

# BLF573; BLF573S

HF / VHF power LDMOS transistor

Rev. 3 — 8 July 2010

Product data sheet

## 1. Product profile

### 1.1 General description

A 300 W LDMOS RF power transistor for broadcast applications and industrial, scientific and medical applications in the HF to 500 MHz band.

Table 1. Production test information

Mode of operation	f (MHz)	V <sub>DS</sub> (V)	P <sub>L</sub> (W)	G <sub>p</sub> (dB)	η <sub>D</sub> (%)
CW	225	50	300	27.2	70

#### CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

### 1.2 Features and benefits

- Typical CW performance at frequency of 225 MHz, a supply voltage of 50 V and an I<sub>Dq</sub> of 900 mA:
  - ◆ Average output power = 300 W
  - ◆ Power gain = 27.2 dB
  - ◆ Efficiency = 70 %
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (HF and VHF band)
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

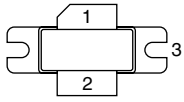
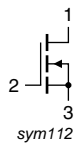
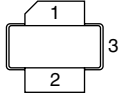
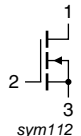
### 1.3 Applications

- Industrial, scientific and medical applications
- Broadcast transmitter applications



## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
<b>BLF573 (SOT502A)</b>			
1	drain		 sym112
2	gate		
3	source		
<b>BLF573S (SOT502B)</b>			
1	drain		 sym112
2	gate		
3	source		

[1] Connected to flange.

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF573	-	flanged LDMOST ceramic package; 2 mounting holes; 2 leads	SOT502A
BLF573S	-	earless flanged LDMOST ceramic package, 2 leads	SOT502B

## 4. Limiting values

Table 4. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{DS}$	drain-source voltage		-	110	V
$V_{GS}$	gate-source voltage		-0.5	+11	V
$I_D$	drain current		-	42	A
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	junction temperature		-	225	°C

## 5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit	
$R_{th(j-c)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C}; P_L = 300\text{ W}$	[1]	0.21	K/W

[1]  $R_{th(j-c)}$  is measured under RF conditions.

## 6. Characteristics

**Table 6. DC characteristics**

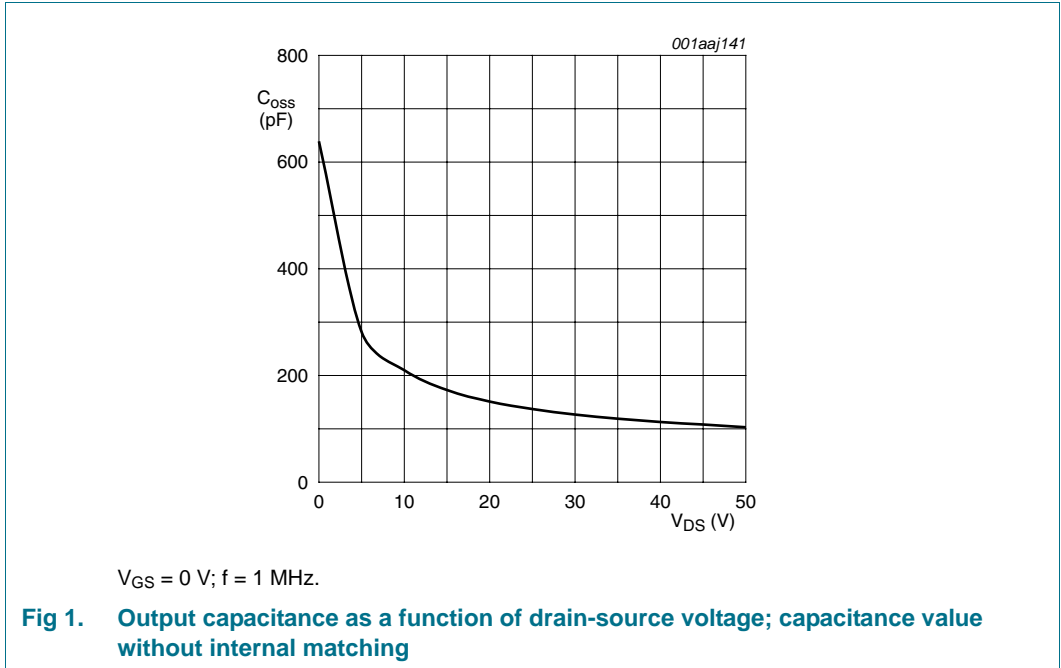
$T_j = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 3.75\text{ mA}$	110	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 375\text{ mA}$	1.25	1.7	2.25	V
$V_{GSq}$	gate-source quiescent voltage	$V_{DS} = 50\text{ V}; I_D = 900\text{ mA}$	1.45	1.95	2.45	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V}$	-	-	4.2	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $V_{DS} = 10\text{ V}$	44	56	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	420	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 18.75\text{ A}$	-	20	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $I_D = 12.49\text{ A}$	-	0.09	-	$\Omega$
$C_{rs}$	feedback capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V};$ $f = 1\text{ MHz}$	-	2.3	-	pF
$C_{iss}$	input capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V};$ $f = 1\text{ MHz}$	-	300	-	pF
$C_{oss}$	output capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V};$ $f = 1\text{ MHz}$	-	103	-	pF

