BLF6G27-100; BLF6G27LS-100

WiMAX power LDMOS transistor

Rev. 02 — 8 July 2010 Product data sheet

1. Product profile

1.1 General description

100 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 °C in a class-AB production test circuit.

Mode of operation	f (MHz)	V_{DS} (V)	$P_{L(AV)}$ (W)	G_p (dB)	η_D (%)	$ACPR_{885k}$ (dBc)	$ACPR_{1980k}$ (dBc)	$ACPR_{5M}$ (dBc)	$ACPR_{10M}$ (dBc)
BLF6G27-100									
1-carrier W-CDMA [1]	2500 to 2700	28	14	16.5	23	-	-	–40	–59
1-carrier N-CDMA [2]	2500 to 2700	28	14	17	23	–50 [3]	–65 [3]	-	-
BLF6G27LS-100									
1-carrier W-CDMA [1]	2500 to 2700	28	14	17	23	-	-	–41	–60
1-carrier N-CDMA [2]	2500 to 2700	28	14	17	23	–50 [3]	–65 [3]	-	-

[1] Signal is a one carrier, TM1 W-CDMA signal with 64 DPCH and 100 % clipping. PAR is 9.65 dB at 0.01 % probability on CCDF.

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

[3] Measured within 30 kHz bandwidth.

1.2 Features and benefits

- Typical 1-carrier W-CDMA performance (single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability on the CCDF; channel bandwidth is 3.84 MHz) at a frequency of 2500 MHz, 2600 MHz and 2700 MHz, a supply voltage of 28 V and an I_{Dq} of 900 mA:
  - Average output power = 14 W
  - Power gain = 17 dB
  - Drain efficiency = 23 %
  - $ACPR_{5M}$ = –41 dBc
- Typical 1-carrier N-CDMA performance (single carrier IS-95 with pilot, paging, sync and 6 traffic channels [Walsh codes 8 to 13]. PAR = 9.7 dB at 0.01 % probability on the CCDF. Channel bandwidth is 1.2288 MHz) at a frequency of 2500 MHz, 2600 MHz and 2700 MHz, a supply voltage of 28 V and an I_{Dq} of 900 mA:
  - Average output power = 14 W
  - Power gain = 17 dB
  - Drain efficiency = 23 %
  - $ACPR_{885k}$ = –50 dBc (within 30 kHz bandwidth)

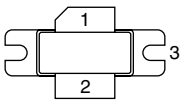
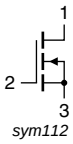
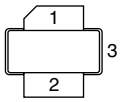
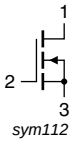
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (2500 MHz to 2700 MHz)
- Internally matched for ease of use

1.3 Applications

- RF power amplifiers for base stations and multicarrier applications in the 2500 MHz to 2700 MHz frequency range

2. Pinning information

Table 2. Pinning

Pin	Description		Simplified outline	Graphic symbol
BLF6G27-100 (SOT502A)				
1	drain			
2	gate			
3	source	[1]		
BLF6G27LS-100 (SOT502B)				
1	drain			
2	gate			
3	source	[1]		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF6G27-100	-	flanged LDMOST ceramic package; 2 mounting holes; 2 leads	SOT502A
BLF6G27LS-100	-	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	Min	Max	Unit
V_{DS}	drain-source voltage	-	65	V
V_{GS}	gate-source voltage	–0.5	+13	V
I_D	drain current	-	29	A
T_{stg}	storage temperature	–65	+150	°C
T_j	junction temperature	-	200	°C

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Type	Typ	Unit
$R_{th(j-case)}$	thermal resistance from junction to case	T_{case} = 80 °C; P_L = 100 W	BLF6G27-100	0.68	K/W
			BLF6G27LS-100	0.5	K/W

