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BLF7G27L-100; BLF7G27LS-100

Power LDMOS transistor

Rev. 5 — 1 December 2016

AMPLEON

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 common source class-AB production test circuit.

Mode of operation	f	I_{Dq}	V_{DS}	$P_{L(AV)}$	G_p	η_D	$ACPR_{885k}$	$ACPR_{5M}$
	(MHz)	(mA)	(V)	(W)	(dB)	(%)	(dBc)	(dBc)
IS-95	2500 to 2700	900	28	20	18	28	–45[1]	-
Single carrier W-CDMA	2500 to 2700	900	28	25	17.5	30	-	–41[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

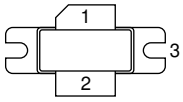
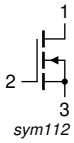
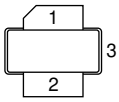
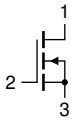
- Excellent ruggedness
- High efficiency
- Low R_{th} providing excellent thermal stability
- Designed for low memory effects providing excellent pre-distortability
- Internally matched for ease of use
- Integrated ESD protection
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

1.3 Applications

- RF power amplifiers for 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-100 (SOT502A)			
1	drain		
2	gate		
3	source [1]		
BLF7G27LS-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
BLF7G27L-100	-	flanged LDMOST ceramic package; 2 mounting holes; 2 leads	SOT502A
BLF7G27LS-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	Conditions	Min	Max	Unit
V_{DS}	drain-source voltage		-	65	V
V_{GS}	gate-source voltage		−0.5	+13	V
I_D	drain current		-	28	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
$R_{th(j-c)}$	thermal resistance from junction to case	T_{case} = 80 °C; P_L = 100 W	0.25	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 = 1 mA	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	V_{DS} = 10 V; I_D = 153 mA	1.5	1.8	2.3	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	25.1	29	-	A
I_{GSS}	gate leakage current	V_{GS} = 11 V; V_{DS} = 0 V	-	-	500	nA
g_{fs}	forward transconductance	V_{DS} = 10 V; I_D = 153 mA	-	1.34	-	S
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = $V_{GS(th)}$ + 3.75 V; I_D = 5.35 A	-	0.1	-	Ω

7. Test information

Remark: All testing performed in a class-AB production test circuit.

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} = 900 mA; T_{case} = 25 °C; unless otherwise specified.

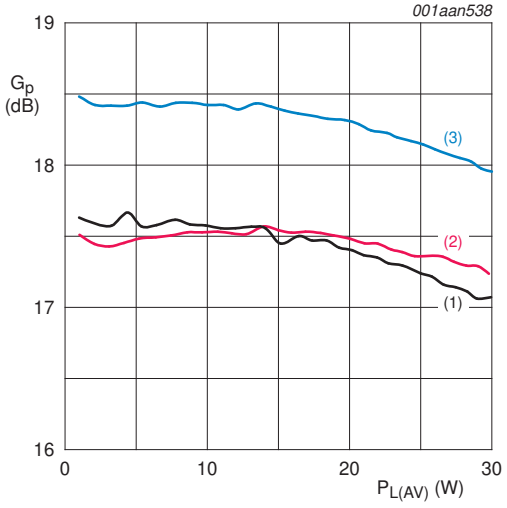
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	20	-	W
G_p	power gain		16.3	18	-	dB
RL_{in}	input return loss		-	−10	-	dB
η_D	drain efficiency		24	28	-	%
$ACPR_{885k}$	adjacent channel power ratio (885 kHz)		-	−45	−40	dBc

7.1 Ruggedness in class-AB operation

The BLF7G27L-100 and BLF7G27LS-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 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.



