

# BLF8G09LS-400PW; BLF8G09LS-400PGW

Power LDMOS transistor

Rev. 1 — 27 September 2013

Objective data sheet

## 1. Product profile

### 1.1 General description

400 W LDMOS power transistor for base station applications at frequencies from 716 MHz to 960 MHz.

**Table 1. Typical performance**

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

Test signal	f (MHz)	$I_{Dq}$ (mA)	$V_{DS}$ (V)	$P_{L(AV)}$ (W)	$G_p$ (dB)	$\eta_D$ (%)	ACPR <sub>5M</sub> (dBc)
2-carrier W-CDMA	716 to 728	3400	28	95	19.5	27	-35 <sup>[1]</sup>

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

### 1.2 Features and benefits

- Excellent ruggedness
- Device can operate with the supply current delivered through the video leads
- High efficiency
- Low thermal resistance providing excellent thermal stability
- Designed for broadband operation
- 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
- Design optimized for gull-wing
- 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 716 MHz to 960 MHz frequency range



## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol	
<b>BLF8G09LS-400PW (SOT1242B)</b>				
1	drain1		 aaa-007816	
2	drain2			
3	gate1			
4	gate2			
5	source			[1]
6	video lead			[2]
7	video lead			[2]
8	n.c.			
9	n.c.			
<b>BLF8G09LS-400PGW (SOT1242C)</b>				
1	drain1		 aaa-007816	
2	drain2			
3	gate1			
4	gate2			
5	source			[1]
6	video lead			[2]
7	video lead			[2]
8	n.c.			
9	n.c.			

[1] Connected to flange.

[2] Device can operate with the supply current delivered through the combined video leads.

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF8G09LS-400PW	-	earless flanged ceramic package; 8 leads	SOT1242B
BLF8G09LS-400PGW	-	earless flanged ceramic package; 8 leads	SOT1242C

## 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.

## 5. Thermal characteristics

**Table 5. Thermal characteristics**

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

## 6. Characteristics

**Table 6. DC 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	$V_{GS} = 0\text{ V}$ ; $I_D = 3\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}$ ; $I_D = 300\text{ mA}$	1.5	1.8	2.3	V
$V_{GSq}$	gate-source quiescent voltage	$V_{DS} = 28\text{ V}$ ; $I_D = 1700\text{ mA}$	1.7	2	2.5	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}$ ; $V_{DS} = 28\text{ V}$	-	-	2.8	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$ ; $V_{DS} = 10\text{ V}$	-	55	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}$ ; $V_{DS} = 0\text{ V}$	-	-	280	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}$ ; $I_D = 15\text{ A}$	-	26	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$ ; $I_D = 12.25\text{ A}$	-	0.06	-	$\Omega$

**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;  $f_1 = 718.5\text{ MHz}$ ;  $f_2 = 723.5\text{ MHz}$ ;  $f_3 = 720.5\text{ MHz}$ ;  $f_4 = 725.5\text{ MHz}$ ; RF performance at  $V_{DS} = 28\text{ V}$ ;  $I_{Dq} = 3400\text{ mA}$ ;  $T_{case} = 25\text{ °C}$ ; 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	$P_{L(AV)} = 95\text{ W}$	<td>	19.5	-	dB
$RL_{in}$	input return loss	$P_{L(AV)} = 95\text{ W}$	-	<td>	<td>	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 95\text{ W}$	<td>	27	-	%
$ACPR_{5M}$	adjacent channel power ratio (5 MHz)	$P_{L(AV)} = 95\text{ W}$	-	-35	<td>	dBc

**7. Test information**

**7.1 Ruggedness in class-AB operation**

The BLF8G09LS-400PW and BLF8G09LS-400PGW are capable of withstanding a load mismatch corresponding to  $V_{SWR} = <td> : 1$  through all phases under the following conditions:  $V_{DS} = <td> V$ ;  $I_{DQ} = <td> mA$ ;  $f = <td> MHz$ .

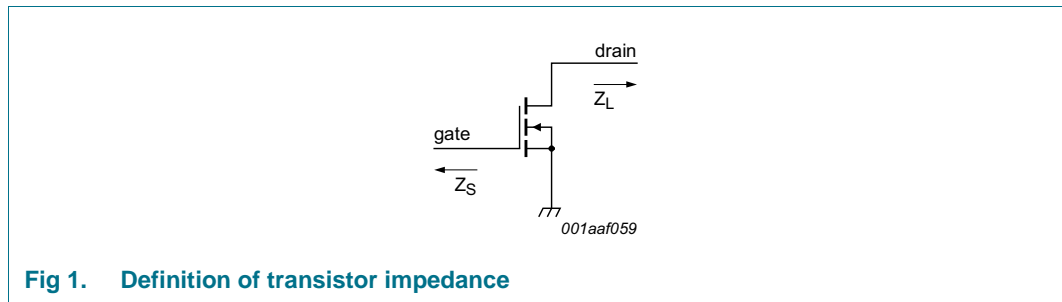
**7.2 Impedance information**

**Table 8. Typical impedance**

Measured load-pull data for the top-half of the push-pull package;  $I_{DQ} = 1800 mA$ ;  $V_{DS} = 28 V$ ;  $T_{case} = 25 \text{ }^\circ C$ , water cooled.