6. Characteristics

Table 6. Characteristics

T_j = 25 °C 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 = 150 mA	1.4	2	2.4	V
I_{DSS}	drain leakage current	V_{GS} = 0 V; V_{DS} = 28 V	-	-	5	μA
I_{DSX}	drain cut-off current	V_{GS} = $V_{GS(th)}$ + 3.75 V; V_{DS} = 10 V	22.3	27	-	A
I_{GSS}	gate leakage current	V_{GS} = 11 V; V_{DS} = 0 V	-	-	450	nA
g_{fs}	forward transconductance	V_{DS} = 10 V; I_D = 5.25 A	-	10.5	-	S
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = $V_{GS(th)}$ + 3.75 V; I_D = 5.25 A	-	0.1	0.16	Ω
C_{rs}	feedback capacitance	V_{GS} = 0 V; V_{DS} = 28 V; f = 1 MHz	-	2.4	-	pF

7. Application information

Table 7. Application information

Mode of operation: 1-carrier W-CDMA; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability on the CCDF; carrier channel bandwidth is 3.84 MHz; f_1 = 2500 MHz; f_2 = 2600 MHz, f_3 = 2700 MHz; RF performance at V_{DS} = 28 V; I_{Dq} = 900 mA; T_{case} = 25 °C; unless otherwise specified, in a class-AB production circuit.

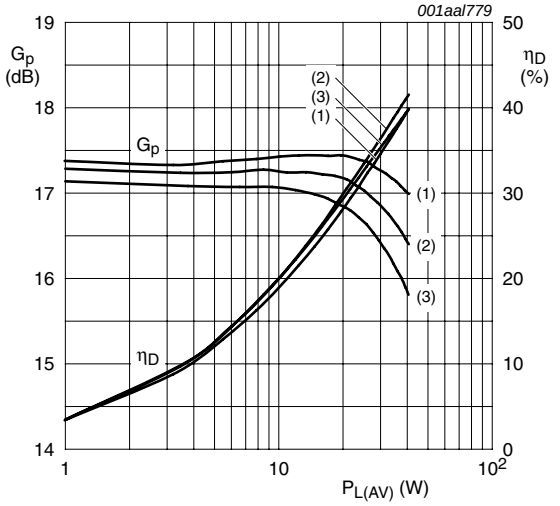
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
G_p	power gain	$P_{L(AV)}$ = 14 W					
		BLF6G27-100		14.8	16.5	-	dB
		BLF6G27LS-100		15	17	-	dB
RL_{in}	input return loss	$P_{L(AV)}$ = 14 W		-	−10	−6	dB
η_D	drain efficiency	$P_{L(AV)}$ = 14 W		20	23	-	%
$ACPR_{5M}$	adjacent channel power ratio (5 MHz)	$P_{L(AV)}$ = 14 W	[1]				
		BLF6G27-100		-	−40	−36	dBc
		BLF6G27LS-100		-	−41	−37	dBc
$ACPR_{10M}$	adjacent channel power ratio (10 MHz)	$P_{L(AV)}$ = 14 W	[1]				
		BLF6G27-100		-	−59	−56	dBc
		BLF6G27LS-100		-	−60	−57	dBc

[1] ACPR measured in 3.84 MHz channel bandwidth at ±5 MHz and ±10 MHz.

7.1 Ruggedness in class-AB operation

The BLF6G27-100 and BLF6G27LS-100 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} = 900 mA; P_L = 100 W (CW); f = 2500 MHz.

7.2 Single carrier W-CDMA performance



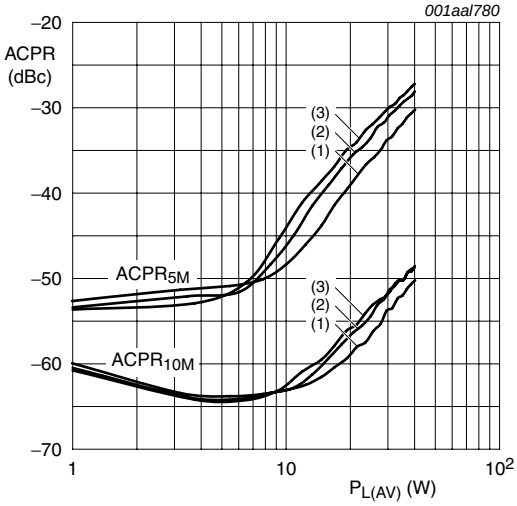
V_{DS} = 28 V; I_{Dq} = 900 mA; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability; channel bandwidth = 3.84 MHz.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

