BLF8G10LS-270V; BLF8G10LS-270GV

Power LDMOS transistor

AMPLEON

Rev. 2 — 1 September 2015

Product data sheet

1. Product profile

1.1 General description

270 W LDMOS power transistor with improved video bandwidth for base station applications at frequencies from 790 MHz to 960 MHz.

Table 1. Typical performance

Typical RF performance at T_{case} = 25 °C in a common source class-AB production test circuit, tested on straight lead device.

Test signal	f (MHz)	V_{DS} (V)	$P_{L(AV)}$ (W)	G_p (dB)	η_D (%)	$ACPR_{5M}$ (dBc)
2-carrier W-CDMA	869 to 894	28	67	19.5	31	−37[1]

[1] Test signal: 3GPP test model 1; 64 DPCH; PAR = 8.4 dB at 0.01 % probability on CCDF; carrier spacing 10 MHz.

1.2 Features and benefits

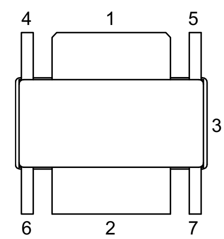
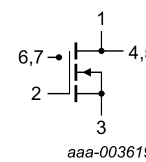
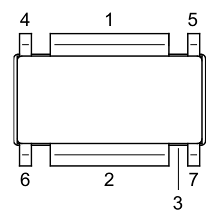
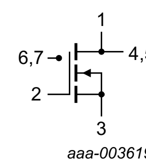
- Excellent ruggedness
- High efficiency
- Low R_{th} providing excellent thermal stability
- Designed for broadband operation (790 MHz to 960 MHz)
- Lower output capacitance for improved performance in Doherty applications
- Decoupling leads to enable improved video bandwidth (55 MHz typical)
- Designed for low memory effects providing excellent pre-distortability
- Internally matched for ease of use
- Integrated ESD protection
- Design optimized for gull-wing and straight lead versions
- 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 790 MHz to 960 MHz frequency range

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
BLF8G10LS-270V (SOT1244B)			
1	drain		
2	gate		
3	source [1]		
4	decoupling lead		
5	decoupling lead		
6	n.c.		
7	n.c.		
BLF8G10LS-270GV (SOT1244C)			
1	drain		
2	gate		
3	source [1]		
4	decoupling lead		
5	decoupling lead		
6	n.c.		
7	n.c.		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF8G10LS-270V	-	earless flanged ceramic package; 6 leads	SOT1244B
BLF8G10LS-270GV	-	earless flanged ceramic package; 6 leads	SOT1244C

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		-	225	°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 = 67 W	0.257	K/W

6. Characteristics

Table 6. DC 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 = 4.5 mA	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	V_{DS} = 10 V; I_D = 450 mA	1.5	1.8	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	-	82	-	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 = 450 mA	-	3.92	-	S
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = $V_{GS(th)}$ + 3.75 V; I_D = 15.75 A	-	0.04	-	Ω

Table 7. RF characteristics

Test signal: 2-carrier W-CDMA; PAR = 8.4 dB at 0.01 % probability on the CCDF; 3GPP test model 1; 1-64 DPCH; f_1 = 871.5 MHz; f_2 = 881.5 MHz; f_3 = 881.5 MHz; f_4 = 891.5 MHz; f_5 = 881.5 MHz; f_6 = 891.5 MHz; RF performance at V_{DS} = 28 V; I_{Dq} = 2000 mA; T_{case} = 25 °C; unless otherwise specified; in a class-AB production test circuit, tested on straight lead device.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$P_{L(AV)}$ = 67 W	17.3	19.5	-	dB
RL_{in}	input return loss	$P_{L(AV)}$ = 67 W	-	−16	−12	dB
η_D	drain efficiency	$P_{L(AV)}$ = 67 W	26	31	-	%
$ACPR_{5M}$	adjacent channel power ratio (5 MHz)	$P_{L(AV)}$ = 67 W	-	−37	−33	dBc

7. Test information

7.1 Ruggedness in class-AB operation

The BLF8G10LS-270V and BLF8G10LS-270GV 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} = 2000 mA; P_L = 270 W; f = 820 MHz; f = 869 MHz; f = 920 MHz; f = 960 MHz and a load mismatch corresponding to VSWR = 5 : 1 through all phases under the following conditions: V_{DS} = 28 V; I_{Dq} = 2000 mA; P_L = 270 W; f = 790 MHz.

