

BLF6G27L-50BN; BLF6G27LS-50BN

Power LDMOS transistor

Rev. 2 — 7 April 2011

Product data sheet

1. Product profile

1.1 General description

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

Table 1. Typical performance

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)	η_D (%)	ACPR (dBc)
2-carrier W-CDMA	2500 to 2700	430	28	3	16.5	14.5	-47 ^[1]

[1] Test signal: 3GPP; test model 1; 64 DPCH; PAR = 8.4 dB at 0.01 % probability on CCDF per carrier; carrier spacing 5 MHz

1.2 Features and benefits

- Typical 2-carrier W-CDMA performance at frequencies of 2500 MHz and 2700 MHz, a supply voltage of 28 V and an I_{DQ} of 430 mA:
 - ◆ Average output power = 3 W
 - ◆ Power gain = 16.5 dB (typical)
 - ◆ Efficiency = 14.5 %
 - ◆ ACPR = -47 dBc
- 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
- Integrated current sense
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

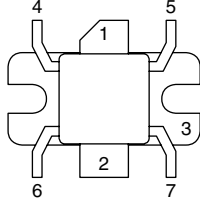
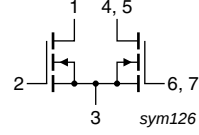
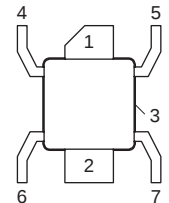
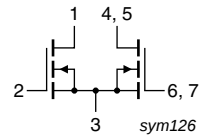
1.3 Applications

- RF power amplifiers for 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-50BN (SOT1112A)			
1	drain		
2	gate		
3	source		
4, 5	sense drain		
6, 7	sense gate		
BLF6G27LS-50BN (SOT1112B)			
1	drain		
2	gate		
3	source		
4, 5	sense drain		
6, 7	sense gate		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF6G27L-50BN	-	flanged ceramic package; 2 mounting holes; 6 leads	SOT1112A
BLF6G27LS-50BN	-	earless flanged ceramic package; 6 leads	SOT1112B

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
$V_{GS(sense)}$	sense gate-source voltage		-0.5	+9	V
I_D	drain current		-	12	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
$R_{th(j-case)}$	thermal resistance from junction to case	$T_{case} = 80\text{ }^{\circ}\text{C}$; $P_L = 12.5\text{ W (CW)}$	1.3	K/W

6. Characteristics

Table 6. 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	$V_{GS} = 0\text{ V}$; $I_D = 0.5\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}$; $I_D = 72\text{ mA}$	1.4	1.9	2.4	V
I_{Dq}	quiescent drain current	sense transistor: $I_{DS} = 9.1\text{ mA}$; $V_{DS} = 26.5\text{ V}$ main transistor: $V_{DS} = 28\text{ V}$	380	430	480	mA
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}$; $V_{DS} = 28\text{ V}$	-	-	1.5	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $V_{DS} = 10\text{ V}$	10	12	-	A
I_{GSS}	gate leakage current	$V_{GS} = 11\text{ V}$; $V_{DS} = 0\text{ V}$	-	-	150	nA
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}$; $I_D = 3.6\text{ A}$	-	5.0	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $I_D = 2.52\text{ A}$	-	0.25	-	Ω

7. Application information

Table 7. 2-carrier W-CDMA application information

All testing performed in Class-AB production test circuit; test signal 3GPP; test model 1; 64 DPCH; $PAR = 8.4\text{ dB}$ at 0.01 % probability on CCDF per carrier; carrier spacing 5 MHz; $f_1 = 2500\text{ MHz}$; $f_2 = 2600\text{ MHz}$; $f_3 = 2700\text{ MHz}$; RF performance at $V_{DS} = 28\text{ V}$; $I_{Dq} = 430\text{ mA}$; $T_{case} = 25\text{ }^{\circ}\text{C}$; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	3	-	W
G_p	power gain	$P_{L(AV)} = 3\text{ W}$	15.3	16.5	-	dB
η_D	drain efficiency	$P_{L(AV)} = 3\text{ W}$	12.5	14.5	-	%
ACPR	adjacent channel power ratio	$P_{L(AV)} = 3\text{ W}$	-	-47	-43	dBc
I_{Dq}	quiescent drain current	$V_{DD} = 28\text{ V}$	-	430	-	mA

Table 8. 1-carrier W-CDMA application information

All testing performed in Class-AB production test circuit; test signal 3GPP; test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on CCDF per carrier; f = 2700 MHz; RF performance at $V_{DS} = 28\text{ V}$; $I_{DQ} = 430\text{ mA}$; $T_{case} = 25\text{ }^{\circ}\text{C}$; unless otherwise specified.

