

DISCRETE SEMICONDUCTORS

DATA SHEET

BLV958; BLV958FL **UHF power transistors**

Product specification
Supersedes data of 1997 Oct 15

2000 Jan 12

UHF power transistors

BLV958; BLV958FL

FEATURES

- Internal input and output matching for easy matching, high gain and efficiency
- Poly-silicon emitter ballasting resistors for an optimum temperature profile
- Gold metallization ensures excellent reliability.

APPLICATIONS

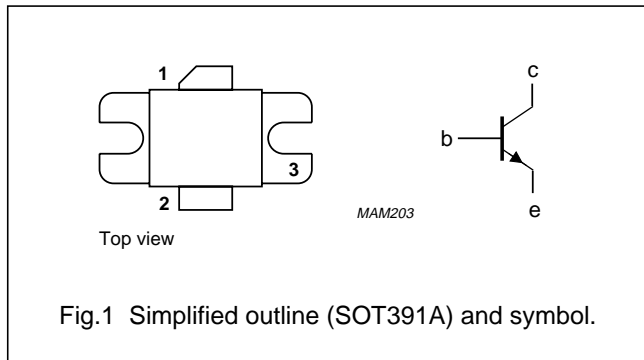
- Base stations in the 800 to 960 MHz frequency range.

DESCRIPTION

NPN silicon planar epitaxial transistors primarily intended for common emitter class-AB operation. The transistors have internal input and output matching by means of MOS capacitors. The encapsulations are a 2-lead rectangular SOT391A flange package and a SOT391B flangeless package, both with a ceramic cap.

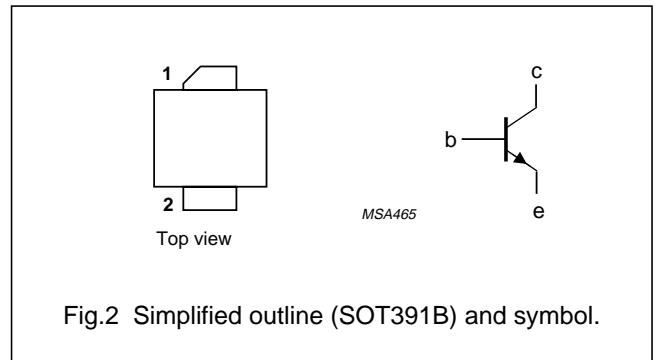
PINNING - SOT391A

PIN	SYMBOL	DESCRIPTION
1	c	collector
2	b	base
3	e	emitter; connected to flange



PINNING - SOT391B

PIN	SYMBOL	DESCRIPTION
1	c	collector
2	b	base
Ground plane	e	emitter



QUICK REFERENCE DATA

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

MODE OF OPERATION	f (MHz)	V _{CE} (V)	P _L (W)	G _p (dB)	η_c (%)
CW, class-AB	900	26	75	≥8	≥50
	960	26	75	≥8.5	≥50

WARNING

Product and environmental safety - toxic materials

This product contains beryllium oxide. The product is entirely safe provided that the BeO disc is 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.

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{CBO}	collector-base voltage	open emitter	–	70	V
V _{CEO}	collector-emitter voltage	open base	–	30	V
V _{EBO}	emitter-base voltage	open collector	–	3	V
I _C	collector current (DC)		–	15	A
I _{C(AV)}	average collector current		–	15	A
P _{tot}	total power dissipation	T _{mb} ≤ 25 °C	–	250	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} = 250 W; T _{mb} = 25 °C; note 1	0.7	K/W
R _{th mb-h}	thermal resistance from mounting base to heatsink		0.2	K/W

