 2SC3670 (§) 2SA2066 (◎) 2SC5755 (♠) 2SC5785 (◎) TPC6501 (△) TPC6602 (△) TPCP8504 (P)		TPCP8902 (NPN+PNP) (M)(P) TPC6902 (NPN+PNP) (M)(△) HN4B102J (NPN+PNP) (M)(V)	**2SC3225** (♣) 2SC3673 (§) 2SC3964 (@)	**2SA1020 2SC2655** (♣) 2SA1241 2SC3076 (◇) 2SA1382 (♣) 2SA2056 (♠) TPC6601 (△) TPCP8701 (W)(P) 2SA2060 (◎) 2SA1428 2SC3668 (§) **2SA1680 2SC4408** (♣) 2SA1891 2SC5028 (□)
2.5		2SA2061 (♠)			2SC5692 (♠) 2SC6033 (♠) TPCP8602 (P)
3	2SC4682 (♣) (15 V) 2SC4683 (§) (15 V)	2SA2059 (◎) TPCP8F01 ($)(P) TPC6603 (△) TPCP8G01 * ($)(P)	2SC5976 (♠) TPCP8H02 ($)(P)	2SA1359 2SC3422 (@)	2SA1761 2SC4604 (♣) 2SA1869 2SC4935 (▲) 2SA1892 2SC5029 (□) 2SC5712 (◎) TPC6502 (△) TPCP8505 (P) 2SC6126 (◎)
3.5		2SC5738 (♠)			

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*: New product
++: Being planned

Legend

Package: Through-Hole Package	Package: Ammo Packaging	Package: Surface-Mount Package	Other Remarks
(♣) LSTM	○ Available	(♠) TSM	(%) Darlington
(§) MSTM	○ Available	(◎) PW-Mini	(#) Built-in zener diode
(□) TPS	◎ Available only in tape packaging	(◇) PW-Mold	Part number in italic signifies built in Freewheel diode.
(@) TO-126	× Not available	(‡) DP	2SA****/2SC****: Complementary
(■) TPL	◎ Available only in tape packaging	(●) TO-220SM	(&) 2-in-1 (transistor + diode)
(▲) TO-220NIS	× Not available	(△) VS-6	($) 2-in-1 (transistor + S-MOS)
(○) TO-220FL	× Not available	(P) PS-8	(W) 2-in-1 (NPN (or PNP) × 2)
(◇) PW-Mold	× Not available	(V) SMV	(M) 2-in-1 (NPN + PNP)
(‡) DP	× Not available	(♥) TFP	
(▽) TO-3P(N)	× Not available		
(▼) TO-3P(N)IS	× Not available		
(※) TO-3P(L)	× Not available		
(∓) TO-220SIS	× Not available		
(◆) TO-92	◎ Available only in tape packaging		

V_{CEO} (V) / I_C(A)	10/(15)	(18)/20	(25)/30	40/(45)	50/(60)
4	2SC4781 (♣) 2SC5713 (◎) S3F61 ++ (△)	2SC5714 (◎) 2SC6125 (◎) S3F62 ++ (△) TPCP8601 (P)	2SC5906 (♠)		2SC5703 (♠)
5		2SA1242 (◇) 2SA1357 (@) 2SA1431 (§) 2SC3072 (◇) 2SC3420 (@) 2SC3671 (§) 2SC4684 (◇) 2SC4685 (@) 2SC5030 (□) 2SC6052 (◇)	2SC6062 (♠)		2SA1244 2SC3074 (◇) 2SA1905 2SC5076 (□) 2SA1931 2SC4881 (▲) 2SA1933 2SC5175 (■) 2SA2097 (◇) 2SC5886 (◇) 2SC5886A (◇) TPCP8H01 ($)(P) S3H32 ++ (◇) 2SA2183 (60 V) (〒)
7					2SC6000 (◇)
10		2SA1327A (▲)			2SA1887 2SC5000 (▲)
12					2SA1451A 2SC3709A (▲)

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++: Being planned

Legend

Package			Other Remarks
Through-Hole Package	Ammo Packaging	Surface-Mount Package	
(♣) LSTM	○ Available	(▲) TSM	(%) Darlington
(§) MSTM	○ Available	(◎) PW-Mini	(#) Built-in zener diode
(□) TPS	◎ Available only in tape packaging	(◇) PW-Mold	Part number in italic signifies built in Freewheel diode.
(@) TO-126	× Not available	(‡) DP	2SA****/2SC****: Complementary
(■) TPL	◎ Available only in tape packaging	(●) TO-220SM	(&) 2-in-1 (transistor + diode)
(▲) TO-220NIS	× Not available	(△) VS-6	($) 2-in-1 (transistor + S-MOS)
(○) TO-220FL	× Not available	(P) PS-8	(W) 2-in-1 (NPN (or PNP) × 2)
(◇) PW-Mold	× Not available	(V) SMV	(M) 2-in-1 (NPN + PNP)
(‡) DP	× Not available	(♥) TFP	
(▽) TO-3P(N)	× Not available		
(▼) TO-3P(N)IS	× Not available		
(※) TO-3P(L)	× Not available		
(〒) TO-220SIS	× Not available		
(◆) TO-92	◎ Available only in tape packaging		

Radio-Frequency Switching Power Transistors (2SA/2SC/TTA/TTC Series) (Continued)

V_{CEO} (V) / I_C (A)	80		100	120		(140)/150		160	
0.05						**2SA1145**	**2SC2705** (♣)		
						2SA1360	2SC3423 (@)		
						2SA949	**2SC2229** (♣)		
0.1									**2SC2230** (♣)
0.2									2SC3963 (@)
0.4	**2SA817A**	**2SC1627A** (♣)							
	2SA1202	2SC2882 (◎)							
0.8				**2SA965**	**2SC2235** (♣)				
				2SA1425	2SC3665 (§)				
1				TPCP8603	TPCP8507 (P)				
					TPCP8510 * (P)				
					2SC6061 (♠)				
				2SA1358	2SC3421 (@)			**2SA1013**	**2SC2383** (♣)
1.5							2SC2073A (▲)	2SA1225	2SC2983 (◇)
						2SA1408	2SC3621 (@)		2SC5154 (□)
								2SA2219 *	2SC6139 * (§)
								2SA2220 *	2SC6140 * (■)
								TTA004 *	TTC004 * (@)
2	**2SA1315**	**2SC3328** (♣)	TPCP8501 (P)						
	2SA1429	2SC3669 (§)							
		2SC3474 (◇)							
		2SC6079 (§)							
	2SA2206	2SC6124 (◎)							
2.5		2SC6075 (□)							
		2SC6087 (□)							
3		2SC6076 (◇)							
		2SC6077 (■)							
		2SC6078 (■)							
5	2SA1934	2SC5176 (■)							
		2SC3303 (◇)							
6		2SC4688 (▼)							
	2SA1939	**2SC5196** (▽)							
8					2SC4689 (▼)				
				2SA1940	2SC5197 (▽)				
10							2SC4690 (▼) (140 V)		
						2SA1941	**2SC5198** (▽) (140 V)		
12	2SA1452A	2SC3710A (▲)						2SA1942	2SC5199 (※)
	2SA1771	(▲)							
18								TTA0001 *	TTC0001 * (▽)
								TTA0002 *	TTC0002 * (※)

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*: New product

Legend

Package			Other Remarks
Through-Hole Package	Ammo Packaging	Surface-Mount Package	
(♣) LSTM	○ Available	(▲) TSM	(%) Darlington
(§) MSTM	○ Available	(◎) PW-Mini	(#) Built-in zener diode
(□) TPS	◎ Available only in tape packaging	(◇) PW-Mold	Part number in italic signifies built in Freewheel diode.
(@) TO-126	× Not available	(‡) DP	2SA****/2SC****: Complementary
(■) TPL	◎ Available only in tape packaging	(●) TO-220SM	(&) 2-in-1 (transistor + diode)
(▲) TO-220NIS	× Not available	(△) VS-6	($) 2-in-1 (transistor + S-MOS)
(○) TO-220FL	× Not available	(P) PS-8	(W) 2-in-1 (NPN (or PNP) × 2)
(◇) PW-Mold	× Not available	(V) SMV	(M) 2-in-1 (NPN + PNP)
(‡) DP	× Not available	(♥) TFP	
(▽) TO-3P(N)	× Not available		
(▼) TO-3P(N)IS	× Not available		
(※) TO-3P(L)	× Not available		
(〒) TO-220SIS	× Not available		
(◆) TO-92	◎ Available only in tape packaging		

V_{CEO} (V) / I_C (A)	(180)/200	230	300	(370)/400	450
0.05				**2SC5122** (♣) 2SC5307 (◎)	
0.1	2SC2230A (♣) (180 V)		2SA1432 2SC3672 (§) 2SC3619 (@) 2SC3620 (@) **2SC4544** (▲) 2SC5027 (□) 2SA1384 2SC3515 (◎)		
0.3				TPCP8604 (P)	
0.5				2SA1923 (◇) 2SA1924 (@) 2SA1925 (□) 2SA1971 (◎) **2SA1972** (♣)	
0.8			2SC6136 * (◆) (285V/0.7A)	2SC3075 (◇) 2SC3425 (@) 2SC5208 (□) 2SC5458 (◇)	
1		**2SA1837 2SC4793** (▲) 2SA1932 2SC5174 (■) 2SA2182 2SC6060 (〒)	**2SC5930** (§) (285 V) **2SC6010** (§) (285 V) **2SC6034** (§) (285 V)	2SC5549 (♣) 2SC5550 (@) **2SC6042** (§) (375 V) 2SC6040 (§) (410 V) TPCP8508 ++ (P) (375 V)	
1.5				2SC6142 * (◇) (375 V 1.5 A) TTC003 * (◇)	
2	**2SA1930 2SC5171** (▲) (180 V) (180 V) 2SA2190 2SC6072 (〒) (180 V) (180 V)			2SC5075 (□) 2SC5548 (◇) (370 V) 2SC5548A (◇) 2SA2034 (◇)	2SC5351 (□) 2SC5368 (@)
3				2SC5459 (▲)	
5				2SC5172 (▲) 2SC5266A (■) 2SC5355 (‡) 2SC6138 ++ (◇) (375 V)	
8					2SC5439 (▲)
10				2SC5352 (▽)	
12	2SA2120 * 2SC5948 * (▽)				
15	2SA2121 * 2SC5949 * (※)	2SA1943 2SC5200 (※) **2SA1962 2SC5242** (▽) 2SA1986 2SC5358 (▽) 2SA1987 2SC5359 (※)			

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*: New product
++: Being planned

Legend

Package			Other Remarks
Through-Hole Package	Ammo Packaging	Surface-Mount Package	
(♣) LSTM	○ Available	(▲) TSM	(%) Darlington
(§) MSTM	○ Available	(◎) PW-Mini	(#) Built-in zener diode
(□) TPS	◎ Available only in tape packaging	(◇) PW-Mold	Part number in italic signifies built in Freewheel diode.
(@) TO-126	× Not available	(‡) DP	2SA****/2SC****: Complementary
(■) TPL	◎ Available only in tape packaging	(●) TO-220SM	(&) 2-in-1 (transistor + diode)
(▲) TO-220NIS	× Not available	(△) VS-6	($) 2-in-1 (transistor + S-MOS)
(○) TO-220FL	× Not available	(P) PS-8	(W) 2-in-1 (NPN (or PNP) × 2)
(◇) PW-Mold	× Not available	(V) SMV	(M) 2-in-1 (NPN + PNP)
(‡) DP	× Not available	(♥) TFP	
(▽) TO-3P(N)	× Not available		
(▼) TO-3P(N)IS	× Not available		
(※) TO-3P(L)	× Not available		
(〒) TO-220SIS	× Not available		
(◆) TO-92	◎ Available only in tape packaging		

