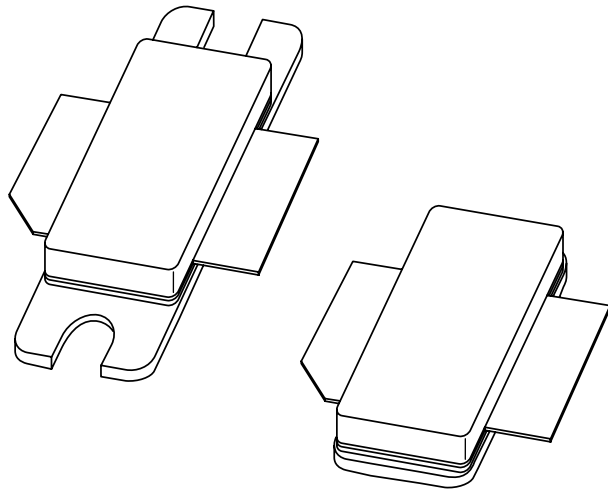


# DATA SHEET



## **BLF900-110; BLF900S-110** Base station LDMOS transistors

Product specification  
Supersedes data of 2003 Sep 22

2004 Feb 04

**Base station LDMOS transistors**

**BLF900-110; BLF900S-110**

**FEATURES**

- Typical CDMA IS95 performance at standard settings with a supply voltage of 27 V, frequency of 881.5 MHz and  $I_{DQ}$  of 700 mA; adjacent channel bandwidth is 30 kHz, adjacent channel at  $\pm 750$  kHz:
  - Output power = 24 W (AV)
  - Gain = 15 dB
  - Efficiency = 27%
  - ACPR = -45 dBc at 750 kHz and BW = 30 kHz.
- 110 W CW performance
- Easy power control
- Excellent ruggedness
- High power gain
- Excellent thermal stability
- Designed for broadband operation (800 to 1000 MHz)
- Internally matched for ease of use.

**APPLICATIONS**

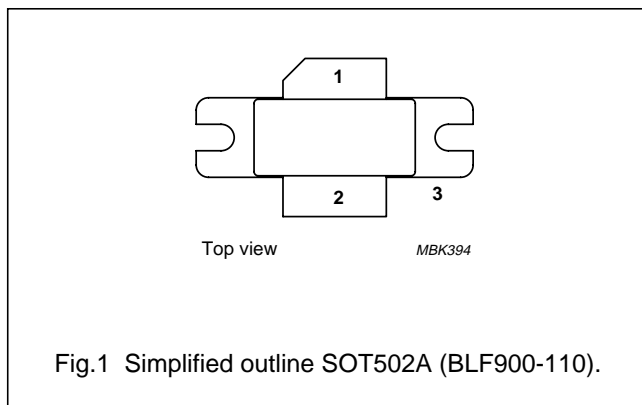
- RF power amplifier for GSM, EDGE and CDMA base stations and multicarrier operations in the 800 to 1000 MHz frequency range.

**DESCRIPTION**

110 W LDMOS power transistor for base station applications at frequencies from 800 to 1000 MHz.

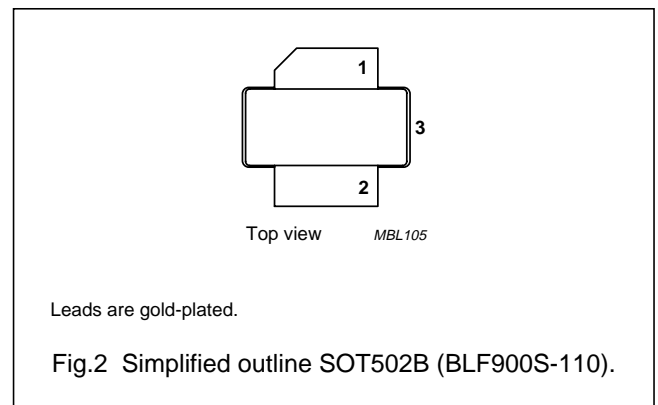
**PINNING - SOT502A**

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



**PINNING - SOT502B**

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



**QUICK REFERENCE DATA**

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

MODE OF OPERATION	f (MHz)	$V_{DS}$ (V)	$P_L$ (W)	$G_p$ (dB)	$\eta_D$ (%)	$d_3$ (dBc)	ACPR 750 (dBc)
2-tone, class-AB	$f_1 = 890.0; f_2 = 890.1$	27	100 (PEP)	17	38	-33	-
CDMA (IS95)	881.5	27	24 (AV)	15	27	-	-45

## Base station LDMOS transistors

## BLF900-110; BLF900S-110

## ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BLF900-110	–	Flanged LDMOST ceramic package; 2 mounting holes; 2 leads	SOT502A
BLF900S-110	–	Earless flanged LDMOST ceramic package; 2 leads	SOT502B

## LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
$V_{DS}$	drain-source voltage	–	75	V
$V_{GS}$	gate-source voltage	–	±15	V
$T_{stg}$	storage temperature	–65	+150	°C
$T_j$	junction temperature	–	200	°C

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-c)}$	thermal resistance from junction to case	$T_h = 25\text{ °C}$ , $P_L = 160\text{ W (AV)}$ , note 1	0.9	K/W

## Note

1. Thermal resistance is 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	$V_{GS} = 0$ ; $I_D = 3\text{ mA}$	75	–	–	V
$V_{GSth}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}$ ; $I_D = 250\text{ mA}$	4.5	–	5.5	V
$I_{DSS}$	drain-source leakage current	$V_{GS} = 0$ ; $V_{DS} = 28\text{ V}$	–	–	3	μA
$I_{DSX}$	on-state drain current	$V_{GS} = V_{GSth} + 9\text{ V}$ ; $V_{DS} = 10\text{ V}$	31	–	–	A
$I_{GSS}$	gate leakage current	$V_{GS} = \pm 15\text{ V}$ ; $V_{DS} = 0$	–	–	0.5	μA
$g_{fs}$	forward transconductance	$V_{DS} = 20\text{ V}$ ; $I_D = 7.5\text{ A}$	–	7	–	S
$R_{DSon}$	drain-source on-state resistance	$V_{GS} = V_{GSth} + 9\text{ V}$ ; $I_D = 9\text{ A}$	–	90	–	mΩ

## Base station LDMOS transistors

## BLF900-110; BLF900S-110

## APPLICATION INFORMATION

RF performance in a common source class-AB circuit.  $V_{DS} = 27$  V;  $f = 890$  MHz;  $T_h = 25$  °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Mode of operation: 2-tone CW, 100 kHz spacing, <math>I_{DQ} = 700</math> mA</b>						
$G_p$	power gain	$P_L = 100$ W (PEP)	16	17 <sup>(1)</sup>	–	dB
$\eta_D$	drain efficiency		35	38	–	%
IRL	input return loss		–	–9	<–6	dB
$d_3$	third order intermodulation distortion		–	–33	–27	dBc
	ruggedness	VSWR = 10 : 1 through all phases; $P_L = 125$ W (PEP)	no degradation in output power			
<b>Mode of operation: CDMA, IS95 (pilot, paging, sync and traffic codes 8 to 13), <math>I_{DQ} = 575</math> mA</b>						
$G_p$	power gain	$P_L = 24$ W (AV)	–	15	–	dB
$\eta_D$	drain efficiency	$P_L = 24$ W (AV)	–	27	–	%
ACPR 750	adjacent channel power ratio	at BW = 30 kHz	–	–45	–	dBc

