

BLF8G10LS-270

Power LDMOS transistor

Rev. 1 — 17 August 2012

Product data sheet

1. Product profile

1.1 General description

270 W LDMOS power transistor for base station applications at frequencies from 820 MHz to 960 MHz.

Table 1. Typical performance

Typical RF performance at $T_{case} = 25\text{ °C}$ in a common source class-AB production test circuit, tested on straight lead device.

Test signal	f (MHz)	I_{Dq} (mA)	V_{DS} (V)	$P_{L(AV)}$ (W)	G_p (dB)	η_D (%)	ACPR _{5M} (dBc)
2-carrier W-CDMA	920 to 960	2000	28	67	18.5	33	-35 ^[1]

[1] 3GPP test model 1; 64 DPCH; PAR = 8.4 dB at 0.01 % probability on CCDF; 10 MHz spacing.

1.2 Features and benefits

- Excellent ruggedness
- High efficiency
- Low R_{th} providing excellent thermal stability
- Designed for broadband operation (820 MHz to 960 MHz)
- Lower output capacitance for improved performance in Doherty applications
- Designed for low memory effects providing excellent pre-distortability
- Internally matched for ease of use
- Integrated ESD protection
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

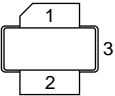
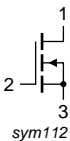
1.3 Applications

- RF power amplifiers for W-CDMA base stations and multi carrier applications in the 820 MHz to 960 MHz frequency range



2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	drain		 sym112
2	gate		
3	source [1]		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF8G10LS-270	-	earless flanged 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		-	65	V
V_{GS}	gate-source voltage		-0.5	+11	V
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	$T_{case} = 80\text{ °C}; P_L = 67\text{ W (CW)}$	0.264	K/W

6. Characteristics

Table 6. DC characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}$; $I_D = 4.5\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}$; $I_D = 450\text{ mA}$	1.5	1.8	2.3	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}$; $V_{DS} = 28\text{ V}$	-	-	4.2	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $V_{DS} = 10\text{ V}$	-	81.3	-	A
I_{GSS}	gate leakage current	$V_{GS} = 11\text{ V}$; $V_{DS} = 0\text{ V}$	-	-	420	nA
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}$; $I_D = 450\text{ mA}$	-	3.91	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $I_D = 15.75\text{ A}$	-	0.0418	-	Ω

Table 7. RF characteristics

Test signal: 2-carrier W-CDMA; PAR = 8.4 dB at 0.01 % probability on the CCDF; carrier spacing 10 MHz; 3GPP test model 1; 1-64 DPCH; $f_1 = 922.5\text{ MHz}$; $f_2 = 932.5\text{ MHz}$; $f_3 = 947.5\text{ MHz}$; $f_4 = 957.5\text{ MHz}$; RF performance at $V_{DS} = 28\text{ V}$; $I_{Dq} = 2000\text{ mA}$; $T_{case} = 25\text{ }^\circ\text{C}$; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$P_{L(AV)} = 67\text{ W}$	17.3	18.5	-	dB
RL_{in}	input return loss	$P_{L(AV)} = 67\text{ W}$	-	-14	-10	dB
η_D	drain efficiency	$P_{L(AV)} = 67\text{ W}$	28.0	33	-	%
$ACPR_{5M}$	adjacent channel power ratio (5 MHz)	$P_{L(AV)} = 67\text{ W}$	-	-35	-30	dBc

7. Test information

7.1 Ruggedness in class-AB operation

The BLF8G10LS-270 is capable to withstand a load mismatch corresponding to $VSWR = 10 : 1$ through all phases under the following conditions: $V_{DS} = 28\text{ V}$; $I_{Dq} = 2000\text{ mA}$; $P_L = 270\text{ W}$; $f = 820\text{ MHz}$; $f = 869\text{ MHz}$; $f = 920\text{ MHz}$; $f = 960\text{ MHz}$.