7.2 Impedance information

Table 8. Typical impedance

I_{Dq} = 2700 mA; main transistor V_{DS} = 28 V.

f (MHz)	Z_S [1] (Ω)	Z_L [1] (Ω)
790	1.4 – j1.84	1.22 – j2.07
820	1.58 – j1.96	1.29 – j1.95
869	1.84 – j2.70	1.12 – j1.83
881	1.78 – j2.94	1.12 – j1.84
894	1.90 – j3.08	1.12 – j1.84
920	2.06 – j2.50	1.04 – j1.13
940	2.10 – j2.90	1.04 – j1.13
960	2.56 – j2.65	1.00 – j1.22

[1] Z_S and Z_L defined in Figure 1.

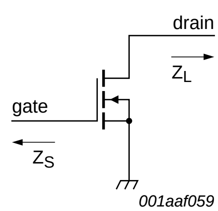
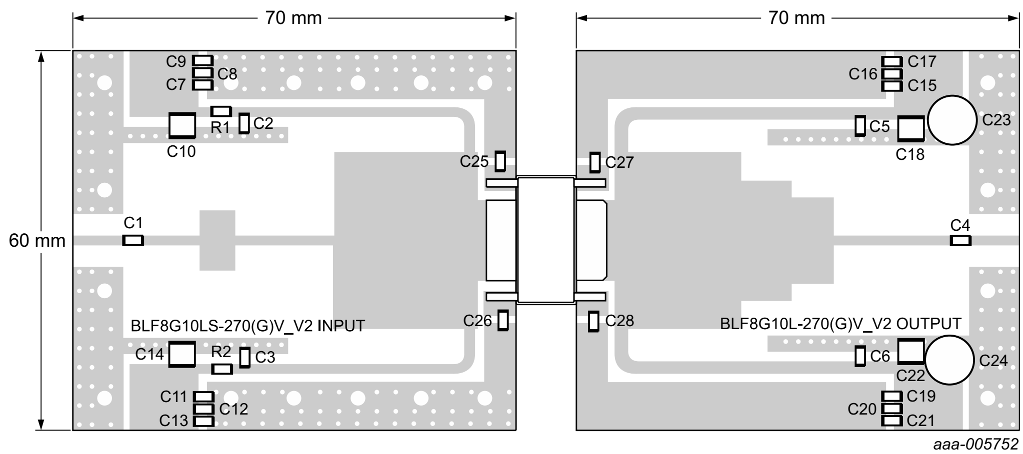


Fig 1. Definition of transistor impedance

7.3 VBW in class-AB operation

The BLF8G10LS-270V and BLF8G10LS-270GV show 55 MHz (typical) video bandwidth in class-AB test circuit in 800 MHz band at V_{DS} = 28 V and I_{Dq} = 2 A.

7.4 Test circuit



Printed-Circuit Board (PCB): Rogers 4350B; ε_r = 3.66; thickness = 0.765 mm; thickness copper plating = 35 μm.

See Table 9 for a list of components.

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

Table 9. List of components

For test circuit see Figure 2.

Component	Description	Value		Remarks
C1, C4	multilayer ceramic chip capacitor	47 pF	[1]	ATC100B
C2, C3, C5, C6	multilayer ceramic chip capacitor	45 pF	[1]	ATC100B
C7, C11, C15, C19	multilayer ceramic chip capacitor	0.01 μF	[2]	Murata
C8, C12, C16, C20	multilayer ceramic chip capacitor	0.1 μF	[2]	Murata
C9, C13, C17, C21	multilayer ceramic chip capacitor	1 μF	[2]	Murata
C10, C14, C18, C22	multilayer ceramic chip capacitor	4.7 μF	[2]	Murata
C23, C24	electrolytic capacitor	470 μF, 63 V		
C25, C26, C27, C28	multilayer ceramic chip capacitor	10 μF	[2]	Murata
R1, R2	chip resistor	9.1 Ω	[3]	Vishay Dale 0805

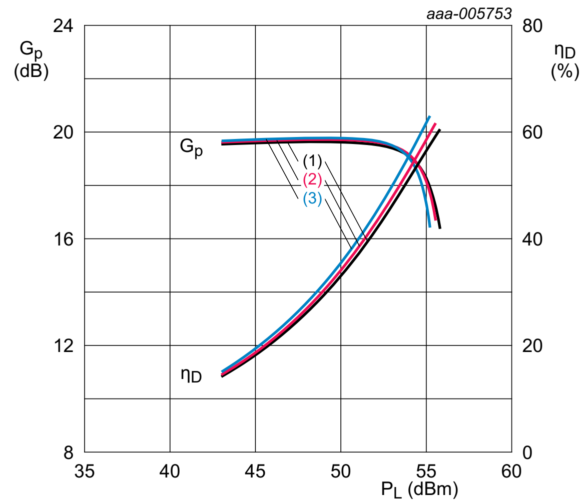
[1] American Technical Ceramics type 100B or capacitor of same quality.