Radio-Frequency Switching Power Transistors (2SA/2SC/TTA/TTC Series) (Continued)

V_{CEO} (V) / I_C(A)	(550)/600	800	1000/(1200)	1500
0.02				2SC5563 (▲)
0.05	2SC5201 (♣)	2SC5460 (@) 2SC5466 (▲) 2SC6127 * (◇)	2SC4686 (▲) 2SC4686A (▲) (1200 V)	
0.5	2SA1937 (◇) 2SA2142 (◇)			
0.8		2SC3405 (◇) 2SC5465 (◇) 2SC5562 (□) 2SC5684 (■)		
1	2SA2184 (◇) (550 V)			
3		**2SC5353** (▲) 2SC5361 (○) 2SC5356 (‡)		
5		2SC5354 (▽)		
10		2SC3307 (※)		

- The products shown in bold are also manufactured in offshore fabs. *: New product
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Legend

Package			Other Remarks
Through-Hole Package	Ammo Packaging	Surface-Mount Package	
(♣) LSTM	○ Available	(▲) TSM	(%) Darlington
(§) MSTM	○ Available	(◎) PW-Mini	(#) Built-in zener diode
(□) TPS	◎ Available only in tape packaging	(◇) PW-Mold	Part number in italic signifies built in Freewheel diode.
(@) TO-126	× Not available	(‡) DP	2SA****/2SC****: Complementary
(■) TPL	◎ Available only in tape packaging	(●) TO-220SM	(&) 2-in-1 (transistor + diode)
(▲) TO-220NIS	× Not available	(△) VS-6	($) 2-in-1 (transistor + S-MOS)
(○) TO-220FL	× Not available	(P) PS-8	(W) 2-in-1 (NPN (or PNP) × 2)
(◇) PW-Mold	× Not available	(V) SMV	(M) 2-in-1 (NPN + PNP)
(‡) DP	× Not available	(♥) TFP	
(▽) TO-3P(N)	× Not available		
(▼) TO-3P(N)IS	× Not available		
(※) TO-3P(L)	× Not available		
(〒) TO-220SIS	× Not available		
(◆) TO-92	◎ Available only in tape packaging		

Low-Frequency Power Transistors (2SB/2SD/TTB/TTD Series)

V_{CEO} (V) / I_C (A)	20	30	40	50	60/(65)
0.8					2SD2719 (#)(%)(♠)
1					*2SD2686* (#)(%)(◎)
1.5		2SD1140 (%)(♣) 2SD1224 (%)(◇) 2SD1508 (%)(@) 2SD1631 (%)(§) 2SD1784 (%)(◎) 2SD2481 (%)(□)			
2	*2SD1160* (◇)				*2SD1658* (#)(%)(@) ***2SD2088*** (#)(%)(♣) **2SD2695** (#)(%)(♣) 2SD2352 (▲)
3			*2SB907* *2SD1222* (%)(◇)		2SD2461 (□) 2SB906 2SD1221 (◇) **2SB1375** **2SD2012** (▲) 2SD2462 (□) 2SB1640 2SD2525 (■) 2SD2353 (▲) TTB001 * (♥) TTB002 * (◇) 2SB1667 (●)
4					*2SD2130* (#)(%)(@) *2SD2204* (#)(%)(▲) (65 V)
5					*2SD2131* (#)(%)(▲)
7				2SD1412A (▲)	

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*: New product

Legend

Package			Other Remarks
Through-Hole Package	Ammo Packaging	Surface-Mount Package	
(♣) LSTM	○ Available	(▲) TSM	(%) Darlington
(§) MSTM	○ Available	(◎) PW-Mini	(#) Built-in zener diode
(□) TPS	◎ Available only in tape packaging	(◇) PW-Mold	Part number in italic signifies built in Freewheel diode.
(@) TO-126	× Not available	(‡) DP	2SA****/2SC****: Complementary
(■) TPL	◎ Available only in tape packaging	(●) TO-220SM	(&) 2-in-1 (transistor + diode)
(▲) TO-220NIS	× Not available	(△) VS-6	($) 2-in-1 (transistor + S-MOS)
(○) TO-220FL	× Not available	(P) PS-8	(W) 2-in-1 (NPN (or PNP) × 2)
(◇) PW-Mold	× Not available	(V) SMV	(M) 2-in-1 (NPN + PNP)
(‡) DP	× Not available	(♥) TFP	
(▽) TO-3P(N)	× Not available		
(▼) TO-3P(N)IS	× Not available		
(※) TO-3P(L)	× Not available		
(〒) TO-220SIS	× Not available		
(◆) TO-92	◎ Available only in tape packaging		

Low-Frequency Power Transistors (2SB/2SD/TTB/TTD Series) (Continued)

VCEO (V) / IC(A)	80	100	120	150/(160)	200
0.9			**TPCP8L01**(1) (&)(P)		
1.5				2SB905 2SD1220 (◇)	
2	*2SB1067* *2SD1509* (%)(@)	*2SB1411* (%)(▲) ***2SB1457*** ***2SD2206*** (%)(♣) *2SB1617* *2SD2480* (%)(□) *2SD2536* (#)(%)(♣)			
3		*2SB1495* *2SD2257* (%)(▲) *2SD2092* (▲) *2SD2129* (%)(▲)			
4	*2SB908* *2SD1223* (%)(◇) 2SD2406 (▲)	*2SB1481* *2SD2241* (%)(▲)			
5		*2SD2079* (%)(▲) *2SD2526* (%)(■) 2SB1016A 2SD1407A (▲) ***2SD2604*** (#)(%)(▲)			
7	2SD2414(*SM*) (●) *2SB1018A* *2SD1411A* (▲)	*2SB1020A* *2SD1415A* (%)(▲) *2SD2584* (%)(‡)			
8				2SD2636 (%)(▽) (160 V)	
10		*2SD1947A* (▲)			
12					
15		*2SD1662* (%)(▽)			
30		*2SD1525* (%)(※)			

(1) NPN + HED (200 V/1 A)

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

VCEO (V) / IC(A)	250	400	450
6	2SD1410A (%)(▲)	*2SD1409A* (%)(▲)	
15			2SD1314 (%)(※)

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Legend

Package			Other Remarks
Through-Hole Package	Ammo Packaging	Surface-Mount Package	
(♣) LSTM	○ Available	(▲) TSM	(%) Darlington
(§) MSTM	○ Available	(◎) PW-Mini	(#) Built-in zener diode
(□) TPS	◎ Available only in tape packaging	(◇) PW-Mold	Part number in italic signifies built in Freewheel diode.
(@) TO-126	× Not available	(‡) DP	2SA****/2SC****: Complementary
(■) TPL	◎ Available only in tape packaging	(●) TO-220SM	(&) 2-in-1 (transistor + diode)
(▲) TO-220NIS	× Not available	(△) VS-6	($) 2-in-1 (transistor + S-MOS)
(○) TO-220FL	× Not available	(P) PS-8	(W) 2-in-1 (NPN (or PNP) × 2)
(◇) PW-Mold	× Not available	(V) SMV	(M) 2-in-1 (NPN + PNP)
(‡) DP	× Not available	(♥) TFP	
(▽) TO-3P(N)	× Not available		
(▼) TO-3P(N)IS	× Not available		
(※) TO-3P(L)	× Not available		
(〒) TO-220SIS	× Not available		
(◆) TO-92	◎ Available only in tape packaging		

Transistors for Power Amps (Drive Stage)

Part Number		I_C (A)	V_{CEO} (V)	P_C (W) Tc = 25°C (♣Ta = 25°C)	f_T (MHz) Typ. (NPN/PNP)	V_{CE} (V)	I_C (A)	Package
NPN	PNP							
2SC1627A	2SA817A	0.4	80	♣ 0.8	100	10	0.01	LSTM
2SC2235	2SA965	0.8	120	♣ 0.9	120	5	0.1	
2SC3665	2SA1425	0.8	120	♣ 1	120	5	0.1	MSTM
2SC6139 *	2SA2219 *	1.5	160	1	100	10	0.1	
2SC5174	2SA1932	1	230	♣ 1.8	100/70	10	0.1	TPL
2SC6140 *	2SA2220 *	1.5	160	1	100	10	0.1	
2SC3423	2SA1360	0.05	150	5	200	5	0.01	TO-126
2SC3421	2SA1358	1	120	10	120	5	0.1	
TTC004 *	TTA004 *	1.5	160	10	100	10	0.1	TO-126
2SC2983	2SA1225	1.5	160	15	100	10	0.1	PW-Mold
2SC4793	2SA1837	1	230	20	100/70	10	0.1	TO-220NIS
2SC6060	2SA2182	1	230	20	100/80	10	0.1	TO-220SIS
2SC5171	2SA1930	2	180	20	200	5/10	0.3	TO-220NIS
2SC6072	2SA2190	2	180	20	200	5	0.3	TO-220SIS

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*: New product

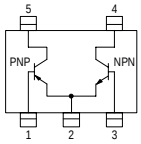
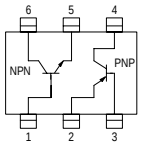
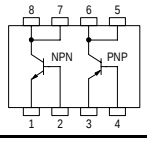
(Output Stage)

Part Number		I_C (A)	V_{CEO} (V)	P_C (W) Tc = 25°C (♣Ta = 25°C)	f_T (MHz) Typ. (NPN/PNP)	V_{CE} (V)	I_C (A)	Package
NPN	PNP							
2SC5196	2SA1939	6	80	60	30	5	1	TO-3P(N)
2SC5197	2SA1940	8	120	80	30	5	1	
2SC5198	2SA1941	10	140	100	30	5	1	
TTC0001 *	TTA0001 *	18	160	150	30	10	1	
2SC5242	2SA1962	15	230	130	30	5	1	
2SC5358	2SA1986	15	230	150	30	5	1	
2SC5948	2SA2120	12	200	200	30/25	5	1	
2SC5199	2SA1942	12	160	120	30	5	1	TO-3P(L)
TTC0002 *	TTA0002 *	18	160	180	30	10	1	
2SC5200	2SA1943	15	230	150	30	5	1	
2SC5359	2SA1987	15	230	180	30	5	1	
2SC5949	2SA2121	15	200	220	30/25	5	1	

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*: New product

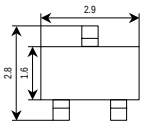
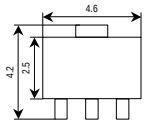
Transistors for MOS Gate Drivers/Compact Motor Drivers (2-in-1 Transistors)

