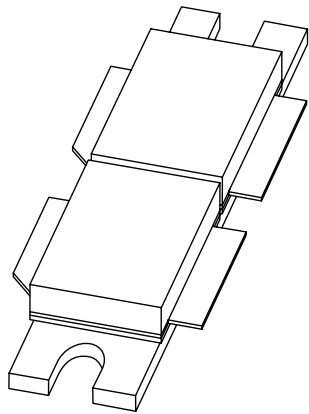


DATA SHEET



BLV2048

UHF push-pull power transistor

Preliminary specification

1999 Apr 23

UHF push-pull power transistor

BLV2048

FEATURES

- Emitter ballasting resistors for optimum temperature profile
- Gold metallization ensures excellent reliability
- Internal input and output matching for an easy design of wideband circuits.
- AlN substrate package for environmental safety
- Linear amplification with low distortion
- Low spectral regrowth in multichannel power amplifiers according to IS-95.

APPLICATIONS

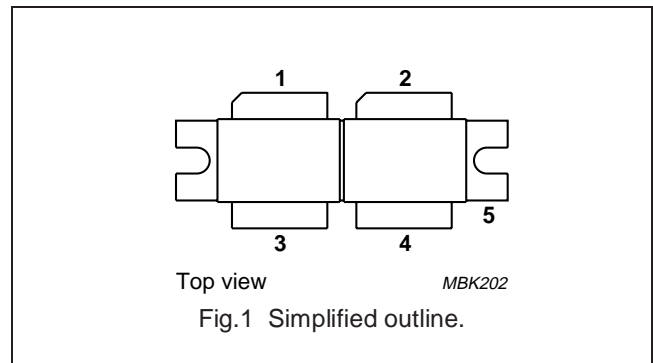
- Common emitter class-AB operation in base stations for PCN (Personal Communication Network): 1805 - 1880 MHz and PCS (Personal Communication Services): 1910 - 1990 MHz.

DESCRIPTION

NPN silicon planar push-pull power transistor in a 4-lead AlN SOT494A flange package with two ceramic caps. The emitters are connected to the flange.

PINNING - SOT494A

PIN	SYMBOL	DESCRIPTION
1	c	collector 1
2	c	collector 2
3	b	base 1
4	b	base 2
5	e	emitter, connected to flange



QUICK REFERENCE DATA

RF performance at $T_h = 25\text{ °C}$ in a common emitter test circuit.

MODE OF OPERATION	f (MHz)	V_{CE} (V)	P_L (W)	G_p (dB)	η_c (%)	d_{im} (dBc)
CW, class-AB	2000	26	120	≥ 8	≥ 40	-
2-tone, class-AB	$f_1 = 2000.0; f_2 = 2000.1$	26	120 (PEP)	≥ 8.5	≥ 33	≤ -28

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134)

Per section unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	-	65	V
V_{CEO}	collector-emitter voltage	open base	-	27	V
V_{EBO}	emitter-base voltage	open collector	-	3	V
I_C	collector current (DC)		-	20	A
$I_{C(AV)}$	average collector current		-	10	A
P_{tot}	total power dissipation	$T_{mb} = 25\text{ °C}$	-	415	W
T_{stg}	storage temperature		-65	+150	°C
T_j	operating junction temperature		-	200	°C

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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-h}$	thermal resistance from junction to heatsink	$P_L = 120\text{ W(PEP)}$; $T_h = 40^\circ\text{C}$; note 1: total device; both sections equally loaded	≤ 0.6	K/W
$R_{th\ mb-h}$	thermal resistance from mounting base to heatsink		0.2	K/W

Note

1. Thermal resistance is determined under nominal 2-tone RF operating conditions.

CHARACTERISTICS

$T_j = 25^\circ\text{C}$; per section; unless otherwise specified.

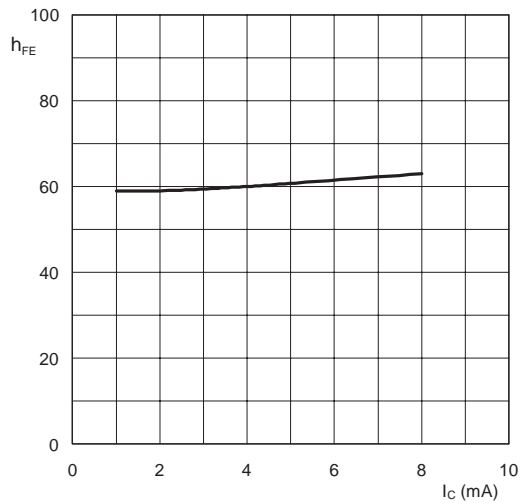
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; $I_C = 40\text{ mA}$	65	–	–	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	open base; $I_C = 120\text{ mA}$	27	–	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector; $I_E = 40\text{ mA}$	3	–	–	V
I_{CES}	collector leakage current	$V_{CE} = 26\text{ V}$; $V_{BE} = 0$	–	–	8	mA
h_{FE}	DC current gain	$V_{CE} = 10\text{ V}$; $I_C = 4\text{ A}$	45	–	100	
C_c	collector capacitance	$V_{CB} = 26\text{ V}$; $I_E = i_e = 0$; $f = 1\text{ MHz}$; note 1	–	72	–	pF
C_{re}	feedback capacitance	$V_{CE} = 26\text{ V}$; $I_C = 0$; $f = 1\text{ MHz}$	–	41	–	pF

Note

1. Capacitance of die only.

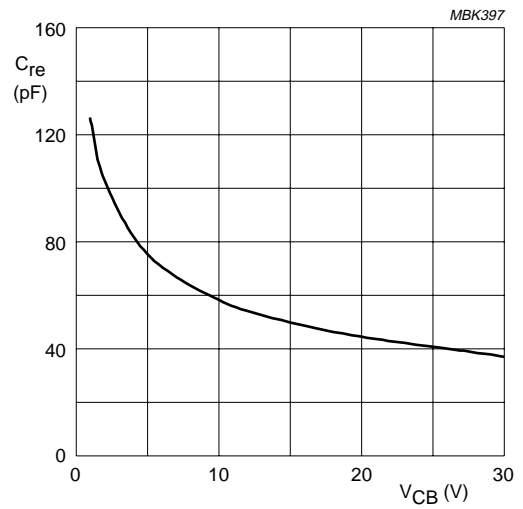
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$V_{CE} = 10$ V.

Fig.2 DC current gain as a function of collector current (per section); typical values.



$f = 1$ MHz.

Fig.3 Feedback capacitance as a function of collector-base voltage (per section); typical values.