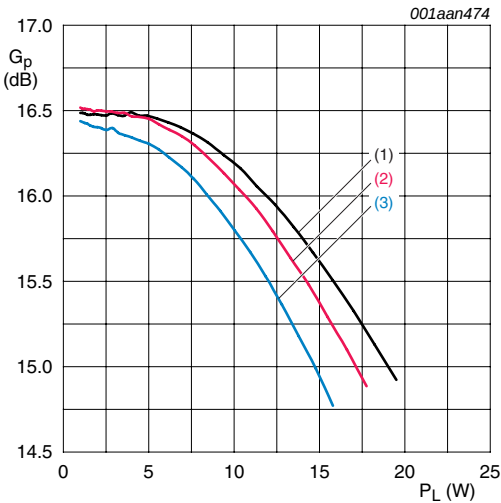
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
PAR _O	output peak-to-average ratio	P _{L(AV)} = 16 W	4.1	4.7	5.3	dB

7.1 Ruggedness in Class-AB operation

The BLF6G27L-50BN and BLF6G27LS-50BN are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS} = 28\text{ V}$; $I_{DQ} = 430\text{ mA}$; P_L = 40 W (CW); f = 2500 MHz.

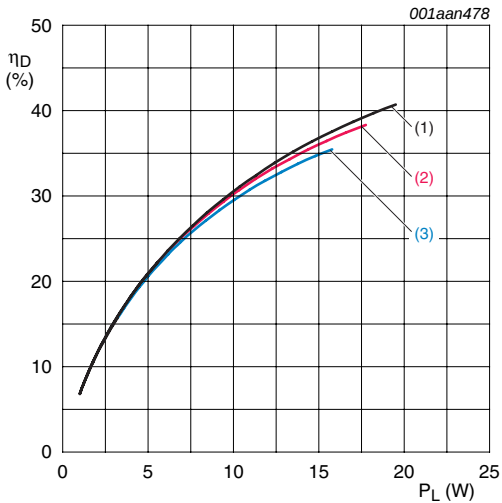
7.2 Single carrier IS-95

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.