Part Number	Polarity	Absolute Maximum Ratings				h_{FE}		V_{CE}	I_C	$V_{CE(sat)}$			Package	Circuit Configuration (Top View)
		V_{CEO} (V)	I_C (A)	I_{CP} (A)	P_C (Note 1) (mW)	Min	Max	(V)	(A)	(V) Max	I_C (A)	I_B (mA)		
HN4B101J	PNP	−30	−1.0	−5	550	200	500	−2	−0.12	−0.2	−0.4	−13	SMV	
	NPN	30	1.2	5	550	200	500	2	0.12	0.17	0.4	13		
HN4B102J	PNP	−30	−1.8	−8	750	200	500	−2	−0.2	−0.2	−0.6	−20		
	NPN	30	2	8	750	200	500	2	0.2	0.14	0.6	20		
TPC6901A	PNP	−50	−0.7	−5	400	200	500	−2	−0.1	−0.23	−0.3	−10	VS-6	
	NPN	50	1	5	400	400	1000	2	0.1	0.17	0.3	6		
TPC6902	PNP	−30	−2	−8	400	200	500	−2	−0.2	−0.2	−0.6	−20		
	NPN	30	2	8	400	200	500	2	0.2	0.14	0.6	20		
TPCP8901	PNP	−50	−0.8	−5	830	200	500	−2	−0.1	−0.21	−0.3	−10	PS-8	
	NPN	50	1	5	830	400	1000	2	0.1	0.17	0.3	6		
TPCP8902	PNP	−30	−2	−8	890	200	500	−2	−0.2	−0.2	−0.6	−20		
	NPN	30	2	8	890	200	500	2	0.2	0.14	0.6	20		

Note 1: The rating applies when the transistor is mounted on an FR4 board (Cu area = 645 mm^2, glass-epoxy, t = 1.6 mm) and is in single-device operation.
Thickness of cu: 70 μm for SMV/PS-8, 35 μm for VS-6

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

(1-in-1 Transistors)

Part Number	Polarity	Absolute Maximum Ratings			h_{FE}		V_{CE}	I_C	$V_{CE(sat)}$			Complementary	Package	Remarks
		V_{CEO} (V)	I_C (A)	P_C (Note 1) (mW)	Min	Max	(V)	(A)	(V) Max	I_C (A)	I_B (mA)			
2SA2058	PNP	−10	−1.5	500	200	500	−2	−0.2	−0.19	−0.6	−20	2SC5755	TSM  (mm)	
2SA2065		−20	−1.5	500	200	500	−2	−0.15	−0.14	−0.5	−17	2SC5784		
2SA2061		−20	−2.5	625	200	500	−2	−0.5	−0.19	−1.6	−53	2SC5735		
S3C83 ++		−50	−1	500	200	500	−2	−0.1	−0.18	−0.3	−10	S3C82 ++		
2SA2056		−50	−2	625	200	500	−2	−0.3	−0.20	−1.0	−33	2SC5692		
2SC5755	NPN	10	2	500	400	1000	2	0.2	0.12	0.6	12	2SA2058		
2SC5784		20	1.5	500	400	1000	2	0.15	0.12	0.5	10	2SA2065		
2SC5738		20	3.5	625	400	1000	2	0.5	0.15	1.6	32	2SA2061		
2SC6062		30	5	800	250	400	2	0.5	0.12	1.6	53	S3P84		(Note 2)
S3C82 ++		50	1	500	400	1000	2	0.1	0.17	0.3	6	S3C83 ++		
2SC5692		50	2.5	625	400	1000	2	0.3	0.14	1.0	20	2SA2056		
2SA2066	PNP	−10	−2	1000	200	500	−2	−0.2	−0.19	−0.6	−20	2SC5785	PW-Mini  (mm)	
2SA2069		−20	−1.5	1000	200	500	−2	−0.15	−0.14	−0.5	−17	2SC5819		
2SA2059		−20	−3	1000	200	500	−2	−0.5	−0.19	−1.6	−53	2SC5714		
2SA2070		−50	−1	1000	200	500	−2	−0.1	−0.18	−0.3	−10	2SC5810		
2SA2060		−50	−2	1000	200	500	−2	−0.3	−0.20	−1.0	−33	2SC5712		
2SC5785	NPN	10	2	1000	400	1000	2	0.2	0.12	0.6	12	2SA2066		
2SC5819		20	1.5	1000	400	1000	2	0.15	0.12	0.5	10	2SC2069		
2SC5714		20	4	1000	400	1000	2	0.5	0.15	1.6	32	2SA2059		
2SC5810		50	1	1000	400	1000	2	0.1	0.17	0.3	6	2SA2070		
2SC5712		50	3	1000	400	1000	2	0.3	0.14	1	20	2SA2060		
2SC6126		50	3	1000	250	400	2	0.3	0.2	1	33	2SA2217 **		(Note 2)

Note 1: The rating applies when the transistor is mounted on an FR4 board (Cu area = 645 mm^2, t = 1.6 mm).

Note 2: Ultra-high-speed using by the Super Hi-Met process and Low $V_{CE(sat)}$ products.

*: New product

++: Being planned

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Transistors for Switching Power Supplies (For AC/DC Converters)

Part Number	Applications	Absolute Maximum Ratings (Ta = 25°C)				Package
		V_{CBO} (V)	V_{CEO} (V)	I_C (A)	P_C (W) T_C = 25°C (♣ Ta = 25°C)	
2SC3425	Switching regulator	500	400	0.8	10	TO-126
2SC5075				2	1.3♣	TPS
2SC5930		600	285	1	1♣	MSTM
2SC6010				1	1♣	MSTM
2SC6034				1	1♣	MSTM
2SC5548			370	2	15	PW-Mold
2SC5548A			400	2	15	PW-Mold
2SC5208				0.8	1.3♣	TPS
2SC5458				0.8	10	PW-Mold
2SC4917				2	10	TO-126
TTC003 *				1.5	1.1♣	PW-Mold
2SC5459				3	25	TO-220NIS
2SC5266A				5	1.8♣	TPL
2SC5355				5	25	DP
2SC5172				5	25	TO-220NIS
2SC5352				10	80	TO-3P(N)
2SC5351			450	2	1.3♣	TPS
2SC5368				2	10	TO-126
2SC6042		800	375	1	1♣	MSTM
2SC6040			410	1	1♣	MSTM
2SC6142 *			375	1.5	1.1♣	PW-Mold
2SC5465		900	800	0.8	20	PW-Mold
2SC5562				0.8	1.3♣	TPS
2SC5353				3	25	TO-220NIS
2SC5356				3	25	DP
2SC5361				3	40	TO-220FL
2SC5354				5	100	TO-3P(N)
2SC3307				10	150	TO-3P(L)
2SC5439		1000	450	8	30	TO-220NIS

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*: New product

Transistors for High-Voltage Power Supplies (For DC/DC Converters)

Part Number	Absolute Maximum Ratings				hFE				$V_{CE\ (sat)}$ (V)			Package
	V_{CEX} (V)	V_{CEO} (V)	I_C (A)	P_C (W)	Min	Max	V_{CE} (V)	I_C (A)	Max	I_C (A)	I_B (mA)	
2SC6061	150	120	1	0.625 (Note 1)	120	300	2	0.1	0.14	0.3	10	TSM
TPCP8510 *	150	120	1	1.1 (Note 1)	120	300	2	0.1	0.14	0.3	10	PS-8
TPCP8507	150	120	1	1.25 (Note 1)	120	300	2	0.1	0.14	0.3	10	PS-8
2SC6076	160	80	3	10 (Note 2)	180	450	2	0.5	0.5	1	100	PW-Mold
2SC6124	160	80	2	1 (Note 1)	100	200	2	0.5	0.5	1	100	PW-Mini
2SC6079	160	80	2	1 (Note 3)	180	450	2	0.5	0.5	1	100	MSTM
2SC6075	160	80	2.5	1.3 (Note 3)	180	450	2	0.5	0.5	1	100	TPS
2SC6087	160	80	2.5	1.3 (Note 3)	100	200	2	0.5	0.5	1	100	TPS
2SC6077	160	80	3	1.8 (Note 3)	180	450	2	0.5	0.5	1	100	TPL
2SC6078	160	80	3	1.8 (Note 3)	100	200	2	0.5	0.5	1	100	TPL

Note 1: The rating applies when the transistor is mounted on an FR4 board (Cu area = 645 mm^2, glass-epoxy, t = 1.6 mm). *: New product

Note 2: Tc = 25°C

Note 3: Ta = 25°C

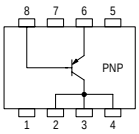
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

(Transistors for Droppers)

Part Number	Absolute Maximum Ratings			hFE				$V_{CE\ (sat)}$ (V)			Package
	V_{CEO} (V)	I_C (A)	P_C (W) Tc = 25°C	Min	Max	V_{CE} (V)	I_C (A)	Max	I_C (A)	I_B (mA)	
2SB906	−60	−3	20	60	200	−5	−0.5	−1.7	−3	−300	PW-Mold
2SB1667	−60	−3	25	60	300	−5	−0.5	−1.7	−3	−300	TO-220SM
2SA2183	−60	−5	20	200	500	−2	−0.5	−1	−1.6	−53	TO-220SIS
TTB001 *	−60	−3	30	100	250	−5	−0.5	−1.7	−3	−300	TFP
TTB002 *	−60	−3	25	100	250	−5	−0.5	−1.7	−3	−300	PW-Mold

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components. *: New product

(High-Voltage Transistors)

Part Number	Absolute Maximum Ratings			Package	Circuit Configuration (Top View)	Remarks
	V_{CEO} (V)	I_C (A)	P_C (W)			
2SA1972	−400	−0.5	0.9	LSTM	TPCP8604  	
2SA1971	−400	−0.5	1	PW-Mini		
TPCP8604	−400	−0.3	1	PS-8		SMD
2SA1925	−400	−0.5	1.2	TPS		
2SA1923	−400	−0.5	10	PW-Mold		
2SA2184	−550	−1	1	PW-Mold		SMD only
2SA1937	−600	−0.5	1	PW-Mold		Through-hole only
2SA2142	−600	−0.5	10	PW-Mold		SMD only
2SC5122	400	0.05	0.9	LSTM		
2SC5307	400	0.05	1	PW-Mini		
2SC5201	600	0.05	0.9	LSTM		SMD
2SC6127 *	800	0.05	10	PW-Mold		
2SC5465	800	0.8	20	PW-Mold		SMD only
2SC4686A	1200	0.05	10	TO-220NIS		
2SC5563	1500	0.02	10	TO-220NIS		

- The circuit configuration diagrams only show the general configurations of the circuits. *: New product
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Low Saturation Voltage Transistors (Small Surface-Mount Packages for Personal Equipments)

