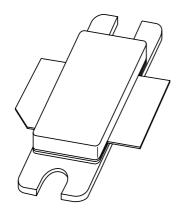
DISCRETE SEMICONDUCTORS

DATA SHEET



BLF2022-70UHF power LDMOS transistor

Product specification Supersedes data of 2002 Jul 04 2003 Feb 24





UHF power LDMOS transistor

BLF2022-70

FEATURES

- Typical W-CDMA performance at a supply voltage of 28 V and I_{DQ} of 1 A:
 - Output power = 7.5 W (AV)
 - Gain = 12.5 dB
 - Efficiency = 20%
 - ACPR = -42 dBc at 3.84 MHz
 - $-d_{im} = -36 dBc$
- · Easy power control
- · Excellent ruggedness
- · High power gain
- · Excellent thermal stability
- Designed for broadband operation (2000 to 2200 MHz)
- · Internally matched for ease of use.

APPLICATIONS

 RF power amplifiers for W-CDMA base stations and multicarrier applications in the 2000 to 2200 MHz frequency range.

DESCRIPTION

70 W LDMOS power transistor for base station applications at frequencies from 2000 to 2200 MHz.

QUICK REFERENCE DATA

RF performance at T_h = 25 °C in a common source test circuit.

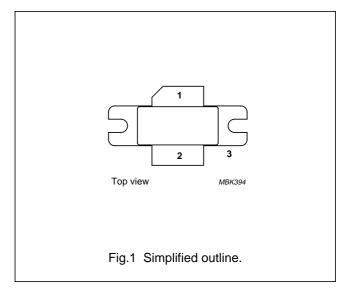
MODE OF OPERATION	E OF OPERATION f (MHz)		P _L (W)	G _p (dB)	η _D (%)	d _{im} (dBc)
2-tone, class-AB	$f_1 = 2170; f_2 = 2170.1$	28	65 (PEP)	>11	>30	≤–25

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.

PINNING - SOT502A

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



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LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V _{DS}	drain-source voltage	_	65	٧
V_{GS}	gate-source voltage	_	±15	٧
I _D	DC drain current	_	9	А
T _{stg}	storage temperature	-65	+150	°C
Tj	junction temperature	_	200	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R _{th j-h}	thermal resistance from junction to heatsink	$T_h = 25$ °C; note 1	1.15	K/W

Note

1. Determined under specified RF operating conditions.

CHARACTERISTICS

 $T_i = 25$ °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V _{(BR)DSS}	drain-source breakdown voltage	V _{GS} = 0; I _D = 1.4 mA	65	_	_	V
V_{GSth}	gate-source threshold voltage	V _{DS} = 10 V; I _D = 140 mA	4.4	_	5.5	V
I _{DSS}	drain-source leakage current	V _{GS} = 0; V _{DS} = 26 V	_	_	10	μΑ
I _{DSX}	on-state drain current	$V_{GS} = V_{GSth} + 9 \text{ V}; V_{DS} = 10 \text{ V}$	18	_	_	Α
I_{GSS}	gate leakage current	$V_{GS} = \pm 15 \text{ V}; V_{DS} = 0$	_	_	25	nA
9fs	forward transconductance	V _{DS} = 10 V; I _D = 5 A	_	4.2	_	S
R _{DSon}	drain-source on-state resistance	$V_{GS} = V_{GSth} + 9 \text{ V}; I_D = 5 \text{ A}$	_	0.15	_	Ω
C _{rs}	feedback capacitance	$V_{GS} = 0$; $V_{DS} = 26 \text{ V}$; $f = 1 \text{ MHz}$	_	3.4	_	pF

APPLICATION INFORMATION

RF performance in a common source class-AB circuit. $T_h = 25$ °C; $R_{th j-h} = 1.15$ K/W; unless otherwise specified.

MODE OF OPERATION	f (MHz)	V _{DS} (V)	I _{DQ} (mA)	P _L (W)	G _p (dB)	η _D (%)	d _{im} (dBc)
2-tone, class-AB	$f_1 = 2170; f_2 = 2170.1$	28	500	65 (PEP)	>11	>30	≤–25

Ruggedness in class-AB operation

The BLF2022-70 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS} = 28 \text{ V}$; $I_{DQ} = 500 \text{ mA}$; $P_L = 65 \text{ W}$ (CW); f = 2170 MHz.

