

# BLF8G10LS-270V; BLF8G10LS-270GV

Power LDMOS transistor

Rev. 1 — 3 December 2012

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

Test signal	f (MHz)	V <sub>DS</sub> (V)	P <sub>L(AV)</sub> (W)	G <sub>p</sub> (dB)	η <sub>D</sub> (%)	ACPR <sub>5M</sub> (dBc)
2-carrier W-CDMA	869 to 894	28	67	19.5	31	-37 <sup>[1]</sup>

[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<sub>th</sub> 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
<b>BLF8G10LS-270V (SOT1244B)</b>			
1	drain		<p>aaa-003619</p>
2	gate		
3	source		
4	decoupling lead		
5	decoupling lead		
6	n.c.		
7	n.c.		
<b>BLF8G10LS-270GV (SOT1244C)</b>			
1	drain		<p>aaa-003619</p>
2	gate		
3	source		
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	$T_{case} = 80\text{ °C}; P_L = 67\text{ W}$	0.257	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	$V_{GS} = 0\text{ V}; I_D = 4.5\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 450\text{ mA}$	1.5	1.8	2.3	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$	-	-	4.2	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	-	82	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	420	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 450\text{ mA}$	-	3.92	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 15.75\text{ A}$	-	0.04	-	$\Omega$

**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;  $f_1 = 871.5\text{ MHz}; f_2 = 881.5\text{ MHz}; f_3 = 881.5\text{ MHz}; f_4 = 891.5\text{ MHz}; f_5 = 881.5\text{ MHz}; f_6 = 891.5\text{ MHz}$ ; RF performance at  $V_{DS} = 28\text{ V}; I_{Dq} = 2000\text{ mA}; T_{case} = 25\text{ °C}$ ; 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	$P_{L(AV)} = 67\text{ W}$	17.3	19.5	-	dB
$RL_{in}$	input return loss	$P_{L(AV)} = 67\text{ W}$	-	-16	-12	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 67\text{ W}$	26	31	-	%
$ACPR_{5M}$	adjacent channel power ratio (5 MHz)	$P_{L(AV)} = 67\text{ W}$	-	-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:  $V_{DS} = 28\text{ V}; I_{Dq} = 2000\text{ mA}; P_L = 270\text{ W}; f = 820\text{ MHz}; f = 869\text{ MHz}; f = 920\text{ MHz}; f = 960\text{ MHz}$  and a load mismatch corresponding to VSWR = 5 : 1 through all phases under the following conditions:  $V_{DS} = 28\text{ V}; I_{Dq} = 2000\text{ mA}; P_L = 270\text{ W}; f = 790\text{ MHz}$ .

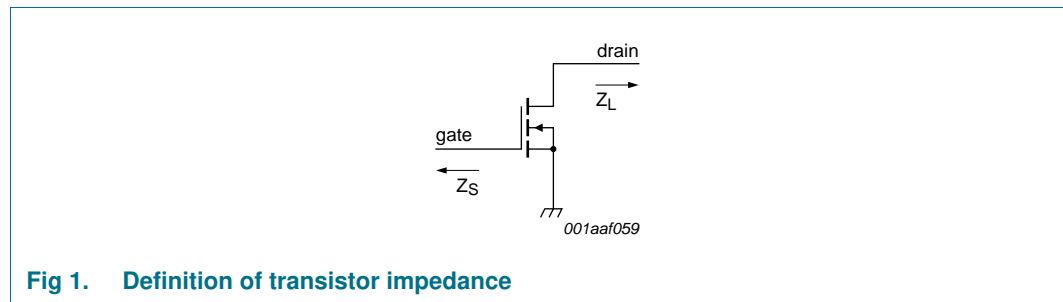
## 7.2 Impedance information

**Table 8. Typical impedance**

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

f (MHz)	$Z_S$ [1] ( $\Omega$ )	$Z_L$ [1] ( $\Omega$ )
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](#).

