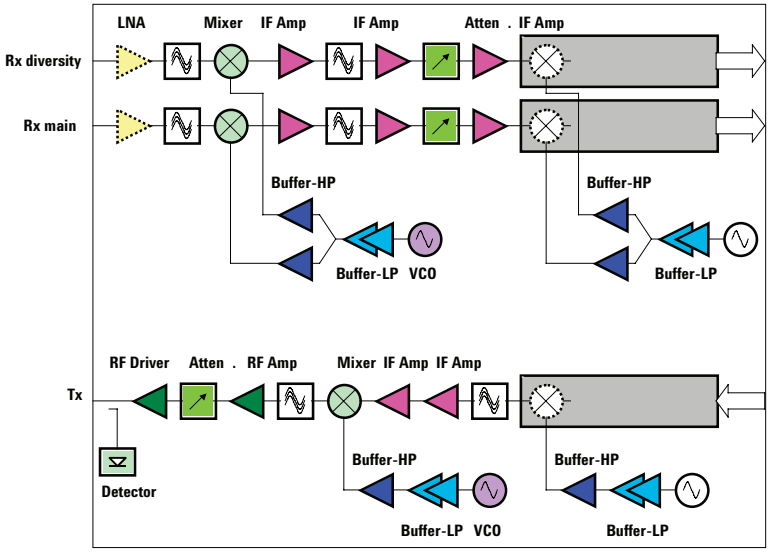
AVAGO TECHNOLOGIES

Semiconductor Wireless Applications and Selection Guides

System Block Diagrams and Product Suggestions

Note:
All RF performance refers to DUT plane, at which circuit losses have been de-embedded from actual measurements.

Basestation Radiocard



Radiocard Suggested Components

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB[1] @ 2GHz	P1dB/dBm[1] @ 2GHz	OIP3/dBm @ 2GHz	NF/dB[2] @ 2GHz	Device Type and Package (mm)
LNA	MGA-12516	4/50	0.8 - 3	24	–	18.4	0.58	QFN 4x4x0.85
	MGA-13516[6]	5/45	1.4 - 2.7	31.8	–	23.5	0.66	QFN 4x4x0.85
	MGA-14516	5/45	1.4 - 2.7	31.7	–	23.5	0.66	QFN 4x4x0.85
	MGA-21108	1.4/19	1.5 - 6	18	-10 (IP1dB)	-3.0 (IIP3)	1.4	E-pHEMT MMIC, STSLP 2.5x2.5
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	MGA-53589	5/52	50MHz - 6GHz	15.8	–	37	1.66	E-pHEMT MMIC, SOT-89
	MGA-631P8[5]	4/60	0.4 - 1.5	17.5	18.0	33.1	0.53	E-pHEMT MMIC, LPCC 2x2
	MGA-632P8[5]	4/60	1.4 - 3	17.6	19.2	34.8	0.62	E-pHEMT MMIC, LPCC 2x2
	ATF-58143	3/30	0.45 - 6	16.5	19	30.5	0.5	E-pHEMT FET, SOT343
	ATF-54143	3/60	0.45 - 6	16.6	20	36.2	0.5	E-pHEMT FET, SOT343
	ALM-1222	5/280	1.8 - 2.2	31.0	27.5	43.7	0.62	MCOB 5.0 x 6.0 x 1.1
	ALM-1322	5/100	1.8 - 2.2	29.9	17	35.6	0.57	MCOB 5.0 x 6.0 x 1.1
RF Amplifier	MGA-30116[6]	5/202.8	0.75 - 1	17	–	44.1	2	QFN 3x3
	MGA-30216	5/206	1.7 - 2.7	14.2	–	45.3	2.8	QFN 3x3
	MGA-30316[7]	5/198	3.3 - 3.9	12.8	–	44.4	2.7	QFN 3x3
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	MGA-545P8	3.3/127	0.05 - 7	18.6	21.7	34	2.7	E-pHEMT MMIC, LPCC
	MGA-61563[4]	3/41	0.5 - 4	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
	ATF-52189	4.5/200	0.05 - 6	16	27	42	1.21	E-pHEMT FET, SOT89
	ATF-521P8	4.5/200	0.05 - 6	17	26.5	42	0.96	E-pHEMT FET, LPCC
	ATF-53189	4/135	0.05 - 6	15.5	23	40	0.62	E-pHEMT FET, SOT89
	ATF-531P8	4/135	0.05 - 6	20	24.5	38	0.6	E-pHEMT FET, LPCC
	ADA-4789	4.1/80	DC - 2.5	16.3	16.9	29	4.5	Si MMIC, SOT89

Recommended Parts in **Bold**.

Notes:

1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. NFmin figures for discrete FETs.
3. High reverse isolation: 50dB typical.
4. Current adjustable: 20-60mA.
5. Both MGA-631P8 and MGA-632P8 come with integrated active bias circuit. MGA-631P8 data tested at 900MHz.
6. MGA-13516, MGA-30116, ALM-31122 and ALM-32120 data tested at 900MHz.
7. MGA-30316, ALM-31322 and ALM-32320 data tested at 3.5GHz.

Basestation Radiocard

Radiocard Suggested Components

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB[1] @2GHz	P1dB/dBm[1] @2GHz	OIP3/dBm @2GHz	NF/dB[2] @2GHz	Device Type and Package (mm)
RF Driver	ATF-50189	4.5/280	0.05 - 6	15.5	29	45	1.1	E-pHEMT FET, SOT89
	ATF-501P8	4.5/280	0.05 - 6	14.7	28	45	–	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	0.05 - 6	14.8	30	41.7	1.4	E-pHEMT FET, LPCC
	ALM-31122[6]	5/394	0.7 - 1	15.6	–	47.6	2	MCOB 5.0x6.0x1.1
	ALM-31222	5/415	1.7 - 2.7	14.9	–	47.9	2.7	MCOB 5.0x6.0x1.1
	ALM-31322[7]	5/413	3.3 - 3.9	13.2	–	47.7	2.8	MCOB 5.0x6.0x1.1
	ALM-32120[6]	5/800	0.7 -1.0	14	–	52	2.5	MCOB 7.0x10.0x1.1
	ALM-32220	5/800	1.7 - 2.7	14.8	–	50	3.5	MCOB 7.0x10.0x1.1
	ALM-32320[7]	5/800	3.3 - 3.9	12.5	–	50	2.5	MCOB 7.0x10.0x1.1
Mixer	**IAM-92516**	5/26	0.4 - 3.5	6 (CL)	9	27 (IIP3)	12.5	E-pHEMT MMIC, LPCC(3x3)
	IAM-93516	5/110	0.4 - 3.0	9.3 (CG)	19	23 (IIP3)	11.6	E-pHEMT MMIC, LPCC(3x3)
Buffer-High Power	**MGA-565P8[3]**	5/67	0.1 - 3.5	21.8	20 (Psat)	–	–	E-pHEMT MMIC, LPCC
	ABA-54563	5/79	DC - 3.4	23	16.1	27.3	4.4	Si MMIC, SOT363
Buffer-Low Power	ABA-31563	3/14	DC - 3	21.5	2.2	13.1	3.8	Si MMIC, SOT363
	ABA-32563	3/37	DC - 3	19	8.4	19.5	3.5	Si MMIC, SOT363
	ABA-51563	5/18	DC - 3.5	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	ABA-52563	5/35	**DC - 3.5**	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363

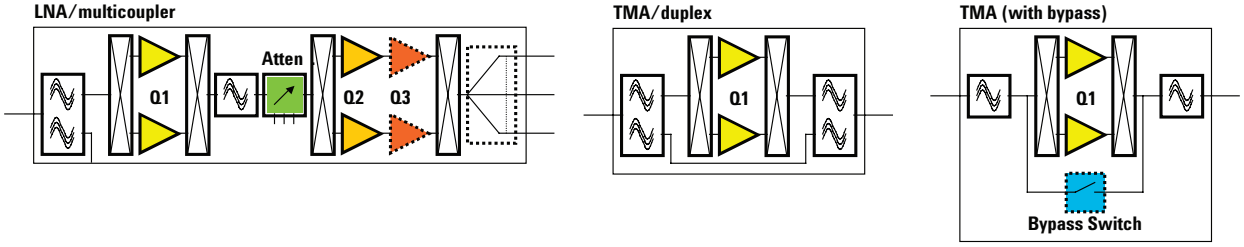
Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB[1] @500MHz	P1dB/dBm[1] @500MHz	OIP3/dBm @500MHz	NF/dB[2] @500MHz	Device Type and Package (mm)
IF Amplifier	**MGA-62563[4]**	3/55	0.1 - 3	22	18	35	0.8	E-pHEMT MMIC, SOT363
	MGA-545P8	3.3/135	0.1 - 7	22	19	36	2	E-pHEMT MMIC, LPCC
	ADA-4789	4.1/80	DC - 2.5	17	18.8	35	4.2	Si MMIC, SOT89
	ADA-4743	(3.8)/60	DC - 2.5	16.5	17.1	34	4.2	Si MMIC, SOT343
	ADA-4643	(3.5)/35	DC - 2.5	17.3	14	29	4	Si MMIC, SOT343
	ADA-4543	(3.4)/15	DC - 2.5	15.5	2.4	15	3.7	Si MMIC, SOT343
	ABA-54563	5/81	DC - 3	23	18	32	3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	15	27.5	2.9	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.8	12.5	28	2.7	Si MMIC, SOT363
Detector - Schottky Diodes	**HSMS-282x**	Ct max = 1pF @0V						SOT323/363/23/143
	HSMS-286x	Ct max = 0.3pF @0V						SOT323/363/23/143
Attenuator - PIN Diodes	**HSMP-381x**	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 & AN5262 pi-attenuator design						SOT323/23/25/SOD-323
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design						SOT323/363/23/25/SOD-323

Recommended Parts in **Bold**.

Notes:

1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. NFmin figures for discrete FETs.
3. High reverse isolation: 50dB typical.
4. Current adjustable: 20-60mA.
5. Both MGA-631P8 and MGA-632P8 come with integrated active bias circuit. MGA-631P8 data tested at 900MHz.
6. MGA-13516, MGA-30116, ALM-31122 and ALM-32120 data tested at 900MHz.
7. MGA-30316, ALM-31322 and ALM-32320 data tested at 3.5GHz.

Basestation Low Noise Amplifier (LNA)
Basestation Tower Mounted Amplifiers (TMA)



LNA & TMA Suggested Components

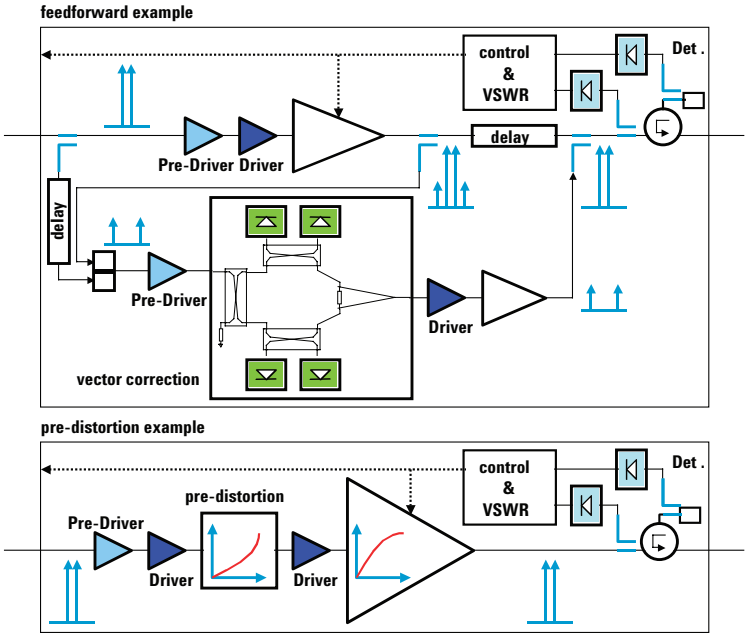
Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB[1] @ 2GHz	P1dB/dBm[1] @ 2GHz	OIP3/dBm @ 2GHz	NF/dB[2] @ 2GHz	Device Type and Package (mm)
Q1	MGA-12516	4/50	0.8 - 3	24	–	18.4	0.58	QFN 4x4x0.85
	MGA-13516[4]	5/45	1.4 - 2.7	31.8	–	23.5	0.66	QFN 4x4x0.85
	MGA-14516	5/45	1.4 - 2.7	31.7	–	23.5	0.66	QFN 4x4x0.85
	MGA-53589	5/54	.05 - 6	18.5	–	37	1.66	E-pHEMT MMIC, SOT-89
	MGA-631P8[3]	4/60	0.4 - 1.5	17.5	18.0	33.1	0.53	E-pHEMT MMIC, LPCC 2x2
	MGA-632P8[3]	4/60	1.4 - 3	17.6	19.2	34.8	0.62	E-pHEMT MMIC, LPCC 2x2
	ATF-58143	3/30	0.45 - 6	16.5	19	30.5	0.5	E-pHEMT FET, SOT343
	ATF-54143	3/60	0.45 - 6	16.6	20	36.2	0.5	E-pHEMT FET, SOT343
	ATF-55143	2.7/10	0.45 - 6	17.7	14	24.2	0.6	E-pHEMT FET, SOT343
	ATF-53189	4/135	0.05 - 6	15.5	23	40	0.62	E-pHEMT FET, SOT89
	ATF-531P8	4/135	0.05 - 6	20	24.5	38	0.6	E-pHEMT FET, LPCC
	ALM-1322	5/100	1.8 - 2.2	29.9	17	35.6	0.57	MCOB 5.0 x 6.0 x 1.1
Q2/Q3	MGA-30116[4]	5/202.8	0.75 - 1	17	-	44.1	2	QFN 3x3
	MGA-30216	5/206	1.7 - 2.7	14.2	-	45.3	2.8	QFN 3x3
	MGA-30316[5]	5/198	3.3 - 3.9	12.8	-	44.4	2.7	QFN 3x3
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	ATF-50189	4.5/280	0.05 - 6	15.5	29	45	1.1	E-pHEMT FET, SOT89
	ATF-501P8	4.5/280	0.05 - 6	14.7	28	45	–	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	0.05 - 6	14.8	30	41.7	1.4	E-pHEMT FET, LPCC
	ATF-52189	4.5/200	0.05 - 6	16	27	42	1.21	E-pHEMT FET, SOT89
	ATF-521P8	4.5/200	0.05 - 6	17	26.5	42	0.96	E-pHEMT FET, LPCC
	ATF-53189	4/135	0.05 - 6	15.5	23	40	0.62	E-pHEMT FET, SOT89
	ATF-531P8	4/135	0.05 - 6	20	24.5	38	0.6	E-pHEMT FET, LPCC
	ALM-1222	5/280	1.8 - 2.2	31.0	27.5	43.7	0.62	MCOB 5.0 x 6.0 x 1.1
Bypass Switch - PIN Diodes	**HSMP-389x**	General purpose switch, Ct typ. = 0.4pF @0V						SOT-323/363/23/143/SOD-323
	HSMP-489x	Low inductance, shunt, Ct typ. = 0.4pF @0V						SOT323/23
	HSMP-386x	Higher linearity switch, Ct typ = 0.2pF @0V						SOT323/363/23/25/SOD-323
Attenuator - PIN Diodes	**HSMP-381x**	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 & AN5262 pi-attenuator design						SOT323/23/25/SOD-323
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design						SOT323/363/23/25/SOD-323

