

# BLF7G27L-140; BLF7G27LS-140

Power LDMOS transistor

Rev. 3 — 22 July 2011

Product data sheet

## 1. Product profile

### 1.1 General description

140 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 common source class-AB production test circuit.

Mode of operation	f (MHz)	$I_{Dq}$ (mA)	$V_{DS}$ (V)	$P_{L(AV)}$ (W)	$G_p$ (dB)	$\eta_D$ (%)	ACPR <sub>885k</sub> (dBc)	ACPR <sub>5M</sub> (dBc)
IS-95	2500 to 2700	1300	28	30	16.5	22	-48 <sup>[1]</sup>	–
Single carrier W-CDMA	2500 to 2700	1300	28	50	16.5	27	–	-38 <sup>[2]</sup>

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

[2] 3GPP; test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on CCDF. Channel bandwidth is 3.84 MHz.

### 1.2 Features and benefits

- Excellent ruggedness
- High efficiency
- Low  $R_{th}$  providing excellent thermal stability
- Designed for low memory effects providing excellent digital pre-distortion capability
- Internally matched for ease of use
- Integrated ESD protection
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

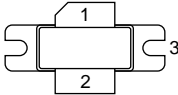
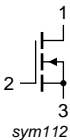
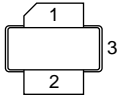
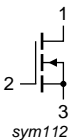
### 1.3 Applications

- RF power amplifiers for W-CDMA base stations and multi carrier applications in the 2500 MHz to 2700 MHz frequency range



## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
<b>BLF7G27L-140 (SOT502A)</b>			
1	drain		 sym112
2	gate		
3	source		
<b>BLF7G27LS-140 (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
BLF7G27L-140	-	flanged LDMOST ceramic package; 2 mounting holes; 2 leads	SOT502A
BLF7G27LS-140	-	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		-	65	V
$V_{GS}$	gate-source voltage		-0.5	+13	V
$I_D$	drain current		-	28	A
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	junction temperature		-	200	°C

## 5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-c)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C}; P_L = 125\text{ W}$	0.28	K/W

**6. Characteristics**

**Table 6. Characteristics**

*T<sub>j</sub> = 25 °C unless otherwise specified.*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>(BR)DSS</sub>	drain-source breakdown voltage	V <sub>GS</sub> = 0 V; I <sub>D</sub> = 1 mA	65	-	-	V
V <sub>GS(th)</sub>	gate-source threshold voltage	V <sub>DS</sub> = 10 V; I <sub>D</sub> = 216 mA	1.5	1.8	2.3	V
I <sub>DSS</sub>	drain leakage current	V <sub>GS</sub> = 0 V; V <sub>DS</sub> = 28 V	-	-	5	μA
I <sub>DSX</sub>	drain cut-off current	V <sub>GS</sub> = V <sub>GS(th)</sub> + 3.75 V; V <sub>DS</sub> = 10 V	34.2	40.5	-	A
I <sub>GSS</sub>	gate leakage current	V <sub>GS</sub> = 11 V; V <sub>DS</sub> = 0 V	-	-	500	nA
g <sub>fs</sub>	forward transconductance	V <sub>DS</sub> = 10 V; I <sub>D</sub> = 216 mA	-	1.87	-	S
R <sub>DS(on)</sub>	drain-source on-state resistance	V <sub>GS</sub> = V <sub>GS(th)</sub> + 3.75 V; I <sub>D</sub> = 7.56 A	-	0.07	-	Ω

**7. Test information**

**Remark:** All testing performed in a class-AB production test circuit.

**Table 7. Functional test information**

*Mode of operation: 1-carrier N-CDMA, single carrier IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 - 13). PAR = 9.7 dB at 0.01 % probability on the CCDF, channel bandwidth is 1.2288 MHz; f<sub>1</sub> = 2500 MHz; f<sub>2</sub> = 2700 MHz; RF performance at V<sub>DS</sub> = 28 V; I<sub>Dq</sub> = 1300 mA; T<sub>case</sub> = 25 °C; unless otherwise specified.*