Note

1. Thermal resistance is determined under specified RF operating conditions.

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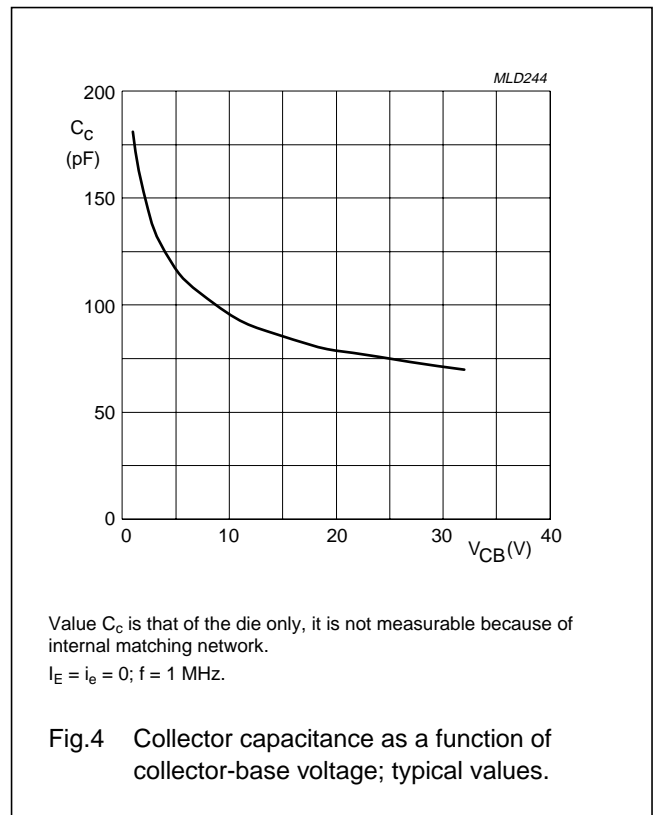
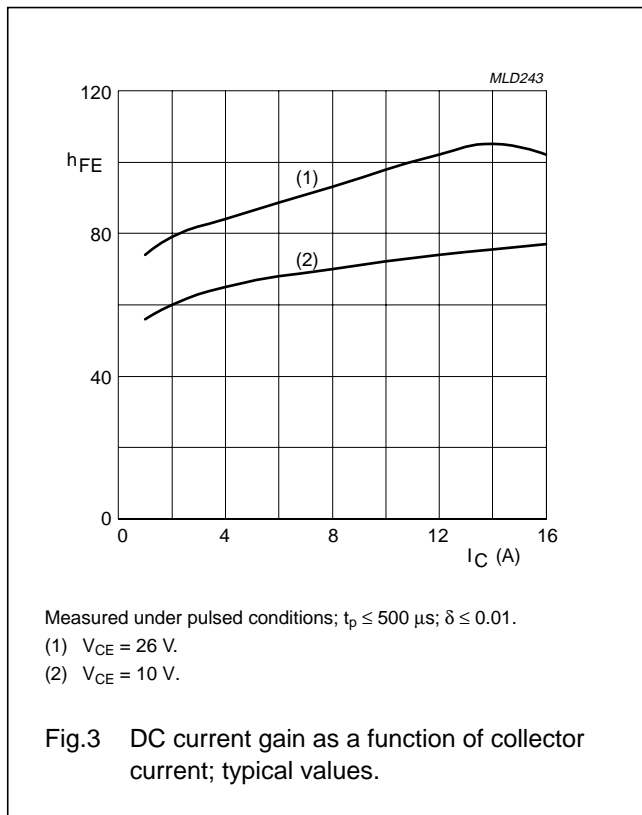
CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; $I_C = 60\text{ mA}$	70	–	–	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	open base; $I_C = 150\text{ mA}$	30	–	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector; $I_E = 3\text{ mA}$	3	–	–	V
I_{CES}	collector leakage current	$V_{BE} = 0; V_{CE} = 28\text{ V}$	–	–	5	mA
h_{FE}	DC current gain	$V_{CE} = 10\text{ V}; I_C = 4.5\text{ A}$; note 1; see Fig 3	30	–	120	
C_c	collector capacitance	$V_{CB} = 26\text{ V}; I_E = i_e = 0$; $f = 1\text{ MHz}$; note 2; see Fig 4	–	75	–	pF

Notes

1. Measured under pulsed conditions: $t_p \leq 500\text{ }\mu\text{s}$; $\delta \leq 0.01$.
2. Value of C_c is that of the die only, it is not measurable because of internal matching network.



