BLF7G27L-90P; BLF7G27LS-90P

Power LDMOS transistor

Rev. 2 — 10 November 2011 Product data sheet

1. Product profile

1.1 General description

90 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 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	720	28	16	18.5	29	–46[1]	-
Single carrier W-CDMA	2500 to 2700	720	28	25	18.5	35	–	–36[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

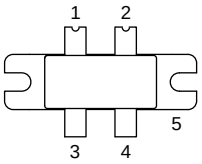
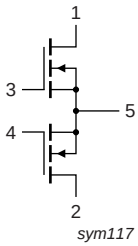
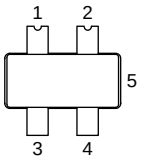
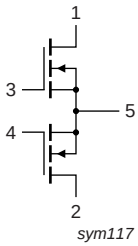
- Excellent ruggedness
- High efficiency
- Low R_{th} providing excellent thermal stability
- Designed for broadband operation (2500 MHz to 2700 MHz)
- Lower output capacitance for improved performance in Doherty applications
- Designed for low memory effects providing excellent pre-distortability
- 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
BLF7G27L-90P (SOT1121A)				
1	drain1			
2	drain2			
3	gate1			
4	gate2			
5	source	[1]		
BLF7G27LS-90P (SOT1121B)				
1	drain1			
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
BLF7G27L-90P	-	flanged LDMOST ceramic package; 2 mounting holes; 4 leads	SOT1121A
BLF7G27LS-90P	-	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		-	18	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 °C; P_L = 16 W	0.4	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 = 0.6 mA	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	V_{DS} = 10 V; I_D = 60 mA	1.5	1.8	2.3	V
I_{DSS}	drain leakage current	V_{GS} = 0 V; V_{DS} = 28 V	-	-	1.4	μA
I_{DSX}	drain cut-off current	V_{GS} = $V_{GS(th)}$ + 3.75 V; V_{DS} = 10 V	9.6	11.5	-	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 = 60 mA	-	0.53	-	S
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = $V_{GS(th)}$ + 3.75 V; I_D = 2100 mA	-	0.24	-	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 MHz; f_2 = 2700 MHz; RF performance at V_{DS} = 28 V; I_{Dq} = 720 mA; T_{case} = 25 °C; 2 sections combined unless otherwise specified; in a class-AB production test circuit.

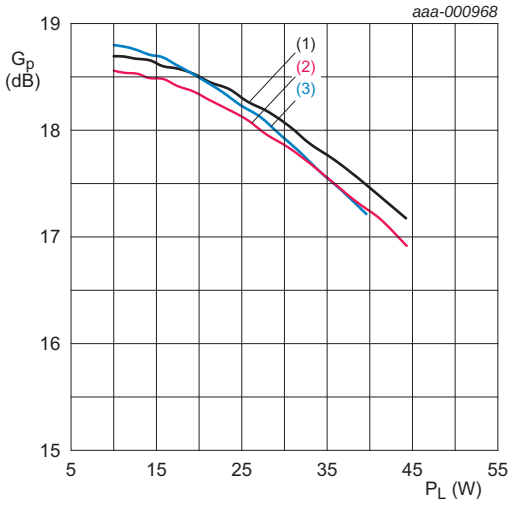
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	16	-	W
G_p	power gain	$P_{L(AV)}$ = 16 W	17	18.5	-	dB
RL_{in}	input return loss	$P_{L(AV)}$ = 16 W	-	−15	-	dB
η_D	drain efficiency	$P_{L(AV)}$ = 16 W	25	29	-	%
$ACPR_{885k}$	adjacent channel power ratio (885 kHz)	$P_{L(AV)}$ = 16 W	-	−46	−41	dBc

7.1 Ruggedness in class-AB operation

The BLF7G27L-90P and BLF7G27LS-90P 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} = 720 mA; P_L = 90 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.



