

# BLF6G27-100; BLF6G27LS-100

WiMAX power LDMOS transistor

Rev. 02 — 8 July 2010

Product data sheet

## 1. Product profile

### 1.1 General description

100 W LDMOS power transistor for base station applications at frequencies from 2500 MHz to 2700 MHz.

**Table 1. Typical performance**

Typical RF performance at  $T_{case} = 25\text{ °C}$  in a class-AB production test circuit.

Mode of operation	f (MHz)	V <sub>DS</sub> (V)	P <sub>L(AV)</sub> (W)	G <sub>p</sub> (dB)	η <sub>D</sub> (%)	ACPR <sub>885k</sub> (dBc)	ACPR <sub>1980k</sub> (dBc)	ACPR <sub>5M</sub> (dBc)	ACPR <sub>10M</sub> (dBc)
<b>BLF6G27-100</b>									
1-carrier W-CDMA [1]	2500 to 2700	28	14	16.5	23	-	-	-40	-59
1-carrier N-CDMA [2]	2500 to 2700	28	14	17	23	-50 [3]	-65 [3]	-	-
<b>BLF6G27LS-100</b>									
1-carrier W-CDMA [1]	2500 to 2700	28	14	17	23	-	-	-41	-60
1-carrier N-CDMA [2]	2500 to 2700	28	14	17	23	-50 [3]	-65 [3]	-	-

[1] Signal is a one carrier, TM1 W-CDMA signal with 64 DPCH and 100 % clipping. PAR is 9.65 dB at 0.01 % probability on CCDF.

[2] Single carrier IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13). PAR = 9.7 dB at 0.01 % probability on the CCDF. Channel bandwidth is 1.2288 MHz.

[3] Measured within 30 kHz bandwidth.

### 1.2 Features and benefits

- Typical 1-carrier W-CDMA performance (single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability on the CCDF; channel bandwidth is 3.84 MHz) at a frequency of 2500 MHz, 2600 MHz and 2700 MHz, a supply voltage of 28 V and an I<sub>Dq</sub> of 900 mA:
  - ◆ Average output power = 14 W
  - ◆ Power gain = 17 dB
  - ◆ Drain efficiency = 23 %
  - ◆ ACPR<sub>5M</sub> = -41 dBc
- Typical 1-carrier N-CDMA performance (single carrier IS-95 with pilot, paging, sync and 6 traffic channels [Walsh codes 8 to 13]. PAR = 9.7 dB at 0.01 % probability on the CCDF. Channel bandwidth is 1.2288 MHz) at a frequency of 2500 MHz, 2600 MHz and 2700 MHz, a supply voltage of 28 V and an I<sub>Dq</sub> of 900 mA:
  - ◆ Average output power = 14 W
  - ◆ Power gain = 17 dB
  - ◆ Drain efficiency = 23 %
  - ◆ ACPR<sub>885k</sub> = -50 dBc (within 30 kHz bandwidth)



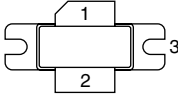
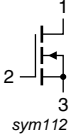
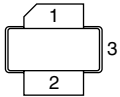
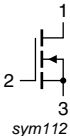
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (2500 MHz to 2700 MHz)
- Internally matched for ease of use

### 1.3 Applications

- RF power amplifiers for base stations and multicarrier applications in the 2500 MHz to 2700 MHz frequency range

## 2. Pinning information

**Table 2. Pinning**

Pin	Description	Simplified outline	Graphic symbol
<b>BLF6G27-100 (SOT502A)</b>			
1	drain		 sym112
2	gate		
3	source		
<b>BLF6G27LS-100 (SOT502B)</b>			
1	drain		 sym112
2	gate		
3	source		

[1] Connected to flange.

