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 $T_{case} = 25 \ ^{\circ}C$ in a common source class-AB production test circuit.

Test signal	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	450	28	12	17.5	30	–46 <mark>[1]</mark>	-
Single carrier W-CDMA	2500 to 2700	450	28	20	17.5	37	-	-35 [2]

 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 AMPLEON

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2. Pinning information

Pin	Description	Simplified outline	Graphic symbol
BLF6G27	L-40P (SOT1121A)		l
1	drain1		
2	drain2	1 2 「ハ」「ハ	
3	gate1		
4	gate2		
5	source		
			2 sym117
BLF6G27	LS-40P (SOT1121B)		
1	drain1		
2	drain2		1
3	gate1		
4	gate2	3 4 5	3 5
5	source	[1]	
			٣-
			2 sym117
BLF6G27	LS-40PG (SOT1121E)		
1	drain1		
2	drain2		
3	gate1		
4	gate2		
5	source	[1]	
			۲ <u>۲</u>
			2 sym117

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Packag	je	
	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

BLF6G27L-40P_LS-40P_LS-40PG#4

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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
Tj	junction temperature		<u>[1]</u>	-	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	Тур	Unit
R _{th(j-c)}	thermal resistance from junction to case	T_{case} = 80 °C; P_L = 40 W	0.7	K/W

6. Characteristics

Table 6. Characteristics

 $T_i = 25 \ ^{\circ}C$; per section unless otherwise specified.

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V _{(BR)DSS}	drain-source breakdown voltage	V _{GS} = 0 V; I _D = 0.4 mA	65	-	-	V
V _{GS(th)}	gate-source threshold voltage	V _{DS} = 10 V; I _D = 40 mA	1.4	1.8	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	$V_{GS} = V_{GS(th)} + 3.75 \text{ V};$ $V_{DS} = 10 \text{ V}$	5.96	7.2	-	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 = 2000 mA	1.8	2.9	-	S
R _{DS(on)}	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75 V;$ I _D = 1400 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.

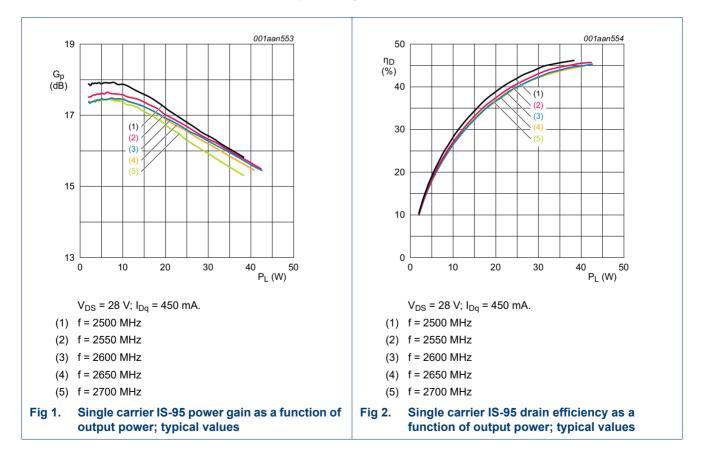
Symbol	Parameter	Conditions	Min	Тур	Max	Unit
G _p	power gain	P _{L(AV)} = 12 W	15.5	17.5	-	dB
RL _{in}	input return loss	P _{L(AV)} = 12 W	-	-10	-	dB
η_D	drain efficiency	P _{L(AV)} = 12 W	26	30	-	%
ACPR _{885k}	adjacent channel power ratio (885 kHz)	P _{L(AV)} = 12 W	-	-46	-41	dBc