Recommended Parts in **Bold**.

Notes:

1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. NFmin figures for discrete FETs.
3. Both MGA-631P8 and MGA-632P8 come with integrated active bias circuit. MGA-631P8 data tested at 900MHz.
4. MGA-13516 and MGA-30116 data tested at 900MHz.
5. MGA-30316 data tested at 3.5GHz.

Basestation Multi-carrier Power Amplifier (MCPA)



MCPA Suggested Compoments

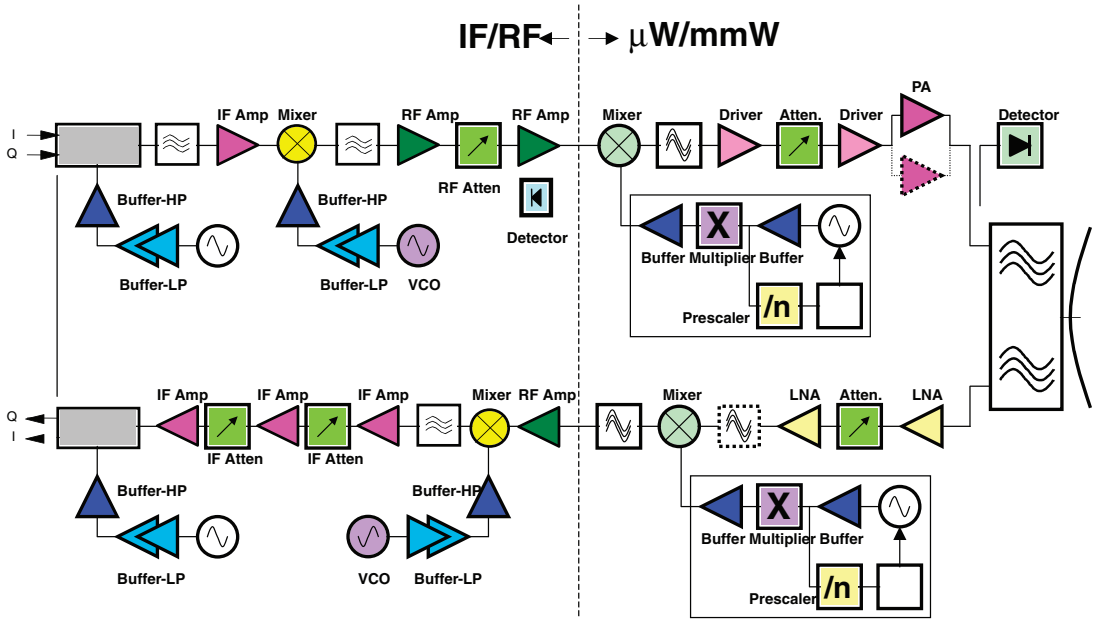
Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB[1] @ 2GHz	P1dB/dBm[1] @ 2GHz	OIP3/dBm @ 2GHz	NF/dB[2] @ 2GHz	Device Type and Package (mm)
Pre-Driver	MGA-30116[3]	5/202.8	0.75 - 1	17	–	44.1	2	QFN 3x3
	MGA-30216	5/206	1.7 - 2.7	14.2	–	45.3	2.8	QFN 3x3
	MGA-30316[4]	5/198	3.3 - 3.9	12.8	–	44.4	2.7	QFN 3x3
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	MGA-545P8	3.3/127	0.05 - 7	18.6	21.7	34	2.7	E-pHEMT MMIC, LPCC
	ATF-52189	4.5/200	0.05 - 6	16	27	42	1.21	E-pHEMT FET, SOT89
	ATF-521P8	4.5/200	0.05 - 6	17	26.5	42	0.96	E-pHEMT FET, LPCC
	ATF-53189	4/135	0.05 - 6	15.5	23	40	0.62	E-pHEMT FET, SOT89
	ATF-531P8	4/135	0.05 - 6	20	24.5	38	0.6	E-pHEMT FET, LPCC
	ALM-1222	5/280	1.8 - 2.2	31.0	27.5	43.7	0.62	MCOB 5.0 x 6.0 x 1.1
	ADA-4789	4.1/80	DC - 2.5	16.3	16.9	29	4.5	Si MMIC, SOT89
Driver	**ATF-50189**	4.5/280	0.05 - 6	15.5	29	45	1.1	E-pHEMT FET, SOT89
	ATF-501P8	4.5/280	0.05 - 6	14.7	28	45	–	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	0.05 - 6	14.8	30	41.7	1.4	E-pHEMT FET, LPCC
	ALM-31122[3]	5/394	0.7 - 1	15.6	–	47.6	2	MCOB 5.0x6.0x1.1
	ALM-31222	5/415	1.7 - 2.7	14.9	–	47.9	2.7	MCOB 5.0x6.0x1.1
	ALM-31322[4]	5/413	3.3 - 3.9	13.2	–	47.7	2.8	MCOB 5.0x6.0x1.1
	ALM-32120[3]	5/800	0.7 -1.0	14	–	52	2.5	MCOB 7.0x10.0x1.1
	ALM-32220	5/800	1.7 - 2.7	14.8	–	50	3.5	MCOB 7.0x10.0x1.1
	ALM-32320[4]	5/800	3.3 - 3.9	12.5	–	50	2.5	MCOB 7.0x10.0x1.1
Detector - Schottky Diodes	**HSMS-282x**	Ct max = 1pF @0V						SOT323/363/23/143
	HSMS-286x	Ct max = 0.3pF @0V						SOT323/363/23/143
Vector Correction - PIN Diodes	**HSMP-481x**	Low inductance, shunt, very low distortion, Ct typ. = 0.2pF @0V						SOT323/23
	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V						SOT323/23/SOD-323

Recommended Parts in **Bold**.

Notes:

1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. NFmin figures for discrete FETs.
3. MGA-13516, MGA-30116, ALM-31122 and ALM-32120 data tested at 900MHz.
4. MGA-30316, ALM-31322 and ALM-32320 data tested at 3.5GHz.

Microwave Link (Point-point/point-multipoint)



Microwave Link MMICs Suggested Components

Application	Part Number	Bias V/mA	Freq Range GHz	Typical Performance				Package (mm)
				Gain dB	P1dB dBm	OIP3 dBm	NF dB	
Power Amplifiers	AMMP-6408	5/650	6 -18	18	28	38	4.5	SM 5x5
	AMMC-6408	5/650	6 -18	19	29	38	4.3	chip
	AMMC-6425	5/900 - 0.6	18 - 28	18.5	28.5	38	/	chip
	AMMC-6430	5.5/900 - 0.7	25 - 33	17	28.5	37	/	chip
	AMMC-6440	5.5/950 - 0.7	37- 42	14	28	38	/	chip
	AMMC-5033	5/500+3.5/280 - 0.6	17.7 - 32	20	27	32	/	chip
Driver/Buffer Amps[1]	**AMMP-5618**	5/107	6 - 20	13	19	30	4.4	SM 5x5
	AMMC-5618	5/107	6 - 20	14.5	19.5	26	4.4	chip
	AMMP-5620	5/95	6 - 20	17.5	15	22.5	5.1	SM 5x5
	AMMC-5620	5/95	6 - 20	19	15	23.5	4.2	chip
	AMMC-5040	4.5/300 - 0.45	20 - 45	25	19.5	30	/	chip
	AMMC-6345	5/480 - 0.7	20 - 45	20	24	32	/	chip
Low Noise Amplifiers	VMMK-1225	2/20	0.5 - 26	11	8	23	1	SM
	VMMK-1218	3/20	0.5 - 18	10.7	12	12	0.81	SM 1x0.5
	AMMP-6220	3/55	6 - 20	22	10	20	2.5	SM 5x5
	AMMC-6220	3/55	6 - 20	23	9	19	2	chip
	AMMP-6222	4/120	7 -21	24	15.5	29	2.3	SM 5x5
	AMMC-6222	4/120	7 -21	25	16	29	2.1	chip
	AMMP-6232	4/138	18 - 32	23	18	29	3	SM 5x5
	AMMC-6232	4/138	18 - 32	24	19	29	2.8	chip
	AMMP-6233	3/65	18 - 32	23	8	19	2.6	SM 5x5
	AMMC-6241	3/60	26 - 43	20	10	20	2.7	chip
	AMMC-5023	5/28	21.2 - 26.5	23	9.5	18	2.3	chip
Travelling Wave Amplifiers	AMMP-5024	7/200	(30k) - 40	15	22	30	4.4	SM 5x5
	AMMC-5024	7/200 - 3	(30k) - 40	16	22.5	30	4.6	chip
	AMMC-5026	7/150 - 1	2 - 35	10.5	24	31	3.6	chip

Recommended Parts in **Bold**.

Notes:

1. Also see Low Noise Amplifiers.

Microwave Link (Point-point/point-multipoint)

Microwave Link MMICs Suggested Components

Application	Part Number	RF Freq	IF Freq	Conversion Gain (dB)	LO/RF Isol (dB)	IIP3 (dBm)	Image Reject	Package (mm)
Mixers	**AMMC-3040**	18-36	DC-3	-9.5	31	23	–	chip
	AMMC-3041	18-42	DC-5	-9.5	44	23	–	chip
	AMMP-6530	5-30	DC-5	-8	22	18	15	SM 5x5
	AMMP-6532	20-32	1-3.5	13	22	-4	15	SM 5x5
	AMMC-6530	5-30	DC-5	-10	22	18	15	chip
	AMMP-6522	7-20	DC-3.5	13	22	-4	15	SM 5x5
	AMMC-6522	7-20	DC-3.5	13	22	-4	15	chip
	AMMP-6545 Sub Harmonic	18-45	DC-3.5	-11	30	11	–	SM 5x5
	AMMC-6545 Sub Harmonic	18-45	DC-3.5	-10	30	11	–	chip

	Part Number	Bias V/mA	Output Freq	IP1dB	Pout	Fo	Package (mm)
Doublers	**AMMP-6120**	4.5/85 - 1.2	8 - 20 (24)	1	14	25	SM 5x5
	AMMC-6120	4.5/85 - 1.2	8 - 20 (24)	1	14	25	chip
	AMMC-6140	4.5/27 - 1.2	20 - 40	5	-1	30	chip
	AMMC-5023	Can be biased as a doubler, see PN#11					chip
Multipliers	AMMC-3040	LO input can be biased as a multiplier					chip
	AMMC-5040	Input stage can be biased as a multiplier, see AN#50					chip

	Part Number	Bias	Output Freq	Loss	IP1dB	IIP3	Package
Switches	**AMMC-2008 SPDT**	0/-3 - 3/0	DC - 50	1.6	14	32	chip

Recommended Parts in **Bold**.