**Table 7. RF characteristics**

Mode of operation: CW;  $f = 225\text{ MHz}$ ; RF performance at  $V_{DS} = 50\text{ V}; I_{Dq} = 900\text{ mA}; T_{case} = 25\text{ °C}$ ; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$P_L = 300\text{ W}$	26	27.2	28.4	dB
$RL_{in}$	input return loss	$P_L = 300\text{ W}$	10	13	-	dB
$\eta_D$	drain efficiency	$P_L = 300\text{ W}$	67	70	-	%



**6.1 Ruggedness in class-AB operation**

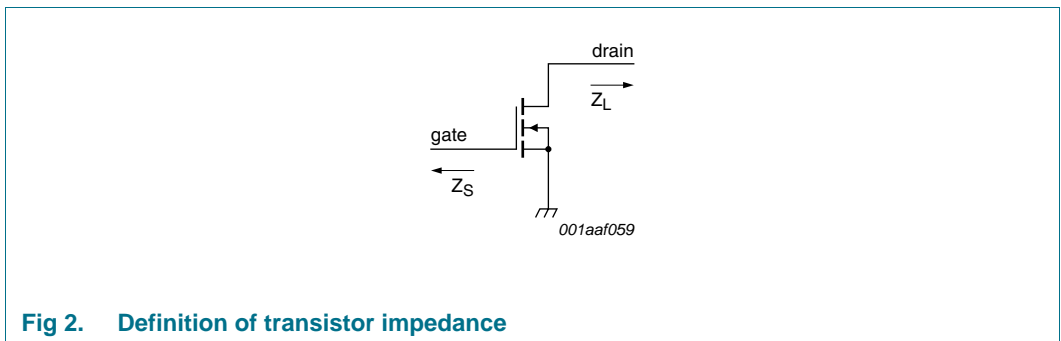
The BLF573 and BLF573S are capable of withstanding a load mismatch corresponding to VSWR = 13 : 1 through all phases under the following conditions: V<sub>DS</sub> = 50 V; I<sub>Dq</sub> = 900 mA; P<sub>L</sub> = 300 W; f = 225 MHz.