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APPLICATION INFORMATION

RF performance at $T_h = 25\text{ }^\circ\text{C}$ in a common emitter test circuit; bias circuit: $R_i = 0.2\text{ }\Omega$.

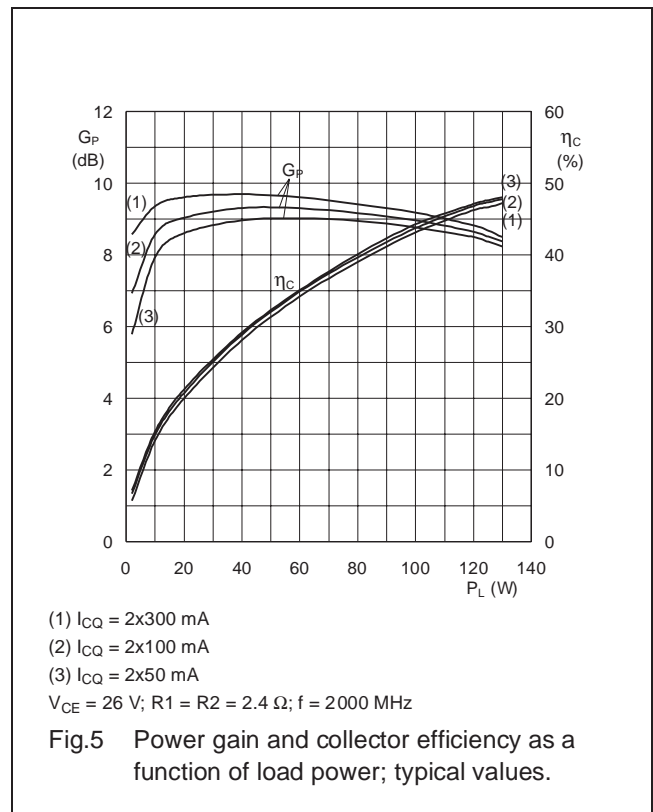
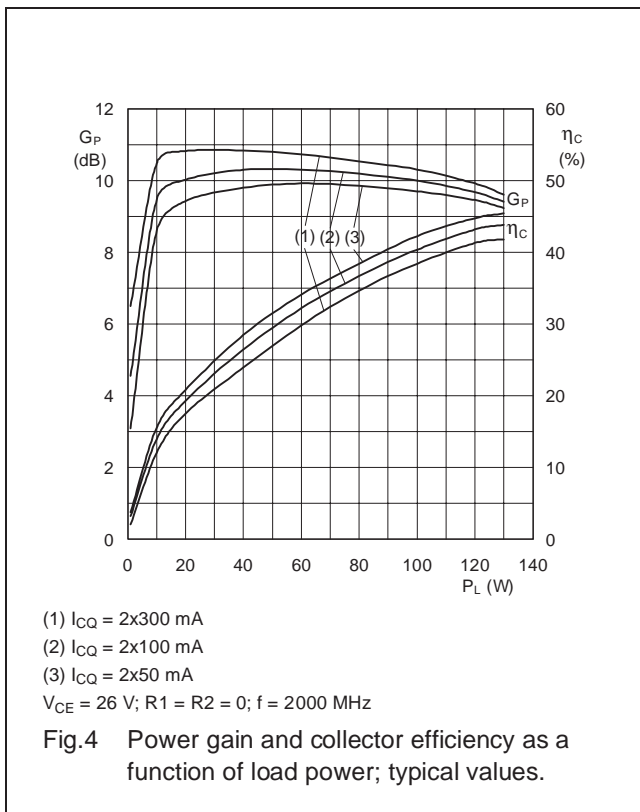
MODE OF OPERATION	f (MHz)	V _{CE} (V)	I _{CQ} (mA)	P _L (W)	G _p (dB)	η_c (%)	d _{im} (dBc)	ACP (dBc)
CW, class-AB	2000	26	2x300	120	≥ 8	≥ 40	–	–
2-tone, class-AB	$f_1 = 2000.0; f_2 = 2000.1$	26	2x300	120 (PEP)	≥ 8.5	≥ 33	≤ -28	–
CDMA, class-AB	2000	26	2x500	25	typ. 9	typ. 22	–	≤ -46 (note 1)

Notes

- CDMA testsignal with peak to average ratio of 11.9 dB.
ACP is measured at +/- 885 kHz offset from the centre of the channel (2000 MHz) using a spectrum analyzer with a resolution set to 30 kHz