[2] Murata or capacitor of same quality.

[3] Vishay Dale resistor of same quality.

7.5 Graphical data

7.5.1 Straight lead sample CW



V_{DS} = 28 V; I_{Dq} = 2000 mA

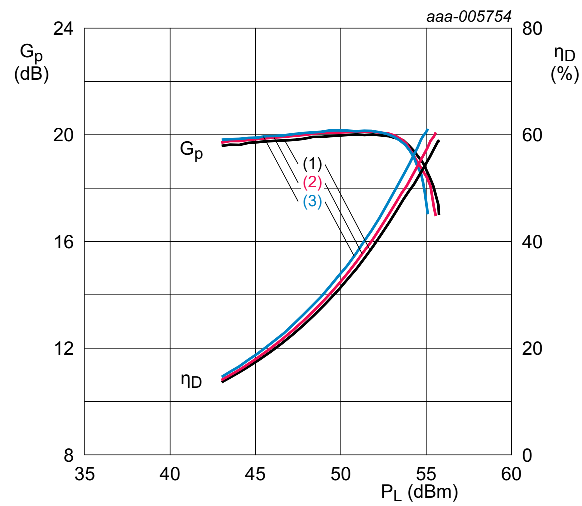
(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

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

7.5.2 Straight lead sample CW pulsed



V_{DS} = 28 V; I_{Dq} = 2000 mA

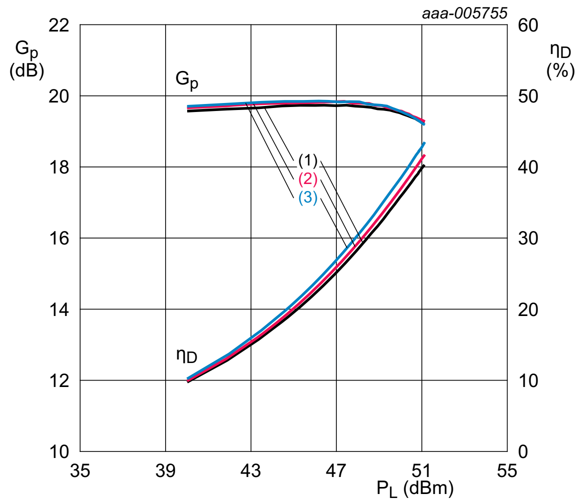
(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