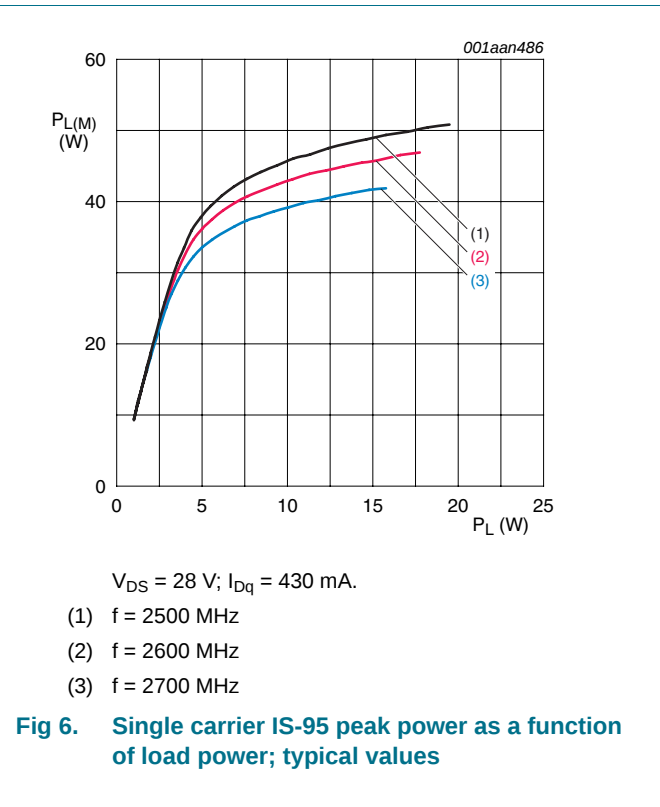
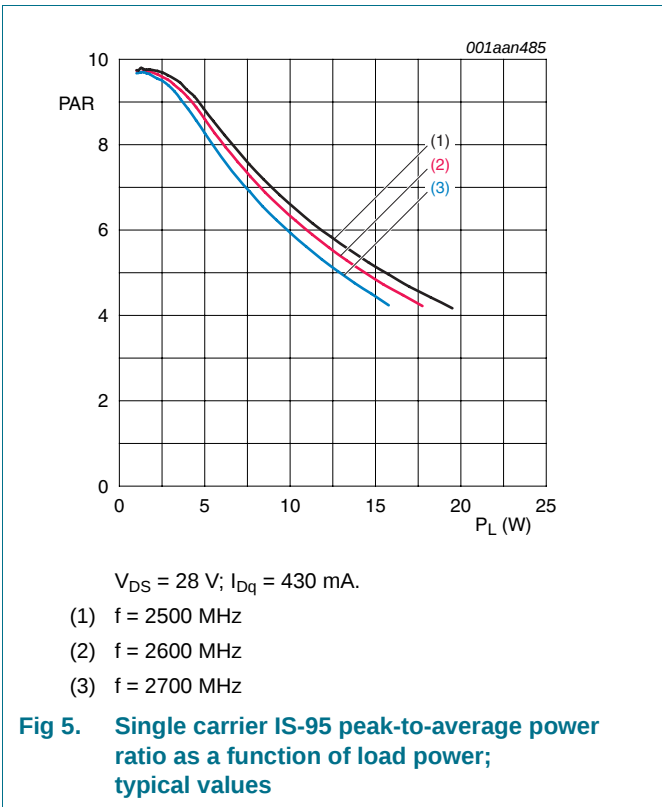
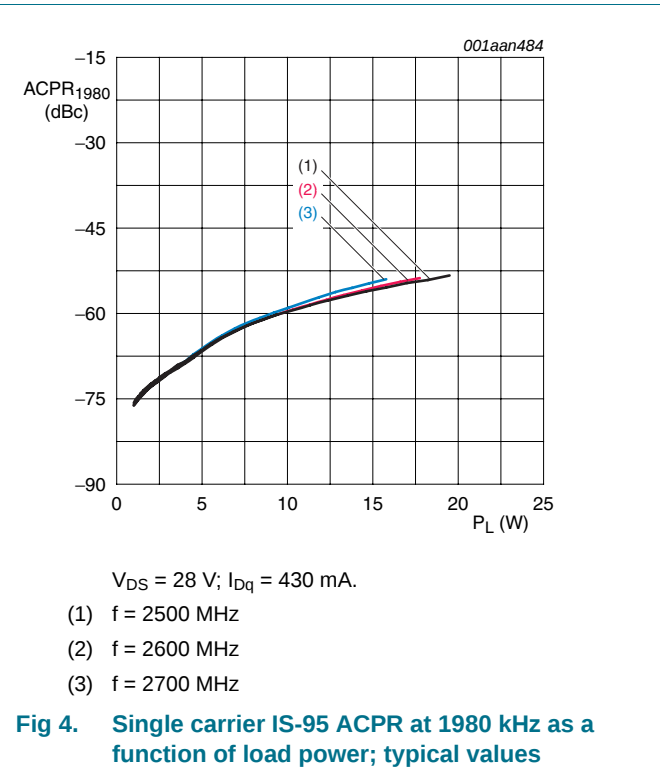
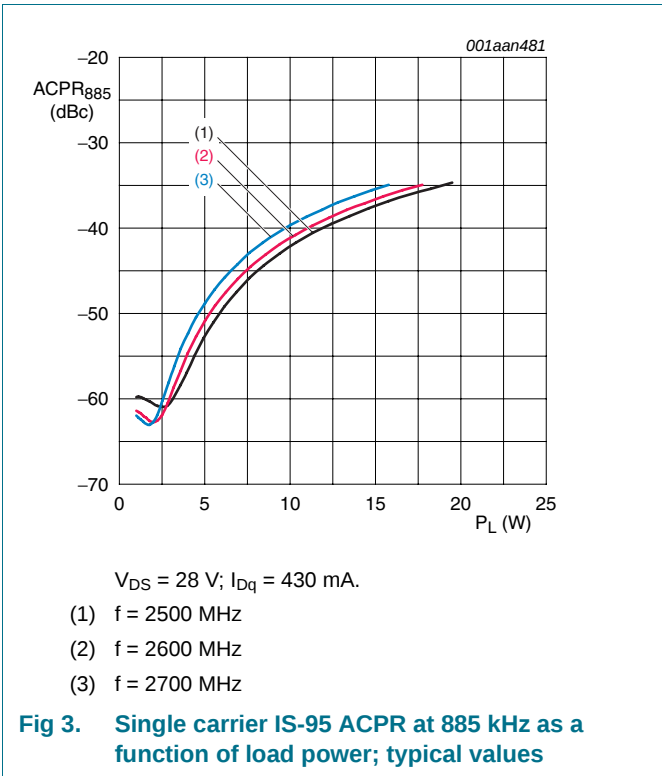
$V_{DS} = 28\text{ V}$; $I_{DQ} = 430\text{ mA}$.
(1) f = 2500 MHz
(2) f = 2600 MHz
(3) f = 2700 MHz