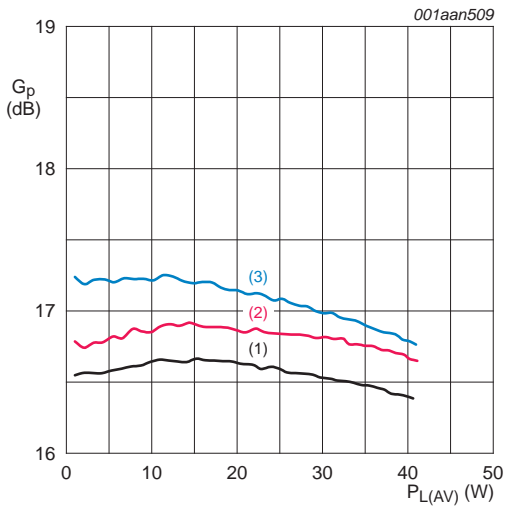
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
P <sub>L(AV)</sub>	average output power		-	30	-	W
G <sub>p</sub>	power gain		15.3	16.5	-	dB
RL <sub>in</sub>	input return loss		-	-10	-	dB
η <sub>D</sub>	drain efficiency		19	22	-	%
ACPR <sub>885k</sub>	adjacent channel power ratio (885 kHz)		-44	-48	-	dBc

**7.1 Ruggedness in class-AB operation**

The BLF7G27L-140 and BLF7G27LS-140 are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: V<sub>DS</sub> = 28 V; I<sub>Dq</sub> = 1300 mA; P<sub>L</sub> = 140 W (CW); f = 2500 MHz.

