

BLF6G27L-40P; BLF6G27LS-40P

Power LDMOS transistor

Rev. 1 — 4 July 2011

Product data sheet

1. Product profile

1.1 General description

40 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	450	28	12	17.5	30	-46 ^[1]	-
Single carrier W-CDMA	2500 to 2700	450	28	20	17.5	37	-	-35 ^[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 broadband operation (2500 MHz to 2700 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)

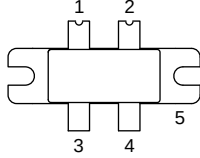
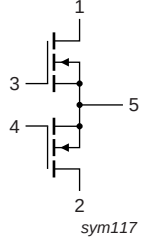
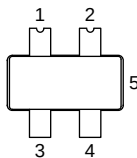
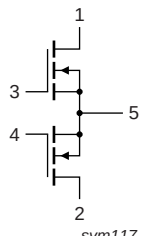
1.3 Applications

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



2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
BLF6G27L-40P (SOT1121A)			
1	drain1		 sym117
2	drain2		
3	gate1		
4	gate2		
5	source		
[1]			
BLF6G27LS-40P (SOT1121B)			
1	drain1		 sym117
2	drain2		
3	gate1		
4	gate2		
5	source		
[1]			

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF6G27L-40P	-	flanged LDMOST ceramic package; 2 mounting holes; 4 leads	SOT1121A
BLF6G27LS-40P	-	earless flanged LDMOST ceramic package; 4 leads	SOT1121B

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		-	15.5	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	$T_{case} = 80\text{ °C}$; $P_L = 40\text{ W}$	0.7	K/W

6. Characteristics

Table 6. Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}$; $I_D = 0.4\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}$; $I_D = 40\text{ mA}$	1.4	1.8	2.4	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}$; $V_{DS} = 28\text{ V}$	-	-	1.4	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $V_{DS} = 10\text{ V}$	5.96	7.2	-	A
I_{GSS}	gate leakage current	$V_{GS} = 11\text{ V}$; $V_{DS} = 0\text{ V}$	-	-	150	nA
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}$; $I_D = 2000\text{ mA}$	1.8	2.9	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $I_D = 1400\text{ mA}$	0.14	0.36	-	Ω

7. Test information

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 $V_{DS} = 28\text{ V}$; $I_{Dq} = 450\text{ mA}$; $T_{case} = 25\text{ °C}$; 2 sections combined unless otherwise specified; in a class-AB production test circuit.

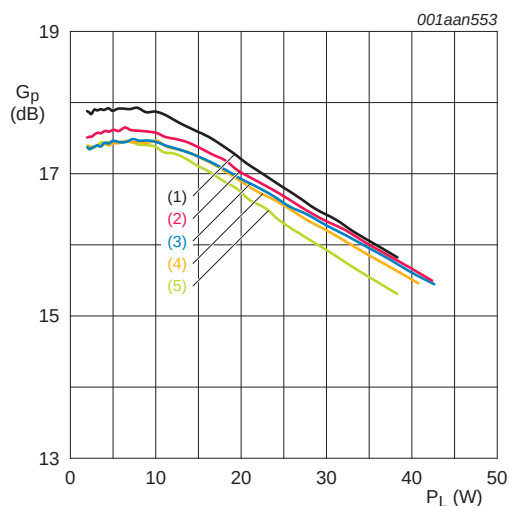
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	12	-	W
G_p	power gain	$P_{L(AV)} = 12\text{ W}$	15.5	17.5	-	dB
RL_{in}	input return loss	$P_{L(AV)} = 12\text{ W}$	-	-10	-	dB
η_D	drain efficiency	$P_{L(AV)} = 12\text{ W}$	26	30	-	%
$ACPR_{885k}$	adjacent channel power ratio (885 kHz)	$P_{L(AV)} = 12\text{ W}$	-	-46	-41	dBc

7.1 Ruggedness in class-AB operation

The BLF6G27L-40P and BLF6G27LS-40P are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS} = 28\text{ V}$; $I_{Dq} = 450\text{ mA}$; $P_L = 40\text{ W}$ (CW); $f = 2500\text{ MHz}$.