Microwave Link (Point-point/point-multipoint)

Microwave Link MMICs Frequency Chart

	Frequency Bands/GHz															
	<6	6	7	8	10	11	13	15	18	20	23	26	29	32	38	>38
Power Amplifiers																
AMMP-6408		■	■	■	■	■	■	■	■							
AMMC-6408		■	■	■	■	■	■	■	■							
AMMC-6425									■	■	■	■				
AMMC-6430											■	■	■			
AMMC-6440															■	■
AMMC-5033									■	■	■	■	■			
Driver/Buffer Amps[1]																
AMMP-5618		■	■	■	■	■	■	■	■							
AMMC-5618		■	■	■	■	■	■	■	■							
AMMP-5620		■	■	■	■	■	■	■	■	■						
AMMC-5620		■	■	■	■	■	■	■	■							
AMMC-5040											■	■	■	■	■	■
AMMC-6345											■	■	■	■	■	■
Low Noise Amplifiers																
AMMP-6220		■	■	■	■	■	■	■	■							
AMMC-6220		■	■	■	■	■	■	■	■							
AMMP-6222			■	■	■	■	■	■	■	■						
AMMC-6222			■	■	■	■	■	■	■	■						
AMMP-6232									■	■	■	■	■	■		
AMMC-6232									■	■	■	■	■	■		
AMMP-6233									■	■	■	■	■	■		
AMMC-6241												■	■	■	■	■
AMMC-5023											■	■				
VMMK-1218	■	■	■	■	■	■	■	■	■							
VMMK-1225	■	■	■	■	■	■	■	■	■	■	■	■				
Travelling Wave Amplifiers																
AMMP-5024	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AMMC-5024	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AMMC-5026	■	■	■	■	■	■	■	■	■	■	■	■	■			
Mixers																
AMMP-6530 IRM	■	■	■	■	■	■	■	■	■	■	■	■	■			
AMMC-6530 IRM	■	■	■	■	■	■	■	■	■	■	■	■	■			
AMMC-3040 DBM + LO Buffer									■	■	■	■	■			
AMMC-3041 DBM									■	■	■	■	■	■	■	■
AMMP-6522			■	■	■	■	■	■	■	■						
AMMC-6522			■	■	■	■	■	■	■	■						
AMMP-6545 Sub Harmonic									■	■	■	■	■	■	■	■
AMMC-6545 Sub Harmonic									■	■	■	■	■	■	■	■
Doublers																
AMMP-6120		■	■	■	■	■	■	■	■							
AMMC-6120		■	■	■	■	■	■	■	■							
AMMC-6140									■	■	■	■	■	■	■	■
AMMC-5023											■	■				
Multipliers																
AMMC-3040									■	■	■	■	■			
AMMC-5040											■	■	■	■	■	
Switches																
AMMC-2008 SPDT	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Recommended Parts in **Bold**.

Notes:

1. Also see Low Noise Amplifiers.

Microwave Link (Point-point/point-multipoint)

Microwave/Millimeter Wave Diode Suggested Components

Application	Part Number	Description	Package
Detector - Schottky diodes	HSCH-9161	GaAs single, Ct=35fF, zero-bias	Beamlead
	HSCH-5310/5330	Si single, Ct=0.1pF, med. barrier/low barrier	Beamlead
	HSCH-5312/5332	Si single Ct=0.15pF, med. barrier/low barrier	Beamlead
Mixers - Schottky diodes	**HSCH-5310/5330**	Si single, Ct=0.1pF, med. barrier/low barrier	Beamlead
	HSCH-5312/5332	Si single Ct=0.15pF, med. barrier/low barrier	Beamlead
	HSCH-5531/5512	Si series pair, Ct=0.15pF, low barrier/ Ct=0.1pF, med. barrier	Beamlead
Multiplier - Schottky diodes	**HSCH-5310/5330**	Si single, Ct=0.1pF, med. barrier/low barrier	Beamlead
	HSCH-5312/5332	Si single Ct=0.15pF, med. barrier/low barrier	Beamlead
	HSCH-5531/5512	Si series pair, Ct=0.15pF, low barrier/ Ct=0.1pF, med. barrier	Beamlead
Attenuator - PIN diodes	HPND-4005	Si single, Ct=17fF, t=100ns	Beamlead
Switch - PIN diodes	HPND-4005	Si single, Ct=17fF, t=100ns	Beamlead
	HPND-4028/4038	Si single. Ct=45fF, t=36ns / Ct=65ns, t=45ns	Beamlead

Recommended Parts in **Bold**.

Microwave Link - RF Component Suggestions

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain (dB) @ 2GHz	P1dB (dBm) @ 2GHz	OIP3 (dBm) @ 2GHz	NF (dB) @ 2GHz	Device Type and Package (mm)
RF Amplifier	MGA-53543	5/54	0.4 – 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	MGA-545P8	3.3/127	0.05 - 7	18.6	21.7	34	2.7	E-pHEMT MMIC, LPCC
	MGA-61563[1]	3/41.6	0.1 - 6	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
	ABA-53563	5/35	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	ABA-54563	5/81	DC - 3	22.5	16	26	4.2	Si MMIC, SOT363
	ADA-4789	4.1/80	DC - 2.5	16.3	16.9	29	4.5	Si MMIC, SOT89
Mixer	**IAM-92516**	5/26	0.4 - 3.5	6 (CL)	9	27 (IIP3)	12.5	E-pHEMT MMIC, LPCC(3x3)
Buffer-High Power	MGA-565P8[2]	5/67	0.1 - 3.5	21.8	20 (Psat)	–	–	E-pHEMT MMIC, LPCC
	ABA-54563	5/81	DC - 3	22.5	16	27.3	4.4	Si MMIC, SOT363
Buffer-Low Power	**ABA-31563**	3/14	DC - 3	21.5	2.2	13.1	3.8	Si MMIC, SOT363
	ABA-32563	3/37	DC - 3	19	8.4	19.5	3.5	Si MMIC, SOT363
	ABA-51563	5/18	DC - 3.5	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-53563	5/35	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363

Application	Part Number	Features	Device Type and Package
Detector - Schottky Diodes	HSMS-282x	Ct max = 1pF @0V	SOT323/363/23/143
	HSMS-286x	Ct max = 0.3pF @0V	SOT323/363/23/143
RF Attenuator - PIN Diodes	HSMP-381x	very low distortion, Ct typ. = 0.2pF @0V, see AN1048 & AN5262 pi-attenuator design	SOT323/23/25/SOD-323
	HSMP-386x	lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design	SOT323/363/23/25/SOD-323

Recommended Parts in **Bold**.

Notes:

1. Current Adjustable: 20-60mA.
2. High Reverse Isolation: 50dB typical.

Microwave Link (Point-point/point-multipoint)

Microwave Link - IF Component Suggestions

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain (dB) @ 500MHz	P1dB (dBm) @ 500MHz	OIP3 (dBm) @ 500MHz	NF (dB) @ 500MHz	Device Type and Package
IF Amplifier	MGA-62563[1]	3/55	0.1 - 3	22	18	35	0.8	E-pHEMT MMIC, SOT363
	MGA-545P8	3.3/135	0.1 - 7	22	19	36	2	E-pHEMT MMIC, LPCC
	ADA-4789	4.1/80	DC - 2.5	17	18.8	35	4.2	Si MMIC, SOT89
	ADA-4743	(3.8)/60	DC - 2.5	16.5	17.1	34	4.2	Si MMIC, SOT343
	ADA-4643	(3.5)/35	DC - 2.5	17.3	14	29	4	Si MMIC, SOT343
	ADA-4543	(3.4)/15	DC - 2.5	15.5	2.4	15	3.7	Si MMIC, SOT343
	ABA-54563	5/81	DC - 3	23	18	32	3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	15	27.5	2.9	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.8	12.5	28	2.7	Si MMIC, SOT363

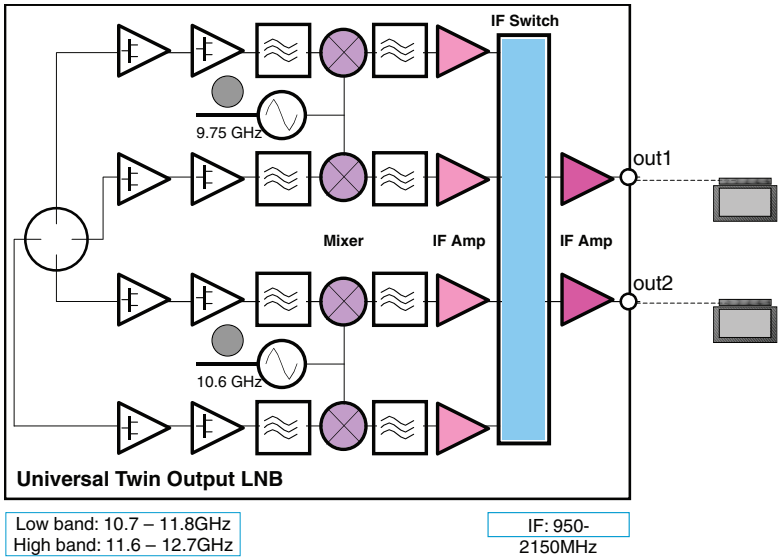
Application	Part Number	Features	Package
Attenuator - PIN Diodes	HSMP-381x	very low distortion, Ct typ. = 0.2pF @0V, see AN1048 & AN5262 pi-attenuator design	SOT323/23/25/SOD-323
	HSMP-386x	lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design	SOT323/363/23/25/SOD-323

Recommended Parts in **Bold**.

Notes:

1. Current Adjustable: 20-60mA

DBS Satellite TV System

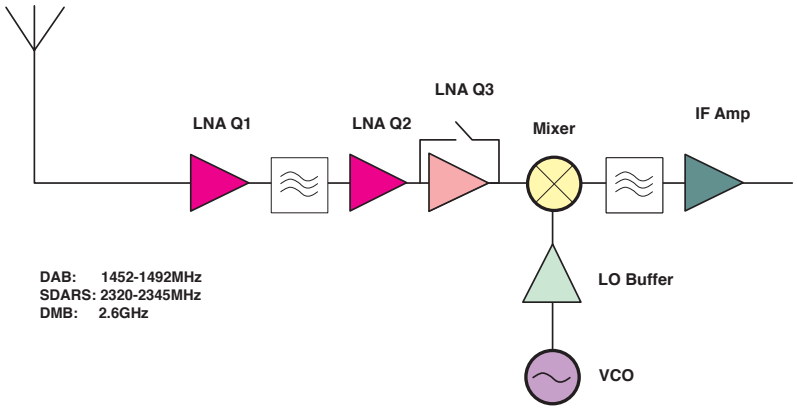


DBS Satellite TV System Suggested Components

Application	Part number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB @ 2GHz	P1dB/dBm @ 2GHz	OIP3/dBm @ 2GHz	NF/dB @ 2GHz	Device Type and Package
IF Amplifier	**ABA-31563**	3/14	DC - 3	21.5	2.2	13.1	3.8	Si MMIC, SOT363
	ABA-32563	3/37	DC - 3	19	8.4	19.5	3.5	Si MMIC, SOT363
	ABA-51563	5/18	DC - 3.5	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	ABA-54563	5/79	DC - 3.4	23	16.1	27.8	4.4	Si MMIC, SOT363
	AT-41511	5/25	10GHz ft	12.5 (MAG)	14.5	25	2.5	Si BJT, SOT143
	MGA-61563	3/41	0.1 - 6	15.5	15.1	31.7	1.0	E-pHEMT MMIC, SOT363
IF Switch	**HSMP-386x**	Higher linearity switch, Ct typ = 0.2pF @0V						SOT323/363/23/SOD-323
	HSMP-389x	General purpose switch, Ct typ. = 0.4pF @0V						SOT323/23/SOD-323
	HMPS-389x	General purpose switch, Ct typ. = 0.4pF @0V						Minipak
Mixer - Schottky Diodes	**HSMS-8202**	Ct max = 0.26pF @0V						SOT23
		RD max = 14W @ IF=5Ma						

Recommended Parts in **Bold**.

Mobile DAB/SDARS/DMB-S Digital Receivers



Mobile DAB/GPS/SDARS/DMB-S Digital Receivers Suggested Components

Application	Part number	Typ. Bias V/mA	Gain/dB[1] DAB SDARS DMB-S	OIP3/dBm DAB SDARS DMB-S	NF/dB[2] DAB SDARS DMB-S	Device Type and Package (mm)
LNA Q1/Q2	**ATF-55143**	2.7/10	20.0 17.0 16.0	23.0 24.0 24.0	0.3 0.45 0.5	E-pHEMT FET, SOT343
	ATF-551M4	2.7/10	20.0 16.5 16.0	23.0 24.2 24.2	0.3 0.45 0.5	E-pHEMT FET, MiniPak
	MGA-635T6	2.85/4.9	14.6 12.0 –	3.5 4.5 –	0.86 0.96 –	E-pHEMT, UTSLP 2x1.3x0.4
LNA Q3	**MGA-645T6**	3/7	– 15.0 14.2	– 7 7.8	– 1.1 1.15	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-71543[3]	3/10[4]	16.5 15.2 14.6	19.5 18.2 17.6	0.7 0.8 0.85	GaAs MMIC, SOT343
	MGA-72543[3]	3/20[4]	14.3 13.2 12.8	24.8 23.7 23.3	1.4 1.45 1.45	GaAs MMIC, SOT343
	MGA-725M4[3]	3/20[4]	16.6 15.3 14.6	26.5 25.2 24.5	1.2 1.3 1.3	GaAS MMIC, MiniPak
Mixer	**IAM-91563**	3/9 to 15	9.5 7.5 7.0	3.0 to 4.5	7.5 11.0 11.5	GaAs MMIC, SOT363

Notes:
1. Gain for discrete FETs when matched for best IP3.
2. NFmin figures for LNA parts.
3. LNA bypass switch included.
4. Current adjustable to set linearity performance

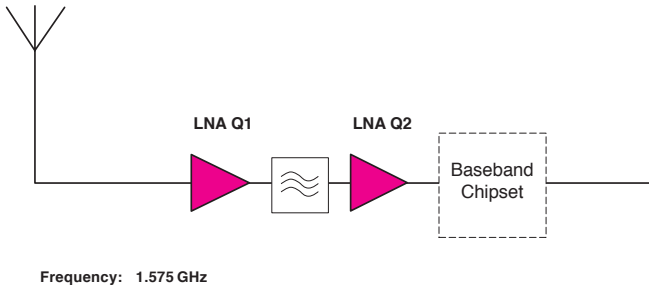
Application	Part number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB @ 2GHz	P1dB/dBm @ 2GHz	OIP3/dBm @ 2GHz	NF/dB @ 2GHz	Device Type and Package
LO Buffer	**ABA-31563**	3/14.5	DC - 3	21	2	13	3.8	Si MMIC, SOT363
	ABA-32563	3/38	DC - 2.5	18.5	8	19	3.4	Si MMIC, SOT363

Recommended Parts in **Bold**.