**7. Application information**

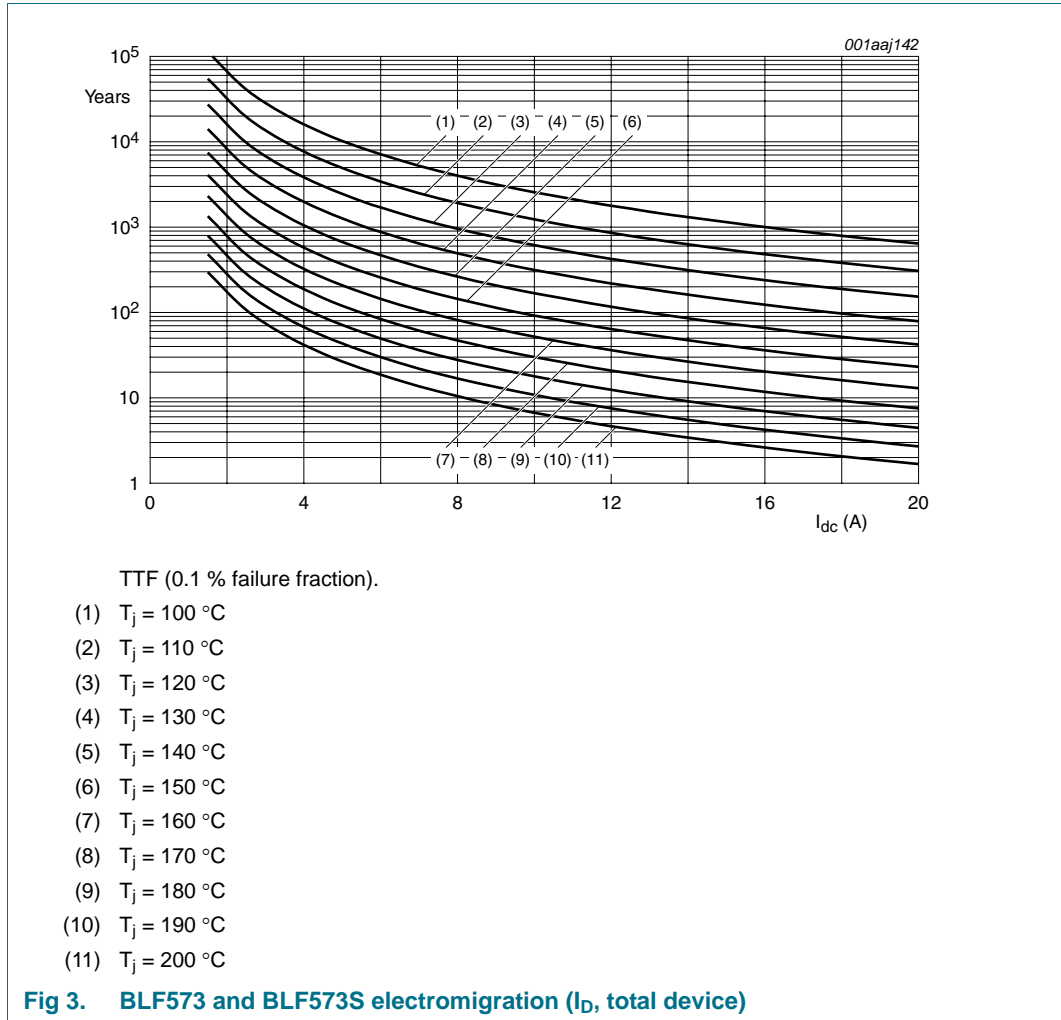
**7.1 Impedance information**

**Table 8. Typical impedance**  
Measured Z<sub>S</sub> and Z<sub>L</sub> test circuit impedances.

f	Z <sub>S</sub>	Z <sub>L</sub>
MHz	Ω	Ω