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

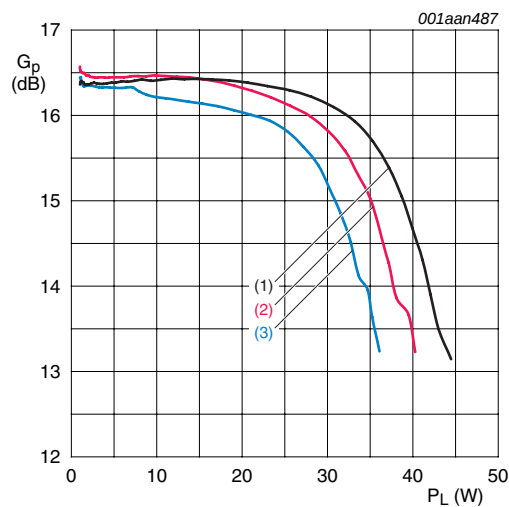


$V_{DS} = 28\text{ V}$; $I_{DQ} = 430\text{ mA}$.
(1) f = 2500 MHz
(2) f = 2600 MHz
(3) f = 2700 MHz

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

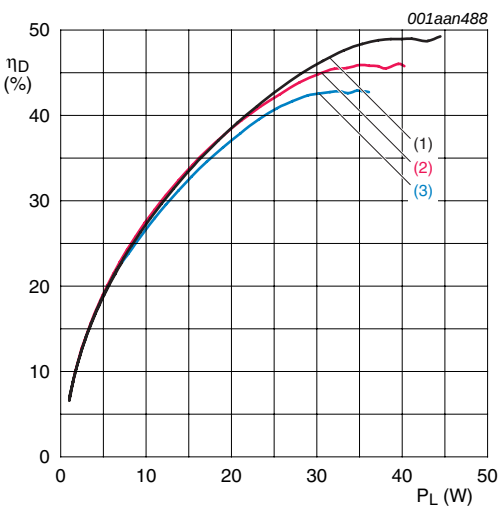


7.3 Pulsed CW



$V_{DS} = 28$ V; $I_{Dq} = 430$ mA.
(1) $f = 2500$ MHz
(2) $f = 2600$ MHz
(3) $f = 2700$ MHz

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

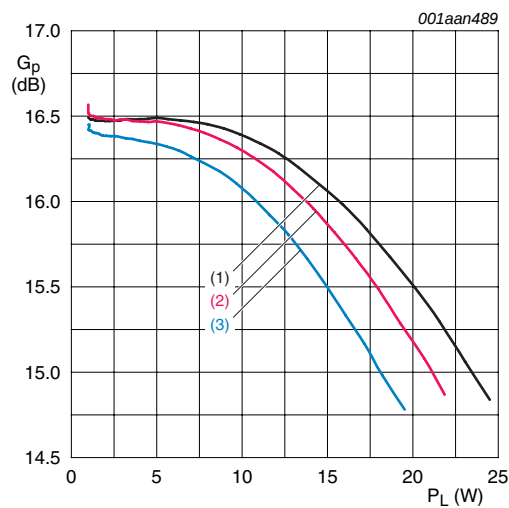


$V_{DS} = 28$ V; $I_{Dq} = 430$ mA.
(1) $f = 2500$ MHz
(2) $f = 2600$ MHz
(3) $f = 2700$ MHz