Part Number	Configuration	Absolute Maximum Ratings					hFE				$V_{CE(sat)}$ (V)			Marking	Package
		V_{CEO} (V)	I_C (A)	I_{CP} (A)	Pc (mW) (Note 1)	Pc (mW) (Note 1) t = 10 s	Min	Max	V_{CE} (V)	I_C (A)	Max	I_C (A)	I_B (mA)		
2SA2058	PNP single	−10	−1.5	−2.5	500	750	200	500	−2	−0.2	−0.19	−0.6	−20	WM	TSM (equivalent to SC-59 SOT-23)
2SA2065		−20	−1.5	−2.5	500	750	200	500	−2	−0.15	−0.14	−0.5	−17	WK	
2SA2061		−20	−2.5	−4	625	1000	200	500	−2	−0.5	−0.19	−1.6	−53	WE	
S3C83 ++		−50	−1	−2	500	750	200	500	−2	−0.1	−0.18	−0.3	−10	WH	
2SA2056		−50	−2	−3.5	625	1000	200	500	−2	−0.3	−0.20	−1.0	−33	WF	
2SC5755	NPN single	10	2	3.5	500	750	400	1000	2	0.2	0.12	0.6	12	WL	
2SC5784		20	1.5	2.5	500	750	400	1000	2	0.15	0.12	0.5	10	WJ	
2SC5738		20	3.5	6	625	1000	400	1000	2	0.5	0.15	1.6	32	WD	
2SC5976		30	3	5	625	1000	250	400	2	0.3	0.14	1.0	33	WW	
2SC5906		30	4	7	800	1250	200	500	2	0.5	0.2	1.6	53	WP	
2SC6062		30	5	10	800	1250	250	400	2	0.5	0.12	1.6	53	WR	
S3C82 ++		50	1	2	500	750	400	1000	2	0.1	0.17	0.3	6	WG	
2SC5692		50	2.5	4	625	1000	400	1000	2	0.3	0.14	1.0	20	WB	
2SC6033		50	2.5	5	625	1000	250	400	2	0.3	0.18	1.0	33	WX	
2SC5703		50	4	7	800	1250	400	1000	2	0.5	0.12	1.6	32	WA	
2SC6061		120	1	2	625	1000	120	300	2	0.1	0.14	0.3	10	WN	
HN4B101J	PNP + NPN	±30	−1/1.2	±5	550	850	200	500	±2	±0.12	−0.2/0.17	±0.4	13	5K	SMV
HN4B102J		±30	−1.8/2	±8	750	750	200	500	±2	±0.2	−0.2/0.14	±0.6	±20	5L	
2SA2066	PNP single	−10	−2	−3.5	1000	2000	200	500	−2	−0.2	−0.19	−0.6	−20	4E	PW-Mini (equivalent to SC-62 SOP-89)
2SA2069		−20	−1.5	−2.5	1000	2000	200	500	−2	−0.15	−0.14	−0.5	−17	4D	
2SA2059		−20	−3	−5	1000	2500	200	500	−2	−0.5	−0.19	−1.6	−53	4F	
2SA2070		−50	−1	−2	1000	2000	200	500	−2	−0.1	−0.18	−0.3	−10	4C	
2SA2060		−50	−2	−3.5	1000	2500	200	500	−2	−0.3	−0.20	−1.0	−33	4G	
2SA2206		−80	−2	−4	1000	2500	100	200	−2	−0.5	−0.5	−1.0	−100	4K	
2SC5785	NPN single	10	2	3.5	1000	2000	400	1000	2	0.2	0.12	0.6	12	3E	
2SC5713		10	4	7	1000	2500	400	1000	2	0.5	0.15	1.6	32	2C	
2SC5819		20	1.5	2.5	1000	2000	400	1000	2	0.15	0.12	0.5	10	3D	
2SC6125		20	4	8	1000	2500	180	390	2	0.5	0.2	1.6	53	4L	
2SC5714		20	4	7	1000	2500	400	1000	2	0.5	0.15	1.6	32	2E	
2SC5810		50	1	2	1000	2000	400	1000	2	0.1	0.17	0.3	6	3C	
2SC6126		50	3	6	1000	2500	250	400	2	0.3	0.2	1.0	33	4M	
2SC5712		50	3	5	1000	2500	400	1000	2	0.3	0.14	1	20	2A	
2SC6124		80	2	4	1000	2500	100	200	2	0.5	0.5	1.0	100	4J	
TPC6501	NPN single	10	2	3.5	800	1600	400	1000	2	0.2	0.12	0.6	12	H2A	VS-6 (equivalent to TSOP-6)
TPC6502		50	3	5	800	1600	400	1000	2	0.3	0.14	1	20	H2B	
TPC6503		20	1.5	2.5	800	1600	400	1000	2	0.15	0.12	0.5	10	H2C	
S3F61 ++		10	4	6	800	1600	400	1000	2	0.5	0.15	1.6	32	—	
S3F62 ++		20	4	6	800	1600	400	1000	2	0.5	0.15	1.6	32	—	
TPC6504 *		50	1	2	800	1600	400	1000	2	0.1	0.17	0.3	6	H2D	
TPC6601	PNP single	−50	−2	−3.5	800	1600	200	500	−2	−0.3	−0.20	−1.0	−33	H3A	
TPC6602		−10	−2	−3.5	800	1600	200	500	−2	−0.2	−0.19	−0.6	−20	H3B	
TPC6603		−20	−3	−5	800	1600	200	500	−2	−0.5	−0.19	−1.6	−53	H3C	
S3F56 ++		−20	−1.5	−2.5	800	1600	200	500	−2	−0.15	−0.14	−0.5	−17	—	
TPC6604 *		−50	−1	−2	800	1600	200	500	−2	−0.1	−0.18	−0.3	−10	H3D	
TPC6701	NPN/dual	50	1	2	660 (Note 2)	—	400	1000	2	0.1	0.17	0.3	6	H4A	
TPC6901A	PNP + NPN	±50	−0.7/1.0	±5	400	500	200/400	500/1000	±2	±0.1	−0.23/0.17	±0.3	−10/6	H6B	
TPC6902		±30	±2	±8	400	TBD	200	500	2	0.2	−0.2/0.14	±0.6	±20	H6C	

Note 1: The rating applies when the transistor is mounted on an FR4 board (Cu area = 645 mm^2, glass-epoxy, t = 1.6 mm).

Note 2: Total loss of dual-device operation

*: New product

++: Being planned

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Low Saturation Voltage Transistors (Small Surface-Mount Packages for Personal Equipments) (Continued)

Part Number	Configuration	Absolute Maximum Ratings					hFE				$V_{CE\ (sat)}$ (V)			Marking	Package
		V_{CEO} (V)	I_C (A)	I_{CP} (A)	P_C (mW) (Note 1)	P_C (mW) (Note 1) t = 10 s	Min	Max	V_{CE} (V)	I_C (A)	Max	I_C (A)	I_B (mA)		
2SA2097	PNP single	−50	−5	−10	20 (Note 3)	—	200	500	−2	−0.5	−0.27	−1.6	−53	A2097	PW-Mold SC-63
2SA1241		−50	−2	−3	10 (Note 3)	—	70	240	−2	−0.5	−0.5	−1	−50	A1241	
2SA1244		−50	−5	−8	20 (Note 3)	—	70	240	−1	−1	−0.4	−3	−150	A1244	
2SC6076	NPN single	80	3	5	10 (Note 3)	—	180	450	2	0.5	0.5	1	100	C6076	
2SC5886		50	5	10	20 (Note 3)	—	400	1000	2	0.5	0.22	1.6	32	C5886	
2SC5886A		50	5	10	20 (Note 3)	—	400	1000	2	0.5	0.22	1.6	32	C5886A	
2SC3076		50	2	3	10 (Note 3)	—	70	240	2	0.5	0.5	1	50	C3076	
2SC3474		80	2	3	20 (Note 3)	—	500	—	1	0.4	0.5	0.3	1	C3474	
2SC6052		20	5	7	10 (Note 3)	—	180	390	2	0.5	0.2	1.6	53	C6052	
2SC3074		50	5	8	20 (Note 3)	—	70	240	1	1	0.4	3	150	C3074	
S3H32 ++		50	5	7	20 (Note 3)	—	200	500	2	0.5	0.2	1.6	53		
2SC3303		80	5	8	20 (Note 3)	—	70	240	1	1	0.4	3	150	C3303	
2SC6000		50	7	10	20 (Note 3)	—	250	400	2	2.5	0.18	2.5	83	C6000	
TPCP8501	NPN single	100	2	4	1300	3300	100	300	2	0.3	0.2	1	33	8501	PS-8
TPCP8507		120	1	2	1250	3000	120	300	2	0.1	0.14	0.3	10	8507	
TPCP8505		50	3	5	1250	3000	400	1000	2	0.3	0.14	1	20	8505	
TPCP8504		10	2	3.5	1200	2800	400	1000	2	0.2	0.12	0.6	12	8504	
TPCP8601	PNP single	−20	−4	−7	1300	3300	200	500	−2	−0.6	−0.19	−2	−67	8601	
TPCP8603		−120	−1	−2	1250	3000	120	300	−2	−0.1	−0.2	−0.3	−10	8603	
TPCP8602		−50	−2.5	−4	1250	3000	200	500	−2	−0.3	−0.2	−1	−33	8602	
TPCP8701	NPN/dual	50	2	3	940	1770	400	1000	2	0.3	0.14	1	20	8701	
TPCP8801 ++	PNP/dual	−30	−1.2	−2	830	1480	200	500	−2	−0.12	−0.30	−0.4	−13	8801	
TPCP8H01 (Note 2)	NPN + S-MOS	50	5	7	1000	2000	250	400	2	0.5	0.13	1.6	53	8H01	
TPCP8H02 (Note 2)		30	3	5	1000	2000	250	400	2	0.3	0.14	1	33	8H02	
TPCP8F01	PNP + S-MOS	−20	−3	−5	1000	—	200	500	−2	−0.5	−0.19	−1.6	−53	8F01	
TPCP8901	PNP + NPN	±50	−0.8/1.0	±5	830	1480	200/400	500/1000	±2	±0.1	−0.2/0.17	±0.3	−10/6	8901	
TPCP8902 *		±30	±2	±8	890	1670	200	500	2	0.2	−0.2/0.14	±0.6	±20	8902	
TPCP8L01 (Note 4)	NPN Darlington + HED	120	0.9	2	900	—	2000	9000	2	1	1.5	1	1	8L01	
TPCP8G01 (Note 5) *	PNP + Pch	−20	−3	−5	940	1770	200	500	−2	−0.5	−0.19	−1.6	−53	8G01	

Note 1: The rating applies when the transistor is mounted on an FR4 board (Cu area = 645 mm^2, glass-epoxy, t = 1.6 mm).

