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 °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

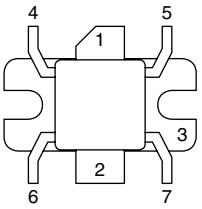
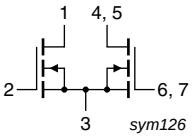
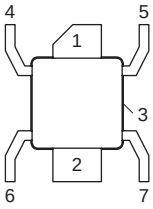
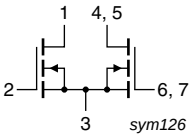
- Typical 2-carrier W-CDMA performance at frequencies of 2500 MHz and 2700 MHz, a supply voltage of 28 V and an I_{Dq} of 430 mA:
  - Average output power = 3 W
  - Power gain = 16.5 dB (typical)
  - Efficiency = 14.5 %
  - ACPR = –47 dBc
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- 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 [1]		
4, 5	sense drain		
6, 7	sense gate		
BLF6G27LS-50BN (SOT1112B)			
1	drain		
2	gate		
3	source [1]		
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
$R_{th(j\text{-}case)}$	thermal resistance from junction to case	T_{case} = 80 °C; P_L = 12.5 W (CW)	1.3	K/W

6. Characteristics

Table 6. Characteristics

T_j = 25 °C per section; unless otherwise specified

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	V_{GS} = 0 V; I_D = 0.5 mA	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	V_{DS} = 10 V; I_D = 72 mA	1.4	1.9	2.4	V
I_{Dq}	quiescent drain current	sense transistor: I_{DS}= 9.1 mA; V_{DS} = 26.5 V main transistor: V_{DS} = 28 V	380	430	480	mA
I_{DSS}	drain leakage current	V_{GS} = 0 V; V_{DS} = 28 V	-	-	1.5	μA
I_{DSX}	drain cut-off current	V_{GS} = $V_{GS(th)}$ + 3.75 V; V_{DS} = 10 V	10	12	-	A
I_{GSS}	gate leakage current	V_{GS} = 11 V; V_{DS} = 0 V	-	-	150	nA
g_{fs}	forward transconductance	V_{DS} = 10 V; I_D = 3.6 A	-	5.0	-	S
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = $V_{GS(th)}$ + 3.75 V; I_D = 2.52 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 dB at 0.01 % probability on CCDF per carrier; carrier spacing 5 MHz; f_1 = 2500 MHz; f_2 = 2600 MHz; f_3 = 2700 MHz; RF performance at V_{DS} = 28 V; I_{Dq} = 430 mA; T_{case} = 25 °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 W	15.3	16.5	-	dB
η_D	drain efficiency	$P_{L(AV)}$ = 3 W	12.5	14.5	-	%
ACPR	adjacent channel power ratio	$P_{L(AV)}$ = 3 W	-	–47	–43	dBc
I_{Dq}	quiescent drain current	V_{DD} = 28 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 V; I_{Dq} = 430 mA; T_{case} = 25 °C; unless otherwise specified.

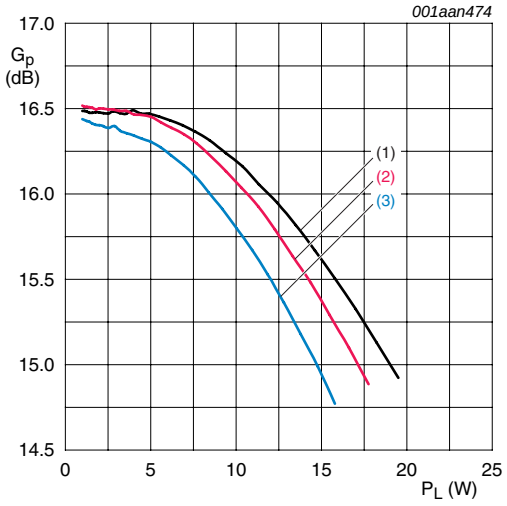
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
PAR_O	output peak-to-average ratio	$P_{L(AV)}$ = 16 W	4.1	4.7	5.3	dB

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 V; I_{Dq} = 430 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.