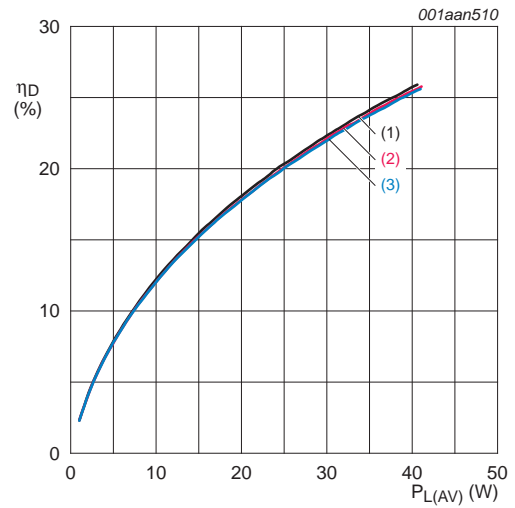
## 7.2 Single carrier IS-95

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



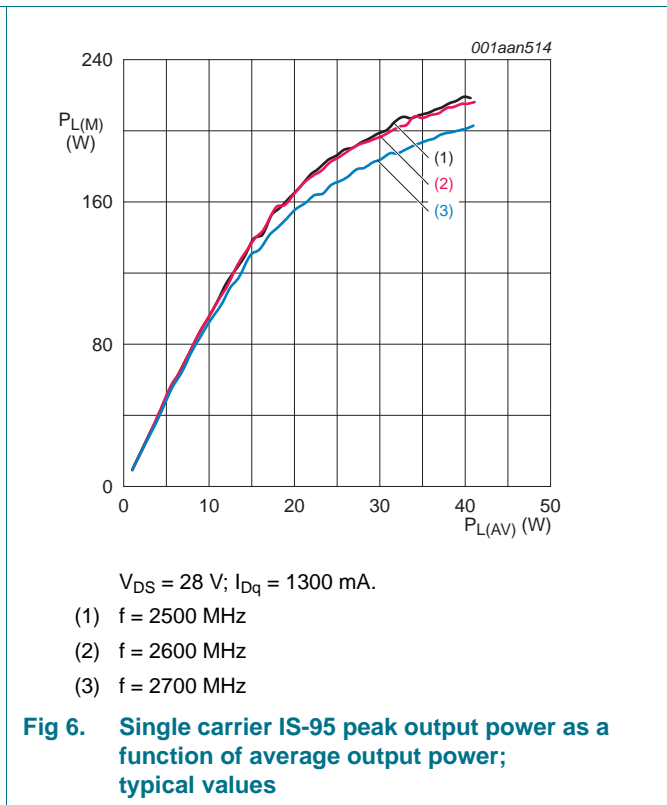
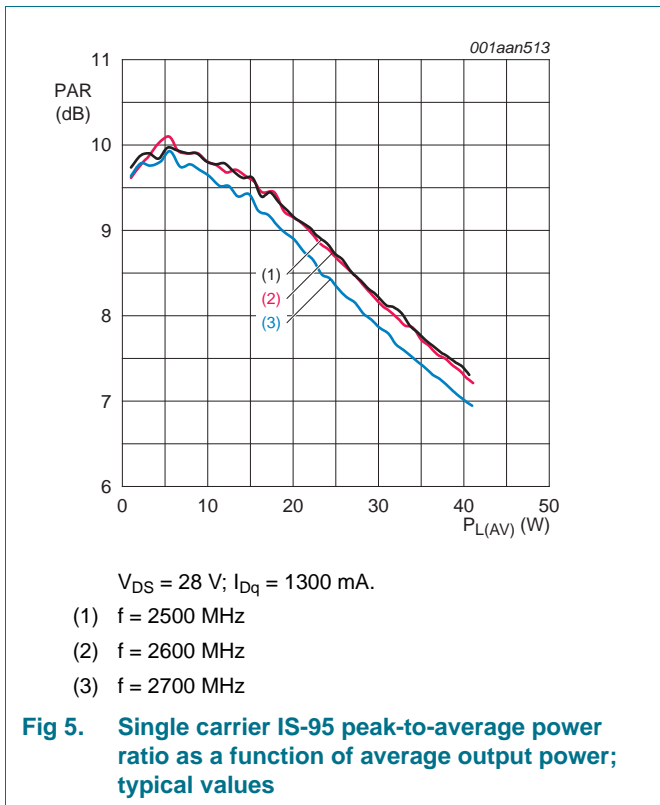
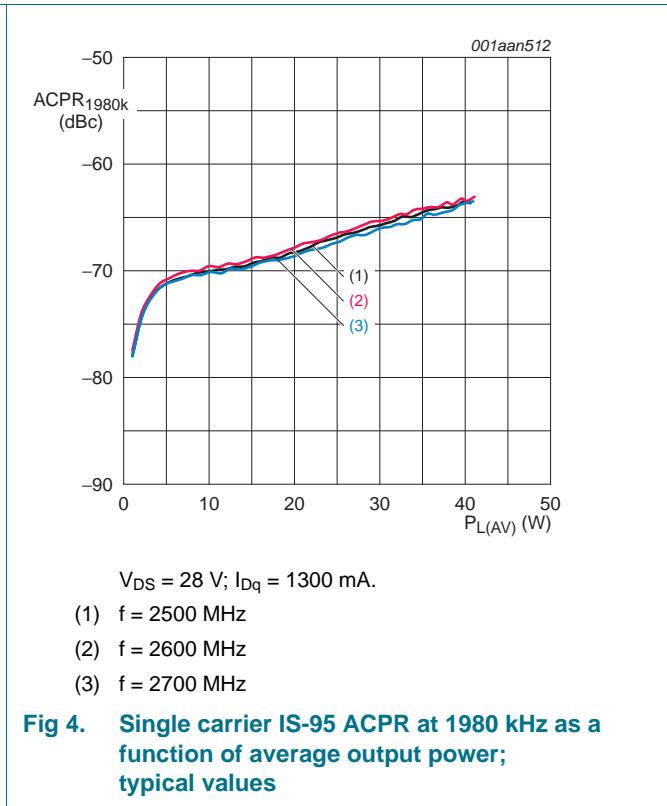
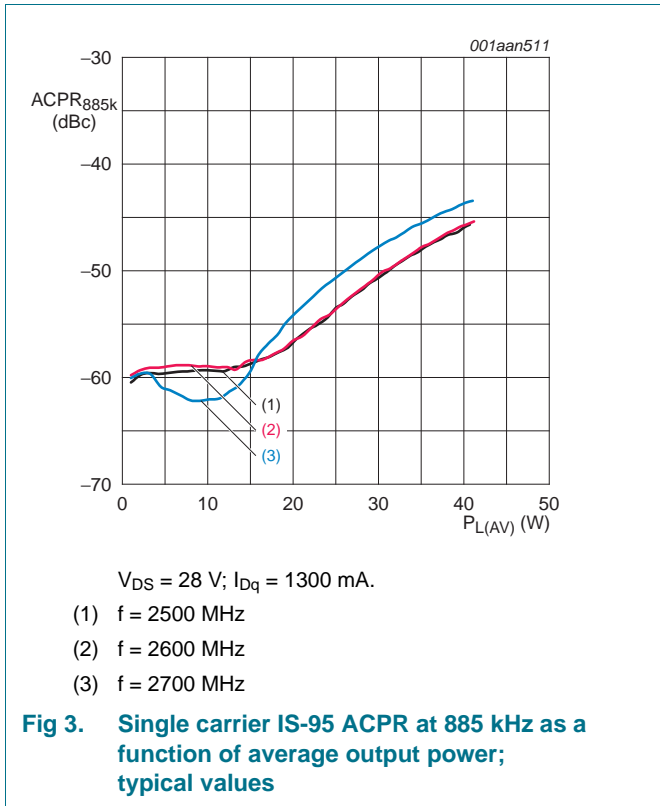
$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}$ .  
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2600\text{ MHz}$   
 (3)  $f = 2700\text{ MHz}$