## 3. Ordering information

**Table 3. Ordering information**

Type number	Package		Version
	Name	Description	
BLF6G27-100	-	flanged LDMOST ceramic package; 2 mounting holes; 2 leads	SOT502A
BLF6G27LS-100	-	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	Min	Max	Unit
$V_{DS}$	drain-source voltage	-	65	V
$V_{GS}$	gate-source voltage	-0.5	+13	V
$I_D$	drain current	-	29	A
$T_{stg}$	storage temperature	-65	+150	°C
$T_j$	junction temperature	-	200	°C

## 5. Thermal characteristics

**Table 5. Thermal characteristics**

Symbol	Parameter	Conditions	Type	Typ	Unit
$R_{th(j-case)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C}; P_L = 100\text{ W}$	BLF6G27-100	0.68	K/W
			BLF6G27LS-100	0.5	K/W

## 6. Characteristics

**Table 6. Characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 0.5\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 150\text{ mA}$	1.4	2	2.4	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$	-	-	5	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	22.3	27	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	450	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 5.25\text{ A}$	-	10.5	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 5.25\text{ A}$	-	0.1	0.16	$\Omega$
$C_{rs}$	feedback capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}; f = 1\text{ MHz}$	-	2.4	-	pF

## 7. Application information

**Table 7. Application information**

Mode of operation: 1-carrier W-CDMA; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability on the CCDF; carrier channel bandwidth is 3.84 MHz;  $f_1 = 2500$  MHz;  $f_2 = 2600$  MHz,  $f_3 = 2700$  MHz; RF performance at  $V_{DS} = 28$  V;  $I_{Dq} = 900$  mA;  $T_{case} = 25$  °C; unless otherwise specified, in a class-AB production circuit.

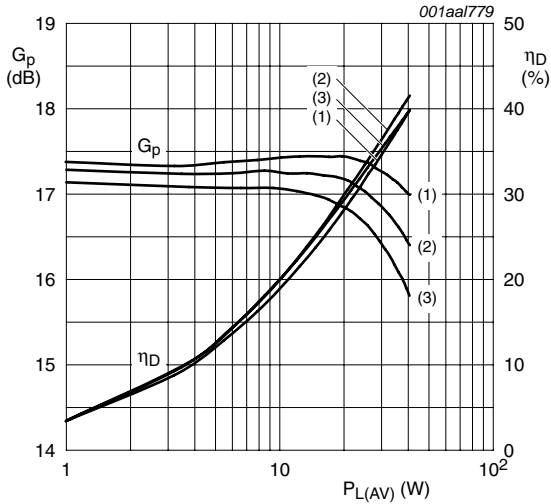
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$P_{L(AV)} = 14$ W				
		BLF6G27-100	14.8	16.5	-	dB
		BLF6G27LS-100	15	17	-	dB
$RL_{in}$	input return loss	$P_{L(AV)} = 14$ W	-	-10	-6	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 14$ W	20	23	-	%
$ACPR_{5M}$	adjacent channel power ratio (5 MHz)	$P_{L(AV)} = 14$ W	[1]			
		BLF6G27-100	-	-40	-36	dBc
		BLF6G27LS-100	-	-41	-37	dBc
$ACPR_{10M}$	adjacent channel power ratio (10 MHz)	$P_{L(AV)} = 14$ W	[1]			
		BLF6G27-100	-	-59	-56	dBc
		BLF6G27LS-100	-	-60	-57	dBc

[1] ACPR measured in 3.84 MHz channel bandwidth at  $\pm 5$  MHz and  $\pm 10$  MHz.

### 7.1 Ruggedness in class-AB operation

The BLF6G27-100 and BLF6G27LS-100 are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions:  $V_{DS} = 28$  V;  $I_{Dq} = 900$  mA;  $P_L = 100$  W (CW);  $f = 2500$  MHz.

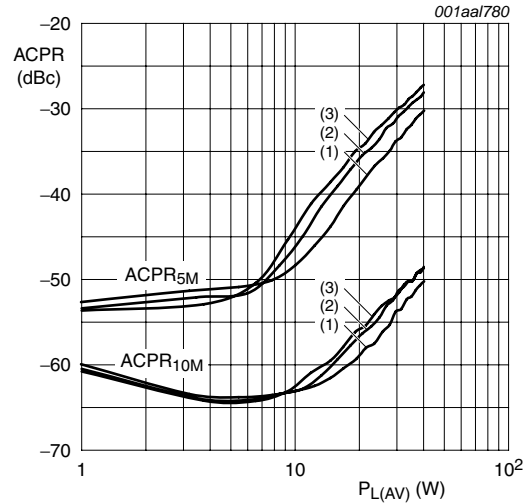
7.2 Single carrier W-CDMA performance



$V_{DS} = 28\text{ V}$ ;  $I_{Dq} = 900\text{ mA}$ ; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability; channel bandwidth = 3.84 MHz.