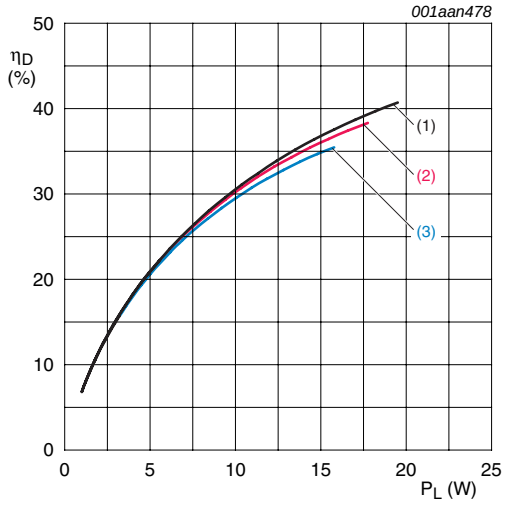
V_{DS} = 28 V; I_{Dq} = 430 mA.

(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



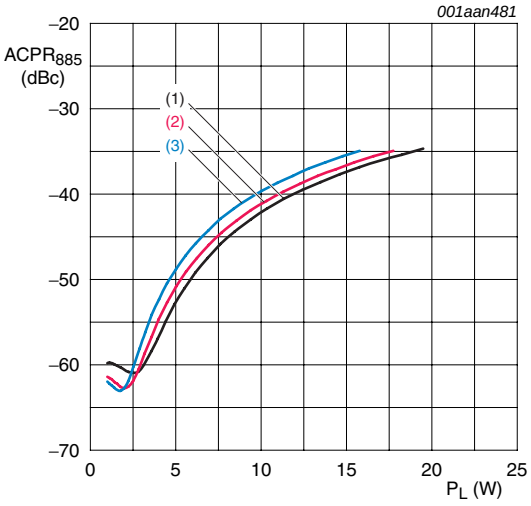
V_{DS} = 28 V; I_{Dq} = 430 mA.

(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



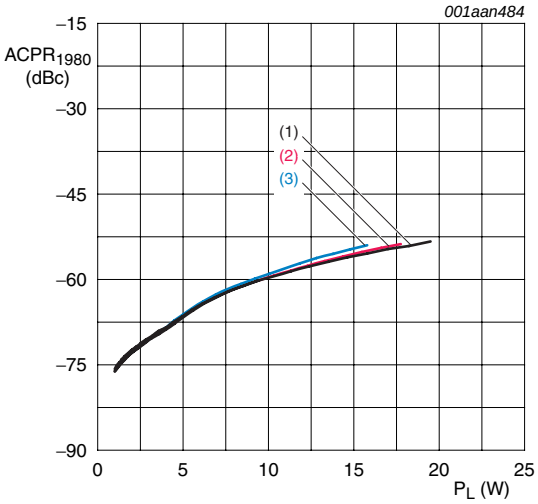
V_{DS} = 28 V; I_{Dq} = 430 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



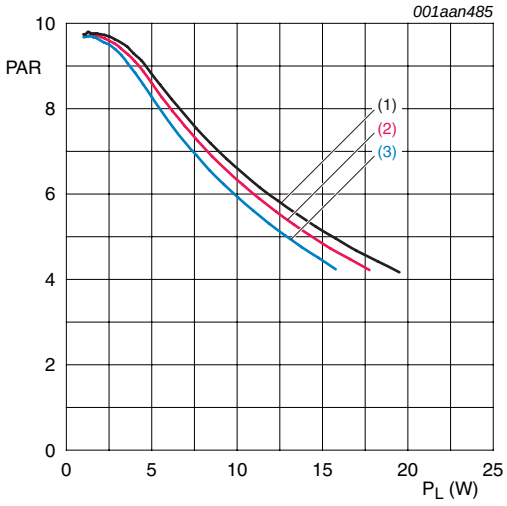
V_{DS} = 28 V; I_{Dq} = 430 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



