BLF8G27LS-100V; BLF8G27LS-100GV

Power LDMOS transistor

Rev. 4 — 26 September 2013 Product data sheet

1. Product profile

1.1 General description

100 W LDMOS power transistor with improved video bandwidth for base station applications at frequencies from 2500 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 (MHz)	I_{Dq} (mA)	V_{DS} (V)	$P_{L(AV)}$ (W)	G_p (dB)	η_D (%)	$ACPR_{5M}$ (dBc)
2-carrier W-CDMA	2500 to 2700	900	28	25	17	28	–32 [1]

[1] Test signal: 3GPP test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on CCDF per carrier; 5 MHz carrier spacing.

1.2 Features and benefits

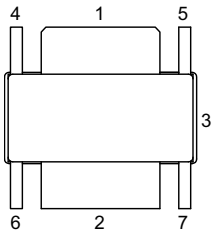
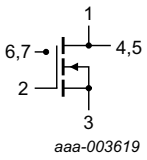
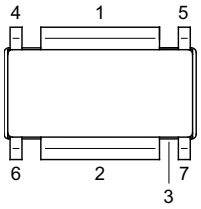
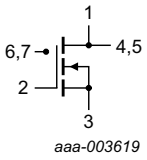
- Excellent ruggedness
- High efficiency
- Low R_{th} providing excellent thermal stability
- Decoupling leads to enable improved video bandwidth (110 MHz typical)
- Designed for broadband operation (2500 MHz to 2700 MHz)
- Lower output capacitance for improved performance in Doherty applications
- Designed for low memory effects providing excellent pre-distortability
- 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 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
BLF8G27LS-100V (SOT1244B)			
1	drain		
2	gate		
3	source [1]		
4	decoupling lead		
5	decoupling lead		
6	n.c.		
7	n.c.		
BLF8G27LS-100GV (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
BLF8G27LS-100V	-	earless flanged ceramic package; 6 leads	SOT1244B
BLF8G27LS-100GV	-	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 = 48 W	0.292	K/W

6. Characteristics

Table 6. 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 = 1 mA	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	V_{DS} = 10 V; I_D = 153 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	-	29	-	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 = 153 mA	-	1.27	-	S
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = $V_{GS(th)}$ + 3.75 V; I_D = 5.35 A	-	0.1	-	Ω

Table 7. RF characteristics

Test signal: 2-carrier W-CDMA, 3GPP test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on the CCDF; f_1 = 2502.5 MHz; f_2 = 2507.5 MHz; f_3 = 2692.5 MHz; f_4 = 2697.5 MHz; RF performance at V_{DS} = 28 V; I_{Dq} = 900 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	$P_{L(AV)}$ = 25 W	15.8	17	-	dB
η_D	drain efficiency	$P_{L(AV)}$ = 25 W	25	28	-	%
RL_{in}	input return loss	$P_{L(AV)}$ = 25 W	-	−10	-	dB
$ACPR_{5M}$	adjacent channel power ratio (5 MHz)	$P_{L(AV)}$ = 25 W	-	−32	−26	dBc

7. Test information

7.1 Ruggedness in class-AB operation

The BLF8G27LS-100V and BLF8G27LS-100GV 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} = 900 mA; P_L = 100 W; f = 2500 MHz.

7.2 Impedance information

Table 8. Typical impedance

Measured load-pull data; I_{Dq} = 900 mA; V_{DS} = 28 V (main transistor).

f	Z_S[1]	Z_L[1]
(MHz)	(Ω)	(Ω)
BLF8G27LS-100V		
2500	1.2 – j4.6	2.7 – j2.7
2600	2.3 – j5.5	2.5 – j2.5
2700	3.8 – j5.2	2.1 – j2.6
BLF8G27LS-100GV		
2500	1.7 – j7.4	2.4 – j4.9
2600	2.8 – j8.0	2.2 – j5.2
2700	4.0 – j7.9	2.0 – j5.3

[1] Z_S and Z_L defined in Figure 1.