Note 2: Built-in SBD, V_{RRM} = 30 V, I_O = 0.7 A, V_F = 0.4 V (MAX)@I_F = 0.5 A, I_R = 100 μA (MAX)@V_R = 10 V

Note 3: T_C = 25°C

Note 4: Built-in HED, V_{RRM} = 200 V, $I_{F(AV)}$ = 1 A

Note 5: Pch MOS V_{DSS} = −20 V, I_D = −2 A, R_{ON} = 130 mΩ Max

*: New product

++: Being planned

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

(Power-Mold Transistors (SC-63/64))

Part Number	Applications	Absolute Maximum Ratings (Ta = 25°C)				Complementary	Equivalent Product	Remarks
		V_{CEO} (V)	I_C (A)	P_C (W)	★P_C (W)			
2SA1225	Power amplification for driver	−160	−1.5	1.0	15	2SC2983	—	
2SC2983		160	1.5	1.0	15	2SA1225	—	
2SA1241	Power amplification	−50	−2.0	1.0	10	2SC3076	2SA1892	
2SC3076		50	2.0	1.0	10	2SA1241	2SC5029	
2SA1242	Strobe flash, power amplification	−20	−5.0	1.0	10	2SC3072 (★★)	2SA1893	
2SC3072		20	5.0	1.0	10	2SA1242 (★★)	2SC3420	
2SC4684		20	5.0	1.0	10	—	2SC5030	High β
2SA1244	High-current switching	−50	−5.0	1.0	20	2SC3074	2SA1905	
2SC3074		50	5.0	1.0	20	2SA1244	2SC5076	
2SA2097		−50	−5.0	1.0	20	—	—	High β
2SC5886		50	5.0	1.0	20	—	—	High β
2SC5886A		50	5	1.0	20	—	—	High β, V_{CBO} = 120 V
2SB905	TV vertical output, TV audio output (B) class	−150	−1.5	1.0	10	2SD1220	2SA1408	
2SD1220		150	1.5	1.0	10	2SB905	2SC3621	
2SB906	Low-frequency power amplification Switching, power amplification	−60	−3.0	1.0	20	2SD1221	2SB834	
2SD1221		60	3.0	1.0	20	2SB906	2SD880	
TTB002 *		−60	−3.0	1.0	25	—	—	
2SB907	Switching, power amplification	−40	−3.0	1.0	15	2SD1222	—	Darlington type
2SD1222		40	3.0	1.0	15	2SB907	—	Darlington type
2SC6076		80	3	—	10	—	—	
2SB908		−80	−4.0	1.0	15	2SD1223	—	Darlington type
2SD1223		80	4.0	1.0	15	2SB908	—	Darlington type
2SD1224	Power amplification	30	1.5	1.0	10	—	2SD2481	Darlington type
2SD1160	Motor control	50 (V_{CBO})	2.0	1.0	10	—	—	
2SC3474	Switching, solenoid drive	80	2.0	1.0	20	—	—	
2SC3303	Switching	80	5.0	1.0	20	—	2SC3258	
2SA1923	High-voltage switching	−400	−0.5	1.0	10	—	2SA1925	
2SA2034		−400	−2	1.0	15	—	—	
2SA2184		−550	−1	—	10	—	—	
2SA2142		−600	−0.5	—	15	—	—	
2SC3075		400	0.8	1.0	10	—	2SC5208	
2SC5458		400	0.8	1.0	10	—	—	
2SC5548		370	2	1.0	15	—	—	
2SC5548A		400	2	1.0	15	—	—	
2SC6127		800	0.05	1.0	10	—	—	
2SC3405		800	0.8	1.0	20	—	—	
2SC5465		800	0.8	1.0	20	—	—	
2SC6142 *		375	1.5	1.1	—	—	—	
TTC003 *		400	3	1.1	—	—	—	

★: T_C = 25°C

★★: h_{FE} classification varies

*: New product

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

(PW-Mini Transistors (SC-62))

Part Number		Absolute Maximum Ratings					hFE				$V_{CE(sat)}$			f_T			Marking		Equivalent to TO-92MOD (TO-92)		Remarks/ Applications
		P_C (W)	P_C (W) (Note 1)	P_C (W) (Note 2)	V_{CEO} (V)	I_C (A)			V_{CE} (V)	I_C (mA)	(V) Max	I_C (mA)	I_B (mA)	(MHz) Typ.	V_{CE} (V)	I_C (mA)					
NPN	PNP						Min	Max									NPN	PNP	NPN	PNP	
2SC2881	2SA1201	0.5	1.0	—	120	0.8	80	240	5	100	1.0	500	50	120	5	100	C□	D□	2SC2235	2SA965	Audio driver
2SC2882	2SA1202	0.5	1.0	—	80	0.4	70	240	2	50	0.4	200	20	120/100	10	10	E□	F□	(2SC1627)	(2SA817)	Low saturation
2SC2883	2SA1203	0.5	1.0	—	30	1.5	100	320	2	500	2.0	1500	30	120	2	500	G□	H□	2SC2236	2SA966	Audio driver
2SC2884	2SA1204	0.5	1.0	—	30	0.8	100	320	1	100	0.5/0.7	500	20	120	5	10	P□	R□	(2SC2120)	(2SA950)	Low saturation
2SC3515	2SA1384	0.5	1.0	—	300	0.1	30	150	10	20	0.5	20	2	60	10	20	I□	J□	(2SC2551)	(2SA1091)	Low saturation
2SC3803	2SA1483	0.5	1.0	—	45	0.2	40	240	1	10	0.3	100	10	200	10	10	V□	W□	—	—	Low saturation
—	2SA1734	0.5	1.0	—	30	1.2	120	400	2	100	0.5	700	35	100	2	100	—	LB	—	—	Low saturation
2SD1784	—	0.5	1.0	—	30	1.5	4000	—	2	150	1.5	1000	1	—	—	—	XN	—	2SD1140	—	Driver (Darlington)
2SC5785	—	—	—	1	10	2	400	1000	2	200	0.12	600	12	—	—	—	3E	—	—	—	Low saturation
—	2SA2066	—	—	1	−10	−2	200	500	−2	−200	−0.19	−600	−20	—	—	—	—	4E	—	—	Low saturation
2SC5713	—	—	—	1	10	4	400	1000	2	500	0.15	1600	32	—	—	—	2C	—	—	—	Low saturation
2SC5819	—	—	—	1	20	1.5	400	1000	2	150	0.12	500	10	—	—	—	3D	—	—	—	Low saturation
—	2SA2069	—	—	1	−20	−1.5	200	500	−2	−150	−0.14	−500	−17	—	—	—	—	4D	—	—	Low saturation
2SC6125	—	—	—	1	20	4	180	390	2	500	0.20	1800	53	—	—	—	4L	—	—	—	High-speed switching
2SC5714	—	—	—	1	20	4	400	1000	2	500	0.15	1600	32	—	—	—	2E	—	—	—	Low saturation
—	2SA2059	—	—	1	−20	−3	200	500	−2	−500	−0.19	−1600	−53	—	—	—	—	4F	—	—	Low saturation
2SC6126	—	—	—	1	50	3	250	400	2	300	0.18	1000	33	—	—	—	4M	—	—	—	High-speed switching
2SC5712	—	—	—	1	50	3	400	1000	2	300	0.14	1000	20	—	—	—	2A	—	—	—	Low saturation
—	2SA2060	—	—	1	−50	−2	200	500	−2	−300	−0.20	−1000	−33	—	—	—	—	4G	—	—	Low saturation
2SC5810	—	—	—	1	50	1	400	1000	2	100	0.17	300	6	—	—	—	3C	—	—	—	Low saturation
—	2SA2070	—	—	1	−50	−1	200	500	−2	−100	−0.18	−300	−10	—	—	—	—	4C	—	—	Low saturation
2SD2686	—	—	—	1	60±10	1	2000	—	2	1000	1.5	1000	1	—	—	—	3H	—	—	—	Darlington
2SC6124	—	—	—	1	80	2	100	200	2	500	0.5	1000	100	—	—	—	4J	—	—	—	Low saturation
—	2SA2206	—	—	1	−80	−2	100	200	−2	−500	−0.5	−1000	−100	—	—	—	—	4K	—	—	Low saturation

Note: The h_{FE} classification that appears instead of the □ shown in the Marking column will be one of the following: A, B, C, D, O, R or Y, according to the rank.

Note 1: The rating applies when the transistor is mounted on a ceramic board (250 mm^2 x 0.8 mm).

Note 2: The rating applies when the transistor is mounted on a glass-epoxy board (645 mm^2 x 1.6 mm).

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

(TSM Transistors)

Part Number	Absolute Maximum Ratings					hFE				$V_{CE(sat)}$ (V)			Marking	Remarks/ Applications
NPN	V_{CEO} (V)	I_C (A)	I_{CP} (A)	Pc (mW) (Note 1)	Pc (mW) (Note 1) t = 10s	Min	Max	V_{CE} (V)	I_C (A)	Max	I_C (A)	I_B (mA)		
2SA2058	−10	−1.5	−2.5	500	750	200	500	−2	−0.2	−0.19	−0.6	−20	WM	Low saturation
2SA2065	−20	−1.5	−2.5	500	750	200	500	−2	−0.15	−0.14	−0.5	−17	WK	Low saturation
2SA2061	−20	−2.5	−4	625	1000	200	500	−2	−0.5	−0.19	−1.6	−53	WE	Low saturation
S3C83 ++	−50	−1	−2	500	750	200	500	−2	−0.1	−0.18	−0.3	−10	WH	Low saturation
2SA2056	−50	−2	−3.5	625	1000	200	500	−2	−0.3	−0.20	−1.0	−33	WF	Low saturation
2SC5755	10	2	3.5	500	750	400	1000	2	0.2	0.12	0.6	12	WL	Low saturation
2SC5784	20	1.5	2.5	500	750	400	1000	2	0.15	0.12	0.5	10	WJ	Low saturation
2SC5738	20	3.5	6	625	1000	400	1000	2	0.5	0.15	1.6	32	WD	Low saturation
2SC5976	30	3	5	625	1000	250	400	2	0.3	0.14	1.0	33	WW	Ultra-high-speed switching Low saturation voltage
2SC5906	30	4	7	800	1250	200	500	2	0.5	0.2	1.6	53	WP	Ultra-high-speed switching Low saturation voltage
2SC6062 *	30	5	10	800	1250	250	400	2	0.5	0.12	1.6	53	WR	Ultra-high-speed switching Ultra-low saturation voltage
S3C82 ++	50	1	2	500	750	400	1000	2	0.1	0.17	0.3	6	WG	Low saturation
2SC5692	50	2.5	4	625	1000	400	1000	2	0.3	0.14	1.0	20	WB	Low saturation
2SC6033	50	2.5	5	625	1000	250	400	2	0.3	0.18	1.0	33	WX	Ultra-high-speed switching Low saturation voltage
2SC5703	50	4	7	800	1250	400	1000	2	0.5	0.12	1.6	32	WA	Low saturation
2SD2719	60 ± 10	0.8	3	800	1250	2000	—	2	1.0	1.5	1	1	WV	Darlington
2SC6061	120	1	2	625	1000	120	300	2	0.1	0.14	0.3	10	WN	Low saturation

Note 1: The rating applies when the transistor is mounted on an FR4 board (Cu area = 645 mm^2, glass-epoxy, t = 1.6 mm).

