

BLF571

HF / VHF power LDMOS transistor

Rev. 02 — 24 February 2009

Product data sheet

1. Product profile

1.1 General description

A 20 W LDMOS RF transistor for broadcast applications and industrial applications in the HF and VHF band.

Table 1. Production test performance

Mode of operation	f (MHz)	V _{DS} (V)	P _L (W)	G _p (dB)	η _D (%)
CW	225	50	20	27.5	70

CAUTION



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

1.2 Features

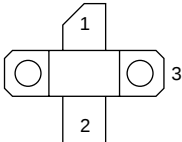
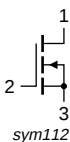
- Typical CW performance at frequency of 225 MHz, a supply voltage of 50 V and an I_{DQ} of 50 mA:
 - ◆ Average output power = 20 W
 - ◆ Power gain = 27.5 dB
 - ◆ Efficiency = 70 %
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (10 MHz to 500 MHz)
- 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
1	drain		
2	gate		
3	source		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF571	-	flanged LDMOST ceramic package; 2 mounting holes; 2 leads	SOT467C

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		-	3.6	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	$T_{case} = 80\text{ °C}$; $P_L = 20\text{ W}$	2.9	K/W

6. Characteristics

Table 6. DC characteristics

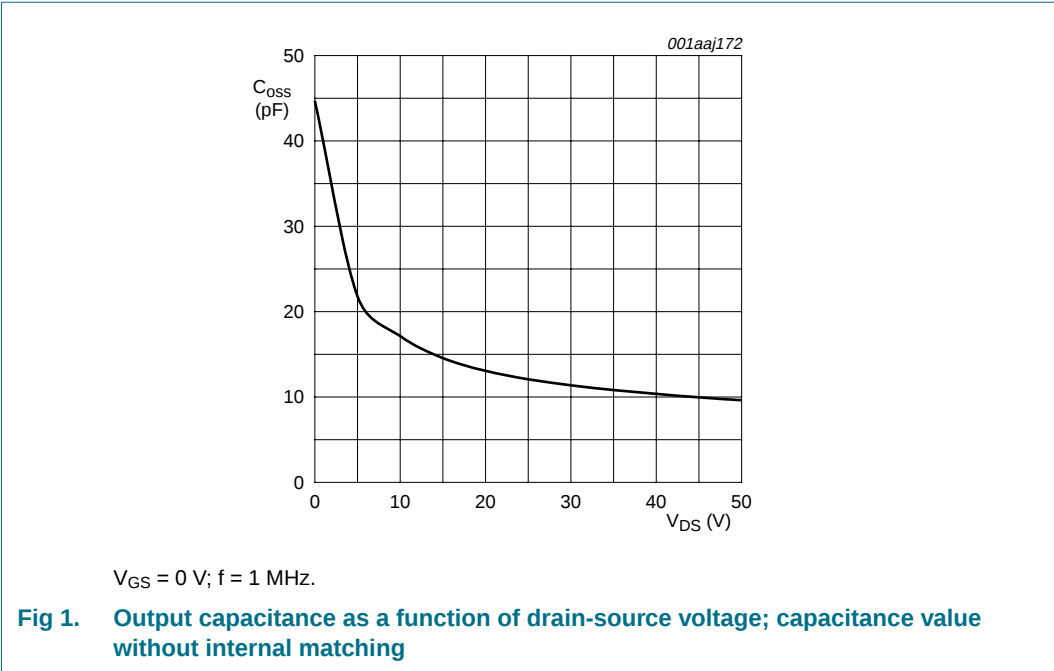
$T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 0.25\text{ mA}$	110	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 25\text{ mA}$	1.25	1.7	2.25	V
V_{GSq}	gate-source quiescent voltage	$V_{DS} = 50\text{ V}; I_D = 50\text{ mA}$	1.25	1.75	2.25	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V}$	-	-	1.4	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	3.0	3.6	-	A
I_{GSS}	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	140	nA
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 1.25\text{ A}$	-	1.8	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 833\text{ mA}$	-	1.34	-	Ω
C_{rs}	feedback capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V}; f = 1\text{ MHz}$	-	0.18	-	pF
C_{iss}	input capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V}; f = 1\text{ MHz}$	-	22.9	-	pF
C_{oss}	output capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V}; f = 1\text{ MHz}$	-	9.64	-	pF

