

UHF push-pull power transistor

BLV945B

FEATURES

- Double internal input matching for easy matching and high gain
- Emitter ballasting resistors for an optimum temperature profile
- Gold metallization ensures excellent reliability.

APPLICATIONS

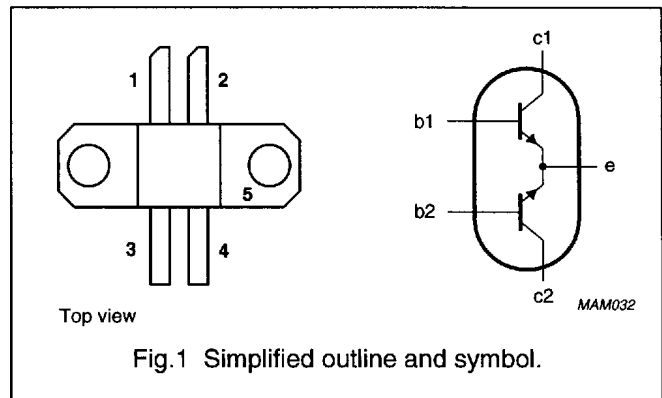
- Base station transmitters in the 900 to 960 MHz range.

PINNING - SOT324

PIN	SYMBOL	DESCRIPTION
1	c1	collector 1
2	c2	collector 2
3	b1	base 1
4	b2	base 2
5	e	emitter connected to flange

DESCRIPTION

Two NPN silicon planar epitaxial transistors in push-pull configuration, intended for linear common emitter class-AB operation. The device has double internal input matching. The transistor is encapsulated in a 4-lead SOT324 flange envelope with a ceramic cap. The flange provides the common emitter connection for both transistors.



QUICK REFERENCE DATA

RF performance at $T_h = 25\text{ }^\circ\text{C}$ in a common emitter push-pull test circuit.

MODE OF OPERATION	f (MHz)	V_{CE} (V)	P_L (W)	G_p (dB)	η_c (%)	d_3 (dBc)
CW, class-AB	960	25	25	≥ 8.5	≥ 45	–
2-tone, class-AB	960	25	30 (PEP)	≥ 8.5	≥ 35	≤ -32
2-tone, class-A	960	25	6 (PEP)	typ. 12.5	–	typ. -43

WARNING

Product and environmental safety - toxic materials

This product contains beryllium oxide. The product is entirely safe provided that the BeO discs are not damaged. All persons who handle, use or dispose of this product should be aware of its nature and of the necessary safety precautions. After use, dispose of as chemical or special waste according to the regulations applying at the location of the user. It must never be thrown out with the general or domestic waste.

UHF push-pull power transistor

BLV945B

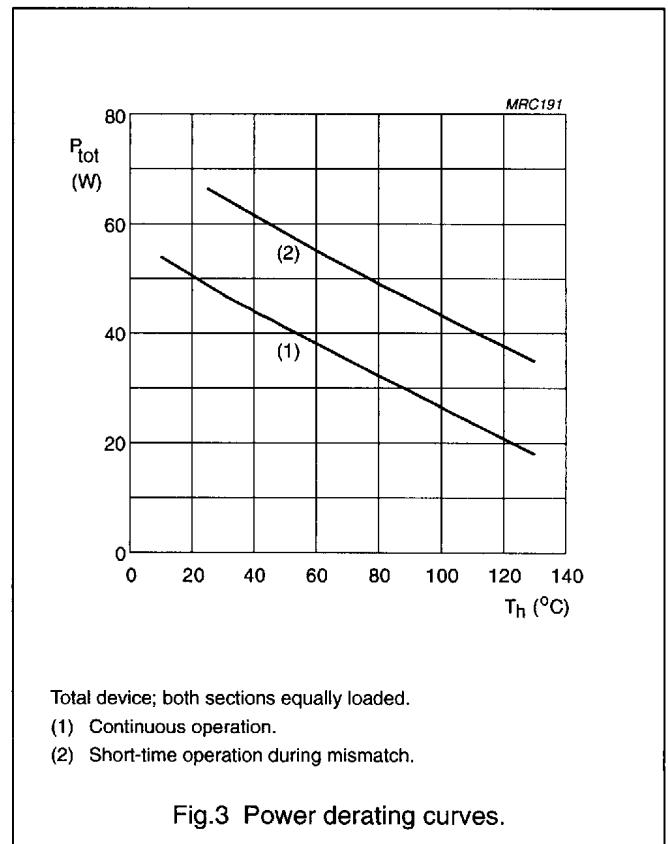
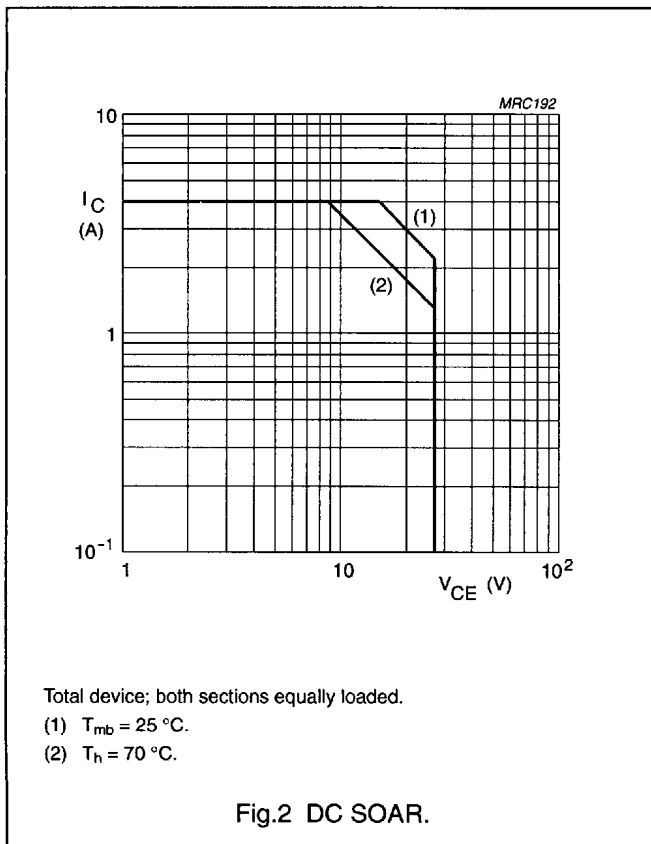
LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per transistor section					
V_{CE0}	collector-emitter voltage	open base	–	27	V
V_{CES}	collector-emitter voltage	$V_{BE} = 0$	–	50	V
V_{EBO}	emitter-base voltage	open collector	–	3.5	V
I_C	collector current (DC)		–	2	A
$I_{C(AV)}$	average collector current		–	2	A
P_{tot}	total power dissipation (DC)	up to $T_{mb} = 25\text{ °C}$; total device; both sections equally loaded	–	60	W
T_{stg}	storage temperature		–65	+150	°C
T_j	operating junction temperature		–	200	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-mb}$	thermal resistance from junction to mounting base	$P_{tot} = 60\text{ W}$; $T_{mb} = 25\text{ °C}$; total device; both sections equally loaded	2.9	K/W
$R_{th\ mb-h}$	thermal resistance from mounting base to heatsink	total device; both sections equally loaded	0.5	K/W