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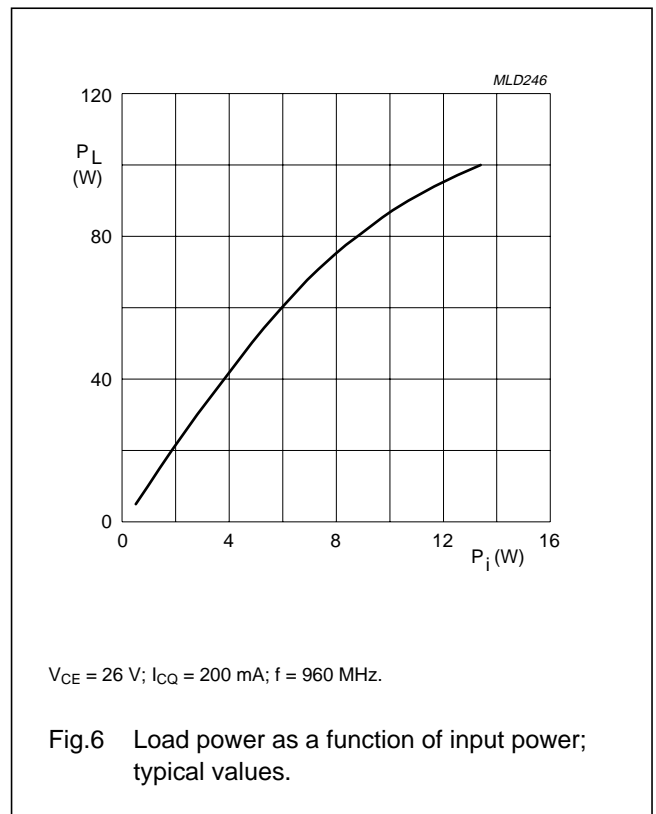
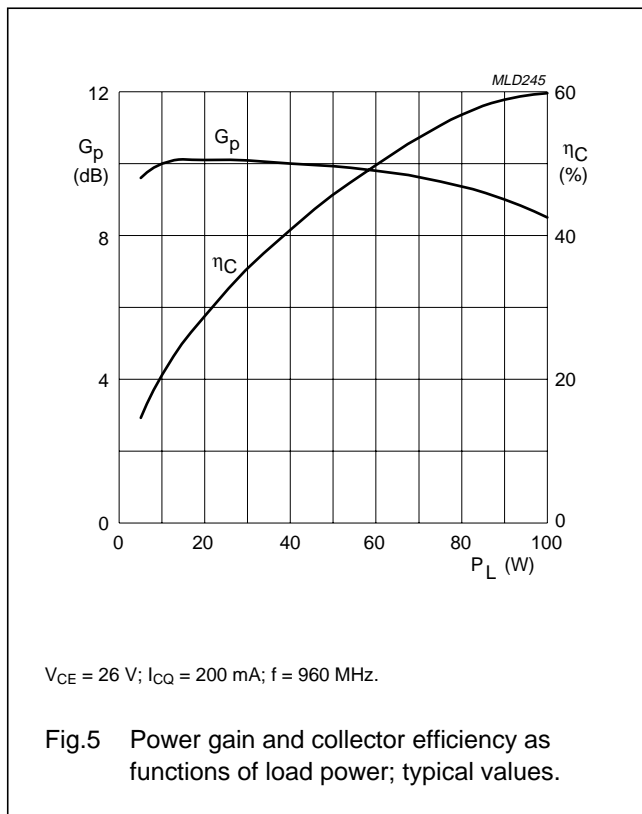
APPLICATION INFORMATION

RF performance at $T_h = 25\text{ }^\circ\text{C}$ in a common emitter, class-AB test circuit; $R_{th\text{ mb-h}} = 0.2\text{ K/W}$.

MODE OF OPERATION	f (MHz)	V _{CE} (V)	I _{CQ} (mA)	P _L (W)	G _p (dB)	η _c (%)
CW, class-AB	900	26	200	75	≥8 typ. 9.5	≥50 typ. 55
	960	26	200	75	≥8.5 typ. 9.5	≥50 typ. 55

Ruggedness in class-AB operation

The transistors are capable of withstanding a load mismatch corresponding to VSWR = 4 : 1 through all phases at rated output power, under the following conditions: V_{CE} = 26 V; f = 960 MHz; I_{CQ} = 200 mA; T_h = 25 °C; R_{th mb-h} = 0.2 K/W.