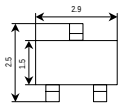
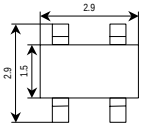
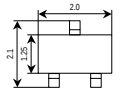
*: New product

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

++: Being planned

Radio-Frequency Bipolar Small-Signal Transistors

Radio-Frequency Bipolar Transistors

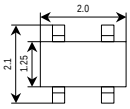
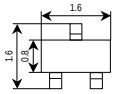
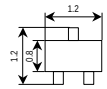
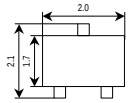
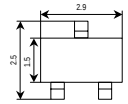
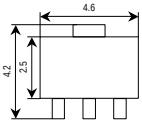
Part Number	Package	Applications	Absolute Maximum Ratings (Ta = 25°C)				Marking	TO-92 Equivalent Product	Remarks (Mini Transistors)
			V_{CEO} (V)	I_C (mA)	P_C (mW)	T_j (°C)			
2SC2714	S-MINI 	FM-band radio-frequency amps	30	20	100	125	Q☐	**2SC1923**	
2SC2715		AM frequency converter, FM IF amps	30	50	150	125	R☐	**2SC380TM**	
2SC2716		AM radio-frequency amps	30	100	150	125	F☐	**2SC941TM**	
2SC3123		VHF TV frequency converters	20	50	150	125	HE	2SC3136	f_T = 1.4 GHz
2SC5064		VHF/UHF-band low-noise amps	12	30	150	125	MA☐	—	f_T = 7 GHz
2SC5084		VHF/UHF-band low-noise amps	12	80	150	125	MC☐	—	f_T = 7 GHz
2SC5089		VHF/UHF-band low-noise amps	10	40	150	125	MD☐	—	f_T = 10 GHz
2SC5094		VHF/UHF-band low-noise amps	10	15	150	125	ME☐	—	f_T = 10 GHz
2SC5106		VHF/UHF oscillators	10	30	150	125	MF☐	—	f_T = 6 GHz
2SC5109		VHF/UHF oscillators	10	60	150	125	MG☐	—	f_T = 5 GHz
MT3S03A		VHF/UHF band, low voltage operation, low phase noise	5	40	150	125	MR	—	f_T = 10 GHz
MT3S04A		VHF/UHF band, low voltage operation, low phase noise	5	40	150	125	AE	—	f_T = 7 GHz
MT3S106		VHF/UHF band low noise, low distortion amps	6	80	700 (Note 1)	150	R2	—	f_T = 13 GHz
2SC5087	SMQ 	VHF/UHF-band low-noise amps	12	80	150	125	C☐	—	f_T = 7 GHz
2SC5087R		VHF/UHF-band low-noise amps	12	80	150	125	ZP	—	f_T = 7 GHz
2SC5092		VHF/UHF-band low-noise amps	10	40	150	125	D☐	—	f_T = 10 GHz
MT4S03A		VHF/UHF band, low voltage operation, low phase noise	5	40	150	125	MR	—	f_T = 10 GHz
MT4S04A		VHF/UHF band, low voltage operation, low phase noise	5	40	150	125	AE	—	f_T = 7 GHz
2SC4215	USM 	FM-band radio-frequency amps	30	20	100	125	Q☐	2SC1923	f_T = 550 MHz
2SC4250		VHF TV frequency converters	20	50	100	125	HE	2SC3136	f_T = 1.4 GHz
2SC5065		VHF/UHF-band low-noise amps	12	30	100	125	MA☐	—	f_T = 7 GHz
2SC5085		VHF/UHF-band low-noise amps	12	80	100	125	MC☐	—	f_T = 7 GHz
2SC5090		VHF/UHF-band low-noise amps	10	40	100	125	MD☐	—	f_T = 10 GHz
2SC5095		VHF/UHF-band low-noise amps	10	15	100	125	ME☐	—	f_T = 10 GHz
2SC5107		VHF/UHF oscillators	10	30	100	125	MF☐	—	f_T = 6 GHz
2SC5110		VHF/UHF oscillators	10	60	100	125	MG☐	—	f_T = 5 GHz
2SC5463		VHF/UHF-band low-noise amps	12	60	100	125	MX/MY	—	f_T = 7 GHz
MT3S03AU		VHF/UHF band, low voltage operation, low phase noise	5	40	100	125	MR	—	f_T = 10 GHz
MT3S04AU		VHF/UHF band, low voltage operation, low phase noise	5	40	100	125	AE	—	f_T = 7 GHz
MT3S16U		UHF-band, low-voltage oscillators and amplifiers	5	60	100	125	T4	—	f_T = 4 GHz

☐: Denotes a h_{FE} class.

Note 1: Mounted on a ceramic board

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Radio-Frequency Bipolar Transistors (Continued)

Part Number	Package	Applications	Absolute Maximum Ratings (Ta = 25°C)				Marking	TO-92 Equivalent Product	Remarks
			V_{CEO} (V)	I_C (mA)	P_C (mW)	T_j (°C)			
2SC5088	USQ	VHF/UHF-band low-noise amps	12	80	100	125	MC☐	—	f_T = 7 GHz
2SC5319		VHF/UHF-band low-noise amps	5	20	100	125	MT	—	f_T = 16 GHz
MT4S03AU		VHF/UHF band, low voltage operation, low phase noise	5	40	100	125	MR	—	f_T = 10 GHz
MT4S06U		VHF/UHF band, low voltage operation, low noise	5	15	60	125	AC	—	f_T = 10 GHz
MT4S32U		VHF/UHF band, low voltage operation, low noise	4.5	15	67.5	125	U4	—	f_T = 16 GHz
2SC4915		FM-band radio-frequency amps	30	20	100	125	Q☐	**2SC1923**	f_T = 550 MHz
2SC5066		VHF/UHF-band low-noise amps	12	30	100	125	M1/M2	—	f_T = 7 GHz
2SC5086		VHF/UHF-band low-noise amps	12	80	100	125	M5/M6	—	f_T = 7 GHz
2SC5091	SSM	VHF/UHF-band low-noise amps	10	40	100	125	M7/M8	—	f_T = 10 GHz
2SC5096		VHF/UHF-band low-noise amps	10	15	100	125	M9/MA	—	f_T = 10 GHz
2SC5108		VHF/UHF oscillators	10	30	100	125	MB/MC	—	f_T = 6 GHz
2SC5111		VHF/UHF oscillators	10	60	100	125	MD/ME	—	f_T = 5 GHz
2SC5322		VHF/UHF-band low-noise amps	5	10	100	125	MU	—	f_T = 15.5 GHz
2SC5464		VHF/UHF-band low-noise amps	12	60	100	125	MX/MY	—	f_T = 7 GHz
MT3S03AS		VHF/UHF band, low voltage operation, low phase noise	5	40	100	125	MR	—	f_T = 10 GHz
MT3S04AS		VHF/UHF band, low voltage operation, low phase noise	5	40	100	125	AE	—	f_T = 7 GHz
MT3S06S		VHF/UHF band, low voltage operation, low noise	5	15	60	125	AC	—	f_T = 10 GHz
2SC4250FV	VESM 	VHF TV frequency converters	20	50	150	125	HE	2SC3136	f_T = 1.4 GHz
MT3S03AFS		VHF/UHF band, low voltage operation, low phase noise	5	40	85 (Note 1)	125	00	—	f_T = 10 GHz
MT3S04AFS		VHF/UHF band, low voltage operation, low phase noise	5	40	85 (Note 1)	125	01	—	f_T = 7 GHz
MT3S05FS		VHF/UHF band, low voltage operation, low phase noise	5	40	85 (Note 1)	125	02	—	f_T = 4.5 GHz
MT3S06FS		VHF/UHF band, low voltage operation, low noise	5	15	85 (Note 1)	125	03	—	f_T = 10 GHz
MT3S07FS	fSM	VHF/UHF band, low voltage operation, low noise	5	25	85 (Note 1)	125	04	—	f_T = 12 GHz
MT3S11FS		VHF/UHF band, low voltage operation, low phase noise	6	40	85 (Note 1)	125	08	—	f_T = 6 GHz
MT3S12FS		VHF/UHF band, low voltage operation, low phase noise	6	40	85 (Note 1)	125	09	—	f_T = 7 GHz
MT3S14FS		VHF/UHF band, low voltage operation, low noise	2.5	30	85 (Note 1)	125	0H	—	f_T = 11 GHz
MT3S16FS		UHF-band, low-voltage oscillators and amplifiers	5	60	85 (Note 1)	125	0K	—	f_T = 4 GHz
MT3S35FS		VHF/UHF band, low voltage operation, low noise	4.5	24	100 (Note 1)	150	20	—	f_T = 20 GHz
MT3S36FS		VHF/UHF band, low voltage operation, low noise	4.5	36	100 (Note 1)	150	21	—	f_T = 19 GHz
MT3S37FS		VHF/UHF band, low voltage operation, low noise	4.5	50	100 (Note 1)	150	22	—	f_T = 19 GHz
MT3S41FS		VHF/UHF band, low voltage operation, low noise	4.5	80	100 (Note 1)	150	26	—	f_T = 15 GHz
MT3S11CT	CST3 	VHF/UHF band, low voltage operation, low phase noise	6	40	105 (Note 1)	125	08	—	f_T = 6 GHz
MT3S15TU *	UFM	VHF/UHF-band low-noise amps	6	80	900 (Note 2)	150	T3	—	f_T = 11.5 GHz
MT3S19TU *		VHF/UHF-band low-noise amps	6	80	900 (Note 2)	150	T6	—	f_T = 11 GHz
MT3S20TU *		VHF/UHF-band low-noise amps	12	80	900 (Note 2)	150	MU	—	f_T = 7 GHz
MT3S19 *	S-MINI 	VHF/UHF-band low-noise amps	6	80	800 (Note 2)	150	T6	—	f_T = 12 GHz
MT3S20P *	Pw-Mini 	VHF/UHF-band low-noise amps	12	80	1800 (Note 2)	150	MU	—	f_T = 7 GHz
MT3S21P *		VHF/UHF-band low-noise amps	6	80	1800 (Note 2)	150	T2	—	f_T = 9 GHz
MT3S22P *		VHF/UHF-band low-noise amps	6	80	1800 (Note 2)	150	T5	—	f_T = 8.5 GHz

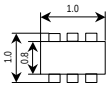
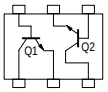
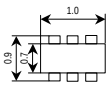
☐: Denotes a h_{FE} class. *: New product

Note 1: When mounted on a glass-epoxy PCB board

Note 2: Mounted on a ceramic board

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Dual Radio-Frequency Bipolar Transistor

Part Number	Package	Absolute Maximum Ratings (Ta = 25°C)			Structure (Q1/Q2)	fT (Q1/Q2) (GHz)	♦Internal Connections	Marking
		V_{CEO} (Q1/Q2) (V)	I_C (Q1/Q2) (mA)	P_C★ (mW)				
MT6L63FS	fS6 	5/6	25/40	110 (Note 1)	MT3S07FS/MT3S11FS	12/4.5		18
MT6L64FS		4.5/6	24/40	110 (Note 1)	MT3S35FS/MT3S11FS	19.5/6		19
MT6L65FS		4.5/6	36/40	110 (Note 1)	MT3S36FS/MT3S11FS	20/6		1F
MT6L67FS		4.5/6	36/80	110 (Note 1)	MT3S36FS/MT3S106FS	20/8.5		1J
MT6L68FS		5/6	15/40	110 (Note 1)	MT3S06FS/MT3S11FS	10/4.5		1K
MT6L70FS		4.5/6	20/80	110 (Note 1)	MT3S107FS/MT3S106FS	16.5/8.5		1U
MT6L71FS		5/6	25/40	105 (Note 1)	MT3S07FS/MT3S11AFS	12/4.5		1W
MT6L72FS		4.5/6	36/40	105 (Note 1)	MT3S36FS/MT3S11AFS	19/4.5		1X
MT6L75FS		5/6	25/80	110 (Note 1)	MT3S07FS/MT3S106FS	12/8.5		52
MT6L76FS		5/6	15/80	110 (Note 1)	MT3S06FS/MT3S106FS	10/8.5		53
MT6L77FS		6/6	40/80	110 (Note 1)	MT3S11FS/MT3S106FS	6/8.5		54
MT6L78FS		6/6	40/40	105 (Note 1)	MT3S11FS/MT3S11AFS	6/6		55
MT6L77FST	fS6T 	6/6	40/80	140	MT3S11FS/MT3S106FS	6/8.5		54