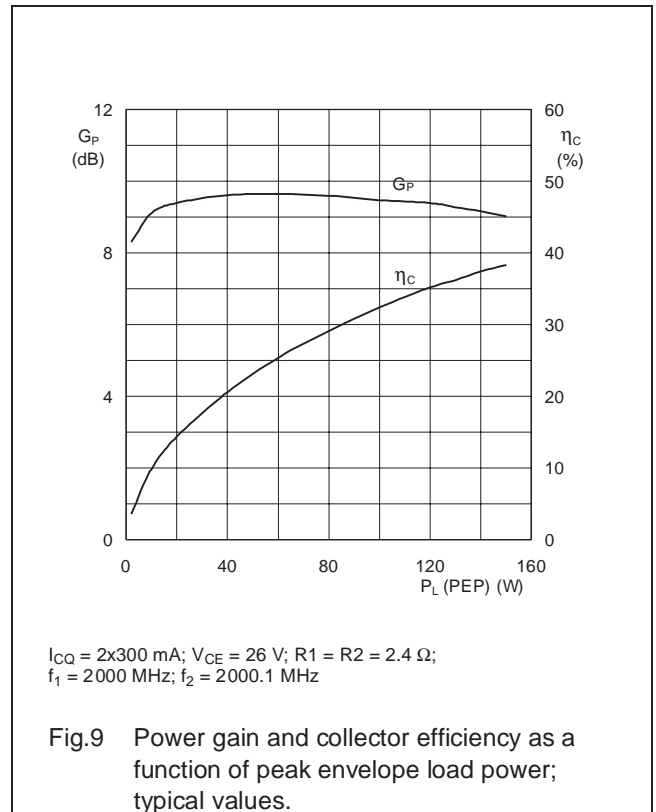
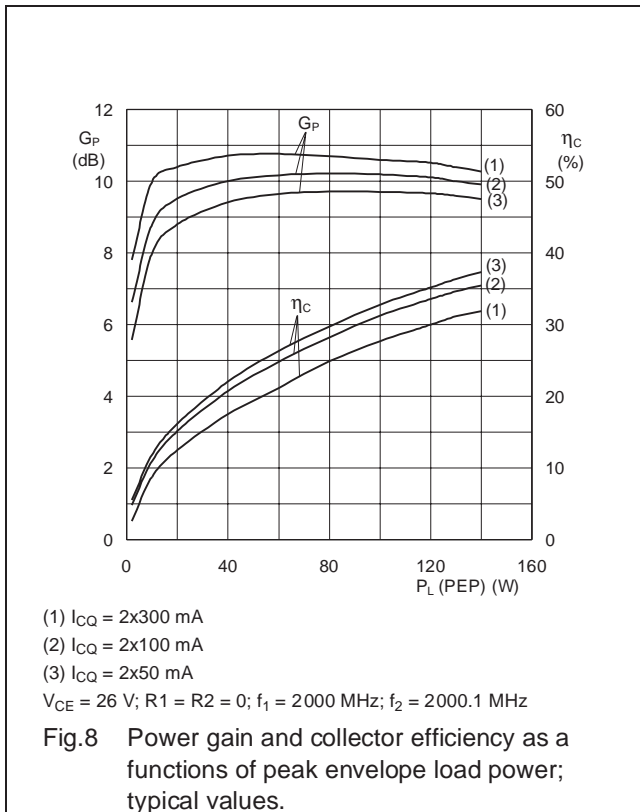
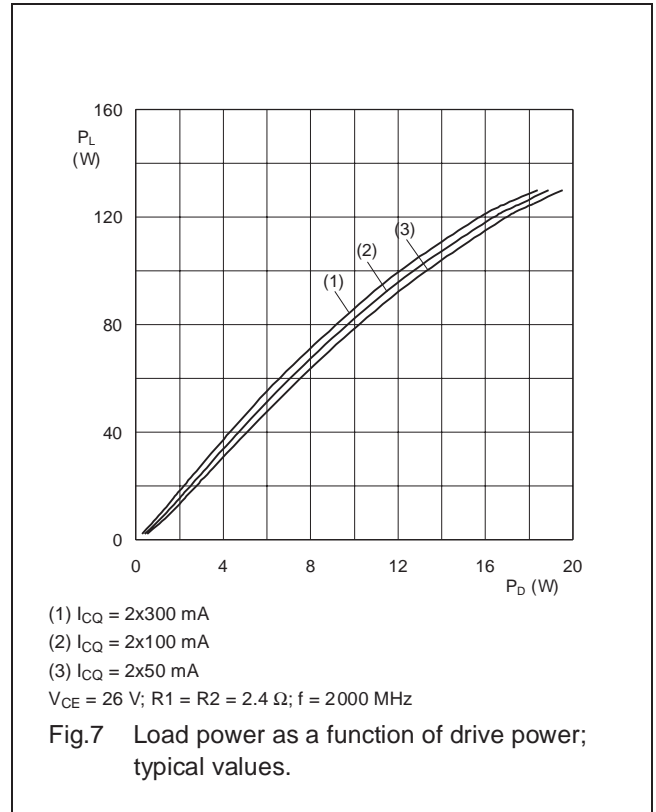
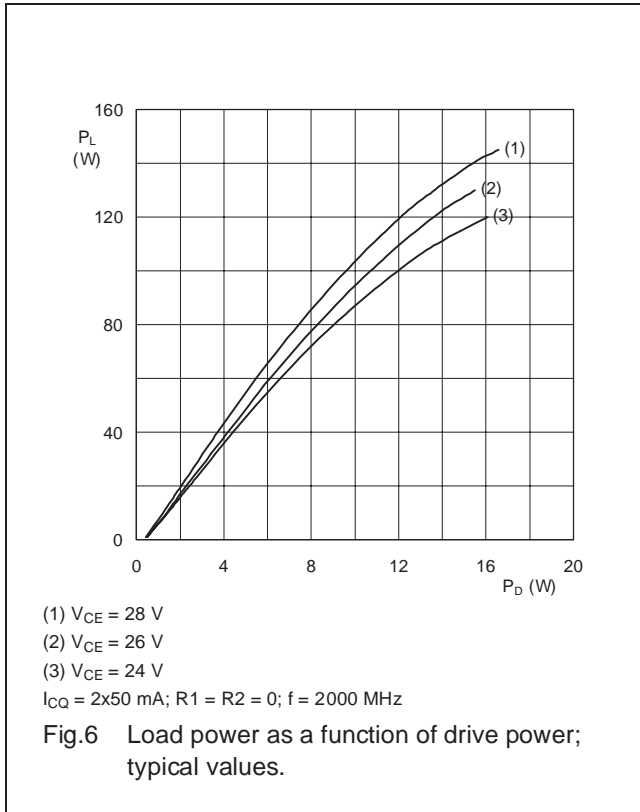
Ruggedness in class-AB operation

The BLV2048 is capable of withstanding a load mismatch corresponding to VSWR = 3 : 1 through all phases under the following conditions: $f_1 = 2000.0\text{ MHz}; f_2 = 2000.1\text{ MHz}; V_{CE} = 26\text{ V}; I_{CQ} = 2 \times 300\text{ mA}; P_L = 120\text{ W (PEP)}; T_{mb} = 25\text{ }^\circ\text{C}$.