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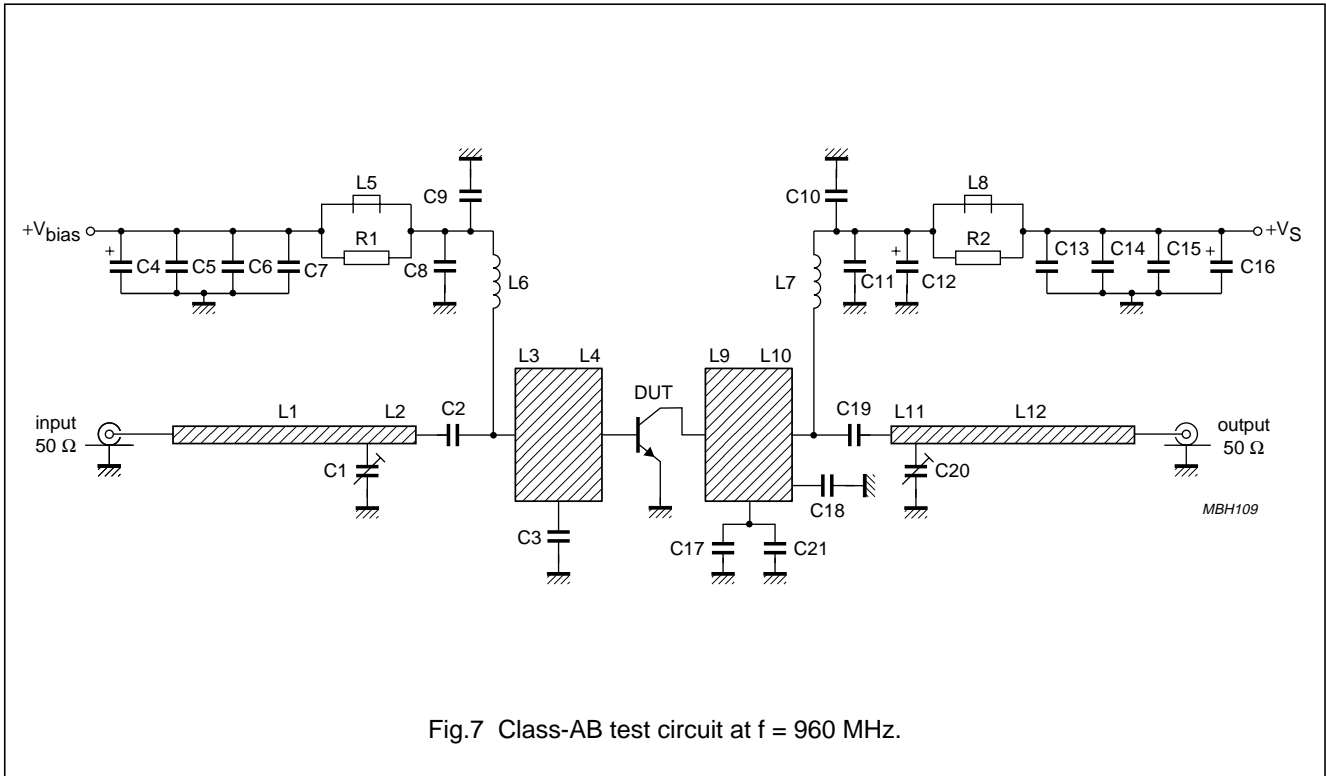


Fig.7 Class-AB test circuit at f = 960 MHz.

List of components (see Figs 7 and 8)

COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE No.
C1, C20	Tekelec, type 5201	0.8 to 10 pF		
C2, C19	multilayer ceramic chip capacitor; note 1	15 pF; 500 V		
C3	multilayer ceramic chip capacitor; note 1	6.2 pF; 500 V		
C4	electrolytic capacitor	10 μF; 63 V		
C5	multilayer ceramic chip capacitor	22 nF; 50 V		
C6	multilayer ceramic chip capacitor; note 1	1 nF; 500 V		
C7	multilayer ceramic chip capacitor; note 1	33 pF; 500 V		2222 030 28109
C8, C11, C14	multilayer ceramic chip capacitor; note 1	100 pF; 500 V		
C9, C10, C13	multilayer ceramic chip capacitor; note 1	20 pF; 500 V		
C12	solid tantalum capacitor	1 μF; 35 V		
C15	multilayer ceramic chip capacitor	100 nF; 50 V		
C16	electrolytic capacitor	47 μF; 40 V		2222 036 68479