7.2 Single carrier IS-95

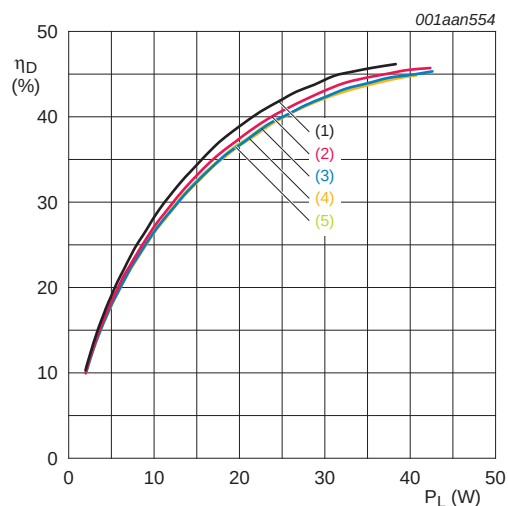
Single carrier IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 - 13).
PAR = 9.7 dB at 0.01 % probability on the CCDF. Channel bandwidth is 1.2288 MHz.



$V_{DS} = 28$ V; $I_{DQ} = 450$ mA.

- (1) $f = 2500$ MHz
- (2) $f = 2550$ MHz
- (3) $f = 2600$ MHz
- (4) $f = 2650$ MHz
- (5) $f = 2700$ MHz

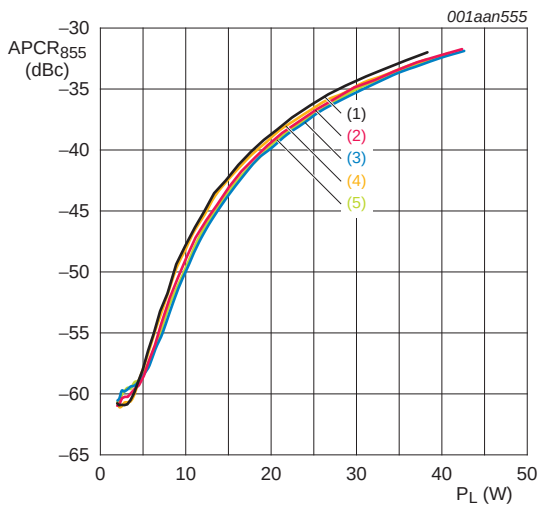
Fig 1. Single carrier IS-95 power gain as a function of output power; typical values



$V_{DS} = 28$ V; $I_{DQ} = 450$ mA.

- (1) $f = 2500$ MHz
- (2) $f = 2550$ MHz
- (3) $f = 2600$ MHz
- (4) $f = 2650$ MHz
- (5) $f = 2700$ MHz

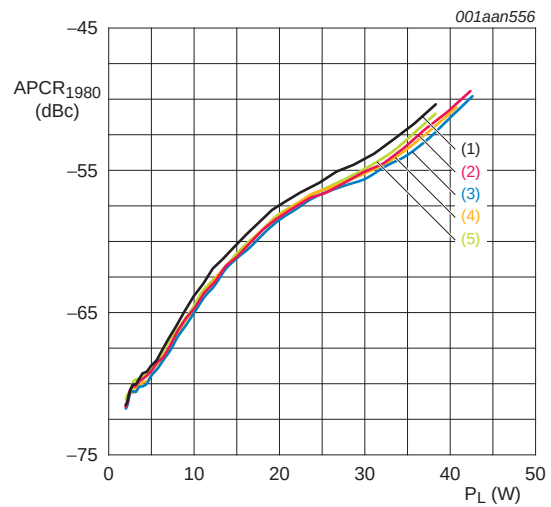
Fig 2. Single carrier IS-95 drain efficiency as a function of output power; typical values



$V_{DS} = 28 \text{ V}$; $I_{DQ} = 450 \text{ mA}$.

- (1) $f = 2500 \text{ MHz}$
- (2) $f = 2550 \text{ MHz}$
- (3) $f = 2600 \text{ MHz}$
- (4) $f = 2650 \text{ MHz}$
- (5) $f = 2700 \text{ MHz}$