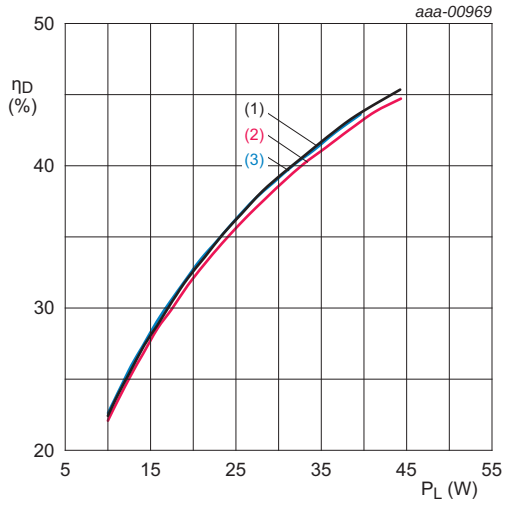
V_{DS} = 28 V; I_{Dq} = 720 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



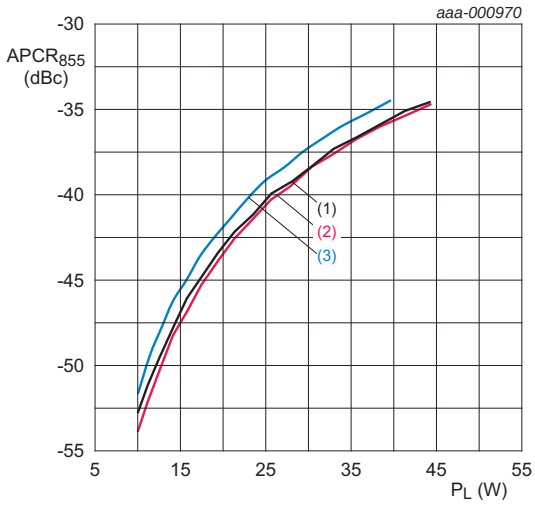
V_{DS} = 28 V; I_{Dq} = 720 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



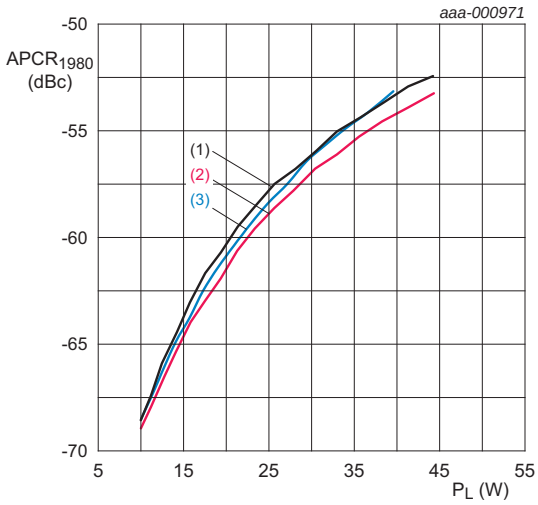
V_{DS} = 28 V; I_{Dq} = 720 mA.

(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 output power; typical values



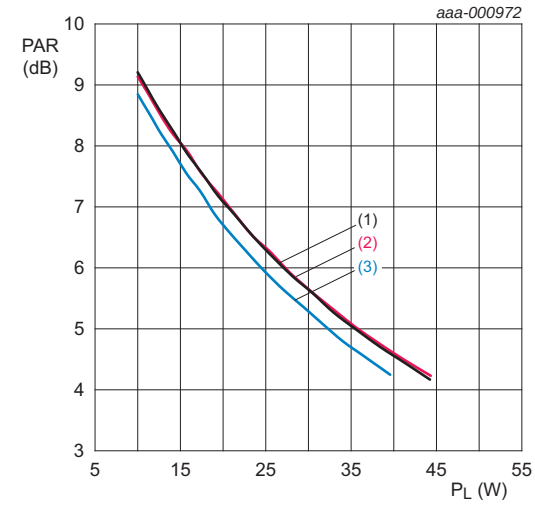
V_{DS} = 28 V; I_{Dq} = 720 mA.