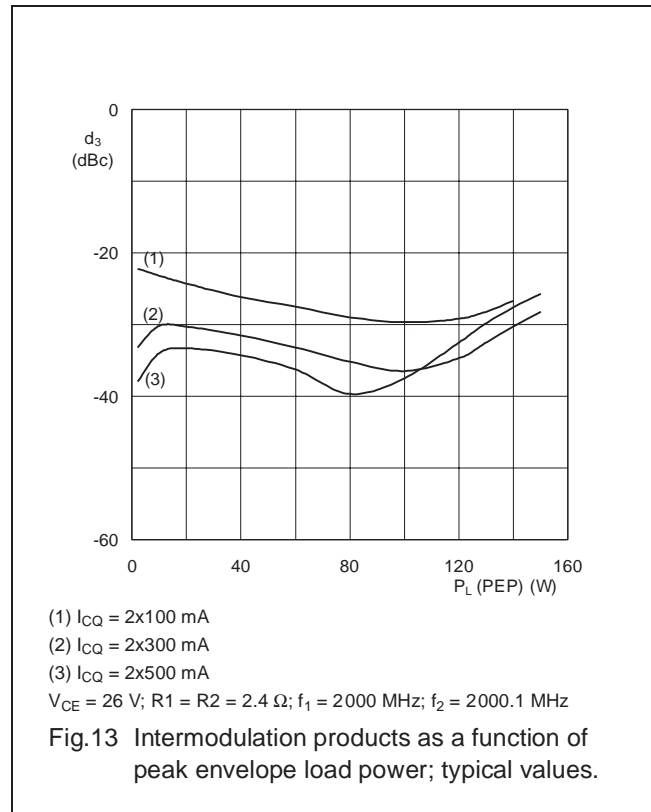
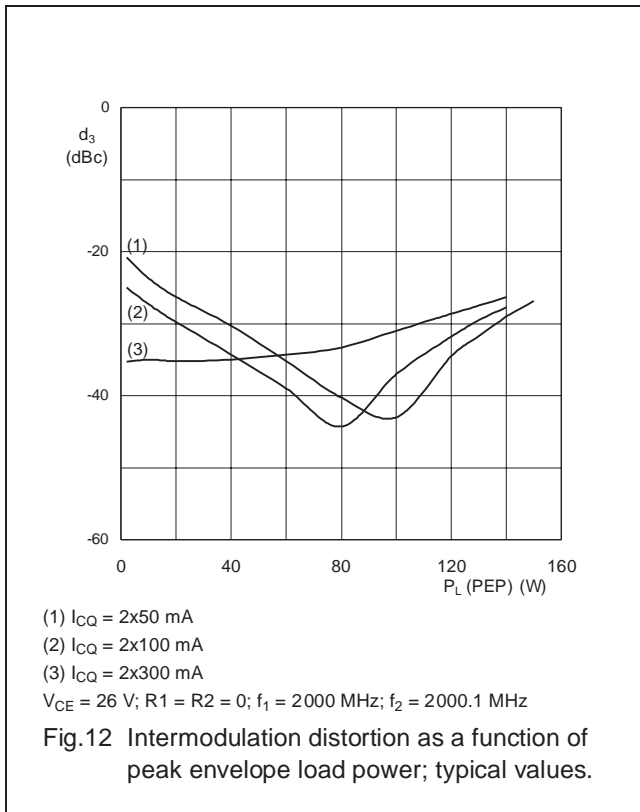
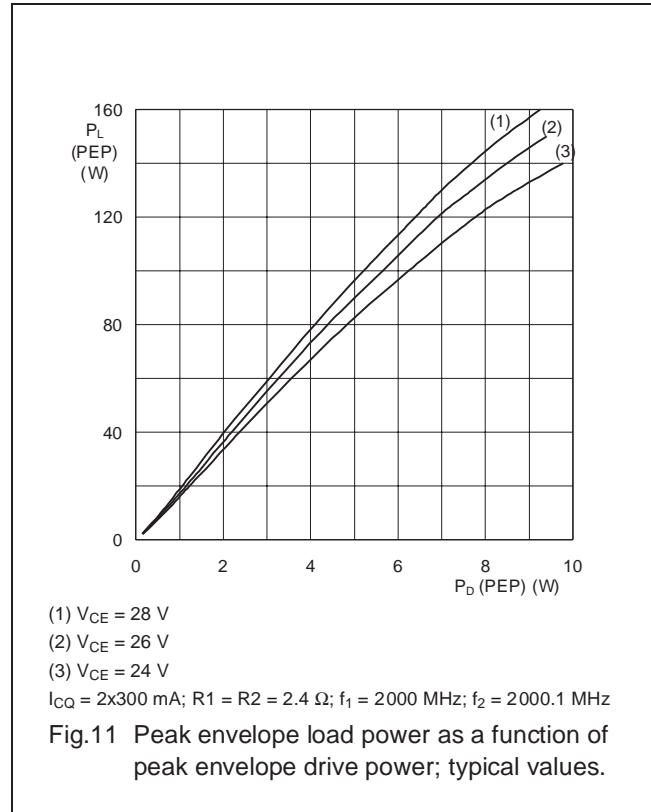
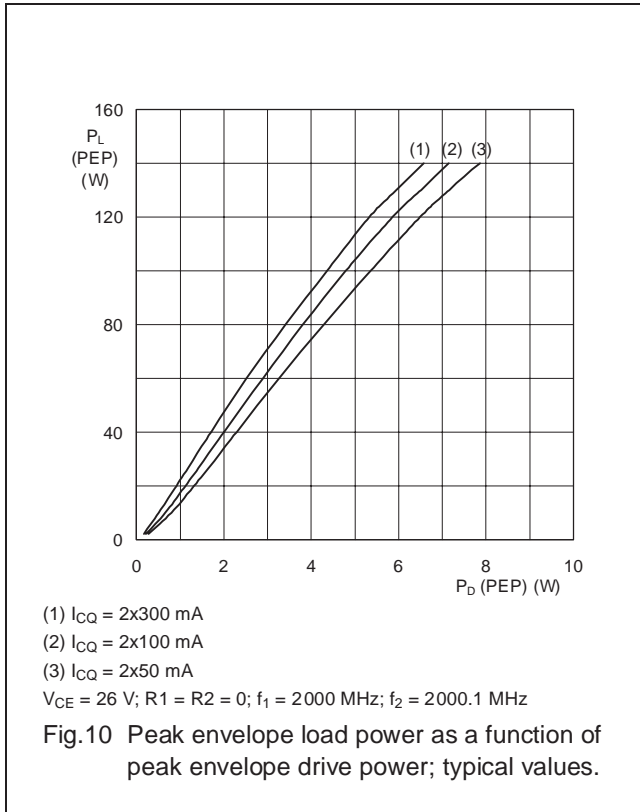
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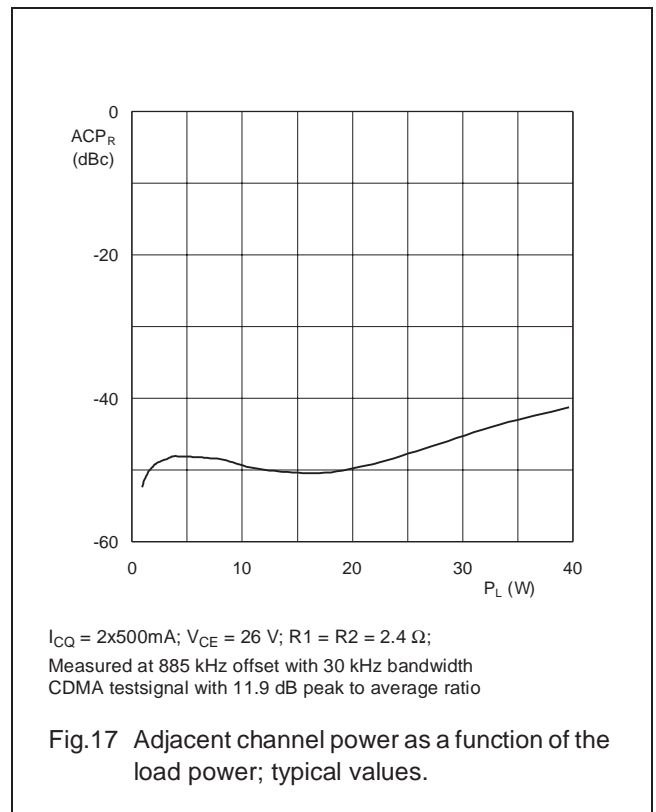
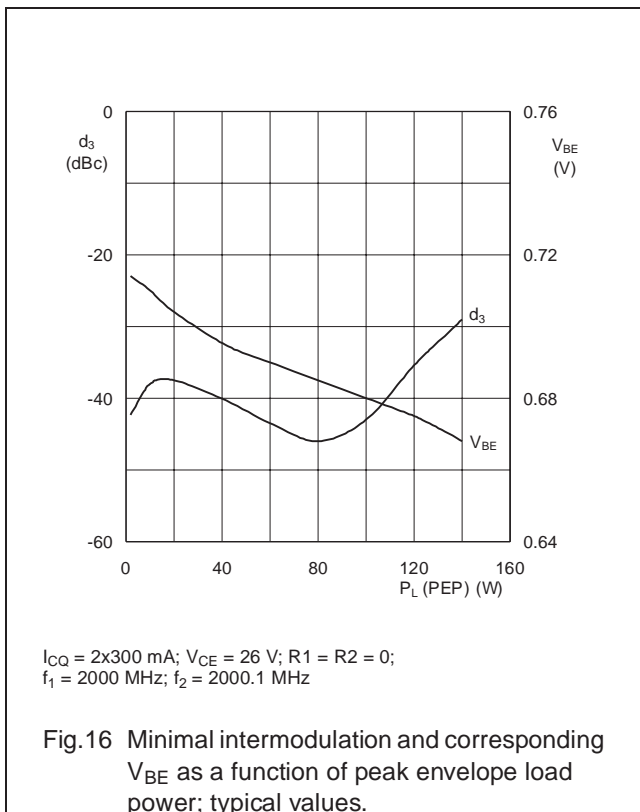