Table 7. RF characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$P_L = 20\text{ W}$	25.5	27.5	29.5	dB
RL_{in}	input return loss	$P_L = 20\text{ W}$	10	13	-	dB
η_D	drain efficiency	$P_L = 20\text{ W}$	67	70	-	%



6.1 Ruggedness in class-AB operation

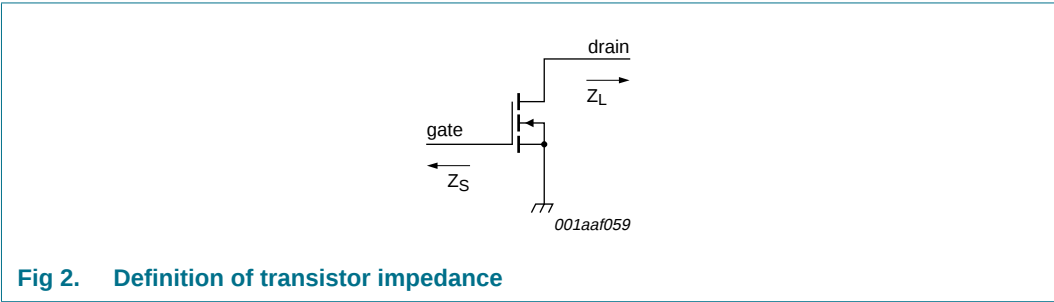
The BLF571 is capable of withstanding a load mismatch corresponding to VSWR = 13 : 1 through all phases under the following conditions: $V_{DS} = 50\text{ V}$; $I_{Dq} = 50\text{ mA}$; $P_L = 20\text{ W}$; $f = 225\text{ MHz}$.