## Note

1. Refer to RF Gain grouping table.

## RF Gain grouping

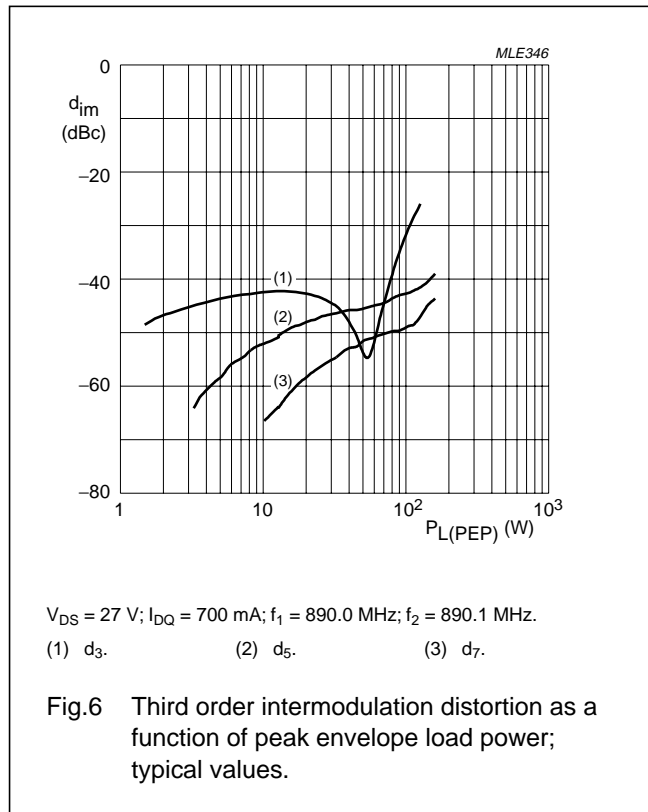
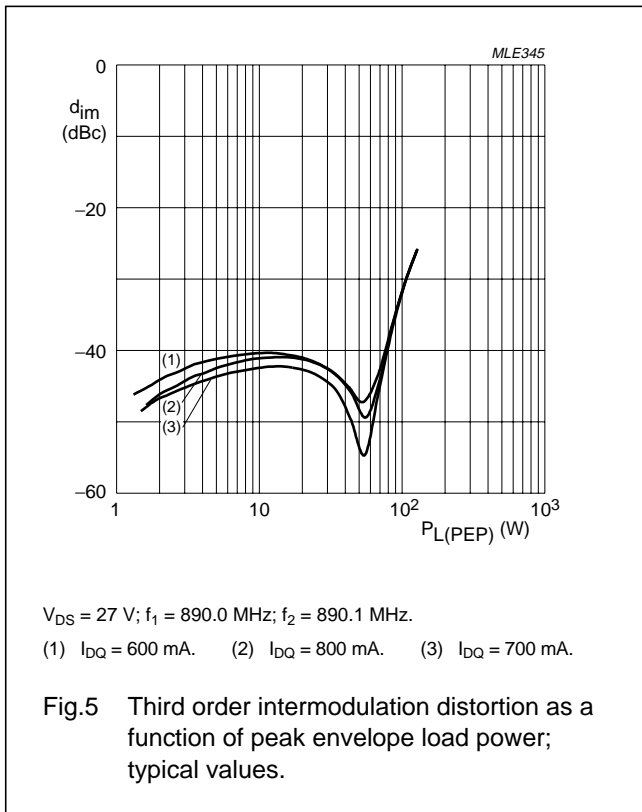
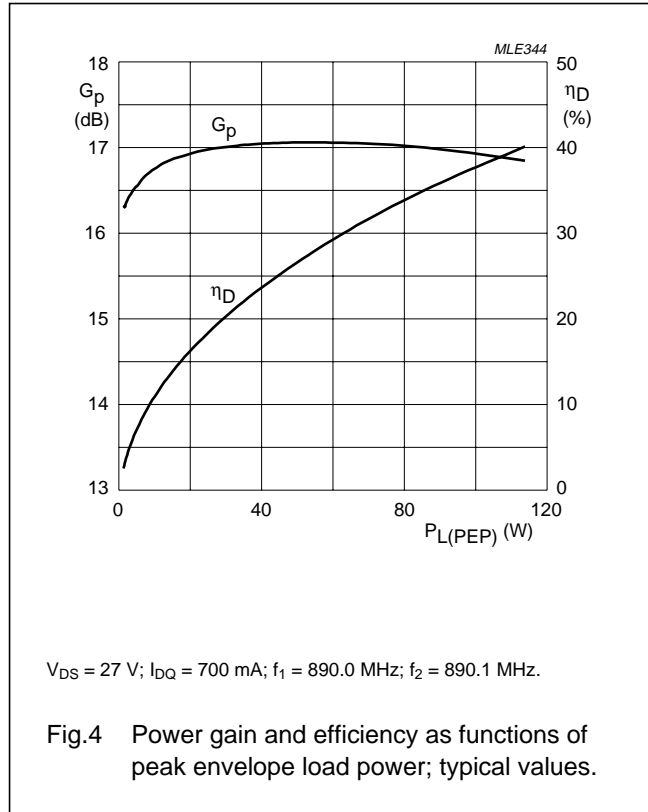
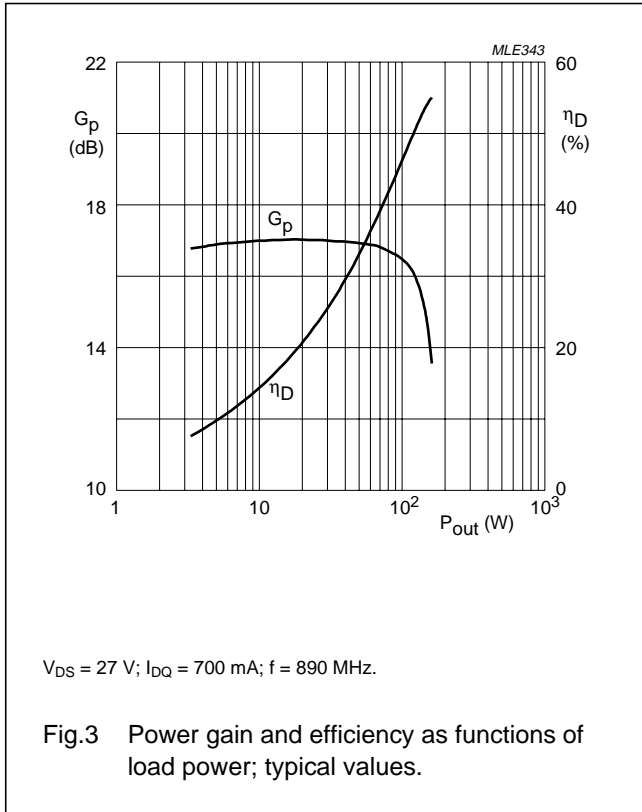
CODE <sup>(1)</sup>	GAIN <sup>(2)</sup> (dB)	
	MIN.	MAX.
B	16.0	16.5
C	16.5	17.0
D	17.0	17.5
E	17.5	18.0

## Notes

1. 0.2 dB overlap is allowed for measurement repeatability.
2. For 2-tone at  $f_1 = 890$  MHz;  $f_2 = 890.1$  MHz.