7.2 Impedance information

Table 8. Typical impedance
 $I_{DQ} = 2700\text{ mA}$; main transistor $V_{DS} = 28\text{ V}$.

f (MHz)	Z_S ^[1] (Ω)	Z_L ^[1] (Ω)
820	1.58 – j1.96	1.29 – j1.95
869	1.84 – j2.70	1.12 – j1.83
881	1.78 – j2.94	1.12 – j1.84
894	1.90 – j3.08	1.12 – j1.84
920	2.06 – j2.50	1.04 – j1.13
940	2.10 – j2.90	1.04 – j1.13
960	2.56 – j2.65	1.00 – j1.22

[1] Z_S and Z_L defined in Figure 1.

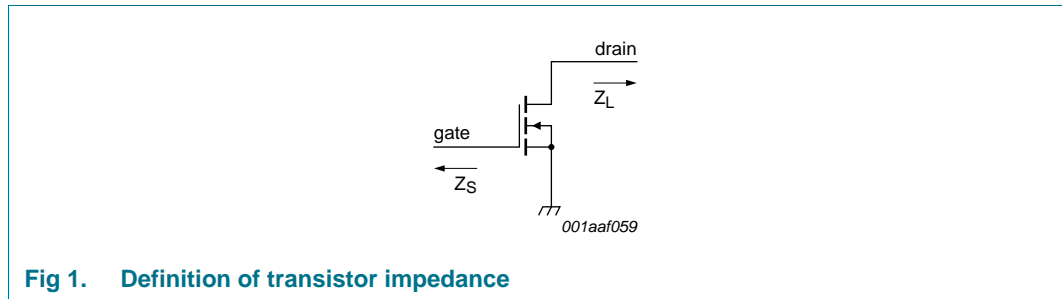


Fig 1. Definition of transistor impedance

7.3 Test circuit information

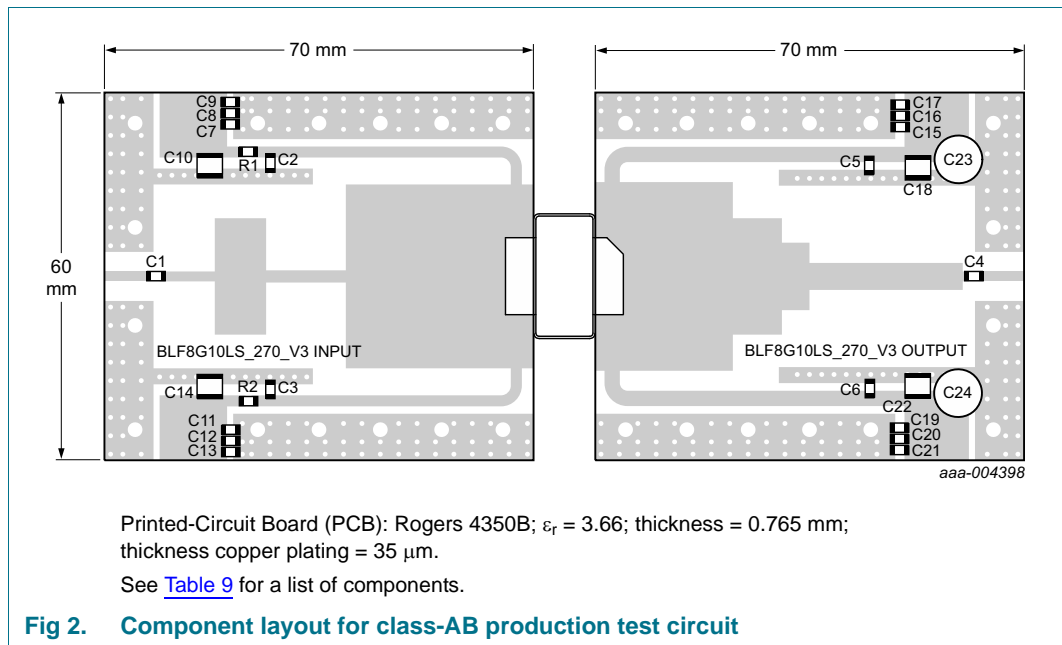


Fig 2. Component layout for class-AB production test circuit

Table 9. List of components

For test circuit see [Figure 2](#).

