

BLF7G27L-140; BLF7G27LS-140

Power LDMOS transistor

Rev. 2 — 5 April 2011

Preliminary 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 $T_{case} = 25\text{ }^{\circ}\text{C}$ 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)	η_D (%)	ACPR _{885k} (dBc)	ACPR _{5M} (dBc)
IS-95	2500 to 2700	1300	28	30	16.5	22	-48 ^[1]	-
Single carrier W-CDMA	2500 to 2700	1300	28	50	16.5	27	-	-38 ^[2]

[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)

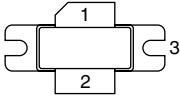
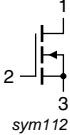
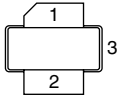
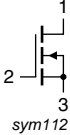
1.3 Applications

- 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
BLF7G27L-140 (SOT502A)			
1	drain		 sym112
2	gate		
3	source		
BLF7G27LS-140 (SOT502B)			
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

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 1\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 216\text{ mA}$	1.5	1.8	2.3	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$	-	-	5	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $V_{DS} = 10\text{ V}$	34.2	40.5	-	A
I_{GSS}	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	500	nA
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 216\text{ mA}$	-	1.87	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $I_D = 7.56\text{ A}$	-	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; $f_1 = 2500\text{ MHz}; f_2 = 2700\text{ MHz};$ RF performance at $V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA};$ $T_{case} = 25\text{ }^\circ\text{C};$ unless otherwise specified.

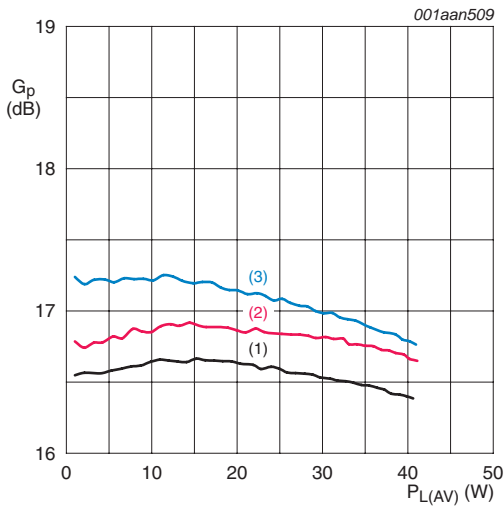
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	30	-	W
G_p	power gain		15.3	16.5	-	dB
RL_{in}	input return loss		-	-10	-	dB
η_D	drain efficiency		19	22	-	%
$ACPR_{885k}$	adjacent channel power ratio (885 kHz)		-44	-48	-	dBc

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: $V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}; P_L = 140\text{ W (CW)}; f = 2500\text{ MHz}.$

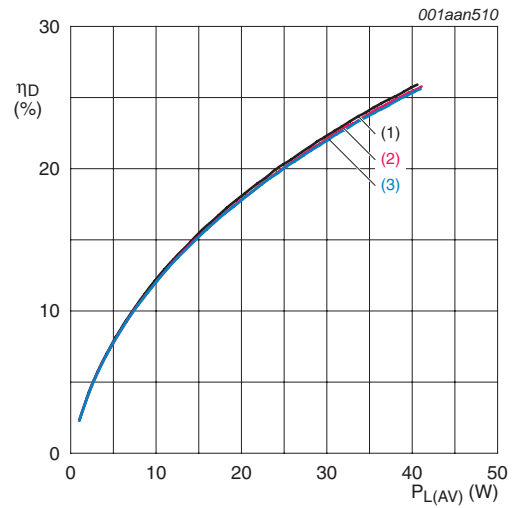
7.2 Single carrier IS-95

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.