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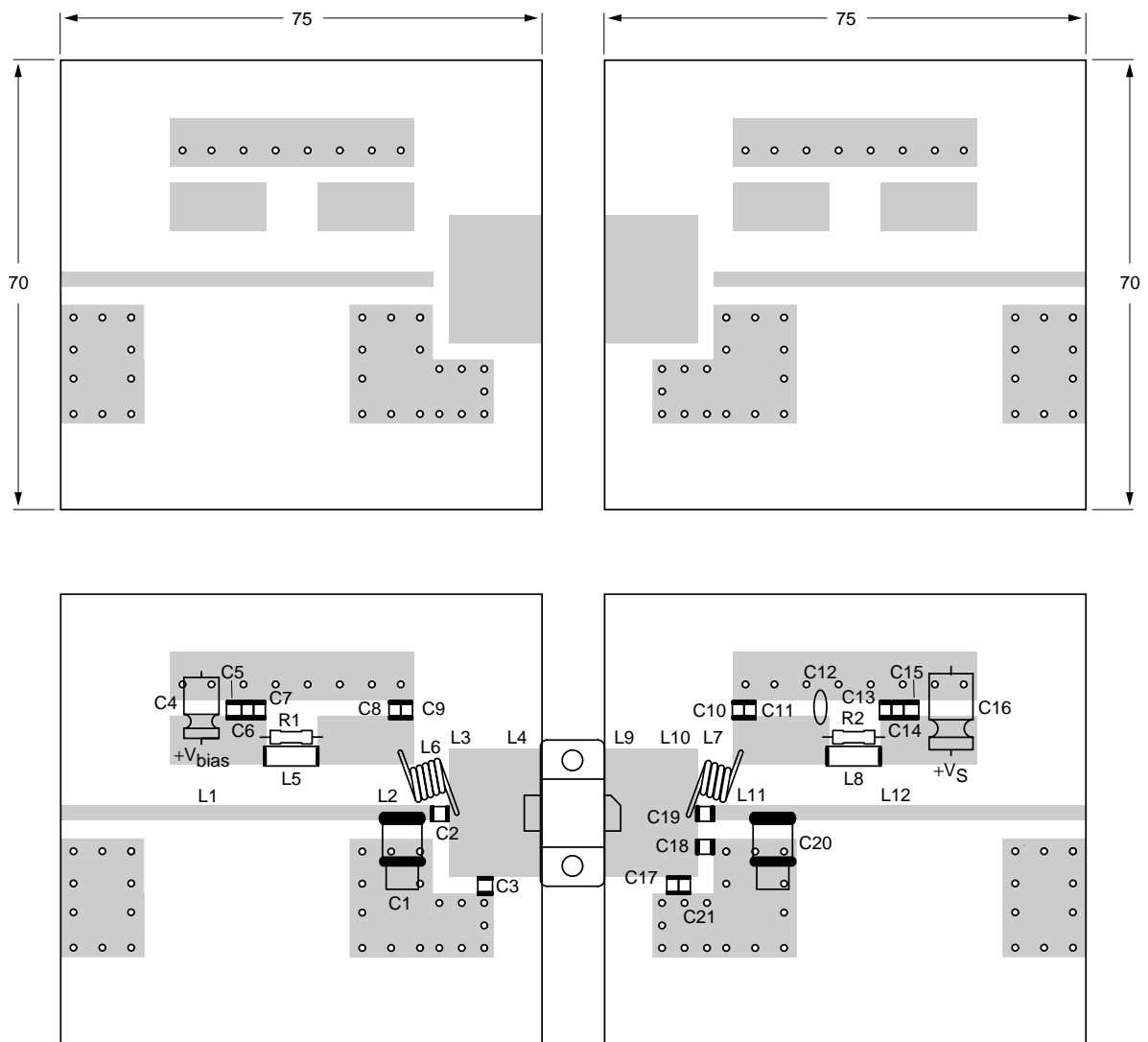
COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE No.
C17	multilayer ceramic chip capacitor; note 1	4.7 pF; 500 V		
C18	multilayer ceramic chip capacitor; note 1	3.3 pF; 500 V		
C21	multilayer ceramic chip capacitor; note 1	2.7 pF; 500 V		
L1	stripline; note 2		length 51 mm width 2.2 mm	
L2	stripline; note 2		length 7 mm width 2.2 mm	
L3	stripline; note 2		length 5.5 mm width 20 mm	
L4	stripline; note 2		length 9 mm width 20 mm	
L5, L8	Ferroxcube chip-bead grade 4S2			4330 030 36300
L6	5 turns enamelled 1 mm copper wire		int. diameter 4 mm close wound	
L7	4 turns enamelled 1 mm copper wire		int. diameter 4 mm close wound	
L9	stripline; note 2		length 12.5 mm width 20 mm	
L10	stripline; note 2		length 2 mm width 20 mm	
L11	stripline; note 2		length 17 mm width 2.2 mm	
L12	stripline; note 2		length 41 mm width 2.2 mm	
R1, R2	metal film resistor	100 Ω ; 0.4 W		

Notes

1. American Technical Ceramics type 100B or capacitor of same quality.
2. The striplines are on double-clad printed-circuit board with PTFE fibre-glass dielectric ($\epsilon_r = 2.25$); thickness $\frac{1}{32}$ inch.

