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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# BLF6G27L-40P; BLF6G27LS-40P(G)

Power LDMOS transistor

Rev. 4 — 1 September 2015

AMPLEON

Product data sheet

## 1. Product profile

### 1.1 General description

40 W LDMOS power transistor for base station applications at frequencies from 2500 MHz to 2700 MHz, also suitable for operation at 2300 MHz to 2400 MHz.

**Table 1. Typical performance**

Typical RF performance at  $T_{case} = 25\text{ °C}$  in a common source class-AB production test circuit.

Test signal	f (MHz)	$I_{Dq}$ (mA)	$V_{DS}$ (V)	$P_{L(AV)}$ (W)	$G_p$ (dB)	$\eta_D$ (%)	ACPR <sub>885k</sub> (dBc)	ACPR <sub>5M</sub> (dBc)
IS-95	2500 to 2700	450	28	12	17.5	30	-46 [1]	-
Single carrier W-CDMA	2500 to 2700	450	28	20	17.5	37	-	-35 [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 thermal resistance 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
- Design optimized for gull-wing and straight lead versions
- 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
<b>BLF6G27L-40P (SOT1121A)</b>			
1	drain1		<p style="text-align: right;">sym117</p>
2	drain2		
3	gate1		
4	gate2		
5	source <span style="float: right;">[1]</span>		
<b>BLF6G27LS-40P (SOT1121B)</b>			
1	drain1		<p style="text-align: right;">sym117</p>
2	drain2		
3	gate1		
4	gate2		
5	source <span style="float: right;">[1]</span>		
<b>BLF6G27LS-40PG (SOT1121E)</b>			
1	drain1		<p style="text-align: right;">sym117</p>
2	drain2		
3	gate1		
4	gate2		
5	source <span style="float: right;">[1]</span>		

[1] Connected to flange.

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF6G27L-40P	-	flanged LDMOST ceramic package; 2 mounting holes; 4 leads	SOT1121A
BLF6G27LS-40P	-	earless flanged ceramic package; 4 leads	SOT1121B
BLF6G27LS-40PG	-	earless flanged LDMOST ceramic package; 4 leads	SOT1121E

## 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
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	junction temperature	[1]	-	225	°C

[1] Continuous use at maximum temperature will affect the reliability, for details refer to the on-line MTF calculator.

## 5. Thermal characteristics

**Table 5. Thermal characteristics**

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-c)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C}; P_L = 40\text{ W}$	0.7	K/W

## 6. Characteristics

**Table 6. Characteristics**

$T_j = 25\text{ °C}$ ; per section unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 0.4\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 40\text{ mA}$	1.4	1.8	2.4	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$	-	-	1.4	μA
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	5.96	7.2	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	150	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 2000\text{ mA}$	1.8	2.9	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 1400\text{ mA}$	0.14	0.36	-	Ω



## 7. Test information

**Table 7. Functional test information**

Test signal: 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;  $I_{Dq} = 450$  mA;  $T_{case} = 25$  °C; 2 sections combined unless otherwise specified; in a class-AB production test circuit.

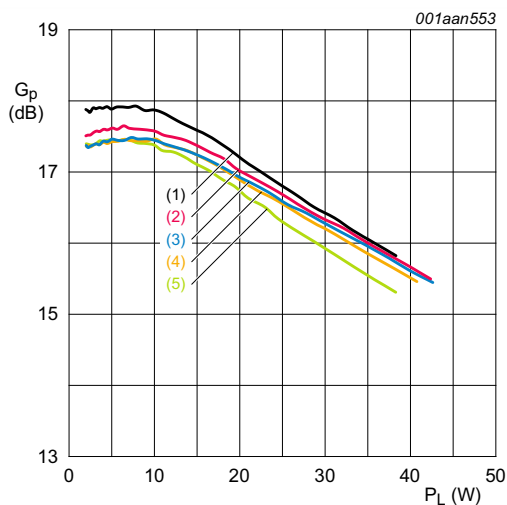
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$P_{L(AV)} = 12$ W	15.5	17.5	-	dB
$RL_{in}$	input return loss	$P_{L(AV)} = 12$ W	-	-10	-	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 12$ W	26	30	-	%
$ACPR_{885k}$	adjacent channel power ratio (885 kHz)	$P_{L(AV)} = 12$ W	-	-46	-41	dBc

### 7.1 Ruggedness in class-AB operation

The BLF6G27L-40P, BLF6G27LS-40P and BLF6G27LS-40PG are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions:  $V_{DS} = 28$  V;  $I_{Dq} = 450$  mA;  $P_L = 40$  W (CW);  $f = 2500$  MHz.