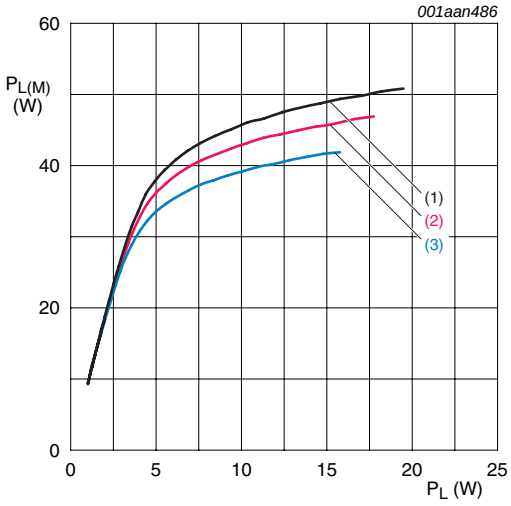
V_{DS} = 28 V; I_{Dq} = 430 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



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

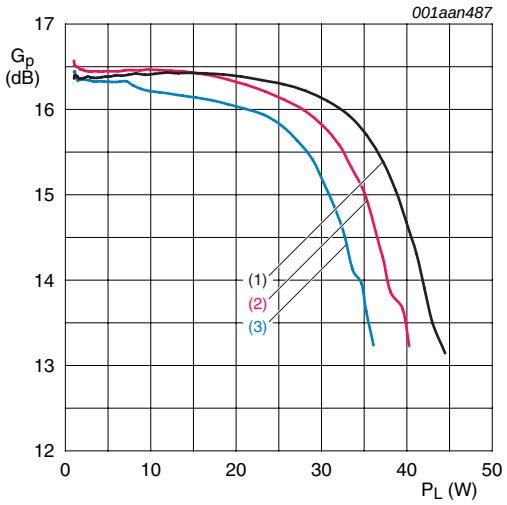
(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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

7.3 Pulsed CW



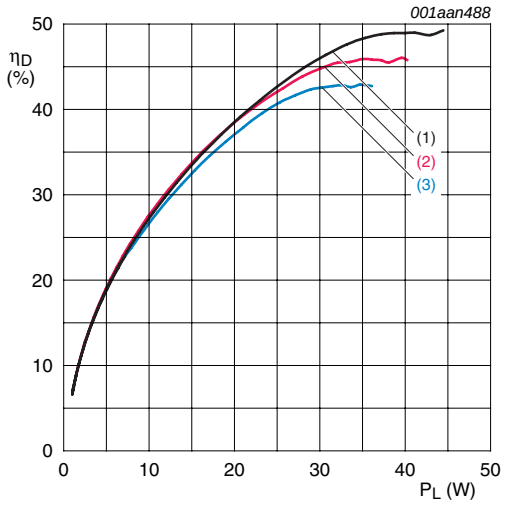
V_{DS} = 28 V; I_{Dq} = 430 mA.

(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

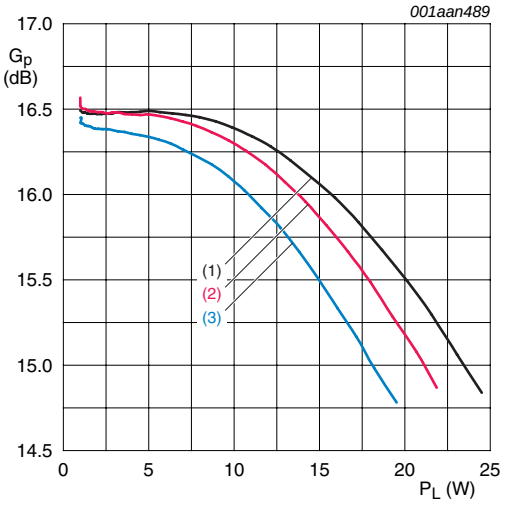
(2) f = 2600 MHz

(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 MHz; f_2 = 2600 MHz; f_3 = 2700 MHz; T_{case} = 25 °C; unless otherwise specified.