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MBH110

The same printed-circuit board can also be used for the flangeless version FL.

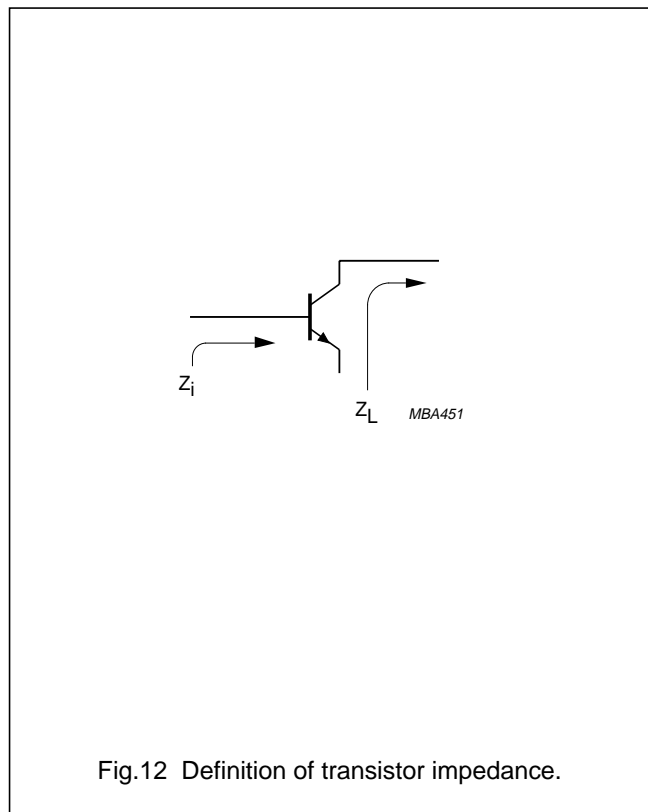
