THE DATASHEET OF

BLF6G27S-45,118

BLF6G27-45; BLF6G27S-45

WiMAX power LDMOS transistor

AMPLEON

Rev. 5 — 1 September 2015 Product data sheet

1. Product profile

1.1 General description

45 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 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)
1-carrier N-CDMA[1]	2500 to 2700	28	7	18	24	−49[2]	−64[2]

[1] Single carrier N-CDMA with pilot, paging sync and 6 traffic channels (Walsh codes 8 - 13). PAR = 9.7 dB at 0.01 % probability on CCDF. Channel bandwidth is 1.23 MHz.

[2] Measured within 30 kHz bandwidth.

CAUTION

This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

1.2 Features and benefits

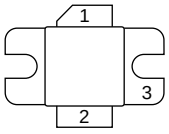
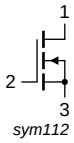
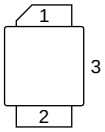
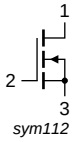
- Typical 1-carrier N-CDMA performance (single carrier N-CDMA with pilot, paging, sync and 6 traffic channels [Walsh codes 8 - 13]. PAR = 9.7 dB at 0.01 % probability on CCDF. Channel bandwidth is 1.23 MHz), a supply voltage of 28 V and an I_{Dq} of 350 mA:
- Qualified up to a maximum V_{DS} operation of 32 V
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation
- Internally matched for ease of use
- Low gold plating thickness on leads
- 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
BLF6G27-45 (SOT608A)				
1	drain			
2	gate			
3	source	[1]		
BLF6G27S-45 (SOT608B)				
1	drain			
2	gate			
3	source	[1]		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF6G27-45	-	flanged ceramic package; 2 mounting holes; 2 leads	SOT608A
BLF6G27S-45	-	ceramic earless flanged package; 2 leads	SOT608B

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		-	20	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 = 34 W (CW)	BLF6G27-45	1.7	K/W
			BLF6G27S-45	1.7	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 = 60 mA	1.4	1.9	2.4	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	8.8	10.4	-	A
I_{GSS}	gate leakage current	V_{GS} = 11 V; V_{DS} = 0 V	-	-	140	nA
g_{fs}	forward transconductance	V_{DS} = 10 V; I_D = 2.5 A	-	4.3	-	S
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = $V_{GS(th)}$ + 3.75 V; I_D = 2.1 A	-	0.24	0.385	Ω
C_{rs}	feedback capacitance	V_{GS} = 0 V; V_{DS} = 28 V; f = 1 MHz	-	1.1	-	pF

7. Application information

Table 7. Application information

Mode of operation: Single carrier N-CDMA with pilot, paging, sync and 6 traffic channels (Walsh codes 8 - 13). PAR 9.7 dB at 0.01 % probability on CCDF; channel bandwidth = 1.23 MHz; f = 2700 MHz; RF performance at V_{DS} = 28 V; I_{Dq} = 350 mA; T_{case} = 25 °C; unless otherwise specified; in a class-AB production circuit.

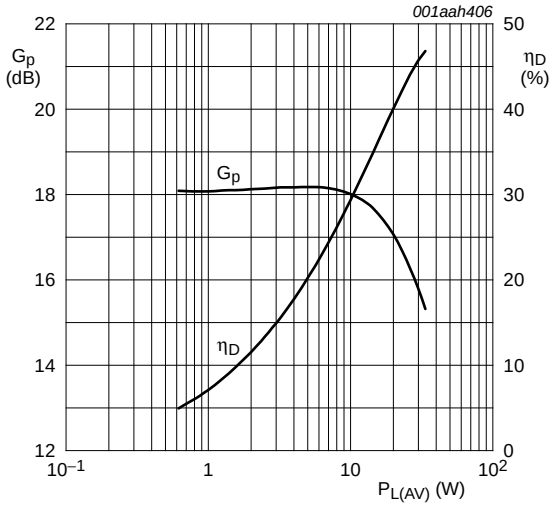
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$P_{L(AV)}$	average output power			-	7	-	W
G_p	power gain	$P_{L(AV)}$ = 7 W		16.5	18	-	dB
RL_{in}	input return loss	$P_{L(AV)}$ = 7 W		-	−10	−5	dB
η_D	drain efficiency	$P_{L(AV)}$ = 7 W		22	24	-	%
$ACPR_{885k}$	adjacent channel power ratio (885 kHz)	$P_{L(AV)}$ = 7 W	[1]	-	−49	−46	dBc
$ACPR_{1980k}$	adjacent channel power ratio (1980 kHz)	$P_{L(AV)}$ = 7 W	[1]	-	−64	−61	dBc

[1] Measured within 30 kHz bandwidth.