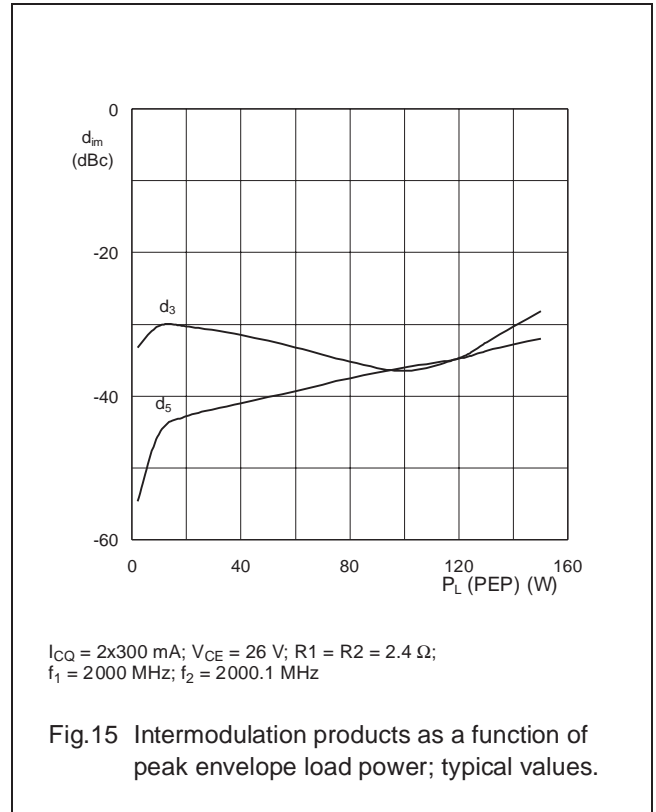
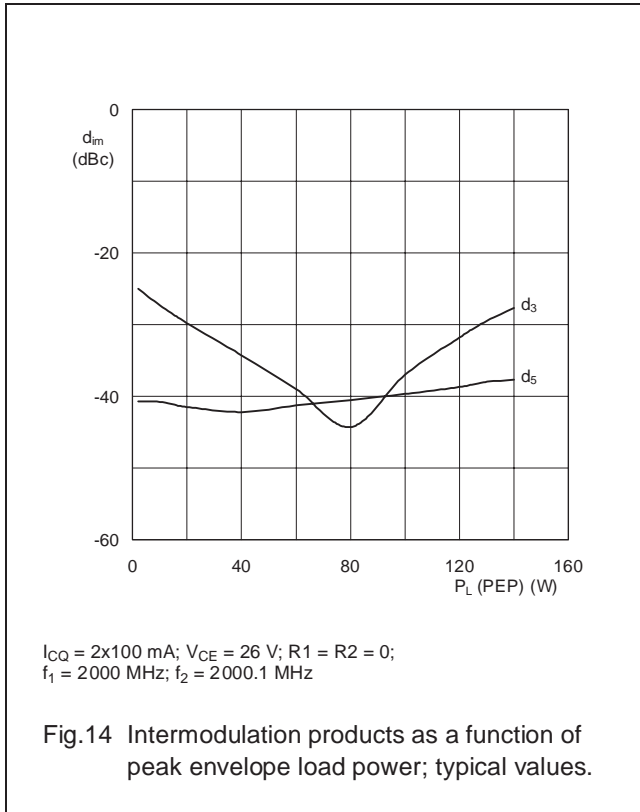
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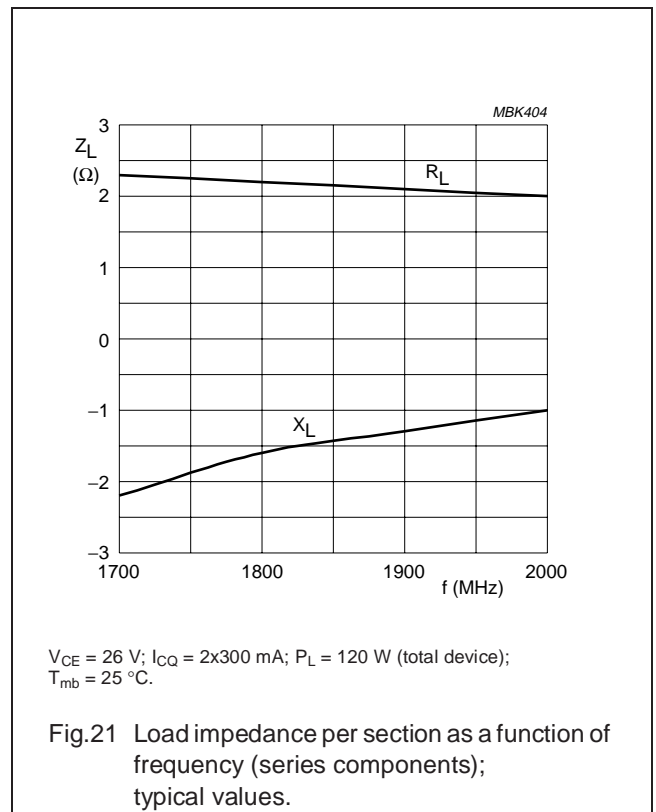
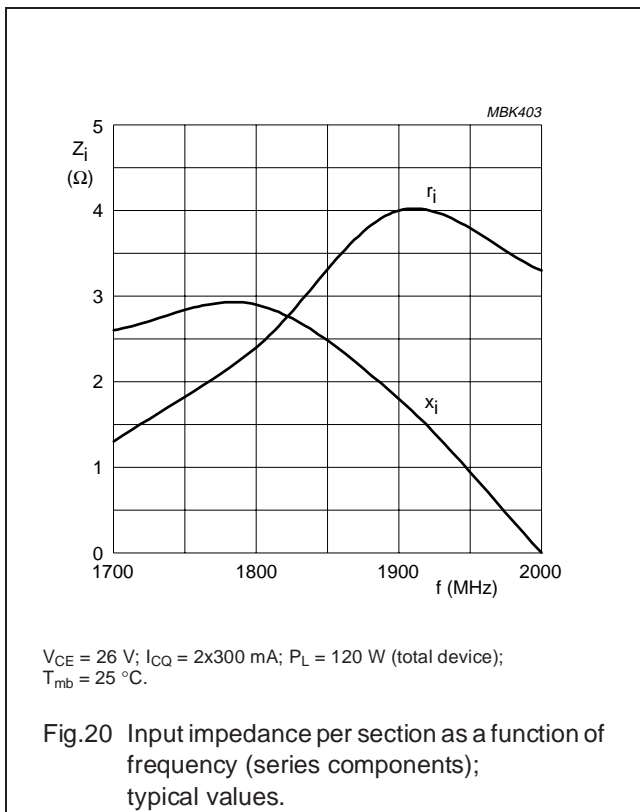
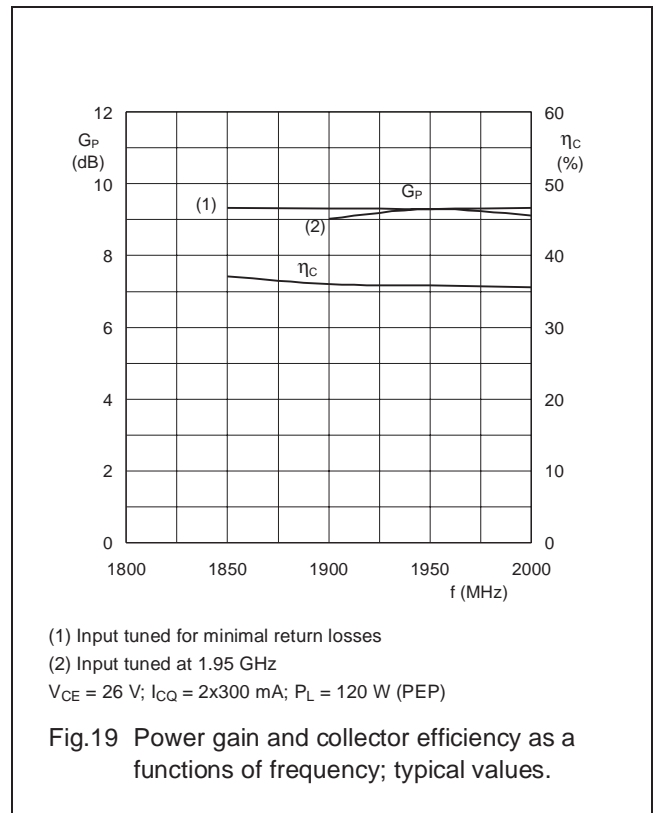
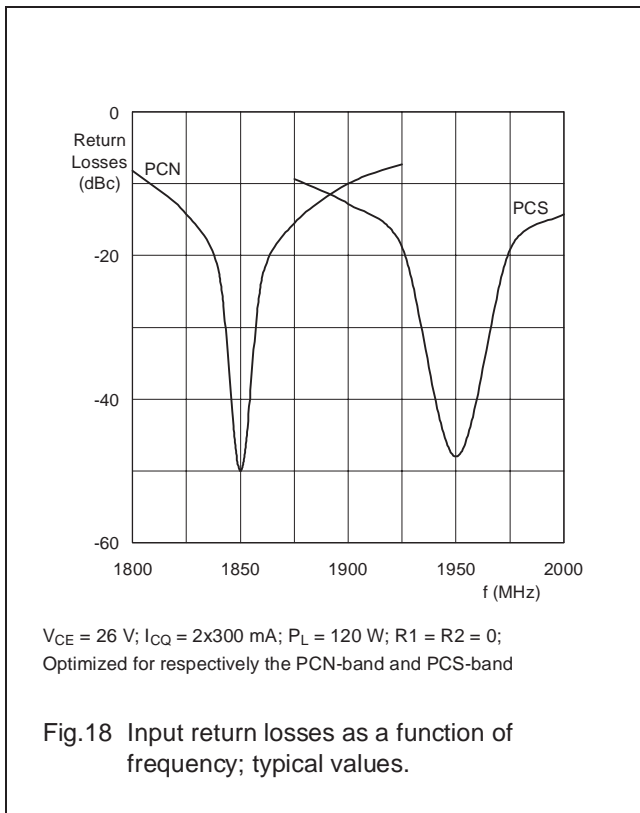
UHF push-pull power transistor