Component	Description	Value	Remarks
C1, C4	multilayer ceramic chip capacitor	47 pF	[1] ATC100B
C2, C3, C5, C6	multilayer ceramic chip capacitor	45 pF	[1] ATC100B
C7, C11, C15, C19	multilayer ceramic chip capacitor	0.01 μ F	[2] Murata
C8, C12, C16, C20	multilayer ceramic chip capacitor	0.1 μ F	[2] Murata
C9, C13, C17, C21	multilayer ceramic chip capacitor	1 μ F	[2] Murata
C10, C14, C18, C22	multilayer ceramic chip capacitor	4.7 μ F	[2] Murata
C23, C24	electrolytic capacitor	470 μ F, 63 V	
R1, R2	chip resistor	9.1 Ω	[3] Vishay Dale 0805

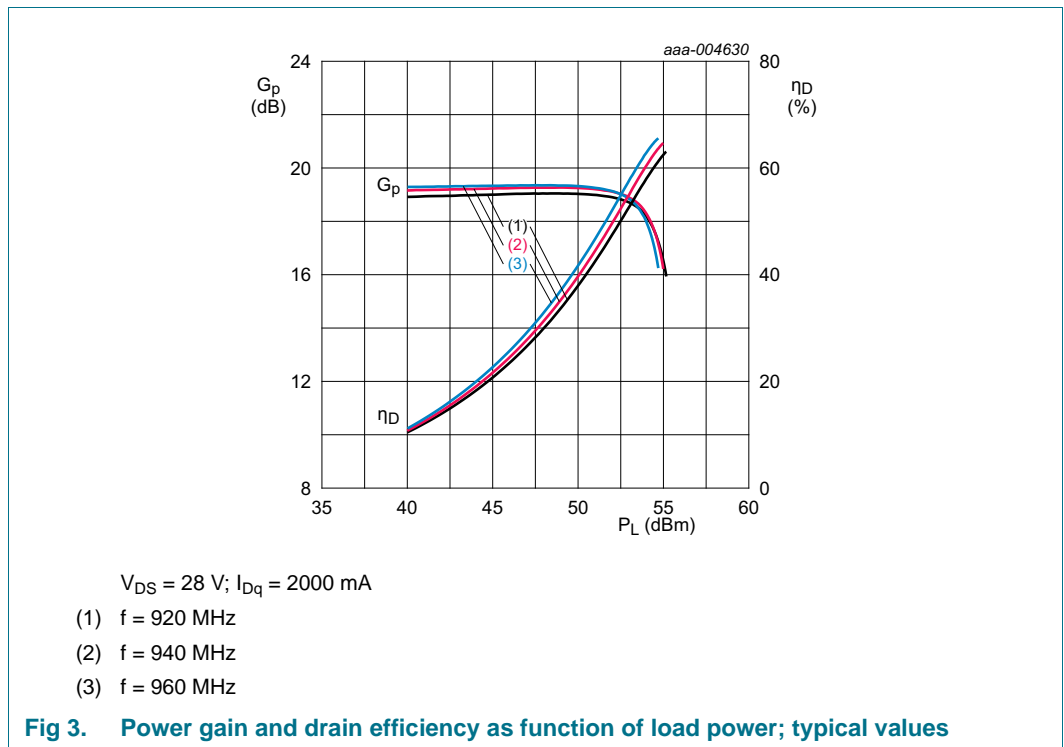
[1] American Technical Ceramics type 100B or capacitor of same quality.

[2] Murata or capacitor of same quality.