7.1 Ruggedness in class-AB operation

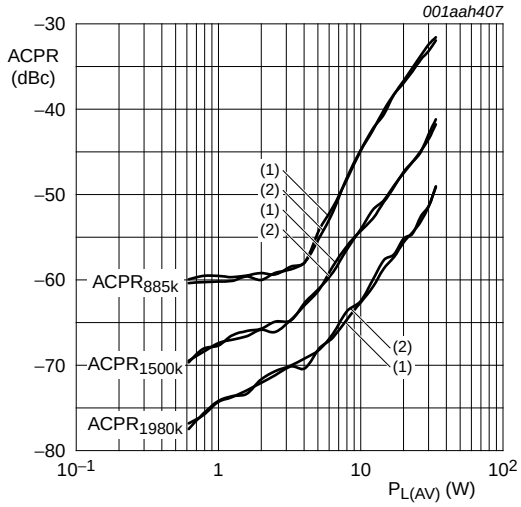
The BLF6G27-45 and BLF6G27S-45 are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: V_{DS} = 28 V; I_{Dq} = 350 mA; P_L = 45 W (CW); f = 2600 MHz.

7.2 Single carrier N-CDMA performance



V_{DS} = 28 V; I_{Dq} = 350 mA; f = 2600 MHz; single carrier N-CDMA; PAR = 9.7 dB at 0.01 % probability; channel bandwidth = 1.23 MHz; instantaneous bandwidth = 30 kHz.

Fig 1. Power gain and drain efficiency as functions of average load power; typical values



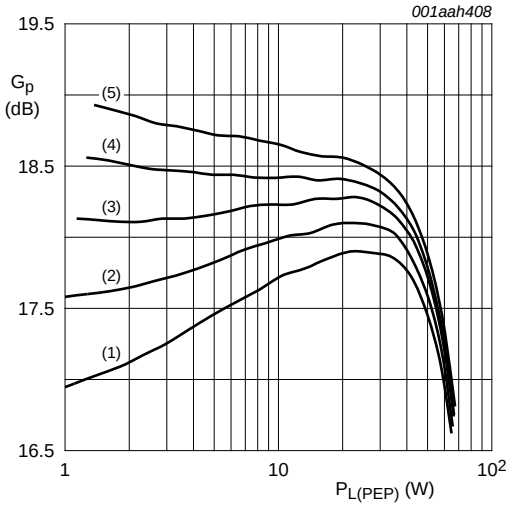
V_{DS} = 28 V; I_{Dq} = 350 mA; f = 2600 MHz; single carrier N-CDMA; PAR = 9.7 dB at 0.01 % probability; channel bandwidth = 1.23 MHz; instantaneous bandwidth = 30 kHz.

(1) Low frequency component

(2) High frequency component

Fig 2. Adjacent channel power ratio as function of average load power; typical values

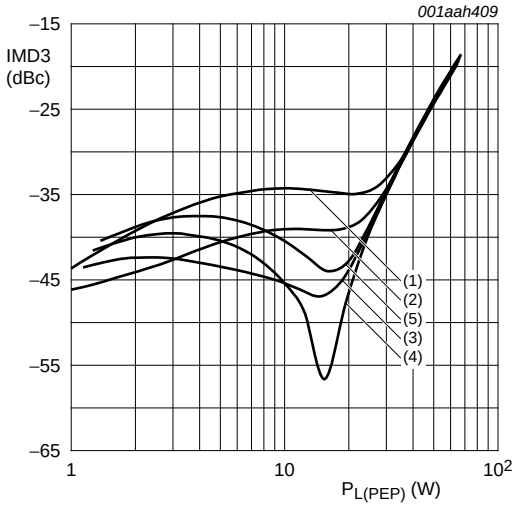
7.3 Two-tone



V_{DS} = 28 V; f_1 = 2598.75 MHz; f_2 = 2601.25 MHz; 2.5 MHz tone spacing.

(1) I_{Dq} = 250 mA
(2) I_{Dq} = 300 mA
(3) I_{Dq} = 350 mA
(4) I_{Dq} = 400 mA
(5) I_{Dq} = 500 mA