225	0.7 + j2.0	1.95 + j2.0



**7.2 Reliability**

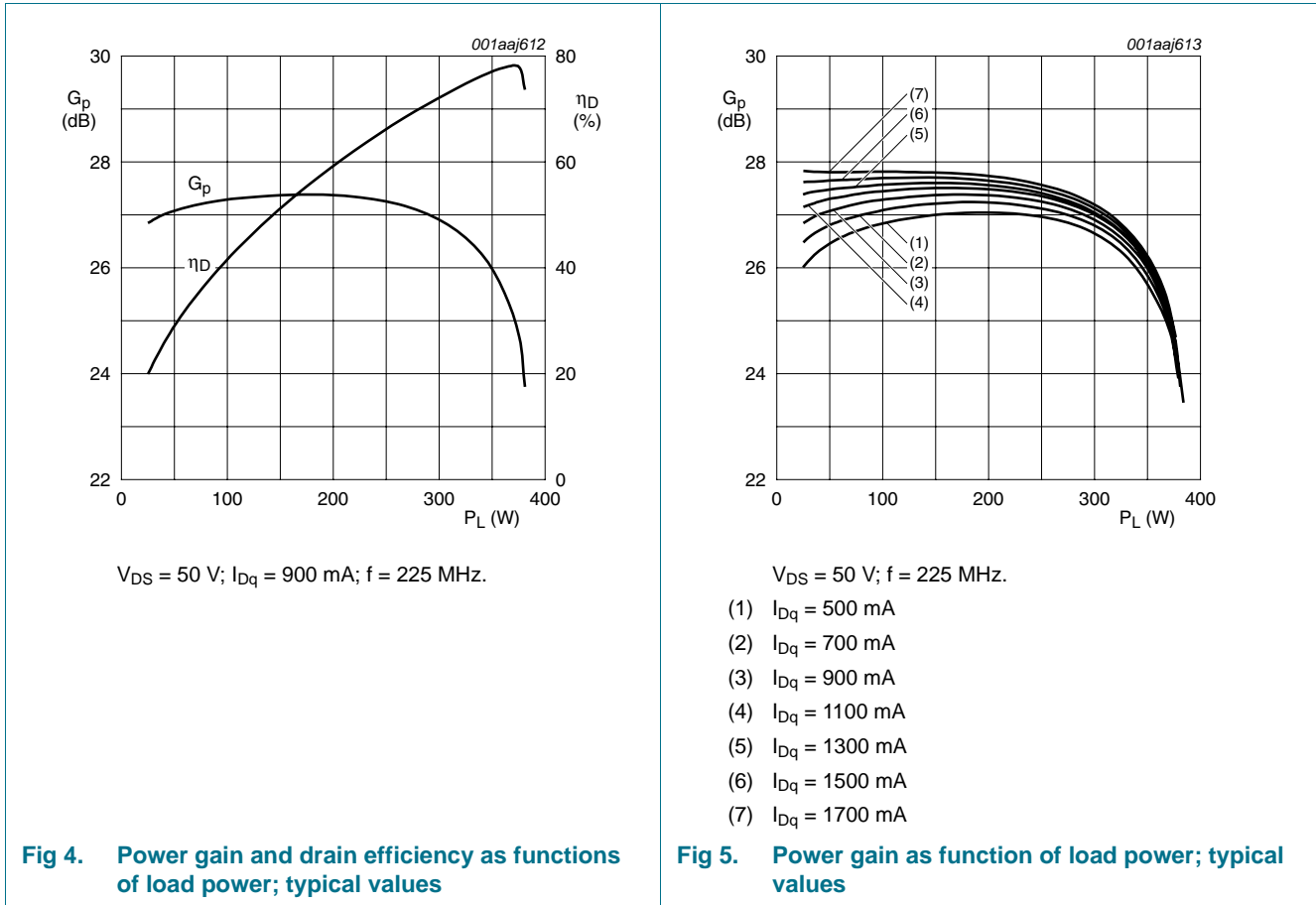


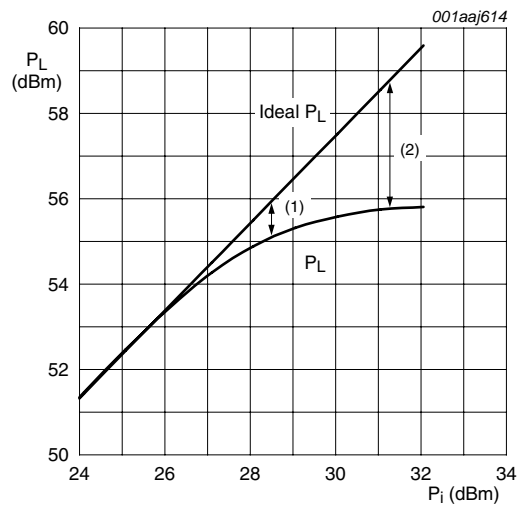
**8. Test information**

**8.1 RF Performance**

The following figures are measured in a class-AB production test circuit.