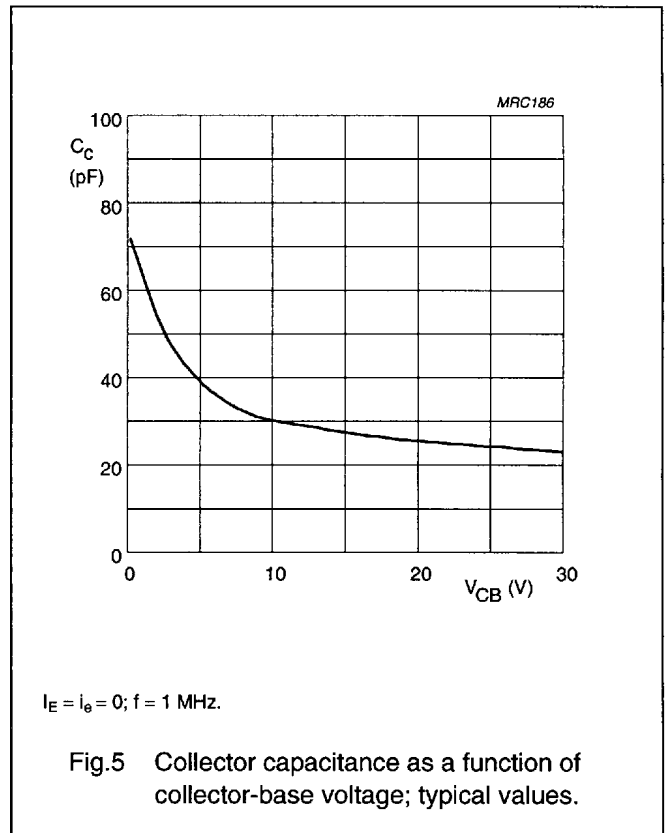
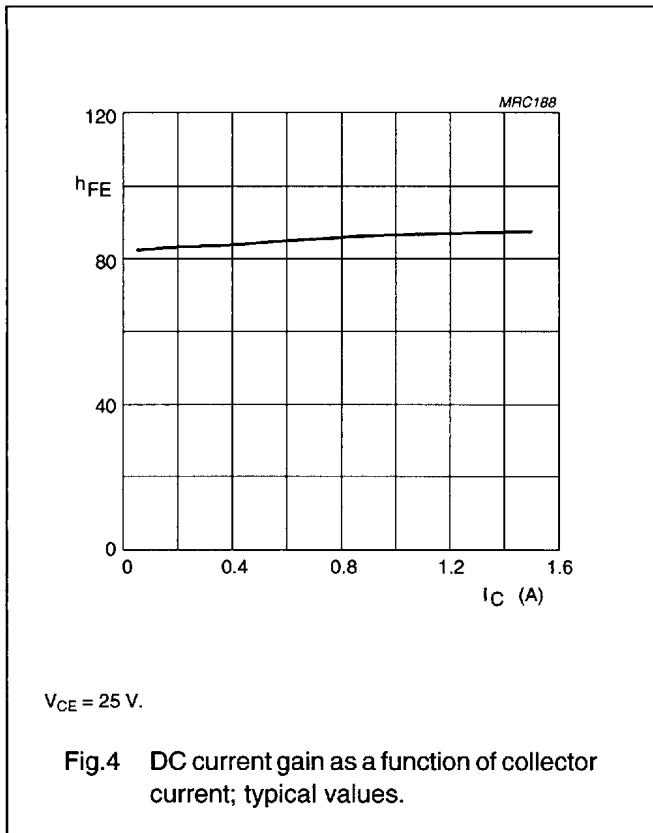
UHF push-pull power transistor

BLV945B

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per transistor section						
$V_{(BR)CEO}$	collector-emitter breakdown voltage	open base; $I_C = 25\text{ mA}$	27	–	–	V
$V_{(BR)CES}$	collector-emitter breakdown voltage	$V_{BE} = 0$; $I_C = 10\text{ mA}$	50	–	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector; $I_E = 5\text{ mA}$	3.5	–	–	V
I_{CES}	collector leakage current	$V_{BE} = 0$; $V_{CE} = 27\text{ V}$	–	–	1	mA
h_{FE}	DC current gain	$V_{CE} = 25\text{ V}$; $I_C = 0.85\text{ A}$	30	–	120	
C_c	collector capacitance	$V_{CB} = 25\text{ V}$; $I_E = i_e = 0$; $f = 1\text{ MHz}$	–	24	30	pF



UHF push-pull power transistor

BLV945B

APPLICATION INFORMATION

RF performance at $T_h = 25\text{ }^\circ\text{C}$ in a common emitter push-pull, class-AB test circuit.