Fig 3. Power gain as function of peak envelope load power; typical values

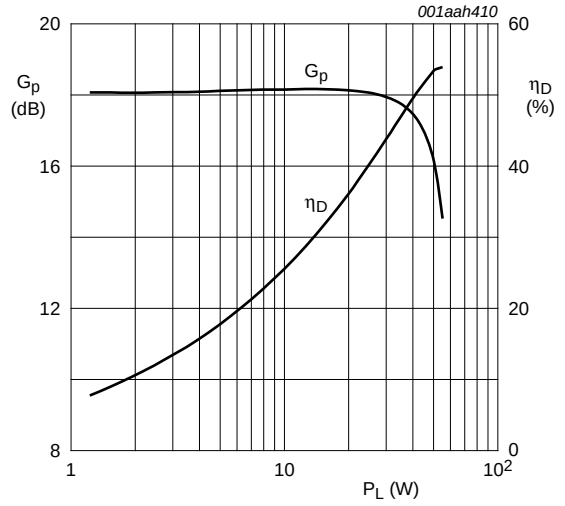


V_{DS} = 28 V; f_1 = 2598.75 MHz; f_2 = 2601.25 MHz; 2.5 MHz tone spacing.

(1) I_{Dq} = 250 mA
(2) I_{Dq} = 300 mA
(3) I_{Dq} = 350 mA
(4) I_{Dq} = 400 mA
(5) I_{Dq} = 500 mA

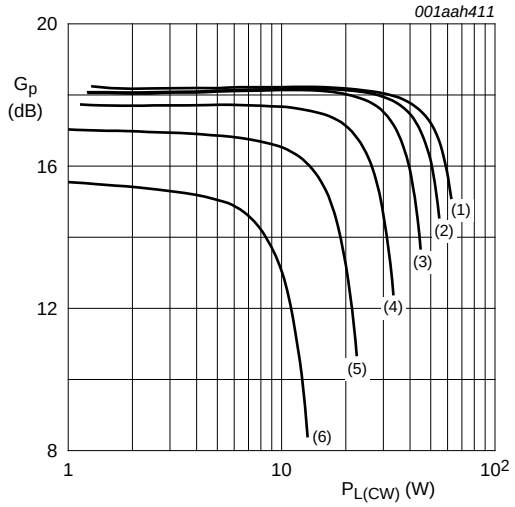
Fig 4. Third order intermodulation distortion as function of peak envelope load power; typical values

7.4 Continuous wave



I_{Dq} = 350 mA; f = 2600 MHz; T_{case} = 25 °C; V_{DS} = 28 V.

Fig 5. Power gain and drain efficiency as functions of CW load power; typical values

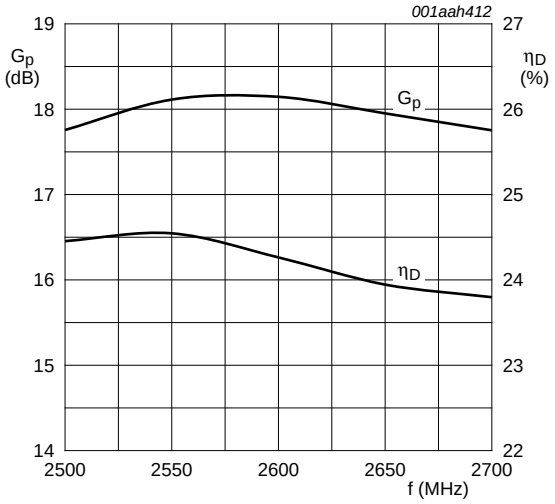


I_{Dq} = 350 mA; f = 2600 MHz; T_{case} = 25 °C.

(1) V_{DS} = 32 V
(2) V_{DS} = 28 V
(3) V_{DS} = 24 V
(4) V_{DS} = 20 V
(5) V_{DS} = 16 V
(6) V_{DS} = 12 V

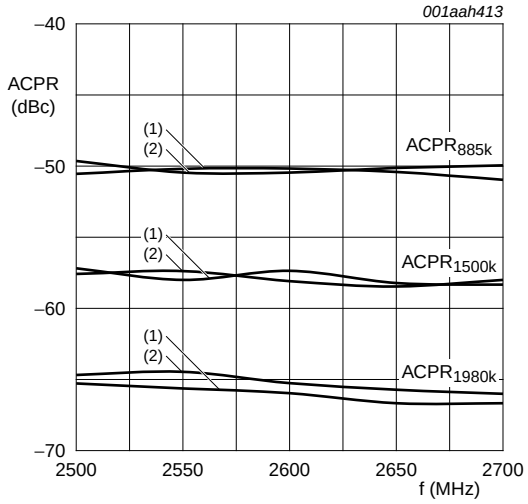
Fig 6. Power gain as function of CW load power; typical values

7.5 Single carrier N-CDMA broadband performance at 7 W average



V_{DS} = 28 V; I_{Dq} = 350 mA; single carrier N-CDMA; PAR = 9.7 dB at 0.01 % probability; instantaneous bandwidth = 30 kHz.