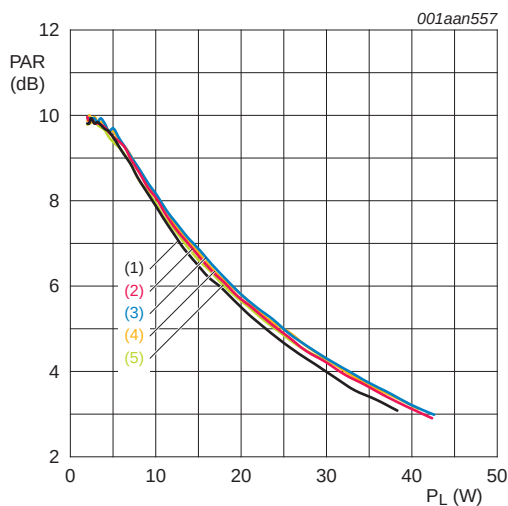
Fig 3. Single carrier IS-95 ACPR at 885 kHz as a function of output power; typical values



$V_{DS} = 28 \text{ V}$; $I_{DQ} = 450 \text{ mA}$.

- (1) $f = 2500 \text{ MHz}$
- (2) $f = 2550 \text{ MHz}$
- (3) $f = 2600 \text{ MHz}$
- (4) $f = 2650 \text{ MHz}$
- (5) $f = 2700 \text{ MHz}$

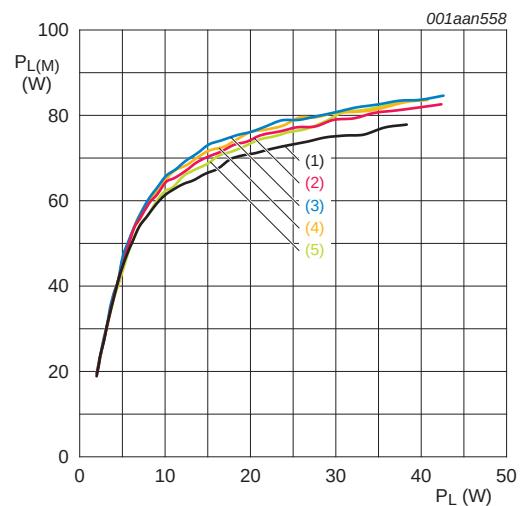
Fig 4. Single carrier IS-95 ACPR at 1980 kHz as a function of output power; typical values



$V_{DS} = 28 \text{ V}$; $I_{DQ} = 450 \text{ mA}$.

- (1) $f = 2500 \text{ MHz}$
- (2) $f = 2550 \text{ MHz}$
- (3) $f = 2600 \text{ MHz}$
- (4) $f = 2650 \text{ MHz}$
- (5) $f = 2700 \text{ MHz}$

Fig 5. Single carrier IS-95 peak-to-average power ratio as a function of output power; typical values

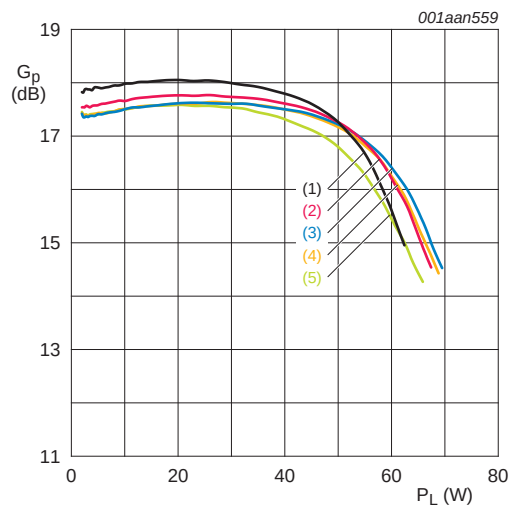


$V_{DS} = 28 \text{ V}$; $I_{DQ} = 450 \text{ mA}$.

- (1) $f = 2500 \text{ MHz}$
- (2) $f = 2550 \text{ MHz}$
- (3) $f = 2600 \text{ MHz}$
- (4) $f = 2650 \text{ MHz}$
- (5) $f = 2700 \text{ MHz}$

Fig 6. Single carrier IS-95 peak output power as a function of output power; typical values

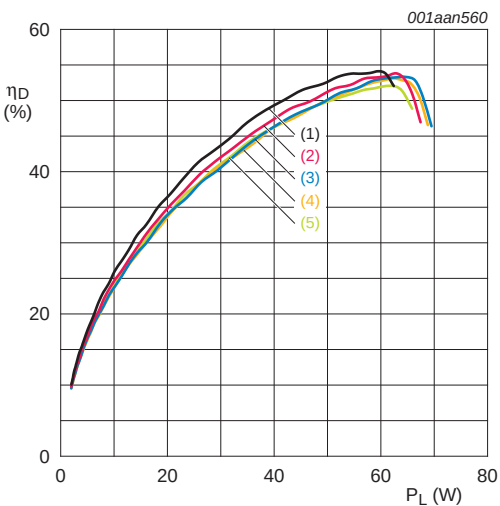
7.3 Pulsed CW



$V_{DS} = 28\text{ V}$; $I_{DQ} = 450\text{ mA}$.