**8.1.1 1-Tone CW**



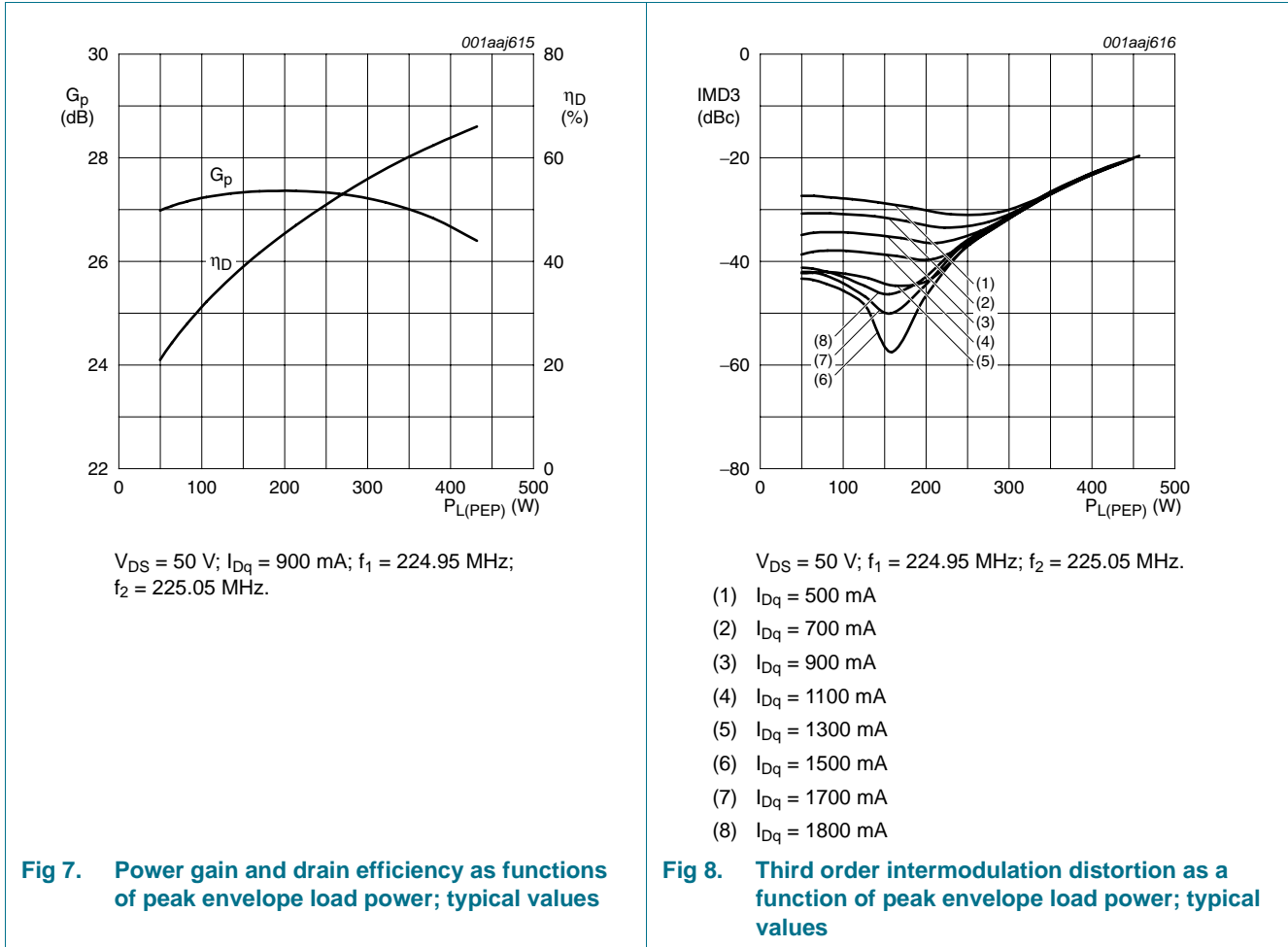


$V_{DS} = 50\text{ V}$ ;  $I_{Dq} = 900\text{ mA}$ ;  $f = 225\text{ MHz}$ .

- (1)  $P_{L(1dB)} = 55.2\text{ dBm}$  (330 W)
- (2)  $P_{L(3dB)} = 55.8\text{ dBm}$  (380 W)

**Fig 6. Load power as function of input power; typical values**

**8.1.2 2-Tone CW**



**8.2 Test circuit**

**Table 9. List of components**

For production test circuit, see [Figure 9](#) and [Figure 10](#).

Printed-Circuit Board (PCB): Rogers 5880;  $\epsilon_r = 2.2$  F/m; height = 0.79 mm; Cu (top/bottom metallization); thickness copper plating = 35  $\mu$ m.

Component	Description	Value	Remarks
B1	ferrite SMD bead	100 $\Omega$ ; 100 MHz	Ferroxcube BDS3/3/8.9-4S2 or equivalent
C1, C18	multilayer ceramic chip capacitor	100 pF	[1]
C2	multilayer ceramic chip capacitor	39 pF	[1]
C3, C4	multilayer ceramic chip capacitor	180 pF	[1]
C5, C6, C7	multilayer ceramic chip capacitor	220 pF	[1]
C8, C20	multilayer ceramic chip capacitor	1 nF	[1]
C9	multilayer ceramic chip capacitor	4.7 $\mu$ F	TDK C4532X7R1E475MT020U or equivalent
C10	multilayer ceramic chip capacitor	30 pF	[1]
C11, C12, C13	multilayer ceramic chip capacitor	51 pF	[1]
C14	multilayer ceramic chip capacitor	43 pF	[1]



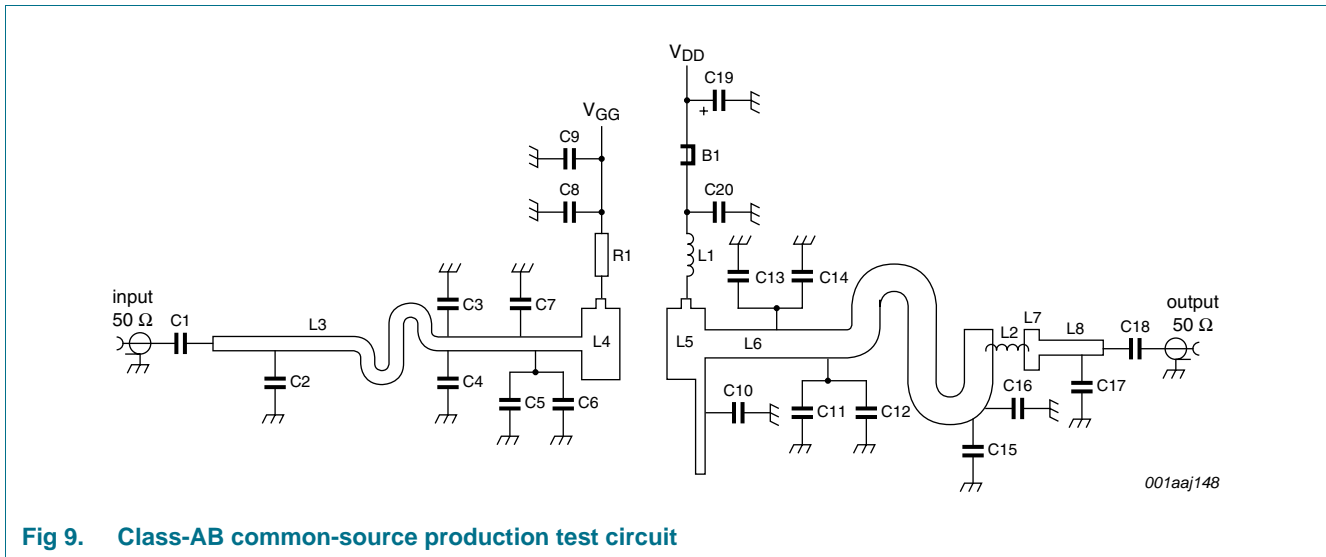
**Table 9. List of components ...continued**