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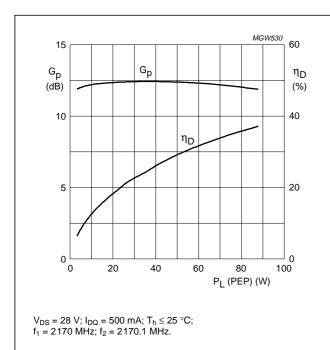


Fig.2 Power gain and drain efficiency as functions of peak envelope load power; typical values.

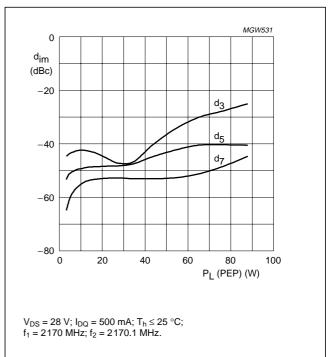
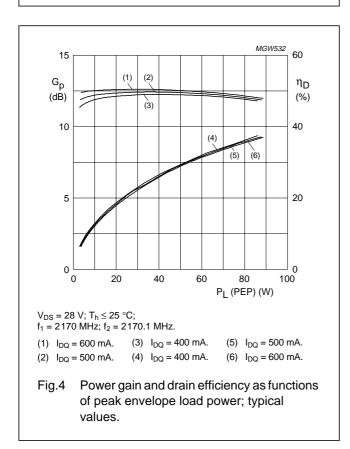
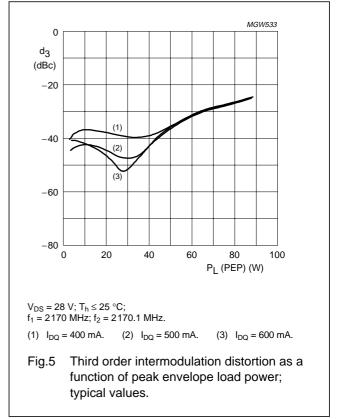


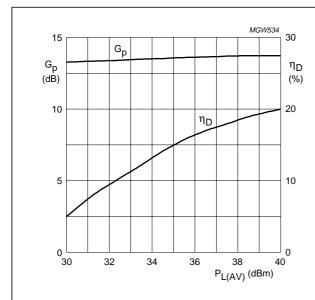
Fig.3 Intermodulation distortion as a function of peak envelope load power; typical values.





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 V_{DS} = 28 V; I_{DQ} = 450 mA; $T_h \leq$ 25 °C; f_1 = 2135 MHz; f_2 = 2145 MHz.

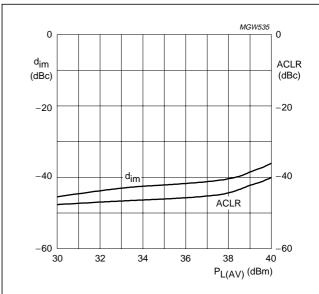
Two-carrier W-CDMA performance.

Input signal: 3GPP W-CDMA 1-64DPCH with 66 % clipping; peak to average power ratio: 8.5 dB at 0.01 % and 9.2 dB at 0.0001 % (CCDF) per carrier;

channel spacing/bandwidth = 5 MHz / 3.84 MHz.

Measured in a W-CDMA application circuit.

Fig.6 Power gain and drain efficiency as functions of average load power; typical values.



 V_{DS} = 28 V; I_{DQ} = 450 mA; $T_h \le$ 25 °C; f_1 = 2135 MHz; f_2 = 2145 MHz.

Two-carrier W-CDMA performance.

Input signal: 3GPP W-CDMA 1-64DPCH with 66 % clipping; peak to average power ratio: 8.5 dB at 0.01 % and 9.2 dB at 0.0001 % (CCDF) per carrier;

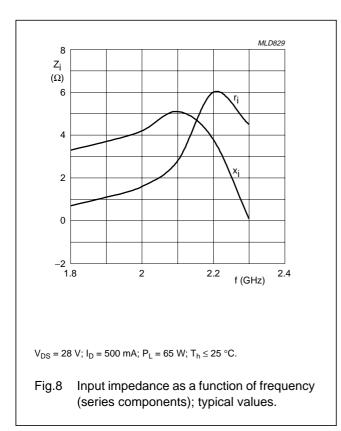
channel spacing/bandwidth = 5 MHz / 3.84 MHz.