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

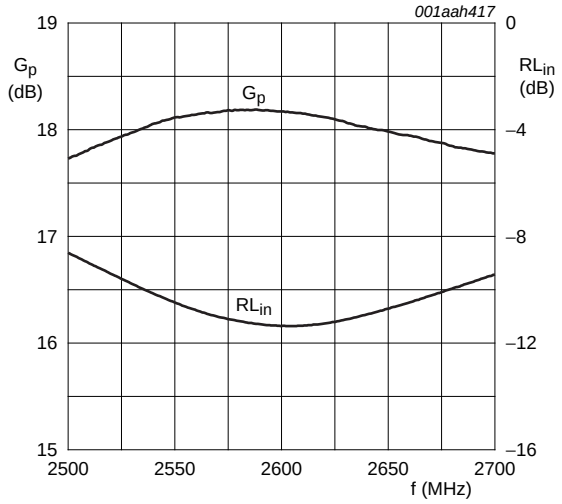


V_{DS} = 28 V; I_{Dq} = 350 mA; single carrier N-CDMA; PAR = 9.7 dB at 0.01 % probability; instantaneous bandwidth = 30 kHz.

(1) Low frequency component

(2) High frequency component

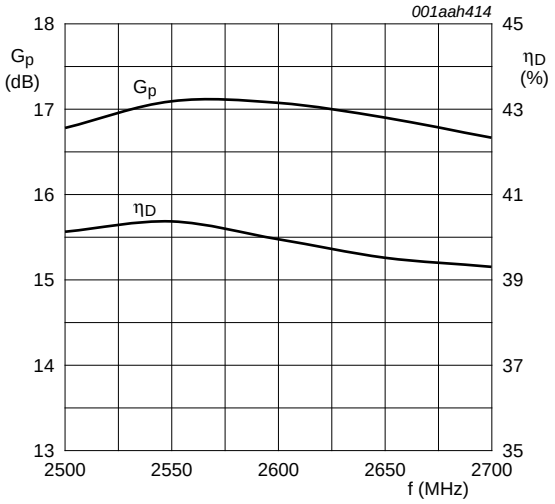
Fig 8. Adjacent channel power ratio as function of frequency; typical values



V_{DS} = 28 V; I_{Dq} = 350 mA; single carrier N-CDMA; PAR = 9.7 dB at 0.01 % probability; instantaneous bandwidth = 30 kHz.

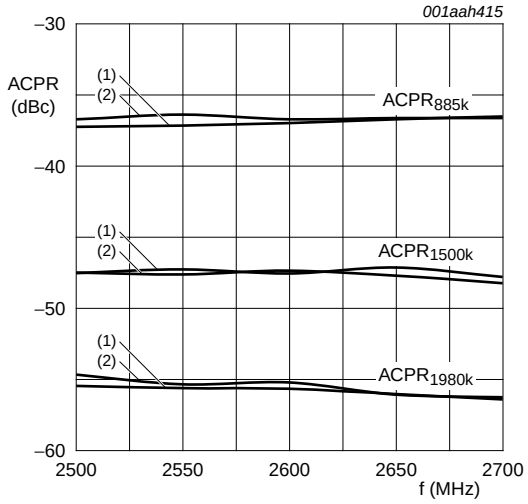
Fig 9. Power gain and input return loss as functions of frequency

7.6 Single carrier N-CDMA broadband performance at 20 W average



V_{DS} = 28 V; I_{Dq} = 350 mA; single carrier N-CDMA; PAR = 9.7 dB at 0.01 % probability; instantaneous bandwidth = 30 kHz.

Fig 10. Power gain and drain efficiency as functions of frequency; typical values