(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 output power; typical values



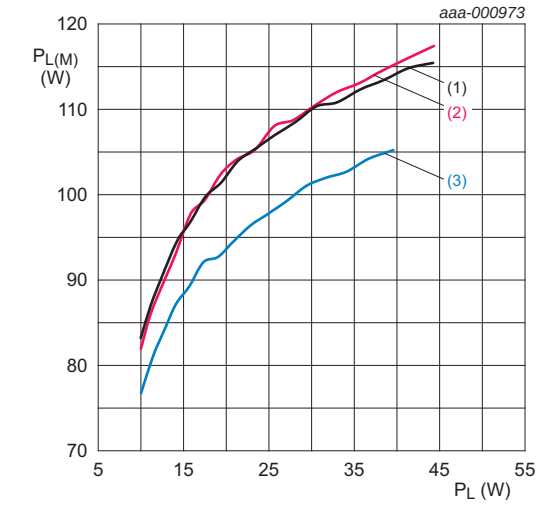
V_{DS} = 28 V; I_{Dq} = 720 mA.

(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 output power; typical values



V_{DS} = 28 V; I_{Dq} = 720 mA.

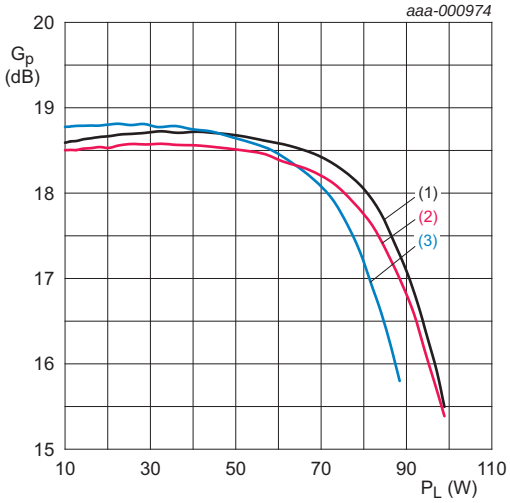
(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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

7.3 Pulsed CW



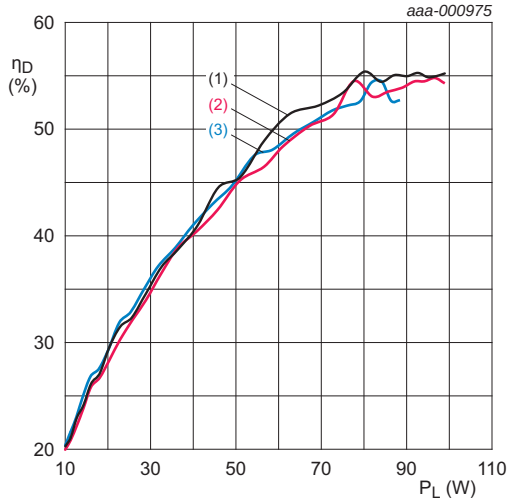
V_{DS} = 28 V; I_{Dq} = 720 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



V_{DS} = 28 V; I_{Dq} = 720 mA.

(1) f = 2500 MHz

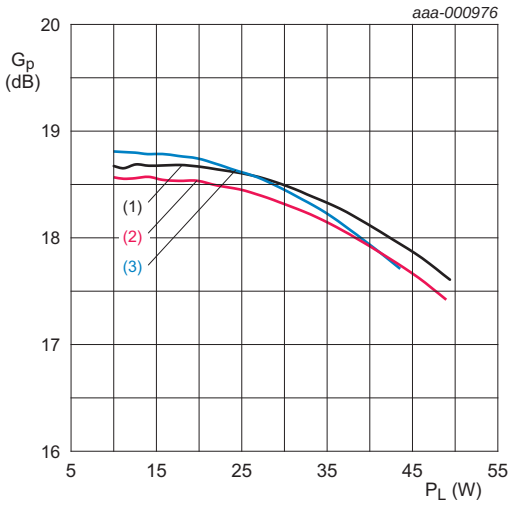
(2) f = 2600 MHz

(3) f = 2700 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.