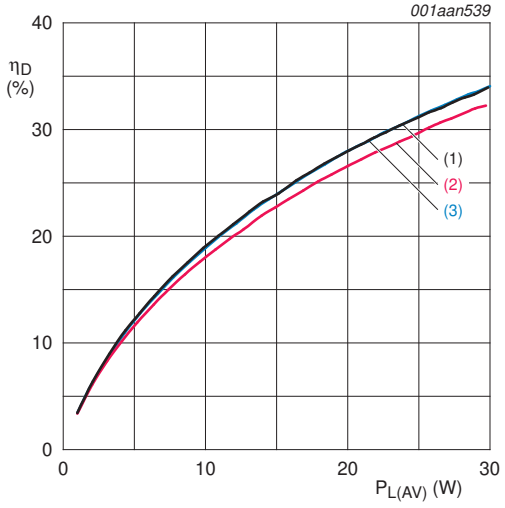
V_{DS} = 28 V; I_{Dq} = 900 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



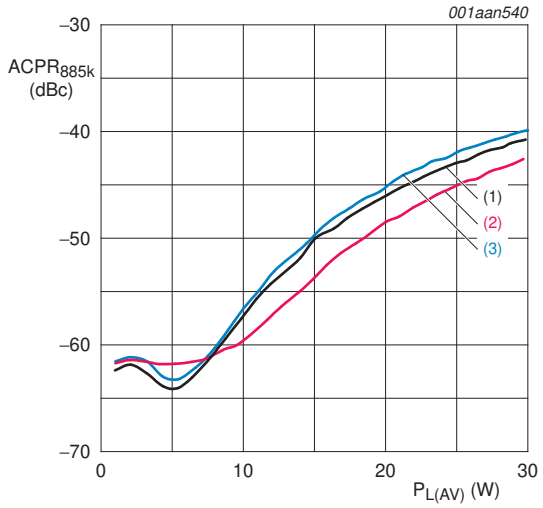
V_{DS} = 28 V; I_{Dq} = 900 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



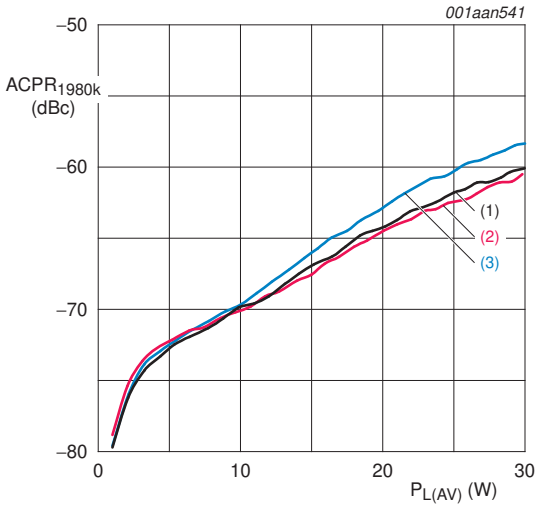
V_{DS} = 28 V; I_{Dq} = 900 mA.

(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 average output power; typical values



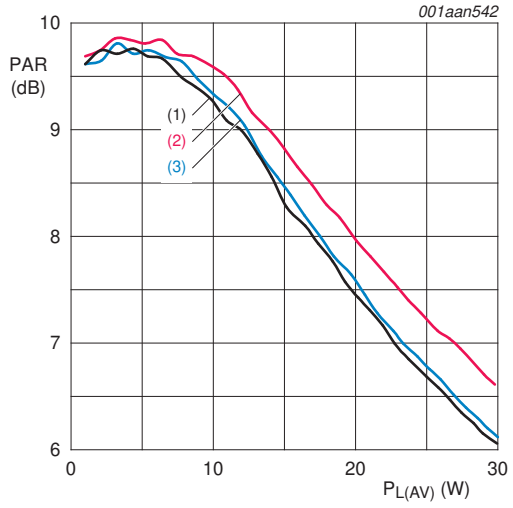
V_{DS} = 28 V; I_{Dq} = 900 mA.