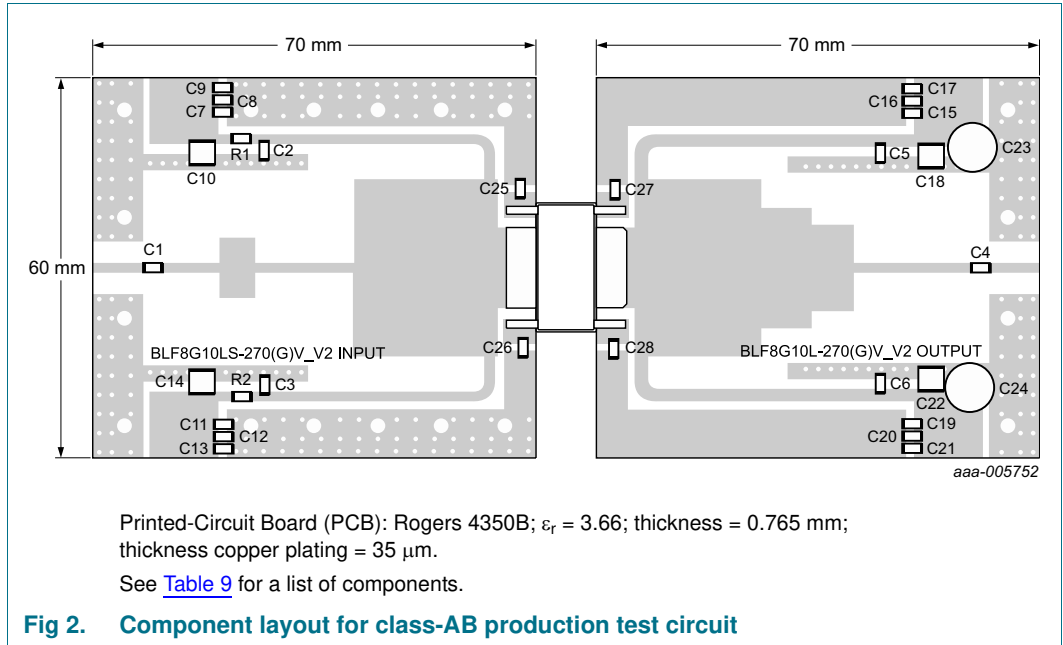


**Fig 1. Definition of transistor impedance**

## 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  $V_{DS} = 28 \text{ V}$  and  $I_{Dq} = 2 \text{ A}$ .

7.4 Test circuit



**Table 9. List of components**

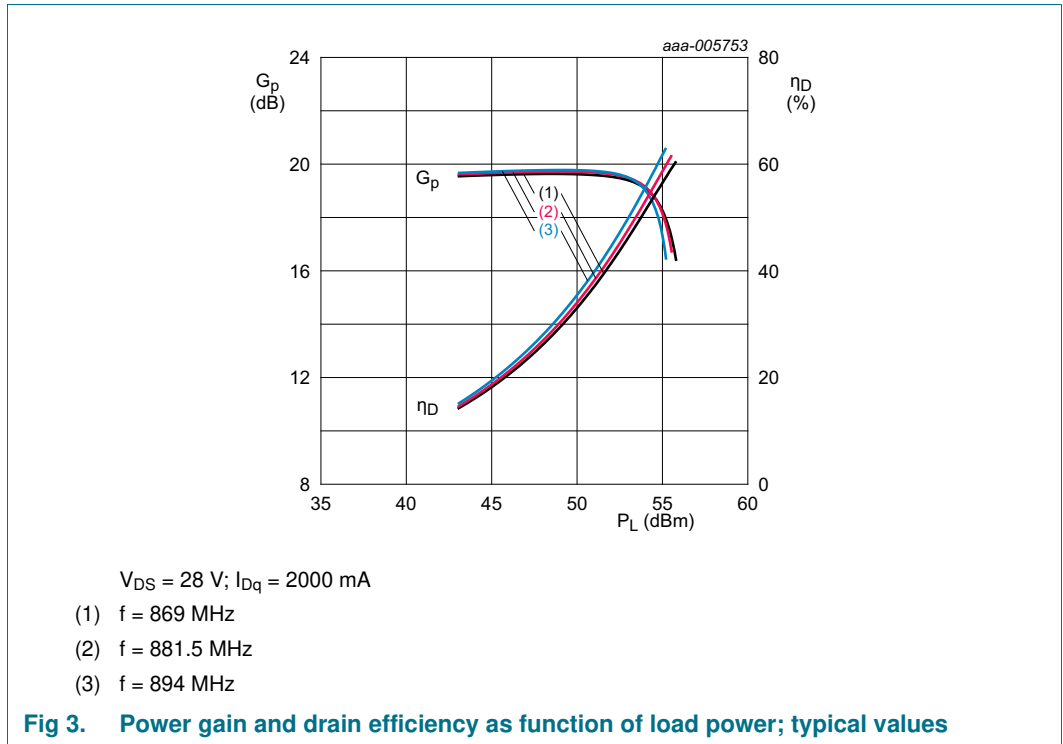
For test circuit see [Figure 2](#).