Fig 4. Power gain and drain efficiency as function of load power; typical values

7.5.3 Straight lead sample 1-carrier W-CDMA



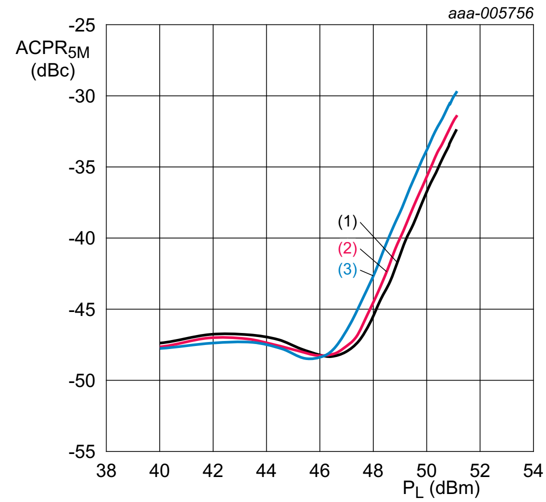
V_{DS} = 28 V; I_{Dq} = 2000 mA

(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

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



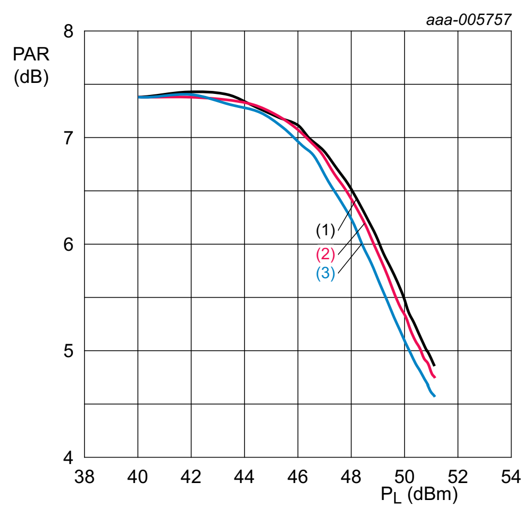
V_{DS} = 28 V; I_{Dq} = 2000 mA

(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

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



V_{DS} = 28 V; I_{Dq} = 2000 mA

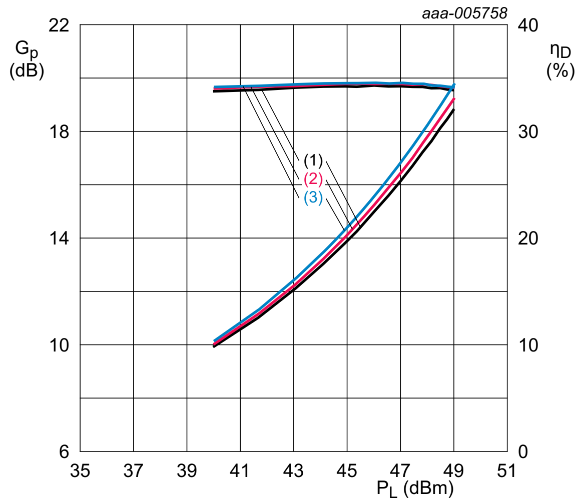
(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

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

7.5.4 Straight lead sample 2-carrier W-CDMA



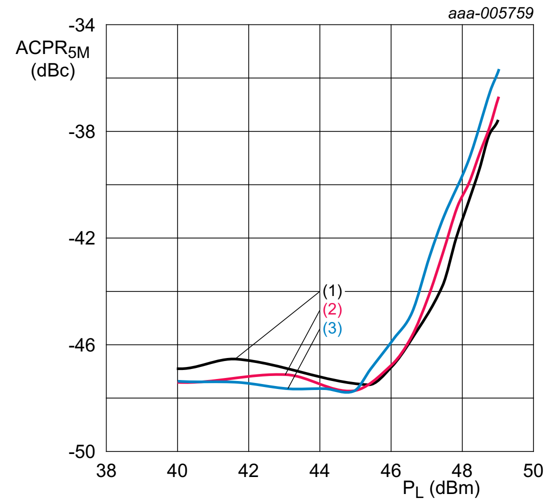
V_{DS} = 28 V; I_{Dq} = 2000 mA

(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

Fig 8. Power gain and drain efficiency as function of load power; typical values



V_{DS} = 28 V; I_{Dq} = 2000 mA

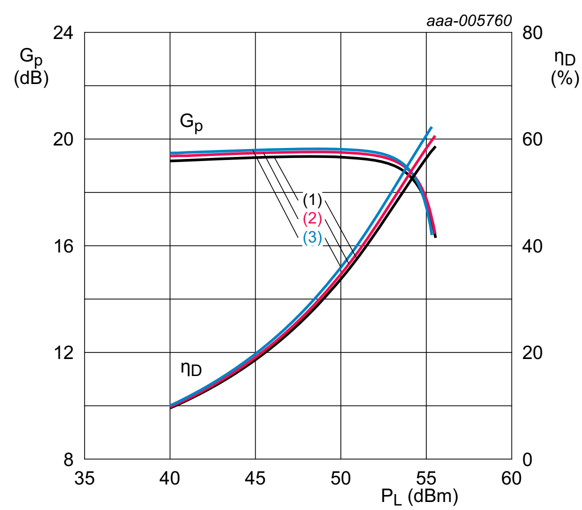
(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

Fig 9. Adjacent channel power ratio (5 MHz) as a function of load power; typical values

7.5.5 Gull-wing sample CW



V_{DS} = 28 V; I_{Dq} = 2000 mA

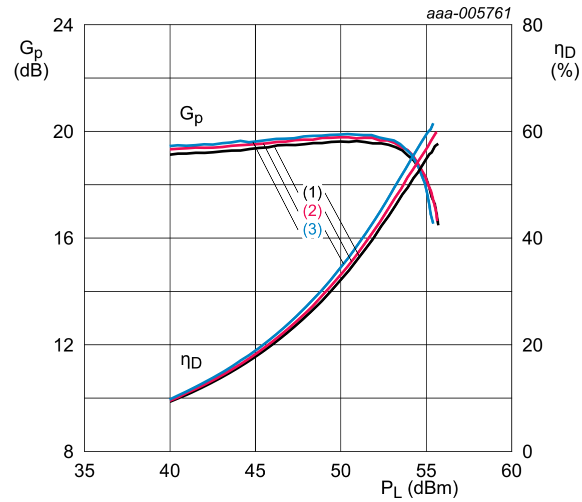
(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