Measured in a W-CDMA application circuit.

Fig.7 Intermodulation distortion and adjacent channel power ratio as functions of average load power; typical values.

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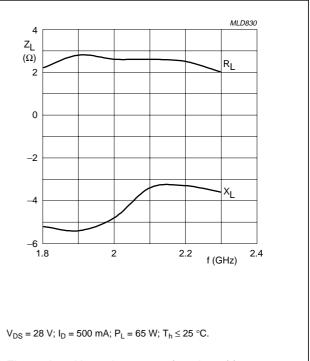
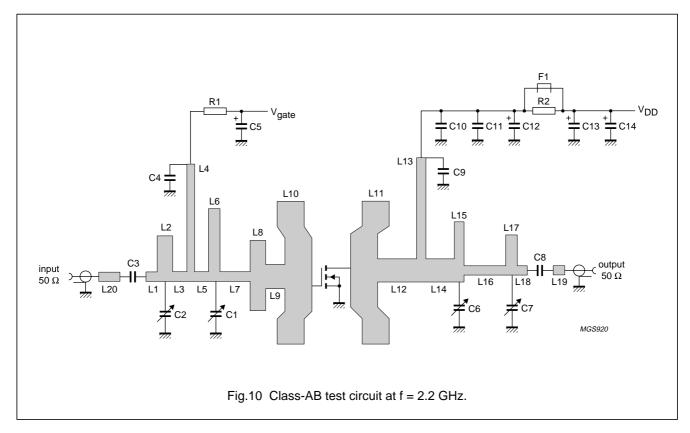


Fig.9 Load impedance as a function of frequency (series components); typical values.



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List of components (See Figs 10 and 11)