### 7.2 Single carrier IS-95

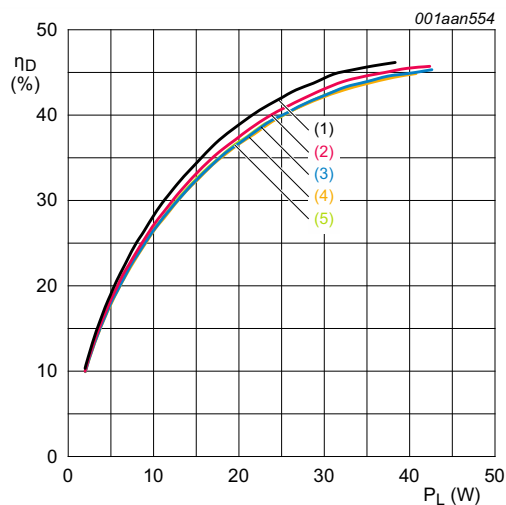
Single carrier IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 - 13). PAR = 9.7 dB at 0.01 % probability on the CCDF. Channel bandwidth is 1.2288 MHz.



$V_{DS} = 28$  V;  $I_{Dq} = 450$  mA.

- (1)  $f = 2500$  MHz
- (2)  $f = 2550$  MHz
- (3)  $f = 2600$  MHz
- (4)  $f = 2650$  MHz
- (5)  $f = 2700$  MHz

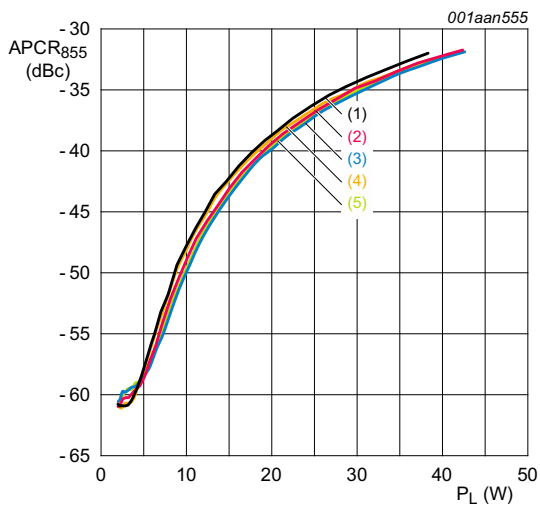
**Fig 1. Single carrier IS-95 power gain as a function of output power; typical values**



$V_{DS} = 28$  V;  $I_{Dq} = 450$  mA.

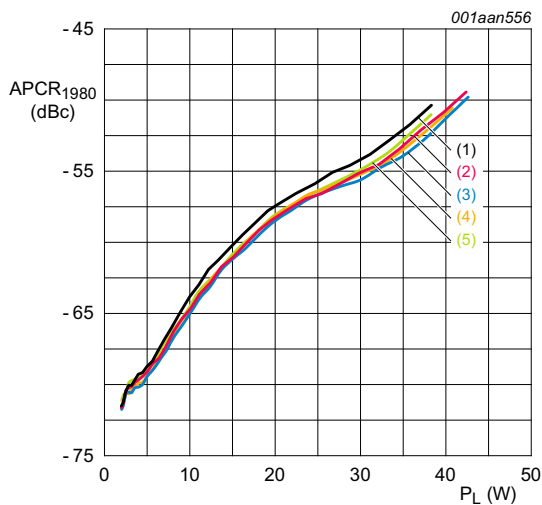
- (1)  $f = 2500$  MHz
- (2)  $f = 2550$  MHz
- (3)  $f = 2600$  MHz
- (4)  $f = 2650$  MHz
- (5)  $f = 2700$  MHz

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



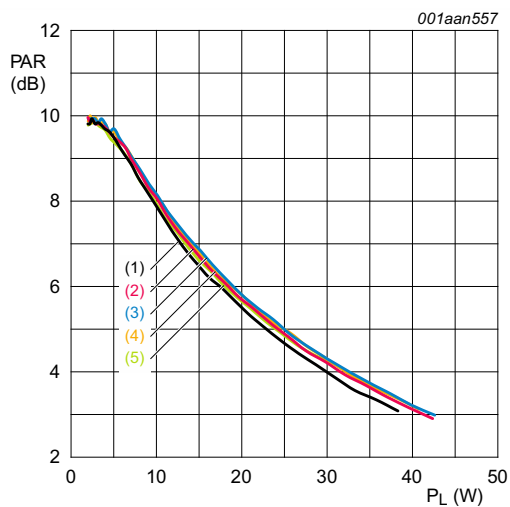
$V_{DS} = 28\text{ V}; I_{Dq} = 450\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2550\text{ MHz}$   
 (3)  $f = 2600\text{ MHz}$   
 (4)  $f = 2650\text{ MHz}$   
 (5)  $f = 2700\text{ MHz}$

