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BLF8G27LS-140V

Power LDMOS transistor

Rev. 4 — 1 September 2015

AMPLEON

Product data sheet

1. Product profile

1.1 General description

140 W LDMOS power transistor with improved video bandwidth for base station applications at frequencies from 2600 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.

Test signal	f	I_{Dq}	V_{DS}	$P_{L(AV)}$	G_p	η_D	ACPR
	(MHz)	(mA)	(V)	(W)	(dB)	(%)	(dBc)
2-carrier W-CDMA	2600 to 2700	1300	32	45	17.4	30	–32 [1]
2-carrier W-CDMA	2600 to 2700	1300	28	35	17.0	29	–33 [1]

[1] Test signal: 3GPP test model 1; 64 DPCH; PAR = 8.4 dB at 0.01 % probability on CCDF; carrier spacing 5 MHz.

1.2 Features and benefits

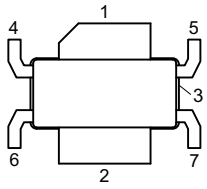
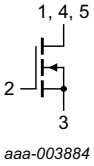
- Excellent ruggedness
- High efficiency
- Low thermal resistance providing excellent thermal stability
- Decoupling leads to enable improved video bandwidth (100 MHz typical)
- Lower output capacitance for improved performance in Doherty applications
- Designed for low memory effects providing excellent 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 amplifier for W-CDMA base stations and multi carrier applications in the 2600 MHz to 2700 MHz frequency range

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	drain		
2	gate		
3	source [1]		
4,5	video decoupling		
6	n.c.		
7	n.c.		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF8G27LS-140V	-	earless flanged LDMOST ceramic package; 6 leads	SOT1120B

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		-	200	°C
T_{case}	case temperature	[1]	-	150	°C

[1] Continuous use at maximum temperature will affect MTTF.

5. Recommended operating conditions

Table 5. Operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{case}	case temperature		−40	-	+125	°C

6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-c)}$	thermal resistance from junction to case	T_{case} = 80 °C; P_L = 55 W	0.27	K/W

7. Characteristics

Table 7. DC 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 = 2.16 mA	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	V_{DS} = 10 V; I_D = 216 mA	1.5	1.9	2.3	V
I_{DSS}	drain leakage current	V_{GS} = 0 V; V_{DS} = 28 V	-	-	4.2	μA
I_{DSX}	drain cut-off current	V_{GS} = $V_{GS(th)}$ + 3.75 V; V_{DS} = 10 V	-	40	-	A
I_{GSS}	gate leakage current	V_{GS} = 11 V; V_{DS} = 0 V	-	-	420	nA
g_{fs}	forward transconductance	V_{DS} = 10 V; I_D = 10.8 A	-	16	-	S
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = $V_{GS(th)}$ + 3.75 V; I_D = 7.56 A	-	0.06	-	Ω

Table 8. RF characteristics

Test signal: 2-carrier W-CDMA; PAR 8.4 dB at 0.01 % probability on CCDF; 3GPP test model 1; 64 DPCH; f_1 = 2627.5 MHz; f_2 = 2687.5 MHz; RF performance at V_{DS} = 32 V; I_{Dq} = 1300 mA; T_{case} = 25 °C; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$P_{L(AV)}$ = 45 W	15.8	17.4	18.7	dB
RL_{in}	input return loss	$P_{L(AV)}$ = 45 W	-	−18	−8	dB
η_D	drain efficiency	$P_{L(AV)}$ = 45 W	27	30	-	%
$ACPR_{5M}$	adjacent channel power ratio (5 MHz)	$P_{L(AV)}$ = 45 W	-	−32	−29	dBc

8. Test information

8.1 Ruggedness in class-AB operation

The BLF8G27LS-140V is capable to withstand a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: V_{DS} = 32 V; I_{Dq} = 1300 mA; P_L = 180 W (CW); f = 2620 MHz.