**Fig 1. Single carrier IS-95 power gain as a function of average output power; typical values**

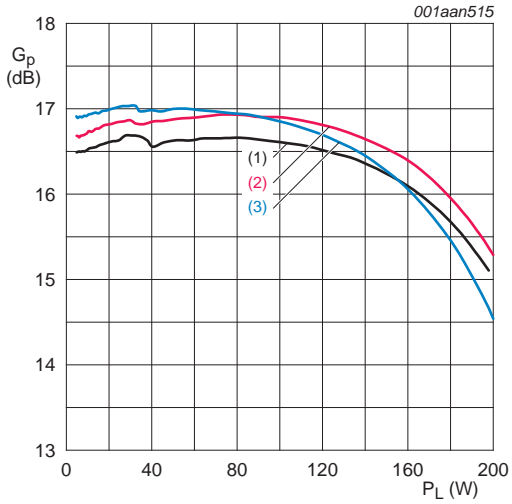


$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}$ .  
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2600\text{ MHz}$   
 (3)  $f = 2700\text{ MHz}$

**Fig 2. Single carrier IS-95 drain efficiency as a function of average output power; typical values**

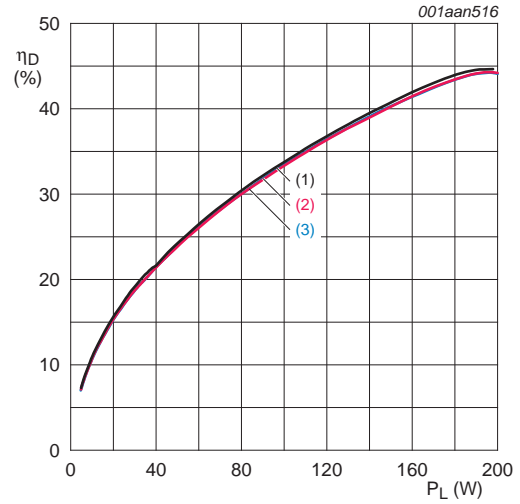


7.3 Pulsed CW



$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2600\text{ MHz}$   
 (3)  $f = 2700\text{ MHz}$