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 $\mu\text{F}$	[2] Murata
C8, C12, C16, C20	multilayer ceramic chip capacitor	0.1 $\mu\text{F}$	[2] Murata
C9, C13, C17, C21	multilayer ceramic chip capacitor	1 $\mu\text{F}$	[2] Murata
C10, C14, C18, C22	multilayer ceramic chip capacitor	4.7 $\mu\text{F}$	[2] Murata
C23, C24	electrolytic capacitor	470 $\mu\text{F}$ , 63 V	
C25, C26, C27, C28	multilayer ceramic chip capacitor	10 $\mu\text{F}$	[2] Murata
R1, R2	chip resistor	9.1 $\Omega$	[3] Vishay Dale 0805

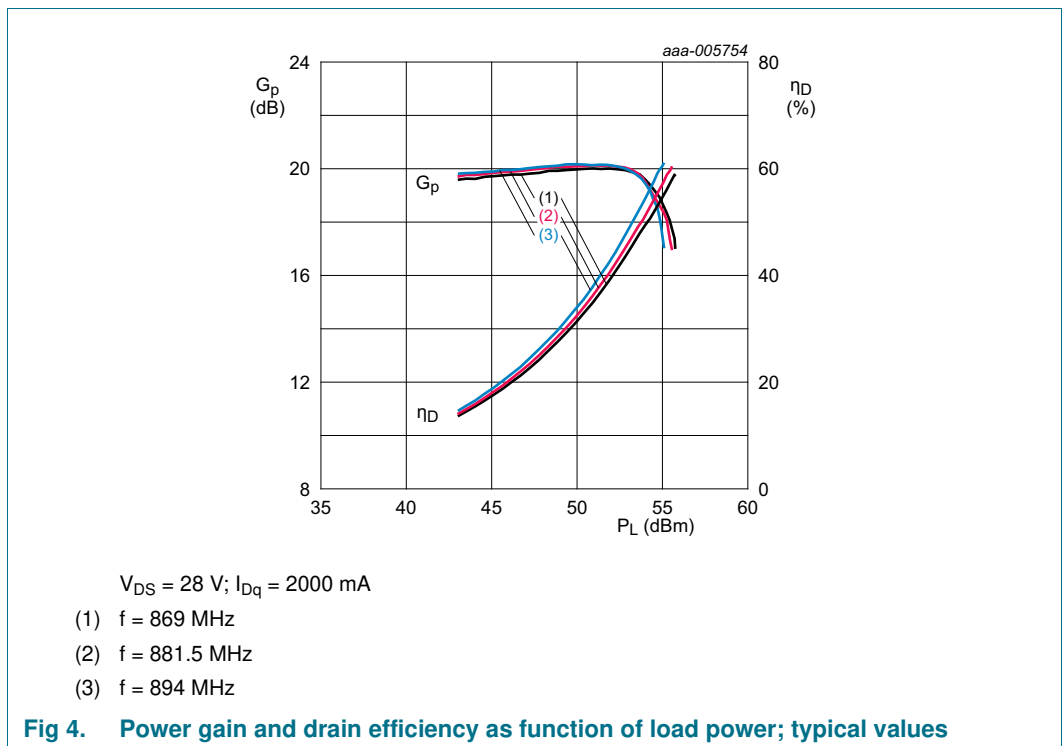
- [1] American Technical Ceramics type 100B or capacitor of same quality.
- [2] Murata or capacitor of same quality.
- [3] Vishay Dale resistor of same quality.