8.2 Impedance information

Table 9. Typical impedance

I_{Dq} = 1300 mA; main transistor V_{DS} = 32 V.

f	Z_S[1]	Z_L[1]
(MHz)	(Ω)	(Ω)
2600	2.0 – j4.8	1.4 – j3.1
2700	3.5 – j4.8	1.4 – j3.1

[1] Z_S and Z_L defined in Figure 1.

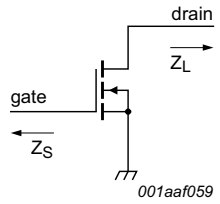
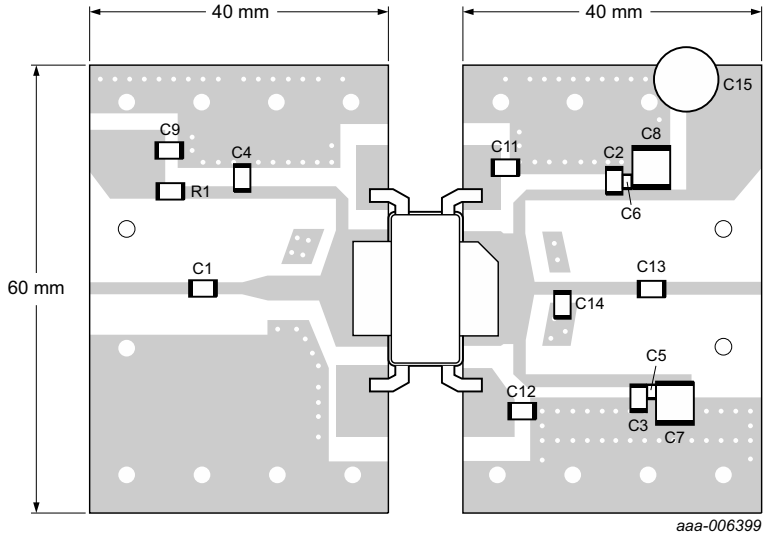


Fig 1. Definition of transistor impedance

8.3 VBW in class-AB operation

The BLF8G27LS-140V shows 100 MHz (typical) video bandwidth in class-AB test circuit in 2.6 GHz to 2.7 GHz band at V_{DS} = 32 V and I_{Dq} = 1.3 A.

8.4 Test circuit



Printed-Circuit Board (PCB): Taconic RF35; ε_r = 3.5; thickness = 0.765 mm; thickness copper plating = 35 μm.

See Table 10 for a list of components.

Fig 2. Component layout for class-AB production test circuit

Table 10. List of components
For test circuit see Figure 2.

Component	Description	Value		Remarks
C1, C2, C3, C4, C13	multilayer ceramic chip capacitor	10 pF	[1]	ATC100B
C14	multilayer ceramic chip capacitor	0.5 pF	[1]	ATC100B
C5, C6	multilayer ceramic chip capacitor	1 μF, 50 V	[2]	Murata
C7, C8	multilayer ceramic chip capacitor	10 μF, 50 V	[2]	Murata
C9	multilayer ceramic chip capacitor	4.7 μF, 50 V	[2]	Murata

Table 10. List of components *...continued*
For test circuit see Figure 2.

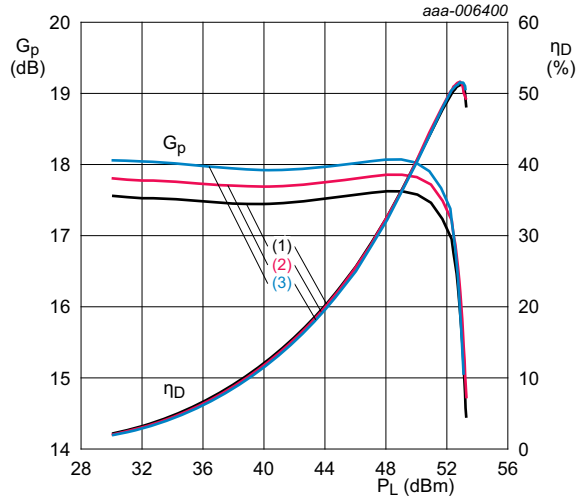
Component	Description	Value	Remarks
C11, C12	multilayer ceramic chip capacitor	4.7 μF, 50 V [2]	Murata
C15	electrolytic capacitor	470 μF, 63 V	
R1	chip resistor	3.9 Ω	Philips SMD 1206

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

[2] Murata or capacitor of same quality.