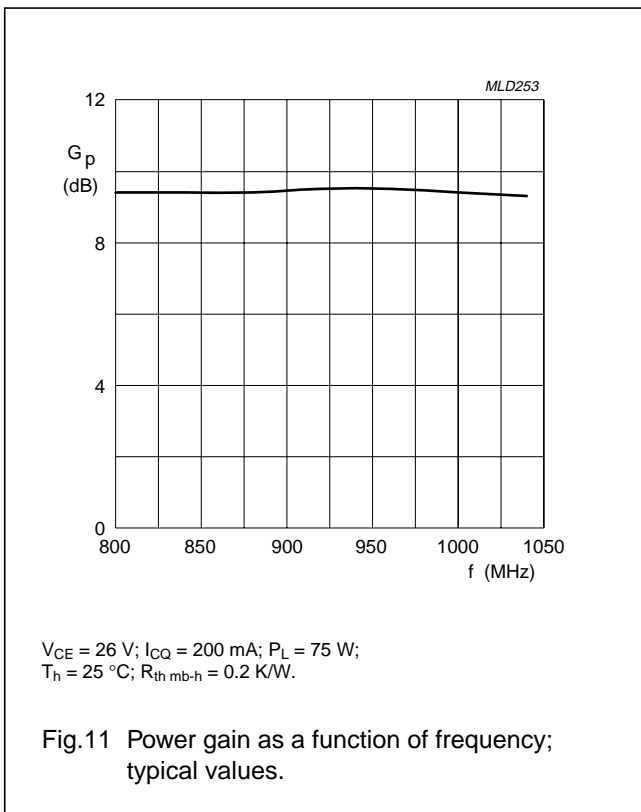
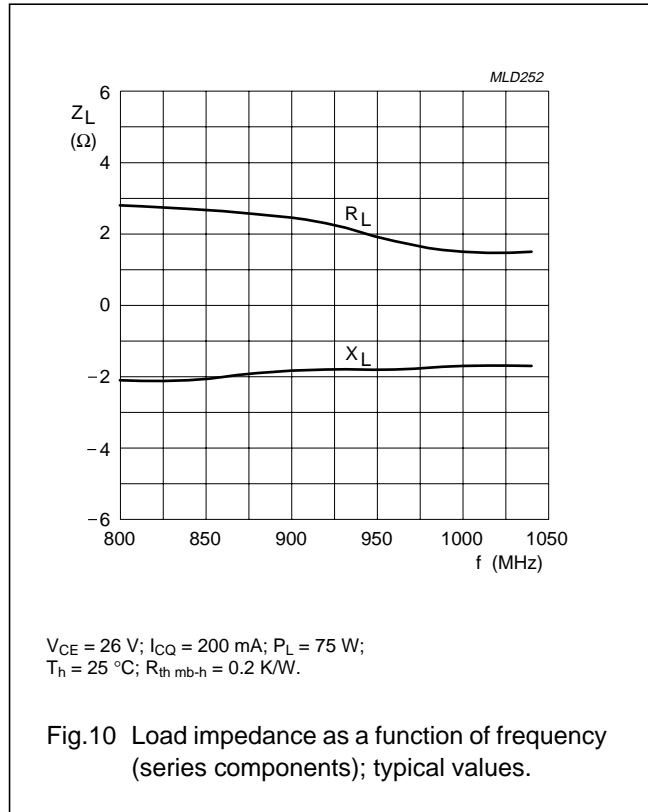
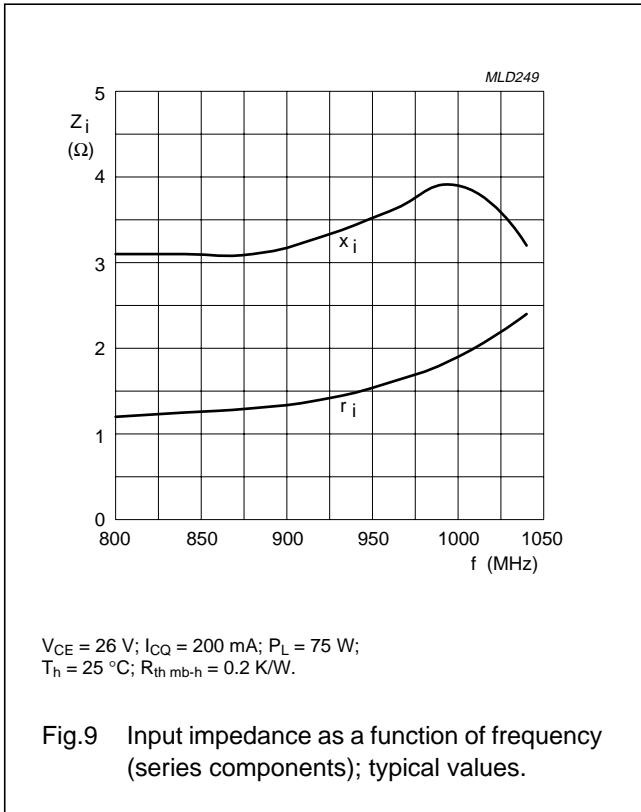
Dimensions in mm.