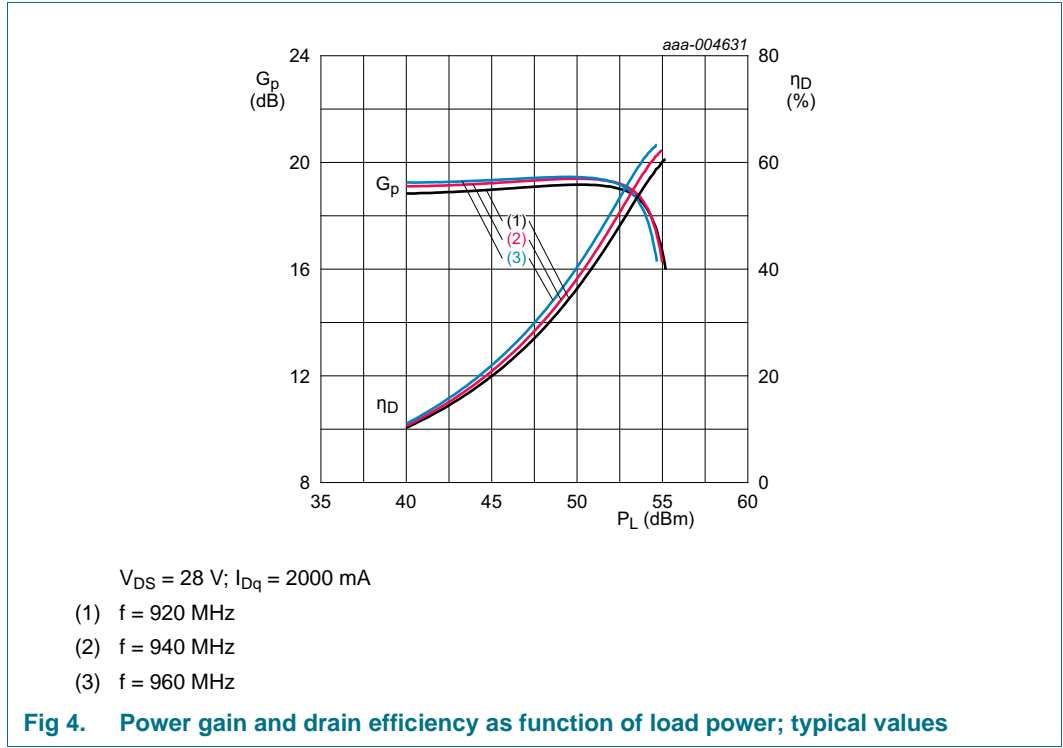
[3] Vishay Dale resistor of same quality.