- (1) $f = 2500\text{ MHz}$
- (2) $f = 2550\text{ MHz}$
- (3) $f = 2600\text{ MHz}$
- (4) $f = 2650\text{ MHz}$
- (5) $f = 2700\text{ MHz}$

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



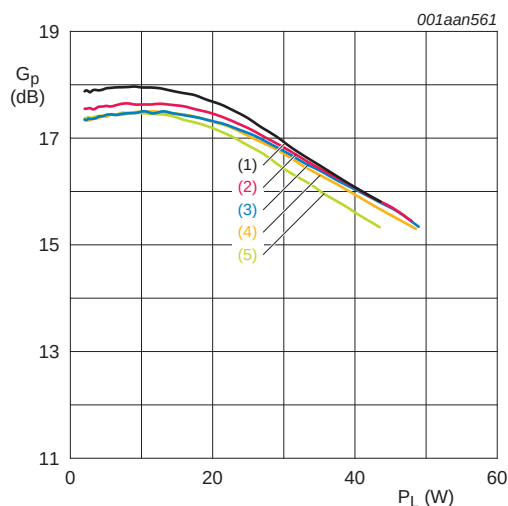
$V_{DS} = 28\text{ V}$; $I_{DQ} = 450\text{ mA}$.

- (1) $f = 2500\text{ MHz}$
- (2) $f = 2550\text{ MHz}$
- (3) $f = 2600\text{ MHz}$
- (4) $f = 2650\text{ MHz}$
- (5) $f = 2700\text{ MHz}$

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

7.4 Single carrier W-CDMA

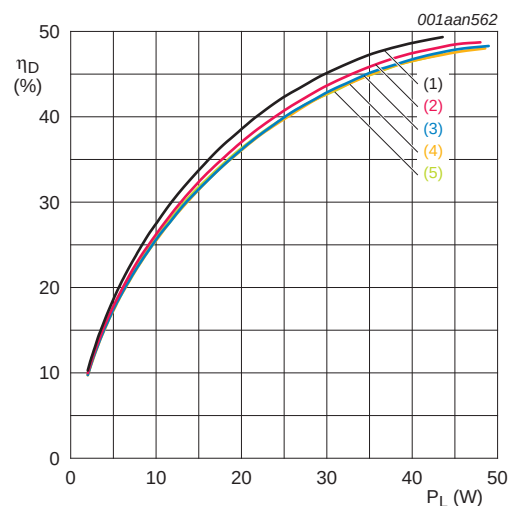
3GPP; test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on CCDF.
Channel bandwidth is 3.84 MHz.



$V_{DS} = 28\text{ V}$; $I_{DQ} = 450\text{ mA}$.

- (1) $f = 2500\text{ MHz}$
- (2) $f = 2550\text{ MHz}$
- (3) $f = 2600\text{ MHz}$
- (4) $f = 2650\text{ MHz}$
- (5) $f = 2700\text{ MHz}$

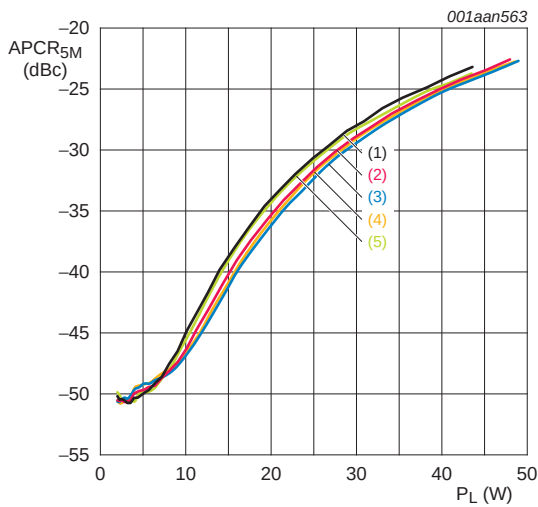
Fig 9. Single carrier W-CDMA power gain as a function of output power; typical values



$V_{DS} = 28\text{ V}$; $I_{DQ} = 450\text{ mA}$.