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



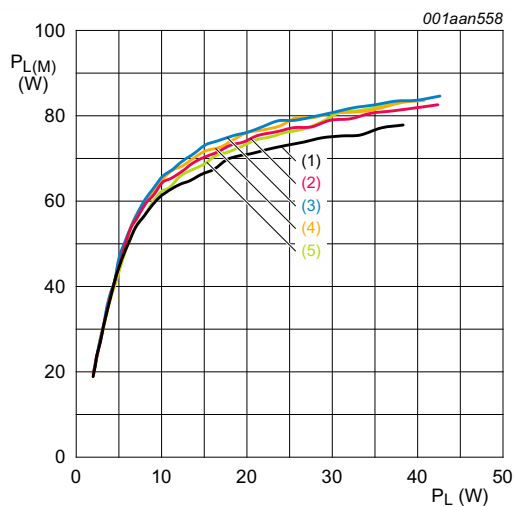
$V_{DS} = 28\text{ V}; I_{Dq} = 450\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2550\text{ MHz}$   
 (3)  $f = 2600\text{ MHz}$   
 (4)  $f = 2650\text{ MHz}$   
 (5)  $f = 2700\text{ MHz}$

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



$V_{DS} = 28\text{ V}; I_{Dq} = 450\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2550\text{ MHz}$   
 (3)  $f = 2600\text{ MHz}$   
 (4)  $f = 2650\text{ MHz}$   
 (5)  $f = 2700\text{ MHz}$

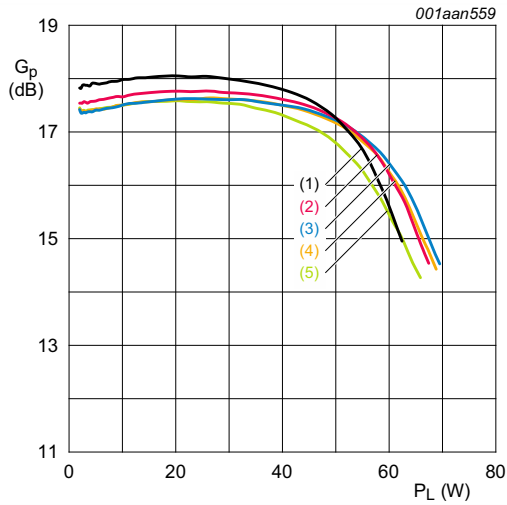
**Fig 5. Single carrier IS-95 peak-to-average power ratio as a function of output power; typical values**



$V_{DS} = 28\text{ V}; I_{Dq} = 450\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2550\text{ MHz}$   
 (3)  $f = 2600\text{ MHz}$   
 (4)  $f = 2650\text{ MHz}$   
 (5)  $f = 2700\text{ MHz}$

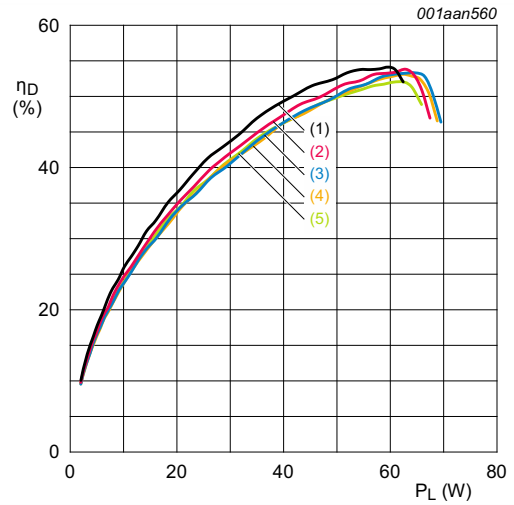
**Fig 6. Single carrier IS-95 peak output power as a function of output power; typical values**

7.3 Pulsed CW



- $V_{DS} = 28\text{ V}; I_{Dq} = 450\text{ mA}.$
- (1)  $f = 2500\text{ MHz}$
  - (2)  $f = 2550\text{ MHz}$
  - (3)  $f = 2600\text{ MHz}$
  - (4)  $f = 2650\text{ MHz}$
  - (5)  $f = 2700\text{ MHz}$