8.5 Graphical data

8.5.1 CW pulse



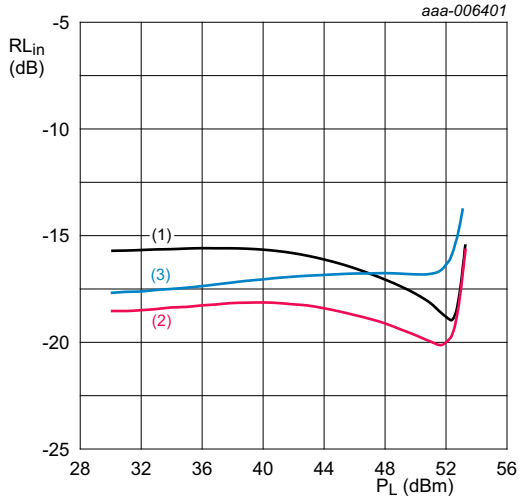
V_{DS} = 32 V; I_{Dq} = 1300 mA; t_p = 100 μs; δ = 10 %.

(1) f = 2620 MHz

(2) f = 2655 MHz

(3) f = 2690 MHz

Fig 3. Power gain and drain efficiency as function of load power; typical values



V_{DS} = 32 V; I_{Dq} = 1300 mA; t_p = 100 μs; δ = 10 %.

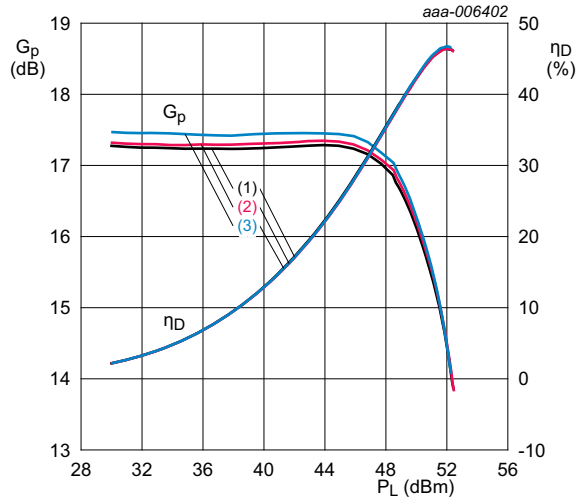
(1) f = 2620 MHz

(2) f = 2655 MHz

(3) f = 2690 MHz

Fig 4. Input return loss as a function of load power; typical values

8.5.2 2-Carrier W-CDMA



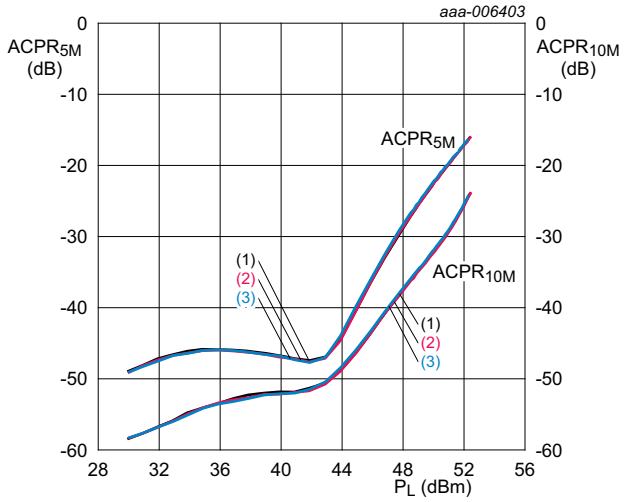
V_{DS} = 32 V; I_{Dq} = 1300 mA.