For production test circuit, see [Figure 9](#) and [Figure 10](#).

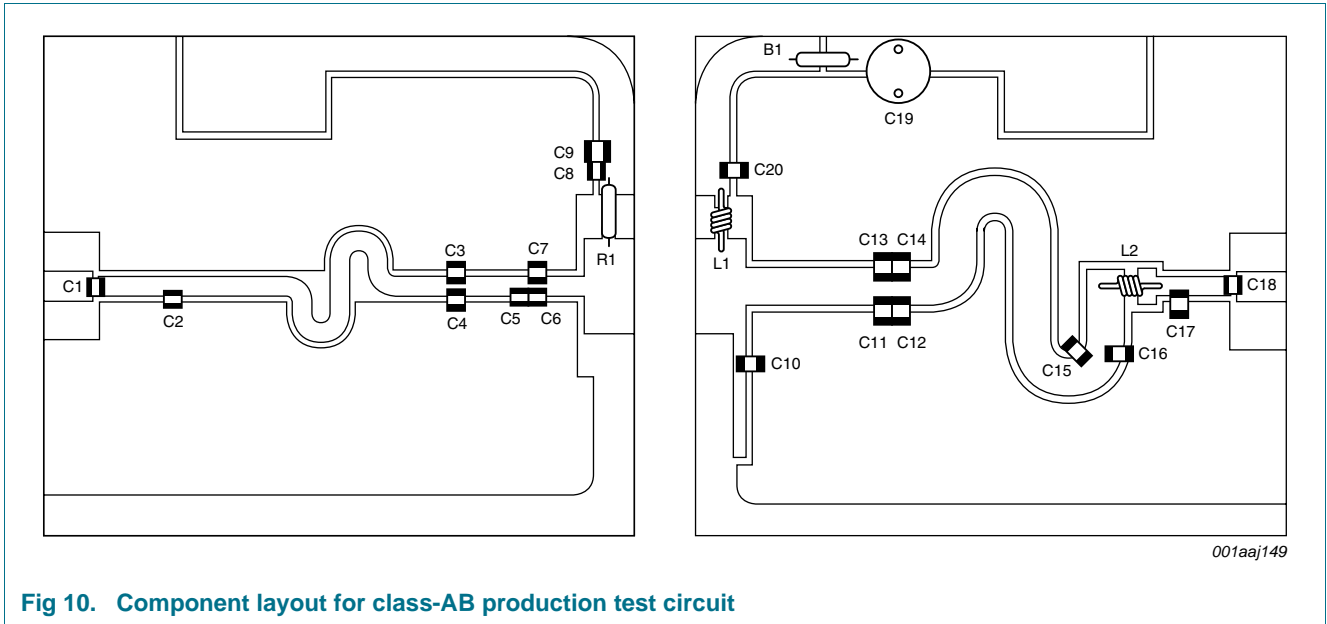
Printed-Circuit Board (PCB): Rogers 5880;  $\epsilon_r = 2.2$  F/m; height = 0.79 mm; Cu (top/bottom metallization); thickness copper plating = 35  $\mu\text{m}$ .

Component	Description	Value	Remarks
C15	multilayer ceramic chip capacitor	33 pF	[1]
C16	multilayer ceramic chip capacitor	36 pF	[1]
C17	multilayer ceramic chip capacitor	16 pF	[1]
C19	electrolytic capacitor	220 $\mu\text{F}$ ; 63 V	
L1	2 turns enamelled copper wire	D = 3 mm; d = 1 mm; length = 2 mm; leads = 2 $\times$ 6 mm	
L2	4 turns enamelled copper wire	D = 2 mm; d = 1 mm; length = 13 mm; leads = 2 $\times$ 5 mm	
L3	stripline	-	(L $\times$ W) 96 mm $\times$ 3 mm
L4, L5	stripline	-	(L $\times$ W) 15 mm $\times$ 8 mm
L6	stripline	-	(L $\times$ W) 105 mm $\times$ 6 mm
L7	stripline	-	(L $\times$ W) 3 mm $\times$ 6 mm
L8	stripline	-	(L $\times$ W) 12 mm $\times$ 6 mm
R1	metal film resistor	100 $\Omega$ ; 0.6 W	

[1] American Technical Ceramics type 100B or capacitor of same quality.