7. Application information

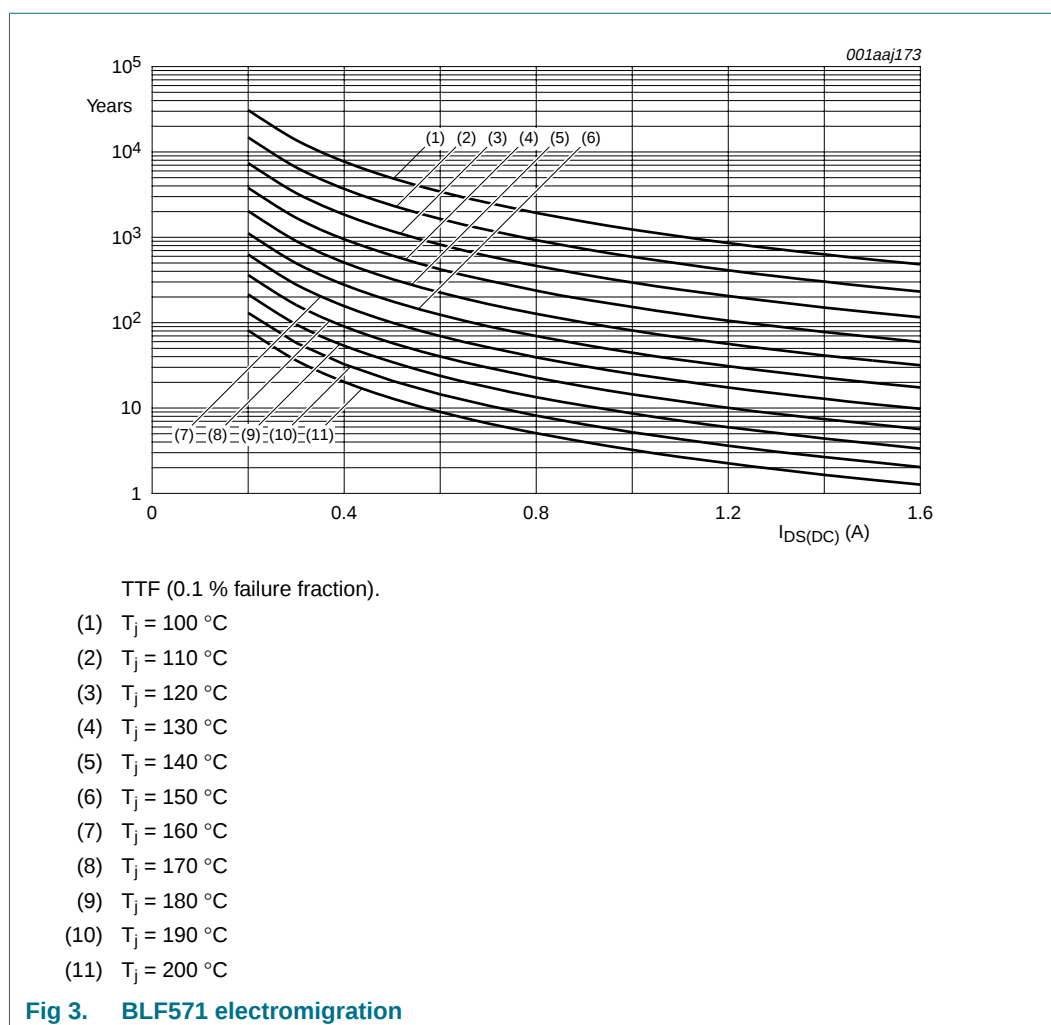
7.1 Impedance information

Table 8. Typical impedance
Simulated Z_S and Z_L test circuit impedances.