7.5 Graphical data

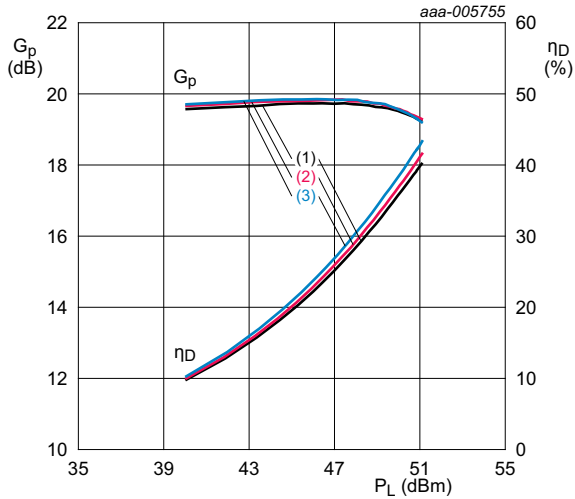
7.5.1 Straight lead sample CW



7.5.2 Straight lead sample CW pulsed

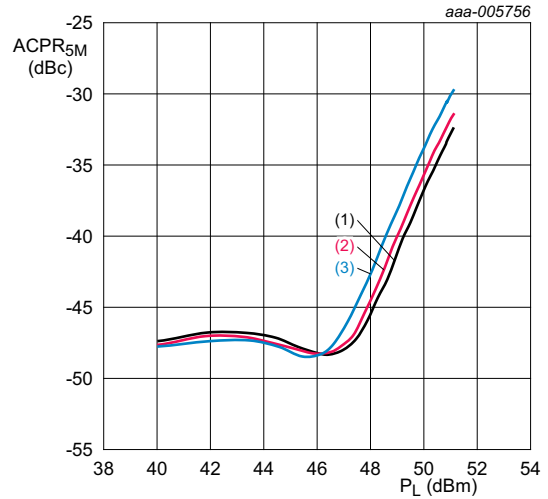


7.5.3 Straight lead sample 1-carrier W-CDMA



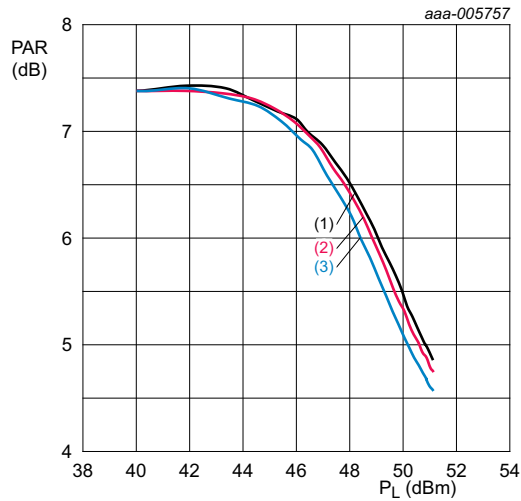
$V_{DS} = 28\text{ V}; I_{Dq} = 2000\text{ mA}$   
 (1)  $f = 869\text{ MHz}$   
 (2)  $f = 881.5\text{ MHz}$   
 (3)  $f = 894\text{ MHz}$

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



$V_{DS} = 28\text{ V}; I_{Dq} = 2000\text{ mA}$   
 (1)  $f = 869\text{ MHz}$   
 (2)  $f = 881.5\text{ MHz}$   
 (3)  $f = 894\text{ MHz}$

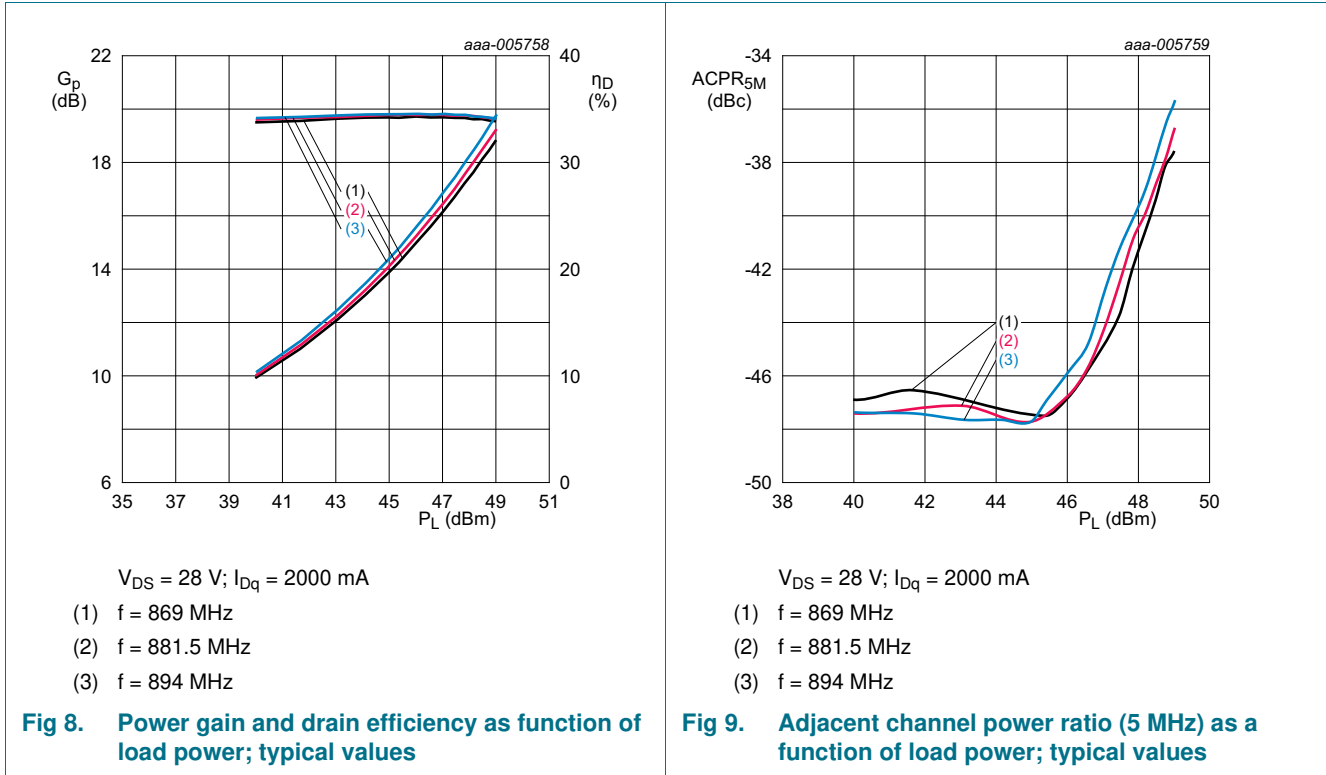
**Fig 6. Adjacent channel power ratio (5 MHz) as a function of load power; typical values**