MODE OF OPERATION	f (MHz)	V _{CE} (V)	I _{CQ} (mA)	P _L (W)	G _p (dB)	η _c (%)	d ₃ (dBc)
CW, class-AB	960	25	2 × 75	25	≥8.5 typ. 9.5	≥45 typ. 48	–
2-tone, class-AB	960 ⁽¹⁾	25	2 × 75	30 (PEP)	≥8.5 typ. 9.5	≥35 typ. 42	≤ -32 typ. -34

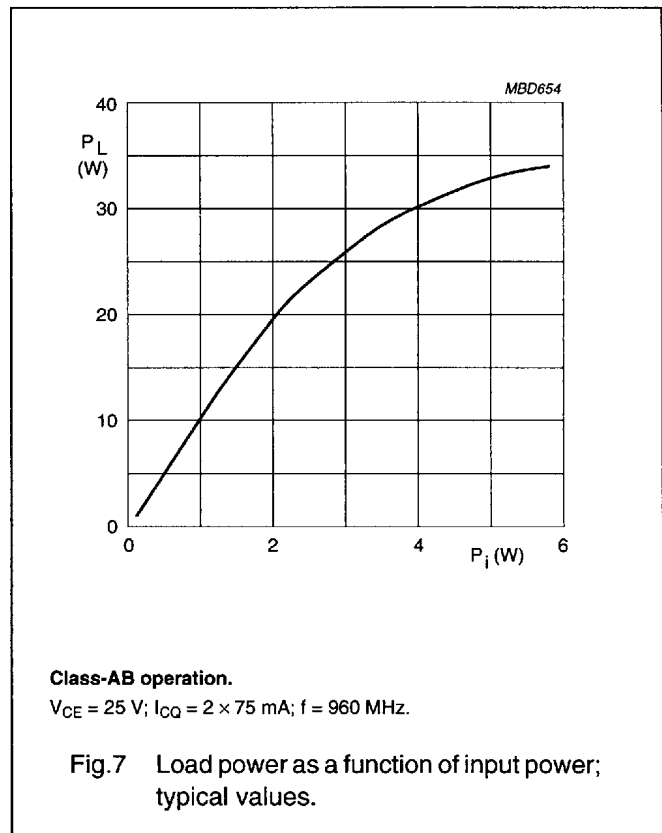
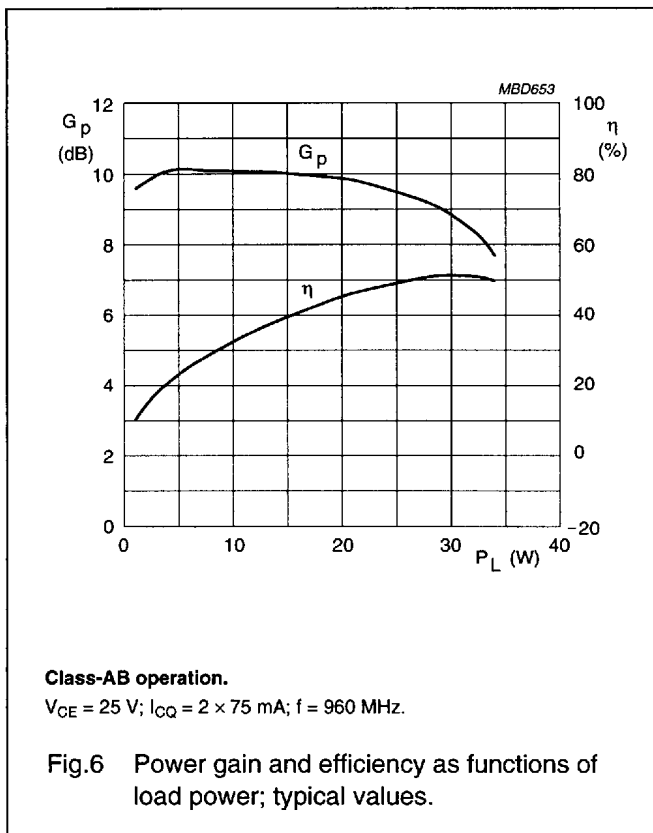
Note

- f₁ = 960.0 MHz; f₂ = 960.1 MHz.