Fig 1. Power gain and drain efficiency as a function of average output power; typical values



V_{DS} = 28 V; I_{Dq} = 900 mA; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability; channel bandwidth = 3.84 MHz.

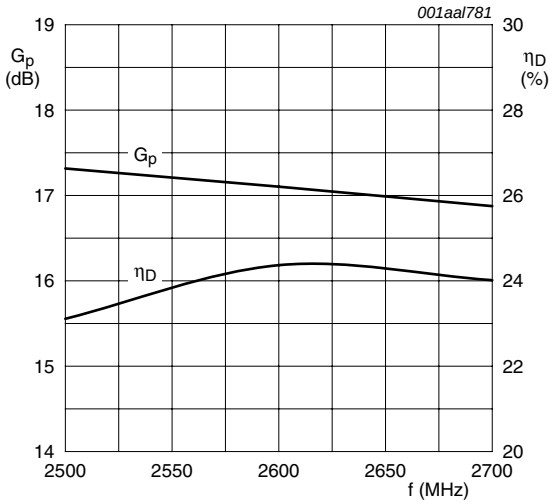
(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

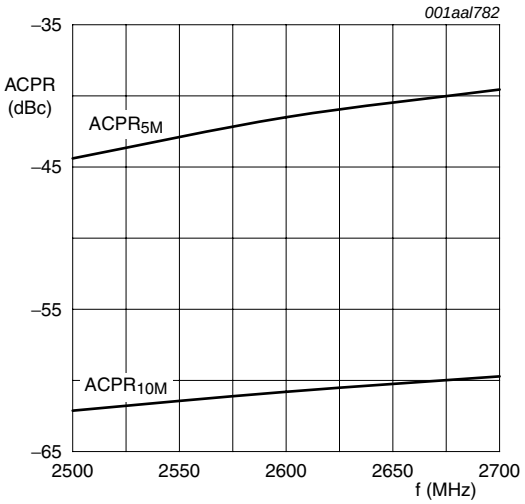
Fig 2. ACPR at 5 MHz and at 10 MHz as a function of average output power; typical values

7.3 Single carrier W-CDMA broadband performance at 14 W average power



V_{DS} = 28 V; I_{Dq} = 900 mA; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability; channel bandwidth = 3.84 MHz.

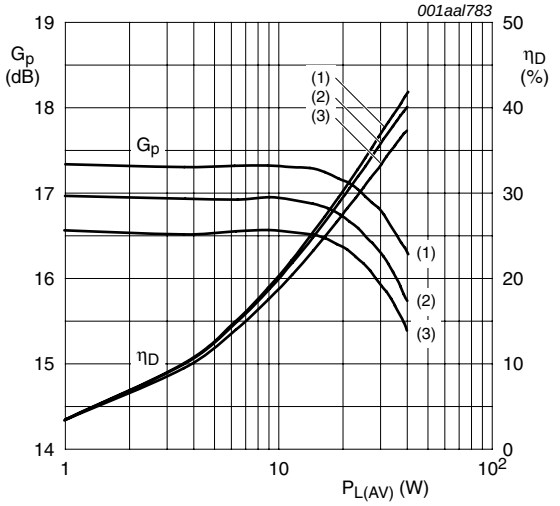
Fig 3. Power gain and drain efficiency as a function of frequency; typical values



V_{DS} = 28 V; I_{Dq} = 900 mA; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability; channel bandwidth = 3.84 MHz.