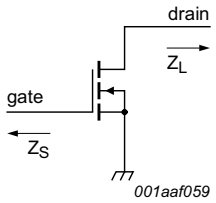
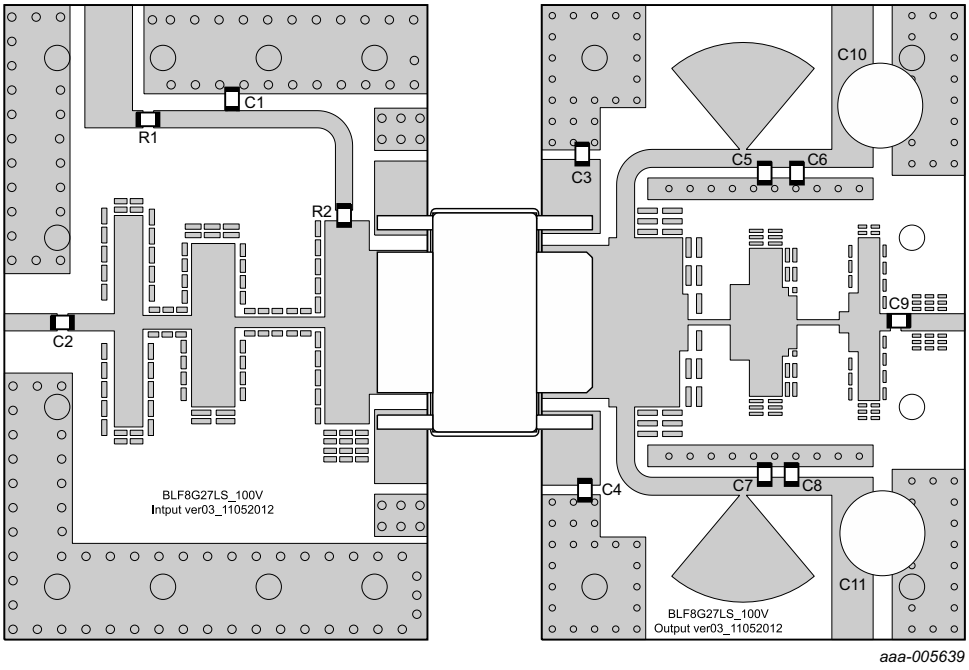


Fig 1. Definition of transistor impedance

7.3 VBW in class-AB operation

The BLF8G27LS-100V and BLF8G27LS-100GV show 110 MHz (typical) video bandwidth in class-AB test circuit in 2.6 GHz band at V_{DS} = 28 V and I_{Dq} = 0.9 A.

7.4 Test circuit



Printed-Circuit Board (PCB): Rogers RO4350B; ε_r = 3.5; thickness = 0.762 mm.

See Table 9 for list of components.

Fig 2. Component layout for test circuit

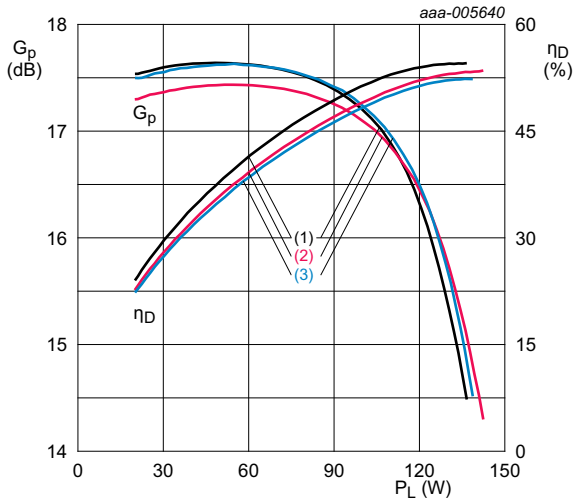
Table 9. List of components

For test circuit, see Figure 2.

Component	Description	Value	Remarks
C1, C2, C9	multilayer ceramic chip capacitor	20 pF	ATC600F
C3, C4, C6, C8	multilayer ceramic chip capacitor	10 μF	Murata
C5, C7	multilayer ceramic chip capacitor	0.1 μF	Murata
C10, C11	electrolytic capacitor	1000 μF, 100 V	
R1, R2	chip resistor	9.1 Ω	Vishay Dale SMD 0805

7.5 Graphical data

7.5.1 Pulsed CW



V_{DS} = 28 V; I_{Dq} = 900 mA.