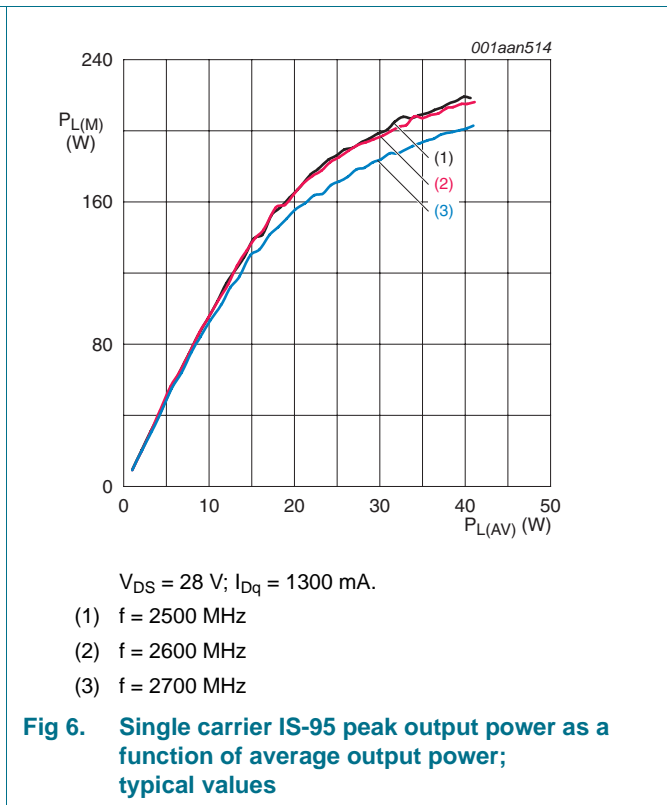
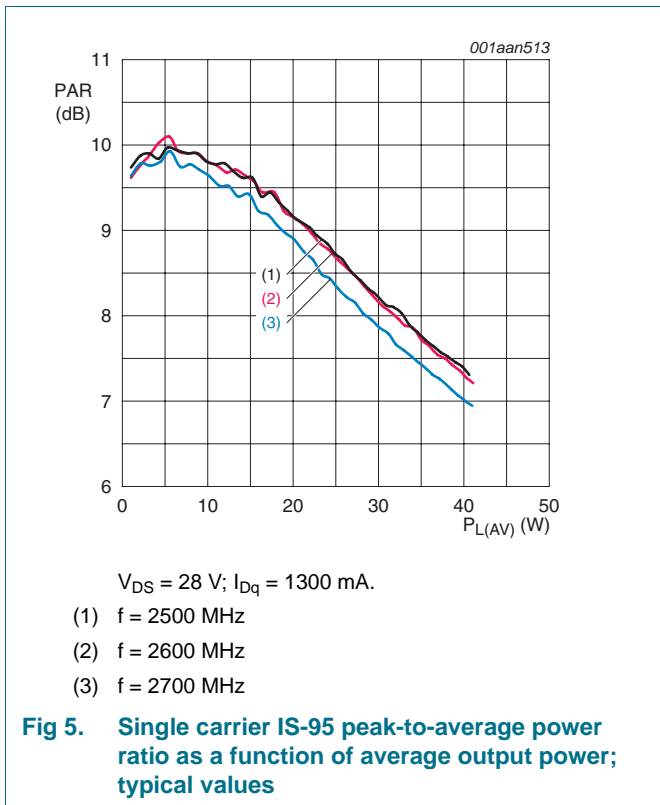
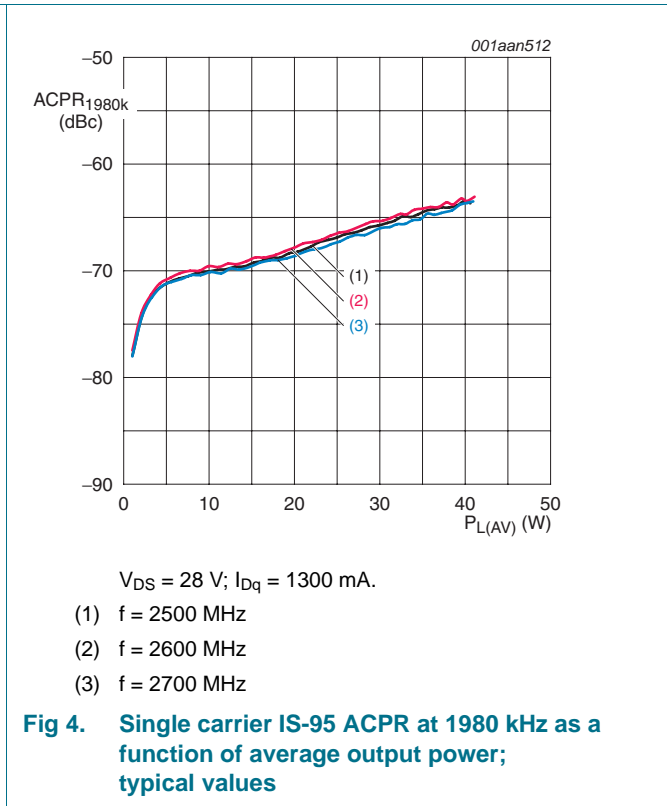
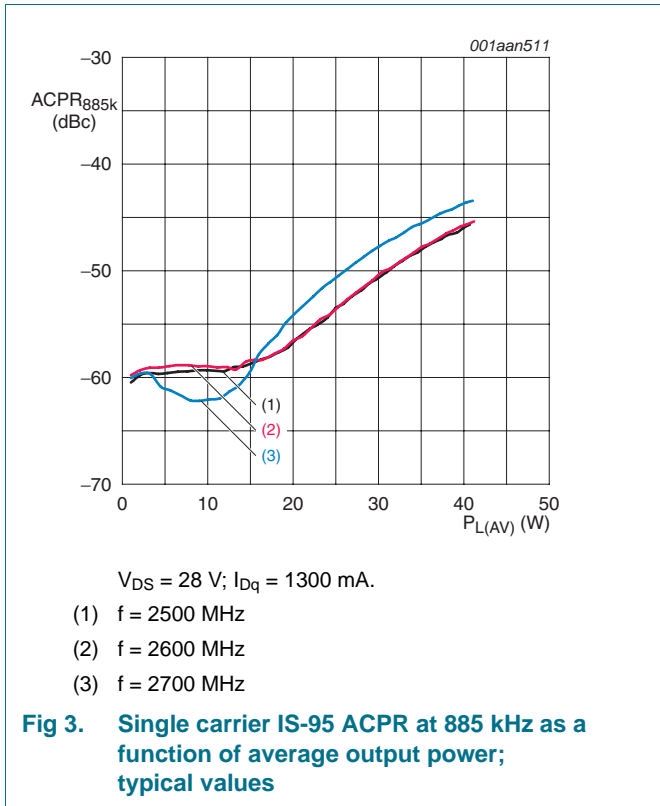
$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}$.
 (1) $f = 2500\text{ MHz}$
 (2) $f = 2600\text{ MHz}$
 (3) $f = 2700\text{ MHz}$