Fig 10. Power gain and drain efficiency as function of load power; typical values

7.5.6 Gull-wing sample CW pulsed



V_{DS} = 28 V; I_{Dq} = 2000 mA

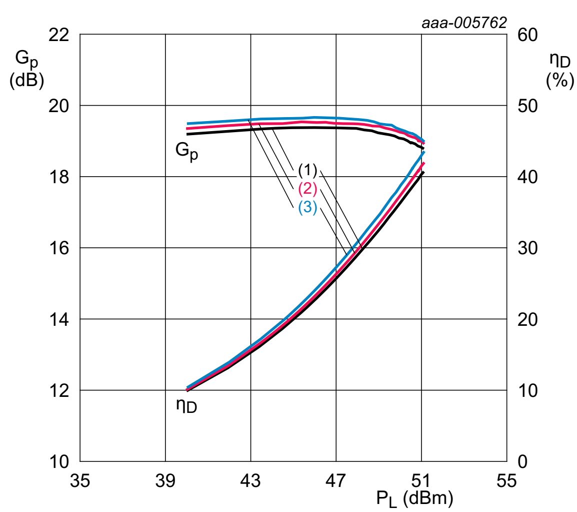
(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

Fig 11. Power gain and drain efficiency as function of load power; typical values

7.5.7 Gull-wing sample 1-carrier W-CDMA



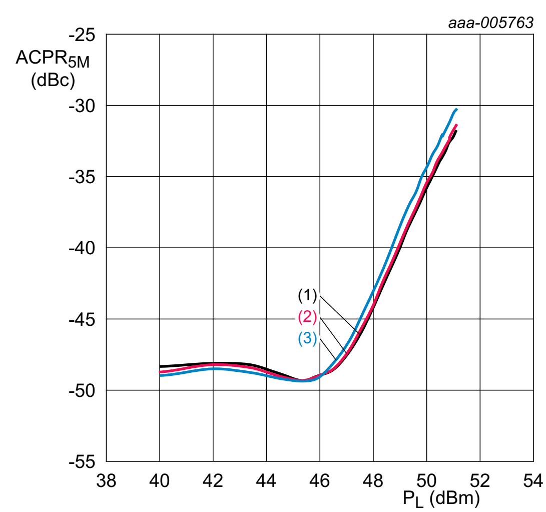
V_{DS} = 28 V; I_{Dq} = 2000 mA

(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

Fig 12. Power gain and drain efficiency as function of load power; typical values



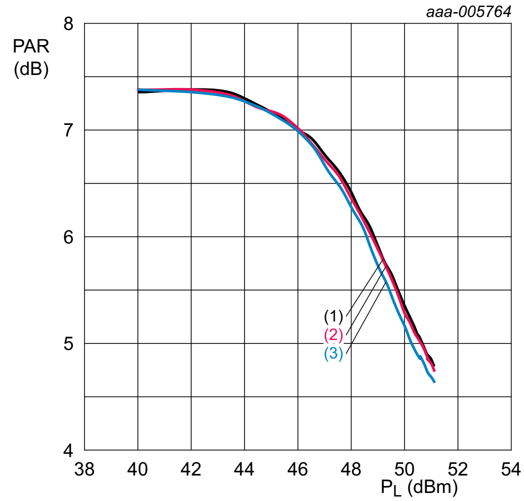
V_{DS} = 28 V; I_{Dq} = 2000 mA

(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

Fig 13. Adjacent channel power ratio (5 MHz) as a function of load power; typical values



V_{DS} = 28 V; I_{Dq} = 2000 mA

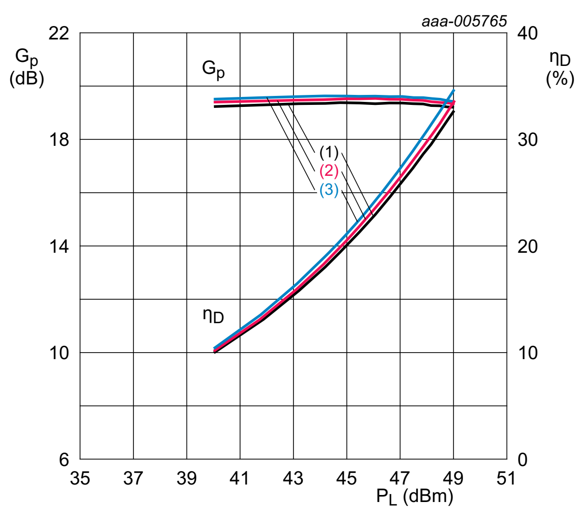
(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

