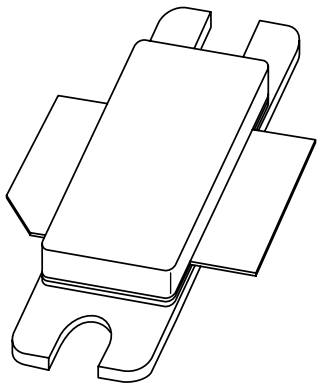


# DATA SHEET



## **BLF1820-90** UHF power LDMOS transistor

Product specification  
Supersedes data of 2001 Mar 07

2003 Feb 10

## UHF power LDMOS transistor

## BLF1820-90

## FEATURES

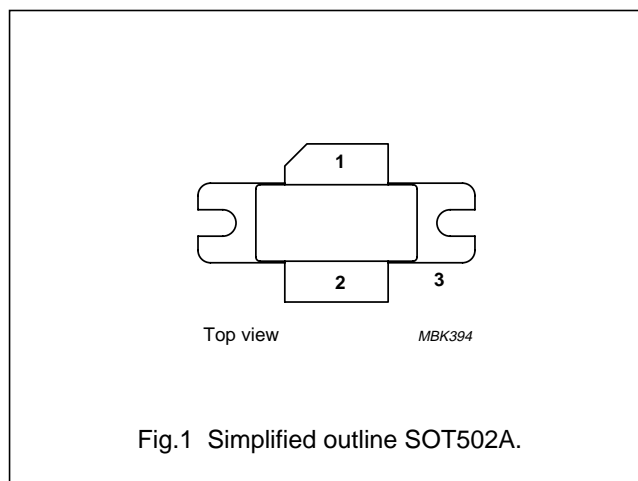
- Typical 2-tone performance at a supply voltage of 26 V and  $I_{DQ}$  of 500 mA:
  - Output power = 90 W (PEP)
  - Gain = 12 dB
  - Efficiency = 32%
  - dim = -26 dBc
- Easy power control
- Excellent ruggedness
- High power gain
- Excellent thermal stability
- Designed for broadband operation (1800 to 2000 MHz)
- Internally matched for ease of use.

## APPLICATIONS

- RF power amplifiers for GSM, EDGE and CDMA base stations and multicarrier applications in the 1800 to 2000 MHz frequency range.

## PINNING

PIN	DESCRIPTION
1	drain
2	gate
3	source, connected to flange



## DESCRIPTION

90 W LDMOS power transistor for base station applications at frequencies from 1800 to 2000 MHz.

## QUICK REFERENCE DATA

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

MODE OF OPERATION	f (MHz)	$V_{DS}$ (V)	$P_L$ (W)	$G_p$ (dB)	$\eta_D$ (%)	$d_{im}$ (dBc)
2-tone, class-AB	$f_1 = 2000$ ; $f_2 = 2000.1$	26	90 (PEP)	>11	>30	$\leq -25$

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
$V_{DS}$	drain-source voltage	–	65	V
$V_{GS}$	gate-source voltage	–	$\pm 15$	V
$I_D$	DC drain current	–	12	A
$T_{stg}$	storage temperature	-65	+150	$^\circ\text{C}$
$T_j$	junction temperature	–	200	$^\circ\text{C}$

## CAUTION

This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

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## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-h}$	thermal resistance from junction to heatsink	$T_h = 25\text{ °C}$ ; note 1	0.81	K/W

## Note

1. Determined under specified RF operating conditions.

## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0$ ; $I_D = 2.1\text{ mA}$	65	–	–	V
$V_{GSth}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}$ ; $I_D = 210\text{ mA}$	4.4	–	5.5	V
$I_{DSS}$	drain-source leakage current	$V_{GS} = 0$ ; $V_{DS} = 26\text{ V}$	–	–	15	$\mu\text{A}$
$I_{DSX}$	on-state drain current	$V_{GS} = V_{GSth} + 9\text{ V}$ ; $V_{DS} = 10\text{ V}$	27	–	–	A
$I_{GSS}$	gate leakage current	$V_{GS} = \pm 15\text{ V}$ ; $V_{DS} = 0$	–	–	38	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}$ ; $I_D = 7.5\text{ A}$	–	6.2	–	S
$R_{DSon}$	drain-source on-state resistance	$V_{GS} = V_{GSth} + 9\text{ V}$ ; $I_D = 7.5\text{ A}$	–	0.1	–	$\Omega$
$C_{rss}$	feedback capacitance	$V_{GS} = 0$ ; $V_{DS} = 26\text{ V}$ ; $f = 1\text{ MHz}$ ; note 1	–	5.1	–	pF