Ruggedness in class-AB operation

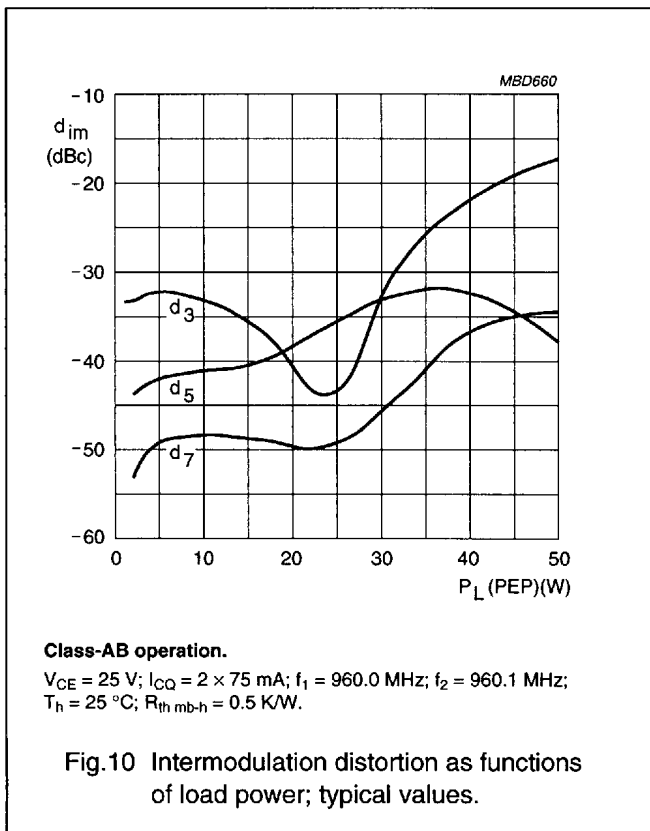
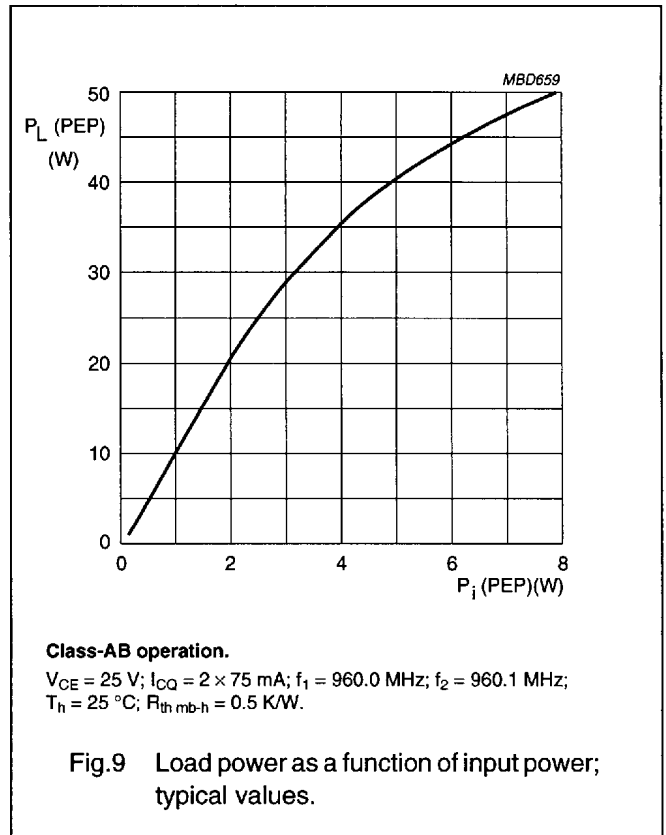
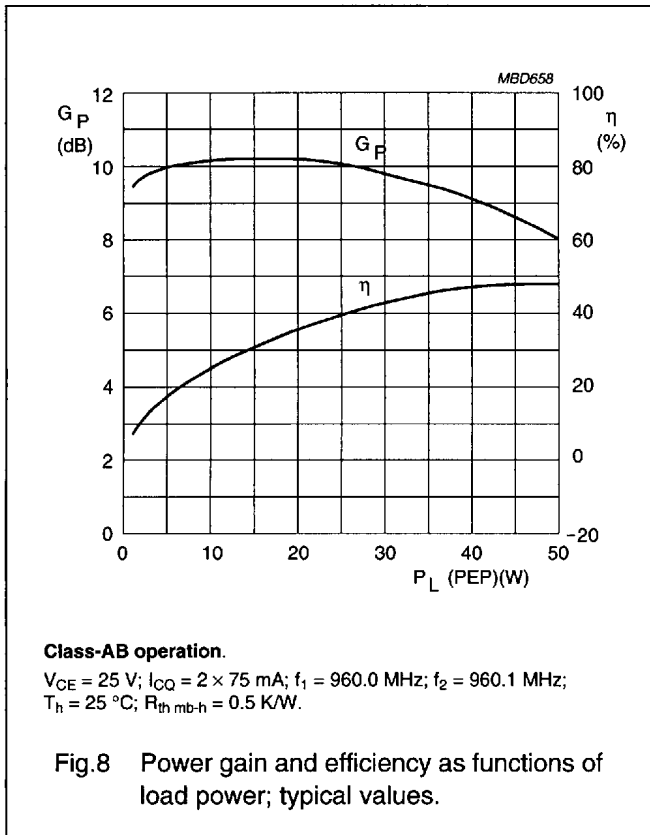
The BLV945B is capable of withstanding a full load mismatch corresponding to VSWR = 3 : 1 through all phases under the following conditions: P_L = 25 W; f = 960 MHz; V_{CE} = 25 V; T_h = 25 °C; I_{CQ} = 2 × 75 mA; R_{th mb-h} = 0.5 K/W.

It is capable of withstanding a full load mismatch corresponding to VSWR = 5 : 1 through all phases under the following conditions: P_L = 30 W (PEP); f₁ = 960 MHz; f₂ = 960.1 MHz; V_{CE} = 25 V; I_{CQ} = 2 × 75 mA; T_h = 25 °C; R_{th mb-h} = 0.5 K/W.



UHF push-pull power transistor

BLV945B



UHF push-pull power transistor

BLV945B

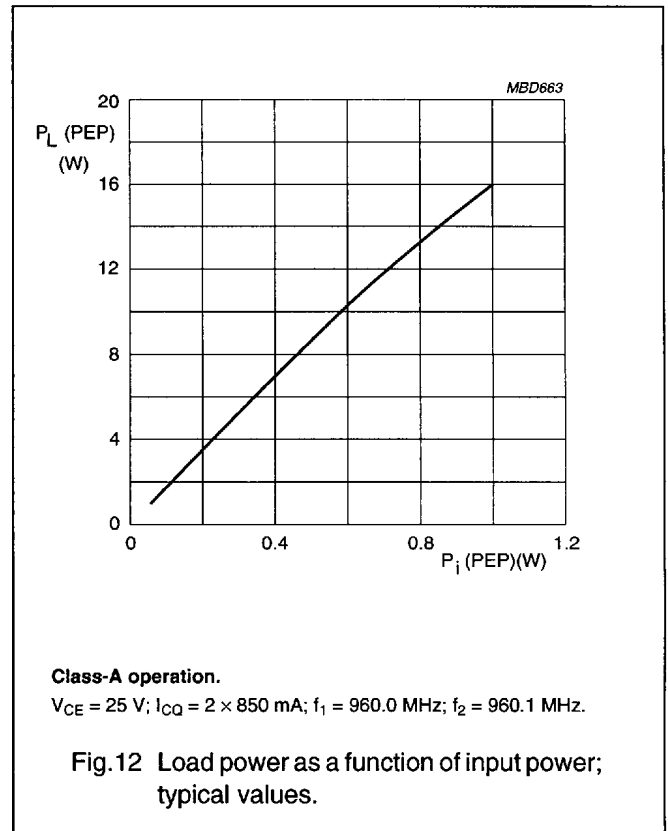
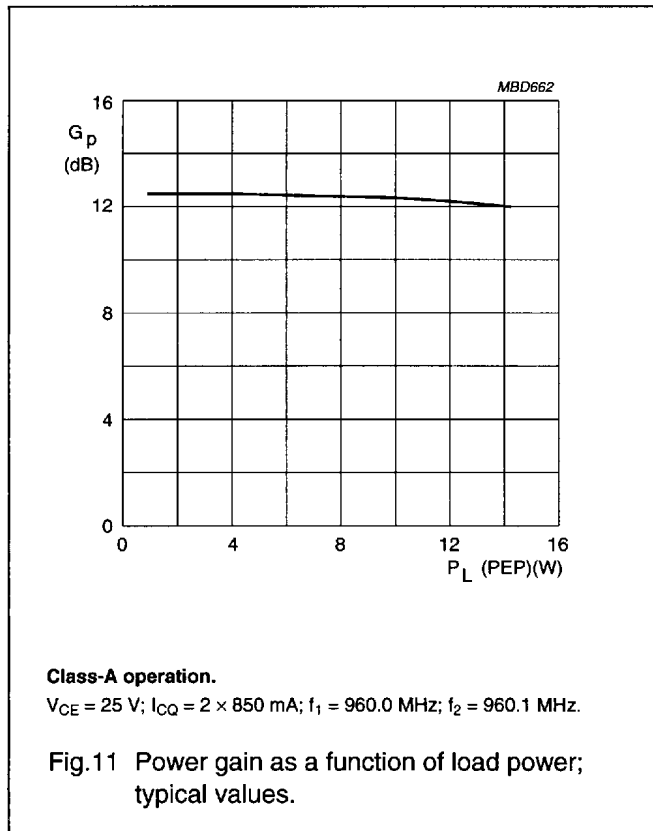
APPLICATION INFORMATION