- (1)  $f = 2500\text{ MHz}$
- (2)  $f = 2600\text{ MHz}$
- (3)  $f = 2700\text{ MHz}$

Fig 1. Power gain and drain efficiency as a function of average output power; typical values

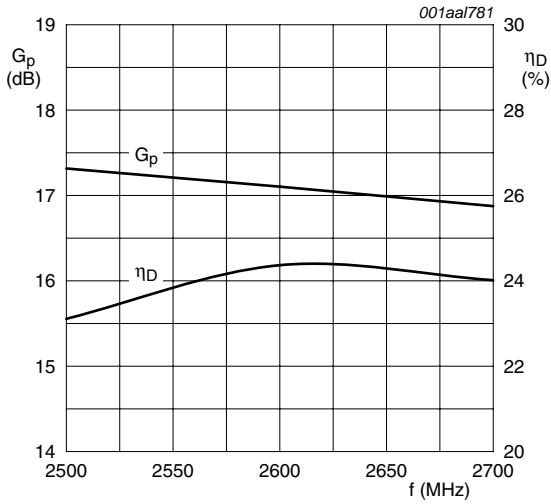


$V_{DS} = 28\text{ V}$ ;  $I_{Dq} = 900\text{ mA}$ ; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability; channel bandwidth = 3.84 MHz.

- (1)  $f = 2500\text{ MHz}$
- (2)  $f = 2600\text{ MHz}$
- (3)  $f = 2700\text{ MHz}$

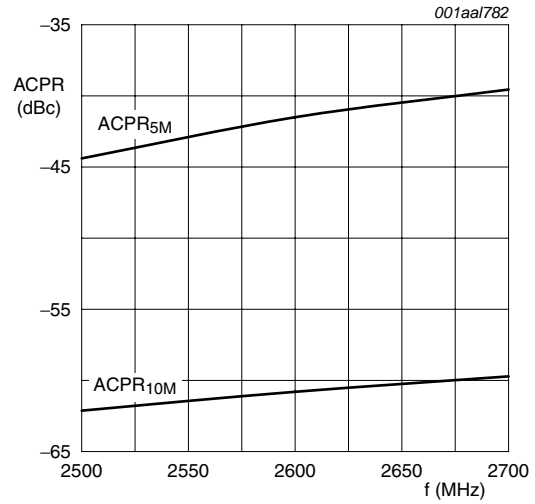
Fig 2. ACPR at 5 MHz and at 10 MHz as a function of average output power; typical values

**7.3 Single carrier W-CDMA broadband performance at 14 W average power**



$V_{DS} = 28\text{ V}$ ;  $I_{Dq} = 900\text{ mA}$ ; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability; channel bandwidth = 3.84 MHz.

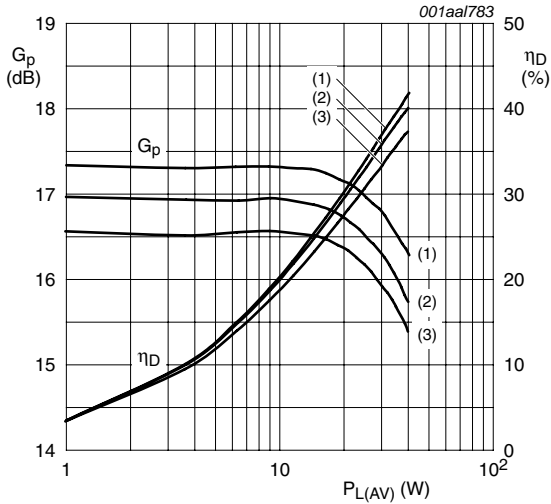
**Fig 3. Power gain and drain efficiency as a function of frequency; typical values**



$V_{DS} = 28\text{ V}$ ;  $I_{Dq} = 900\text{ mA}$ ; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability; channel bandwidth = 3.84 MHz.