**Fig 9. Class-AB common-source production test circuit**



**9. Package outline**

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads

SOT502A

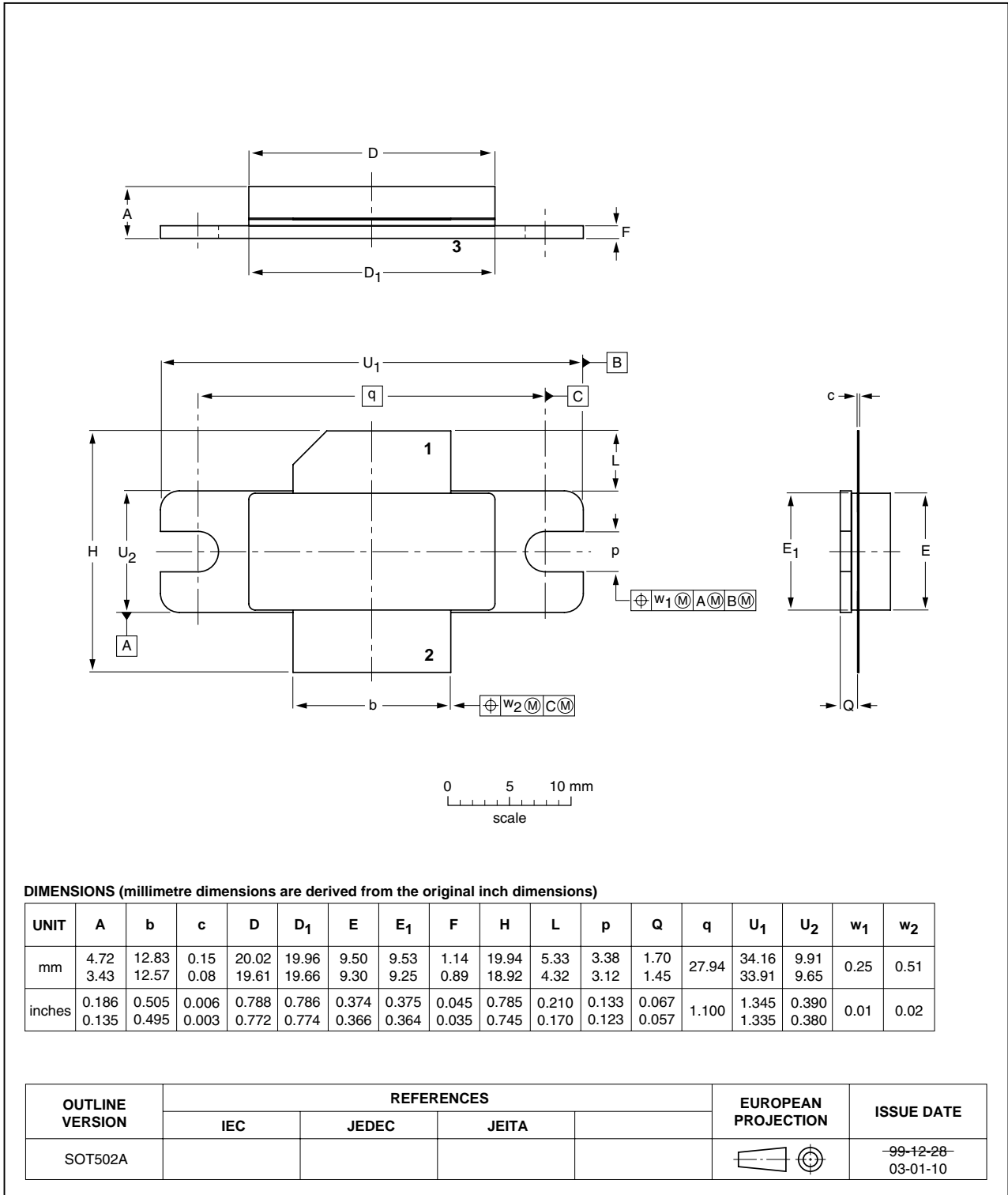


Fig 11. Package outline SOT502A

Earless flanged LDMOST ceramic package; 2 leads

SOT502B

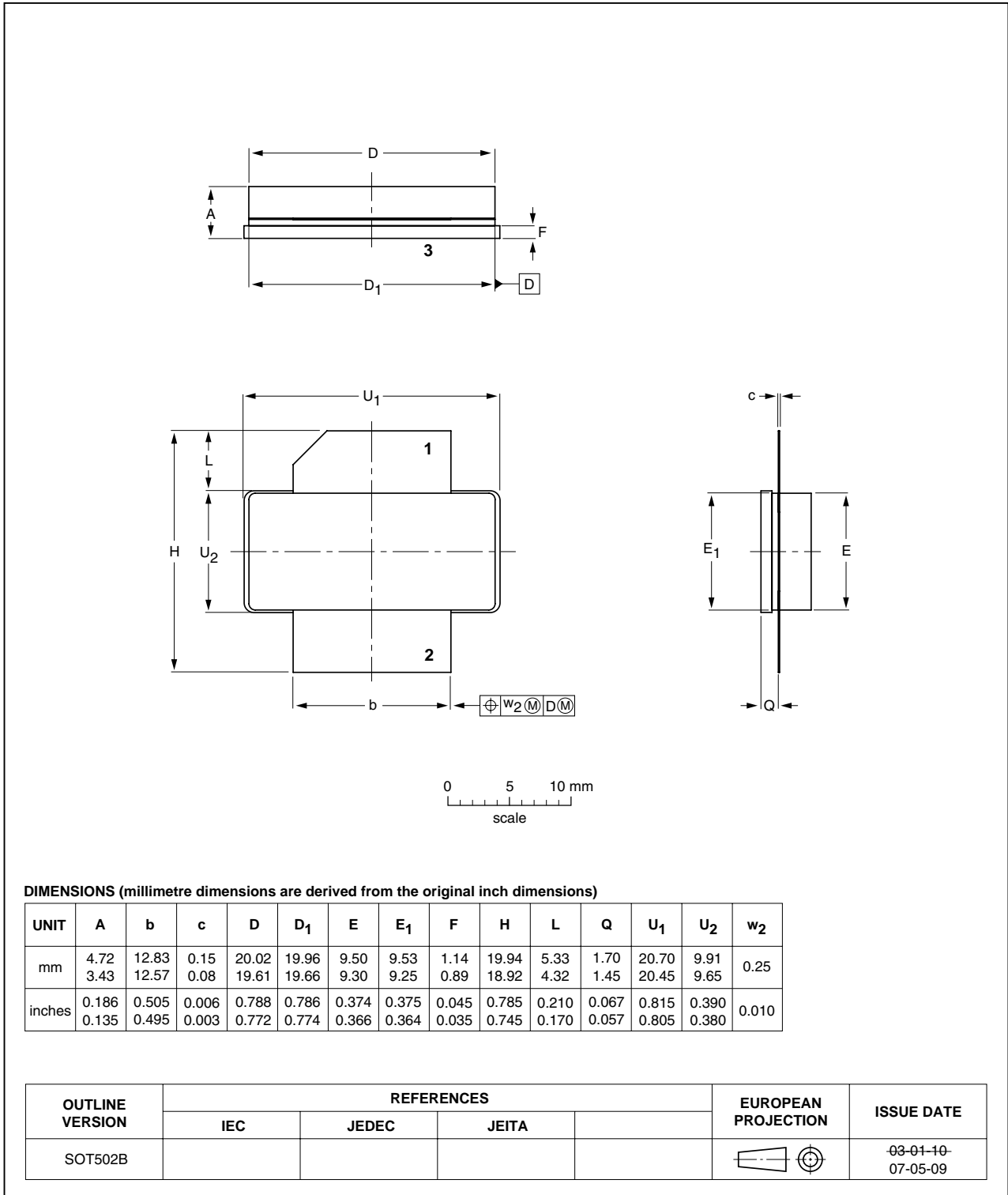


Fig 12. Package outline SOT502B

## 10. Abbreviations

**Table 10. Abbreviations**

Acronym	Description
CW	Continuous Wave
EDGE	Enhanced Data rates for GSM Evolution
GSM	Global System for Mobile communications
HF	High Frequency
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
LDMOST	Laterally Diffused Metal-Oxide Semiconductor Transistor
RF	Radio Frequency
SMD	Surface Mount Device
TTF	Time To Failure
VHF	Very High Frequency
VSWR	Voltage Standing-Wave Ratio

## 11. Revision history

**Table 11. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF573_BLF573S v.3	20100708	Product data sheet	-	BLF573S v.2
Modifications:	<ul style="list-style-type: none"> <li>The document now describes both the eared and earless version of this product: BLF573 and BLF573S respectively.</li> </ul>			
BLF573S v.2	20090217	Product data sheet	-	BLF573S v.1
BLF573S v.1	20081208	Preliminary data sheet	-	-

## 12. Legal information

### 12.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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