DMB-T/ISDB-T Receivers Suggested Components

Application	Part number	Typ. Bias V/mA	Gain/dB @ 500MHz	OIP3/dBm @ 500MHz	NF/dB @ 500MHz	Device Type and Package (mm)
LNA Q1/Q2	**MGA-68563**	3/10	19.7	0.3	1.0	E-pHEMT, UTSLP 2x1.3x0.4
LNA Q3	**MGA-725M4**	3/9	14	2.5	1.7	E-pHEMT, UTSLP 2x1.3x0.4

GPS Receivers



Frequency: 1.575 GHz

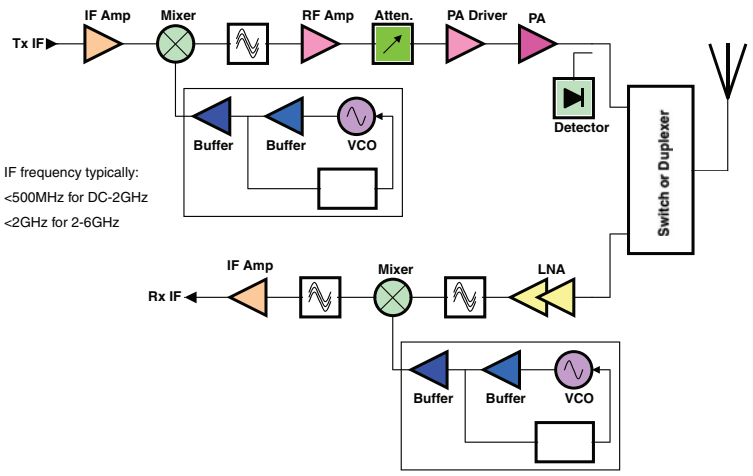
Mobile GPS Receivers Suggested Components

Application	Part Number	Typ. Bias V/mA	NF/dB	Gain/dB	IIP3/dBm	Device Type and Package (mm)
LNA Q1/Q2	ALM-1106	2.85/8	0.8	14.3	4.7	E-pHEMT MMIC, MCOB 2 x 2
	MGA-61563	3.0/9	1.18	16	-3	E-pHEMT MMIC, SOT-363
	MGA-635T6	2.85/4.9	0.86	14.6	3.5	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-665P8	3.0/21	1.22	20.8	-0.5	E-pHEMT MMIC, LPCC 2 x 2
	*ATF-55143	2.0/10	0.6	17.4	-0.6	E-pHEMT FET, SOT343

Note:
*Refer to Application Note 1376.

Application	Part Number	Typ. Bias V/mA	NF/dB	Gain/dB	IIP3/dBm	Cell-Band Rejection/dBc	PCS-Band Rejection/dBc	Device Type and Package (mm)
LNA Q1 with Integrated Filter	ALM-1412	2.85/9	0.8	13.1	7	61	54	E-pHEMT & FBAR, MCOB 3.3 x 2.1
	ALM-1612	2.7/5.0	0.95	18	2	66	67	E-pHEMT & FBAR, MCOB 3.3 x 2.1

2-6 GHz Systems (including 802.11 a/b/g and 802.16)



2-6 GHz Systems Suggested Components

Application	Part Number	Typical Performance					Package (mm)
		Test Bias V/mA	Test Freq GHz	Gain[1] dB	Linear Pout dBm	EVM %	
PA	MGA-412P8	3.3/95	2.452	25.5	19	3.0	E-pHEMT MMIC. LPCC
	MGA-425P8[2]	3.3/58	5.25	16.0	12	3.0	E-pHEMT MMIC. LPCC
	MGA-545P8	3.3/127	5.825	11.5	16	5.6	E-pHEMT MMIC, LPCC
	ALM-42216	3.3/240	2.5	30	23.5	2.5	MCOB 5.0x5.0x1.1
	ALM-42316	3.3/240	3.5	30	23	2.5	MCOB 5.0x5.0x1.1
	ALM-31222	5/415	2	14.9	–	–	MCOB 5.0x6.0x1.1
	ALM-31322	5/413	3.5	13.2	–	–	MCOB 5.0x6.0x1.1
	ALM-32220	5/800	2	14.8	–	–	MCOB 7.0x10.0x1.1
	ALM-32320	5/800	3.5	12	–	–	MCOB 7.0x10.0x1.1

Application	Part Number	Typical Performance						Package (mm)
		Test Bias V/mA	Test Freq GHz	Gain[1] dB	P1dB[1] dBm	OIP3 dBm	NF dB	
PA Driver	MGA-30216	5/206	2	14.2	–	45.3	2.8	QFN 3x3
	MGA-30316	5/198	3.5	12.8	–	44.4	2.7	QFN 3x3
	MGA-53543	5/54	1.9	15.4	18.6	39.1	1.5	E-pHEMT MMIC. SOT343
	ATF-501P8	4.5/280	2	15	29	45.5	1	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	2	14.8	30	41.7	1.4	E-pHEMT FET, LPCC
	ATF-521P8	4.5/200	2	17	26.5	42	1.5	E-pHEMT FET, LPCC
	ATF-531P8	4/135	2	20	24.5	38	0.6	E-pHEMT FET, LPCC
	ATF-541M4	3/60	2	17.5	21.4	35.8	0.5	E-pHEMT FET, MiniPak
	ATF-54143	3/60	2	16.6	20.4	36.2	0.5	E-pHEMT FET, SOT343

Notes:
1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. Current adjustable: 10 - 80mA.
3. Current adjustable 10 - 60mA.
4. High reverse isolation: 50dB typical.

2-6 GHz Systems (including 802.11 a/b/g and 802.16)

2-6 GHz Systems Suggested Components

Application	Part Number	Typical Performance						Package
		Test Bias V/ mA	Test Freq GHz	Gain[1] dB	P1dB[1] dBm	OIP3 dBm	NF dB	
RF Amplifier	MGA-61563[3]	3/41	2	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
Buffer Amplifier	ABA-31563	3/14	2	21.5	2.2	13.1	3.8	Si MMIC, SOT363
	ABA-32563	3/37	2	19	8.4	19.5	3.5	Si MMIC, SOT363
	ABA-51563	5/18	2	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	ABA-52563	5/35	2	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-53563	5/46	2	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	ABA-54563	5/79	2	23	16.1	27.8	4.4	Si MMIC, SOT363
	MGA-565P8[4]	5/67	2	21.8	20 (Psat)			E-pHEMT MMIC, LPCC
	MGA-61563[3]	3/41	2	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363

Notes:
1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. Current adjustable: 10 - 80mA.
3. Current adjustable 10 - 60mA.
4. High reverse isolation: 50dB typical.

Application	Part Number	Test Bias	Test Freq	Gain[1]	P1dB[1]	OIP3	NF	Package (mm)
Low Noise Amplifiers	MGA-14516	5/45	1.95	31.7	–	38	0.68	QFN 4x4
	MGA-21108	1.4/19	3.5	18	–	–	1.4	STSLP 2.5x2.5
	MGA-61563[2]	3/41	2	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
	MGA-632P8	4/60	1.95	17.6	18.3	35.4	0.6	LPCC 2x2
	MGA-645T6	3/7	2.4	15	9.0	22	1.1	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-655T6	3/10	3.5	14.7	12.0	20.2	1.17	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-665P8	3/20.5	5.25	16	11.4	18.2	1.45	E-pHEMT MMIC, LPCC
	MGA-675T6	3/10	5.5	17.8	–	–	1.75	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-71543[3]	2.4/10	2.01	15.9	7.4	18.9	1.1	pHEMT MMIC, SOT343
	MGA-85563	3/15	2	19	0.9	11.5	1.85	pHEMT MMIC, SOT363
	MGA-87563	3/4.5	2	14	-2	8	1.8	pHEMT MMIC, SOT363
	ATF-36077	1.5/10	12	12	5		0.5	pHEMT FET, ceramic
	ATF-36163	1.5	12	10	5		1.2	pHEMT FET, SOT363
	ATF-551M4	2.7/10	2	17.5	14.6	24.1	0.5	E-pHEMT FET, MiniPak
	ATF-55143	2.7/10	2	17.7	14.4	24.2	0.6	E-pHEMT FET, SOT343
	ALM-2812	3.3/15	2.45	16.7	–	–	0.8	MCOB 3x3
		3.3/23.4	5.5	23.2	–	–	1.4	MCOB 3x3
	VMMK-1218	3/20	10	10.7	12	12	0.7	SM 1x0.5
	VMMK-1225	2/20	12	11	8	23	0.9	SM 1x0.5
Mixers	IAM-91563	3/9	1.89	9	-8	-6	8.5	pHEMT MMIC, SOT363

Notes
1. Gain and P1dB performance for discrete FETs when matched for best IP3
2. Current adjustable 10 - 60mA
3. Source grounded configuration

2-6 GHz Systems (including 802.11 a/b/g and 802.16)

2-6 GHz Systems Suggested Components

Application	Part Number	Ct max @0V	Package
Detector	HMPS-282x	1pF	Schottky, MiniPak
	HSMS-282x	1pF	Schottky, SOT323/363/23/143
	HSMS-286x	0.3pF	Schottky, SOT323/363/23/143
Switch	HMPP-389x	0.35pF	PIN, MiniPak
	HSMP-389x/489x	0.4pF	SOT323/363/23/143/SOD-323
	HMPP-386x	0.2pF	PIN, MiniPak
	HSMP-386x	0.2pF	SOT323/363/23/SOD-323

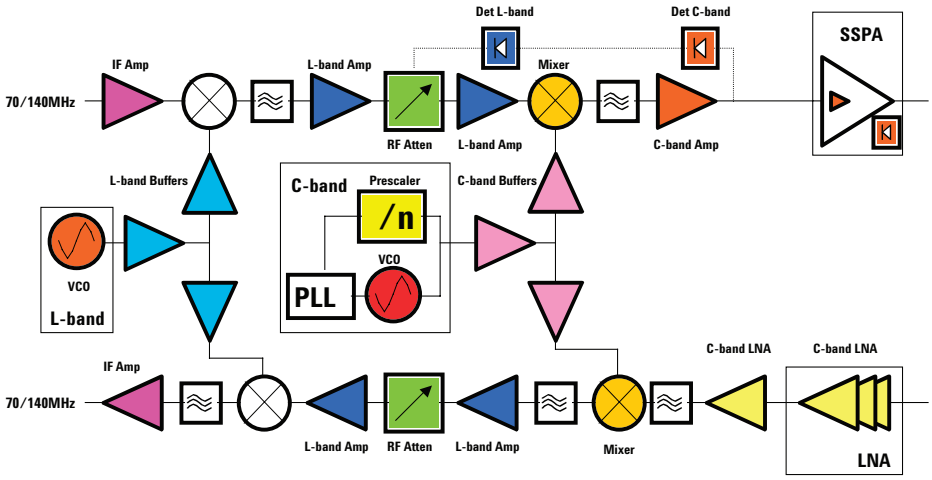
Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB @ 2GHz	P1dB/dBm @ 2GHz	OIP3/dBm @ 2GHz	NF/dB @ 2GHz	Device Type and Package
IF Amplifier	**MGA-62563**[1]	3/55	0.1 - 3	22	18	35	0.8	E-pHEMT MMIC, SOT363
	MGA-545P8	3.3/135	0.1 - 7	22	19	36	2	E-pHEMT MMIC, LPCC
	ADA-4789	4.1/80	DC - 2.5	16.3	16.9	29	4.5	Si MMIC, SOT89
	ADA-4743	(3.8)/60	DC - 2.5	16.5	17.1	34	4.2	Si MMIC, SOT343
	ADA-4643	(3.5)/35	DC - 2.5	17.3	14	29	4	Si MMIC, SOT343
	ADA-4543	(3.4)/15	DC - 2.5	15.5	2.4	15	3.7	Si MMIC, SOT343
	ABA-54563	5/81	DC - 3	23	18	32	3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	15	27.5	2.9	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.8	12.5	28	2.7	Si MMIC, SOT363

Recommended Parts in **Bold**.