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

7.4 2-carrier W-CDMA

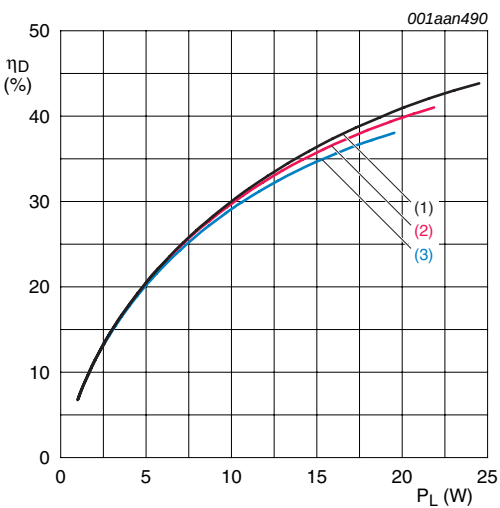
All testing performed in Class-AB production test circuit; test signal 3GPP; test model 1; 64 DPCH; PAR = 8.4 dB at 0.01 % probability on CCDF per carrier; carrier spacing 5 MHz; $f_1 = 2500\text{ MHz}$; $f_2 = 2600\text{ MHz}$; $f_3 = 2700\text{ MHz}$; $T_{\text{case}} = 25\text{ }^{\circ}\text{C}$; unless otherwise specified.



$V_{DS} = 28\text{ V}$; $I_{Dq} = 430\text{ mA}$.

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

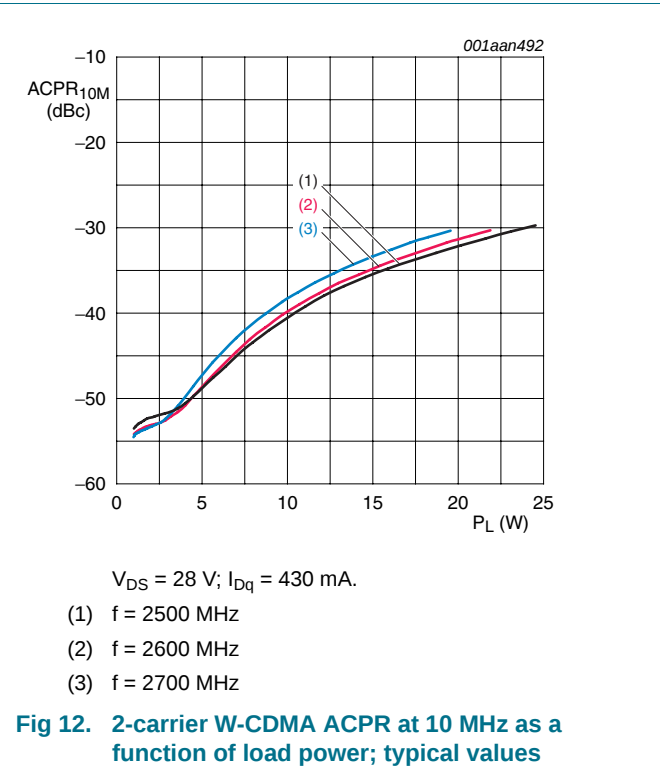
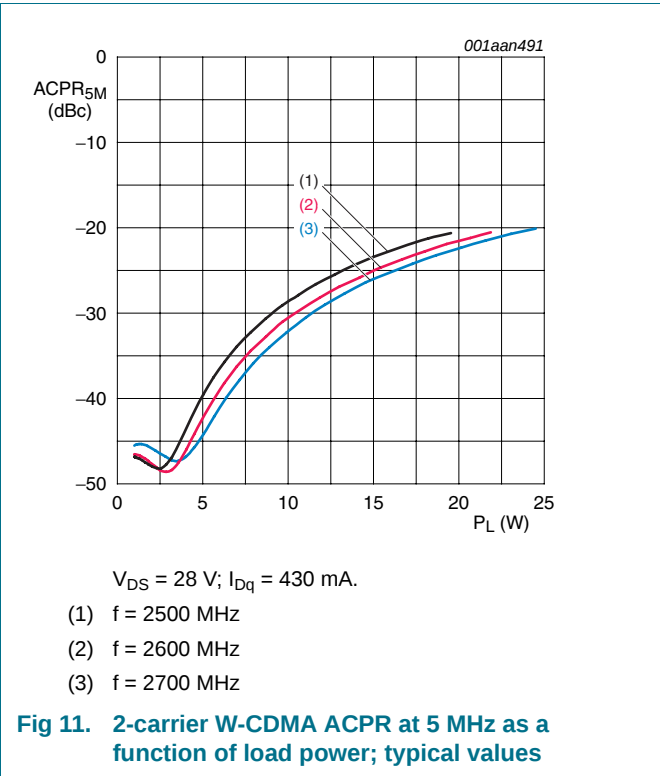
Fig 9. 2-carrier W-CDMA power gain as a function of load power; typical values