(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 average output power; typical values



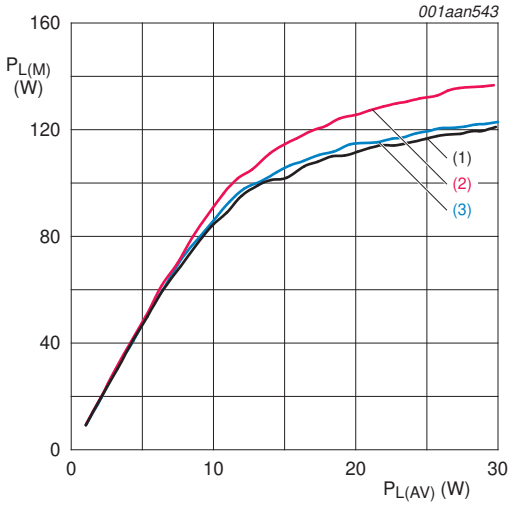
V_{DS} = 28 V; I_{Dq} = 900 mA.

(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 average output power; typical values



V_{DS} = 28 V; I_{Dq} = 900 mA.

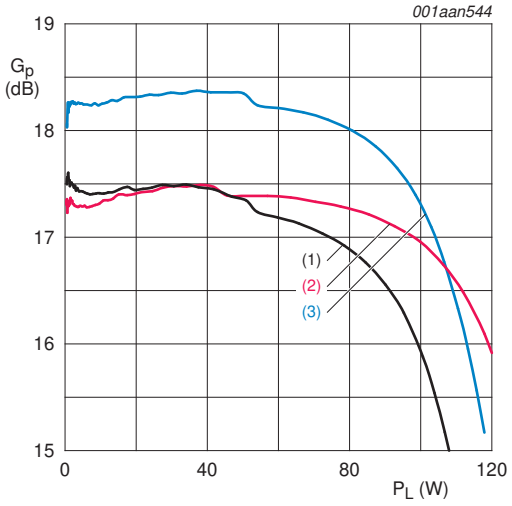
(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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

7.3 Pulsed CW



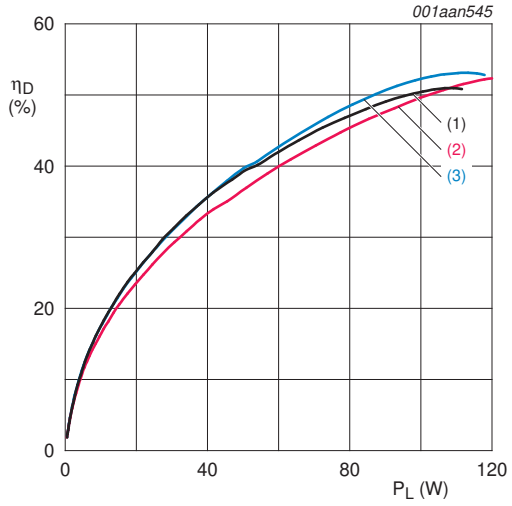
V_{DS} = 28 V; I_{Dq} = 900 mA.

(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} = 900 mA.

(1) f = 2500 MHz

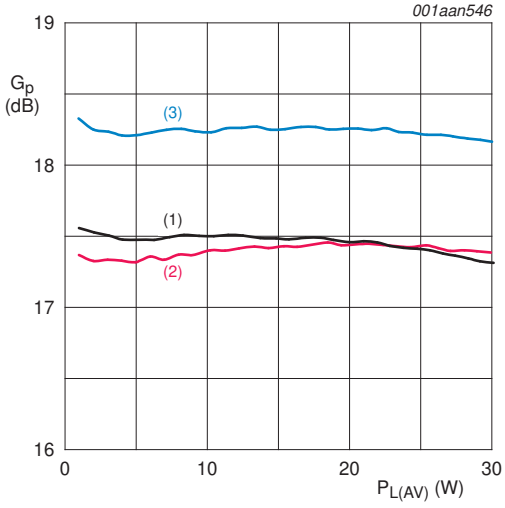
(2) f = 2600 MHz

(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.