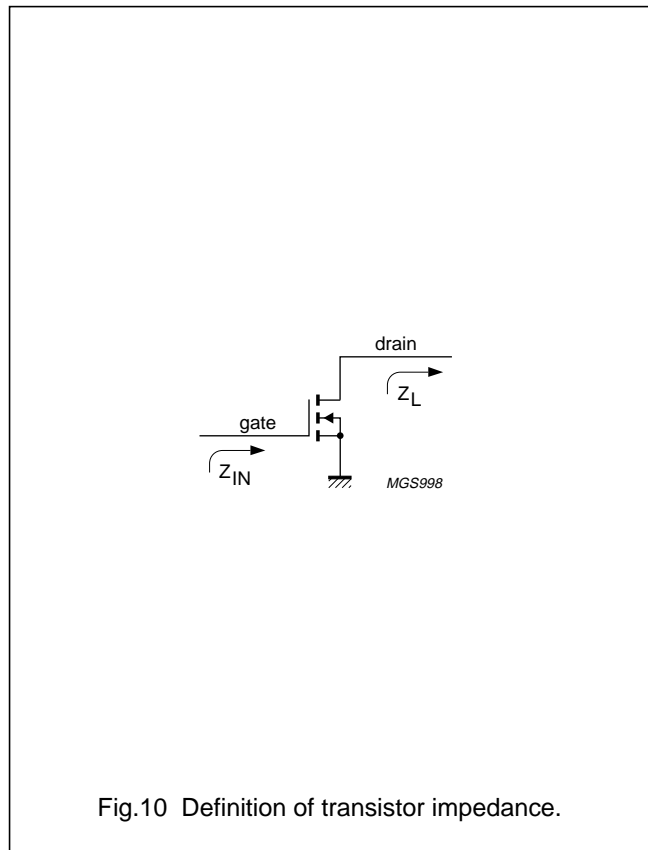
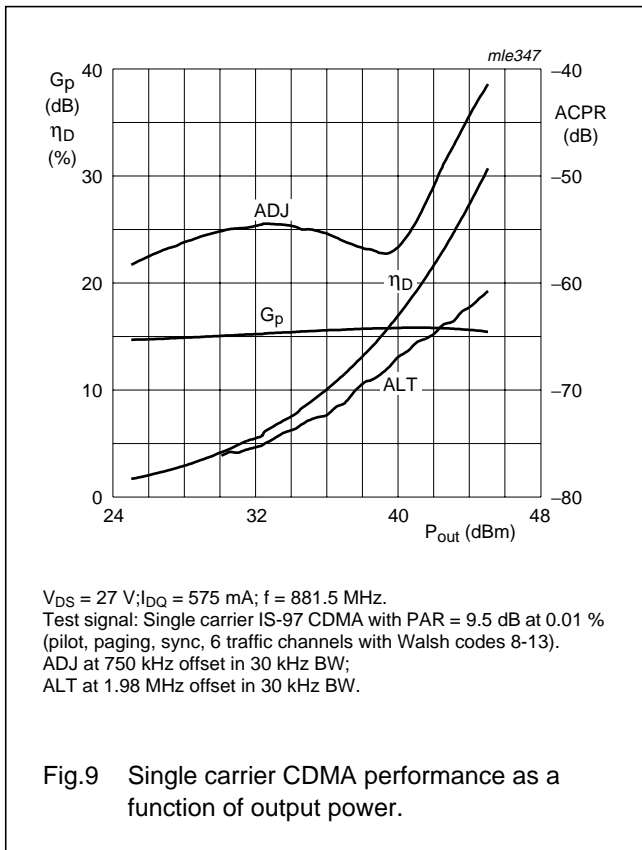
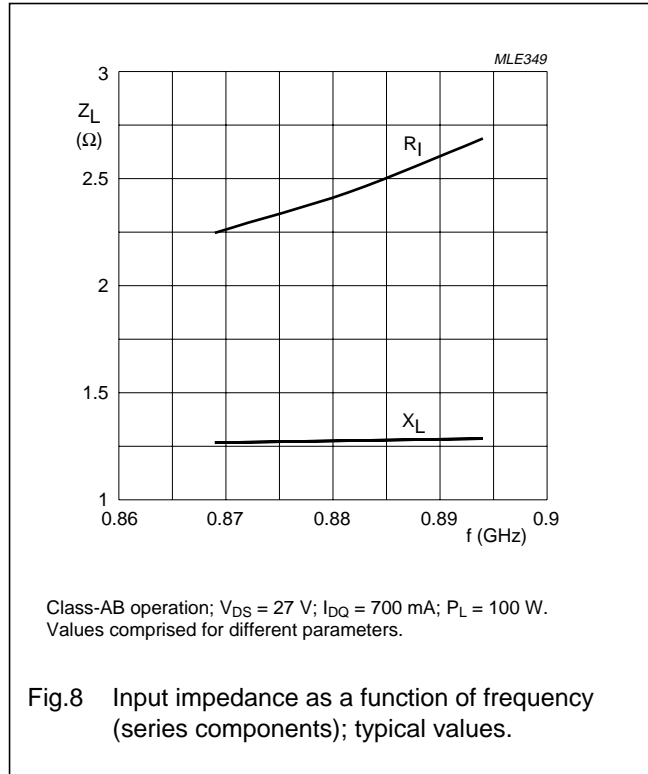
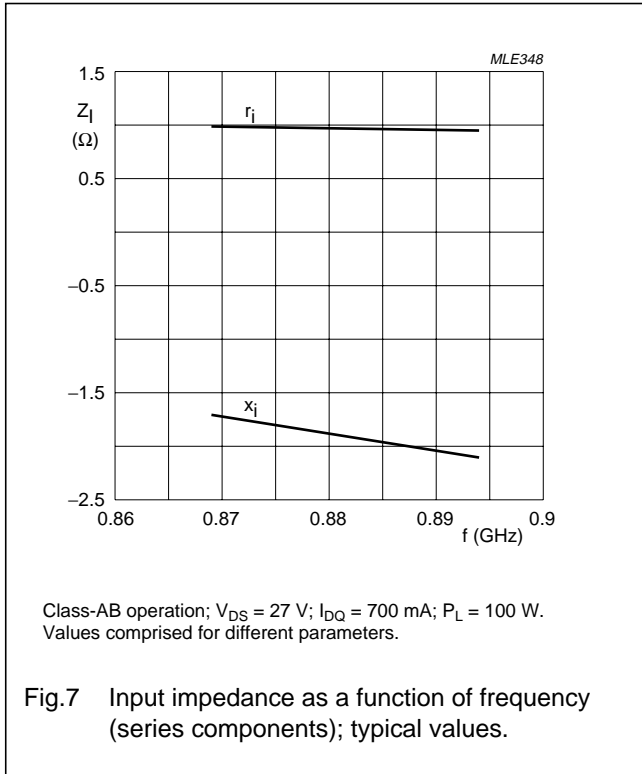
Base station LDMOS transistors