f	Z_S	Z_L
MHz	Ω	Ω
225	$9.7 + j31.5$	$31.7 + j29.3$



7.2 Reliability

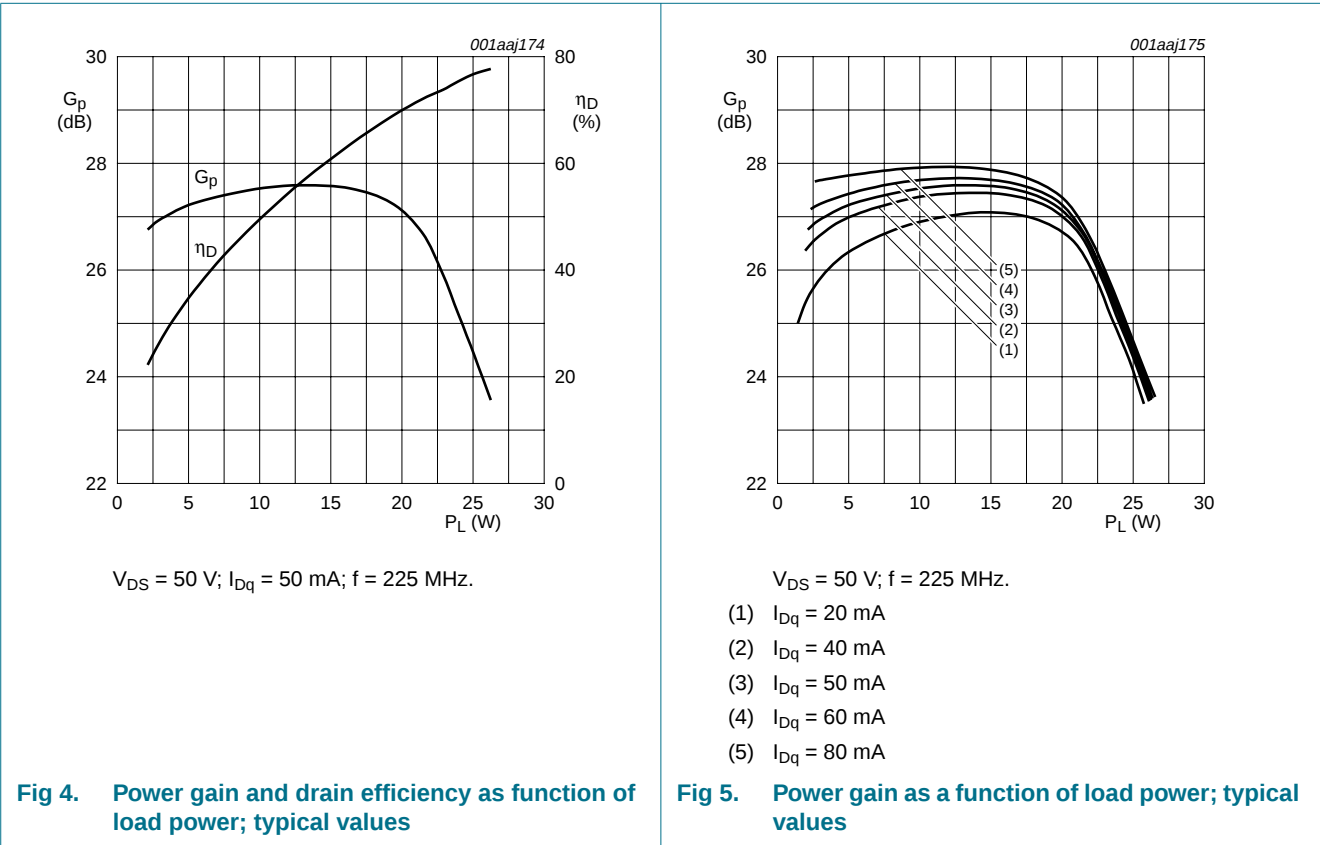


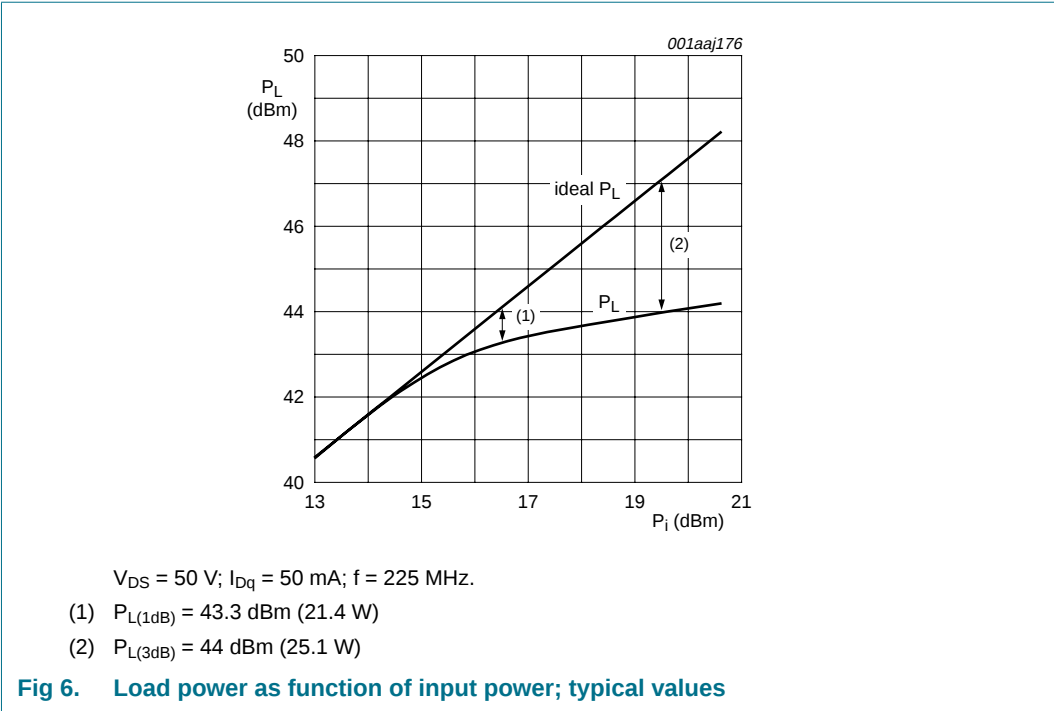