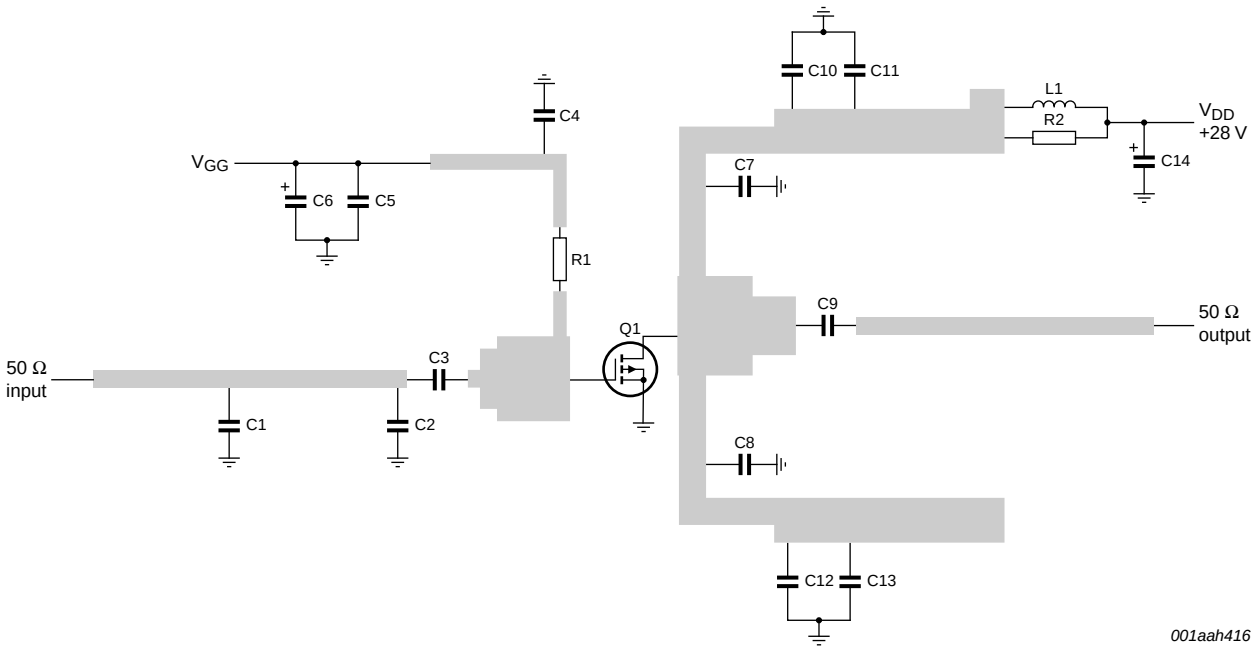
V_{DS} = 28 V; I_{Dq} = 350 mA; single carrier N-CDMA; PAR = 9.7 dB at 0.01 % probability; instantaneous bandwidth = 30 kHz.

(1) Low frequency component

(2) High frequency component

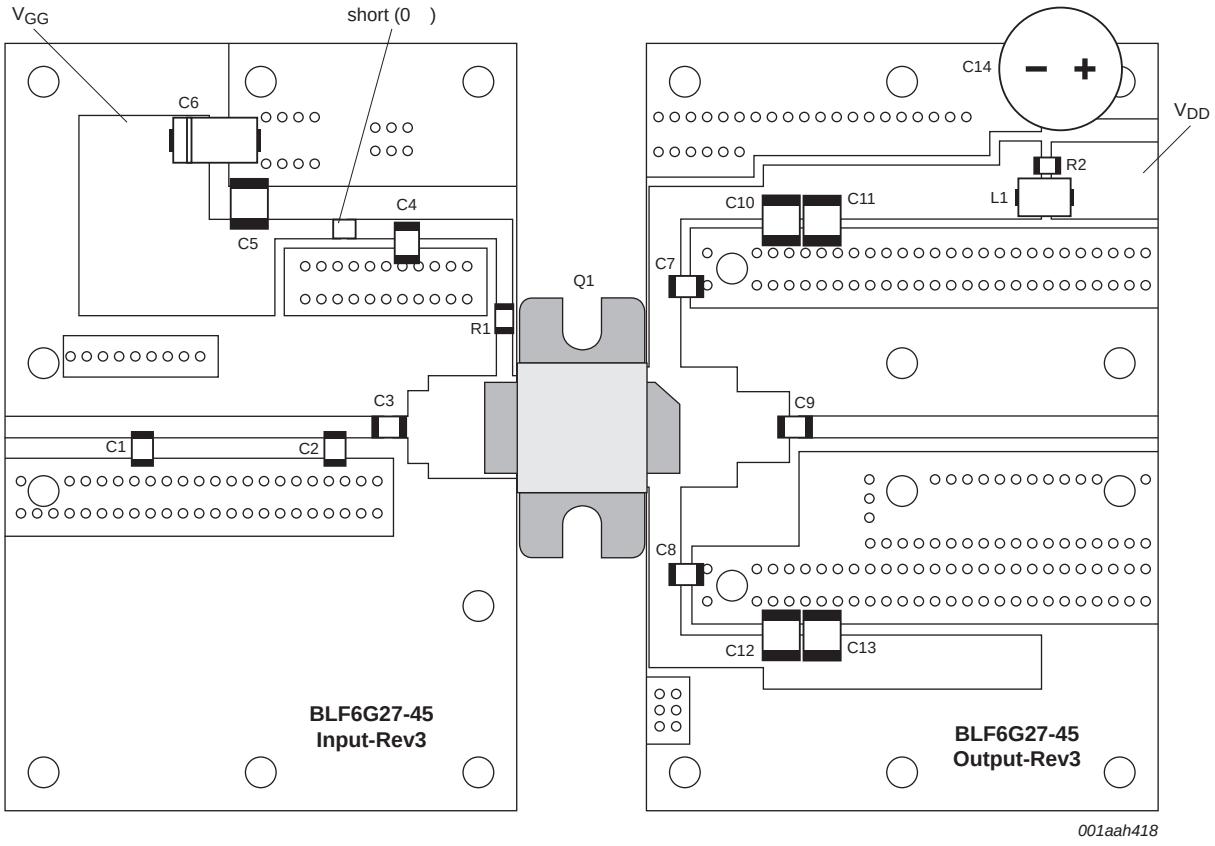
Fig 11. Adjacent channel power ratio as function of frequency; typical values