RF performance at $T_h = 25\text{ }^\circ\text{C}$ in a common emitter push-pull, class-A test circuit.

MODE OF OPERATION	f (MHz)	V _{CE} (V)	I _{CO} (mA)	P _L (W)	G _p (dB)	d ₃ (dBc)
2-tone, class-A	960 ⁽¹⁾	25	2 × 850	6 (PEP)	typ. 12.5	typ. -43

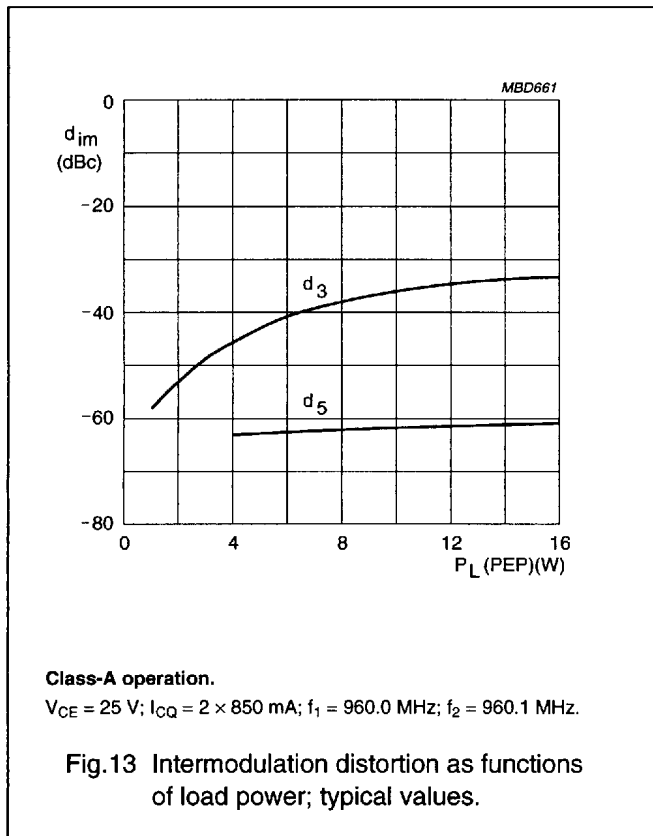
Note

- f₁ = 960.0 MHz; f₂ = 960.1 MHz.