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

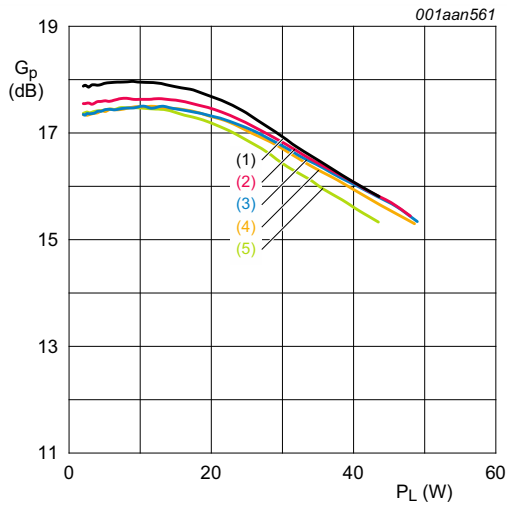


- $V_{DS} = 28\text{ V}; I_{Dq} = 450\text{ mA}.$
- (1)  $f = 2500\text{ MHz}$
  - (2)  $f = 2550\text{ MHz}$
  - (3)  $f = 2600\text{ MHz}$
  - (4)  $f = 2650\text{ MHz}$
  - (5)  $f = 2700\text{ MHz}$

Fig 8. Pulsed CW drain efficiency as a function of output power; typical values

7.4 Single carrier W-CDMA

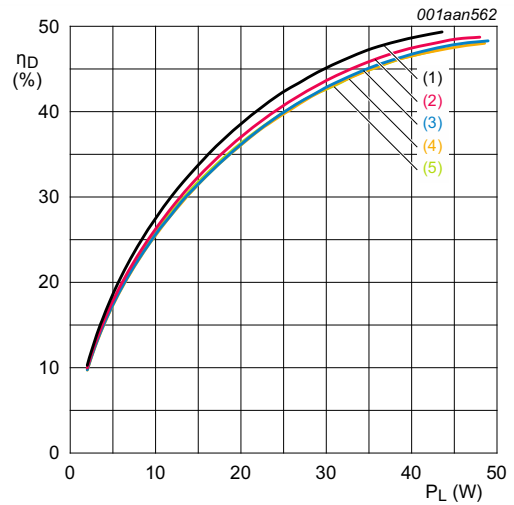
3GPP; test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on CCDF.  
Channel bandwidth is 3.84 MHz.



$V_{DS} = 28\text{ V}; I_{Dq} = 450\text{ mA}$ .

- (1)  $f = 2500\text{ MHz}$
- (2)  $f = 2550\text{ MHz}$
- (3)  $f = 2600\text{ MHz}$
- (4)  $f = 2650\text{ MHz}$
- (5)  $f = 2700\text{ MHz}$

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

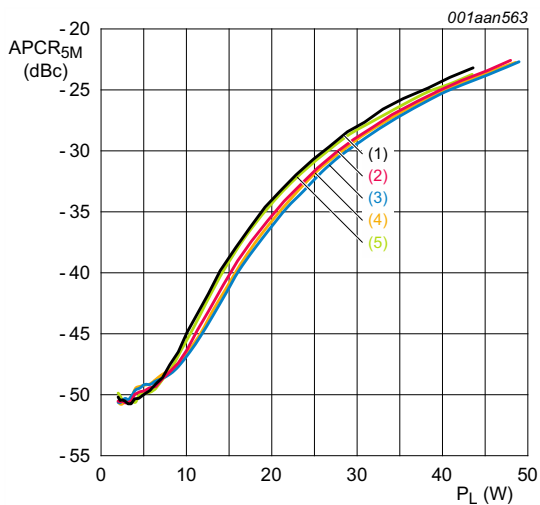


$V_{DS} = 28\text{ V}; I_{Dq} = 450\text{ mA}$ .