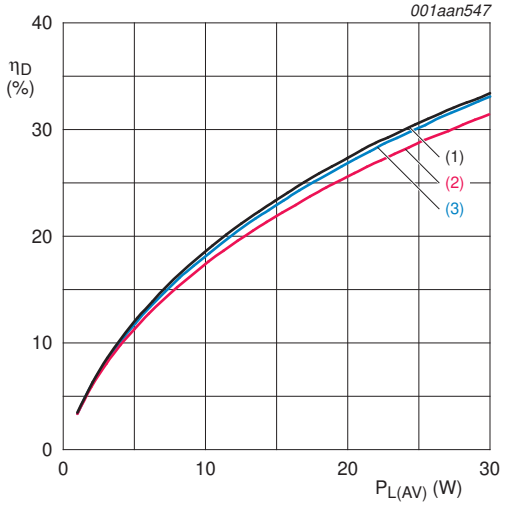
V_{DS} = 28 V; I_{Dq} = 900 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



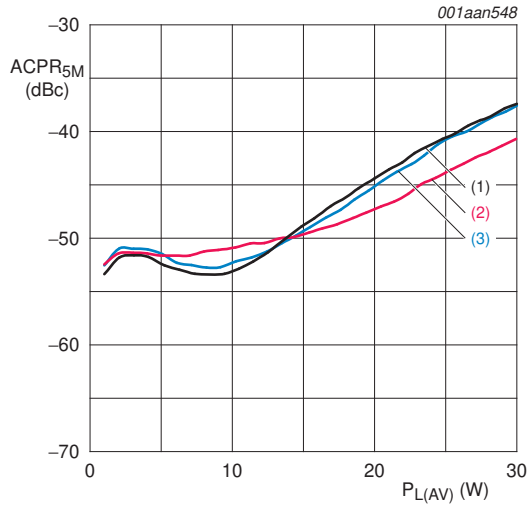
V_{DS} = 28 V; I_{Dq} = 900 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



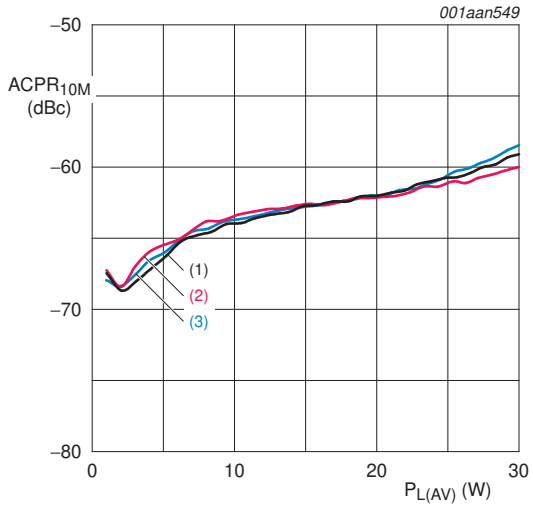
V_{DS} = 28 V; I_{Dq} = 900 mA.

(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 average output power; typical values



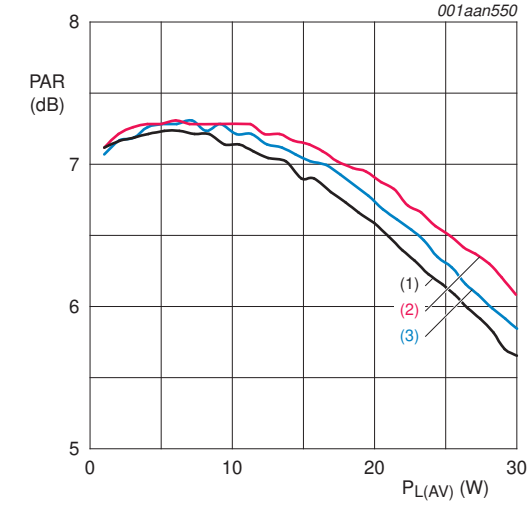
V_{DS} = 28 V; I_{Dq} = 900 mA.