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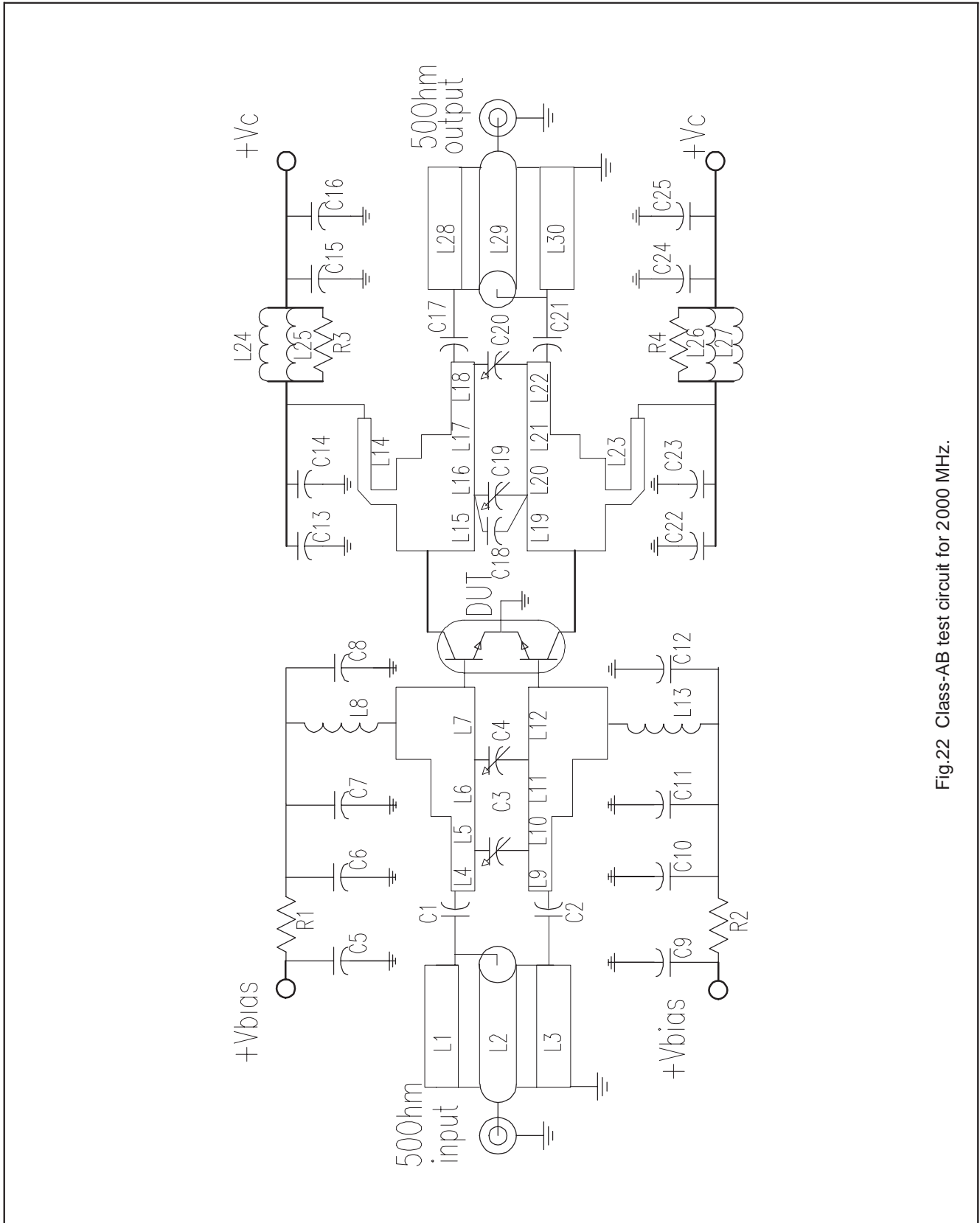