- (1)  $f = 2500\text{ MHz}$
- (2)  $f = 2550\text{ MHz}$
- (3)  $f = 2600\text{ MHz}$
- (4)  $f = 2650\text{ MHz}$
- (5)  $f = 2700\text{ MHz}$

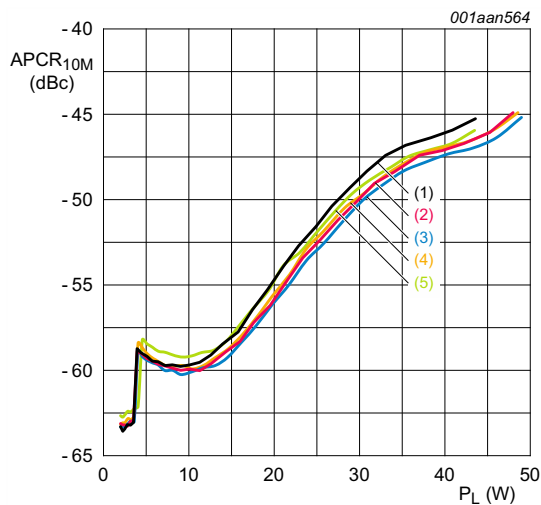
Fig 10. Single carrier W-CDMA drain efficiency as a function of output power; typical values





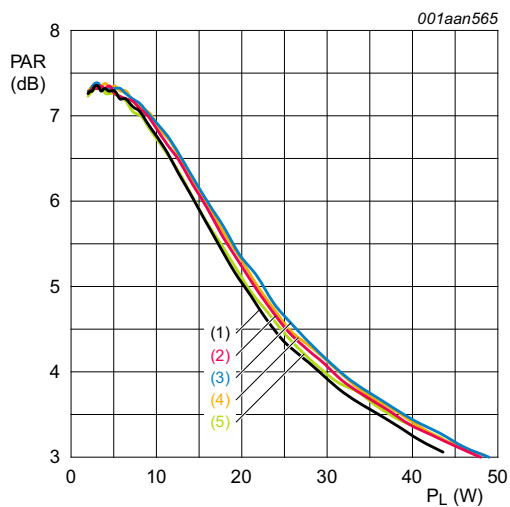
$V_{DS} = 28\text{ V}; I_{Dq} = 450\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2550\text{ MHz}$   
 (3)  $f = 2600\text{ MHz}$   
 (4)  $f = 2650\text{ MHz}$   
 (5)  $f = 2700\text{ MHz}$

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



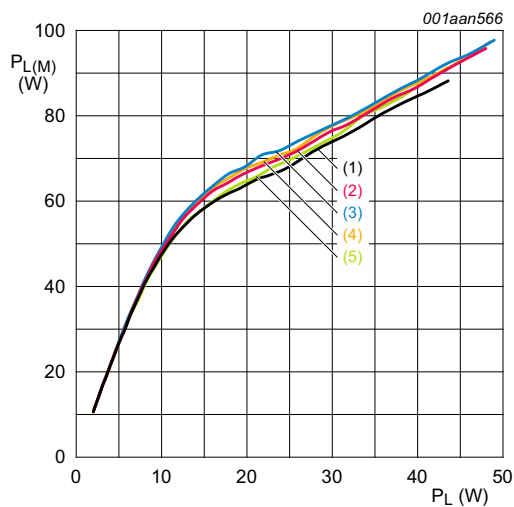
$V_{DS} = 28\text{ V}; I_{Dq} = 450\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2550\text{ MHz}$   
 (3)  $f = 2600\text{ MHz}$   
 (4)  $f = 2650\text{ MHz}$   
 (5)  $f = 2700\text{ MHz}$

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



$V_{DS} = 28\text{ V}; I_{Dq} = 450\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2550\text{ MHz}$   
 (3)  $f = 2600\text{ MHz}$   
 (4)  $f = 2650\text{ MHz}$   
 (5)  $f = 2700\text{ MHz}$

Fig 13. Single carrier W-CDMA peak-to-average power ratio as a function of output power; typical values