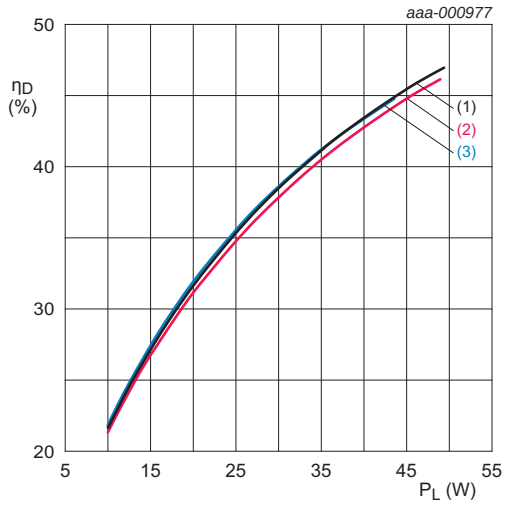
V_{DS} = 28 V; I_{Dq} = 720 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



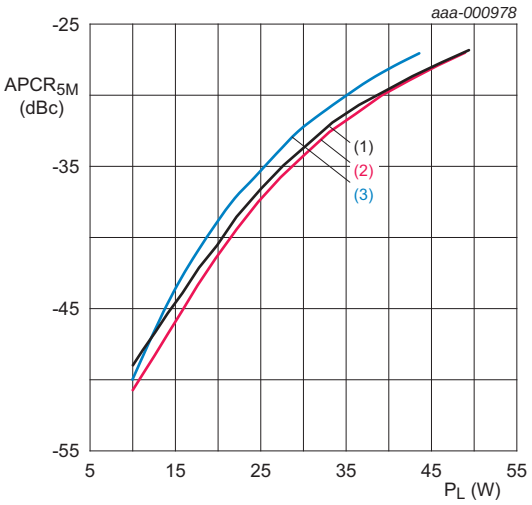
V_{DS} = 28 V; I_{Dq} = 720 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



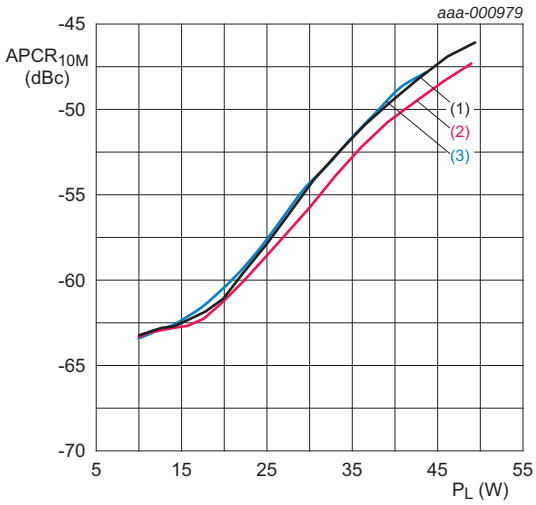
V_{DS} = 28 V; I_{Dq} = 720 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



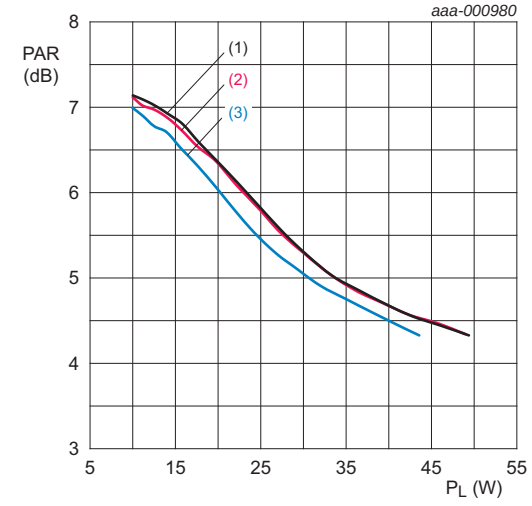
V_{DS} = 28 V; I_{Dq} = 720 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