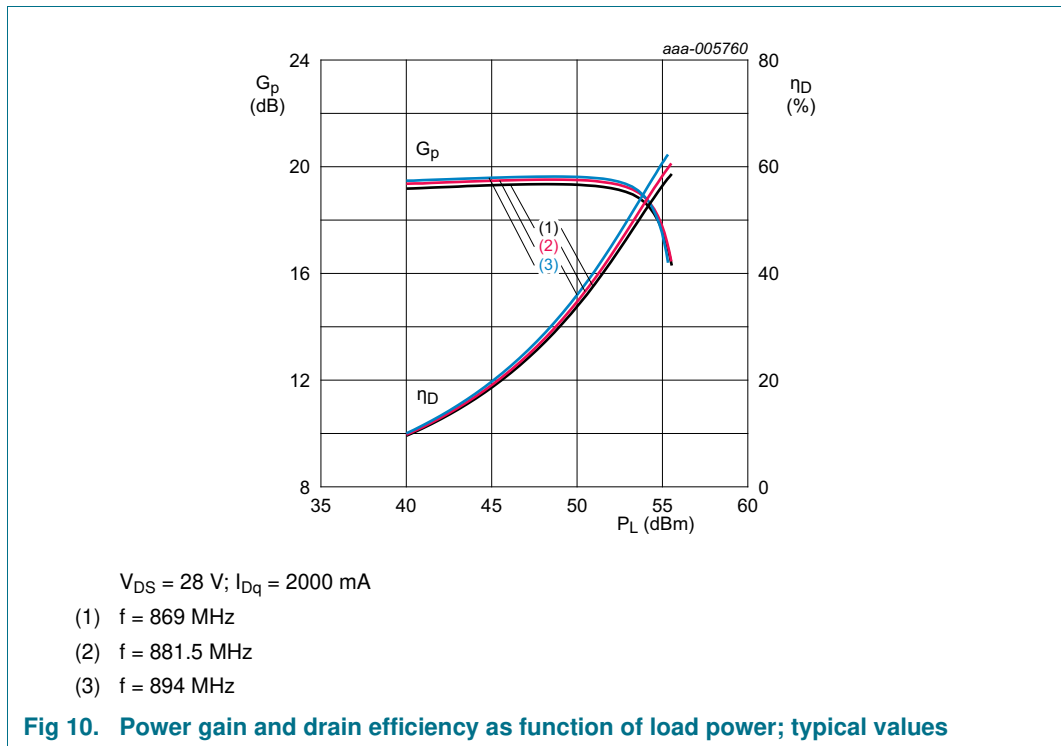
$V_{DS} = 28\text{ V}; I_{Dq} = 2000\text{ mA}$   
 (1)  $f = 869\text{ MHz}$   
 (2)  $f = 881.5\text{ MHz}$   
 (3)  $f = 894\text{ MHz}$