- (1) $f = 2500\text{ MHz}$
- (2) $f = 2550\text{ MHz}$
- (3) $f = 2600\text{ MHz}$
- (4) $f = 2650\text{ MHz}$
- (5) $f = 2700\text{ MHz}$

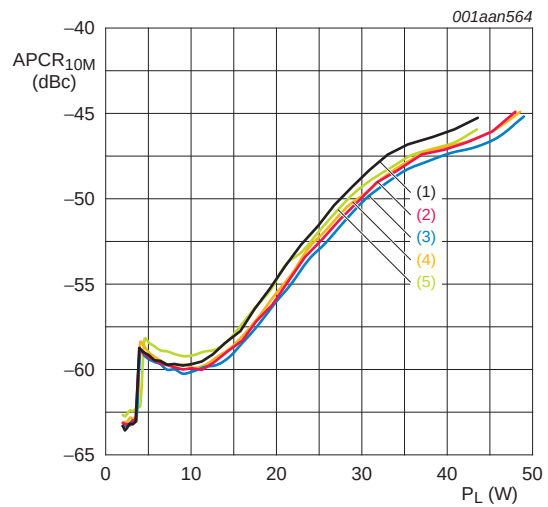
Fig 10. Single carrier W-CDMA drain efficiency as a function of output power; typical values



$V_{DS} = 28 \text{ V}$; $I_{DQ} = 450 \text{ mA}$.

- (1) $f = 2500 \text{ MHz}$
- (2) $f = 2550 \text{ MHz}$
- (3) $f = 2600 \text{ MHz}$
- (4) $f = 2650 \text{ MHz}$
- (5) $f = 2700 \text{ MHz}$

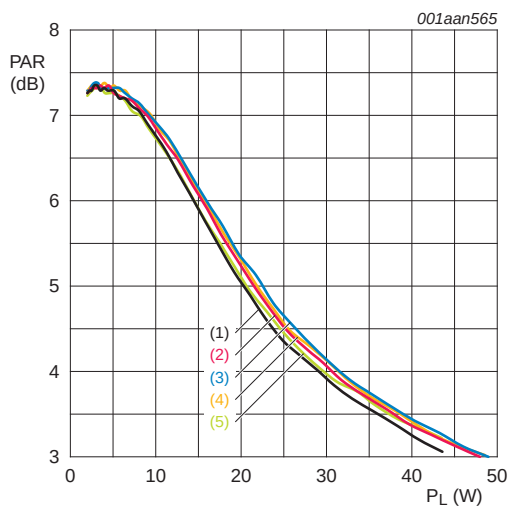
Fig 11. Single carrier W-CDMA ACPR at 5 MHz as a function of output power; typical values



$V_{DS} = 28 \text{ V}$; $I_{DQ} = 450 \text{ mA}$.

- (1) $f = 2500 \text{ MHz}$
- (2) $f = 2550 \text{ MHz}$
- (3) $f = 2600 \text{ MHz}$
- (4) $f = 2650 \text{ MHz}$
- (5) $f = 2700 \text{ MHz}$

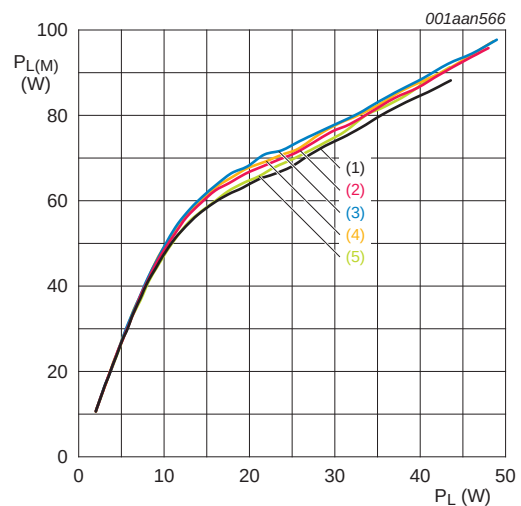
Fig 12. Single carrier W-CDMA ACPR at 10 MHz as a function of output power; typical values



$V_{DS} = 28 \text{ V}$; $I_{DQ} = 450 \text{ mA}$.