**Fig 7. Pulsed CW power gain as a function of output power; typical values**

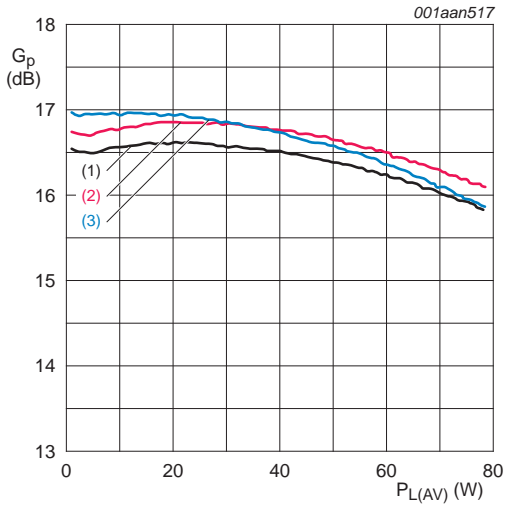


$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2600\text{ MHz}$   
 (3)  $f = 2700\text{ MHz}$

**Fig 8. Pulsed CW drain efficiency as a function of output power; typical values**

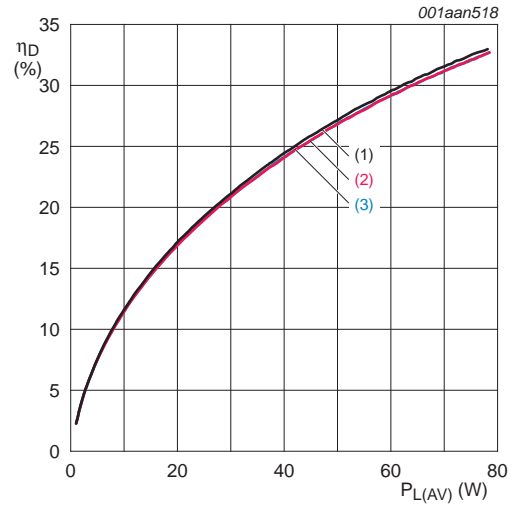
**7.4 Single carrier W-CDMA**

3GPP; test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on CCDF.  
Channel bandwidth is 3.84 MHz.



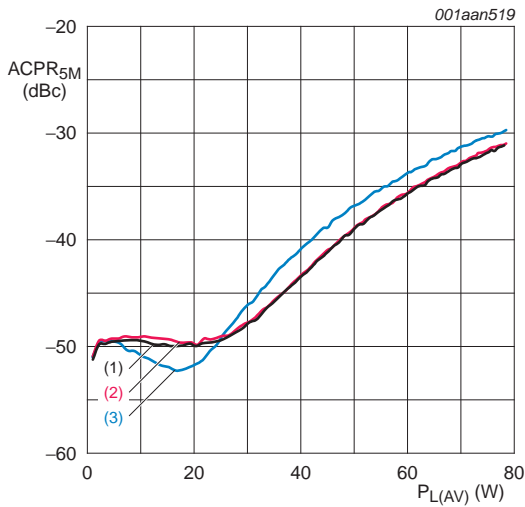
$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}$ .  
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2600\text{ MHz}$   
 (3)  $f = 2700\text{ MHz}$

**Fig 9. Single carrier W-CDMA power gain as a function of average output power; typical values**



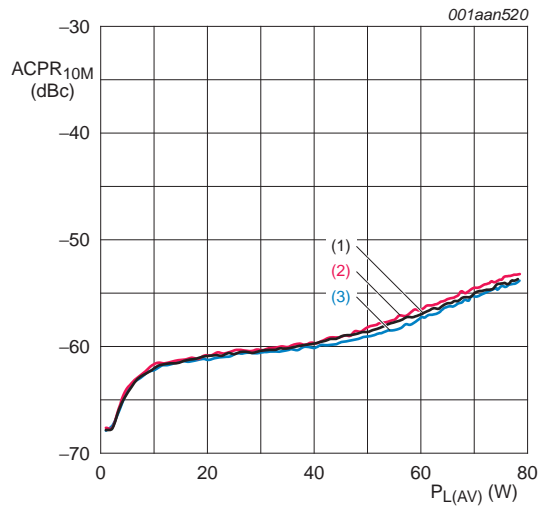
$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}$ .  
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2600\text{ MHz}$   
 (3)  $f = 2700\text{ MHz}$