Fig 4. ACPR at 5 MHz and at 10 MHz as a function of frequency; typical values

7.4 IS-95 performance



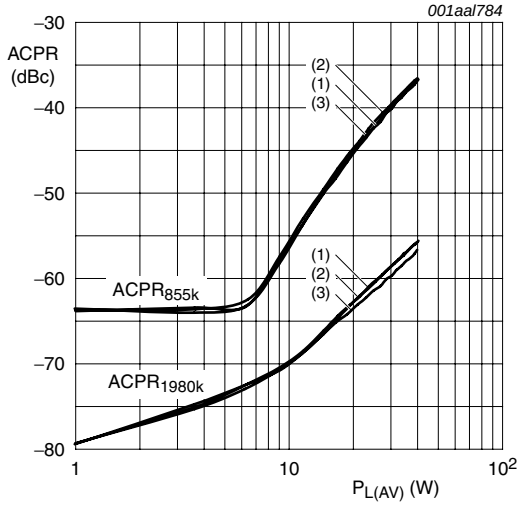
V_{DS} = 28 V; I_{Dq} = 900 mA; IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13); PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth = 1.2288 MHz.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

Fig 5. Power gain and drain efficiency as a function of average output power; typical values



V_{DS} = 28 V; I_{Dq} = 900 mA; IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13); PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth = 1.2288 MHz.

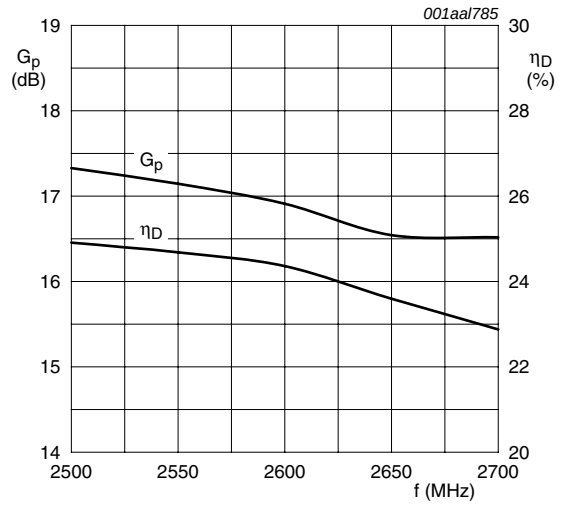
(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

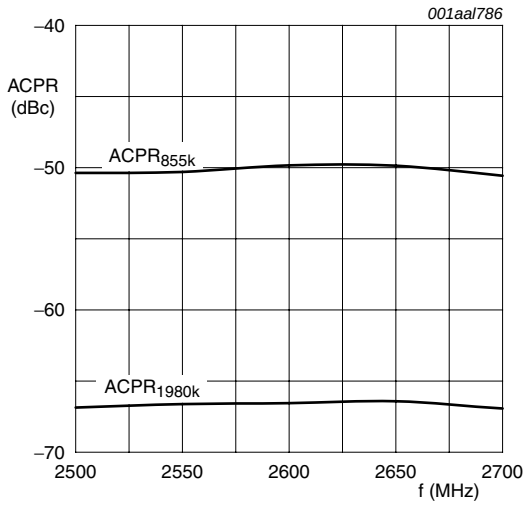
Fig 6. ACPR at 885 kHz and at 1980 kHz as a function of average output power; typical values

7.5 IS-95 broadband performance at 14 W average power



V_{DS} = 28 V; I_{Dq} = 900 mA; IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13); PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth = 1.2288 MHz.