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

7.5.4 Straight lead sample 2-carrier W-CDMA

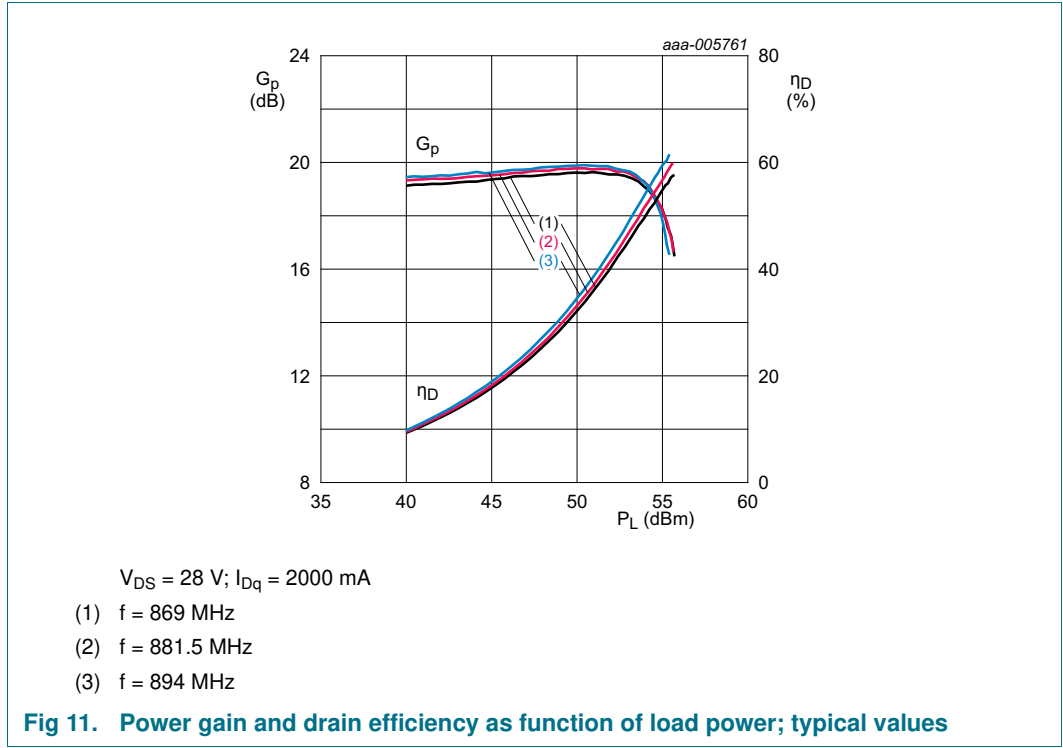


7.5.5 Gull-wing sample CW

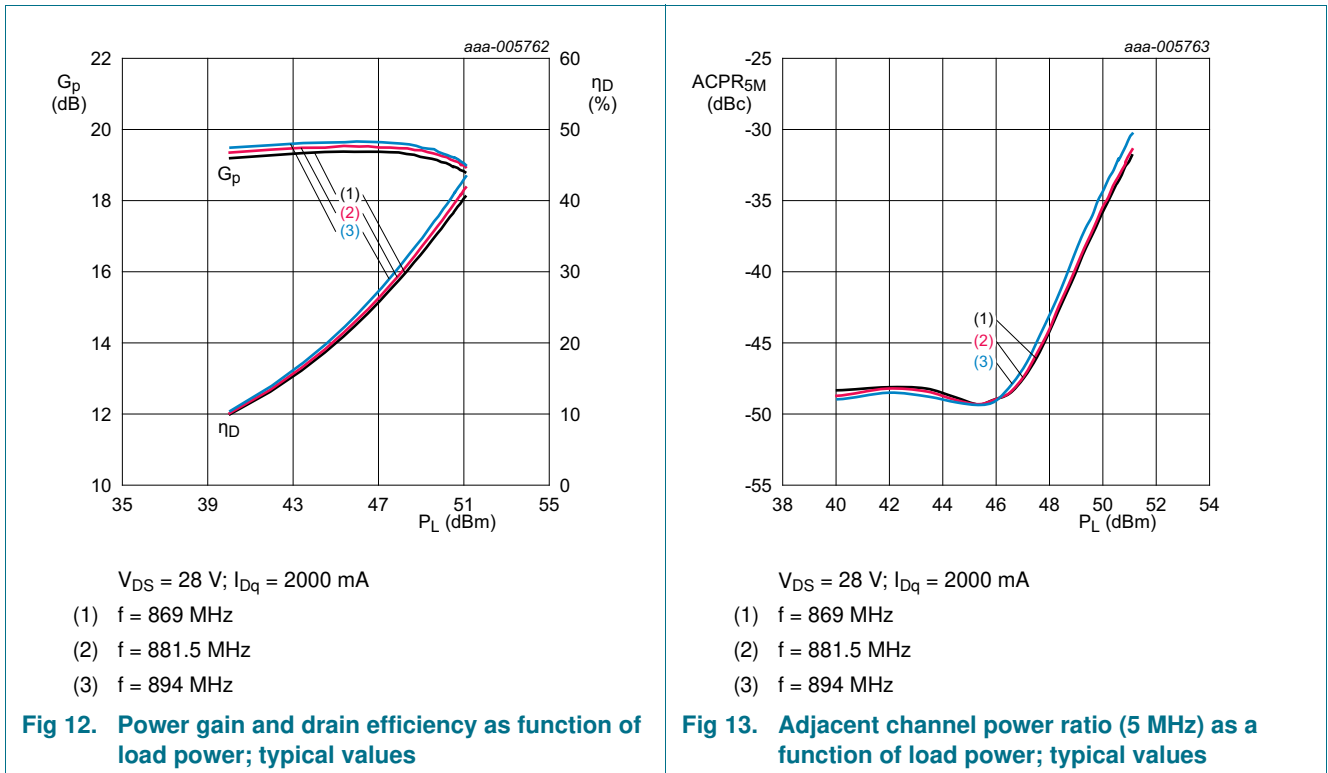