f (MHz)	$Z_S$ <sup>[1]</sup> ( $\Omega$ )	$Z_L$ <sup>[1]</sup> ( $\Omega$ )
<b>BLF8G09LS-400PW (straight lead)</b>		
720	1.26 – j2.89	1.8 – j1.94
757	1.44 – j3.82	2 – j1.6
769	1.55 – j3.64	1.9 – j1.75
805	1.7 – j4.5	1.5 – j1.3
<b>BLF8G09LS-400PGW (gull-wing)</b>		
720	1.37 – j3	1.7 – j2.1
757	1.4 – j3.6	1.6 – j2.3
769	1.3 – j3.9	1.7 – j2.2
805	1.6 – j4.3	1.48 – j1.97

[1]  $Z_S$  and  $Z_L$  defined in [Figure 1](#).



**Fig 1. Definition of transistor impedance**

8. Package outline

Earless flanged ceramic package; 8 leads

SOT1242B

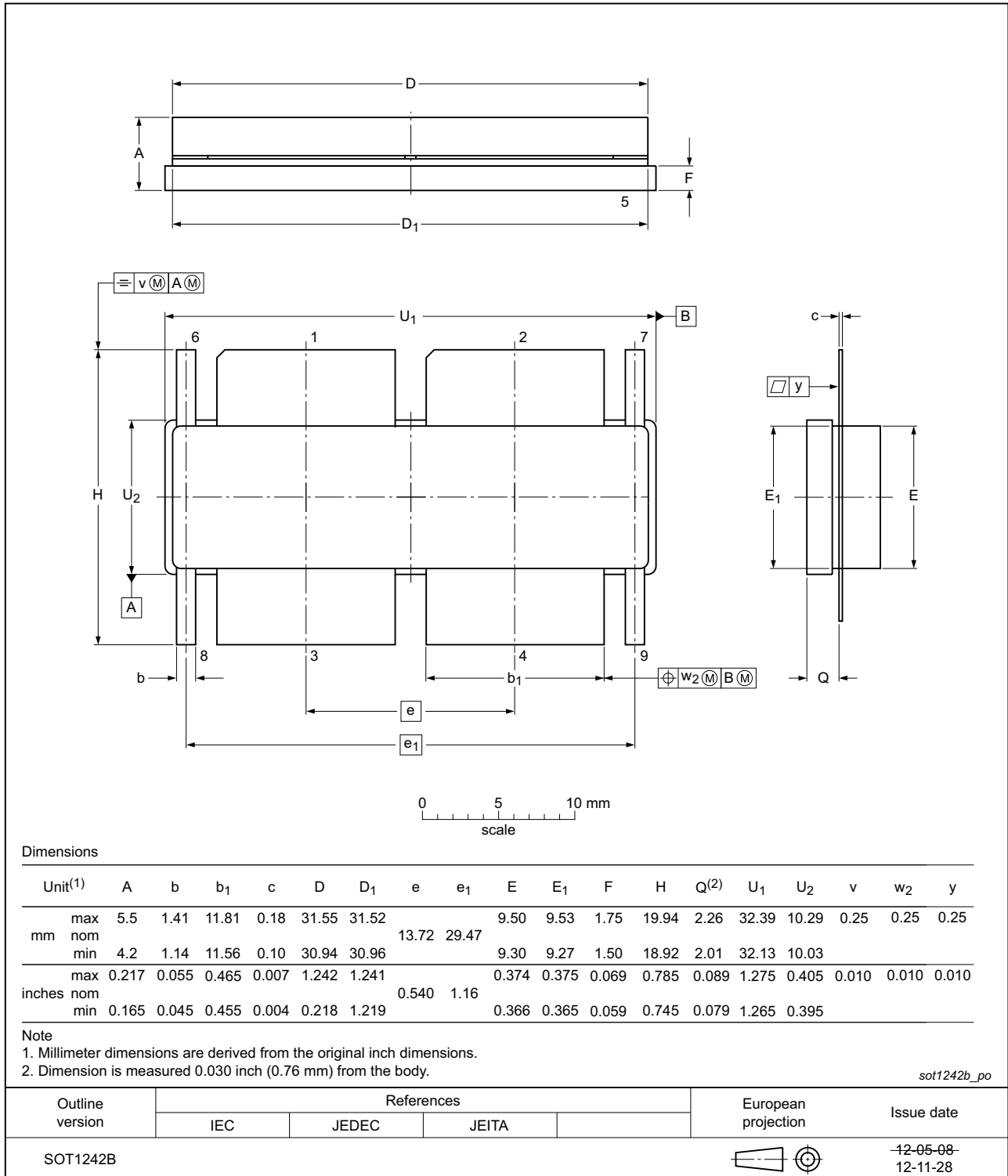


Fig 2. Package outline SOT1242B