## Note

1. The value of capacitance is that of the die only.

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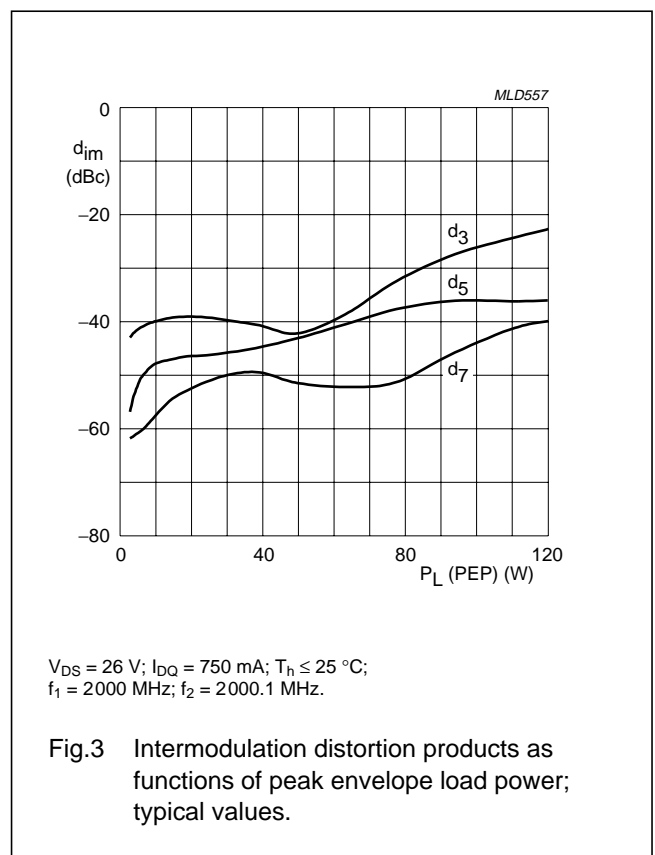
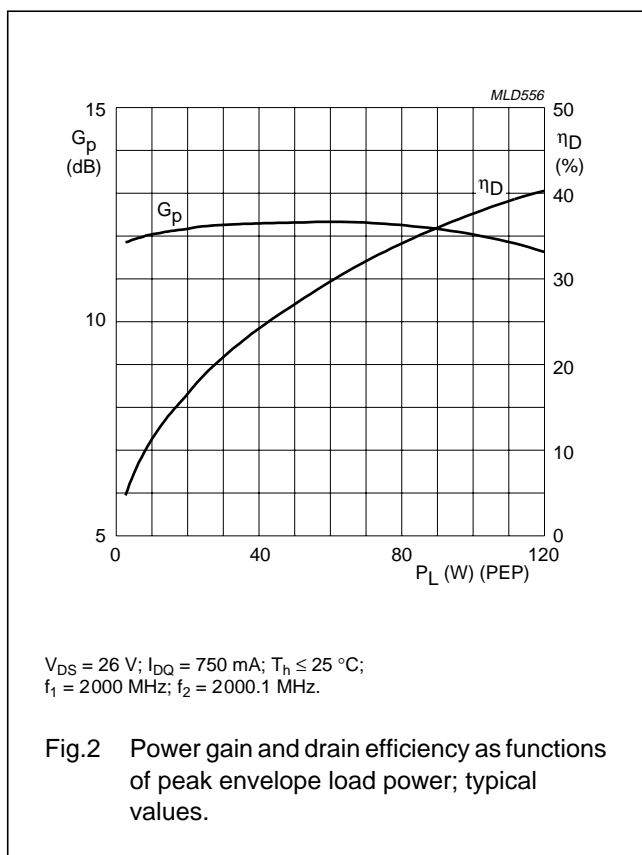
**APPLICATION INFORMATION**

RF performance in a common source class-AB circuit.  $T_h = 25\text{ }^\circ\text{C}$ ;  $R_{th\ j-h} = 0.81\text{ K/W}$ ; unless otherwise specified.