Fig 14. Peak-to-average ratio as a function of load power; typical values

7.5.8 Gull-wing sample 2-carrier W-CDMA



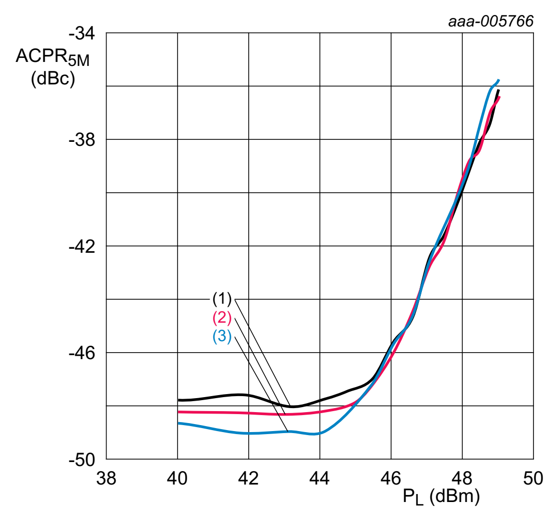
V_{DS} = 28 V; I_{Dq} = 2000 mA

(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

Fig 15. Power gain and drain efficiency as function of load power; typical values



V_{DS} = 28 V; I_{Dq} = 2000 mA

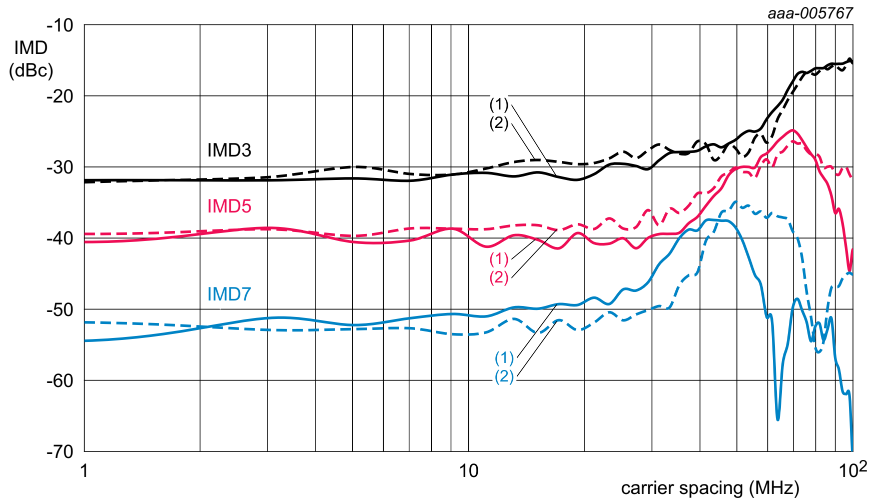
(1) f = 869 MHz

(2) f = 881.5 MHz

(3) f = 894 MHz

Fig 16. Adjacent channel power ratio (5 MHz) as a function of load power; typical values

7.5.9 2-Tone VBW



V_{DS} = 28 V; I_{Dq} = 2000 mA; f = 881.5 MHz.