Notes

1. Current adjustable 20 - 60mA

C-Band



Tx/GHz: 5.880-6.425, 5.725-6.275, 6.725-7.025, 6.425-6.725
Rx/GHz: 3.625-4.200, 3.400-3.950, 4.500-4.800, 3.400-3.700

VSAT Suggested Components

Application	Part number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB @ 500MHz	P1dB/dBm @ 500MHz	OIP3/dBm @ 500MHz	NF/dB @ 500MHz	Device Type and Package
IF Amplifier	**MGA-62563**[1]	3/55	0.1 - 3	22	18	34.8	0.8	E-pHEMT MMIC, SOT363
	MGA-545P8	3.3/135	0.1 - 7	22	19	36	2	E-pHEMT MMIC, LPCC
	ADA-4789	4.1/80	DC - 2.5	17	18.8	35	4.2	Si MMIC, SOT89
	ADA-4743	(3.8)/60	DC - 2.5	16.6	17.1	34	4.2	Si MMIC, SOT343
	ABA-53563	5/46	DC - 3.5	21.5	15	27.5	2.9	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.8	12.5	28	2.7	Si MMIC, SOT363

Application	Part number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB @ 2GHz	P1dB/dBm @ 2GHz	OIP3/dBm @ 2GHz	NF/dB @ 2GHz	Device Type and Package
L-band Amplifier	**MGA-53543**	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
L-band Buffer - Low Power	MGA-61563[1]	3/41.6	0.1 - 6	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
	MGA-82563	3/84	0.1 - 6	13.2	17.3	31	2.2	GaAs MMIC, SOT363
	MGA-81563	3/42	0.1 - 6	12.4	14.8	27	2.8	GaAs MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-51563	5/18	DC - 3.5	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	MGA-85563[3]	3/15 to 30	0.8 - 6	19	1 to 8	12 to 17	1.9	GaAs MMIC, SOT363
L-band Buffer-High Power	**MGA-565P8**[2]	5/67	0.1 - 3.5	21.8	20 (Psat)	–	–	E-pHEMT MMIC, LPCC
	MGA-82563	3/84	0.1 - 6	13.2	17.3	31	2.2	GaAs MMIC, SOT363

Recommended Parts in **Bold**.
Notes:
1. Current adjustable 10-60mA.
2. High reverse isolation: 50dB typical.
3. Reverse Isolation 40dB typical.

C-Band

VSAT Suggested Components

Application	Part Number	Description	Package
L-band/C-band Detector - Schottky Diodes	**HSMS-282x**	Ct max = 1pF @0V	SOT323/363/23/143
	HSMS-286x	Ct max = 0.3pF @0V	SOT323/363/23/143
RF Attenuator - PIN Diodes	**HSMP-381x**	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design	SOT323/23/25/SOD-323
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design	SOT323/363/23/25/SOD-323

Recommended Parts in **Bold**.

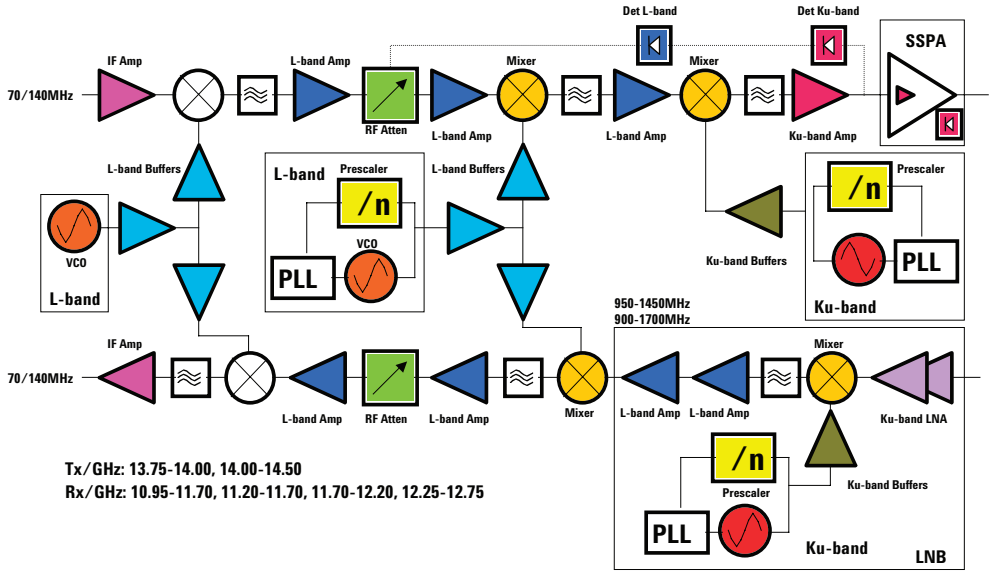
Application	Part number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB[1] @ 5GHz	P1dB/dBm[1] @ 5GHz	OIP3/dBm @ 5GHz	NF/dB[2] @ 5GHz	Device Type and Package
C-band LNA	**ATF-36077**	1.5/10	2 - 18	16	5	–	0.3	PHEMT FET, ceramic
	ATF-36163	1.5/10	1.5 - 18	15	5	–	0.61	PHEMT FET, SOT363
	ATF-551M4	2.7/10	0.5 - 6	12	14.5	24.5	0.75	E-pHEMT FET, MiniPak
	ATF-55143	2.7/10	0.5 - 6	12	13.5	24	0.9	E-pHEMT FET, SOT343
C-band Amplifier C-band Buffer	**MGA-545P8**	3.3/135	0.1 - 6	12	21	34	3.6	E-pHEMT MMIC, LPCC
	MGA-82563	3/84	0.1 - 6	9.5	17	31	2.6	GaAs MMIC, SOT363
	MGA-81563	3/42	0.1 - 6	10.5	14.5	27	3.2	GaAs MMIC, SOT363
	MGA-85563	3/15 to 30	0.8 - 6	16	1 to 8	12 to 18	1.6	GaAs MMIC, SOT363
	ATF-541M4	3/60	0.5 - 8	11	19.5	37.5	1.02	E-pHEMT FET, MiniPak
	ATF-54143	3/60	0.5 - 6	11	18	36	0.93	E-pHEMT FET, SOT343
	ATF-521P8	4.5/200	0.5 - 6	10	27	39	1.75	E-pHEMT FET, LPCC

Recommended Parts in **Bold**.

Notes:

1. Gain and P1dB performance for discrete FETs when matched for best IP3
2. NFmin figures for discrete FETs

Ku-Band



VSAT Suggested Components

Application	Part number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB[1] @ 12GHz	P1dB/dBm[1] @ 12GHz	OIP3/dBm @ 12GHz	NF/dB[2] @ 12GHz	Device Type and Package (mm)
Ku-band LNA	**ATF-36077**	1.5/10	2 - 18	12	5	–	0.5	PHEMT FET, Ceramic
	ATF-36163	1.5/10	1.5 - 18	9.4	5	–	1	PHEMT FET, SOT363
	AMMP-6220	3/60	6 - 20	23	10	23	2.2	SM 5x5
	VMMK-1225	2/20	0.5 - 26	11	8	23	0.9	SM 1x0.5
	VMMK-1218	3/20	0.5 - 18	10.7	12	12	0.7	SM 1x0.5
Ku-band Amplifier	AMMP-5618	5/107	6 - 20	13	19	30	4.4	SM 5x5
Ku-band Buffer	AMMP-6408	5/650	6 - 18	18	28	38	4.5	SM 5x5
Ku-band Mixer (IRM)	AMMP-6530	-1/0	5 - 30	-10	8	18	10	SM 5x5

Recommended Parts in **Bold**.
Notes:
1. Gain and P1dB performance for discrete FETs when matched for best noise.
2. NFmin figures for discretes FETs.

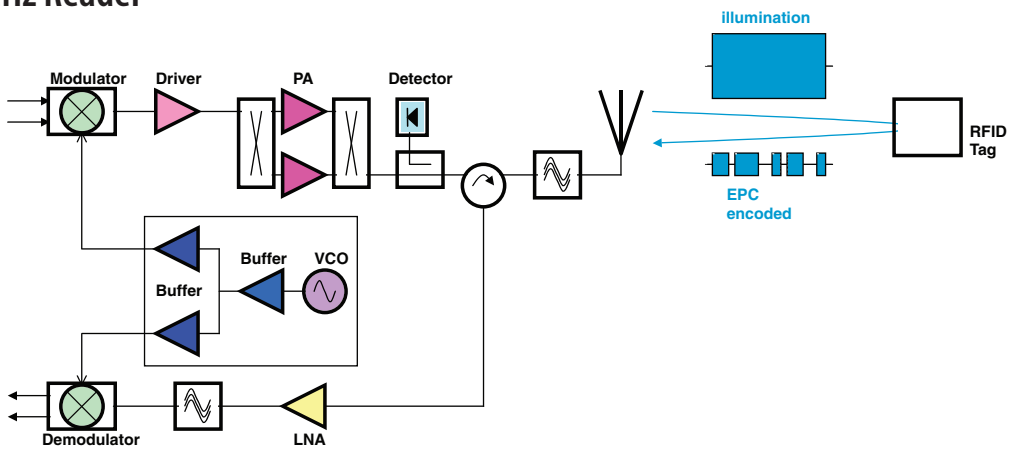
Ku-Band

VSAT Suggested Components

Application	Part Number	Description	Package
Ku-band Detector - Schottky diodes	**HSMS-286x**	Ct max = 0.3pF @0V	SOT323/363/23/143
	HSCH-5310/5330	Si single, Ct=0.1pF, med. barrier/low barrier	beamlead
	HSCH-5312/5332	Si single Ct=0.15pF, med. barrier/low barrier	beamlead
Ku-band Mixer - Schottky diodes	**HSMS-8202**	Si series pair, Ct=0.26pF, low-cost	SOT23
	HSCH-5312/5332	Si single Ct=0.15pF, med. barrier/low barrier	beamlead
	HSCH-5531/5512	Si series pair, Ct=0.15pF, low barrier/ Ct=0.1pF, med. barrier	beamlead

Recommended Parts in **Bold**.

RFID 900 MHz Reader



RFID 900MHz Reader Suggested Components

Application	Part number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB[1] @ 0.9GHz	P1dB/dBm[1] @ 0.9GHz	OIP3/dBm @ 0.9GHz	NF/dB[2] @ 0.9GHz	Device Type and Package (mm)
LNA	**MGA-53543**	5/54	0.4 - 6	17.4	19.3	39.7	1.3	E-pHEMT MMIC, SOT343
	MGA-72543[5]	3/20	0.1 - 6	14.8	12	23	1.35	E-pHEMT MMIC, SOT343
	ATF-54143	3/60	0.45 - 6	23.4	18.4	35.5	0.3	E-pHEMT FET, SOT343
	ATF-58143	3/30	0.45 - 6	23.1	18.1	28.6	0.3	E-pHEMT FET, SOT343
Driver Amplifier	**MGA-53543**	5/54	0.4 - 6	17.4	19.3	39.7	1.3	E-pHEMT MMIC, SOT343
	MGA-545P8	3.3/127	0.05 - 7	22.4	21.5	34	2.6	E-pHEMT MMIC, LPCC
	MGA-61563[4]	3/41	0.1 - 6	19.3	15.4	30.5	0.9	E-pHEMT MMIC, SOT363
	ATF-52189	4.5/200	0.05 - 6	16.5	27.2	42	1	E-pHEMT FET, SOT89
	ATF-521P8	4.5/200	0.05 - 6	17.2	26.5	42.5	0.7	E-pHEMT FET, LPCC
	ATF-53189	4/135	0.05 - 6	17.2	21.7	42	0.41	E-pHEMT FET, SOT89
	ATF-531P8	4/135	0.05 - 6	25	23	37	0.26	E-pHEMT FET, LPCC
	ADA-4789	4.1/80	DC - 2.5	16.9	18.8	33.2	4.3	Si MMIC, SOT89
	ADA-4743	3.8/60	DC - 2.5	16.5	17.1	32.6	4.2	Si MMIC, SOT343
Power Amplifier	**ATF-50189**	4.5/280	0.05 - 6	21.5	28.5	44	1	E-pHEMT FET, SOT89
	ATF-501P8	4.5/280	0.05 - 6	16.6	27.3	42	1	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	0.05 - 6	17.8	29.6	43	1.2	E-pHEMT FET, LPCC
Mixer	**IAM-92516**	5/26	0.4 - 3.5	6.5 (CL)	16 (IP1dB)	29.3 (IIP3)	7.1	E-pHEMT MMIC, LPCC(3x3)
Buffer-High Power	**MGA-565P8**[3]	5/67	0.1 - 3.5	28	22 (Psat)	–	–	E-pHEMT MMIC, LPCC
	ABA-54563	5/79	DC - 3.4	23	18	34	4.2	Si MMIC, SOT363
Buffer-Low Power	**ABA-31563**	3/14	DC - 3.5	21.3	3	15	3.8	Si MMIC, SOT363
	ABA-32563	3/37	DC - 2.5	20.5	9.5	22.5	3.1	Si MMIC, SOT363
	ABA-51563	5/18	DC - 3.5	21	3.5	15	3.4	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.3	12	26	2.9	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	14.5	26.5	3.1	Si MMIC, SOT363
Detector	**HSMS-282x**	Ct max = 1pF @0V						SOT323/363/23/143

Notes:
1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. NFmin figures for discrete FETs.
3. High reverse isolation: 50dB typical.
4. Current adjustable: 20-60mA.
5. Includes integral bypass function. Current adjustable between 5 – 60mA.