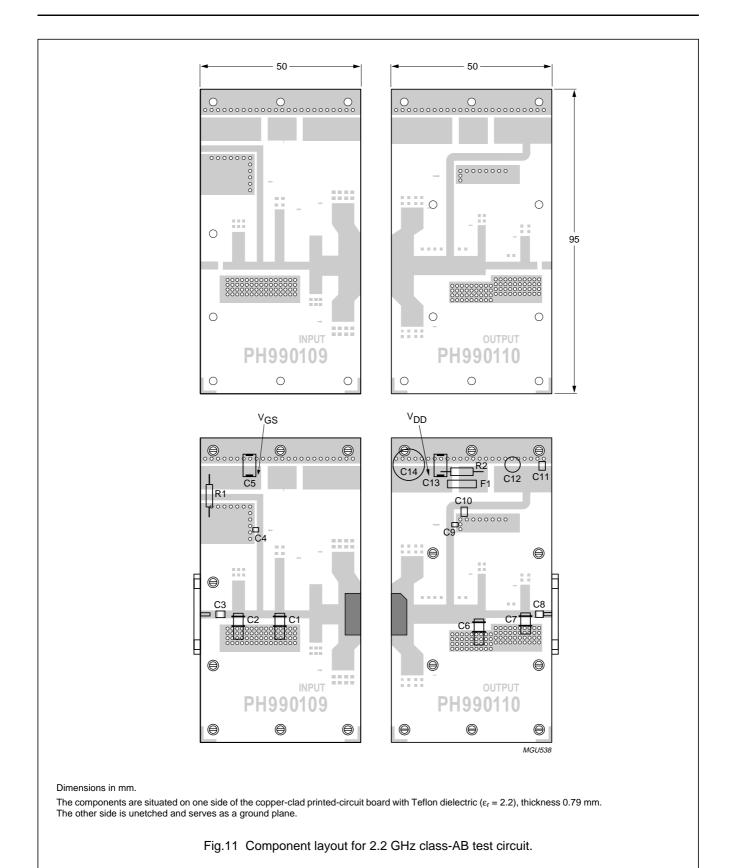
COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE NO.
C1, C2, C6, C7	Tekelec variable capacitor; type 37281	0.4 to 2.5 pF		
C3, C8	multilayer ceramic chip capacitor; note 1	12 pF		
C4, C9	multilayer ceramic chip capacitor; note 2	12 pF		
C5, C12	electrolytic capacitor	10 μF; 100 V		2222 037 59109
C10	multilayer ceramic chip capacitor; note 1	1 nF		
C11	multilayer ceramic chip capacitor	100 nF		2222 581 16641
C13	tantalum SMD capacitor	4.5 μF; 50 V		
C14	electrolytic capacitor	100 μF; 63 V		2222 037 58101
F1	Ferroxcube chip-bead 8DS3/3/8/9-4S2			4330 030 36301
L1	stripline; note 3	50 Ω	2.9 × 2.4 mm	
L2	stripline; note 3	14.5 Ω	4 × 11.7 mm	
L3	stripline; note 3	50 Ω	3.7 × 2.4 mm	
L4	stripline; note 3	6 Ω	2 × 30.8 mm	
L5	stripline; note 3	50 Ω	3.6 × 2.4 mm	
L6	stripline; note 3	9.5 Ω	3 × 18.8 mm	
L7	stripline; note 3	50 Ω	7.8 × 2.4 mm	
L8	stripline; note 3	9.8 Ω	4 × 18.3 mm	
L9	stripline; note 3	24.4 Ω	5 × 6.3 mm	
L10, L11	stripline; note 3	5.1 Ω	7 × 37 mm	
L12	stripline; note 3	25.4 Ω	10.1 × 6 mm	
L13	stripline; note 3	5.7 Ω	2.4 × 32.8 mm	
L14	stripline; note 3	25.4 Ω	7.4 × 6 mm	
L15	stripline; note 3	11.3 Ω	2.5 × 15.6 mm	
L16	stripline; note 3	50 Ω	10.8 × 2.4 mm	
L17	stripline; note 3	16.1 Ω	3 × 10.4 mm	
L18	stripline; note 3	50 Ω	2.3 × 2.4 mm	
L19	stripline; note 3	50 Ω	3 × 2.4 mm	
L20	stripline; note 3	50 Ω	5.5 × 2.4 mm	
R1, R2	metal film resistor	10 Ω, 0.6 W		2322 156 11009

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 ($\varepsilon_r = 2.2$); thickness 0.79 mm.

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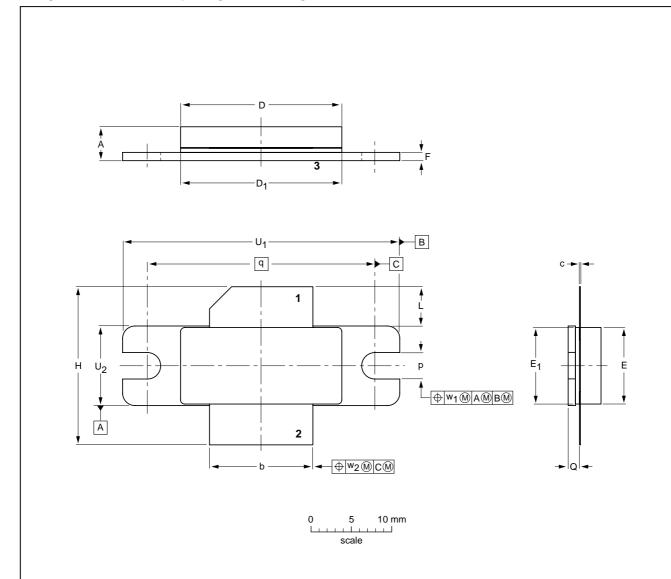
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PACKAGE OUTLINE

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads

SOT502A



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

UNIT	A	b	С	D	D ₁	E	E ₁	F	н	L	р	Q	q	U ₁	U ₂	w ₁	w ₂
mm	4.72 3.43	12.83 12.57		20.02 19.61			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										0.133 0.123		1.100	1.345 1.335	0.390 0.380	0.01	0.02

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

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DATA SHEET STATUS

LEVEL	DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾⁽³⁾	DEFINITION
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