UHF push-pull power transistor

BLV945B



UHF push-pull power transistor

BLV945B

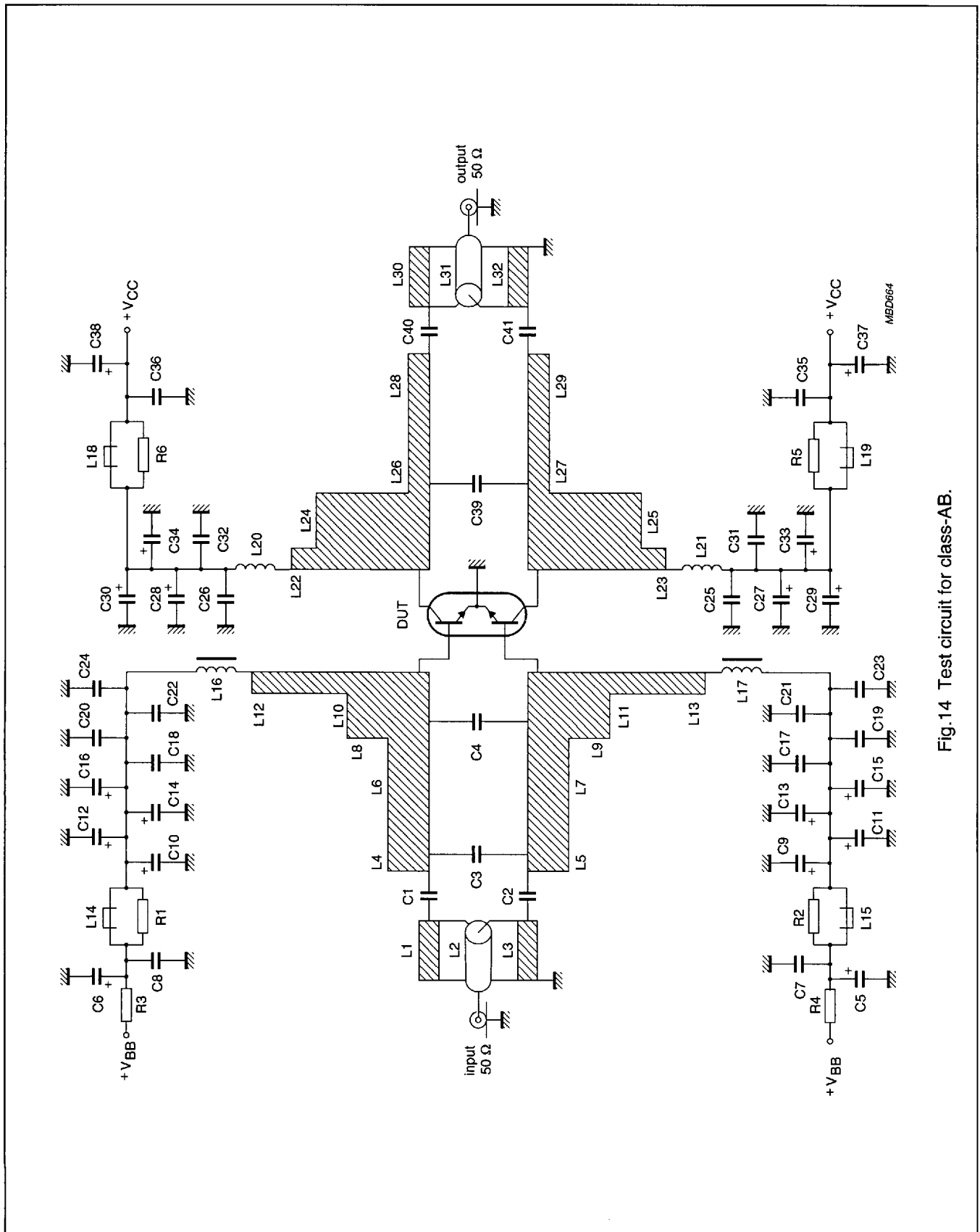


Fig.14 Test circuit for class-AB.

UHF push-pull power transistor

BLV945B

List of components (see Figs 14 and 15)

COMPONENT	DESCRIPTION	VALUE	DIMENSION	CATALOGUE NO.
C1, C2	multilayer ceramic chip capacitor; note 1	47 pF, 500 V		
C3	multilayer ceramic chip capacitor; note 1	1.2 pF, 500 V		
C4	multilayer ceramic chip capacitor; note 1	3.6 pF, 500 V		
C5, C6, C15, C16, C27, C28, C37, C38	tantalum capacitor	1 μ F, 35 V		2022 019 00056
C7, C8, C21, C22, C31, C32, C35, C36	multilayer ceramic chip capacitor; note 1	300 pF, 200 V		
C9, C10	SMD electrolytic capacitor	1 μ F, 63 V		2222 085 78108
C11, C12	SMD electrolytic capacitor	10 μ F, 16 V		2222 085 75109
C13, C14, C29, C30	tantalum capacitor	2.2 μ F, 35 V		2022 019 00058
C17, C18	multilayer ceramic chip capacitor	100 nF, 50 V		2222 581 76641
C19, C20	multilayer ceramic chip capacitor	10 nF, 50 V		2222 581 76627
C23, C24, C25, C26	multilayer ceramic chip capacitor; note 1	39 pF, 500V		
C33, C34	electrolytic capacitor	10 μ F, 63 V		2222 030 28109
C39	multilayer ceramic chip capacitor; note 1	6.2 pF, 500 V		
C40, C41	multilayer ceramic chip capacitor; note 1	27 pF, 500 V		
L1, L3, L30, L32	stripline; note 2	50 Ω	length 57.1 mm width 3 mm	
L2, L31	semi-rigid cable; note 3	50 Ω	ext. conductor; length 57.1 mm ext. diameter 2.2 mm	
L4, L5	stripline; note 2		length 3 mm width 2.6 mm	
L6, L7	stripline; note 2		length 15 mm width 2.6 mm	
L8, L9	stripline; note 2		length 2.8 mm width 15 mm	
L10, L11	stripline; note 2		length 3 mm width 15 mm	
L12, L13	stripline; note 2		length 3 mm width 31.5 mm	
L14, L15, L18, L19	grade 4S2 Ferroxcube chip-bead			4330 030 36300
L16, L17	microchoke	470 nH		4322 057 04771
L20, L21	4 turns enamelled 1 mm copper wire		int. diameter 6 mm close wound	