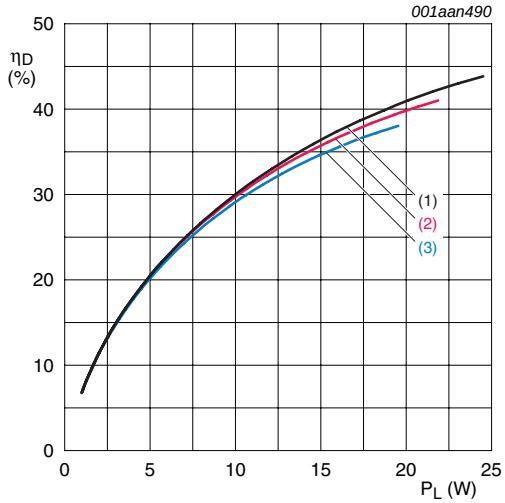
V_{DS} = 28 V; I_{Dq} = 430 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



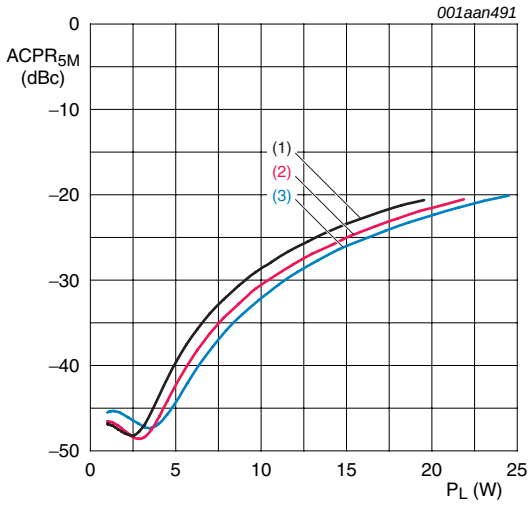
V_{DS} = 28 V; I_{Dq} = 430 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



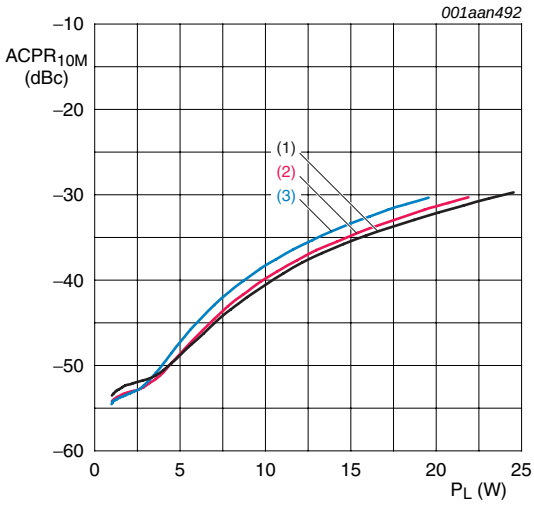
V_{DS} = 28 V; I_{Dq} = 430 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

Fig 11. 2-carrier W-CDMA ACPR at 5 MHz as a function of load power; typical values



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

(1) f = 2500 MHz

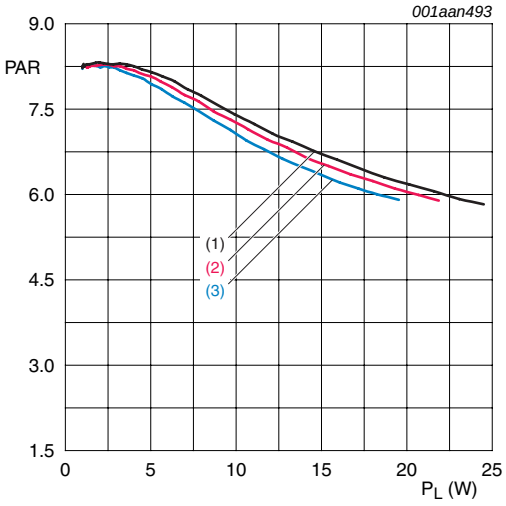
(2) f = 2600 MHz

(3) f = 2700 MHz

Fig 12. 2-carrier W-CDMA ACPR at 10 MHz 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_{case} = 25 °C; unless otherwise specified.