7.4 Graphical data

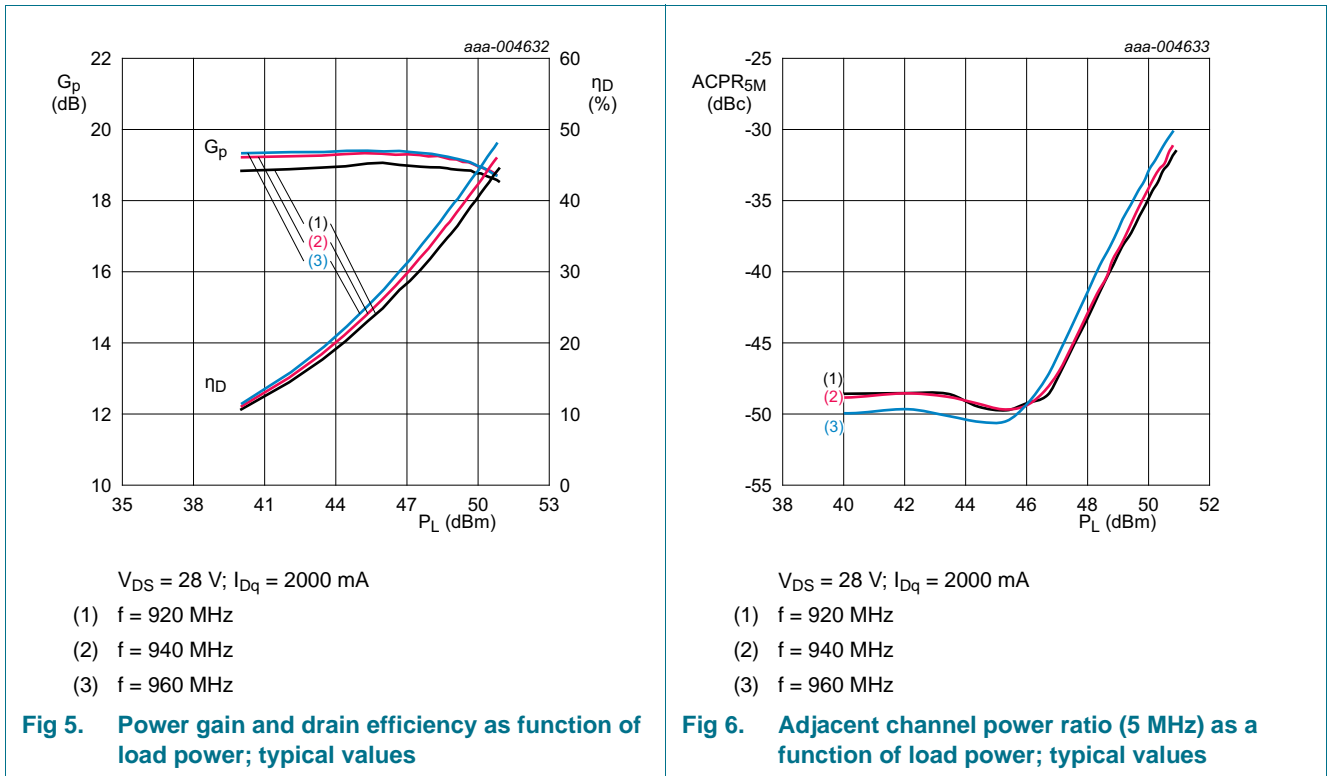
7.4.1 CW

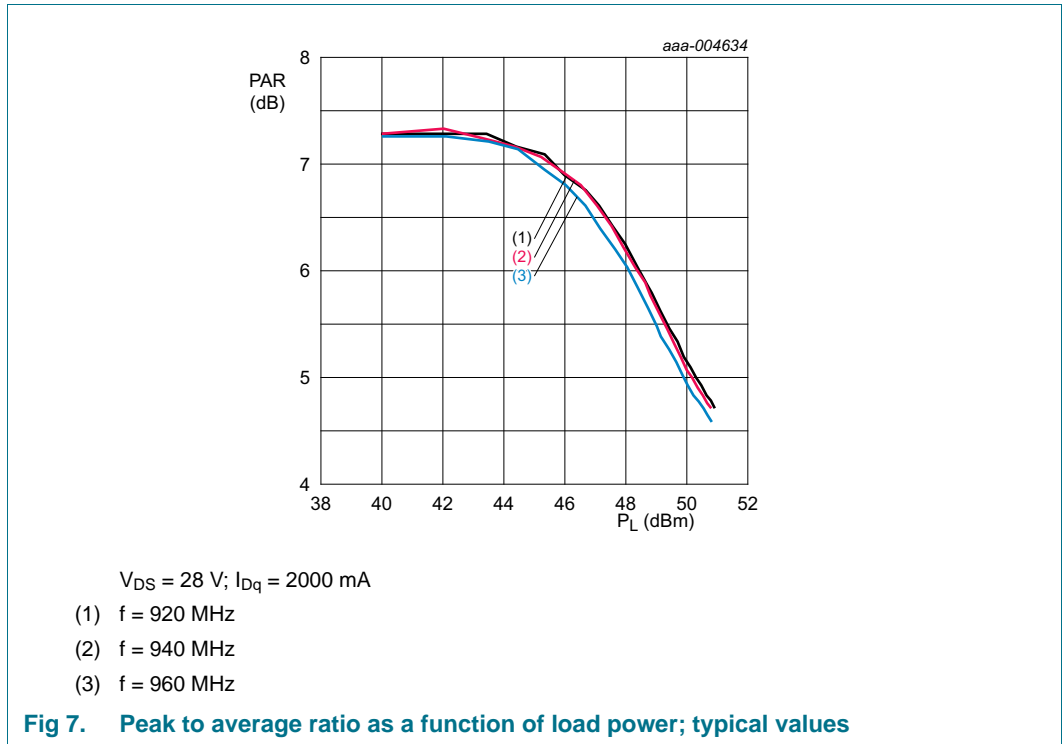