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

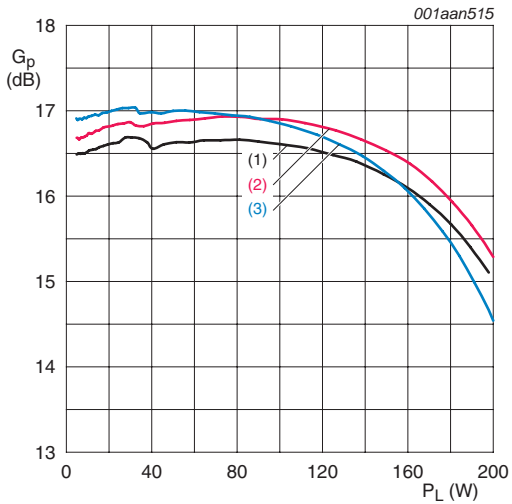


$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}$.
 (1) $f = 2500\text{ MHz}$
 (2) $f = 2600\text{ MHz}$
 (3) $f = 2700\text{ MHz}$

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

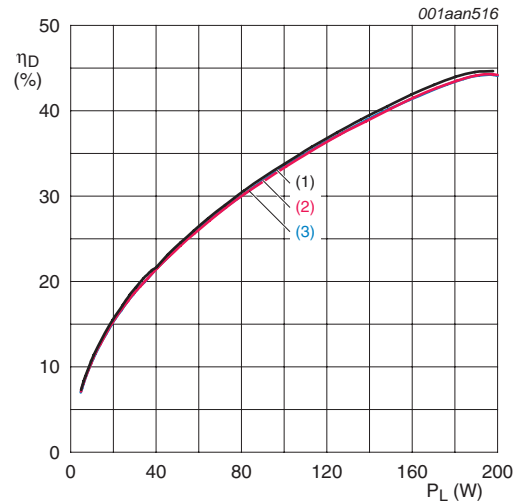


7.3 Pulsed CW



$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}.$
 (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

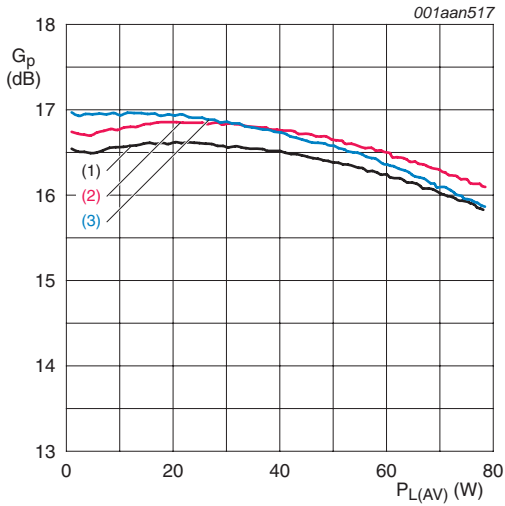


$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}.$
 (1) $f = 2500\text{ MHz}$
 (2) $f = 2600\text{ MHz}$
 (3) $f = 2700\text{ MHz}$

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

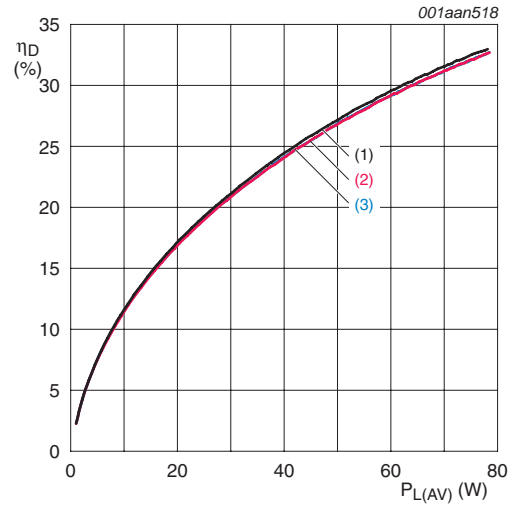
7.4 Single carrier W-CDMA

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



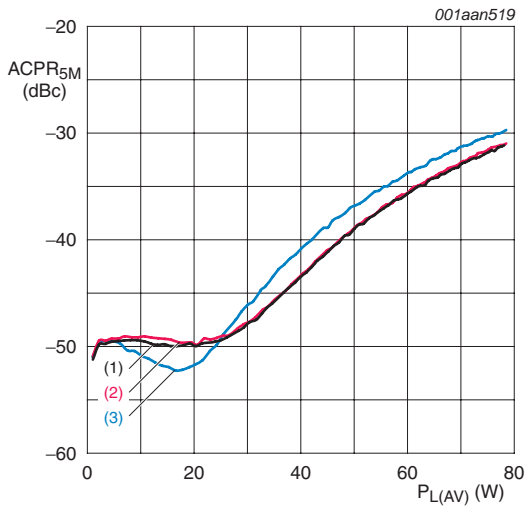
$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}$.
 (1) $f = 2500\text{ MHz}$
 (2) $f = 2600\text{ MHz}$
 (3) $f = 2700\text{ MHz}$