Product Selection Guides
RFICs (GaAs and Silicon)

GaAs RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package
GaAs Fixed Gain Amplifiers	MGA-52543	0.4 - 6	1.9	5	53	1.9	14.2	+17.4	+32	SOT-343 (SC-70)
	MGA-53543	0.4 - 6	1.9	5	54	1.5	15.4	+18.6	+39	SOT-343 (SC-70)
	MGA-53589	0.05 - 6	1.9	5	52	1.66	15.8	+18.5	+37	SOT-89
	MGA-81563	0.1 - 6	2.0	3	42	2.8	12.4	+14.8	+27	SOT-363 (SC-70)
	MGA-82563	0.1 - 6	2.0	3	84	2.2	13.2	+17.3	+31	SOT-363 (SC-70)
	MGA-85563	0.8 - 6	2.0	3	15 to 30	1.9	18.0	+1 to +8	+12 to +17	SOT-363 (SC-70)
	MGA-86563	0.5 - 6	2.0	5	14	1.5	22.7	+4.1	+15	SOT-363 (SC-70)
	MGA-86576	1.5 - 8	4.0	5	16	1.6	23.1	+6.3	+16	SM Ceramic
	MGA-87563	0.5 - 4	2.0	3	4.5	1.6	14.0	-2	+8	SOT-363 (SC-70)

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idsat (mA)	PAE (%)	Gain (dB)	PSAT (dBm)	OIP3 (dBm)	Package (mm)
GaAs Medium Power Amplifiers	MGA-83563	0.5 - 6	2.4	3	152	37.0	22.0	+22	+29	SOT-363 (SC-70)
	MGA-545P8	0.05 - 7	5.825	3.3	92	46.0	11.5	+22	+34	LPCC 2x2
	MGA-425P8	2 - 10	5.25	3.3	65	47.0	16.0	+20.3	32.9	LPCC 2x2
	MGA-412P8	2.4 - 2.5	2.4	3.3	95	NA	25.5	+25.3	38	LPCC 2X2

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	OP1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs Match-Pair Dual LNA	MGA-12516	0.8 - 3	1.95	4	50	0.58	24	18.4	33.3	QFN 4.0x4.0x0.85

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs Smart Bias Amplifier	MGA-13516	1.4 - 2.7	0.9	5	45	0.66	31.8	23.5	38	QFN 4x4x0.85
	MGA-14516	1.4 - 2.7	1.95	5	45	0.66	31.7	23.5	38	QFN 4x4x0.85
	MGA-61563	0.1 - 6	2	3	41	1.2	16.6	+15.8	+28.5	SOT-363 (SC-70)
	MGA-62563	0.1 - 3	0.5	3	60	0.9	22.0	+17.8	+32.9	SOT-363 (SC-70)
	MGA-631P8	0.4 - 1.5	0.9	4	60	0.5	17.5	18	32.8	LPCC2x2
	MGA-632P8	1.4 - 3	1.95	4	60	0.6	17.6	18.3	35.4	LPCC2x2
	MGA-685T6	0.1 - 1.5	0.5	3	10	0.9	18.9	17.3	+18.7	UTSLP 2.0x1.3x0.4
	MGA-68563	0.1 - 1.5	0.5	3	11	1	19.7	17.5	20.7	SOT-363

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	PAE (%)	OIP3 (dBm)	Package (mm)
GaAs High Linearity Amplifier	ALM-31122	0.7 - 1	0.9	5	394	2	15.6	52.5	47.6	MCOB 5.0x6.0x1.1
	ALM-31222	1.7 - 2.7	2	5	415	2.7	14.9	52.6	47.9	MCOB 5.0x6.0x1.1
	ALM-31322	3.3 - 3.9	3.5	5	413	2.8	13.2	51.5	47.7	MCOB 5.0x6.0x1.1
	ALM-32120	0.7 - 1.0	0.9	5	800	2.5	14	47	52	MCOB 7.0x10.0x1.1
	ALM-32220	1.7 - 2.7	2	5	800	3.5	14.8	47.5	50	MCOB 7.0x10.0x1.1
	ALM-32320	3.3 - 3.9	3.5	5	800	2.5	12	43	49	MCOB 7.0x10.0x1.1
	MGA-30116	0.75 - 1	0.9	5	202.8	2	17	47	44.1	QFN 3x3
	MGA-30216	1.7 - 2.7	2	5	206	2.8	14.2	48.9	45.3	QFN 3x3
	MGA-30316	3.3 - 3.9	3.5	5	198	2.7	12.8	51.3	44.4	QFN 3x3
	MGA-53589	50MHz - 6GHz	1.9	5	54	1.66	18.6	–	37	SOT-89

RFICs (GaAs and Silicon)

GaAs RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idsat (mA)	Isolation (dB)	Gain (dB)	Psat (dBm)	Package (mm)
GaAs LO Buffer Amplifier	MGA-565P8	0.1 - 3	2	5	67	50.0	21.8	+20	LPCC2x2

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vd/Id (V/mA)	Switch Insertion Loss (dB)	NF (dB)	Gain (dB)	P1dB (dBm @ mA)	IIP3 (dBm @mA)	Package (mm)
GaAs Amplifier with Bypass Switch	MGA-645T6	1.7 - 3	2.4	3/7	4.5	1.1	15.0	+9 @ 7	+7 @ 7	UTSLP 2.0x1.3x0.4
	MGA-655T6	2.5 - 4	3.5	3/10	4.2	1.17	14.7	+12 @ 10	+5.5 @ 10	UTSLP 2.0x1.3x0.4
	MGA-71543	0.1 - 6	2	2.7/10	5.6	0.8	15.4	+7.4 @ 10	+3 @ 10	SOT-343 (SC-70)
	MGA-72543	0.1 - 6	2	2.7/20	2.5	1.4	13.6	+11.2 @ 20	+10.5 @ 20	SOT-343 (SC-70)
	MGA-725M4	0.1 - 6	2	2.7/20	1.6	1.3	15.7	+13.1 @ 20	+9.9 @ 20	MiniPak Package
	MGA-785T6	0.1 - 1.5	0.6	3/10	2.6	1.5	15.7	3.2 @ 10	+1.10 @ 10	UTSLP 2.0x1.3x0.4

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vd (V)	Id (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs LNA with Power Down	MGA-665P8	0.5 - 6	5.25	3	21	1.5	16.5	11.1	15.4	LPCC2x2
GaAs LNA Module	MGA-21108	1.5 - 6	3.5	1.4	19	1.4	18	-10 (IP1dB)	-3.0 (IIP3)	STSLP
	MGA-635T6	0.9 - 2.4	1.575	2.85	4.9	0.86	14.6	1 (IP1dB)	3.5 (IIP3)	UTSLP 2.0x1.3x0.4
	MGA-675T6	4.9 - 6.0	5.5	2.7	5	0.9	16.3	NA	14.7	UTSLP
	ALM-1106	0.9 - 2.5	1.575	2.85	8	0.8	14.3	1.8 (IP1dB)	4.7 (IIP3)	MCOB 2x2x1.1
	ALM-1222	1.8 - 2.2GHz	2	5	280	0.62	31.0	27.5	43.7	MCOB 5.0 x 6.0 x 1.1
	ALM-1322	1.8 - 2.2GHz	2	5	100	0.57	29.9	17.0	35.6	MCOB 5.0 x 6.0 x 1.1

Component	Part Number	Test Freq. (GHz)	Vd/Id (V/mA)	NF (dB)	Gain (dB)	IP1dB (dBm)	IIP3 (dBm)	Cell-Band Rejection	PCS-Band Rejection	Package (mm)
GPS LNA Module with Integrated FBAR Filter	ALM-1412	1.575	2.85/9	0.8	13.1	3.4	7	61	54	MCOB 3.3x2.1x1.1
	ALM-1612	1.575	2.7/5.0	0.95	18	-12	-2	66	67	MCOB 3.3x2.1x1.1

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Voltage (Vdg)	Current (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
Mixers-Downconverter	IAM-91563	0.8 - 6	1.9	3	9	8.5	9.0	-8	-6	SOT-363 (SC-70)
	IAM-92516	0.4 - 3.5	1.9	5	26	12.5	-6.0	9	27 (IIP3)	LPCC 3x3
	IAM-93516	0.4 - 3.0	1.9	5	110	11.6	9.3	19	23 (IIP3)	LPCC 3x3

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	Gain (dB)	P1dB (dB)	Pout @ 2.5% EVM	Atten (dB)	Package (mm)
GaAs WiMAX Power Amplifier Module	ALM-42216	2.3 - 2.7	2.5	3.3	240	30	30	23.5	20	MCOB 5.0x5.0x1.1
	ALM-42316	3.3 - 3.8	3.5	3.3	240	30	30.5	23	18	MCOB 5.0x5.0x1.1

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	IIP3 (dBm)	IP1dB (dBm)	Package (mm)
WiFi Dual Band LNA Module	ALM-2812	2.4 - 2.5	2.45	3.3	15	0.8	16.7	6.1	5.8	MCOB 3.0x3.0x1.1
		4.9 - 6.0	5.5	3.3	23.4	1.4	23.2	2.2	12.8	MCOB 3.0x3.0x1.1

RFICs (GaAs and Silicon)

Silicon RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Voltage (Vdg)	Current (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package
Silicon Broadband Amplifiers	ABA-31563	DC - 3.5	2.0	3	14.5	3.8	21.0	+2.0	13.0	SOT-363 (SC-70)
	ABA-32563	DC - 2.5	2.0	3	38	3.4	18.5	+8.0	19.0	SOT-363 (SC-70)
	ABA-51563	DC - 3.5	2.0	5	18	3.7	21.5	+1.8	11.4	SOT-363 (SC-70)
	ABA-52563	DC - 3.5	2.0	5	35	3.3	21.5	+9.8	19.9	SOT-363 (SC-70)
	ABA-53563	DC - 3.5	2.0	5	46	3.5	21.5	+12.7	22.9	SOT-363 (SC-70)
	ABA-54563	DC - 3	2.0	5	79	4.4	23.0	+16.1	27.8	SOT-363 (SC-70)
Silicon Darlington Amplifiers	ADA-4543	DC - 2.5	0.9	3.4	15	3.7	15.1	+1.9	15.0	SOT-343 (SC-70)
	ADA-4643	DC - 2.5	0.9	3.5	35	4.0	17.0	+13.4	28.3	SOT-343 (SC-70)
	ADA-4743	DC - 2.5	0.9	3.8	60	4.2	16.5	+17.1	32.6	SOT-343 (SC-70)
	ADA-4789	DC - 2.5	0.9	3.8	60	4.2	16.5	+17.1	32.6	SOT-89
Silicon Fixed Gain Amplifiers	MSA-0300	DC - 2.8	1 Typ	5	35	6	12.5	10	23	Chip
	MSA-0600	DC - 1	0.5 Typ	3.5	16	2.8	19.5	2	14.5	Chip
	MSA-0836	DC - 4	1.0	7.8	36	3.0	23.0	+12.5	27.0	35 Micro-X
	MSA-0870	DC - 4	1.0	7.8	36	3.0	23.5	+12.5	27.0	70 mil
	MSA-0886	DC - 4	1.0	7.8	36	3.3	22.5	+12.5	27.0	86 Plastic
	MSA-3111	DC - 0.5	1.0	4.5	29	3.5	18.4	+9	23.0	SOT-143
	MSA-3186	DC - 0.5	1.0	4.7	29	3.5	18.7	+9	21.0	86 Plastic
	MSA-2011	DC - 1.0	1.0	5	32	4.3	16.2	+9	22.0	SOT-143
	MSA-2086	DC - 1.1	1.0	5	32	3.7	16.6	+9	22.0	86 Plastic
	MSA-0711	DC - 1.9	1.0	3.8	22	5.0	12.0	+5.5	18.0	SOT-143
	MSA-0736	DC - 2.4	1.0	4	22	4.5	13.0	+5.5	19.0	35 Micro-X
	MSA-0770	DC - 2.5	1.0	4	22	4.5	13.0	+5.5	19.0	70 mil
	MSA-0786	DC - 2.0	1.0	4	22	5.0	12.5	+5.5	19.0	86 Plastic
	MSA-0986	0.1 - 5.5	2.0	7.8	35	6.2	7.2	+10.5	23.0	86 Plastic
	MSA-0236	DC - 2.7	1.0	5	25	6.5	12.0	+4.5	17.0	35 Micro-X
	MSA-0270	DC - 2.8	1.0	5	25	6.5	12.0	+4.5	17.0	70 mil
	MSA-0286	DC - 2.5	1.0	5	25	6.5	12.0	+4.5	17.0	86 Plastic
	MSA-0420	DC - 4.0	1.0	6.3	90	6.5	8.5	16	30.0	200 mil BeO
	MSA-0436	DC - 3.8	1.0	5.25	50	6.5	8.5	+12.5	25.5	35 Micro-X
	MSA-0470	DC - 4.0	1.0	5.25	50	6.5	8.5	+12.5	25.5	70 mil
	MSA-0486	DC - 3.2	1.0	5.25	50	7.0	8.0	+12.5	25.5	86 Plastic
	MSA-0505	0.02 - 2.3	1.0	8.4	80	6.5	7.0	18	29.0	05 Plastic
	MSA-0520	0.02 - 2.8	1.0	12	165	6.5	8.5	+23	33.0	200 mil BeO
	MSA-9970	DC - 2.0	1.0	7.8	35		16.0	+14.5	25.0	70 mil
	MSA-0311	DC - 2.3	1.0	4.7	35	6.0	11.0	+9	22.0	SOT-143
	MSA-0336	DC - 2.7	1.0	5	35	6.0	12.0	+10	23.0	35 Micro-X
	MSA-0370	DC - 2.8	1.0	5	35	6.0	12.0	+10	23.0	70 mil
	MSA-0386	DC - 2.4	1.0	5	35	6.0	12.0	+10	23.0	86 Plastic
	MSA-0611	DC - 0.7	0.5	3.3	16	3.0	18.0	+2	14.0	SOT-143
	MSA-0636	DC - 0.9	0.5	3.5	16	2.8	19.0	+2	14.5	35 Micro-X
	MSA-0670	DC - 1.0	0.5	3.5	16	2.8	19.5	+2	14.5	70 mil
	MSA-0686	DC - 0.8	0.5	3.5	16	3.0	18.5	+2	14.5	86 Plastic
	MSA-1105	0.05 - 1.3	0.5	5.5.	60	3.6	12.0	+17.5	30.0	05 Plastic
	MSA-1110	0.05 - 1.6	0.5	5.5	60	3.5	12.0	+17.5	30.0	100 mil
	MSA-1120	0.05 - 1.6	0.5	5.5	60	3.5	12.0	+17.5	30.0	200 mil BeO
	MSA-2111	DC - 0.5	0.9	3.6	29	3.3	17.5	10	20.0	SOT-143