8. Test information



See Table 8 for list of components.

Fig 12. Test circuit for operation at 2500 MHz to 2700 MHz



Striplines are on a double copper-clad Taconic RF35 Printed-Circuit Board (PCB) with ε_r = 3.5 and thickness = 0.76 mm.

See Table 8 for list of components.

Fig 13. Component layout for 2500 MHz to 2700 MHz test circuit

Table 8. List of components

For test circuit, see Figure 12 and Figure 13.

Component	Description	Value		Remarks
C1	multilayer ceramic chip capacitor	0.3 pF	[1]	
C2	multilayer ceramic chip capacitor	0.5 pF	[1]	
C3, C4, C7, C8	multilayer ceramic chip capacitor	11 pF	[1]	
C5, C10, C11, C12, C13	multilayer ceramic chip capacitor	4.7 μF		C4532X7R1H475M
C6	tantalum capacitor	10 μF; 35 V		Kemet (Farnell)
C9	multilayer ceramic chip capacitor	8.2 pF		
C14	electrolytic capacitor	470 μF; 63 V		
L1	ferrite SMD bead	-		Ferroxcube BDS 3/3/4.6-4S2 or equivalent
R1	resistor	22 Ω		package 0603
R2	resistor	12 Ω		package 1206
Q1	BLF6G27-45 or BLF6G27S-45	-		

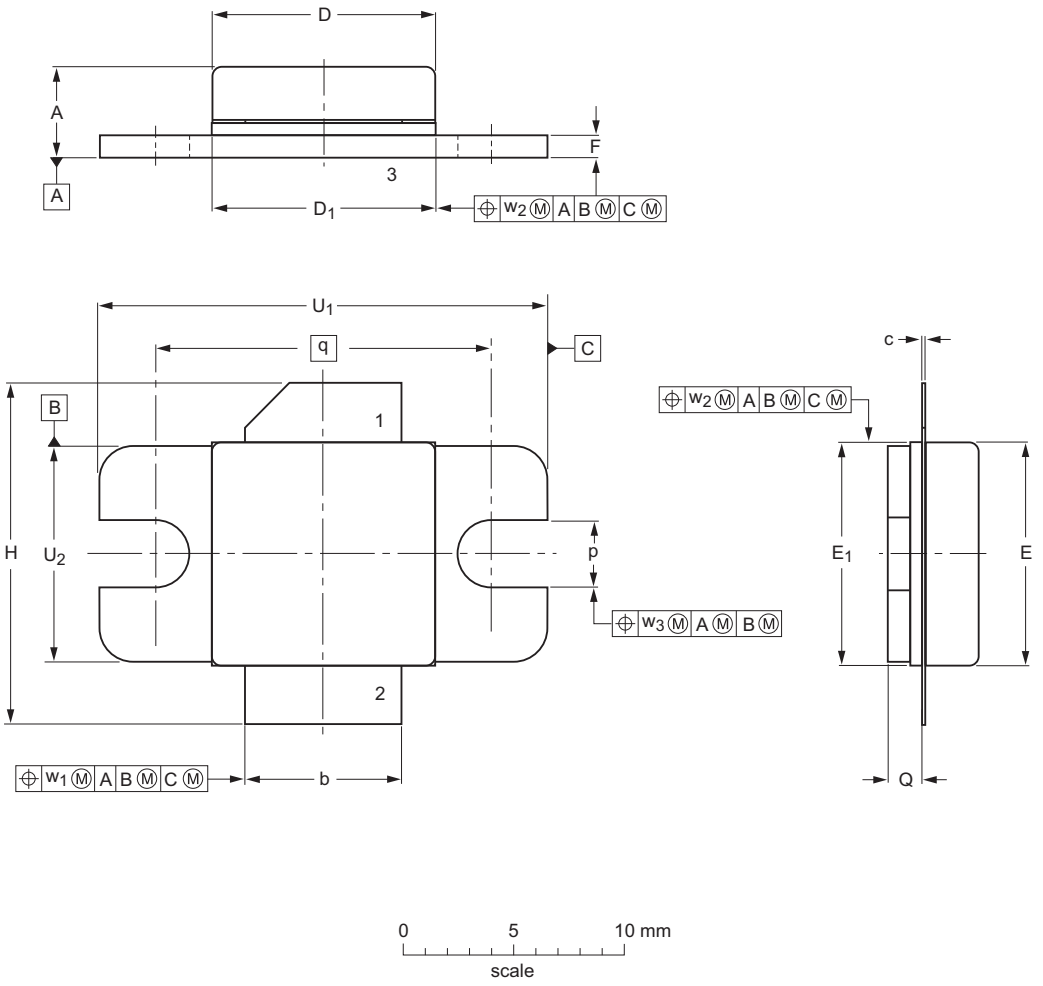
[1] American Technical Ceramics type 100B or capacitor of same quality.