7.1 Ruggedness in class-AB operation

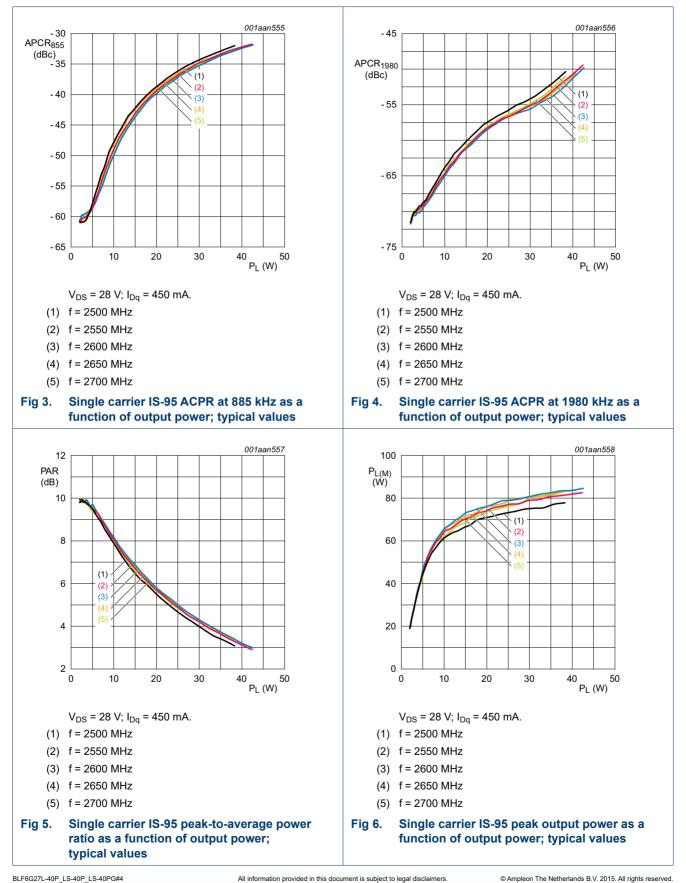
The BLF6G27L-40P, BLF6G27LS-40P and BLF6G27LS-40PG are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS} = 28$ V; $I_{Dg} = 450$ mA; $P_L = 40$ W (CW); f = 2500 MHz.

7.2 Single carrier IS-95

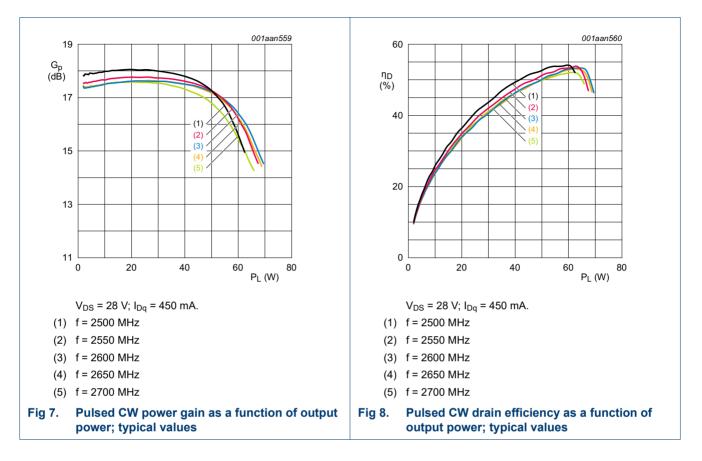
Single carrier IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 - 13). PAR = 9.7 dB at 0.01 % probability on the CCDF. Channel bandwidth is 1.2288 MHz.



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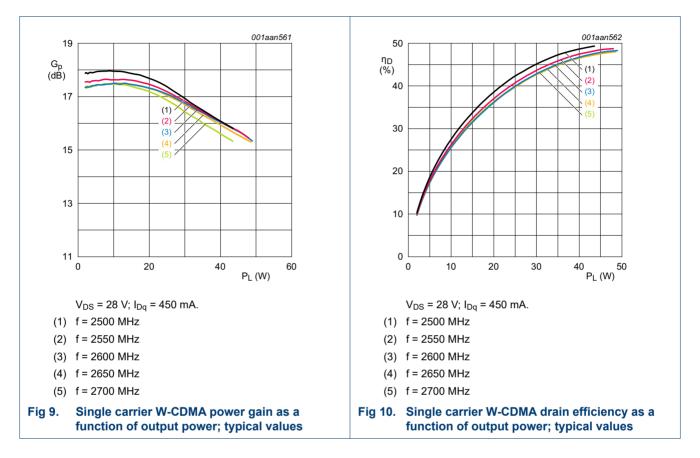