BLF900-110; BLF900S-110



Base station LDMOS transistors

BLF900-110; BLF900S-110



Base station LDMOS transistors

BLF900-110; BLF900S-110

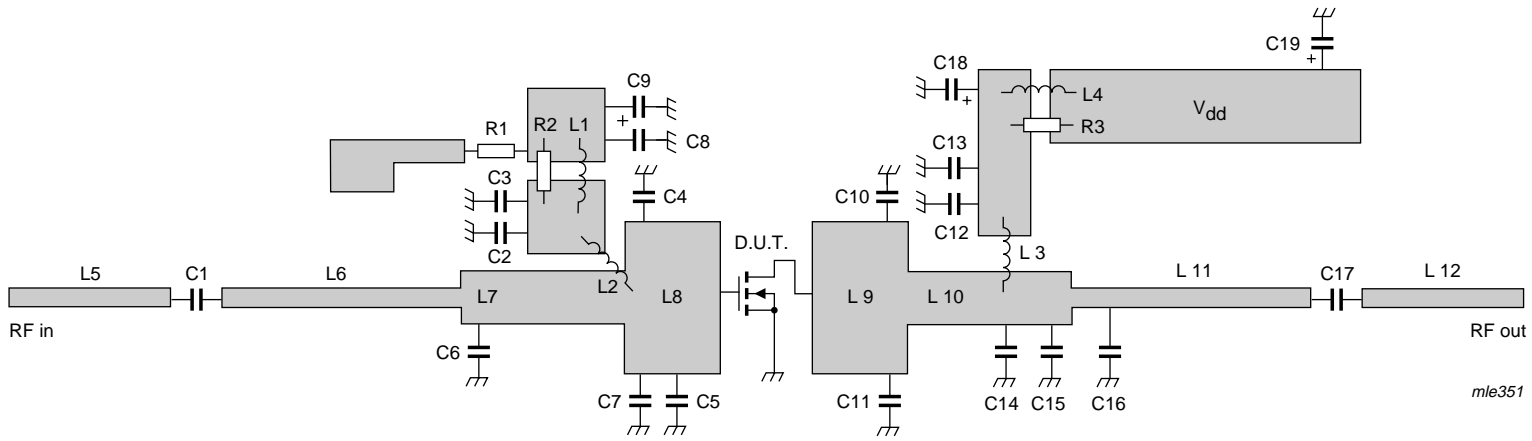
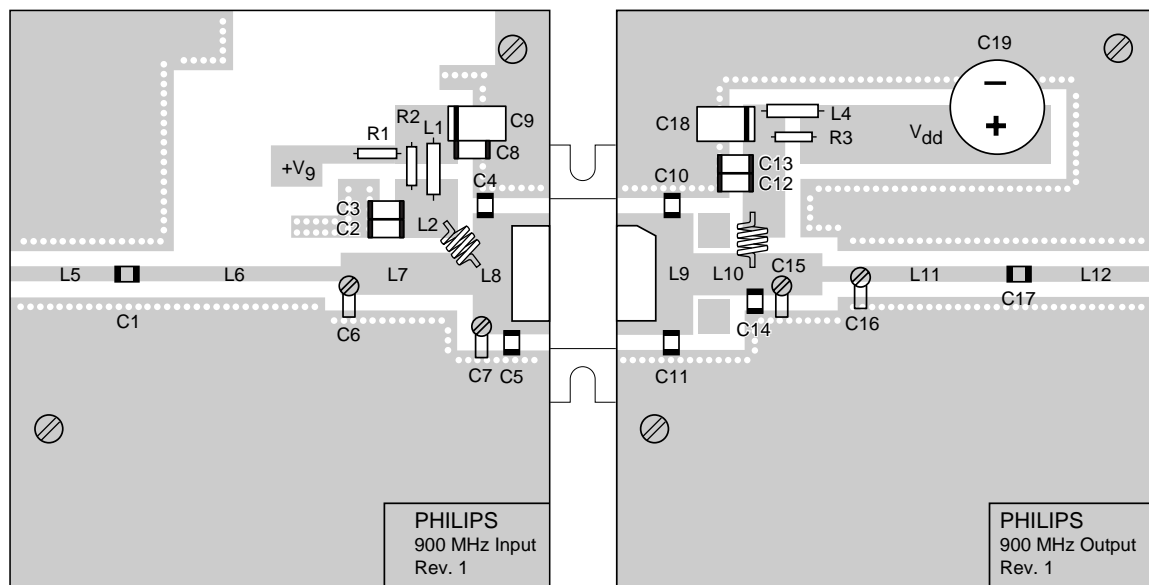
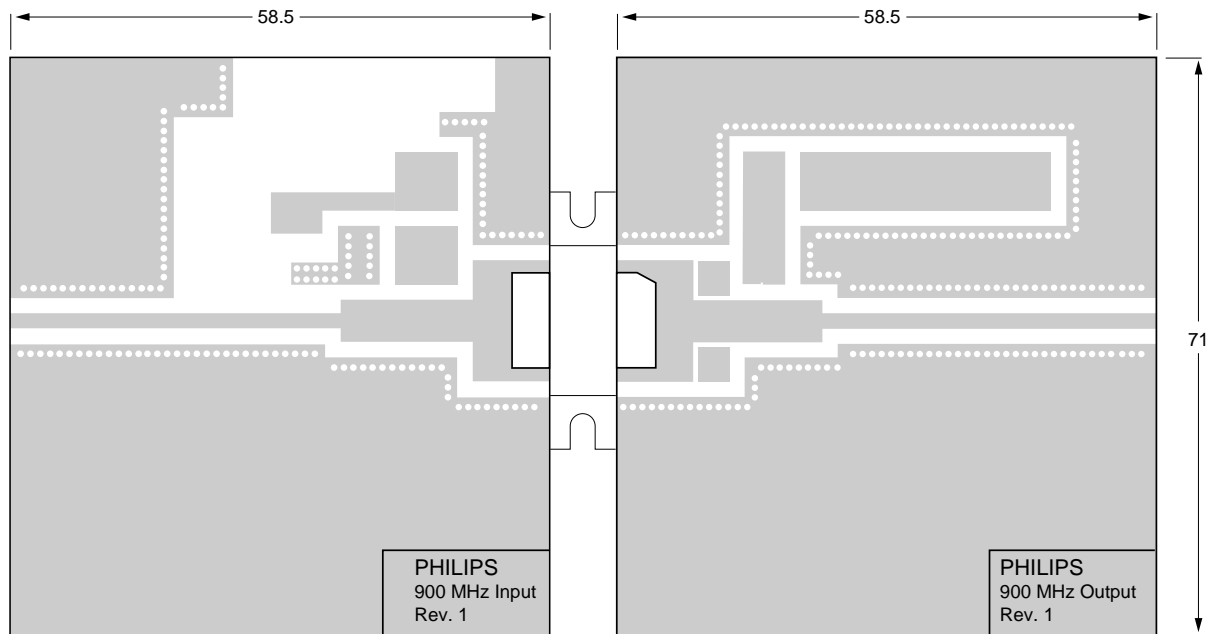


Fig.11 Test circuit for 860 to 900 MHz operation.

mle351

Base station LDMOS transistors

BLF900-110; BLF900S-110



mle350

Dimensions in mm.