Fig 7. Power gain and drain efficiency as a function of frequency; typical values

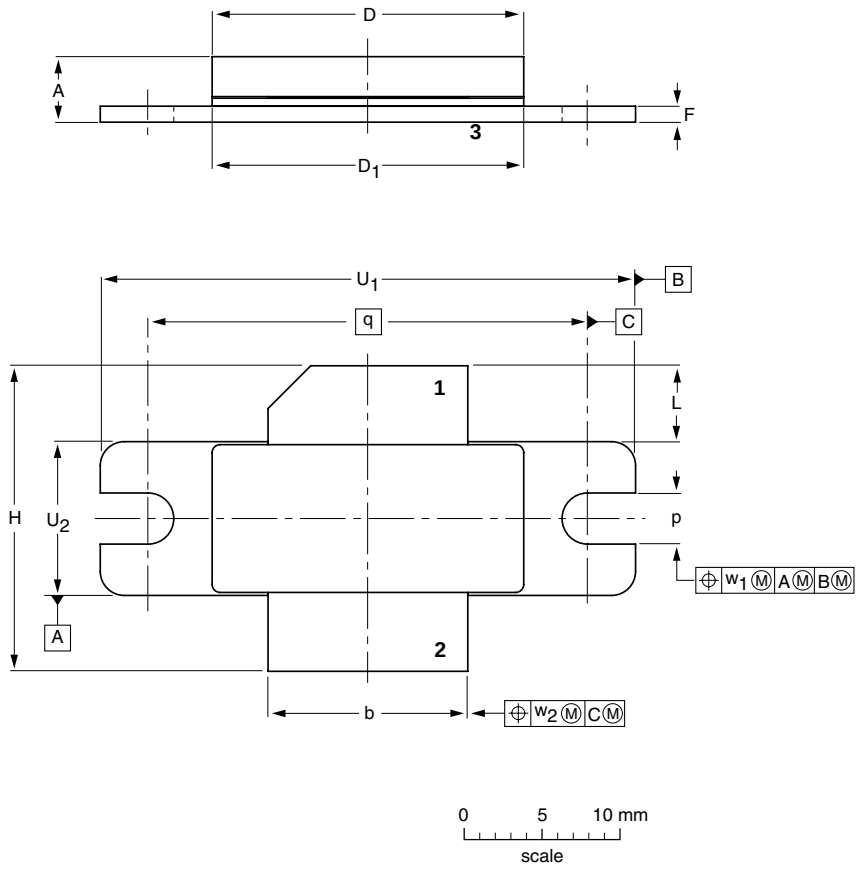


V_{DS} = 28 V; I_{Dq} = 900 mA; IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13); PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth = 1.2288 MHz.

Fig 8. ACPR at 885 kHz and at 1980 kHz as a function of frequency; typical values