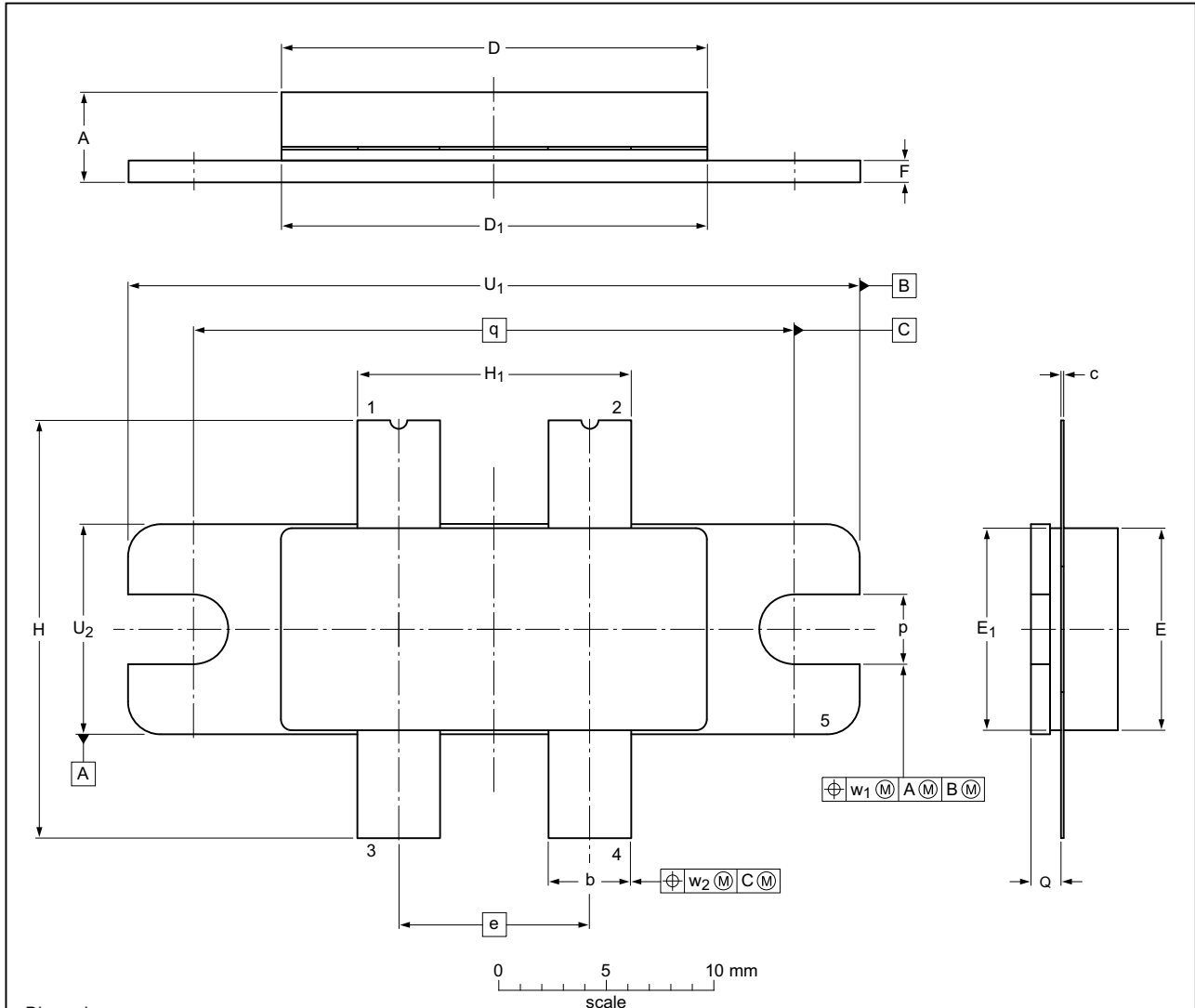
$V_{DS} = 28\text{ V}; I_{Dq} = 450\text{ mA}.$   
 (1)  $f = 2500\text{ MHz}$   
 (2)  $f = 2550\text{ MHz}$   
 (3)  $f = 2600\text{ MHz}$   
 (4)  $f = 2650\text{ MHz}$   
 (5)  $f = 2700\text{ MHz}$

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 <sup>(1)</sup>	A	b	c	D	D <sub>1</sub>	e	E	E <sub>1</sub>	F	H	H <sub>1</sub>	p	Q <sup>(2)</sup>	q	U <sub>1</sub>	U <sub>2</sub>	w <sub>1</sub>	w <sub>2</sub>
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	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	0.772	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.