MODE OF OPERATION	f (MHz)	V <sub>DS</sub> (V)	I <sub>DQ</sub> (mA)	P <sub>L</sub> (W)	G <sub>p</sub> (dB)	η <sub>D</sub> (%)	d <sub>im</sub> (dBc)
Two-tone, class-AB	f <sub>1</sub> = 2000; f <sub>2</sub> = 2000.1	26	750	90 (PEP)	>11	>30	≤-25

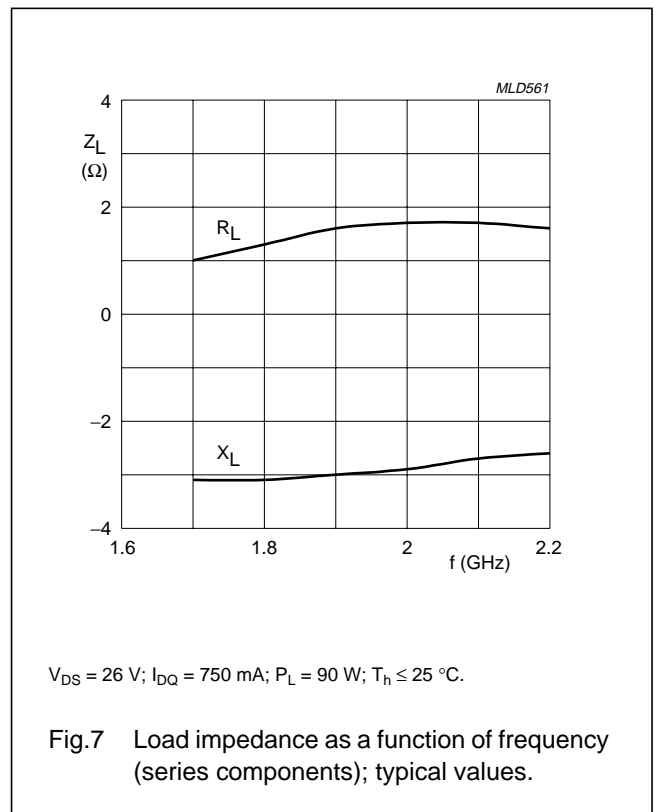
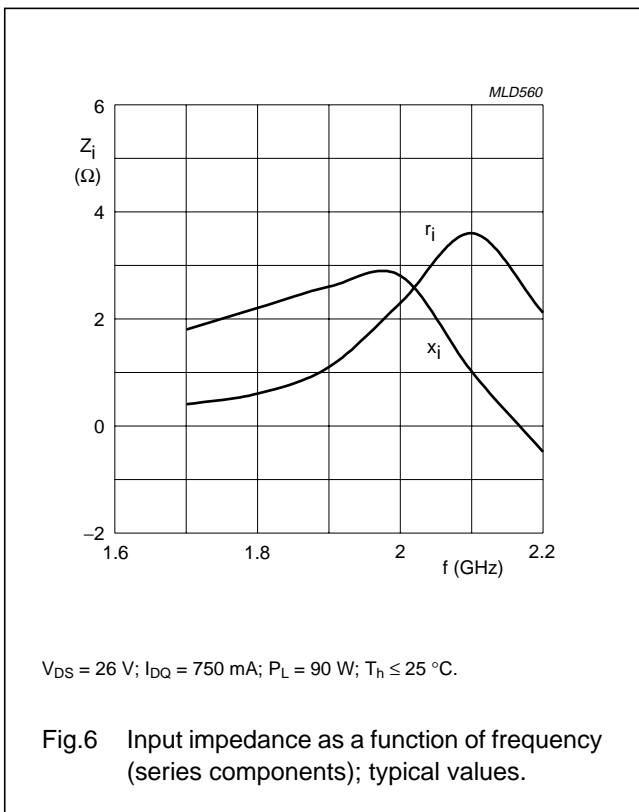
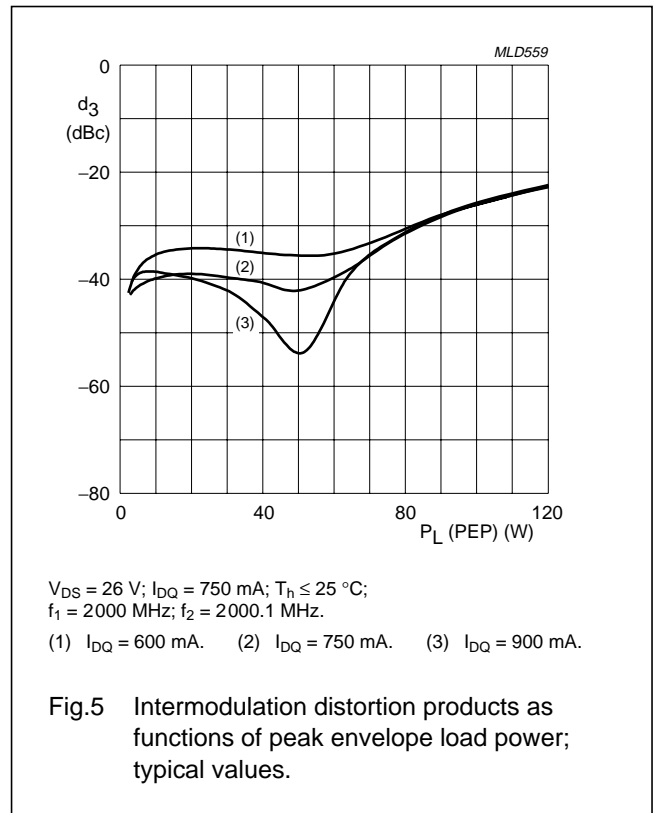
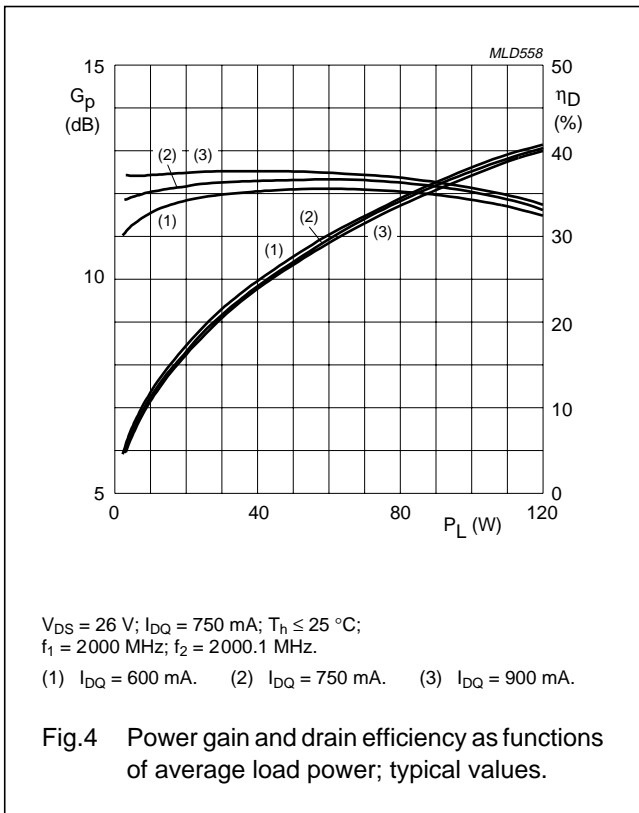
**Ruggedness in class-AB operation**