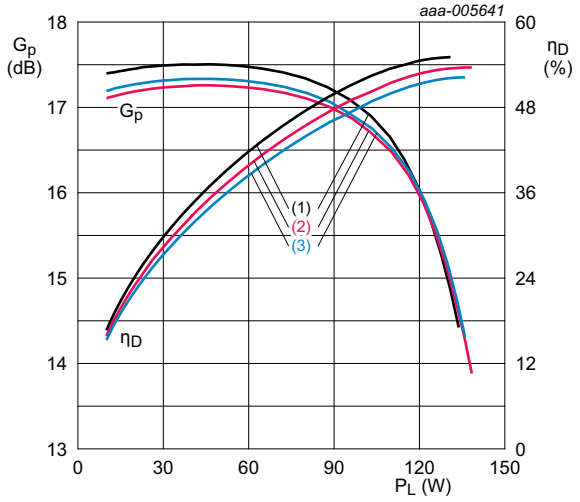
(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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

7.5.2 1-Tone CW



V_{DS} = 28 V; I_{Dq} = 900 mA.

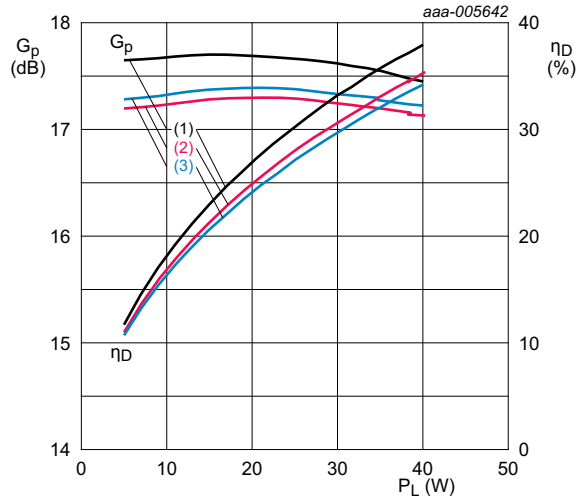
(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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

7.5.3 1-Carrier W-CDMA



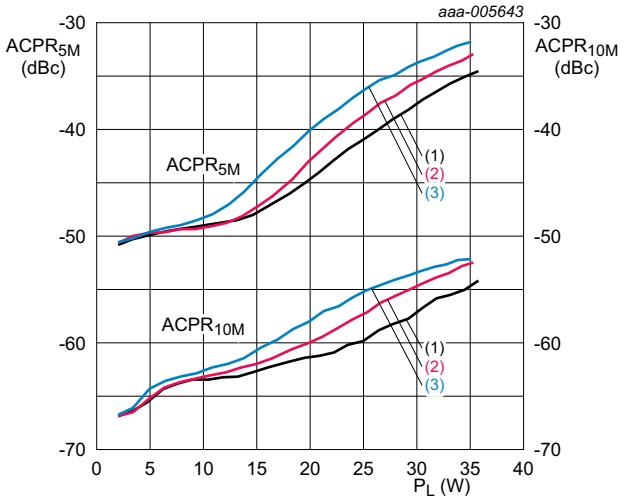
V_{DS} = 28 V; I_{Dq} = 900 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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



V_{DS} = 28 V; I_{Dq} = 900 mA.

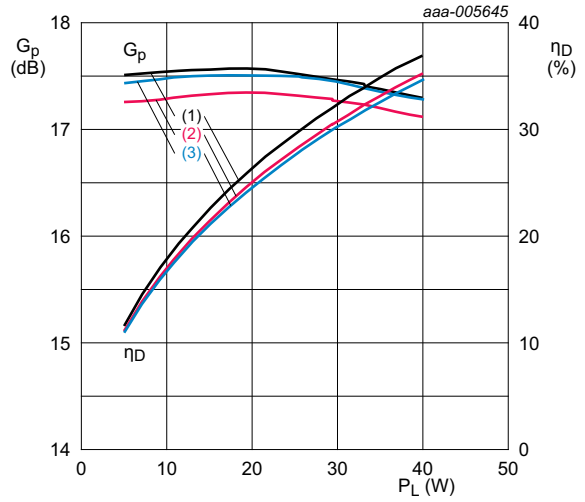
(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