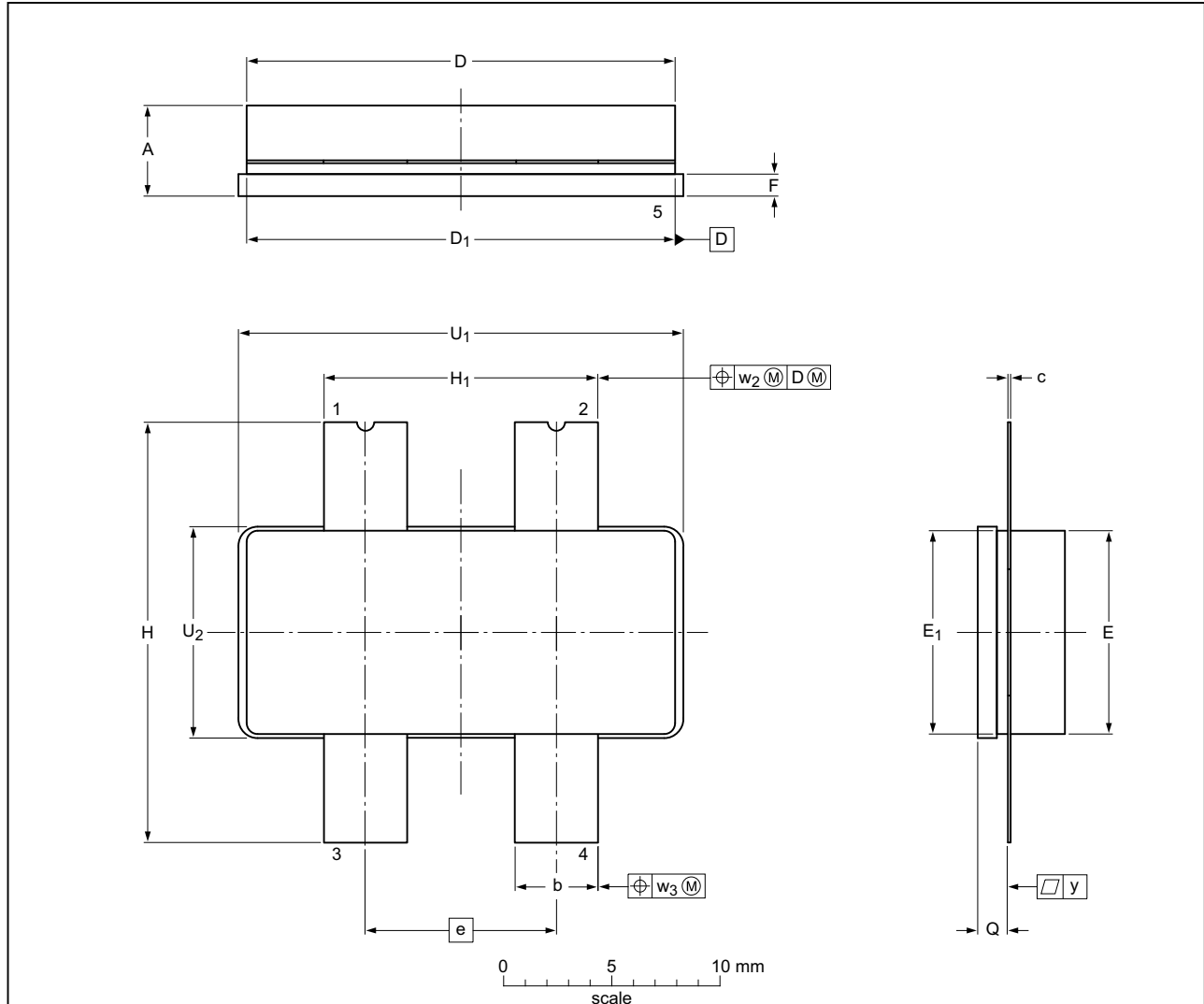
sot1121a\_po

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

Fig 15. Package outline SOT1121A

Earless flanged ceramic package; 4 leads

SOT1121B



Dimensions

Unit <sup>(1)</sup>	A	b	c	D	D <sub>1</sub>	e	E	E <sub>1</sub>	F	H	H <sub>1</sub>	Q	U <sub>1</sub>	U <sub>2</sub>	w <sub>2</sub>	w <sub>3</sub>	y
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	0.51	0.25	0.25
	nom					8.89											
	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	0.02	0.01	0.01
	nom					0.35											
	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					09-12-14 12-06-07