7.3 Pulsed CW

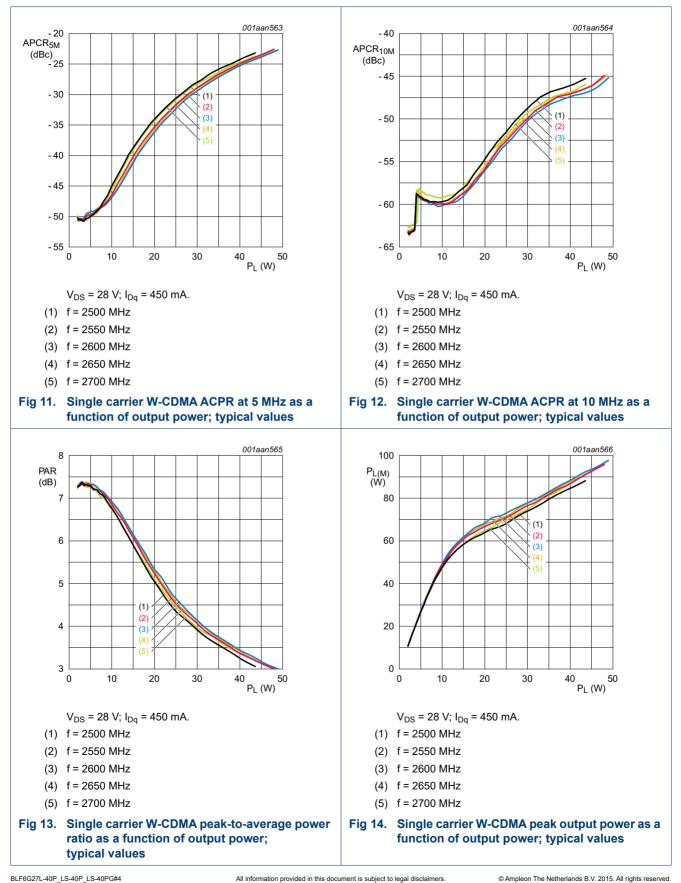
Power LDMOS transistor

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.