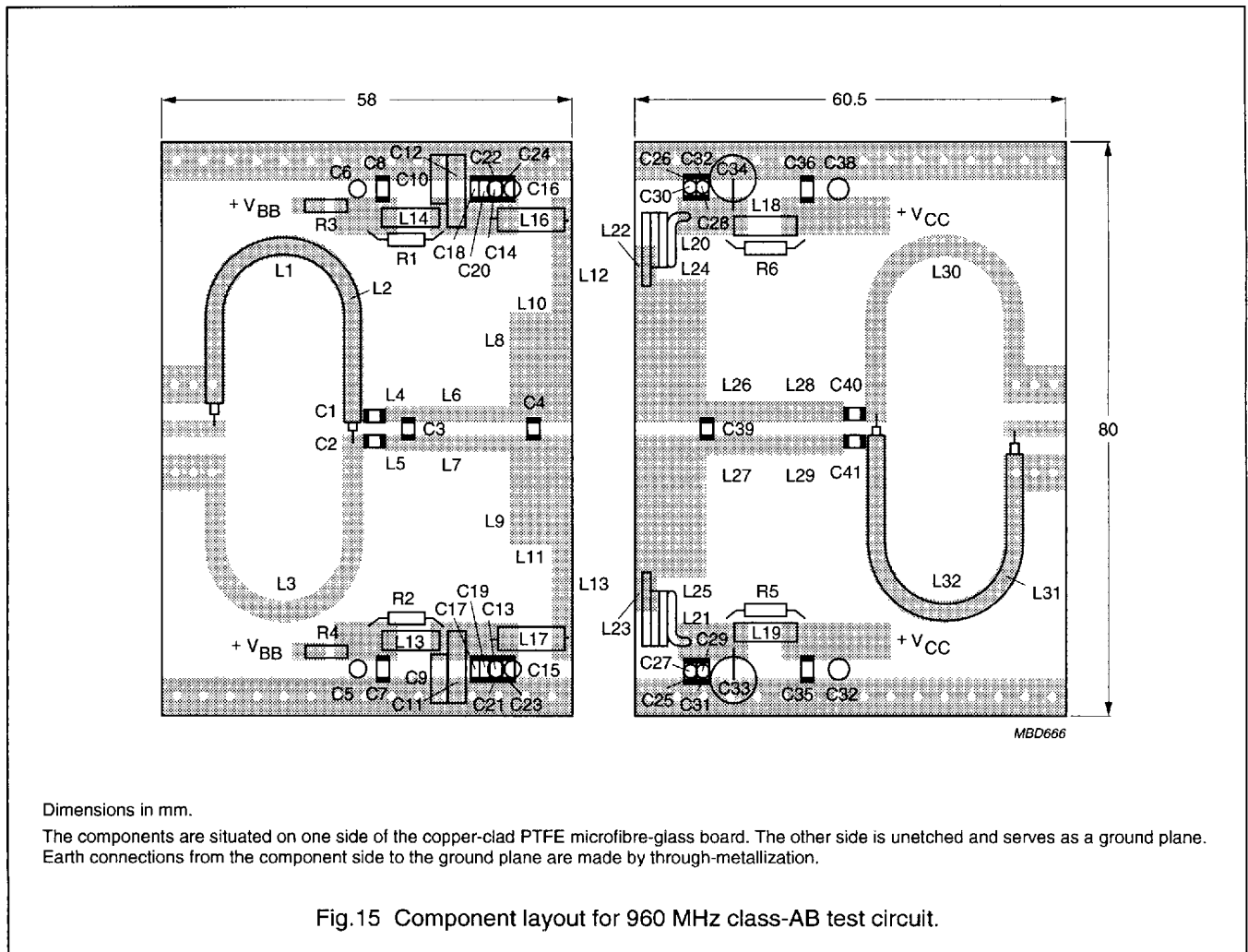
UHF push-pull power transistor

BLV945B

COMPONENT	DESCRIPTION	VALUE	DIMENSION	CATALOGUE NO.
L22, L23	stripline; note 2		length 3 mm width 24 mm	
L24, L25	stripline; note 2		length 7.5 mm width 20 mm	
L26, L27	stripline; note 2		length 3.6 mm width 3 mm	
L28, L29	stripline; note 2		length 15.9 mm width 3 mm	
R1, R2, R5, R6	metal film resistor	5.11 Ω , 0.4 W		2322 151 75118
R3, R4	metal film resistor	7.5 Ω , 0.4 W		2322 151 77508