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

7.5.4 2-Carrier W-CDMA



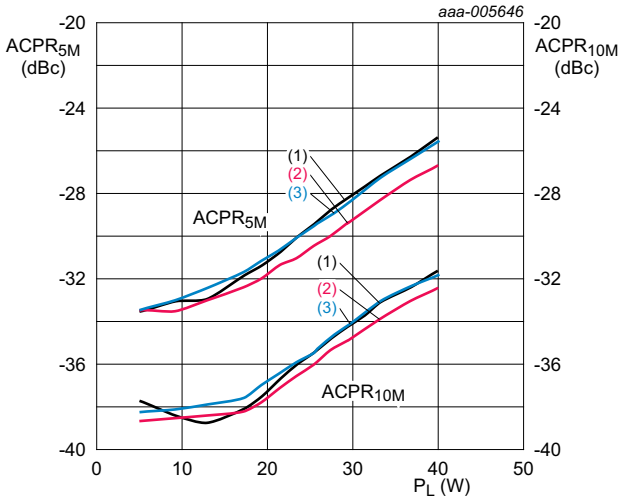
V_{DS} = 28 V; I_{Dq} = 900 mA.

(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

Fig 7. Power gain and drain efficiency as function of load power; typical values



V_{DS} = 28 V; I_{Dq} = 900 mA.

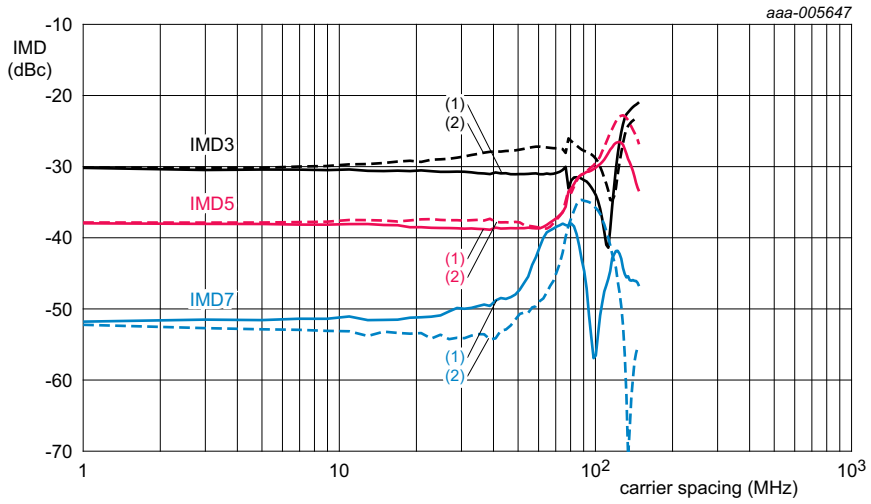
(1) f = 2500 MHz

(2) f = 2600 MHz

(3) f = 2700 MHz

Fig 8. Adjacent channel power ratio (5 MHz) and Adjacent channel power ratio (10 MHz) as function of load power; typical values

7.5.5 2-Tone VBW



V_{DS} = 28 V; I_{Dq} = 900 mA; f_c = 2600 MHz.