8. Test information

8.1 RF performance

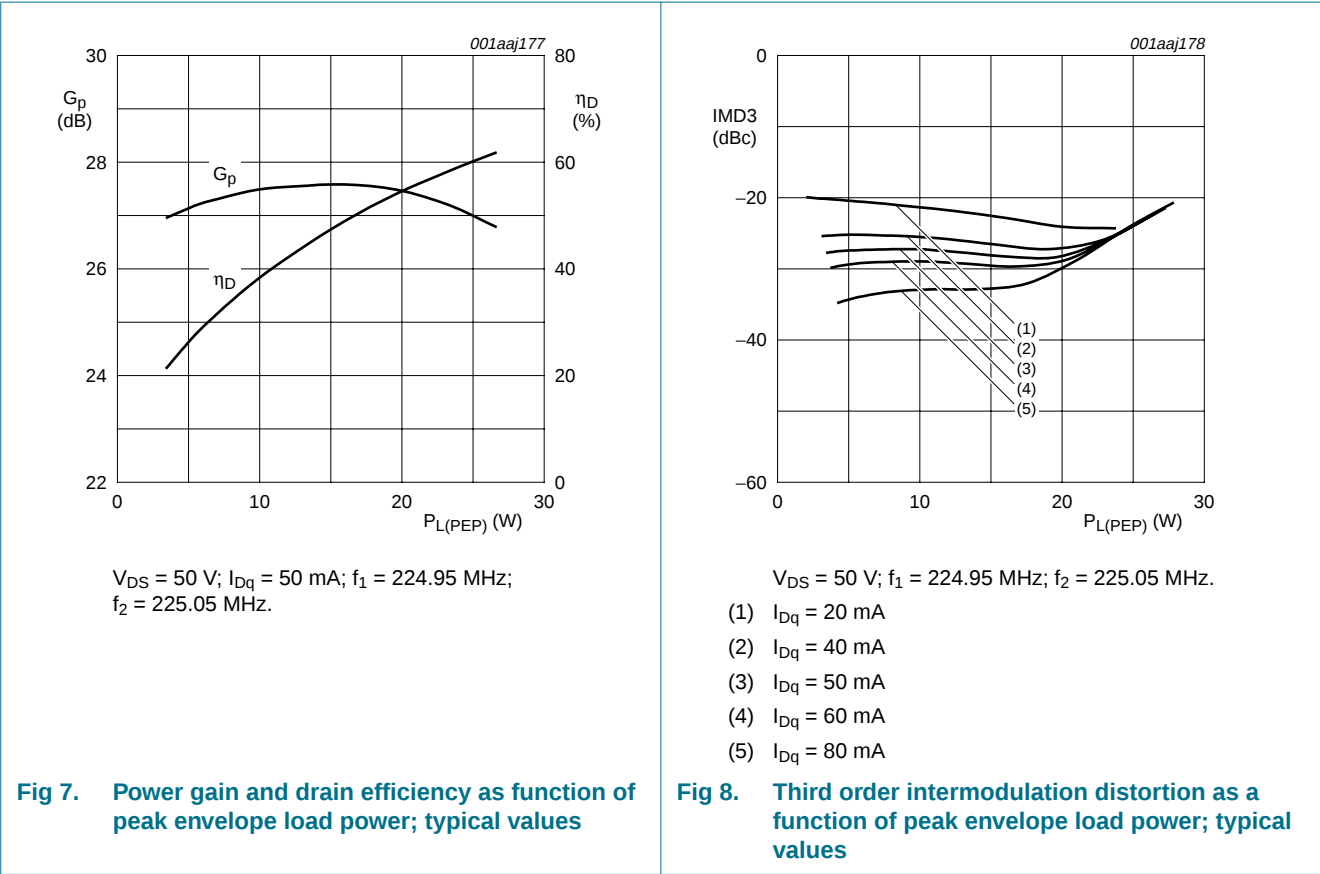
The following figures are measured in a class-AB production test circuit.