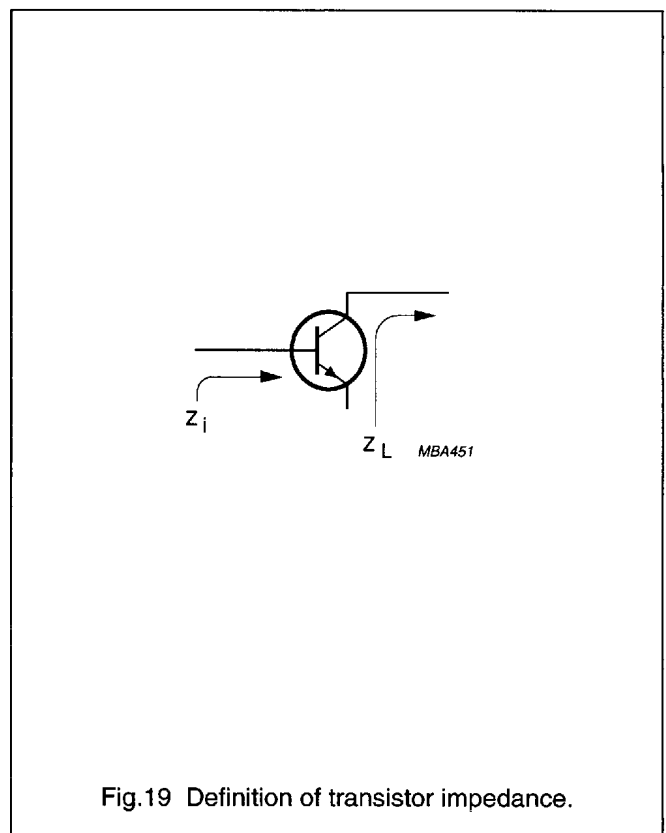
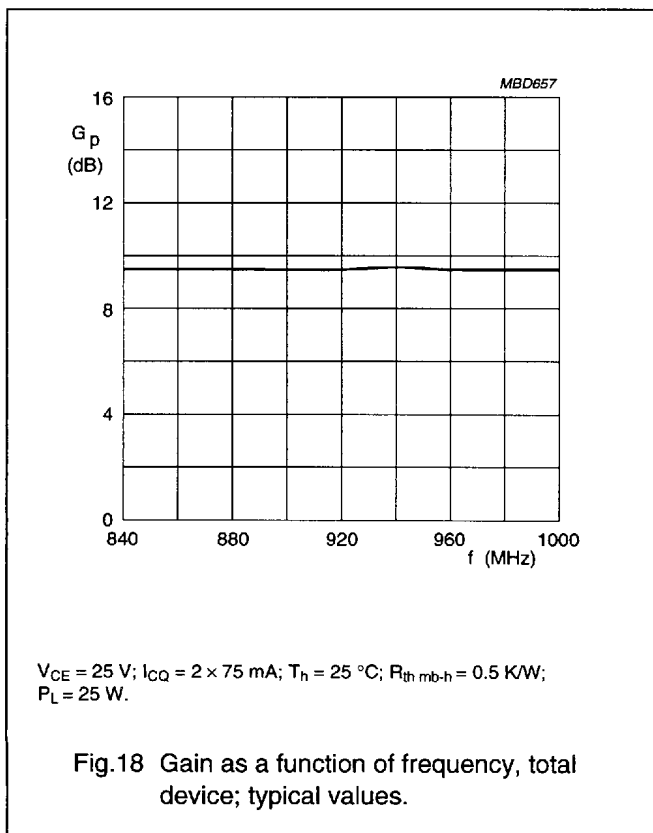
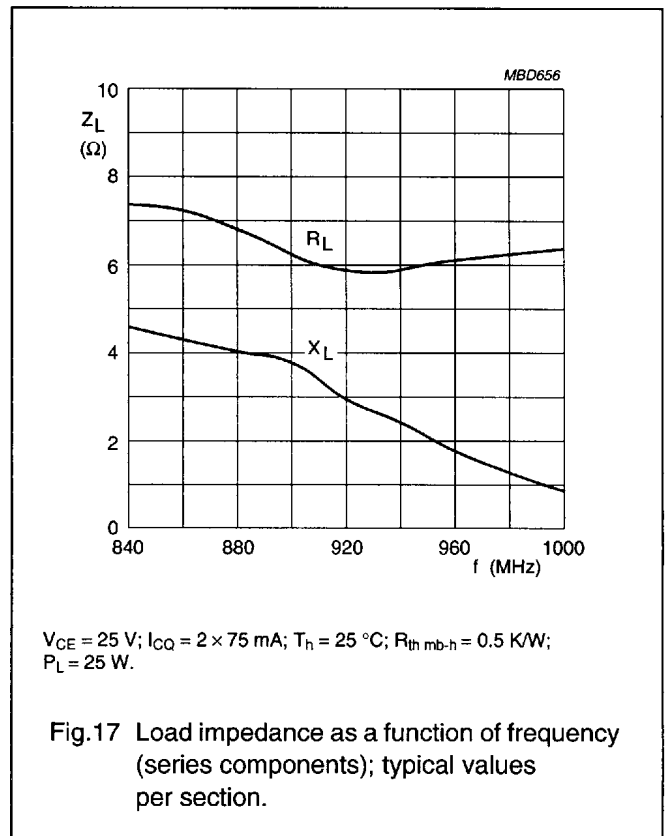
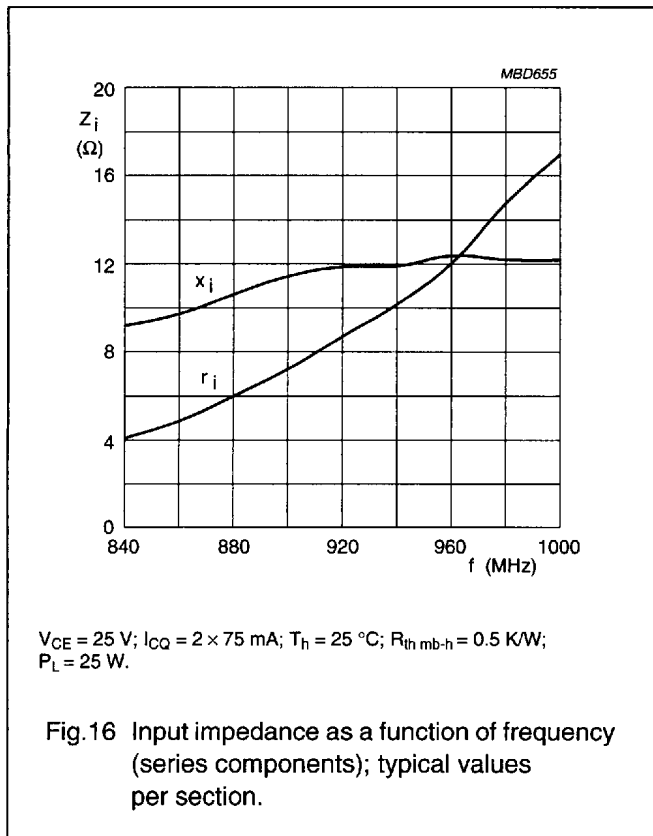
Notes

- American Technical Ceramics type 100B or capacitor of same quality.
- The striplines are on a double copper-clad printed-circuit board with microfibre-glass dielectric ($\epsilon_r = 2.2$); thickness $\frac{1}{32}$ inch; thickness of the copper sheet $2 \times 35 \mu\text{m}$.
- Semi-rigid cables L2 and L31 are soldered onto striplines L1 and L30.



UHF push-pull power transistor

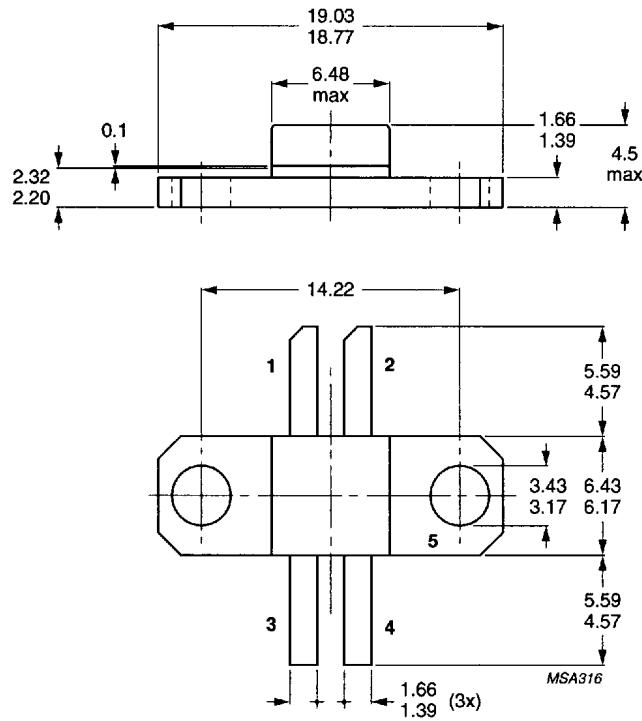
BLV945B



UHF push-pull power transistor

BLV945B

PACKAGE OUTLINE



Dimensions in mm.
 Torque on screw: min. 0.6 Nm; max. 0.75 Nm.
 Recommended screw: cheese-head 4-40 UNC/2A.
 Heatsink compound must be applied sparingly and evenly distributed.

Fig.20 SOT324.