The components are situated on one side of the copper-clad Ultralam 2000 printed-circuit board ( $\epsilon_r = 2.5$ ); thickness = 31 mm. The other side is unetched and serves as a ground plane.

Fig.12 Component layout for 860 to 900 MHz test circuit.



## Base station LDMOS transistors

## BLF900-110; BLF900S-110

## List of components (see Figs 11 and 12)

COMPONENT	DESCRIPTION	VALUE	DIMENSIONS
C1	multilayer ceramic chip capacitor; note 1	30 pF	
C2, C12	multilayer ceramic chip capacitor; note 1	47 pF	
C3, C13	multilayer ceramic chip capacitor; note 1	300 pF	
C4	multilayer ceramic chip capacitor; note 1	10 pF	
C5	multilayer ceramic chip capacitor; note 1	3 pF	
C6, C7, C15	trimmer capacitors (Tekelec); note 2	0.8 to 8 pF	
C8	multilayer ceramic chip capacitor; note 1	20 nF	
C9	tantalum capacitor	10 $\mu$ F; 35 V	
C10, C11	multilayer ceramic chip capacitor; note 1	13 pF	
C14	multilayer ceramic chip capacitor; note 1	8.2 pF	
C16	trimmer capacitor	0.5 to 4.5 pF	
C17	multilayer ceramic chip capacitor; note 1	56 pF	
C18	tantalum capacitor; low ESR	10 $\mu$ F; 35 V	
C19	electrolytic capacitor	220 $\mu$ F; 40 V	
L1	ferrite bead (long)	grade 4S2	
L2	3 turn ind. copper wire		1 mm; int dia = 4.5 mm
L3	4 turn ind. copper wire		1 mm; int dia = 3 mm
L4	ferrite bead (short)	grade 4S2	
L5	stripline; note 3	$Z_0 = 50 \Omega$	2 x 17.2 mm
L6	stripline; note 3	$Z_0 = 50 \Omega$	2 x 25.4 mm
L7	stripline; note 3	$Z_0 = 50 \Omega$	5.6 x 17.4 mm
L8	stripline; note 3	$Z_0 = 50 \Omega$	16 x 10.2 mm
L9	stripline; note 3	$Z_0 = 10 \Omega$	16 x 10.2 mm
L10	stripline; note 3	$Z_0 = 25 \Omega$	5.6 x 17.4 mm
L11	stripline; note 3	$Z_0 = 50 \Omega$	2 x 25.4 mm
L12	stripline; note 3	$Z_0 = 50 \Omega$	2 x 17.2 mm
R1	SMD resistor	8.2 $\Omega$ , 0.1 W	
R2	SMD resistor	4.7 $\Omega$ , 0.1 W	
R3	metal film resistor	10 $\Omega$ , 0.6 W	

## Notes

1. American Technical Ceramics type 100A or capacitor of same quality.
2. Mounted flat.
3. Striplines are on a double copper-clad Ultralam 2000 printed-circuit board ( $\epsilon_r = 2.5$ ); thickness = 0.31 mm.