Table 9. Measured test circuit impedances

f	Z_i	Z_o
(GHz)	(Ω)	(Ω)
2.50	11.1 – j11.0	18.4 – j9.1
2.55	10.6 – j10.8	16.9 – j9.2
2.60	10.1 – j10.5	15.6 – j9.2
2.65	9.6 – j10.2	14.4 – j9.1
2.70	9.1 – j9.8	13.3 – j8.9

9. Package outline

Flanged ceramic package; 2 mounting holes; 2 leads **SOT608A**



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

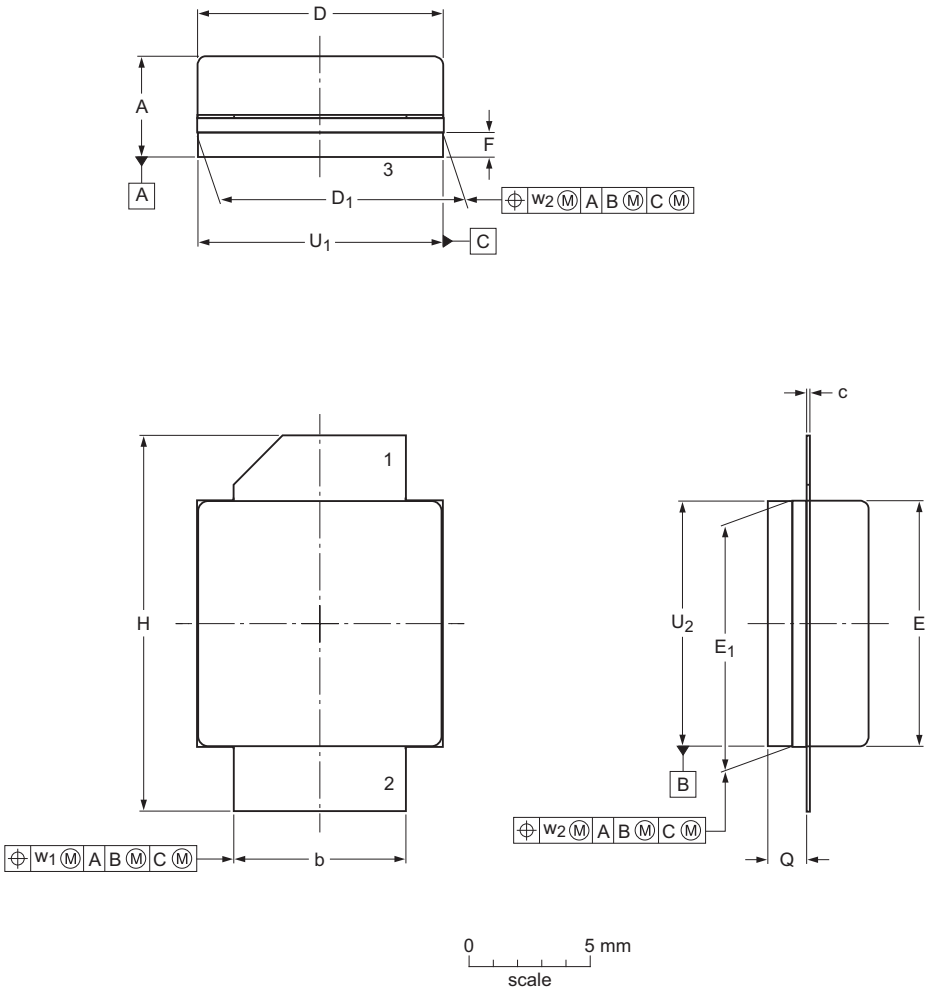
Unit		A	b	c	D	D_1	E	E_1	F	H	p	Q	q	U_1	U_2	w_1	w_2	w_3
mm	max	4.62	7.24	0.15	10.21	10.29	10.21	10.29	1.14	15.37	3.30	1.70		20.45	9.91			
	nom												15.24			0.25	0.25	0.25
	min	3.76	6.99	0.10	10.01	10.03	10.01	10.03	0.89	15.11	2.92	1.45		20.19	9.65			

sot608a_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT608A						~~09-08-26~~ 13-01-29