Fig.22 Class-AB test circuit for 2000 MHz.

UHF push-pull power transistor

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List of components

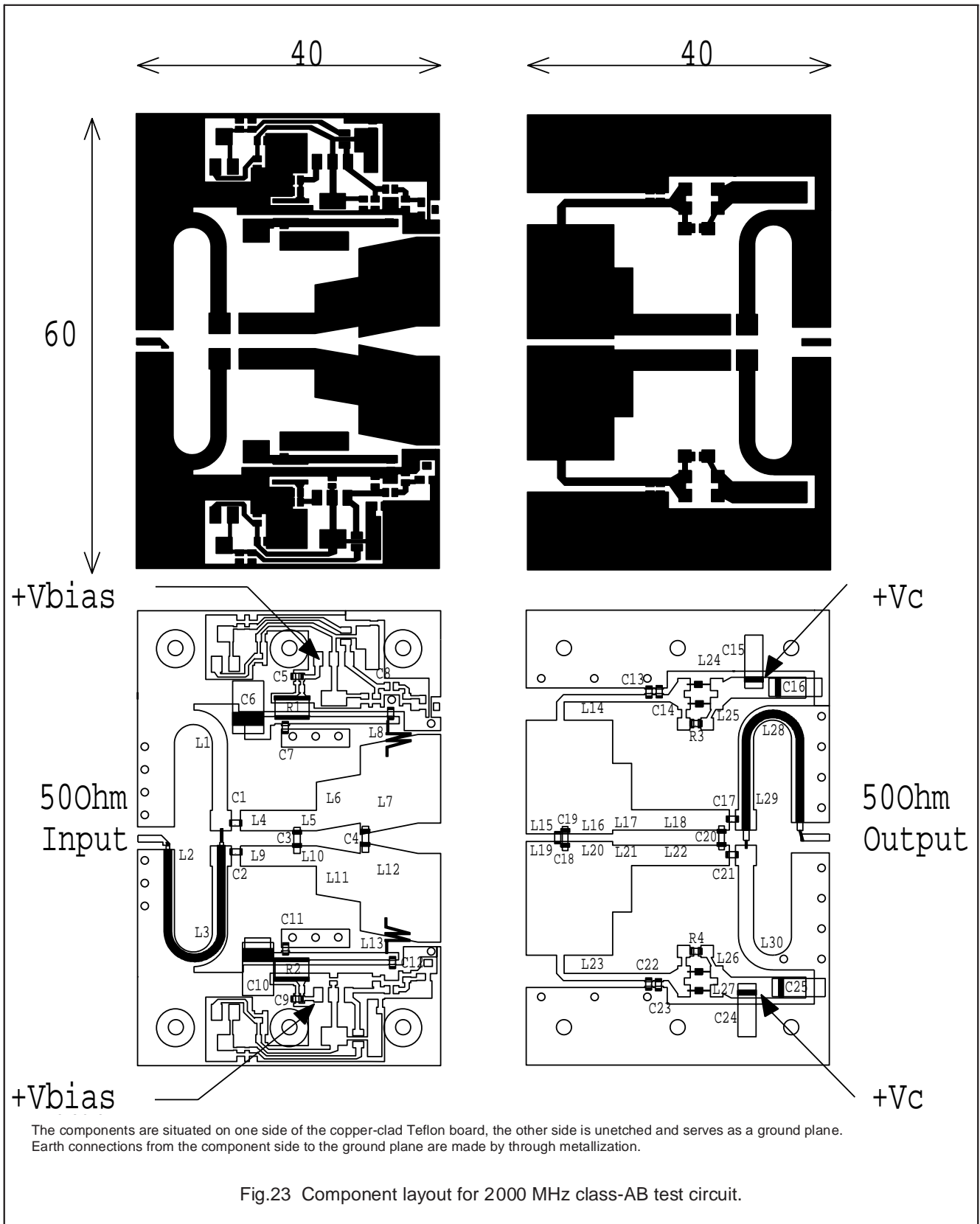
COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE NO.
C1, C2, C13, C17, C21, C22	multilayer ceramic chip capacitor; note 1	10 pF		
C3, C4, C19, C20	Tekelec variable capacitor; type 37271	0.6 to 4.5 pF		
C5, C9, C14, C23	multilayer ceramic chip capacitor; note 1	10 nF		
C6, C10, C16, C25	tantalum SMD capacitor	10 μ F, 35 V		
C7, C11	multilayer ceramic chip capacitor, note 2	100 pF		
C8, C12	multilayer ceramic chip capacitor, note 2	18 pF		
C18	multilayer ceramic chip capacitor; note 1	1.2 pF		
C15, C24	tantalum SMD capacitor	4.7 μ F, 50 V		
L1, L3, L28, L30	stripline; note 3	30 Ω	length 16 mm; width 2 mm	
L2, L29	semi-rigid cable	50 Ω	length 32 mm; width 2.2 mm	
L4 L5, L9, L10	stripline; note 3	25 Ω	length 5 mm; width 2.68 mm	
L6, L11	stripline; note 3	12.5 Ω	length 5.8 mm; width 6.4 mm	
L7, L12	stripline; note 3	7.3 Ω	length 10.6 mm; width 11.7 mm	
L8, L13	2 turns enamelled 1 mm copper wire	12 nH	int.dia. 3 mm; length 4 mm	
L14, L23	stripline; note 3	43.7 Ω	length 12.5 mm; width 1 mm	
L15, L19	stripline; note 3	5.9 Ω	length 6.5 mm; width 15 mm	
L16, L20	stripline; note 3	5.9 Ω	length 5 mm; width 15 mm	
L17, L21	stripline; note 3	9.5 Ω	length 2.5 mm; width 8.8 mm	
L18, L22	stripline; note 3	25 Ω	length 16 mm; width 2.68 mm	
L24, L25, L26, L27	grade 4B1 ferroxcube chip-bead			4322 020 34420
R1, R2	SMD resistor	2.4 Ω	type PRC201	
R3, R4	SMD resistor	10 Ω	type 0603	