- (1) $f = 2500 \text{ MHz}$
- (2) $f = 2550 \text{ MHz}$
- (3) $f = 2600 \text{ MHz}$
- (4) $f = 2650 \text{ MHz}$
- (5) $f = 2700 \text{ MHz}$

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



$V_{DS} = 28 \text{ V}$; $I_{DQ} = 450 \text{ mA}$.

- (1) $f = 2500 \text{ MHz}$
- (2) $f = 2550 \text{ MHz}$
- (3) $f = 2600 \text{ MHz}$
- (4) $f = 2650 \text{ MHz}$
- (5) $f = 2700 \text{ MHz}$

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

8. Package outline

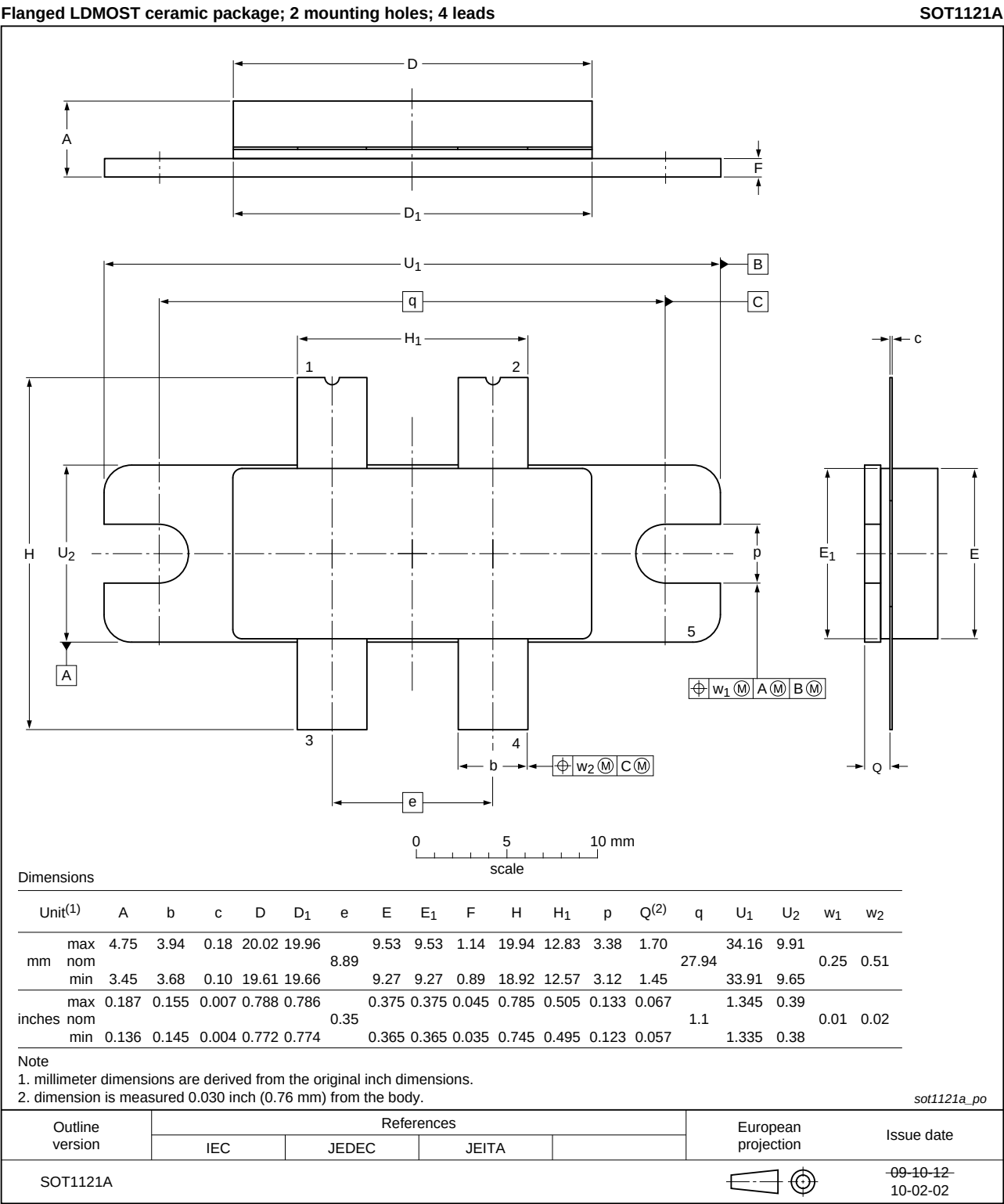