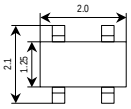
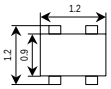
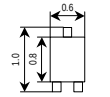
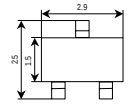
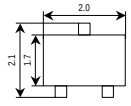
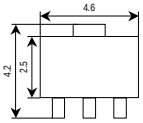
★P_C: Total power dissipation

Note 1: When mounted on a glass-epoxy PCB board

♦The internal connection diagrams only show the general configurations of the circuits.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

SiGe HBTs

Part Number	Package	Applications	Absolute Maximum Ratings (Ta = 25°C)				Marking	Remarks
			V_{CEO} (V)	I_C (mA)	P_C (mW)	T_j (°C)		
MT4S100U	USQ 	VHF/UHF band, low voltage operation, low noise	3	15	100	150	P6	fT = 22 GHz
MT4S101U		VHF/UHF band, low voltage operation, low noise	3	10	100	150	P7	fT = 21 GHz
MT4S102U		UHF/SHF band, low voltage operation, low noise	3	20	100	150	P8	fT = 24 GHz
MT4S104U		UHF/SHF band, low voltage operation, low noise	3	10	100	150	P1	fT = 23 GHz
MT4S200U		UHF/SHF band, low voltage operation, low noise	4	35	140 (Note 1)	150	P2	fT = 30 GHz
MT4S100T	TESQ 	VHF/UHF band, low voltage operation, low noise	3	15	100	150	P6	fT = 23 GHz
MT4S101T		VHF/UHF band, low voltage operation, low noise	3	10	100	150	P7	fT = 23 GHz
MT4S102T		UHF/SHF band, low voltage operation, low noise	3	20	100	150	P8	fT = 25 GHz
MT4S104T		UHF/SHF band, low voltage operation, low noise	3	10	100	150	P1	fT = 25 GHz
MT4S200T		UHF/SHF band, low voltage operation, low noise	4	35	100	150	P2	fT = 30 GHz
MT3S106FS	fSM 	UHF/SHF band, low voltage operation, low noise	6	80	100 (Note 1)	150	41	fT = 8.5 GHz
MT3S107FS		UHF/SHF band, low voltage operation, low noise	4.5	20	100 (Note 1)	150	42	fT = 16.5 GHz
MT3S111 *	S-MINI 	VHF/UHF band, low noise, low distortion	6	100	700 (Note 1)	150	R5	fT = 11.5 GHz
MT3S113 *		VHF/UHF band, low noise, low distortion	5.3	100	800 (Note 1)	150	R7	fT = 12.5 GHz
MT3S111TU *	UFM 	VHF/UHF band, low noise, low distortion	6	100	800 (Note 1)	150	R5	fT = 10 GHz
MT3S113TU *			5.3	100	900 (Note 1)	150	R7	fT = 11 GHz
MT3S111P *	Pw-Mini 	VHF/UHF band, low noise, low distortion	6	100	1000 (Note 1)	150	R5	fT = 8 GHz
MT3S113P *			5.3	100	1600 (Note 1)	150	R7	fT = 8.5 GHz

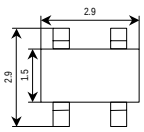
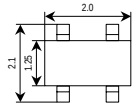
Note 1: When mounted on a glass-epoxy PCB board

*: New product

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

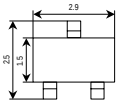
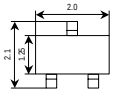
Radio-Frequency Small-Signal FETs

Radio-Frequency MOSFETs

Part Number	Package	Applications	Electrical Characteristics (Ta = 25°C)					Marking	Equivalent Product (Leaded Type)
			V_{DS} (V)	I_D (mA)	P_D (mW)	I_{DSS} (mA)	|Yfs| (mS) Typ.		
3SK232	SMQ 	TV UHF radio-frequency amps	12.5	30	150	0 to 0.1	21	UO	—
3SK291		TV UHF radio-frequency amps	12.5	30	150	0 to 0.1	26	UF	—
3SK292		TV VHF/UHF radio-frequency amps	12.5	30	150	0 to 0.1	23.5	UV	—
3SK249	USQ 	TV UHF radio-frequency amps	12.5	30	100	0 to 0.1	21	UO	
3SK293		TV UHF radio-frequency amps	12.5	30	100	0 to 0.1	26	UF	
3SK294		TV VHF/UHF radio-frequency amps	12.5	30	100	0 to 0.1	23.5	UV	

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Radio-Frequency Junction FETs

Part Number	Package	Applications	Electrical Characteristics (Ta = 25°C)					Marking	Equivalent Product (Leaded Type)
			V_{GDO} V_{GDS} ◊ (V)	I_G (mA)	P_D (mW)	I_{DSS} (mA)	|Yfs| (mS) Typ.		
2SK210	S-MINI 	FM radio-frequency amps	−18	10	100	3.0 to 24	7	Y☐	
2SK211		FM radio-frequency amps	−18	10	150	1.0 to 10	9	K☐	
2SK711		AM radio-frequency amps	−20 ◊	10	150	6 to 32	25	RB☐	2SK709
2SK1875	USM 	AM radio-frequency amps	−20 ◊	10	100	6 to 32	25	RB☐	2SK709

☐: Denotes a I_{DSS} class.

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Radio-Frequency Power MOSFETs

Radio-Frequency Power MOSFETs

Part Number	Package	Applications	Absolute Maximum Ratings (Tc = 25°C)			Po (W)			
							Test Conditions		
			V_{DSS} (V)	P_D (W)	I_D (A)	Min	V_{DD} (V)	f (MHz)	Pi (W)
RFM08U9X *	PW-X	UHF/VHF Professional radios	36	20	5	7.5	9.6	520	0.5
2SK3075	PW-X		30	20	5	7.5	9.6	520	0.5
2SK3074	PW-MINI		30	3	1	0.63	9.6	520	0.02
2SK3476	PW-X		20	20	3	7.0	7.2	520	0.5
2SK3475	PW-MINI		20	3	1	0.63	7.2	520	0.02
2SK4037	PW-X	GMRS	12	20	3	3.55	6.0	470	0.3
2SK2855	PW-MINI	UHF/VHF Professional radios	10	0.5	1.0	1.26	6.0	849	0.2
2SK2854	PW-MINI		10	0.5	0.5	0.2	6.0	849	0.02
2SK3079A	PW-X	FRS/GMRS	10	20	3	2.24	4.5	470	0.1
2SK3756	PW-MINI		7.5	3	1	1.26	4.5	470	0.1
2SK3078A	PW-MINI		10	3	0.5	0.63	4.5	470	0.1
2SK3077	USQ	Driver	10	0.25	0.1	0.032	4.8	915	0.001
2SK3656	PW-MINI	FRS/GMRS	5	3	0.5	0.50	3.6	470	0.02

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*: New product

Radio-Frequency Bipolar Power Transistors

Part Number	Package	Applications	Absolute Maximum Ratings (Tc = 25°C)			Po (W)			
							Test Conditions		
			V_{CBO} (V)	P_C (W)	I_C (A)	Min	V_{CC} (V)	f (MHz)	Pi (W)
2SC2782A	2-13C1A	175 MHz Marine radios Professional radios Amateur radios	36	220	20	80	12.5	175	18

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Part Number	Package	Applications	Absolute Maximum Ratings (Tc = 25°C)			Pi (WPEP)			
							Test Conditions		
			V_{CBO} (V)	P_C (W)	I_C (A)	Max	V_{CC} (V)	f (MHz)	Po (WPEP)
2SC2510A	2-13B1A	27 to 50 MHz CB radios Amateur radios	60	250	20	9	28	28	150
2SC2879A	2-13B1A		45	250	25	10	12.5	28	100
2SC2290A	2-13B1A		45	175	20	4	12.5	28	60

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

IGBTs (Discrete IGBTs)

Part Number	Applications	AC Voltage	Features	Absolute Maximum Ratings (Ta = 25°C) V_{CES} (V)	I_C DC (A)	I_C Pulse (A)	P_C Ta = 25°C (W)	P_C Tc = 25°C (W)
GT10J321	Power supplies (and UPS/PFC/Motor)		High-speed switching	600	10	20	—	29
GT15J321					15	30	—	30
GT15J331					15	30	—	70
GT20J321					20	40	—	45
GT30J121					30	60	—	170
GT30J126 *					30	60	—	90
GT30J324					30	60	—	170
GT50J121					50	100	—	240
GT50J325					50	100	—	240
GT10Q101	Motor drives (and UPS/PFC)		High ruggedness	1200	10	20	—	140
GT10Q301					10	20	—	140
GT15Q102					15	30	—	170
GT15Q301					15	30	—	170
GT25Q102					25	50	—	200
GT25Q301					25	50	—	200
GT5J301			High ruggedness	600	5	10	—	28
GT5J311					5	10	—	45
GT10J301					10	20	—	90
GT10J303					10	20	—	30
GT10J312					10	20	—	60
GT15J301					15	30	—	35
GT15J311					15	30	—	70
GT20J101					20	40	—	130
GT20J301					20	40	—	130
GT30J101					30	60	—	155
GT30J301					30	60	—	155
GT50J102					50	100	—	200
GT50J301					50	100	—	200
GT30J122	Power factor correction		Low $V_{CE(sat)}$		30	100	—	75
GT30J322	IH rice cookers, IH cooktops, Microwave ovens, Induction heating equipment	AC200 V	Current resonance		30	60	—	75
GT35J321					37	100	—	75
GT40J321					40	100	—	110
GT40J322					40	100	—	110
GT40J323 *					40	100	—	120
GT50J322					50	100	—	130
GT50J322H					50	100	—	130
GT50J327					50	100	—	140
GT50J328					50	120	—	140
GT60J321					60	120	—	200
GT60J323					60	120	—	170
GT60J323H					60	120	—	170
GT15M321		AC100 V	Voltage resonance	900	15	30	—	55
GT50M322					50	120	—	150
GT60M323					60	120	—	200
GT60M303					60	120	—	170
GT60M324 *					60	120	—	120
GT50N321				1000	50	120	—	156
GT50N322A					50	120	—	156
GT50N324 *					50	120	—	150
GT60N321					60	120	—	170
GT60N322					57	120	—	200
GT40Q321		AC200 V		1200	40	80	—	170
GT40T302 *				1500	40	80	—	200
GT5G133 *	Digital still cameras, cell phone		Strobe flash (dimming control)	400	—	130	0.83	—
GT8G132	Digital still cameras, single lens reflex cameras				—	150	1.1	—
GT8G133					—	150	0.6	—
GT8G134					—	150	0.6	—
GT8G136					—	150	0.6	—
GT10G131					—	200	1.1	—
GT30F122	PDP-TV		PDP sustain, energy recovery and separation circuits	300	—	120	2.0	25
GT30F123 *					—	200	2.0	25
GT45F122					—	200	2.0	25
GT45F123					—	200	2.0	26
GT45F124					—	200	2.0	29
GT45F125					—	200	2.0	29
GT45F127 *				300	—	200	2.0	26
GT45F131 *				300	—	200	2.0	160
GT30G122				400	—	120	2.0	25
GT30G123 *				430	—	200	2.0	25
GT45G122				400	—	200	2.0	25
GT45G123					—	200	2.0	26
GT45G124					—	200	2.0	29
GT45G125					—	200	2.0	29
GT45G127 *				430	—	200	2.0	26
GT45G131 *				400	—	200	2.0	160
GT30J124 *				600	—	200	2.0	26