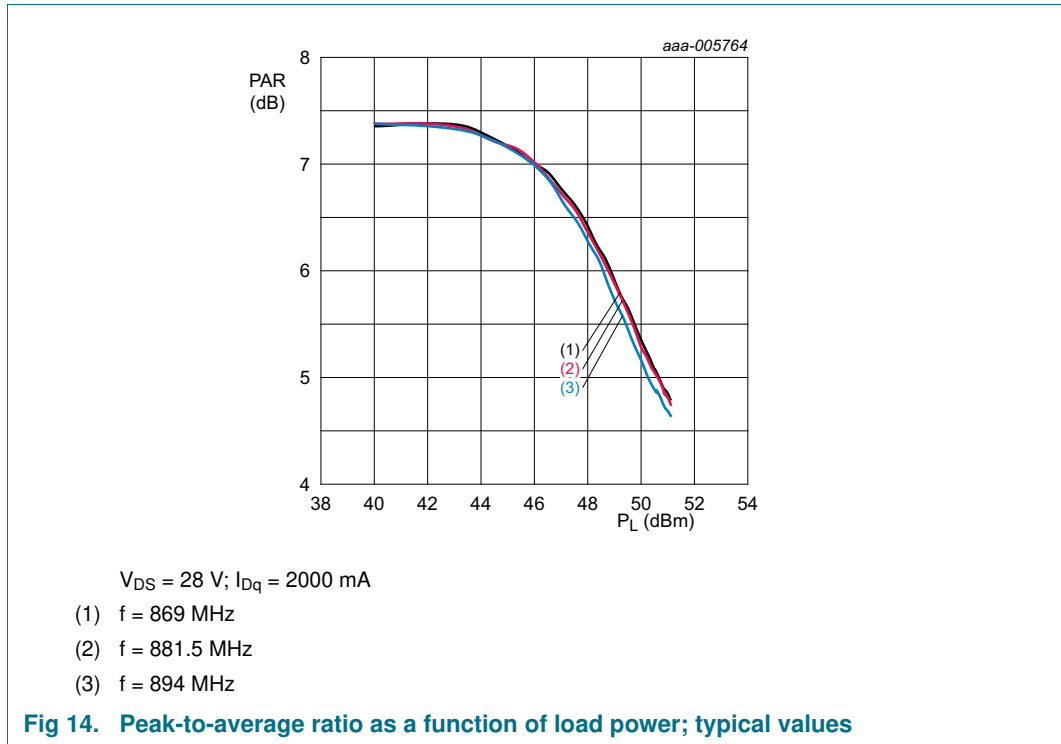


7.5.6 Gull-wing sample CW pulsed

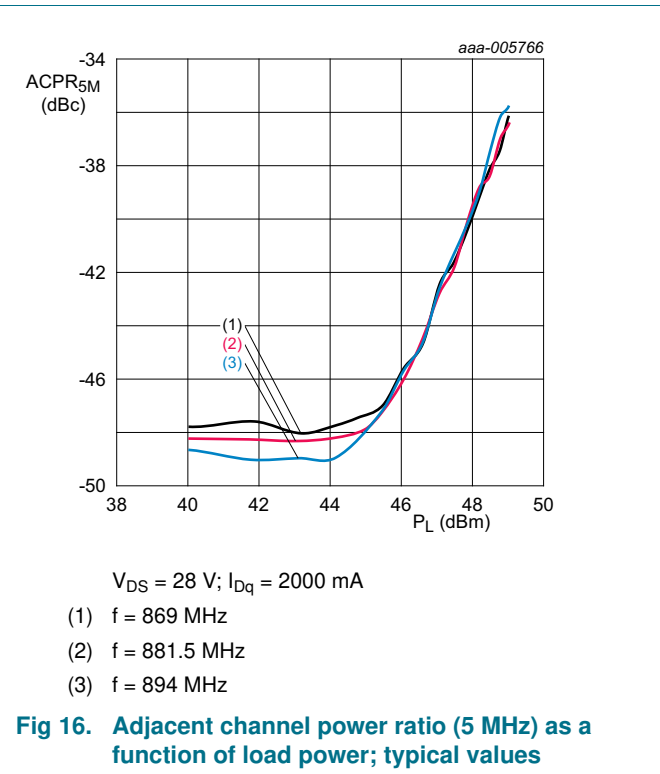
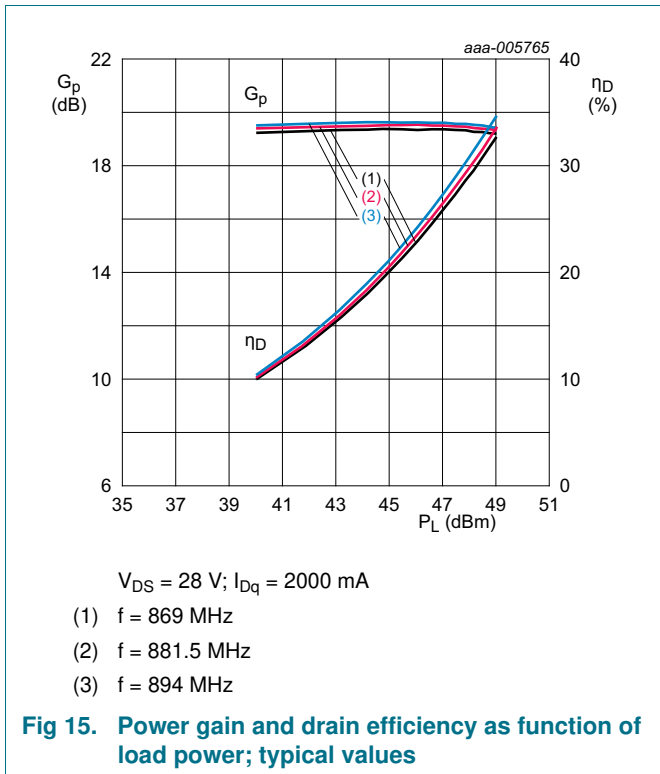


7.5.7 Gull-wing sample 1-carrier W-CDMA