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8. Package outline

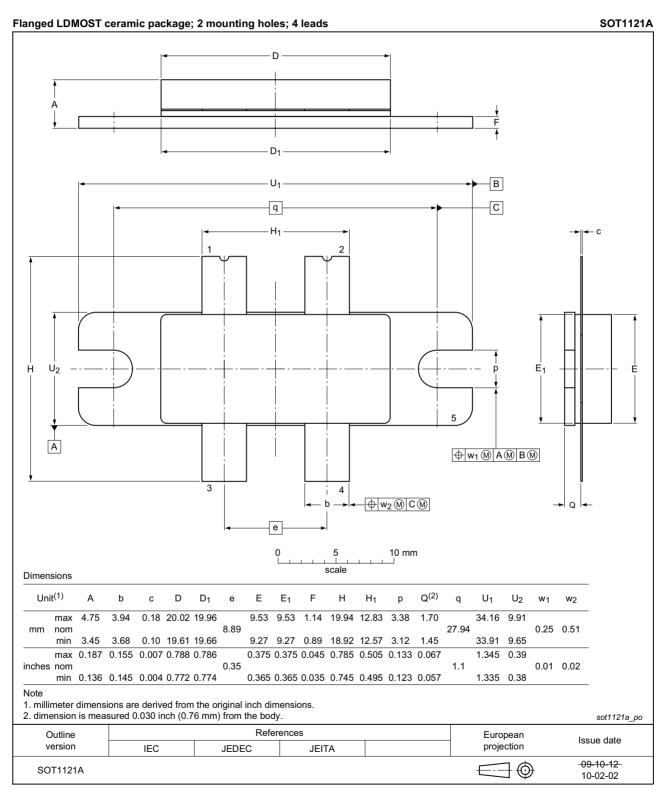


Fig 15. Package outline SOT1121A

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

Power LDMOS transistor

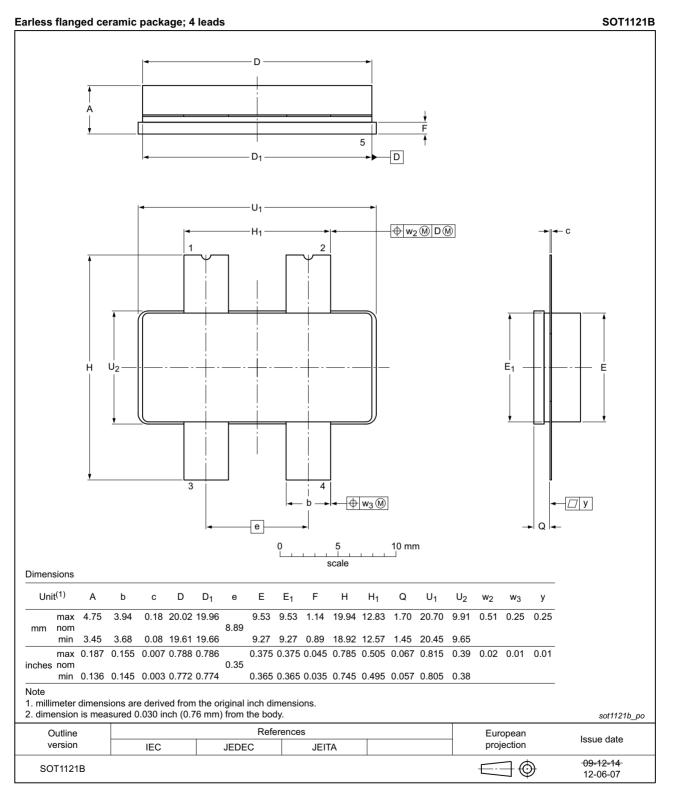


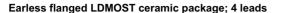
Fig 16. Package outline SOT1121B

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

Power LDMOS transistor

SOT1121E



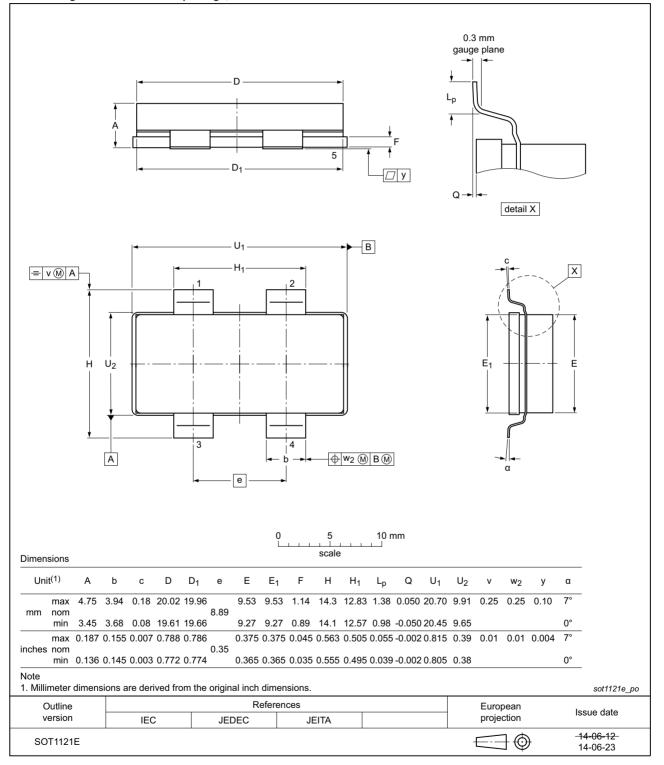


Fig 17. Package outline SOT1121E

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. Abbre	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:	• 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. 						
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_6G27 LS-40P v.1			
BLF6G27L-40P_6G27LS-40P v.1	20110704	Product 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.

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[2] The term 'short data sheet' is explained in section "Definitions".

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