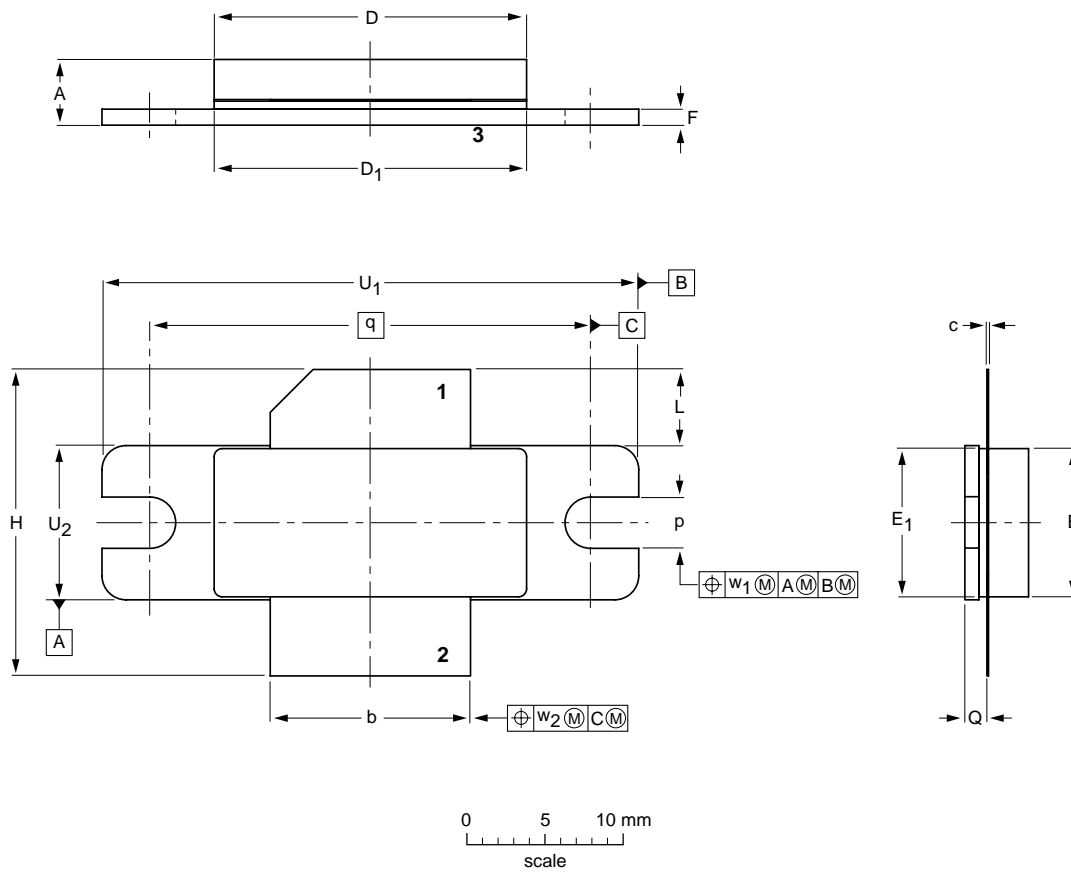
Base station LDMOS transistors

BLF900-110; BLF900S-110

PACKAGE OUTLINES

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

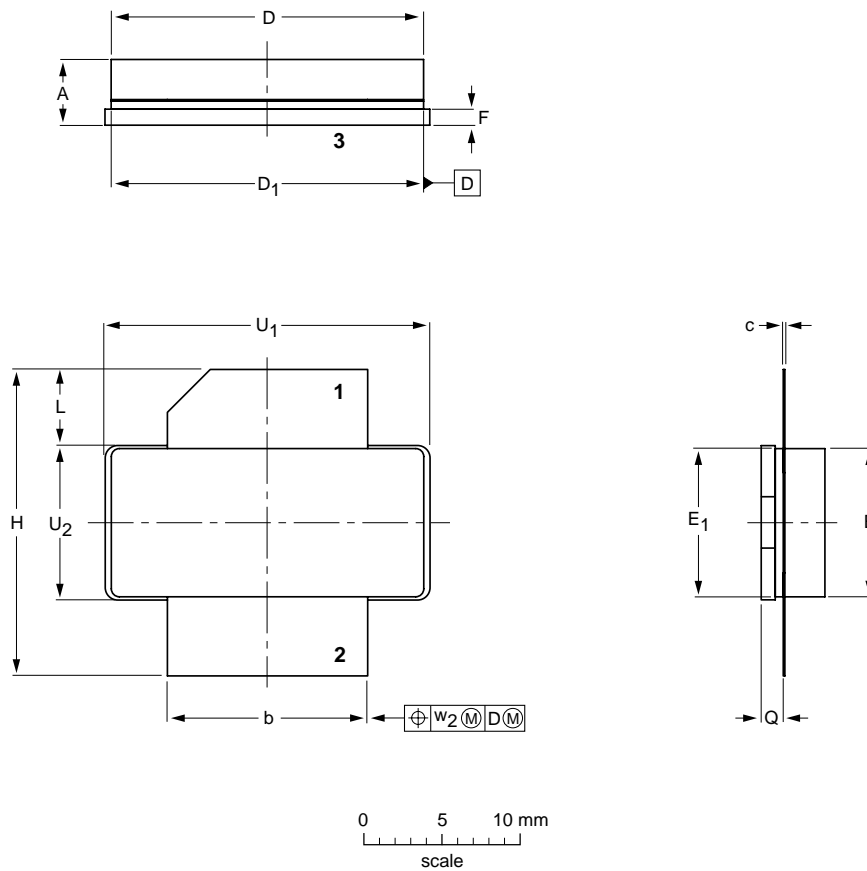
OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT502A					99-12-28 03-01-10

Base station LDMOS transistors

BLF900-110; BLF900S-110

Earless flanged LDMOST ceramic package; 2 leads

SOT502B



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	Q	U <sub>1</sub>	U <sub>2</sub>	w <sub>2</sub>
mm	4.72	12.83	0.15	20.02	19.96	9.50	9.53	1.14	19.94	5.33	1.70	20.70	9.91	0.25
	3.43	12.57	0.08	19.61	19.66	9.30	9.25	0.89	18.92	4.32	1.45	20.45	9.65	
inches	0.186	0.505	0.006	0.788	0.786	0.374	0.375	0.045	0.785	0.210	0.067	0.815	0.390	0.010
	0.135	0.495	0.003	0.772	0.774	0.366	0.364	0.035	0.745	0.170	0.057	0.805	0.380	

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT502B						99-12-28-03-01-10

## Base station LDMOS transistors

## BLF900-110; BLF900S-110

## DATA SHEET STATUS

LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)(3)</sup>	DEFINITION
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