The BLF1820-90 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: V<sub>DS</sub> = 26 V; I<sub>DQ</sub> = 750 mA; P<sub>L</sub> = 90 W; f = 2000 MHz (single tone).



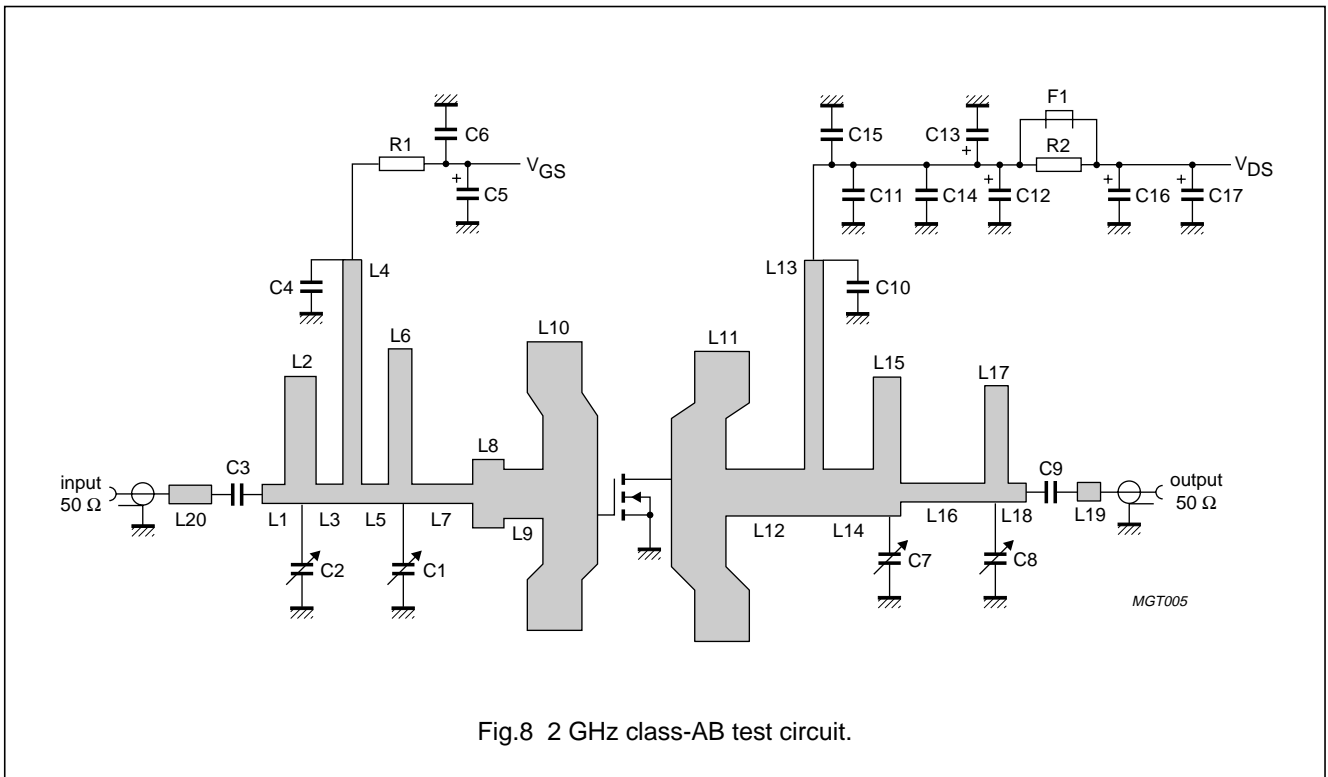
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## UHF power LDMOS transistor

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## List of components

See Figs 8 and 9.