**Fig 10. Single carrier W-CDMA drain efficiency as a function of average output power; typical values**



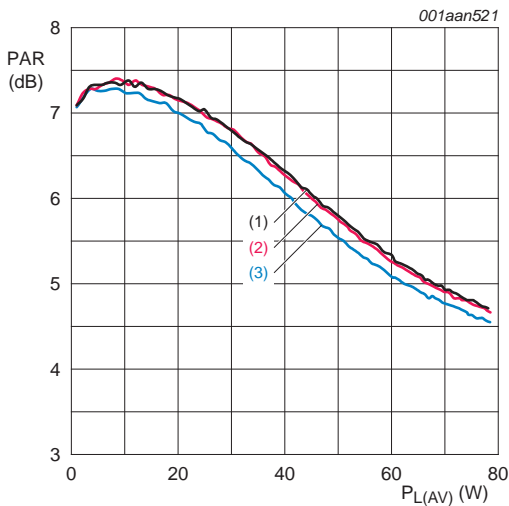
$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2600\text{ MHz}$   
 (3)  $f = 2700\text{ MHz}$

**Fig 11. Single carrier W-CDMA ACPR at 5 MHz as a function of average output power; typical values**



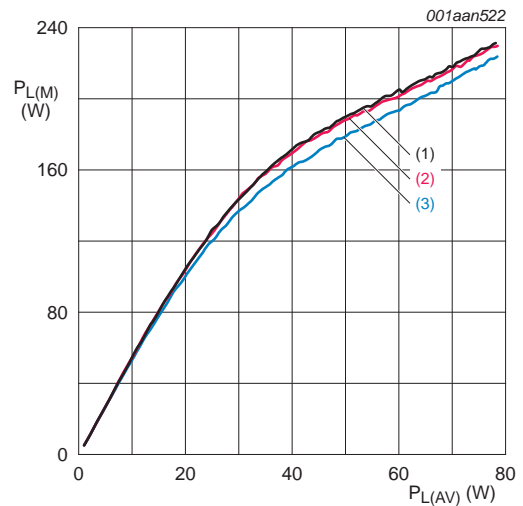
$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2600\text{ MHz}$   
 (3)  $f = 2700\text{ MHz}$

**Fig 12. Single carrier W-CDMA ACPR at 10 MHz as a function of average output power; typical values**



$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2600\text{ MHz}$   
 (3)  $f = 2700\text{ MHz}$

**Fig 13. Single carrier W-CDMA peak-to-average power ratio as a function of average output power; typical values**



$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2600\text{ MHz}$   
 (3)  $f = 2700\text{ MHz}$