8. Package outline

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads **SOT502A**



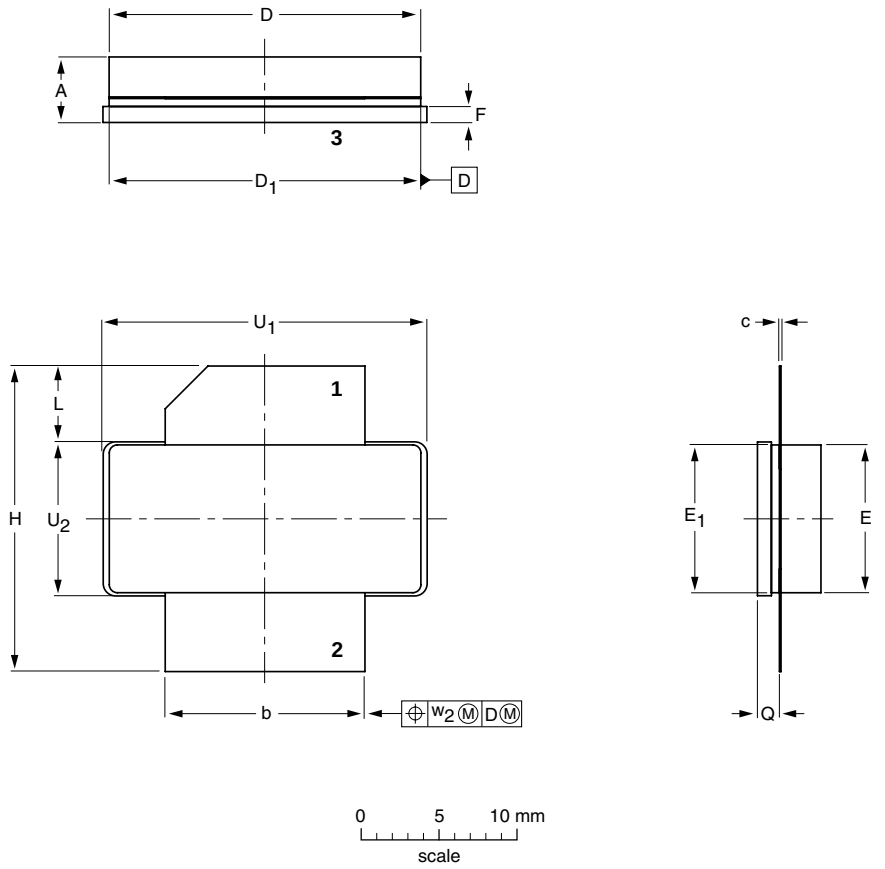
DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	b	c	D	D_1	E	E_1	F	H	L	p	Q	q	U_1	U_2	w_1	w_2
mm	4.72 3.43	12.83 12.57	0.15 0.08	20.02 19.61	19.96 19.66	9.50 9.30	9.53 9.25	1.14 0.89	19.94 18.92	5.33 4.32	3.38 3.12	1.70 1.45	27.94	34.16 33.91	9.91 9.65	0.25	0.51
inches	0.186 0.135	0.505 0.495	0.006 0.003	0.788 0.772	0.786 0.774	0.374 0.366	0.375 0.364	0.045 0.035	0.785 0.745	0.210 0.170	0.133 0.123	0.067 0.057	1.100	1.345 1.335	0.390 0.380	0.01	0.02

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT502A						~~99-12-28~~ 03-01-10

Fig 9. Package outline SOT502A

Earless flanged LDMOST ceramic package; 2 leads **SOT502B**



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	b	c	D	D_1	E	E_1	F	H	L	Q	U_1	U_2	w_2
mm	4.72 3.43	12.83 12.57	0.15 0.08	20.02 19.61	19.96 19.66	9.50 9.30	9.53 9.25	1.14 0.89	19.94 18.92	5.33 4.32	1.70 1.45	20.70 20.45	9.91 9.65	0.25
inches	0.186 0.135	0.505 0.495	0.006 0.003	0.788 0.772	0.786 0.774	0.374 0.366	0.375 0.364	0.045 0.035	0.785 0.745	0.210 0.170	0.067 0.057	0.815 0.805	0.390 0.380	0.010

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT502B						~~03-01-10~~ 07-05-09

Fig 10. Package outline SOT502B

9. Abbreviations

Table 8. Abbreviations

Acronym	Description
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
DPCH	Dedicated Physical CHannel
ESD	ElectroStatic Discharge
FCH	Frame Control Header
FFT	Fast Fourier Transform
IBW	Instantaneous BandWidth
IS-95	Interim Standard 95
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
N-CDMA	Narrowband Code Division Multiple Access
PAR	Peak-to-Average power Ratio
PUSC	Partial Usage of SubChannels
RF	Radio Frequency
TM1	Test Model 1
VSWR	Voltage Standing-Wave Ratio
W-CDMA	Wideband Code Division Multiple Access
WCS	Wireless Communications Service
WiMAX	Worldwide interoperability for Microwave Access

10. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF6G27-100_BLF6G27LS-100 v.2	20100708	Product data sheet	-	BLF6G27-100_ BLF6G27LS-100_1
Modifications:	• Data sheet status change to Product data sheet. • Table 1 on page 1: A distinction has been made between BLF6G27-100 and BLF6G27LS-100 • Table 7 on page 4: A distinction has been made between BLF6G27-100 and BLF6G27LS-100			
BLF6G27-100_BLF6G27LS-100_1	20100503	Preliminary 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".

[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.

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13. Contents

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Document identifier: BLF6G27-100_BLF6G27LS-100

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