The components are located on one side of the copper-clad PTFE microfibre-glass board, the other side is unetched and serves as a ground plane. Earth connections from the component side to the ground plane are made by through metallization.

Fig.8 Component layout and printed-circuit board for 960 MHz class-AB test circuit.

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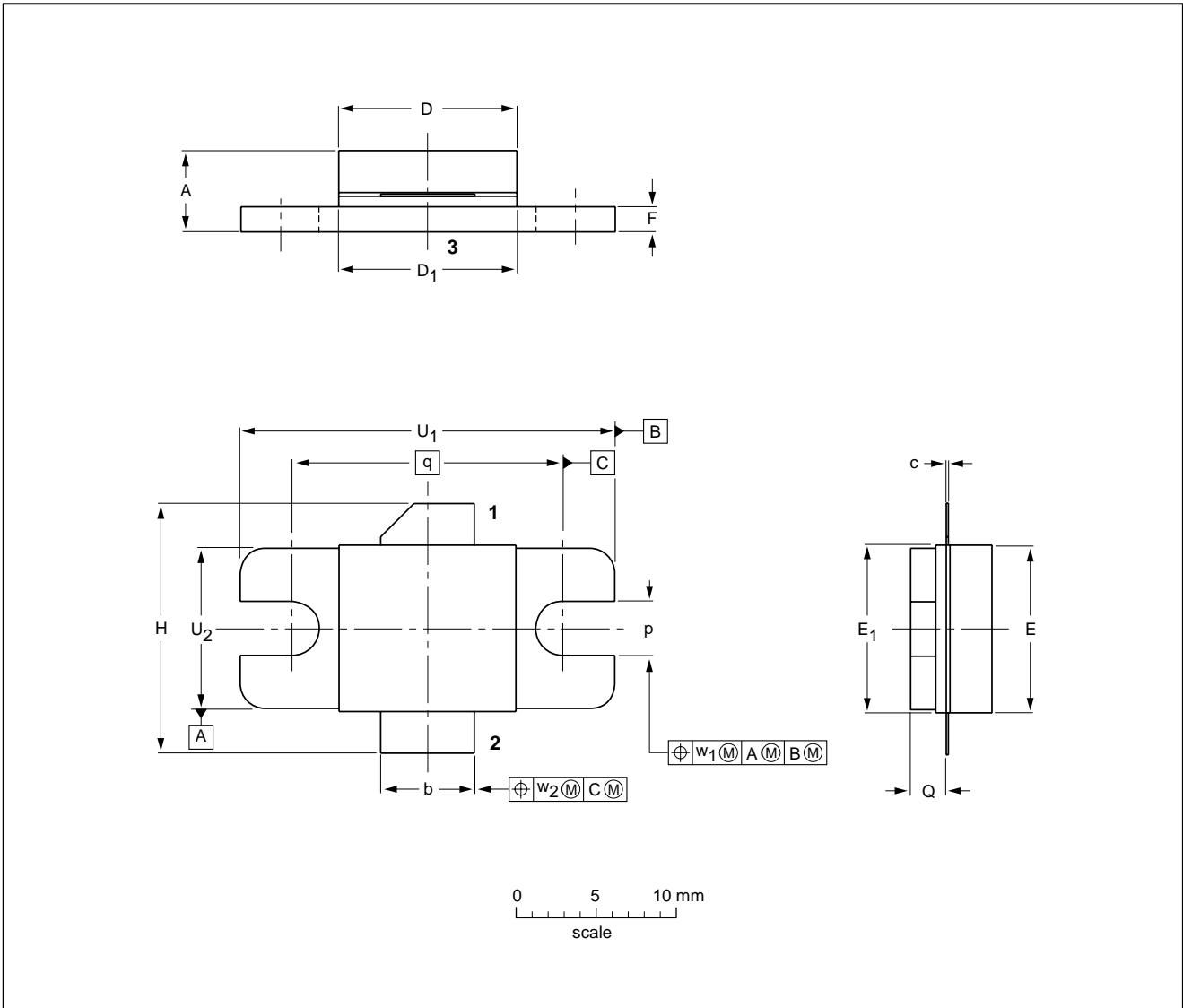
UHF power transistors

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PACKAGE OUTLINES

Flanged ceramic package; 2 mounting holes; 2 leads

SOT391A



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

UNIT	A	b	c	D	D ₁	E	E ₁	F	H	p	Q	q	U ₁	U ₂	w ₁	w ₂
mm	5.21 4.45	5.84 5.59	0.15 0.10	10.87 10.67	10.92 10.67	10.26 10.06	10.29 10.03	1.65 1.40	15.75 14.73	3.43 3.18	2.29 2.03	20.32	22.99 22.73	9.91 9.65	0.25	0.51
inches	0.205 0.175	0.230 0.220	0.006 0.004	0.428 0.420	0.430 0.420	0.404 0.396	0.405 0.395	0.065 0.055	0.620 0.580	0.135 0.125	0.090 0.080	0.800	0.905 0.895	0.390 0.380	0.010	0.020

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT391A						97-05-29 99-12-08

UHF power transistors

BLV958; BLV958FL

Flangeless ceramic package; 2 leads

SOT391B

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

UNIT	A	b	c	D	E	L	Q
mm	4.09 3.02	5.85 5.58	0.16 0.10	11.54 10.51	10.93 9.90	2.79 2.29	1.02 0.76

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT391B						97-05-29

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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