**Fig 4. ACPR at 5 MHz and at 10 MHz as a function of frequency; typical values**

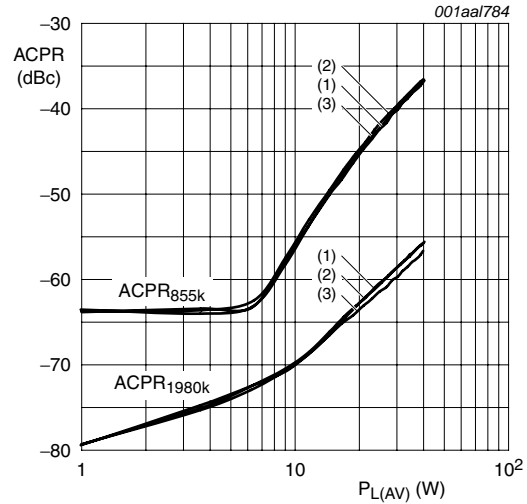
7.4 IS-95 performance



$V_{DS} = 28\text{ V}$ ;  $I_{DQ} = 900\text{ mA}$ ; IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13); PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth = 1.2288 MHz.

- (1)  $f = 2500\text{ MHz}$
- (2)  $f = 2600\text{ MHz}$
- (3)  $f = 2700\text{ MHz}$

Fig 5. Power gain and drain efficiency as a function of average output power; typical values

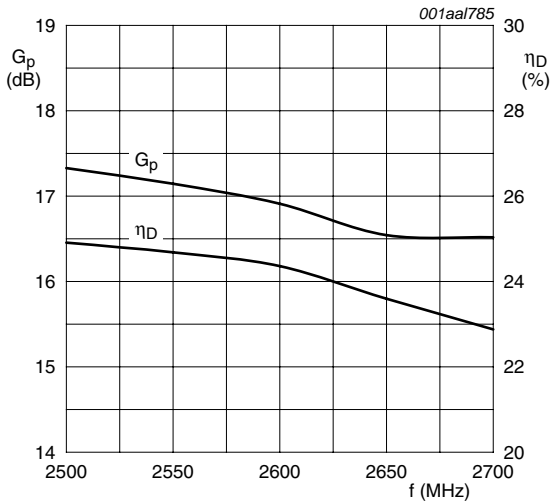


$V_{DS} = 28\text{ V}$ ;  $I_{DQ} = 900\text{ mA}$ ; IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13); PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth = 1.2288 MHz.

- (1)  $f = 2500\text{ MHz}$
- (2)  $f = 2600\text{ MHz}$
- (3)  $f = 2700\text{ MHz}$

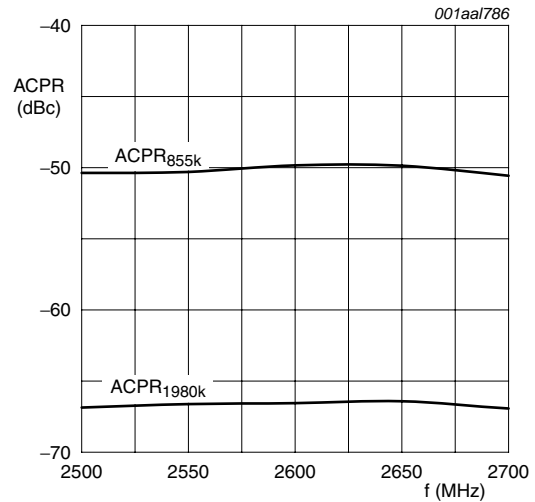
Fig 6. ACPR at 885 kHz and at 1980 kHz as a function of average output power; typical values

## 7.5 IS-95 broadband performance at 14 W average power



$V_{DS} = 28$  V;  $I_{Dq} = 900$  mA; IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13); PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth = 1.2288 MHz.

**Fig 7. Power gain and drain efficiency as a function of frequency; typical values**



$V_{DS} = 28$  V;  $I_{Dq} = 900$  mA; IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13); PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth = 1.2288 MHz.