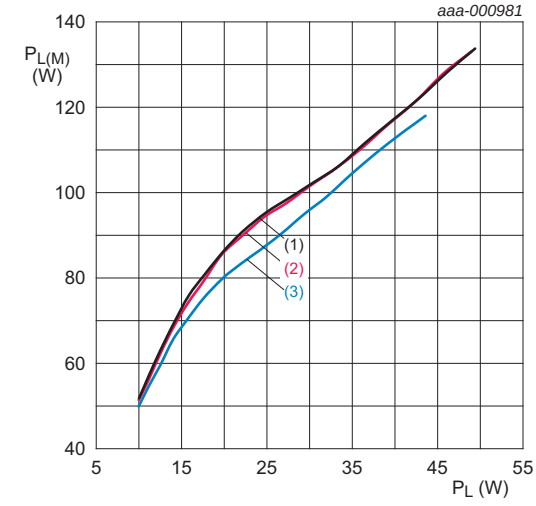
V_{DS} = 28 V; I_{Dq} = 720 mA.

(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 output power; typical values



V_{DS} = 28 V; I_{Dq} = 720 mA.

(1) f = 2500 MHz

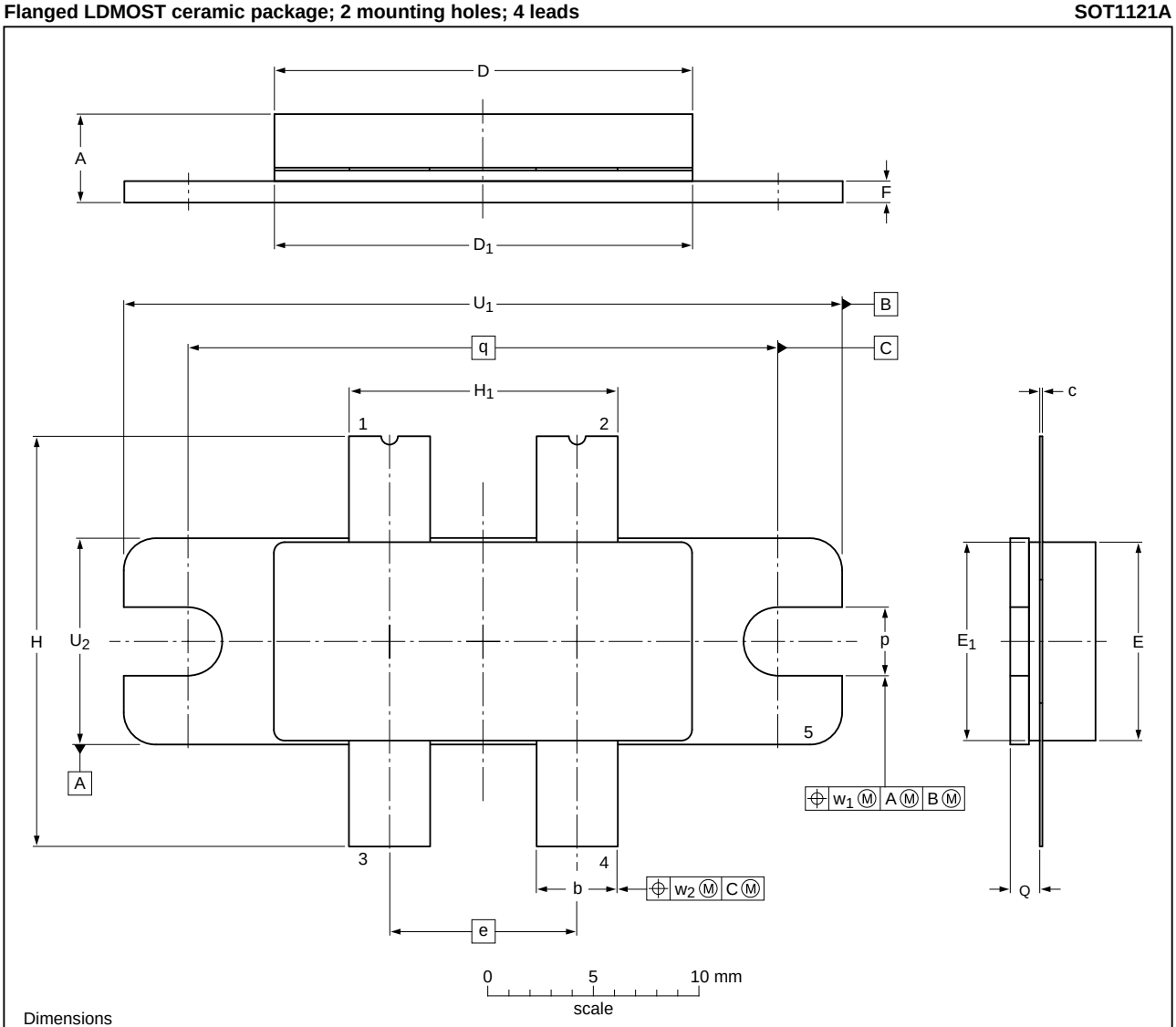
(2) f = 2600 MHz

(3) f = 2700 MHz

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

8. Package outline

Flanged LDMOST ceramic package; 2 mounting holes; 4 leads **SOT1121A**



Dimensions

Unit[1]		A	b	c	D	D1	e	E	E1	F	H	H1	p	Q[2]	q	U1	U2	w1	w2
mm	max	4.75	3.94	0.18	20.02	19.96		9.53	9.53	1.14	19.94	12.83	3.38	1.70		34.16	9.91		
	nom						8.89								27.94			0.25	0.51
	min	3.45	3.68	0.10	19.61	19.66		9.27	9.27	0.89	18.92	12.57	3.12	1.45		33.91	9.65		
inches	max	0.187	0.155	0.007	0.788	0.786		0.375	0.375	0.045	0.785	0.505	0.133	0.067		1.345	0.39		
	nom						0.35								1.1			0.01	0.02
	min	0.136	0.145	0.004	0.772	0.774		0.365	0.365	0.035	0.745	0.495	0.123	0.057		1.335	0.38		