$V_{DS} = 28\text{ V}$; $I_{Dq} = 430\text{ mA}$.

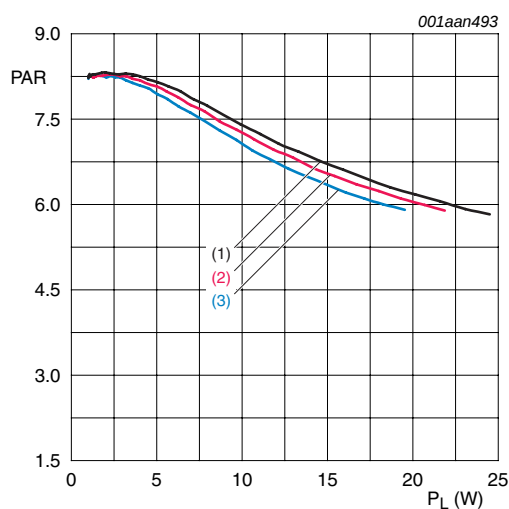
- (1) $f = 2500\text{ MHz}$
- (2) $f = 2600\text{ MHz}$
- (3) $f = 2700\text{ MHz}$

Fig 10. 2-carrier W-CDMA drain efficiency as a function of load power; typical values



7.5 Single carrier W-CDMA

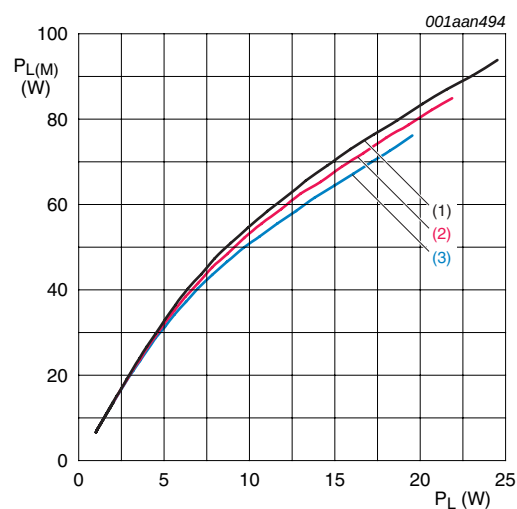
All testing performed in Class-AB production test circuit; test signal 3GPP; test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on CCDF per carrier; $f = 2700$ MHz; $T_{\text{case}} = 25$ °C; unless otherwise specified.



$V_{\text{DS}} = 28$ V; $I_{\text{DQ}} = 430$ mA.

- (1) $f = 2500$ MHz
- (2) $f = 2600$ MHz
- (3) $f = 2700$ MHz

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



$V_{\text{DS}} = 28$ V; $I_{\text{DQ}} = 430$ mA.