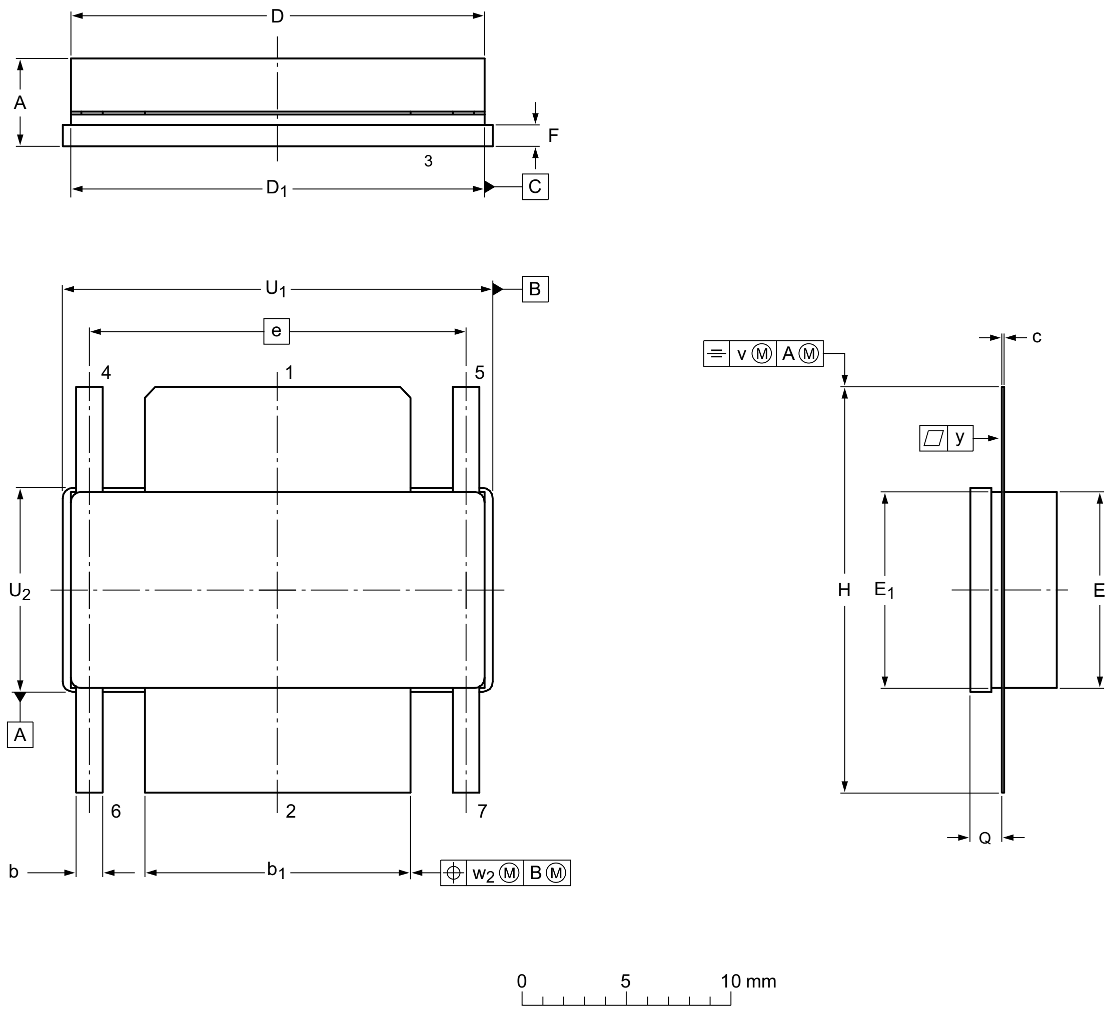
(1) IMD low

(2) IMD high

Fig 17. VBW capability in class-AB test circuit

8. Package outline

Earless flanged ceramic package; 6 leads **SOT1244B**



Dimensions

Unit(1)		A	b	b1	c	D	D1	e	E	E1	F	H	Q(2)	U1	U2	v	w2	y
mm	max	4.75	1.41	12.83	0.18	20.02	19.96		9.53	9.53	1.14	19.94	1.70	20.70	9.91	0.25	0.25	0.25
	nom							18.03										
	min	3.45	1.14	12.57	0.10	19.61	19.66		9.27	9.27	0.89	18.92	1.45	20.45	9.65			
inches	max	0.187	0.055	0.505	0.007	0.788	0.786		0.375	0.375	0.045	0.785	0.067	0.815	0.39	0.01	0.01	0.01
	nom							0.710										
	min	0.136	0.045	0.495	0.004	0.772	0.774		0.365	0.365	0.035	0.745	0.057	0.805	0.38			