(1) f = 2620 MHz

(2) f = 2655 MHz

(3) f = 2690 MHz

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



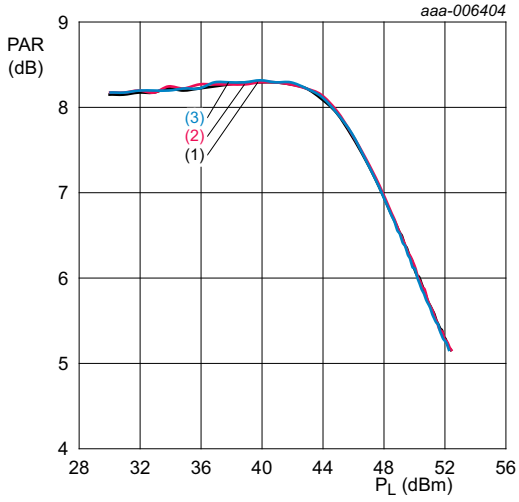
V_{DS} = 32 V; I_{Dq} = 1300 mA.

(1) f = 2620 MHz

(2) f = 2655 MHz

(3) f = 2690 MHz

Fig 6. Adjacent channel power ratio (5MHz) and adjacent channel power ratio (10MHz) as function of load power; typical values



V_{DS} = 32 V; I_{Dq} = 1300 mA.

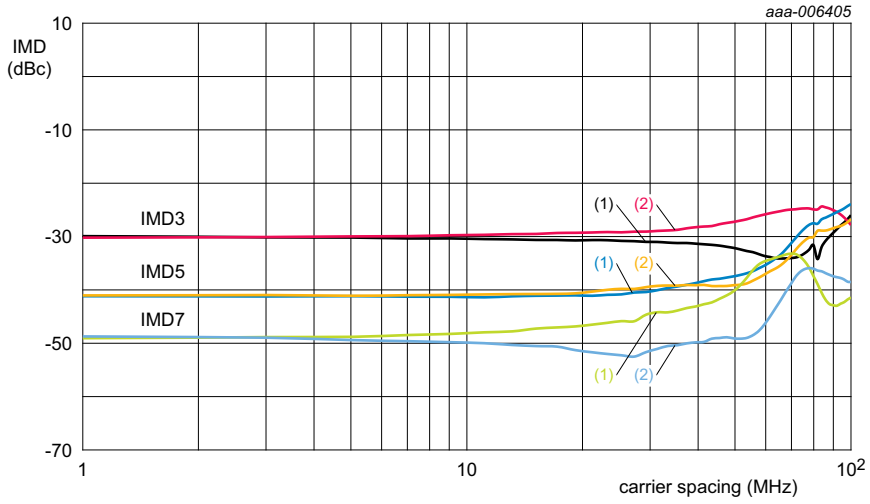
(1) f = 2620 MHz

(2) f = 2655 MHz

(3) f = 2690 MHz

Fig 7. Peak-to-average power ratio as a function of load power; typical values

8.5.3 2-Tone VBW



V_{DS} = 32 V; I_{Dq} = 1300 mA; f = 2655 MHz.