**Fig 14. Single carrier W-CDMA peak output power as a function of average output power; typical values**



8. Package outline

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads

SOT502A

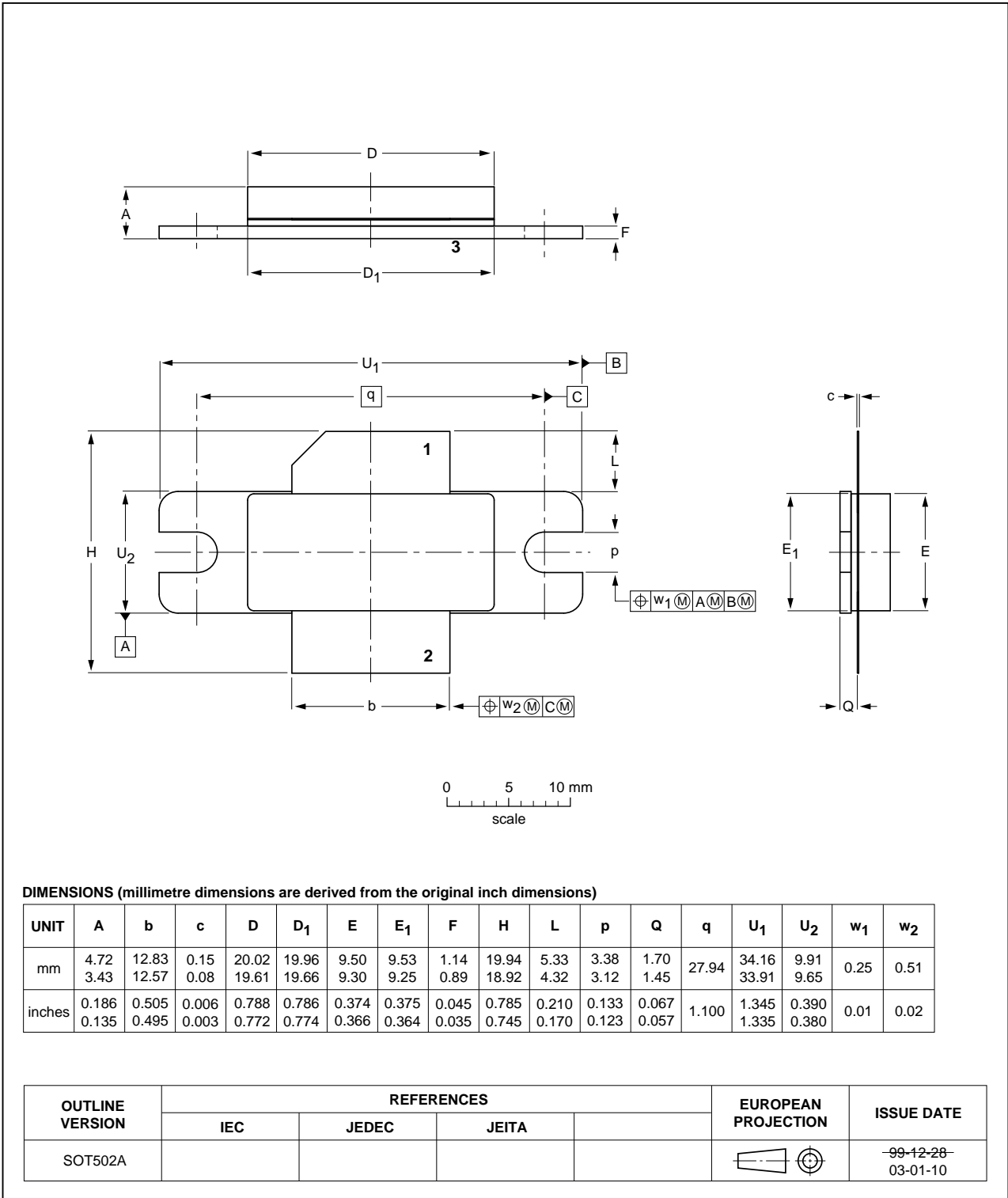


Fig 15. Package outline SOT502A

Earless flanged LDMOST ceramic package; 2 leads

SOT502B

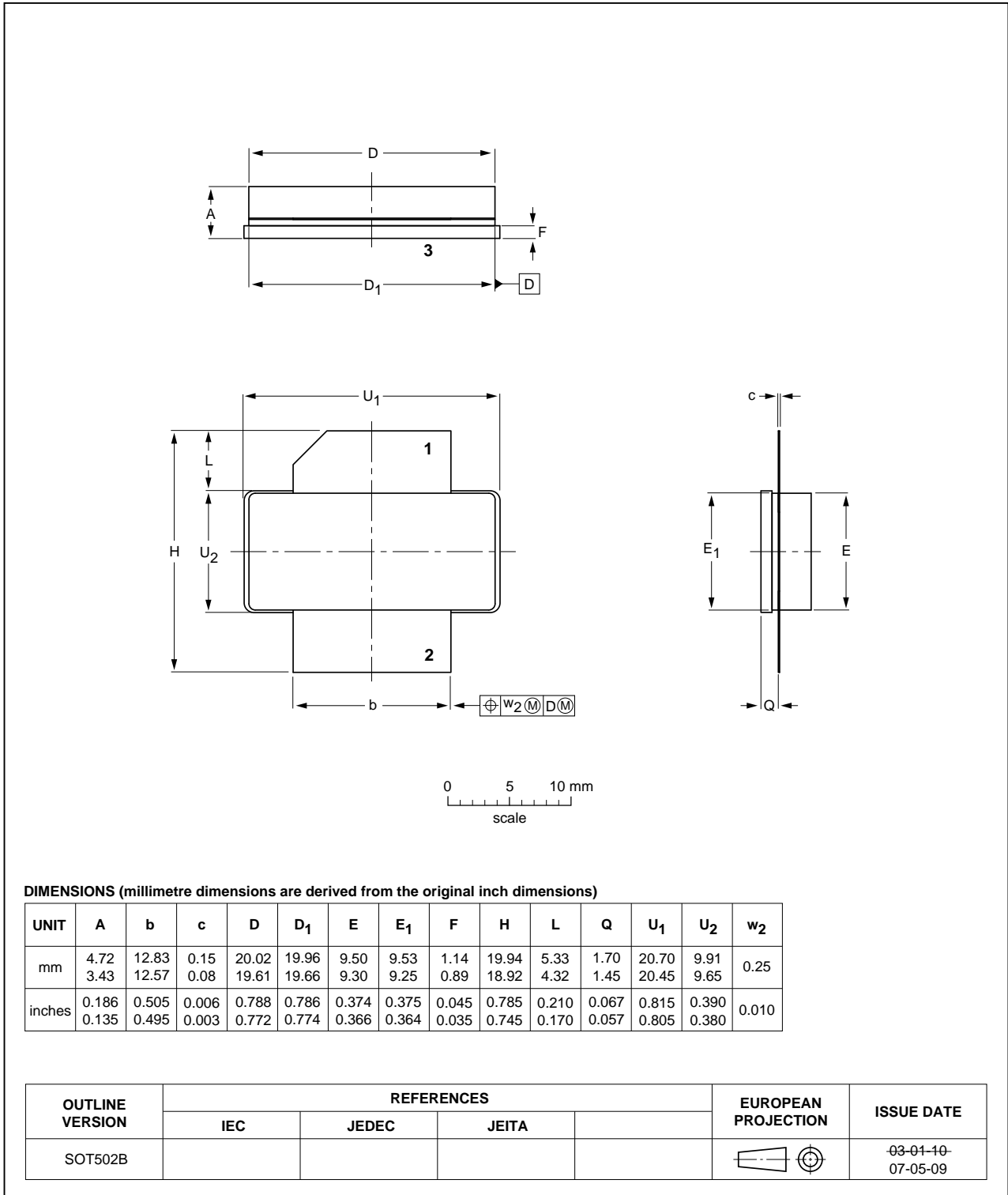


Fig 16. Package outline SOT502B

## 9. Abbreviations

**Table 8. Abbreviations**

Acronym	Description
3GPP	Third Generation Partnership Project
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
DPCH	Dedicated Physical CHannel
IS-95	Interim Standard 95
ESD	ElectroStatic Discharge
LDMOS	Laterally Diffused Metal Oxide Semiconductor
LDMOST	Laterally Diffused Metal Oxide Semiconductor Transistor
N-CDMA	Narrowband Code Division Multiple Access
PAR	Peak-to-Average power Ratio
RF	Radio Frequency
VSWR	Voltage Standing Wave Ratio
W-CDMA	Wideband Code Division Multiple Access

## 10. Revision history

**Table 9. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF7G27L-140_7G27LS-140 v.3	20110722	Product data sheet	-	BLF7G27L-140_7G27LS-140 v.2
Modifications:		<ul style="list-style-type: none"> <li>The status of this data sheet has been changed to Product data sheet</li> </ul>		
BLF7G27L-140_7G27LS-140 v.2	20110405	Preliminary data sheet	-	BLF7G27L-140_7G27LS-140 v.1
BLF7G27L-140_7G27LS-140 v.1	20100527	Objective data sheet	-	-

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### 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.

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

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