Earless flanged ceramic package; 8 leads

SOT1242C

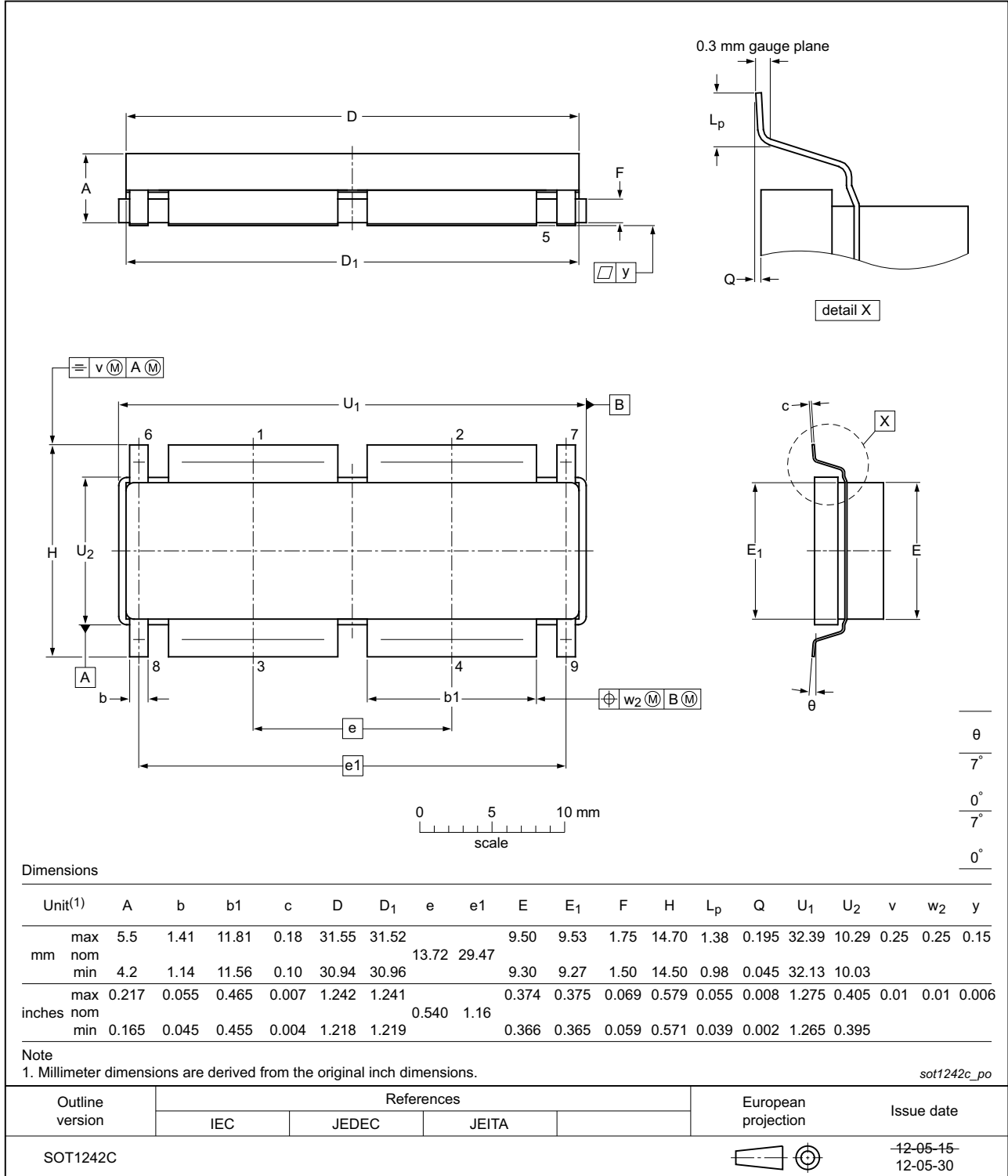


Fig 3. Package outline SOT1242C

## 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 9. Abbreviations**

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

## 11. Revision history

**Table 10. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF8G09LS-400PW_8G09LS-400PGW v.1	20130927	Objective data sheet	-	-

## 12. Legal information

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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.
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