Fig 15. Package outline SOT1121A

Earless flanged LDMOST ceramic package; 4 leads

SOT1121B

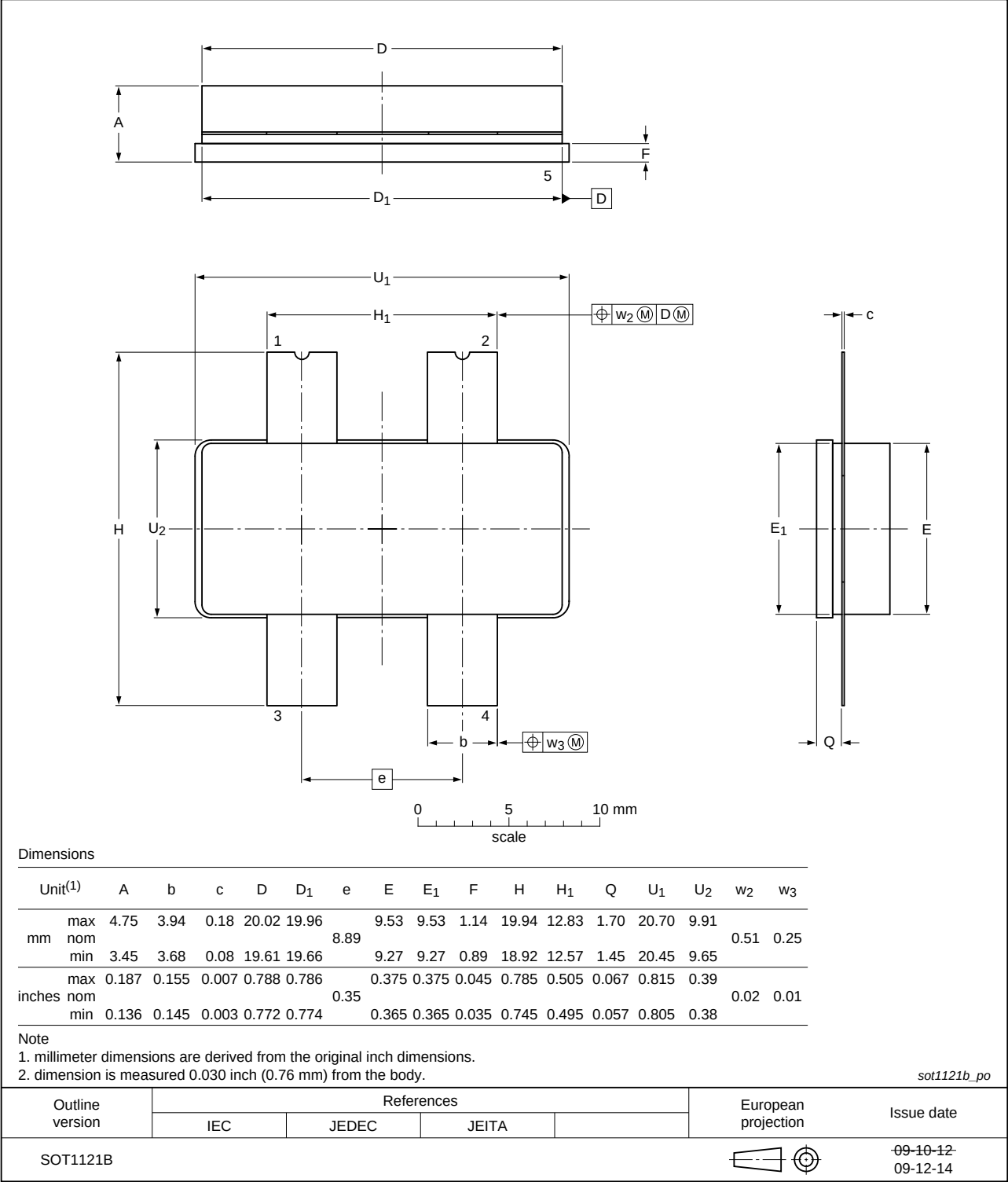


Fig 16. Package outline SOT1121B

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
BLF6G27L-40P_BLF6G27LS-40P v.1	20110704	Product 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.
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[2] The term 'short data sheet' is explained in section "Definitions".

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