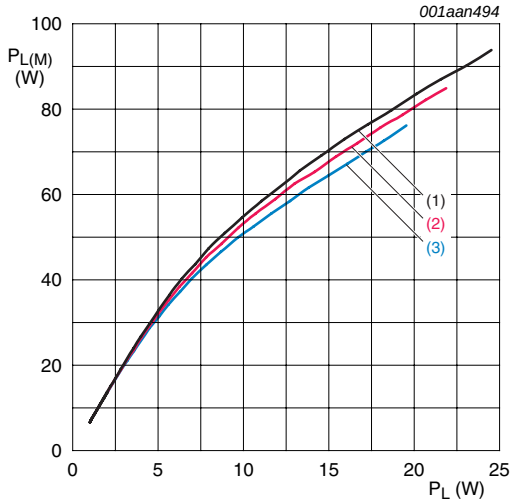
V_{DS} = 28 V; I_{Dq} = 430 mA.

(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_{DS} = 28 V; I_{Dq} = 430 mA.

(1) f = 2500 MHz

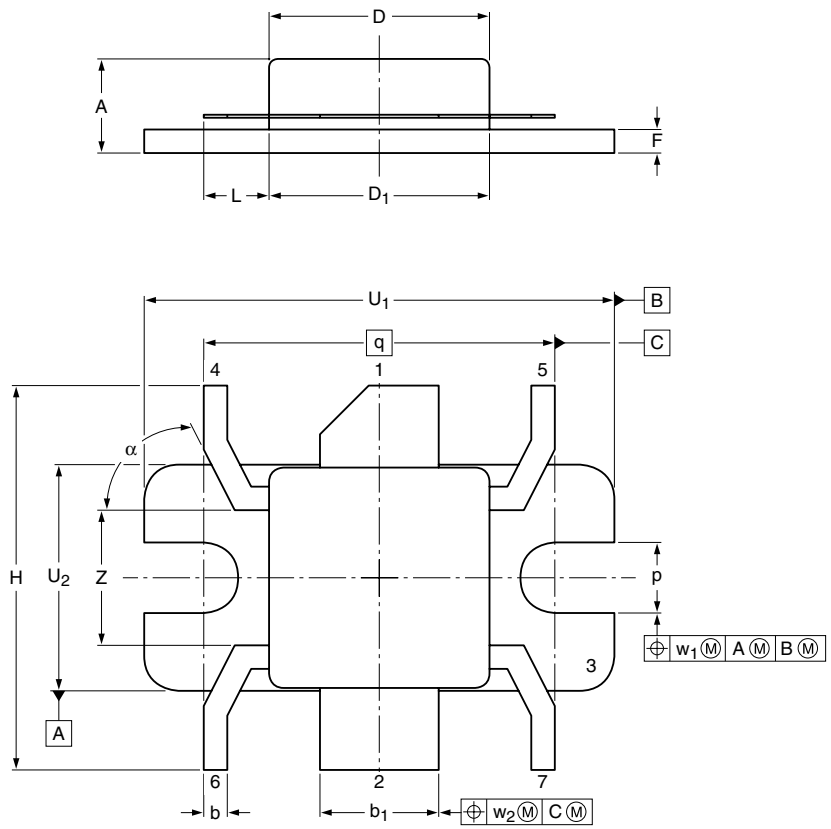
(2) f = 2600 MHz

(3) f = 2700 MHz

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

8. Package outline

Flanged ceramic package; 2 mounting holes; 6 leads **SOT1112A**



Dimensions

Unit[1]		A	b	b_1	c	D	D_1	E	E_1	F	H	L	p	Q[2]	q	U_1	U_2	w_1	w_2	Z	α
mm	max	4.65	1.14	5.26	0.18	9.65	9.65	9.65	9.65	1.14	17.12	3.00	3.30	1.70		20.45	9.91			5.97	64°
	nom														15.24			0.25	0.51		
	min	3.76	0.89	5.00	0.10	9.40	9.40	9.40	9.40	0.89	16.10	2.69	2.92	1.45		20.19	9.65			5.72	62°
inches	max	0.183	0.045	0.207	0.007	0.38	0.38	0.38	0.38	0.045	0.674	0.118	0.130	0.067		0.805	0.39			0.235	64°
	nom														0.6			0.01	0.02		
	min	0.148	0.035	0.197	0.004	0.37	0.37	0.37	0.37	0.035	0.634	0.106	0.115	0.057		0.795	0.38			0.225	62°