Transistors

Transistors

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Voltage (V)	NF (dB)	Gain (dB)	P1dB (dBm)	S21E (dB)	OIP3 (dBm)	Package
Silicon Bipolar Transistor	AT-30511	DC - 5	0.9	2.7	1.1	16.0	+7.0	17.9	17.0	SOT-143
	AT-30533	DC - 5	0.9	2.7	1.1	13.0	+7.0	15.2	17.0	SOT-23
	AT-31011	DC - 5	0.9	2.7	0.9	13.0	+9.0	19.1	20.0	SOT-143
	AT-31033	DC - 5	0.9	2.7	0.9	11.0	+9.0	15.8	20.0	SOT-23
	AT-32011	DC - 5	0.9	2.7	1.0	14.0	+13.0	18.9	24.0	SOT-143
	AT-32032	DC - 6	0.9	2.7	1.0	15.0	+13.0	11.5	23.0	SOT-323
	AT-32033	DC - 5	0.9	2.7	1.0	12.5	+13.0	15.1	24.0	SOT-23
	AT-32063	DC - 5	0.9	2.7	1.1	14.5	+12.0	17.0	24.0	SOT-363 (SC-70)
	AT-41435	DC - 6	2.0	8.0	1.7	14.0	+19.0	17.2		35 micro-X
	AT-41486	DC - 6	1.0	8.0	1.4	18.0	+18.0	17.5		86 mil Plastic
	AT-41535	DC - 6	2.0	8.0	1.7	14.0	19.0	11.0	–	35 micro-X
	AT-41500	DC - 6	2.0	8.0	1.7	12.5	18	11.0	–	Chip
	AT-41511	DC - 5	0.9	5.0	1.0	15.5	+14.5	15.8	25.0	SOT-143
	AT-41532	DC - 6	0.9	5.0	1.0	15.5	+14.5	13.3	25.0	SOT-323
	AT-41533	DC - 5	0.9	5.0	1.0	14.5	+14.5	13.9	25.0	SOT-23
	AT-41586	DC - 6	1.0	8.0	1.4	17.0	+18.0	17.0		86 mil Plastic
	AT-42000	DC - 6	2 Typ	8.0	1.9	14.0	21	11.5		Chip
	AT-42010	DC - 6	2.0	8.0	1.9	13.5	21	11.5	–	100 mil
	AT-42035	DC - 6	2.0	8.0	2.0	13.5	+21.0	11.0		35 micro-X
	AT-42036	DC - 6	2.0	8.0	1.9	13.5	+21.0	16.6		36 micro-X
	AT-42070	DC - 6	2.0	8.0	1.9	14.0	+21.0	17.3		70 mil stripline
	AT-42085	DC - 6	2.0	8.0	1.9	13.5	+20.5	17.0		85 mil Plastic
	AT-42086	DC - 6	2.0	8.0	1.9	13.0	+20.5	16.5		86 mil Plastic

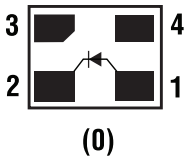
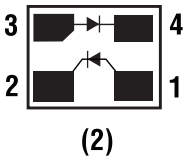
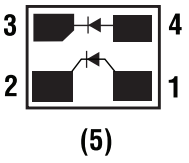
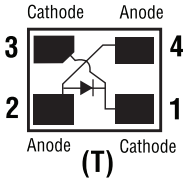
Component	Part Number	Freq. Range (GHz)	Voltage (V)	Test Freq. (GHz)	P1dB (dBm)	G1dB (dBm)	Package
Medium Power Si Transistor	AT-64020	DC - 4	16	2	+28	10	200 mil BeO disk
	AT-64023	DC - 4	16	4	26.5	9.5	230 mil BeO disk
	AT-64000	DC - 4	16	4	26.5	9.5	Chip

Transistors

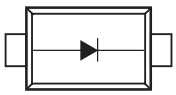
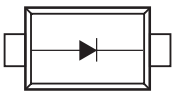
Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd / Idq (V)	NF (dB)	Ga (dB)	P1dB (dBm)	OIP3 (dBm)	Gate Width (um)	Package (mm)
Single Voltage Low Noise GaAs E-pHEMTs	ATF-501P8	.05 - 6	2	4.5/280	1.8	14.6	+28	+47	6400	LPCC 2x2
	ATF-50189	.05 - 6	2	4.5/280	1.1	15.5	+29.1	+45.3	6400	SOT-89
	ATF-511P8	.05 - 6	2	4.5/200	1.4	14.8	+30	+42	6400	LPCC 2x2
	ATF-521P8	05 - 6	2	4.5/200	1.5	17.0	+26.5	+42	3200	LPCC 2x2
	ATF-52189	05 - 6	2	4.5/200	1.5	16.0	+27.0	+42	3200	SOT-89
	ATF-531P8	05 - 6	2	4.0/135	0.6	20.0	+24.5	+38	1600	LPCC 2x2
	ATF-53189	05 - 6	2	4.0/135	0.85	15.5	+23.0	+40	1600	SOT-89
	ATF-54143	.45 - 6	2	3.0/60	0.5	16.6	+20.4	+36	800	SOT-343 (SC-70)
	ATF-541M4	.45 - 10	2	3.0/60	0.5	17.5	+21.4	+36	800	MiniPak Package
	ATF-55143	.45 - 6	2	2.7/10	0.6	17.7	+14.4	+24	400	SOT-343 (SC-70)
	ATF-551M4	.45 - 10	2	2.7/10	0.5	17.5	+14.6	+24	400	MiniPak Package
	ATF-58143	.45 - 6	2	3.0/30	0.5	16.5	+19	+30.5	800	SOT-343 (SC-70)
Low Noise GaAs pHEMTS	ATF-33143	.45 - 6	2	4.0/80	0.5	15.0	+22	+33.5	1600	SOT-343 (SC-70)
	ATF-331M4	.45 - 6	2	4.0/80	0.6	15.0	+19	+31	1600	MiniPak Package
	ATF-34143	.45 - 6	2	4.0/60	0.5	17.5	+20	+31.5	800	SOT-343 (SC-70)
	ATF-35143	.45 - 6	2	2.0/15	0.4	18.0	+11	+21	400	SOT-343 (SC-70)
	ATF-38143	.45 - 6	2	2.0/10	0.4	16.0	+12	+22	800	SOT-343 (SC-70)
	ATF-36077	1.5 - 18	12	1.5	0.5	12.0	+5	–	200	70 mil SM
	ATF-36163	1.5 - 18	12	1.5	1.2	10.0	+5	–	200	SOT-363 (SC-70)
	VMMK-1218	0.5 - 18	–	3/20	0.7	10.7	12	12	–	SM 1x0.5
	VMMK-1225	0.5 - 26	–	2/20	0.9	11	8	23	–	SM 1x0.5

Diodes — PIN

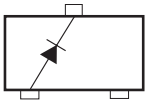
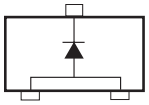
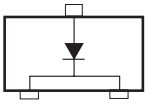
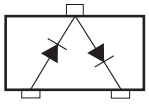
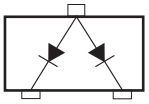
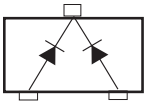
MiniPak

	Single	Anti-parallel	Parallel	Shunt Switch
Configuration	 (0)	 (2)	 (5)	 (T)
PIN	HMPP-3860	HMPP-3862	HMPP-3865	
	HMPP-3890	HMPP-3892	HMPP-3895	HMPP-389T

2 Lead Diodes SOD-323, 2 Lead Diodes SOD-523

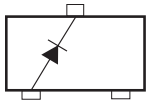
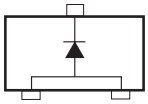
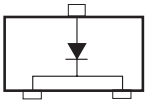
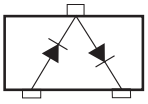
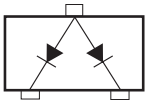
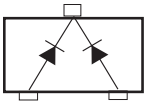
	Single	Single
Configuration	 SOD-323	 SOD-523
PIN	HSMP-381Z	HSMP-389Y
	HSMP-386Z	
	HSMP-389Z	

3 Lead Diodes SOT-3223 (SC-70)

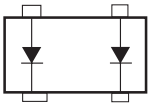
	Single	Dual Anode	Dual Cathode	Series Pair	Common Anode	Common Cathode
Configuration						
PIN	HSMP-381B		HSMP-481B	HSMP-381C	HSMP-381E	HSMP-381F
	HSMP-386B			HSMP-386C	HSMP-386E	HSMP-386F
	HSMP-389B	HSMP-489B		HSMP-389C	HSMP-389E	HSMP-389F
		HSMP-482B				

Diodes — PIN

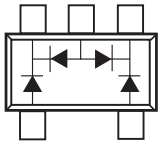
3 Lead Diodes SOT-23

	Single	Dual Anode	Dual Cathode	Series Pair	Common Anode	Common Cathode
Configuration						
PIN	HSMP-3810		HSMP-4810	HSMP-3812	HSMP-3813	HSMP-3814
	HSMP-3860			HSMP-3862	HSMP-3863	HSMP-3864
	HSMP-3890	HSMP-4890		HSMP-3892	HSMP-3893	HSMP-3894
	HSMP-3820	HSMP-4820		HSMP-3822	HSMP-3823	HSMP-3824
	HSMP-3830			HSMP-3832	HSMP-3833	HSMP-3834

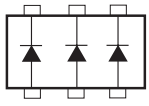
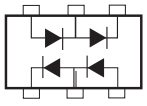
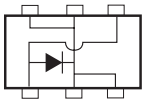
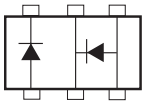
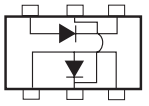
4 Lead Diodes SOT-143

	Unconnected Pair
Configuration	
PIN	HSMP-3895

5 Lead Diodes SOT-25

	Pi Quad
Configuration	
PIN	HSMP-3816
	HSMP-3866

6 Lead Diodes SOT-363 (SC-70)

	Unconnected Trio	Dual Mode Switch	Low Inductance	Series Shunt Pair	High Frequency Series Shunt Pair
Configuration					
PIN	HSMP-386L				
	HSMP-389L	HSMP-389R	HSMP-389T	HSMP-389U	HSMP-389V

Diodes — PIN

PIN Diodes

Application	Part Number	C_t (pF) (max/typ)	RS (Ω) (max)	V_{BR} (V) (min)	T_{rr} (nS) (typ)	Lifetime (nS) (typ)
Low Distortion Attenuator	HSMP-381x	0.35/0.27	3.0	100	300	1500
Low Distortion/Low Inductance Attenuator	HSMP-481x	0.40/0.35	3.0	100	300	1500
Low Resistance Limiter	HSMP-382x	0.8/0.6	0.6	50	7	70
Low Inductance Limiter	HSMP-482x	1.0/0.75	0.6	50	7	70
Low Current Switch/ Attenuator	HSMP-383x	0.3/0.2	1.5	200	80	500
Low Current Switch/ Attenuator	HMPP/HSMP-386x	- / 0.2	1.5 typ	50	80	500
Low Resistance Switch	HMPP/HSMP-389x	0.30/0.20	2.5	50	–	200
Low Resistance/Low Inductance Switch	HSMP-489X	0.38/0.33	2.5	50	–	200