**Fig 8. ACPR at 855 kHz and at 1980 kHz as a function of frequency; typical values**

8. Package outline

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads

SOT502A

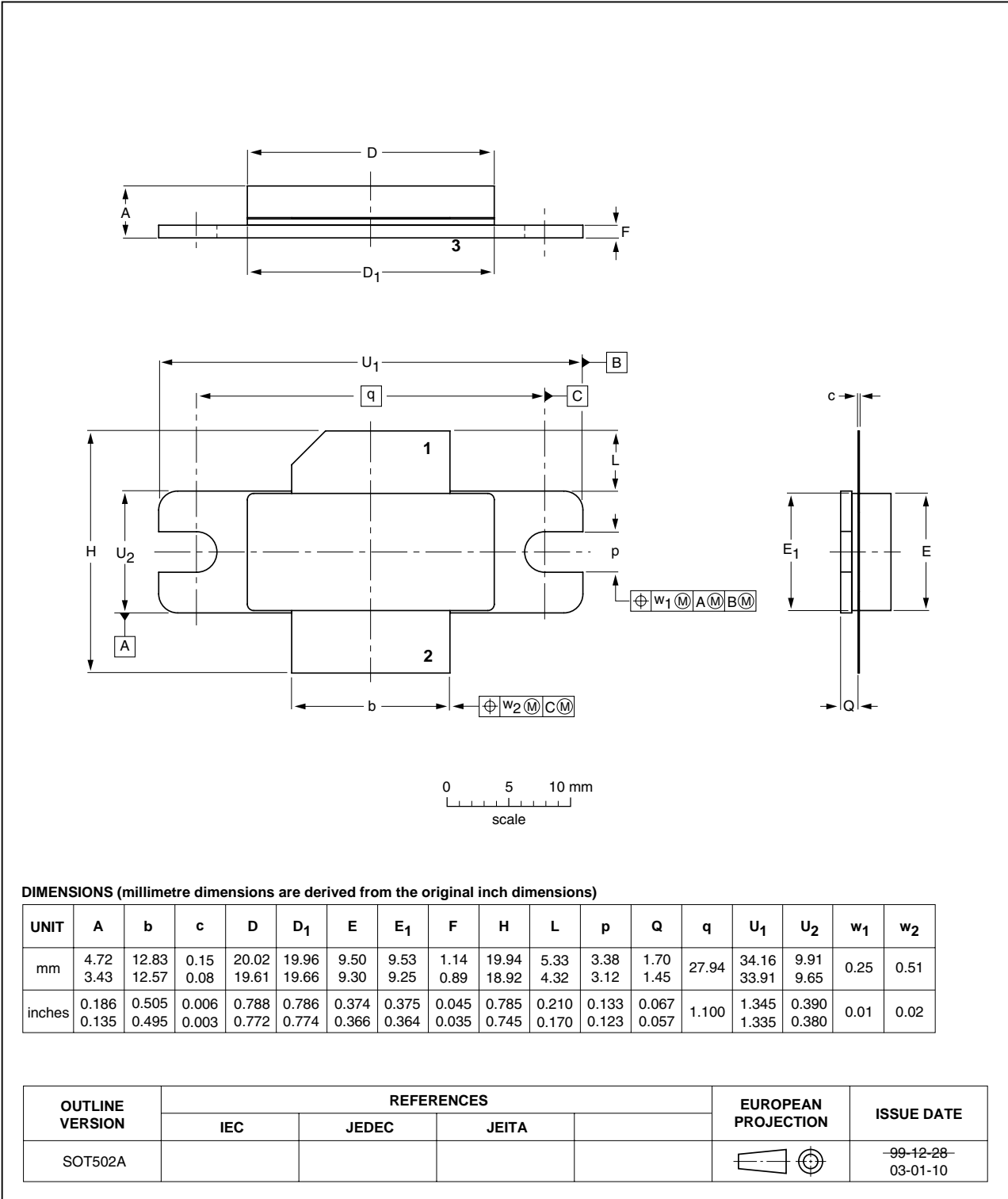


Fig 9. Package outline SOT502A

Earless flanged LDMOST ceramic package; 2 leads

SOT502B

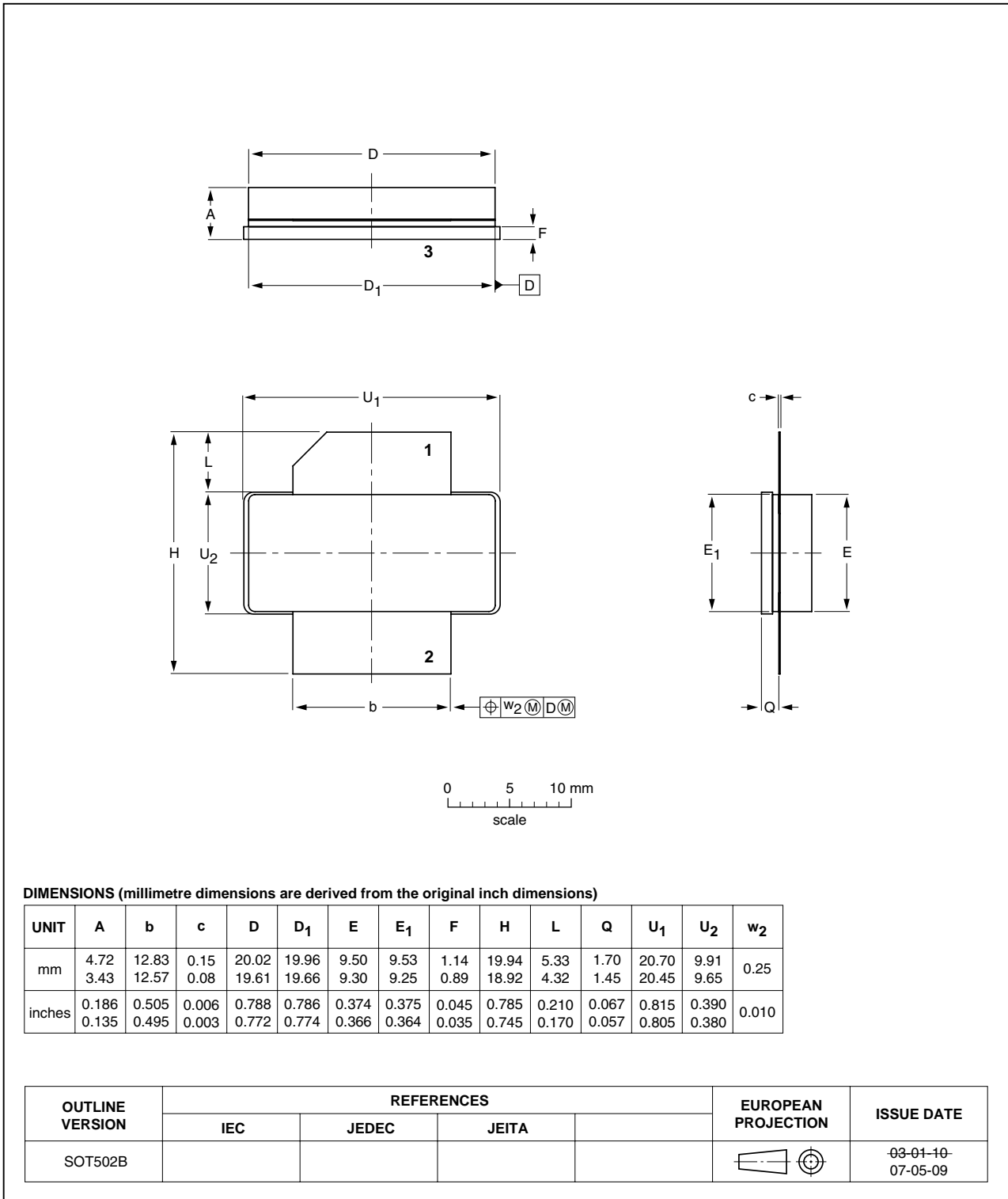


Fig 10. Package outline SOT502B

## 9. Abbreviations

Table 8. Abbreviations

Acronym	Description
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
DPCH	Dedicated Physical CHannel
ESD	ElectroStatic Discharge
FCH	Frame Control Header
FFT	Fast Fourier Transform
IBW	Instantaneous BandWidth
IS-95	Interim Standard 95
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
N-CDMA	Narrowband Code Division Multiple Access
PAR	Peak-to-Average power Ratio
PUSC	Partial Usage of SubChannels
RF	Radio Frequency
TM1	Test Model 1
VSWR	Voltage Standing-Wave Ratio
W-CDMA	Wideband Code Division Multiple Access
WCS	Wireless Communications Service
WiMAX	Worldwide interoperability for Microwave Access

## 10. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF6G27-100_BLF6G27LS-100 v.2	20100708	Product data sheet	-	BLF6G27-100_ BLF6G27LS-100_1
Modifications:		<ul style="list-style-type: none"> <li>Data sheet status change to Product data sheet.</li> <li><a href="#">Table 1 on page 1</a>: A distinction has been made between BLF6G27-100 and BLF6G27LS-100</li> <li><a href="#">Table 7 on page 4</a>: A distinction has been made between BLF6G27-100 and BLF6G27LS-100</li> </ul>		
BLF6G27-100_BLF6G27LS-100_1	20100503	Preliminary data sheet	-	-

## 11. Legal information

### 11.1 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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