7.4.2 CW pulsed

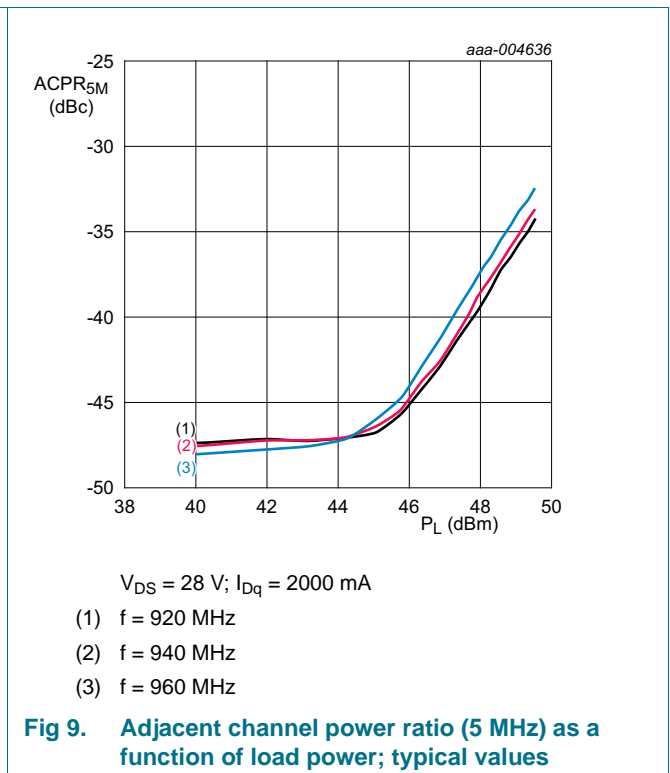
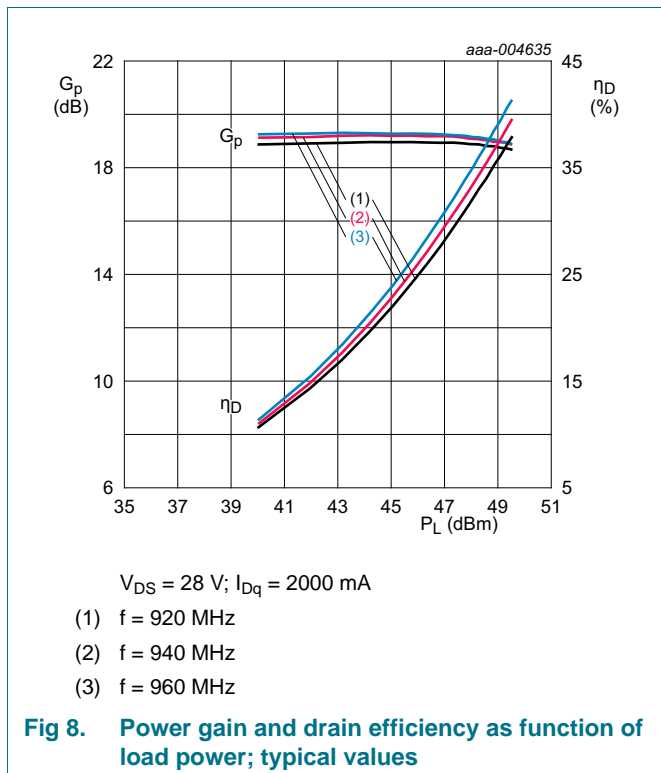