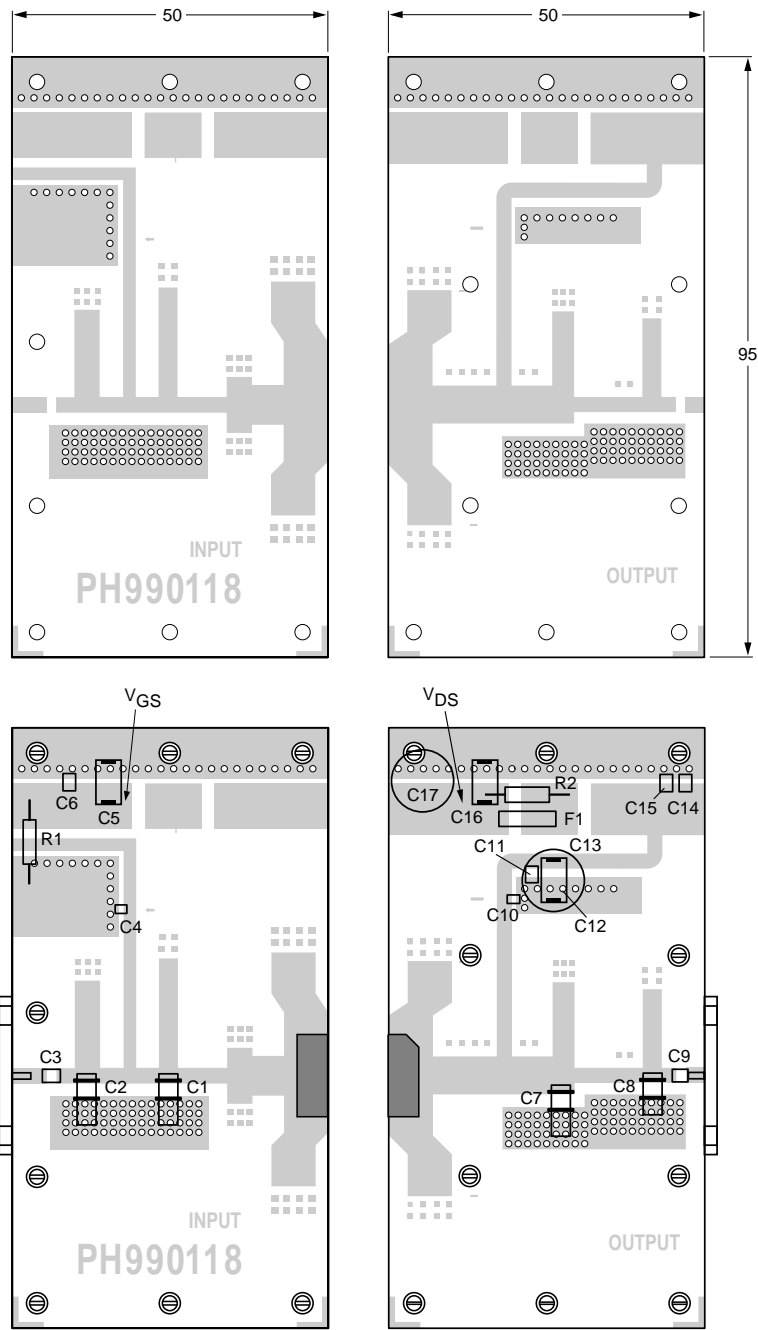
COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE NO.
C1, C2, C7, C8	Tekelec variable capacitor; type 37271	0.6 to 4.5 pF		
C3, C9	multilayer ceramic chip capacitor; note 1	12 pF		
C4, C10	multilayer ceramic chip capacitor; note 2	12 pF		
C5, C12, C16	electrolytic capacitor	4.5 $\mu$ F; 50 V		
C6, C11, C15	multilayer ceramic chip capacitor; note 1	1 nF		
C13, C17	electrolytic capacitor	100 $\mu$ F; 63 V		2222 037 58101
C14	multilayer ceramic chip capacitor	100 nF		2222 581 16641
F1	Ferroxcube chip-bead 8DS3/3/8/9-4S2			4330 030 36301
L1	stripline; note 3	50 $\Omega$	2.9 $\times$ 2.4 mm	
L2		10.8 $\Omega$	4 $\times$ 16.3 mm	
L3		50 $\Omega$	3.7 $\times$ 2.4 mm	
L4		6 $\Omega$	2 $\times$ 30.8 mm	
L5		50 $\Omega$	3.6 $\times$ 2.4 mm	
L6		9 $\Omega$	3 $\times$ 19.9 mm	
L7		50 $\Omega$	7.8 $\times$ 2.4 mm	
L8		18.5 $\Omega$	4 $\times$ 8.8 mm	
L9		24.4 $\Omega$	5 $\times$ 6.3 mm	
L10		5.1 $\Omega$	7 $\times$ 37 mm	
L11		5.1 $\Omega$	7 $\times$ 40.9 mm	
L12		25.4 $\Omega$	10.1 $\times$ 6 mm	
L13		5.7 $\Omega$	2.4 $\times$ 32.8 mm	
L14		25.4 $\Omega$	6.4 $\times$ 6 mm	
L15		10 $\Omega$	3.5 $\times$ 20.7 mm	
L16		50 $\Omega$	10.8 $\times$ 2.4 mm	
L17		11.8 $\Omega$	3 $\times$ 7.9 mm	
L18		50 $\Omega$	2.3 $\times$ 2.4 mm	
L19		50 $\Omega$	3 $\times$ 2.4 mm	
L20		50 $\Omega$	5.5 $\times$ 2.4 mm	
R1, R2	metal film resistor	10 $\Omega$ , 0.6 W		2322 156 11009

## Notes

- American Technical Ceramics type 100B or capacitor of same quality.
- American Technical Ceramics type 100A or capacitor of same quality.
- The striplines are on a double copper-clad printed-circuit board with Teflon dielectric ( $\epsilon_r = 2.2$ ); thickness 0.79 mm.

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MGU327

Dimensions in mm.  
 The components are situated on one side of the copper-clad printed-circuit board with Teflon dielectric ( $\epsilon_r = 2.2$ ), thickness 0.79 mm.  
 The other side is unetched and serves as a ground plane.

Fig.9 Component layout for 2 GHz class-AB test circuit.