(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 average output power; typical values



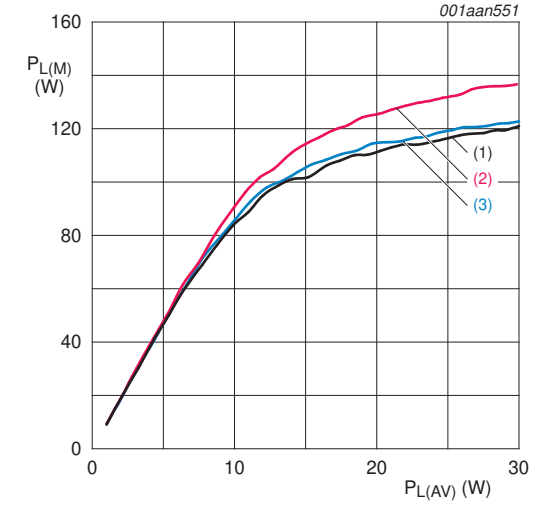
V_{DS} = 28 V; I_{Dq} = 900 mA.

(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 average output power; typical values



V_{DS} = 28 V; I_{Dq} = 900 mA.

(1) f = 2500 MHz

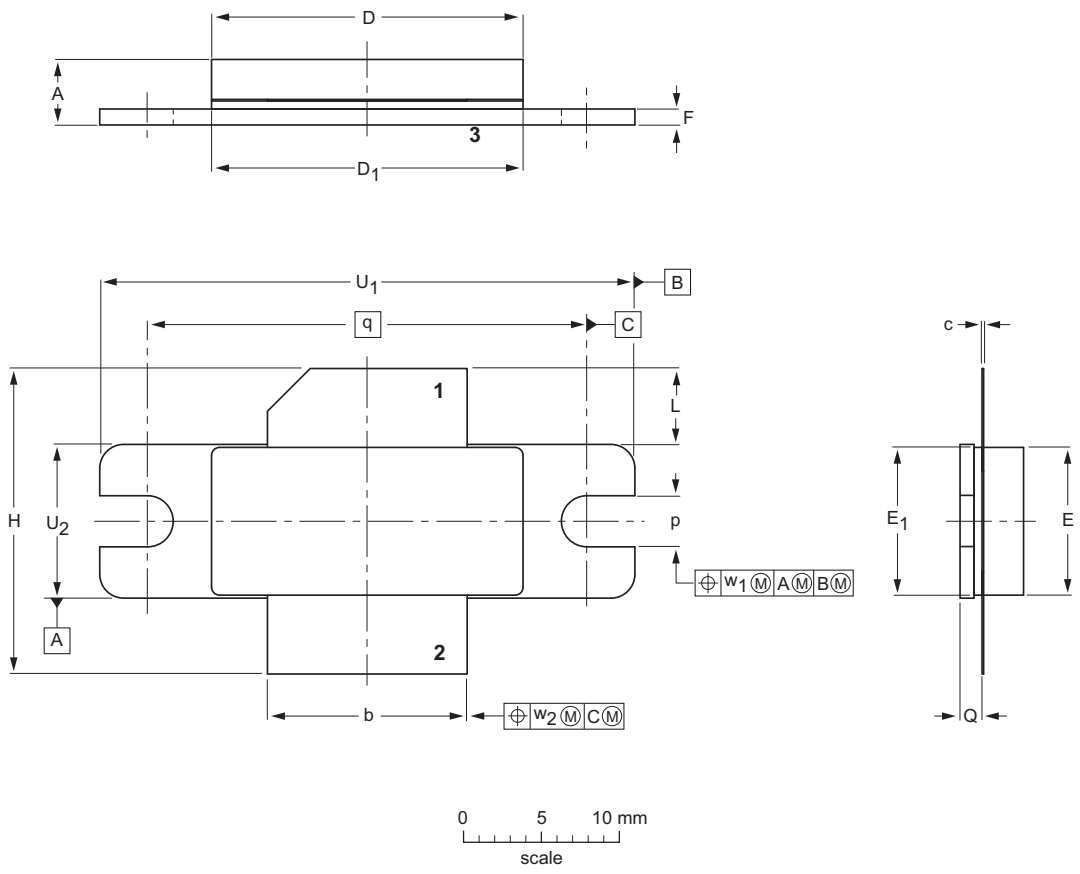
(2) f = 2600 MHz

(3) f = 2700 MHz

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

8. Package outline

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



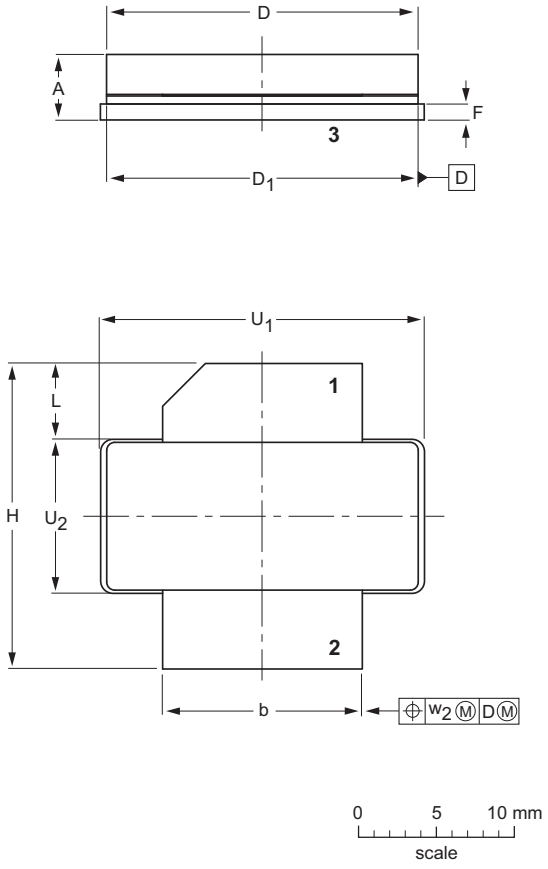
DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

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						~~03-01-10~~ 12-05-02

Fig 15. Package outline SOT502A

Earless flanged 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						~~07-05-09~~ 12-05-02

Fig 16. Package outline SOT502B

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.

Table 8. ESD sensitivity

ESD model	Class
Charged Device Model (CDM); According to ANSI/ESDA/JEDEC standard JS-002	C2A [1]
Human Body Model (HBM); According to ANSI/ESDA/JEDEC standard JS-001	3A [2]

[1] CDM classification C2A is granted to any part that passes after exposure to an ESD pulse of 500 V, but fails after exposure to an ESD pulse of 750 V.

[2] HBM classification 3A is granted to any part that passes after exposure to an ESD pulse of 4000 V, but fails after exposure to an ESD pulse of 8000 V.

10. Abbreviations

Table 9. 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

11. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF7G27L-100_7G27LS-100 v.5	20161201	Product data sheet	-	BLF7G27L-100_7G27LS-100 v.4
Modifications:	• Section 9 on page 11: updated Handling information			
BLF7G27L-100_7G27LS-100 v.4	20150901	Product data sheet	-	BLF7G27L-100_7G27LS-100 v.3
BLF7G27L-100_7G27LS-100 v.3	20110722	Product data sheet	-	BLF7G27L-100_7G27LS-100 v.2
BLF7G27L-100_7G27LS-100 v.2	20110405	Preliminary data sheet	-	BLF7G27L-100_7G27LS-100 v.1
BLF7G27L-100_7G27LS-100 v.1	20100421	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.ampleon.com.

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13. Contact information

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Date of release: 1 December 2016
Document identifier: BLF7G27L-100_7G27LS-100