- (1) $f = 2500$ MHz
- (2) $f = 2600$ MHz
- (3) $f = 2700$ MHz

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

8. Package outline

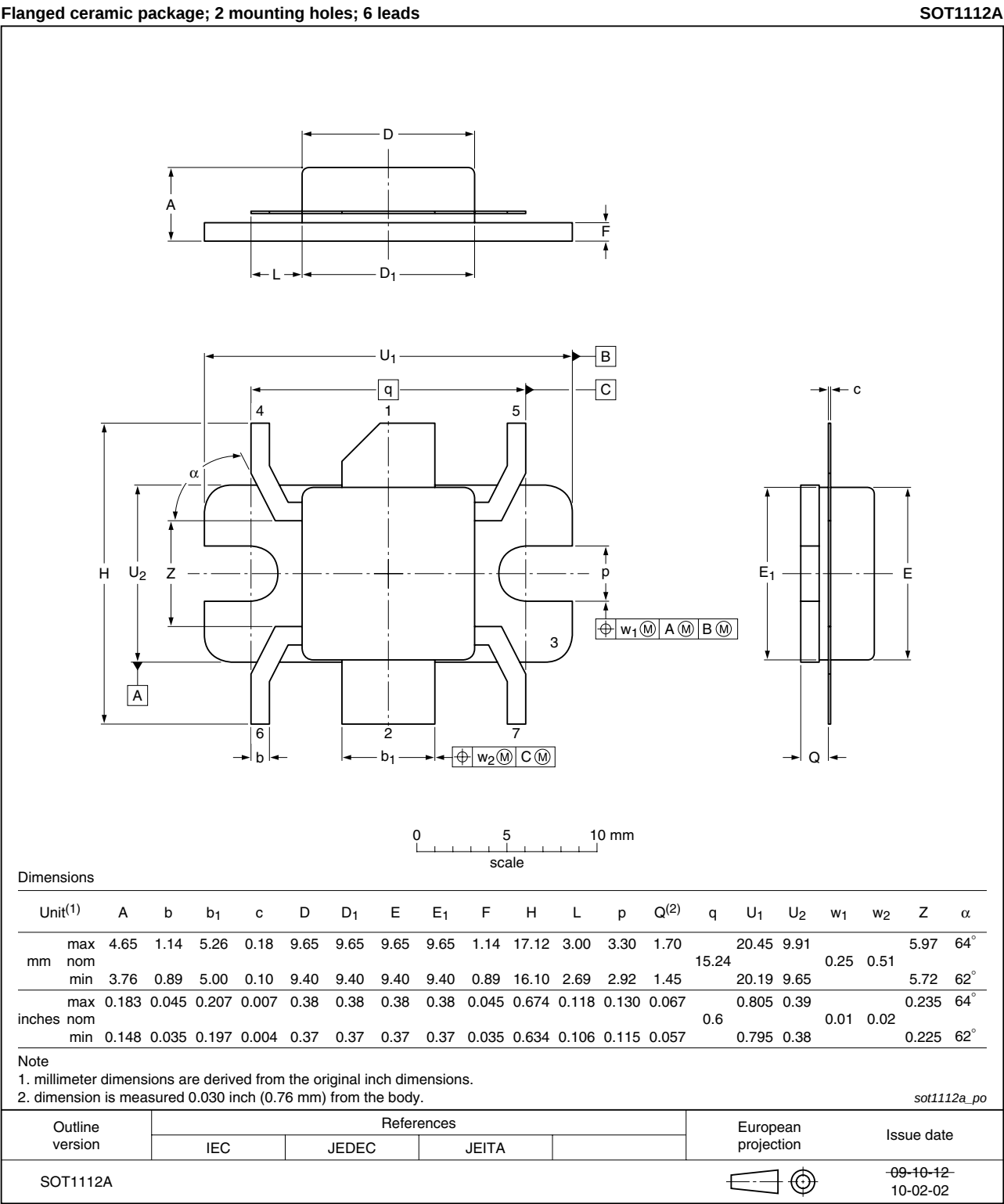


Fig 15. Package outline SOT1112A

Earless flanged ceramic package; 6 leads

SOT1112B

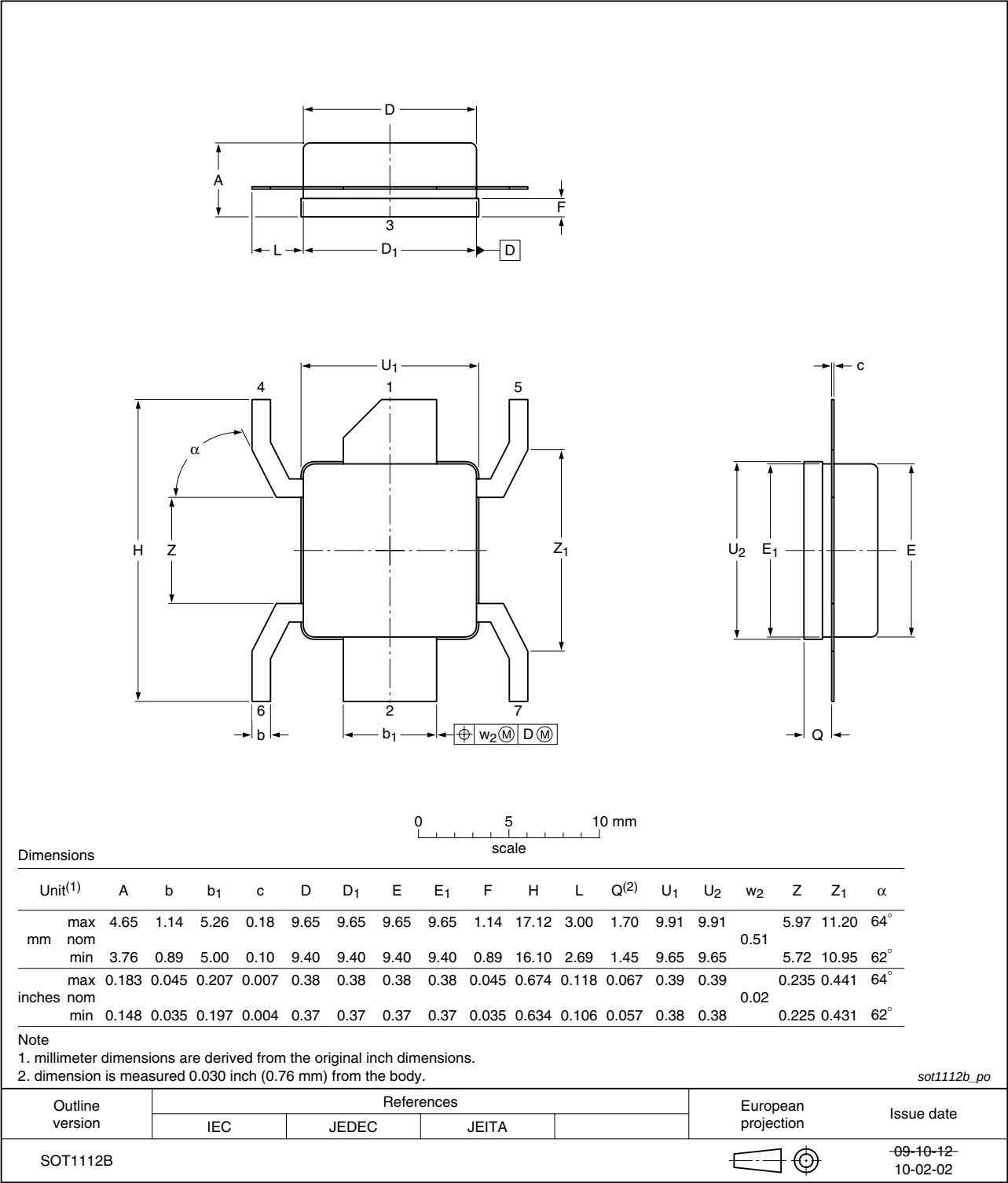


Fig 16. Package outline SOT1112B

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 9. 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 power Ratio
RF	Radio Frequency
VSWR	Voltage Standing-Wave Ratio
W-CDMA	Wideband Code Division Multiple Access

11. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF6G27L-50BN_6G27LS-50BN v.2	20110407	Product data sheet	-	BLF6G27L-50BN_6G27LS-50BN v.1
Modifications: • Section 1.1 on page 1: 45 W has been changed to 50 W. • Table 1 on page 1: several changes have been made. • The ESD warning has been moved to Section 9 on page 12. • Section 1.2 on page 1: the value of efficiency has been changed. • Section 1.3 on page 1: the term W-CDMA has been removed from the sentence. • Table 4 on page 2: the limiting values for I_D have been added. • Table 5 on page 3: The value for $R_{th(j-case)}$ has been changed. • Table 6 on page 3: several changes have been made. • Table 7 on page 3: several changes have been made. • Table 8 on page 4: several changes have been made. • Section 7.1 on page 4: several changes have been made. • Section 7.2 on page 4: section has been added. • Section 7.3 on page 5: section has been added. • Section 7.4 on page 7: section has been added. • Section 7.5 on page 9: section has been added. • Section 9 on page 12: section has been added.				
BLF6G27L-50BN_6G27LS-50BN v.1	20100916	Objective 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.

[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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