Notes

1. American Technical Ceramics type 100B or capacitor of same quality.
2. American Technical Ceramics type 100A or capacitor of same quality.
3. The striplines are on a double copper-clad printed-circuit board with Teflon dielectric ($\epsilon_r = 6.15$); thickness 0.64 mm.

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UHF push-pull power transistor

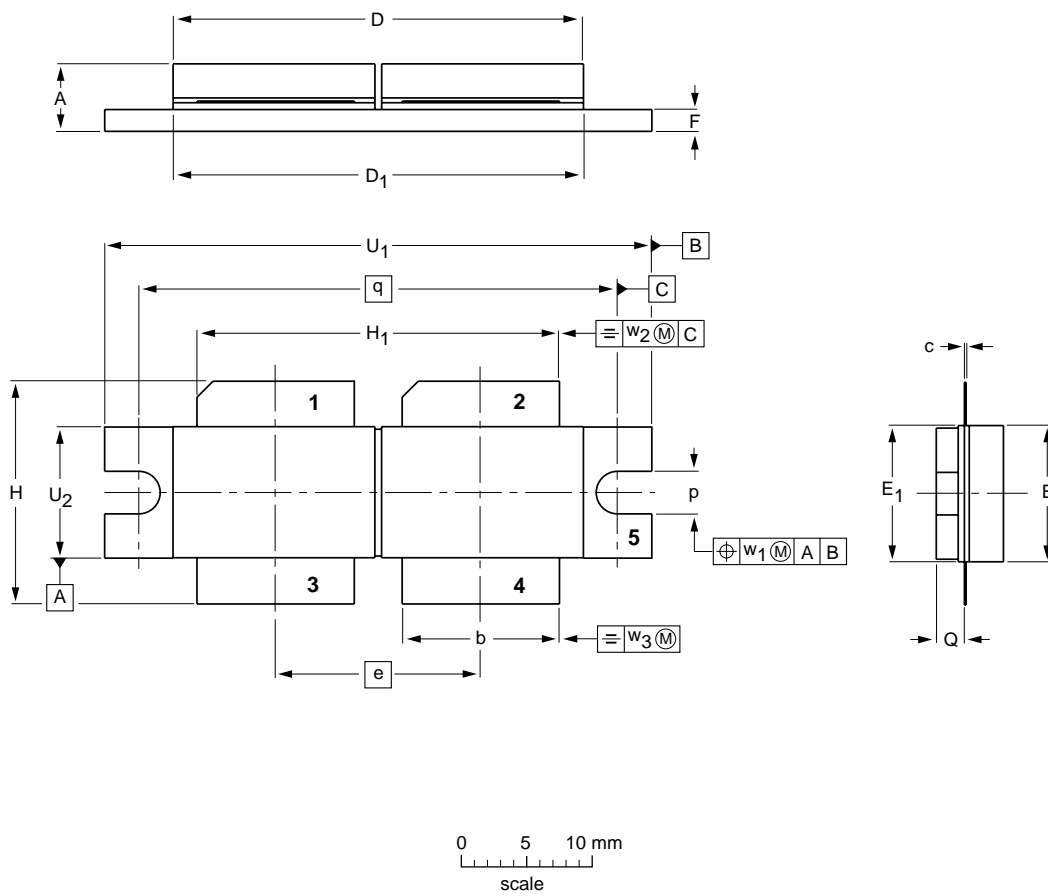
BLV2048

PACKAGE OUTLINE

Flanged double-ended ceramic (AlN) package; 2 mounting holes; 4 leads

SOT494A

Package under development
 Philips Semiconductors reserves the right to make changes without notice.



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	b	c	D	D ₁	E	E ₁	e	F	H	H ₁	p	Q	q	U ₁	U ₂	w ₁	w ₂	w ₃
mm	5.26 4.60	11.81 11.56	0.15 0.10	33.96 28.02	31.37 30.61	10.26 10.06	10.29 10.03	15.75	1.66 1.60	16.74 16.48	27.81 27.05	3.30 3.05	2.21 2.06	36.07	41.28 41.02	10.29 10.03	0.25	0.51	0.25
inches	0.207 0.181	0.465 0.455	0.006 0.004	1.337 1.103	1.235 1.205	0.404 0.396	0.405 0.395	0.62	0.065 0.063	0.659 0.649	1.095 1.065	0.130 0.120	0.087 0.081	1.42	1.625 1.615	0.405 0.395	0.01	0.02	0.01

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT494A						99-03-30

UHF push-pull power transistor

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DEFINITIONS

Data Sheet Status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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微波光电部专业代理经销高频、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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