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



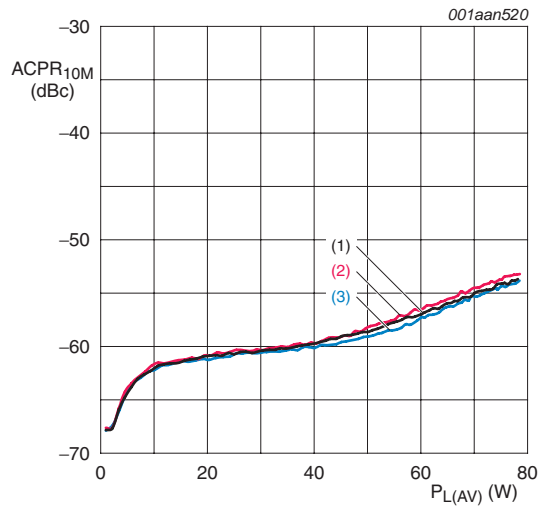
$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}$.
 (1) $f = 2500\text{ MHz}$
 (2) $f = 2600\text{ MHz}$
 (3) $f = 2700\text{ MHz}$

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



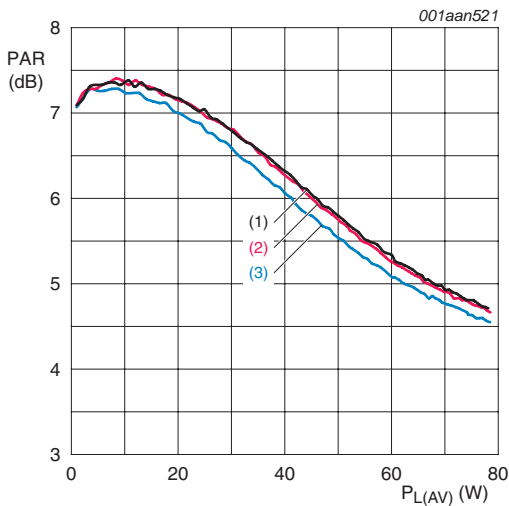
$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}.$
 (1) $f = 2500\text{ MHz}$
 (2) $f = 2600\text{ MHz}$
 (3) $f = 2700\text{ MHz}$

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



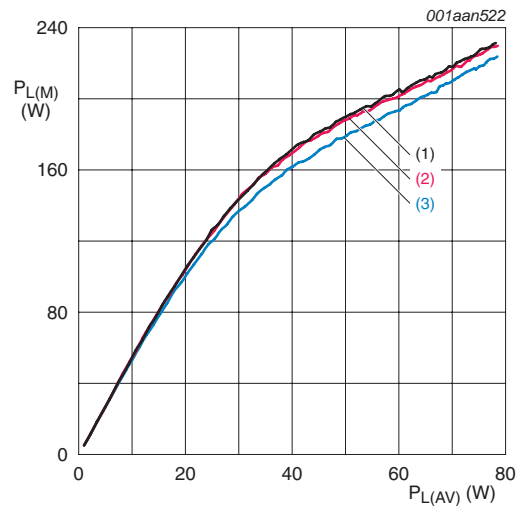
$V_{DS} = 28\text{ V}; I_{Dq} = 1300\text{ mA}.$
 (1) $f = 2500\text{ MHz}$
 (2) $f = 2600\text{ MHz}$
 (3) $f = 2700\text{ MHz}$