Fig 16. Package outline SOT1121B

Earless flanged LDMOST ceramic package; 4 leads

SOT1121E

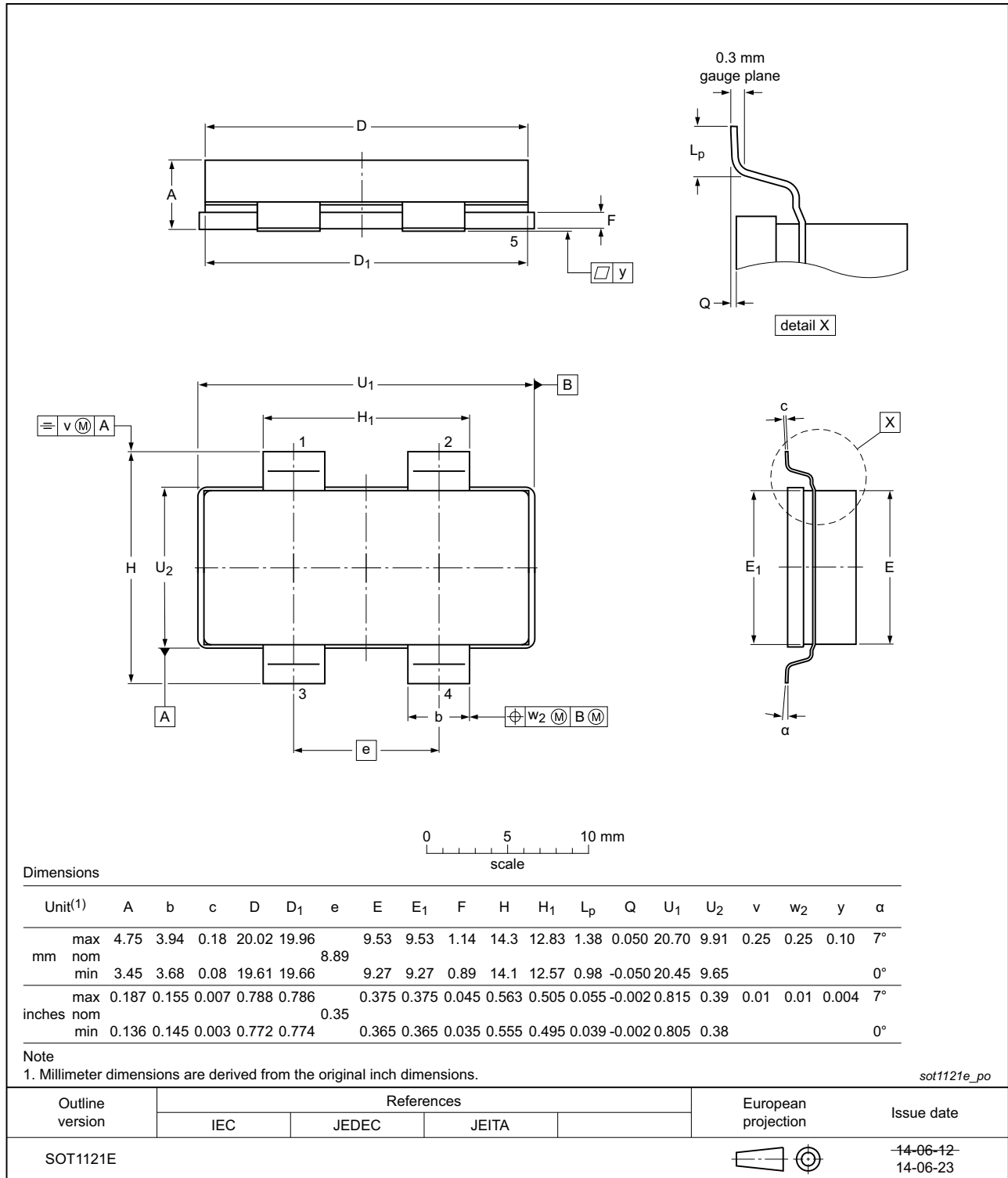


Fig 17. Package outline SOT1121E

## 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 8. Abbreviations

Acronym	Description
3GPP	3rd Generation Partnership Project
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
DPCH	Dedicated Physical CHannel
ESD	ElectroStatic Discharge
IS-95	Interim Standard 95
LDMOS	Laterally Diffused Metal Oxide Semiconductor
LDMOST	Laterally Diffused Metal Oxide Semiconductor Transistor
MTF	Median Time to Failure
N-CDMA	Narrowband Code Division Multiple Access
PAR	Peak-to-Average Ratio
VSWR	Voltage Standing Wave Ratio
W-CDMA	Wideband Code Division Multiple Access

## 11. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF6G27L-40P_27LS-40P_27LS-40PG#4	20150901	Product data sheet	-	BLF6G27L-40P_27LS-40P_27LS-40PG v.3
Modifications:	<ul style="list-style-type: none"> <li>The format of this document has been redesigned to comply with the new identity guidelines of Ampleon.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> </ul>			
BLF6G27L-40P_27LS-40P_27LS-40PG v.3	20150114	Product data sheet	-	BLF6G27L-40P_27LS-40P_27LS-40PG v.2
BLF6G27L-40P_27LS-40P_27LS-40PG v.2	20141114	Product data sheet	-	BLF6G27L-40P_6G27LS-40P v.1
BLF6G27L-40P_6G27LS-40P v.1	20110704	Product data sheet	-	-

## 12. Legal information

### 12.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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

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**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.

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Date of release: 1 September 2015

Document identifier: BLF6G27L-40P\_LS-40P\_LS-40PG#4