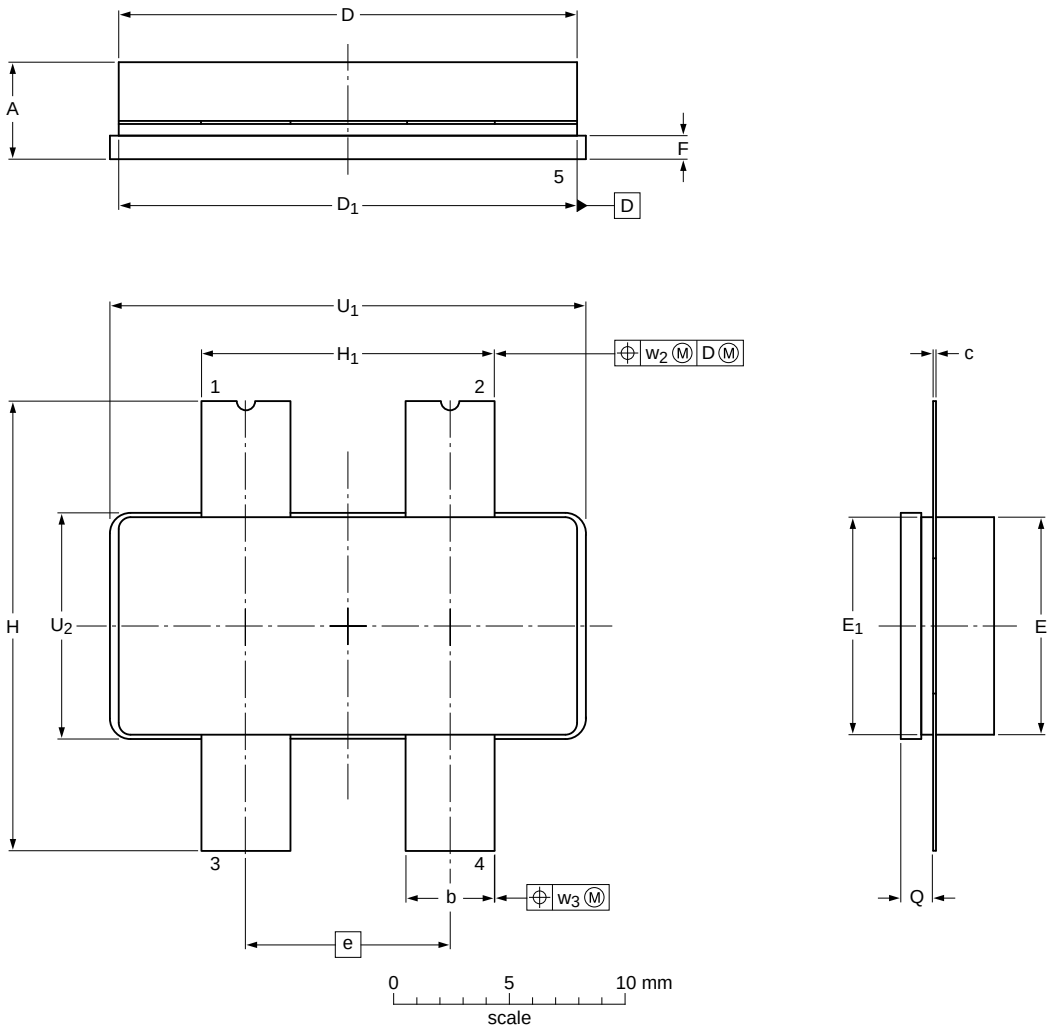
Note
1. millimeter dimensions are derived from the original inch dimensions.
2. dimension is measured 0.030 inch (0.76 mm) from the body.

sot1121a_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1121A						~~09-10-12~~ 10-02-02

Fig 15. Package outline SOT1121A

Earless flanged LDMOST ceramic package; 4 leads **SOT1121B**



Dimensions

Unit[1]		A	b	c	D	D_1	e	E	E_1	F	H	H_1	Q	U_1	U_2	w_2	w_3
mm	max	4.75	3.94	0.18	20.02	19.96		9.53	9.53	1.14	19.94	12.83	1.70	20.70	9.91		
	nom						8.89									0.51	0.25
	min	3.45	3.68	0.08	19.61	19.66		9.27	9.27	0.89	18.92	12.57	1.45	20.45	9.65		
inches	max	0.187	0.155	0.007	0.788	0.786		0.375	0.375	0.045	0.785	0.505	0.067	0.815	0.39		
	nom						0.35									0.02	0.01
	min	0.136	0.145	0.003	0.772	0.774		0.365	0.365	0.035	0.745	0.495	0.057	0.805	0.38		

Note

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

sot1121b_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1121B						~~09-10-12~~ 09-12-14

Fig 16. Package outline SOT1121B

9. Abbreviations

Table 8. Abbreviations

Acronym	Description
3GPP	Third Generation Partnership Project
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
DPCH	Dedicated Physical CHannel
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-90P_BLF7G27LS-90P v.2	20111110	Product data sheet	-	BLF7G27L-90P_BLF7G27LS-90P v.1
Modifications:	• Table 1 on page 1: Some values have been changed; added row: Single carrier W-CDMA. • Table 5 on page 3: Some values have been changed. • Table 6 on page 3: Some values have been changed/added. • Table 7 on page 3: Some values have been changed. • Section 7.1 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-90P_BLF7G27LS-90P v.1	20101102	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".

[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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