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

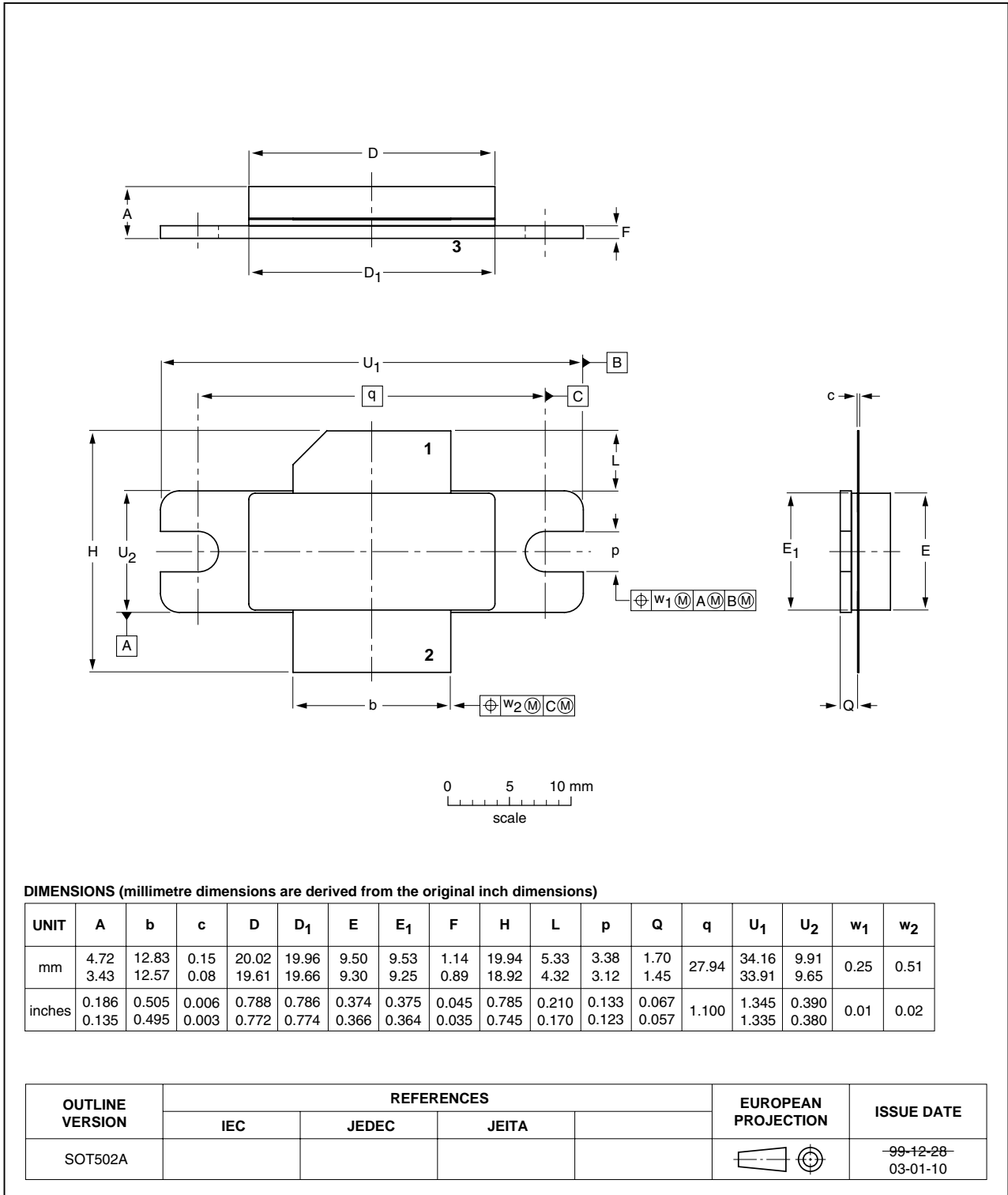


Fig 15. Package outline SOT502A

Earless flanged LDMOST ceramic package; 2 leads

SOT502B

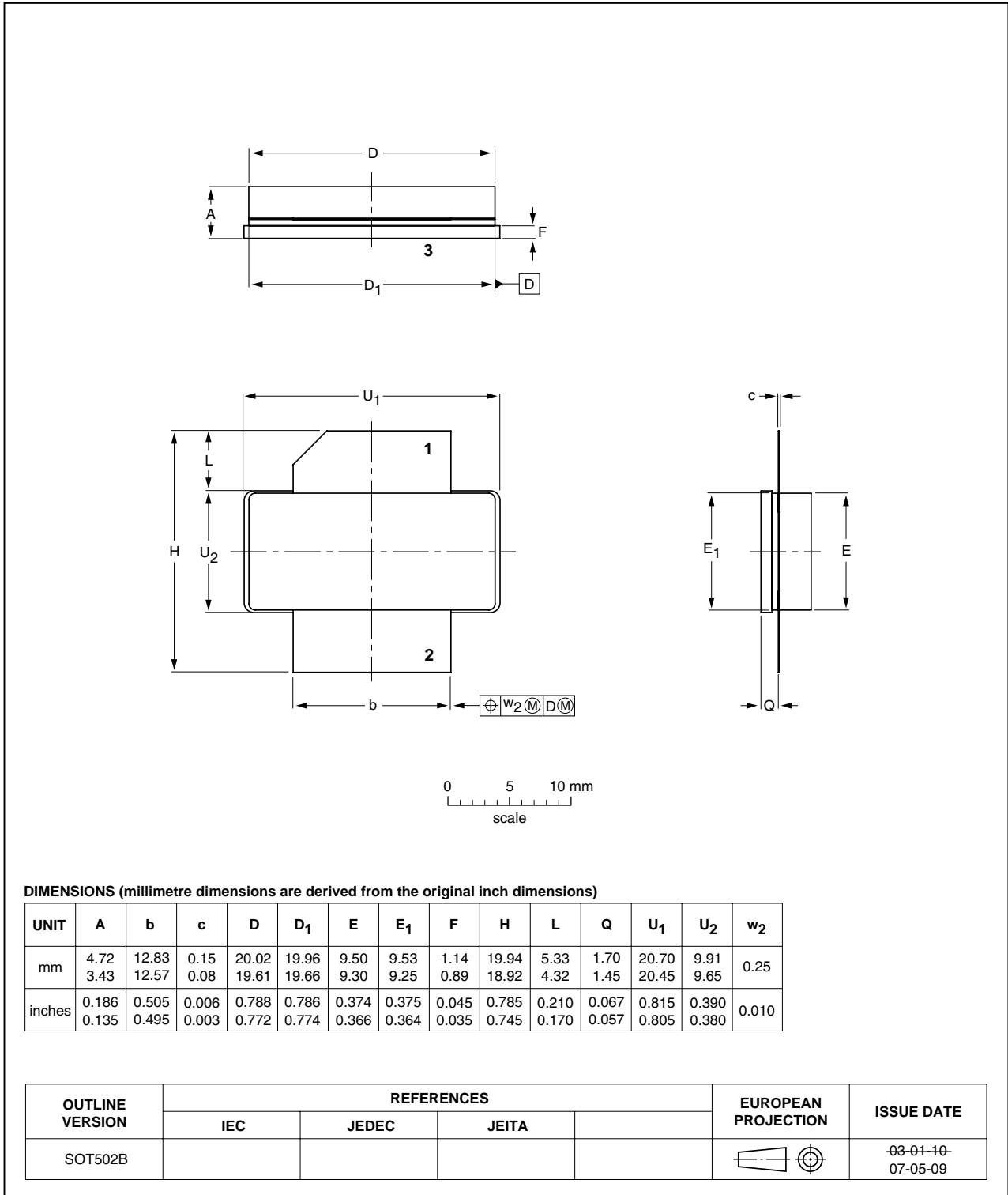


Fig 16. Package outline SOT502B

9. Abbreviations

Table 8. Abbreviations

Acronym	Description
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
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.2	20110405	Preliminary data sheet	-	BLF7G27L-140_7G27LS-140 v.1
Modifications:			<ul style="list-style-type: none"> • Table 1 on page 1: Some values have been changed. • Table 5 on page 2: Some values have been changed. • Table 6 on page 3: Some values have been changed. • Table 7 on page 3: Some values have been changed. • Section 7.2 on page 4: Graphs have been added. • Section 7.3 on page 6: Graphs have been added. • Section 7.4 on page 7: Graphs have been added. 	
BLF7G27L-140_7G27LS-140 v.1	20100527	Objective data sheet	-	-

11. Legal information

11.1 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.

[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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