8.1.1 1-Tone CW





8.1.2 2-Tone CW



8.2 Test circuit

Table 9. List of components

All capacitors should be soldered vertically. For test circuit, see [Figure 9](#) and [Figure 10](#).

Component	Description	Value	Remarks
C1, C3, C4, C5, C14	multilayer ceramic chip capacitor	100 pF	[1]
C2	multilayer ceramic chip capacitor	39 pF	[1]
C6	multilayer ceramic chip capacitor	68 pF	[1]
C7, C9	multilayer ceramic chip capacitor	1 nF	[1]
C8	multilayer ceramic chip capacitor	4.7 μ F	TDK C4532X7R1E475MT020U or equivalent
C10	multilayer ceramic chip capacitor	8.2 pF	[1]
C11	electrolytic capacitor	220 μ F	
C12	multilayer ceramic chip capacitor	33 pF	[1]
C13	multilayer ceramic chip capacitor	15 pF	[1]
L1	1 turn enamelled copper wire	D = 5.5 mm; d = 1 mm; length = 1 mm	
L2	2 turns enamelled copper wire	D = 3.5 mm; d = 1 mm; length = 3 mm	
L3	5 turns enamelled copper wire	D = 6 mm; d = 1 mm; length = 5 mm	
L4	3.3 turns enamelled copper wire	D = 3 mm; d = 1 mm; length = 4 mm	
L5	3 turns enamelled copper wire	D = 3 mm; d = 1 mm; length = 3 mm	
L6	stripline	-	[2] (L $\times$ W) 16.5 mm $\times$ 2.4 mm
L7, L8, L10, L11, L17, L19, L20	stripline	-	[2] (L $\times$ W) 3.0 mm $\times$ 5.0 mm
L9	stripline	-	[2] (L $\times$ W) 43.0 mm $\times$ 2.4 mm
L12, L15	stripline	-	[2] (L $\times$ W) 3.5 mm $\times$ 2.4 mm
L13, L14	stripline	-	[2] (L $\times$ W) 8.0 mm $\times$ 8.0 mm
L16	stripline	-	[2] (L $\times$ W) 3.0 mm $\times$ 5.9 mm
L18	stripline	-	[2] (L $\times$ W) 27.0 mm $\times$ 2.4 mm
L21	stripline	-	[2] (L $\times$ W) 28.5 mm $\times$ 2.4 mm
R1	metal film resistor	1000 Ω ; 0.6 W	