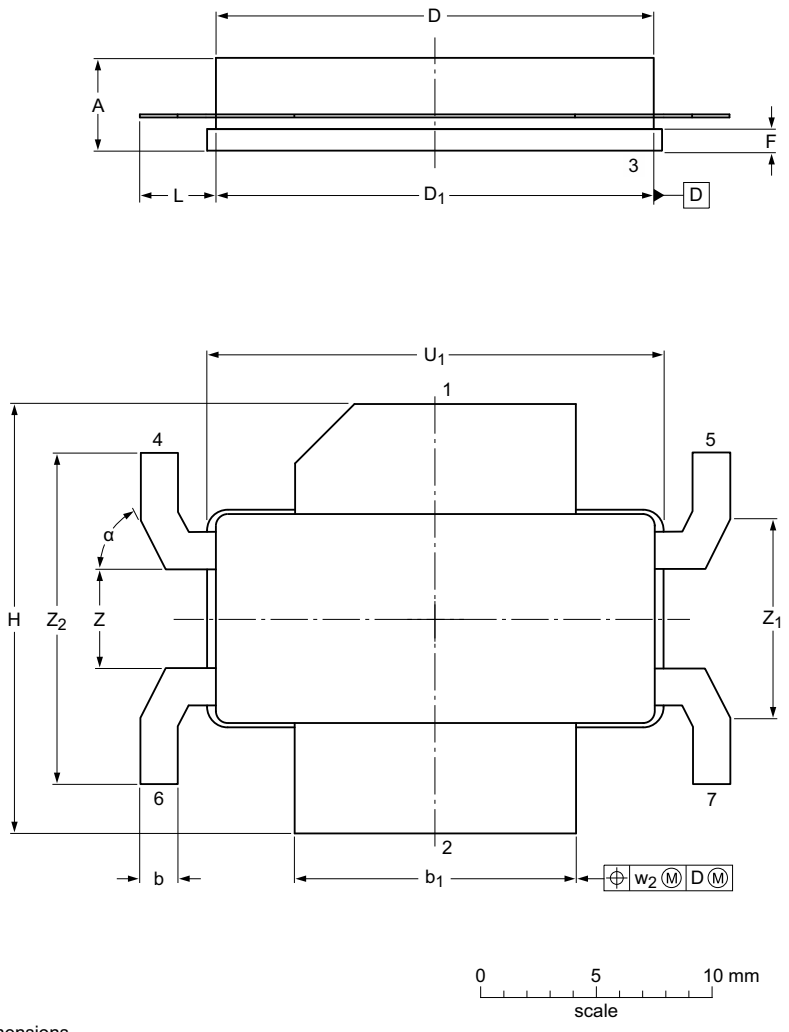
(1) low

(2) high

Fig 8. VBW capability in class-AB test circuit

9. Package outline

Earless flanged LDMOST ceramic package; 6 leads **SOT1120B**



Dimensions

Unit[1]		A	b	b_1	c	D	D_1	E	E_1	F	H	L	Q[2]	U_1	U_2	w_2	y	Z	Z_1	Z_2	α
mm	max	4.75	1.83	12.83	0.18	20.02	19.96	9.53	9.53	1.14	19.94	3.56	1.70	20.70	9.91		0.10	4.60	9.53	15.52	64°
	nom															0.51					
	min	3.45	1.57	12.57	0.10	19.61	19.66	9.27	9.25	0.89	18.92	3.30	1.45	20.45	9.65			4.32	8.71	14.50	60°
inches	max	0.187	0.072	0.505	0.007	0.788	0.786	0.375	0.375	0.045	0.785	0.140	0.067	0.815	0.39		0.004	0.181	0.375	0.611	64°
	nom															0.02					
	min	0.136	0.062	0.495	0.004	0.772	0.774	0.365	0.364	0.035	0.745	0.130	0.057	0.805	0.38			0.170	0.343	0.571	60°

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

sot1120b_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1120B						~~12-06-14~~ 13-10-21

Fig 9. Package outline SOT1120B

10. Abbreviations

Table 11. Abbreviations

Acronym	Description
3GPP	3rd Generation Partnership Project
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
DPCH	Dedicated Physical CHannel
ESD	ElectroStatic Discharge
LDMOS	Laterally Diffused Metal Oxide Semiconductor
LDMOST	Laterally Diffused Metal Oxide Semiconductor Transistor
MTTF	Mean Time To Failure
PAR	Peak-to-Average Ratio
SMD	Surface Mounted Device
VBW	Video BandWidth
VSWR	Voltage Standing Wave Ratio
W-CDMA	Wideband Code Division Multiple Access

11. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF8G27LS-140V#4	20150901	Product data sheet		BLF8G27LS-140V 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.			
BLF8G27LS-140V v.3	20150501	Product data sheet	-	BLF8G27LS-140V v.2
BLF8G27LS-140V v.2	20130327	Product data sheet	-	BLF8G27LS-140V v.1
BLF8G27LS-140V v.1	20130307	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.

[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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Document identifier: BLF8G27LS-140V#4