★: IEGT: Injection Enhanced Gate Transistor

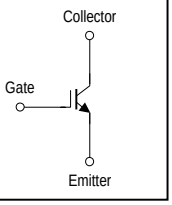
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Package		Circuit Configuration (Note)	$V_{CE(sat)}$ Typ. @Ta = 25°C			t_f Typ. @Ta = 25°C		Remarks
	Type		(V)	@I_C (A)	@V_{GE} (V)	(μs)	Test Conditions	
TO-220NIS	Isolation, Through-hole	(2)	2.0	10	15	0.05		NPT design
TO-220NIS	Isolation, Through-hole	(2)	1.9	15	15	0.03		NPT design
TO-220SM	SMD	(2)	1.75	15	15	0.10		Low $V_{CE\ (sat)}$, NPT design
TO-220NIS	Isolation, Through-hole	(2)	2.0	20	15	0.04		NPT design
TO-3P(N)	Through-hole	(1)	2.0	30	15	0.05		NPT design
TO-3P(N)IS	Isolation, Through-hole	(1)	1.95	30	15	0.05		NPT design
TO-3P(N)	Through-hole	(2)	2.0	30	15	0.05		NPT design
TO-3P(LH)	Through-hole	(1)	2.0	50	15	0.05		NPT design
TO-3P(LH)	Through-hole	(2)	2.0	50	15	0.05		NPT design
TO-3P(N)	Through-hole	(1)	2.1	10	15	0.16		NPT design
TO-3P(N)	Through-hole	(2)	2.1	10	15	0.16		NPT design
TO-3P(N)	Through-hole	(1)	2.1	15	15	0.16		NPT design
TO-3P(N)	Through-hole	(2)	2.1	15	15	0.16		NPT design
TO-3P(LH)	Through-hole	(1)	2.1	25	15	0.16	Inductive load	NPT design
TO-3P(LH)	Through-hole	(2)	2.1	25	15	0.16		NPT design
TO-220NIS	Isolation, Through-hole	(2)	2.1	5	15	0.15		
TO-220SM	SMD	(2)	2.1	5	15	0.15		
TO-3P(N)	Through-hole	(2)	2.1	10	15	0.15		
TO-220NIS	Isolation, Through-hole	(2)	2.1	10	15	0.15		
TO-220SM	SMD	(2)	2.1	10	15	0.15		
TO-220NIS	Isolation, Through-hole	(2)	2.1	15	15	0.15		
TO-220SM	SMD	(2)	2.1	15	15	0.15		
TO-3P(N)	Through-hole	(1)	2.1	20	15	0.15		
TO-3P(N)	Through-hole	(2)	2.1	20	15	0.15		
TO-3P(N)	Through-hole	(1)	2.1	30	15	0.15		
TO-3P(N)	Through-hole	(2)	2.1	30	15	0.15		
TO-3P(LH)	Through-hole	(1)	2.1	50	15	0.15		
TO-3P(LH)	Through-hole	(2)	2.1	50	15	0.15		
TO-3P(N)IS	Isolation, Through-hole	(1)	2.1	50	15	0.25		
TO-3P(N)IS	Isolation, Through-hole	(2)	2.1	50	15	0.25		
TO-3P(N)IS	Isolation, Through-hole	(2)	1.9	50	15	0.19		
TO-3P(N)	Through-hole	(2)	2.1	40	15	0.15		High speed, Mount the GT50J322H chip
TO-3P(N)	Through-hole	(2)	1.7	40	15	0.20		Mount the GT50J322 chip
TO-3P(N)	Through-hole	(2)	2.0	40	15	0.06		5th generation
TO-3P(LH)	Through-hole	(2)	2.1	50	15	0.25		
TO-3P(N)	Through-hole	(2)	2.2	50	15	0.16		High speed
TO-3P(N)	Through-hole	(2)	1.9	50	15	0.19		
TO-3P(N)	Through-hole	(2)	2.0	50	15	0.11		High speed, Mount the GT60J323H chip
TO-3P(LH)	Through-hole	(2)	1.55	60	15	0.30		Low $V_{CE\ (sat)}$
TO-3P(LH)	Through-hole	(2)	1.9	60	15	0.16		
TO-3P(LH)	Through-hole	(2)	2.1	60	15	0.12		High speed
TO-3P(N)IS	Isolation, Through-hole	(2)	1.8	15	15	0.20		For small power
TO-3P(N)	Through-hole	(2)	2.1	60	15	0.25		Mount the GT60M303 chip
TO-3P(LH)	Through-hole	(2)	2.3	60	15	0.09		High speed
TO-3P(LH)	Through-hole	(2)	2.1	60	15	0.25		
TO-3P(N)	Through-hole	(2)	1.65	60	15	0.11		6th generation
TO-3P(N)	Through-hole	(2)	2.5	60	15	0.25		
TO-3P(N)	Through-hole	(2)	2.2	60	15	0.1		High speed
TO-3P(N)	Through-hole	(2)	1.9	60	15	0.12		6th generation
TO-3P(LH)	Through-hole	(2)	2.3	60	15	0.25		
TO-3P(LH)	Through-hole	(2)	2.4	60	15	0.11		High speed
TO-3P(N)	Through-hole	(2)	2.8	40	15	0.41	Resistive load	IEGT ★
TO-3P(LH)	Through-hole	(2)	3.7	40	15	0.23		High V_{CES}
TSON-8	SMD	(1)	3.0	130	2.5	1.5		I_{CP} = 130 A@V_{GE} = 2.5-V gate drive
SOP-8	SMD	(3)	2.3	150	4.0	1.6		I_{CP} = 150 A@V_{GE} = 4.0-V gate drive
TSSOP-8	SMD	(3)	2.9	150	4.0	1.7		I_{CP} = 150 A@V_{GE} = 4.0-V gate drive
TSSOP-8	SMD	(3)	3.4	150	2.5	1.2		I_{CP} = 150 A@V_{GE} = 2.5-V gate drive
TSSOP-8	SMD	(3)	3.5	150	3.0	1.6		I_{CP} = 150 A@V_{GE} = 3.0-V gate drive
SOP-8	SMD	(3)	2.3	200	4.0	1.8		I_{CP} = 200 A@V_{GE} = 4.0-V gate drive
TO-220SIS	Isolation, Through-hole	(1)	2.9	120	15	0.15		Sustain circuit
TO-220SIS	Isolation, Through-hole	(1)	2.1	120	15	0.15		Sustain circuit
TO-220SIS	Isolation, Through-hole	(1)	2.2	120	15	0.2		Sustain circuit
TO-220SIS	Isolation, Through-hole	(1)	1.95	120	15	0.2		Energy recovery circuit
TO-220SIS	Isolation, Through-hole	(1)	1.7	120	15	0.22		Energy recovery circuit
TO-220SIS	Isolation, Through-hole	(1)	1.5	120	15	0.4		Energy recovery circuit
TO-220SIS	Isolation, Through-hole	(1)	1.6	120	15	0.27		Energy recovery circuit
TO-220SM	SMD	(1)	2.1	120	15	0.22		Energy recovery circuit
TO-220SIS	Isolation, Through-hole	(1)	2.6	120	15	0.27		Sustain circuit
TO-220SIS	Isolation, Through-hole	(1)	2.2	120	15	0.26		Sustain circuit
TO-220SIS	Isolation, Through-hole	(1)	2.4	120	15	0.28		Sustain circuit
TO-220SIS	Isolation, Through-hole	(1)	2.1	120	15	0.23		Energy recovery circuit
TO-220SIS	Isolation, Through-hole	(1)	1.9	120	15	0.27		Energy recovery circuit
TO-220SIS	Isolation, Through-hole	(1)	1.6	120	15	0.5		Energy recovery circuit
TO-220SIS	Isolation, Through-hole	(1)	1.7	120	15	0.37		Energy recovery circuit
TO-220SM	SMD	(1)	2.3	120	15	0.27		Energy recovery circuit
TO-220SIS	Isolation, Through-hole	(1)	2.4	120	15	0.25		Sustain/energy recovery circuits

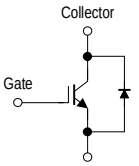
*: New product

Note)

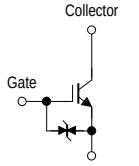
(1) Typical



(2) Built-in FRD



(3) Built-in Zener diode



Phototransistors (for Optical Sensors)

Part Number	Part Number with Rank	Package	Electrical/Optical Characteristics (Ta = 25°C)							Applications
			Light Current			Dark Current		Peak Sensitive Wavelength (nm)	Half-Value Angle (°)	Impermeable to Visible Light	
			Min (μA)	Max (μA)	E (mW/cm²)	Max (μA)	V_{CE} (V)				
TPS601A(F)	—	TO-18CAN with lens	100	—	0.1	0.2	30	800	±10	—	Optoelectronic switches
	TPS601A(A,F)		100	300							
	TPS601A(B,F)		200	600							
	TPS601A(C,F)		400	1200							
TPS610(F)	—	ϕ5	100	—	0.1	0.1	24	800	±8	—	
TPS611(F)	—	ϕ5	30	—	0.1	0.1	24	900	±8	●	
TPS615(F)	—	ϕ3	20	150	0.1	0.1	24	800	±30	—	
	TPS615(A,F)		20	50							
	TPS615(B,F)		34	85							
	TPS615(C,F)		60	150							
	TPS615(AB,F)		20	85							
	TPS615(BC,F)		34	150							
TPS616(F)	—	ϕ3	10	75	0.1	0.1	24	900	±30	●	
	TPS616(A,F)		10	25							
	TPS616(B,F)		17	42.5							
	TPS616(C,F)		30	75							
	TPS616(AB,F)		10	42.5							
	TPS616(BC,F)		17	75							
TPS622(F)	—	Small side-view package	27	—	0.1	0.1	24	870	±15	●	
	TPS622(A,F)		27	80							
	TPS622(B,F)		55	165							

Note: E = radiant incidence; V_{CE} = collector-emitter voltage

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

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微波光电部专业研制、代理经销高频、微波、光纤、光电元器件、组件、部件、模块、整机；电磁兼容元器件、材料、设备；微波CAD、EDA 软件、开发测试仿真工具；微波、光纤仪器仪表。欢迎国外高科技微波、光纤厂商将优秀产品介绍到中国、共同开拓市场。长期大量现货专业批发高频、微波、卫星、光纤、电视、CATV 器件：晶振、VCO、连接器、PIN 开关、变容二极管、开关二极管、低噪晶体管、功率电阻及电容、放大器、功率管、MMIC、混频器、耦合器、功分器、振荡器、合成器、衰减器、滤波器、隔离器、环行器、移相器、调制解调器；光电子元器件和组件：红外发射管、红外接收管、光电开关、光敏管、发光二极管和发光二极管组件、半导体激光二极管和激光器组件、光电探测器和光接收组件、光发射接收模块、光纤激光器和光放大器、光调制器、光开关、DWDM 用光发射和接收器件、用户接入系统光光收发器件与模块、光纤连接器、光纤跳线/尾纤、光衰减器、光纤适 配器、光隔离器、光耦合器、光环行器、光复用器/转换器；无线收发芯片和模组、蓝牙芯片和模组。

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