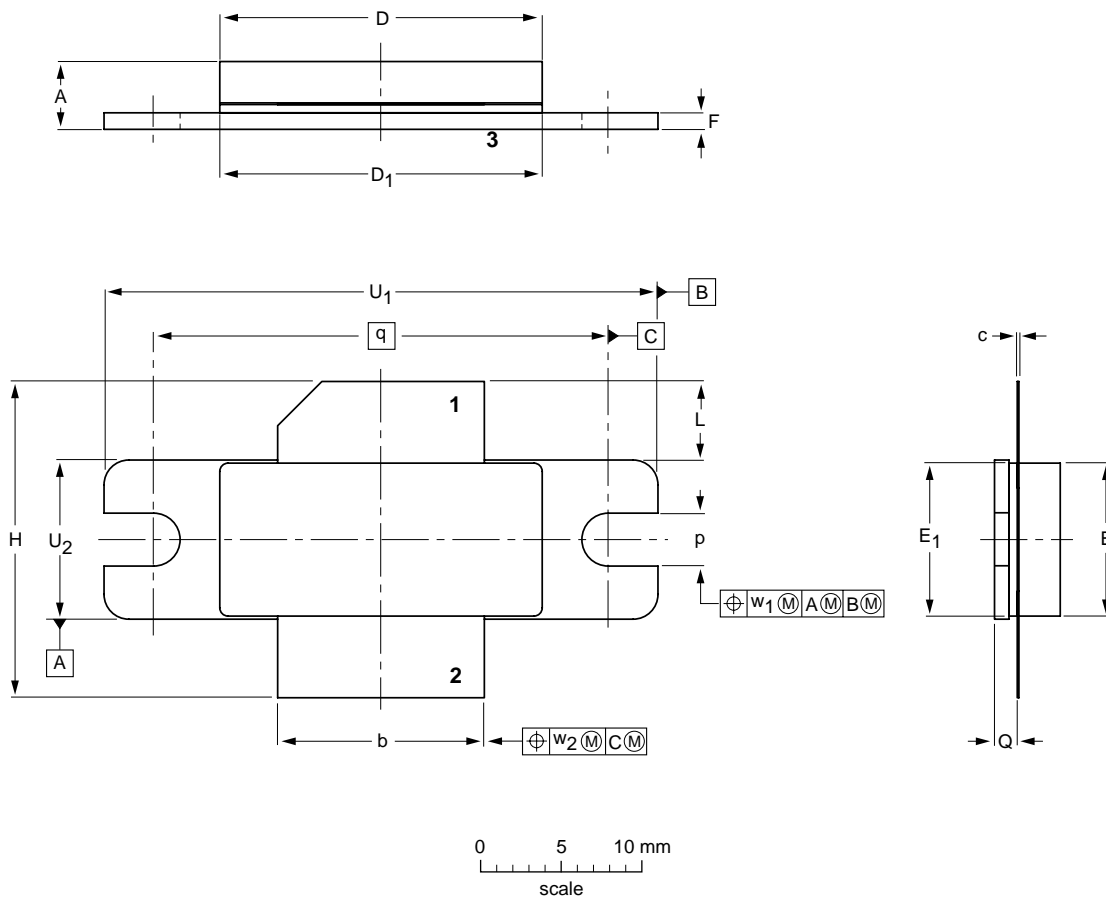
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PACKAGE OUTLINE

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads

SOT502A



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

UNIT	A	b	c	D	D <sub>1</sub>	E	E <sub>1</sub>	F	H	L	p	Q	q	U <sub>1</sub>	U <sub>2</sub>	w <sub>1</sub>	w <sub>2</sub>
mm	4.72 3.43	12.83 12.57	0.15 0.08	20.02 19.61	19.96 19.66	9.50 9.30	9.53 9.25	1.14 0.89	19.94 18.92	5.33 4.32	3.38 3.12	1.70 1.45	27.94	34.16 33.91	9.91 9.65	0.25	0.51
inches	0.186 0.135	0.505 0.495	0.006 0.003	0.788 0.772	0.786 0.774	0.374 0.366	0.375 0.364	0.045 0.035	0.785 0.745	0.210 0.170	0.133 0.123	0.067 0.057	1.100	1.345 1.335	0.390 0.380	0.01	0.02

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT502A						99-12-28- 03-01-10

## UHF power LDMOS transistor

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