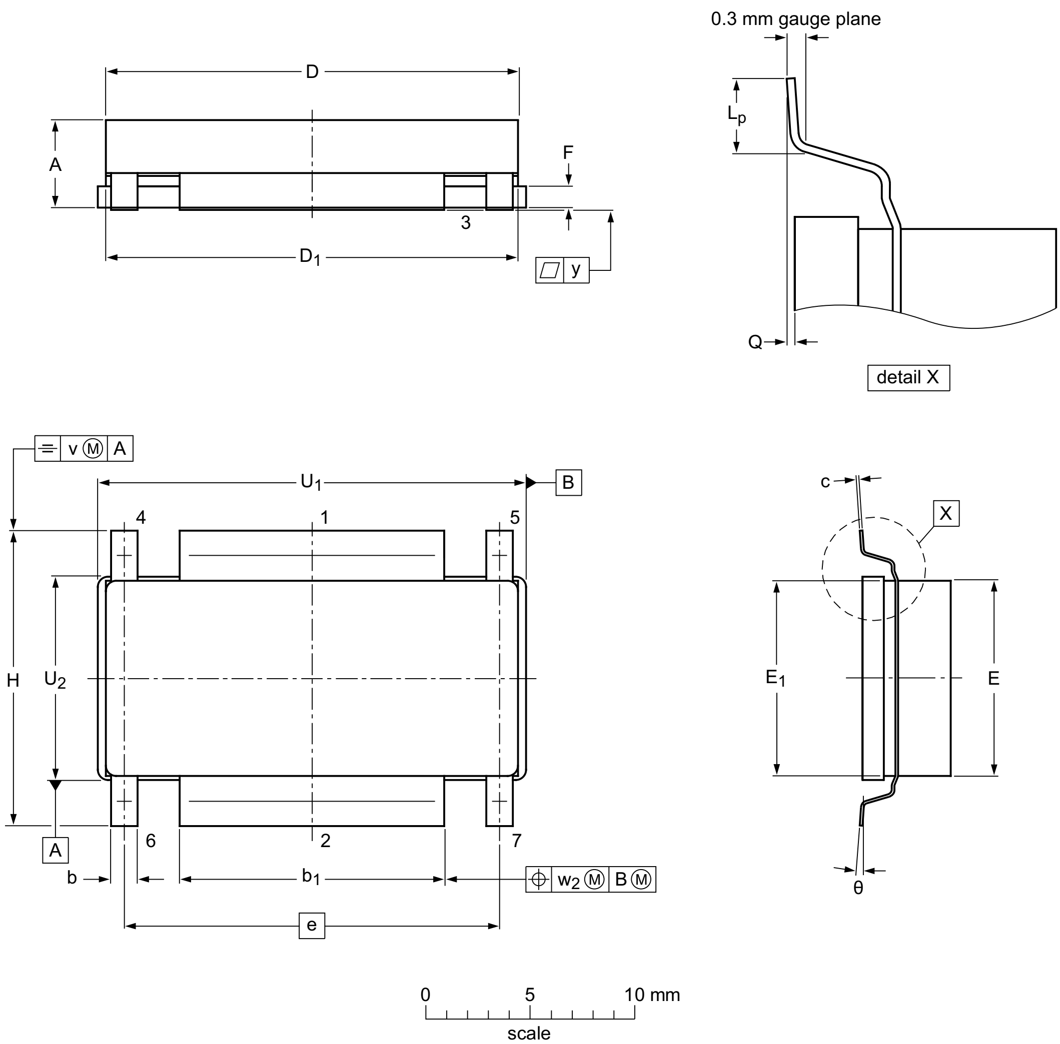
Note
1. Millimeter dimensions are derived from the original inch dimensions.
2. Dimension is measured 0.030 inch (0.76 mm) from body.

sot1244b_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1244B						~~12-04-18~~ 12-05-07

Fig 18. Package outline SOT1244B

Earless flanged ceramic package; 6 leads **SOT1244C**



Dimensions

Unit(1)		A	b	b_1	c	D	D_1	e	E	E_1	F	H	L_p	Q	U_1	U_2	v	w_2	y	θ
mm	max	4.75	1.41	12.83	0.18	20.02	19.96		9.53	9.53	1.14	14.3	1.38	0.195	20.70	9.91	0.25	0.25	0.15	7°
	nom							18.03												
	min	3.45	1.14	12.57	0.10	19.61	19.66		9.27	9.27	0.89	14.1	0.98	0.055	20.45	9.65				0°
inches	max	0.187	0.055	0.505	0.007	0.788	0.786		0.375	0.375	0.045	0.563	0.055	0.008	0.815	0.39	0.01	0.01	0.006	7°
	nom							0.710												
	min	0.136	0.045	0.495	0.004	0.772	0.774		0.365	0.365	0.035	0.555	0.039	0.002	0.805	0.38				0°

Note

1. Millimeter dimensions are derived from the original inch dimensions.

sot1244c_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1244C						~~12-05-10~~ 12-05-30

Fig 19. Package outline SOT1244C

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 10. Abbreviations

Acronym	Description
3GPP	3rd Generation Partnership Project
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
DPCH	Dedicated Physical Channel
ESD	ElectroStatic Discharge
IMD	InterModulation Distortion
LDMOS	Laterally Diffused Metal Oxide Semiconductor
PAR	Peak-to-Average Ratio
VBW	Video BandWidth
VSWR	Voltage Standing Wave Ratio
W-CDMA	Wideband Code Division Multiple Access

11. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF8G10LS-270V_8G10LS-270GV#2	20150901	Product data sheet	-	BLF8G10LS-270V_8G10LS-270GV v.1
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.			
BLF8G10LS-270V_8G10LS-270GV v.1	20121203	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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13. Contact information

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14. Contents

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