7.4.3 1-Carrier W-CDMA





7.4.4 2-Carrier W-CDMA



8. Package outline

Earless flanged ceramic package; 2 leads

SOT502B

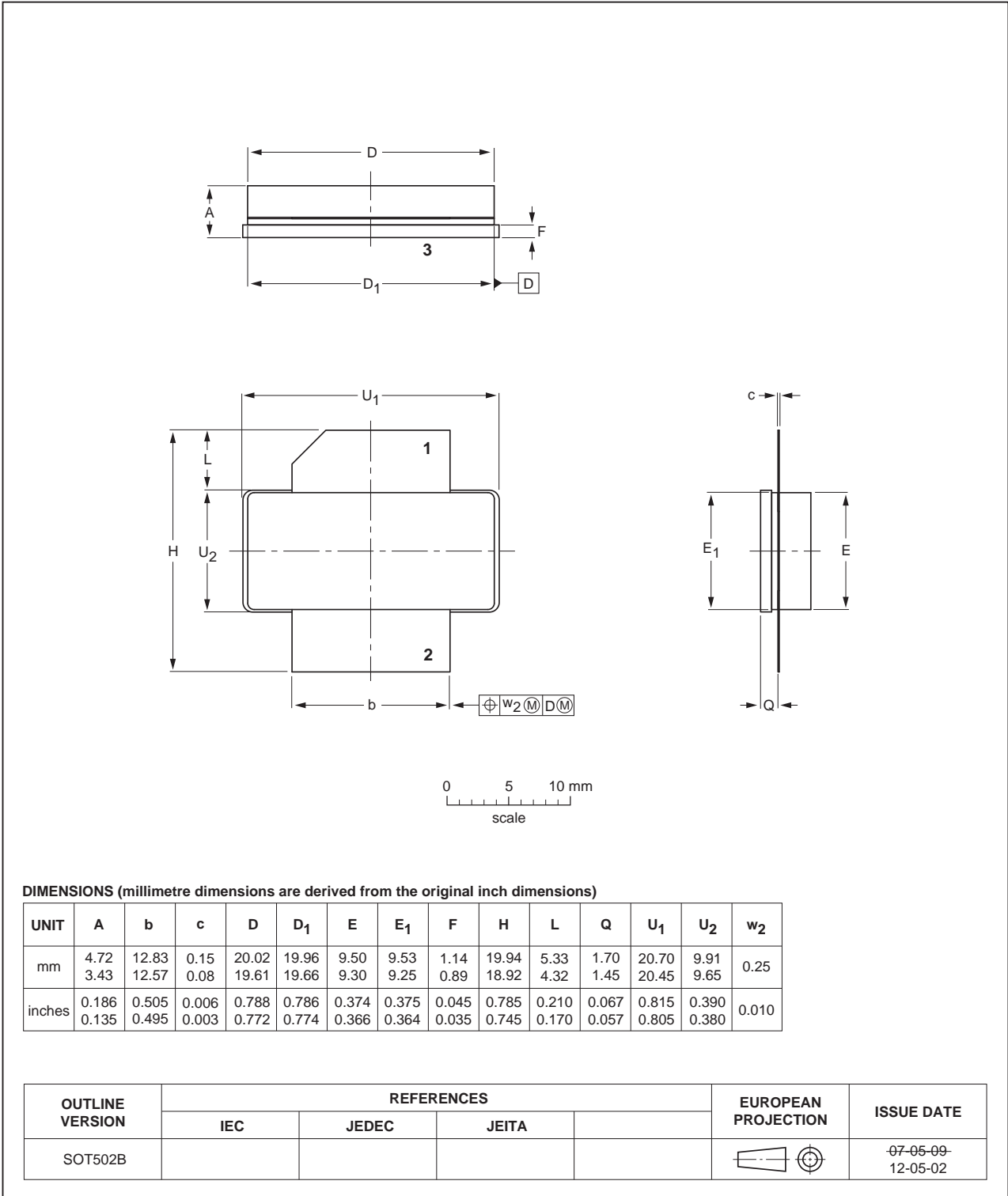


Fig 10. Package outline SOT502B

9. Handling information

CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.

Such precautions are described in the *ANSI/ESD S20.20*, *IEC/ST 61340-5*, *JESD625-A* or equivalent standards.

10. Abbreviations

Table 10. Abbreviations

Acronym	Description
3GPP	3rd Generation Partnership Project
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
DPCH	Dedicated Physical Channel
ESD	ElectroStatic Discharge
LDMOS	Laterally Diffused Metal Oxide Semiconductor
PAR	Peak-to-Average Ratio
VSWR	Voltage Standing Wave Ratio
W-CDMA	Wideband Code Division Multiple Access

11. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF8G10LS-270 v.1	20120817	Product 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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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

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