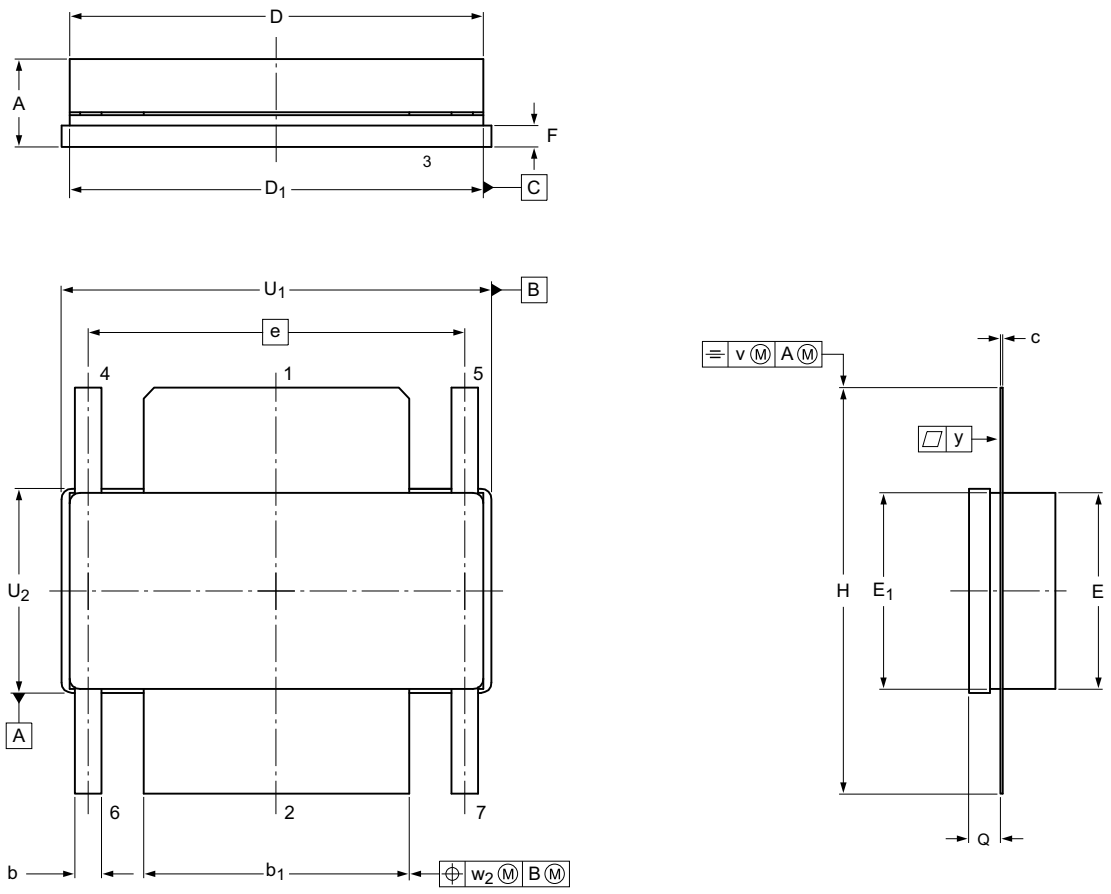
(1) IMD low

(2) IMD high

Fig 9. 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			

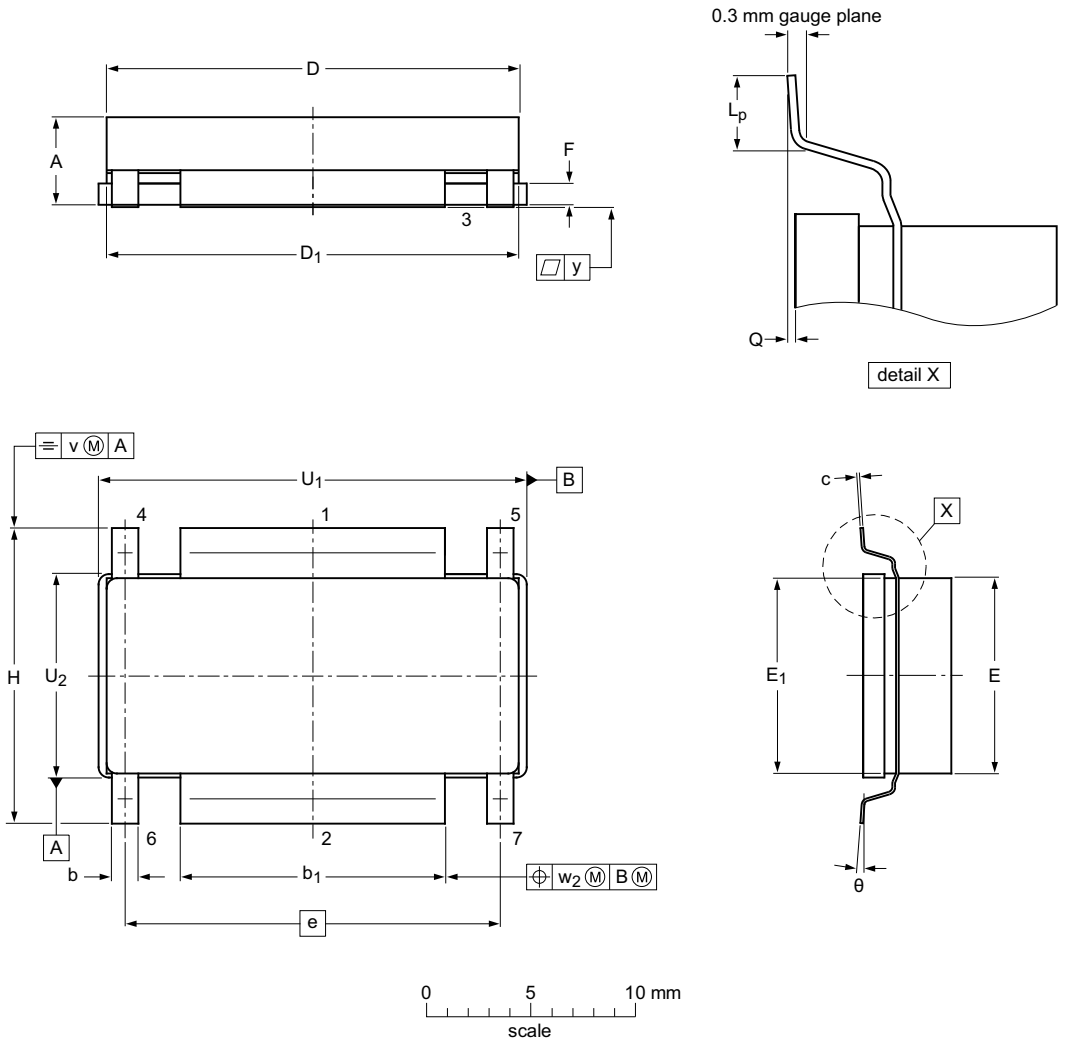
Note
1. Millimeter dimensions are derived from the original inch dimensions.
2. Dimension is measured 0.030 inch (0.76 mm) from body.

sot1244b_po

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

Fig 10. 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 11. 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	Third 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
SMD	Surface Mounted Device
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
BLF8G27LS-100V_27LS-100GV v.4	20130926	Product data sheet	-	BLF8G27LS-100V v.3
Modifications:	• This data sheet now describes both the BLF8G27LS-100V and the BLF8G27LS-100GV products. • Section 1.2 on page 1: Section has been updated. • Section 7.2 on page 4: Section has been updated.			
BLF8G27LS-100V v.3	20130129	Product data sheet	-	BLF8G27LS-100V v.2
BLF8G27LS-100V v.2	20121203	Product data sheet	-	BLF8G27LS-100V v.1
BLF8G27LS-100V v.1	20120817	Objective 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".

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14. Contents

1 Product profile 1
1.1 General description 1
1.2 Features and benefits 1
1.3 Applications 1
2 Pinning information 2
3 Ordering information 2
4 Limiting values 2
5 Thermal characteristics 3
6 Characteristics 3
7 Test information 3
7.1 Ruggedness in class-AB operation 3
7.2 Impedance information 4
7.3 Test circuit 5
7.4 Graphical data 6
7.4.1 Pulsed CW 6
7.4.2 1-Tone CW 6
7.4.3 1-Carrier W-CDMA 7
7.4.4 2-Carrier W-CDMA 8
7.4.5 2-Tone VBW 8
8 Package outline 9
9 Handling information 11
10 Abbreviations 11
11 Revision history 11
12 Legal information 12
12.1 Data sheet status 12
12.2 Definitions 12
12.3 Disclaimers 12
12.4 Trademarks 13
13 Contact information 13
14 Contents 14

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