PIN Diode Chips

Part Number	C_t (pF)	RS (Ω)	V_{BR} (V)	T_{rr} (nS)	Lifetime (nS)	Configuration	Package
5082-0012	0.12	1	150	100	400	Single	Chip
HPND-0002	0.2	3.5	100	300	1500	Single	Chip

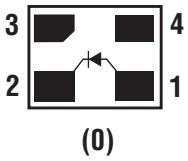
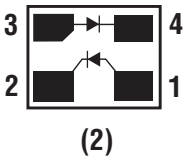
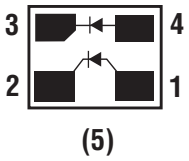
Glass PIN Diodes

Part Number	C_t (pF)	RS (Ω)	V_{BR} (V)	T_{rr} (nS)	Lifetime (nS)	Configuration	Package
1N5719	0.3	1.25	150	100	100	Single	Axial
1N5767	0.4	2.5	100		1300	Single	Axial
5082-3039	0.25	1.25	150	100	100	Single	Axial
5082-3077	0.3	1.5	200	100	100	Single	Axial
5082-3080	0.4	2.5	100		1300	Single	Axial
5082-3081	0.4	3.5	100		2500	Single	Axial
5082-3379	0.4	n/a	50		1300	Single	Axial

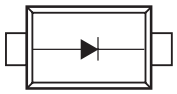
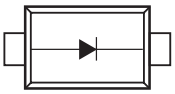
Beam Lead PIN Diodes

Part Number	C_t (pF)	RS (Ω)	V_{BR} (V)	T_{rr} (nS)	Lifetime (nS)	Configuration	Package
HPND-4005	0.017	4.7	120	n/a	100	Single	Beam Lead
HPND-4028	0.045	2.3	60	3	36	Single	Beam Lead
HPND-4038	0.065	1.5	60	2	45	Single	Beam Lead

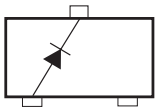
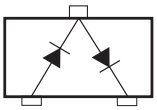
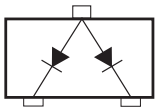
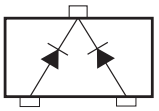
MiniPak

	Single	Anti-parallel	Parallel
Configuration	 (0)	 (2)	 (5)
Schottky	HMPS-2820	HMPS-2822	HMPS-2825

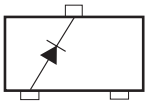
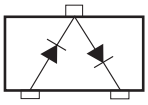
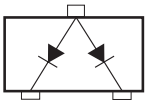
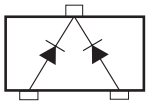
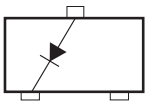
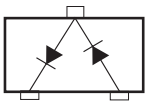
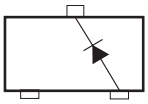
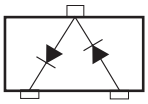
2 Lead Diodes SOD-323, 2 Lead Diodes SOD-523

	Single	Single
Configuration	 SOD-323	 SOD-523
Schottky	HSMS-282Z	HSMS-282Y
		HSMS-285Y
		HSMS-286Y

3 Lead Diodes SOT-323 (SC-70)

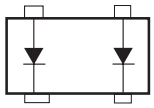
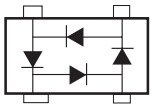
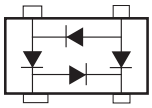
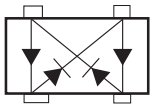
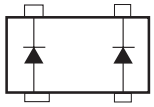
	Single	Series Pair	Common Anode	Common Cathode
Configuration				
Schottky	HBAT-540B	HBAT-540C		
	HSMS-270B	HSMS-270C		
	HSMS-280B	HSMS-280C	HSMS-280E	HSMS-280F
	HSMS-281B	HSMS-281C	HSMS-281E	HSMS-281F
	HSMS-282B	HSMS-282C	HSMS-282E	HSMS-282F
	HSMS-285B	HSMS-285C		
	HSMS-286B	HSMS-286C	HSMS-286E	HSMS-286F

3 Lead Diodes SOT-23

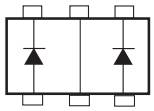
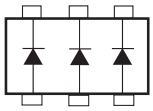
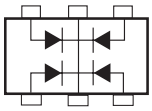
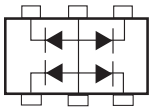
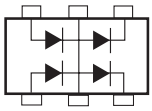
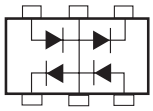
	Single	Series Pair	Common Anode	Common Cathode
Configuration				
Schottky	HBAT-5400	HBAT-5402		
	HSMS-2700	HSMS-2702		
	HSMS-2800	HSMS-2802	HSMS-2803	HSMS-2804
	HSMS-2810	HSMS-2812	HSMS-2813	HSMS-2814
	HSMS-2820	HSMS-2822	HSMS-2823	HSMS-2824
	HSMS-2860	HSMS-2862	HSMS-2863	HSMS-2864
				
	HSMS-2850	HSMS-2852		
				
	HSMS-8101	HSMS-8202		

Diodes — Schottky Diode

4 Lead Diodes SOT-143

	Unconnected Pair	Ring Quad	Bridge Quad	Crossover Quad
Configuration				
Schottky	HSMS-2805		HSMS-2808	
	HSMS-2815	HSMS-2817	HSMS-2818	
	HSMS-2825	HSMS-2827	HSMS-2828	HSMS-2829
	HSMS-2865			
		HSMS-8207		HSMS-8209
				
	HSMS-2855			

6 Lead Diodes SOT-363 (SC-70)

	High Isolation Unconnected Pair	Unconnected Trio	Common Cathode Quad	Common Anode Quad	Bridge Quad	Ring Quad
Configuration						
Schottky	HSMS-280K	HSMS-280L	HSMS-280M	HSMS-280N	HSMS-280P	HSMS-280R
	HSMS-281K	HSMS-281L				
	HSMS-282K	HSMS-282L	HSMS-282M	HSMS-282N	HSMS-282P	HSMS-282R
		HSMS-285L			HSMS-285P	
	HSMS-286K	HSMS-286L			HSMS-286P	HSMS-286R

Schottky-Barrier Diodes

Application	Part Number	V_{BR} (V) (min)	V_F (mV) (max) IF = 1 mA	V_F @ I_F (V @ mA) (max)	C_t (pF) (typ)	R_D (Ω) (typ)	Volt. Sens. (Y) (mV/mW)			Rv (KΩ) (typ)
							900 MHz	2.45 GHz	5.8 GHz	
General Purpose Detector	HMPS/HSMS-282x	15	340	0.7 @ 30	1.0	12.0	–	–	–	–
Clipping/Clamping	HBAT-540x	30	–	800 @ 100	3.0	2.4	–	–	–	–
High Current Clipping/ Clamping	HSMS-270x	15	–	550 @ 100	6.7	0.65	–	–	–	–
Lowest flicker noise	HSMS-281x	20	400	1.0 @ 35	1.2	15.0	–	–	–	–
High V_{BR}	HSMS-280x	70	400	1.0 @ 35	2.0	35	–	–	–	–
Zero bias detector	HSMS-285x	–	250	0.15 @ 0.1	0.3	–	40	30	22	8
High frequency up to 14 GHz	HSMS-286x	4	350	0.25 @ 0.1	0.3	–	50	35	25	5
Mixer	HSMS-8x0x	4	350	0.25 @ 0.1	0.26	11.0	–	35	25	5

Glass Schottky Diodes

Part Number	V_{BR} (V)	V_F (mV)	C_t (pF)	R_D (Ω)	Configuration	Package
1N5711	70	410	2.0		Single	Axial
5082-2835	8	340	1.0		Single	Axial
5082-2800	70	410	2.0		Single	Axial

Beam Lead Schottky Diodes

Part Number	V_{BR} (V)	V_F (mV)	C_t (pF)	R_D (Ω)	Configuration	Package
HSCH-5310	4	500	0.1	20.0	Medium Barrier	Beam-Lead
HSCH-5312	4	500	0.15	16.0	Medium Barrier	Beam-Lead
HSCH-5314	4	500	0.15	16.0	Medium Barrier	Beam-Lead
HSCH-5330	4	375	0.1	20.0	Low Barrier	Beam-Lead
HSCH-5331	4	375	0.1	20.0	Batch Match	Beam-Lead
HSCH-5332	4	375	0.15	16.0	Series Pair	Beam-Lead
HSCH-5340	4	375	0.1	20.0	Low Barrier	Beam-Lead
HSCH-5512	4	500	0.15	16.0	Series Pair	Dual Beam Lead
HSCH-5531	4	375	0.1	20.0	Low Barrier	Dual Beam Lead

Millimeter Wave MMICs Selection Guide

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs MMIC Low Noise Amplifier	AMMC-5023	21.2 - 26.5	5V @ 28	2.3	23.0	+10	24	Chip
	AMMC-5024	30Khz - 40	4V @ 160	3.7	17.5	17.3	22.5	Chip
	AMMC-5026	2 - 35	7V @ 150	3.6	10.0	+24	31	Chip
	AMMC-6220	6 - 20	3V @ 55	1.8	23.0	9	19	Chip
	AMMC-6222	7-21	4V @ 120	2.4	25.0	16	29	Chip
	AMMC-6232	18 - 32	4V @ 135	2.8	27.0	18	29	Chip
	AMMC-6241	26 - 43	3V @ 60	2.7	20.0	10	20	Chip
	AMMP-6220	6 - 20	3V @ 55	1.9	23.0	10	21	SM 5x5
	AMMP-6222	7 - 21	4V @ 120	2.3	24	15.5	29	SM 5x5
	AMMP-6232	18 - 32	4V @ 138	3.0	23	18	29	SM 5x5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	8	19	SM 5x5
	VMMK-1218	0.5 - 18	3/20	0.7	10.7	12	12	SM 1x0.5
	VMMK-1225	0.5 - 26	2/20	0.9	11	8	23	SM 1x0.5
GaAs MMIC Broadband Medium Power Amplifiers	AMMC-5033	17.7 - 32	5 @ 780	8	20	+27	32	Chip
	AMMC-5040	20 - 45	4.5V @ 300	8	24	22	23	Chip
	AMMC-5618	6 - 20	5V @ 107	4.4	14.5	+19.5	26	Chip
	AMMC-5620	6 - 20	5V @ 95	4.2	19	+15	23.5	Chip
	AMMC-6345	20 - 45	5V @ 480	9.0	20.0	24	32	Chip
	AMMC-6408	6 - 18	5V @ 650	4.3	19.0	29	38	Chip
	AMMC-6425	18 - 28	5V @ 900	9.0	20.0	28	38	Chip
	AMMC-6430	25 - 33	5.5V @ 900	8.0	17.0	29	37	Chip
	AMMC-6440	37 - 42	5.5V @ 950	9.5	14.0	28	38	Chip
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19.5	30	SM 5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	15	22.5	SM 5x5
	AMMP-6408	6 - 18	5V @ 650	4.5	18.0	28	38	SM 5x5

Component	Part Number	Freq. Range (GHz)	Insertion Loss (dBm)	Isolation dB	Input P1dB (dBm)	Control Input (Vdc)	Package
GaAs MMIC SPDT Switch	AMMC-2008	DC - 50	2.3	25	14	0 / -5	Chip

Component	Part Number	RF Freq. (GHz)	IF Freq. (GHz)	Conversion Gain (dB)	LO/RF Iso (dB)	IIP3 (dBm)	Image Reject	Package (mm)
GaAs MMIC Mixers	AMMC-3040	18 - 36	DC - 3	-9.5	31	23	–	Chip
	AMMC-3041	18 - 42	DC - 5	-9.5	44	23	–	Chip
	AMMC-6530	5 - 30	DC - 5	-10	22	18	15	Chip
	AMMP-6522	7 - 20	DC - 3.5	13		-4	15	SM 5x5
	AMMP-6530	5 - 30	DC - 5	-8	22	18	15	SM 5x5
	AMMP-6545	18-45	DC - 3.5	-11	30	11	–	SM 5x5

Component	Part Number	Input Freq. (GHz)	Output Freq. (GHz)	IP1dB (dBm)	Pout (dBm)	Fo (dBc)	Package (mm)
GaAs MMIC Doublers	AMMC-6120	4 - 12	8 - 24	2.0	15	25	Chip
	AMMC-6140	10 - 20	20 - 40	5.0	-1	30	Chip
	AMMP-6120	4 - 12	8 - 24	2.0	15	25	SM 5x5

About Avago Technologies

Avago Technologies is a leading supplier of analog interface components for communications, industrial and consumer applications. By leveraging its core competencies in III-V compound and silicon semiconductor design and processing, the company provides an extensive range of analog, mixed signal and optoelectronics components and subsystems to more than 40,000 customers. Backed by strong customer service support, the company's products serve four diverse end markets: industrial and automotive, wired infrastructure, wireless communications, and computer peripherals. Avago has a global employee presence and heritage of technical innovation dating back 40 years to its Hewlett-Packard roots. Information about Avago is available on the Web at www.avagotech.com

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AV00-0141EN 05/28/08

AVAGO TECHNOLOGIES

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