Fig 14. Package outline SOT608A

Ceramic earless flanged package; 2 leads **SOT608B**



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

Unit		A	b	c	D	D_1	E	E_1	F	H	Q	U_1	U_2	w_1	w_2
mm	max	4.62	7.24	0.15	10.21	10.29	10.21	10.29	1.14	15.37	1.70	10.24	10.24		
	nom													0.25	0.25
	min	3.76	6.99	0.10	10.01	10.03	10.01	10.03	0.89	15.11	1.45	9.98	9.98		

sot608b_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT608B						~~09-08-26~~ 13-01-29

Fig 15. Package outline SOT608B

10. Abbreviations

Table 10. Abbreviations

Acronym	Description
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
N-CDMA	Narrowband Code Division Multiple Access
PAR	Peak-to-Average power Ratio
RF	Radio Frequency
SMD	Surface Mounted Device
VSWR	Voltage Standing-Wave Ratio
WiMAX	Worldwide Interoperability for Microwave Access

11. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF6G27-45_BLF6G27S-45#5	20150901	Product data sheet	-	BLF6G27-45_BLF6G27S-45 v.4
Modifications:	• The format of this document has been redesigned to comply with the new identity guidelines of Ampleon. • Legal texts have been adapted to the new company name where appropriate.			
BLF6G27-45_BLF6G27S-45 v.4	20130307	Product data sheet	-	BLF6G27-45_BLF6G27S-45_3
BLF6G27-45_BLF6G27S-45_3	20081215	Product data sheet	-	BLF6G27-45_BLF6G27S-45_2
BLF6G27-45_BLF6G27S-45_2	20080207	Preliminary data sheet		BLF6G27-45_BLF6G27S-45_1
BLF6G27-45_BLF6G27S-45_1	20080129	Preliminary 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.

12.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Ampleon does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Ampleon sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

Product specification — The information and data provided in a Product data sheet shall define the specification of the product as agreed between Ampleon and its customer, unless Ampleon and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Ampleon product is deemed to offer functions and qualities beyond those described in the Product data sheet.

12.3 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Ampleon does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. Ampleon takes no responsibility for the content in this document if provided by an information source outside of Ampleon.

In no event shall Ampleon be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Ampleon' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the *Terms and conditions of commercial sale* of Ampleon.

Right to make changes — Ampleon reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — Ampleon products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Ampleon product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Ampleon and its suppliers accept no liability for inclusion and/or use of Ampleon products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. Ampleon makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using Ampleon products, and Ampleon accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Ampleon product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Ampleon does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Ampleon products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Ampleon does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — Ampleon products are sold subject to the general terms and conditions of commercial sale, as published at http://www.ampleon.com/terms, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Ampleon hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Ampleon products by customer.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Non-automotive qualified products — Unless this data sheet expressly states that this specific Ampleon product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. Ampleon accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without Ampleon' warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond Ampleon' specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies Ampleon for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond Ampleon' standard warranty and Ampleon' product specifications.

Translations — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

12.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

Any reference or use of any 'NXP' trademark in this document or in or on the surface of Ampleon products does not result in any claim, liability or entitlement vis-à-vis the owner of this trademark. Ampleon is no longer part of the NXP group of companies and any reference to or use of the 'NXP' trademarks will be replaced by reference to or use of Ampleon's own Any reference or use of any 'NXP' trademark in this document or in or on the surface of Ampleon products does not result in any claim, liability or entitlement vis-à-vis the owner of this trademark. Ampleon is no longer part of the NXP group of companies and any reference to or use of the 'NXP' trademarks will be replaced by reference to or use of Ampleon's own trademarks.

13. Contact information

For more information, please visit:
http://www.ampleon.com

For sales office addresses, please visit:
http://www.ampleon.com/sales

14. Contents

For more information, please visit: http://www.ampleon.com
For sales office addresses, please visit: http://www.ampleon.com/sales

Date of release: 1 September 2015
Document identifier: BLF6G27-45_BLF6G27S-45#5

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- View BLF6G27S-45,118 on WIN SOURCE
- Ampleon USA Inc. Information

Optimize Your Supply Chain with WIN SOURCE Solutions

- Global Sourcing Solution
- Obsolete Management
- Cost Control Management
- Shortage Management
- Alternative Solution
- Excess Inventory Management