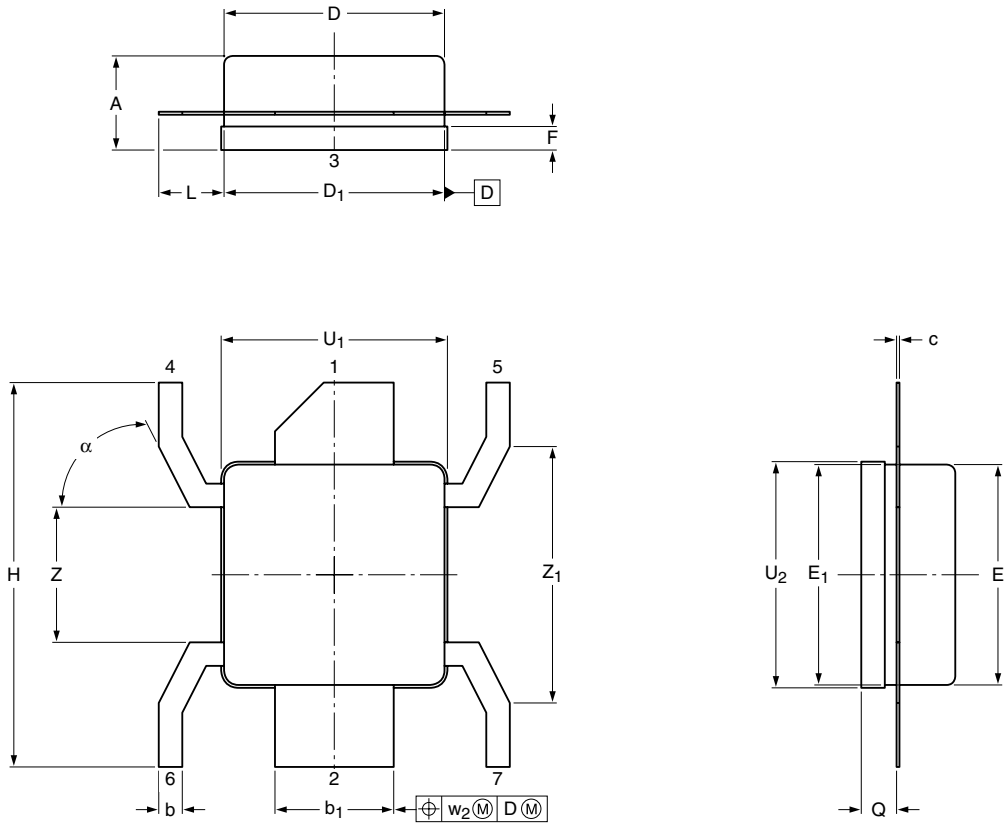
Note
1. millimeter dimensions are derived from the original inch dimensions.
2. dimension is measured 0.030 inch (0.76 mm) from the body.

sot1112a_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1112A						~~09-10-12~~ 10-02-02

Fig 15. Package outline SOT1112A

Earless flanged ceramic package; 6 leads **SOT1112B**



Dimensions

Unit[1]		A	b	b_1	c	D	D_1	E	E_1	F	H	L	Q[2]	U_1	U_2	w_2	Z	Z_1	α
mm	max	4.65	1.14	5.26	0.18	9.65	9.65	9.65	9.65	1.14	17.12	3.00	1.70	9.91	9.91		5.97	11.20	64°
	nom															0.51			
	min	3.76	0.89	5.00	0.10	9.40	9.40	9.40	9.40	0.89	16.10	2.69	1.45	9.65	9.65		5.72	10.95	62°
inches	max	0.183	0.045	0.207	0.007	0.38	0.38	0.38	0.38	0.045	0.674	0.118	0.067	0.39	0.39		0.235	0.441	64°
	nom															0.02			
	min	0.148	0.035	0.197	0.004	0.37	0.37	0.37	0.37	0.035	0.634	0.106	0.057	0.38	0.38		0.225	0.431	62°

Note
1. millimeter dimensions are derived from the original inch dimensions.
2. dimension is measured 0.030 inch (0.76 mm) from the body.

sot1112b_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1112B						~~09-10-12~~ 10-02-02

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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

12.2 Definitions

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