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

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

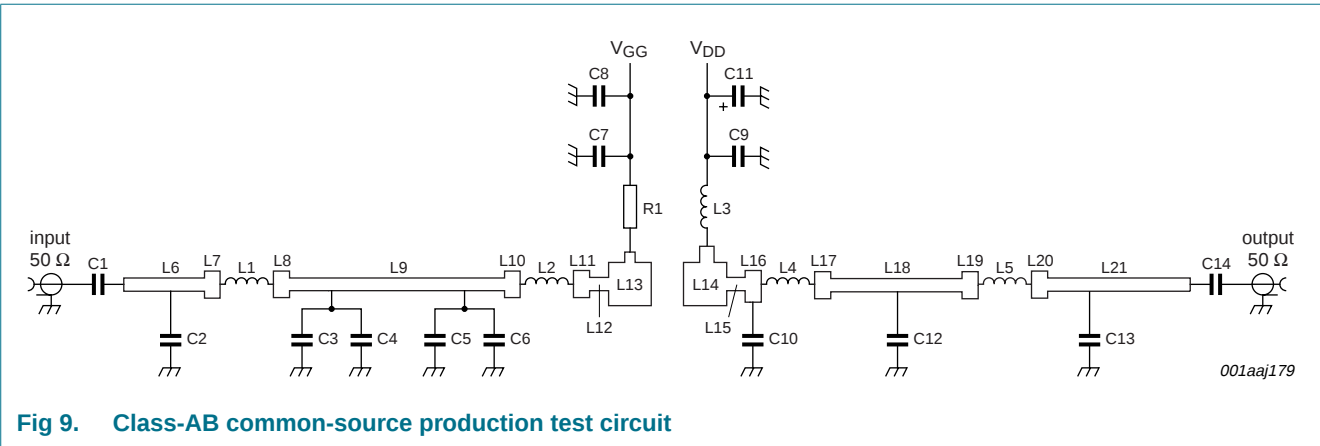


Fig 9. Class-AB common-source production test circuit

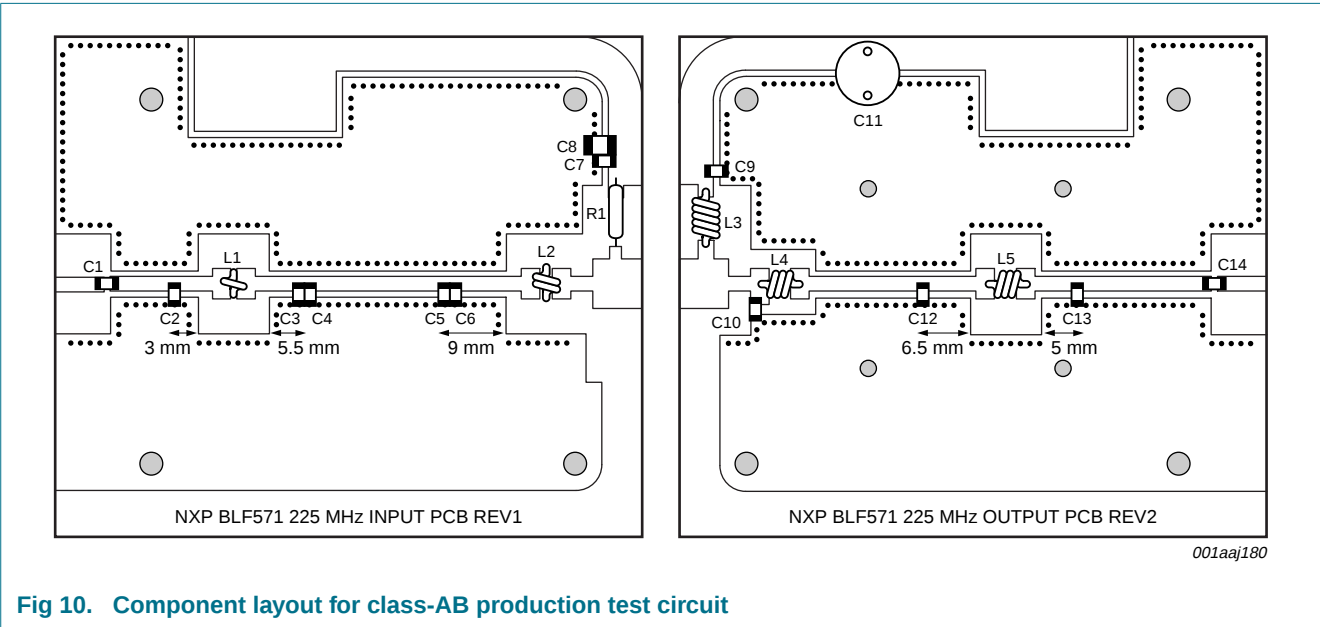


Fig 10. Component layout for class-AB production test circuit

9. Package outline

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads

SOT467C

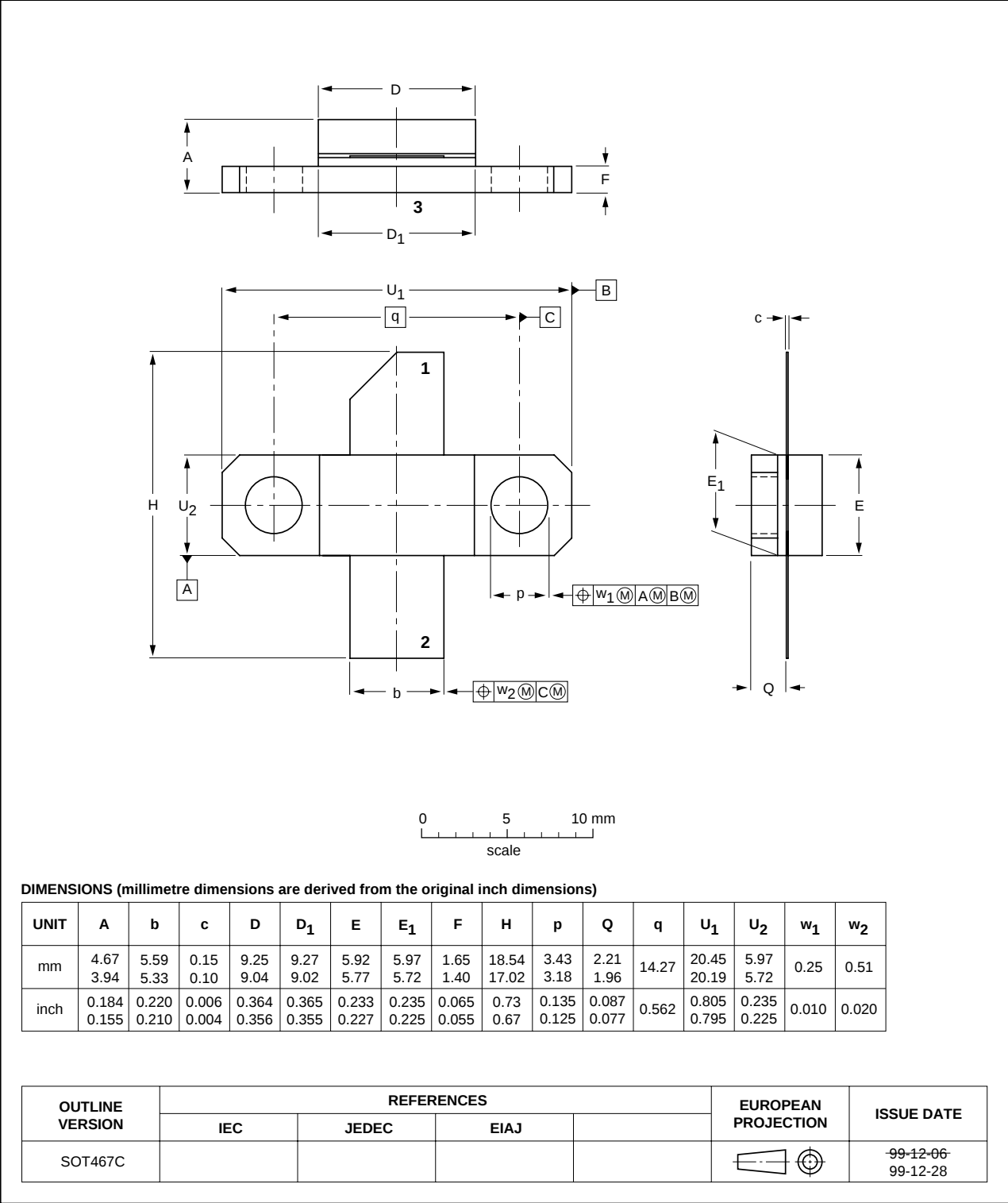


Fig 11. Package outline SOT467C

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
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
BLF571_2	20090224	Product data sheet	-	BLF571_1
Modifications:	• Data sheet status updated from Preliminary to Product			
BLF571_1	20081211	Preliminary data sheet	-	-

12. Legal information

12.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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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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