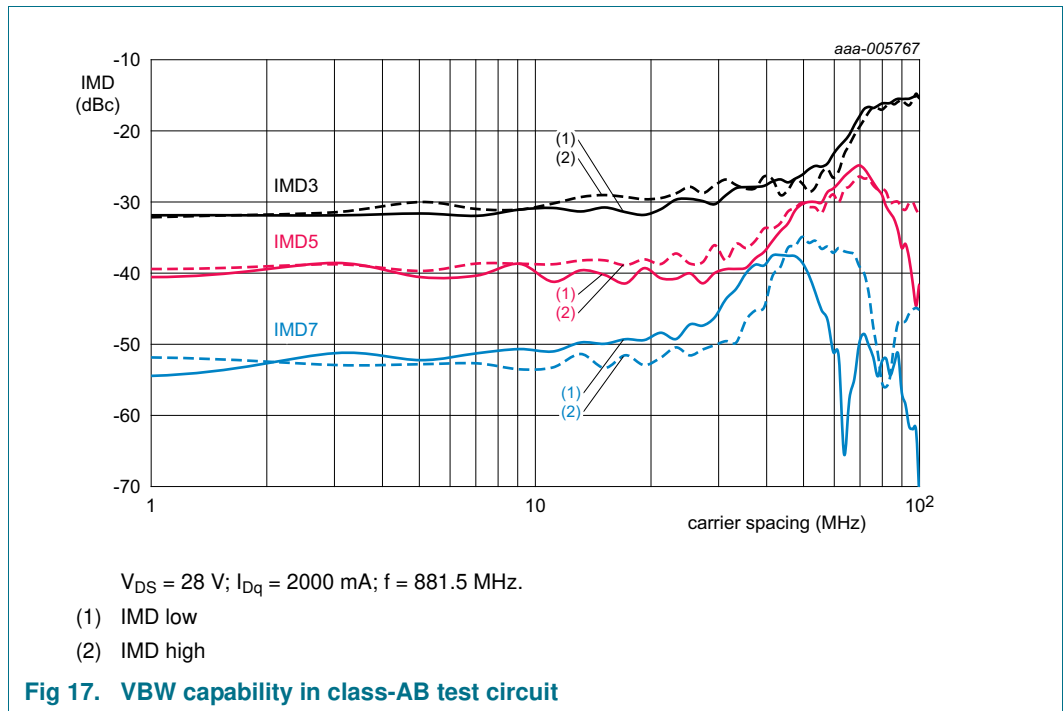




7.5.8 Gull-wing sample 2-carrier W-CDMA



**7.5.9 2-Tone VBW**



8. Package outline

Earless flanged ceramic package; 6 leads

SOT1244B

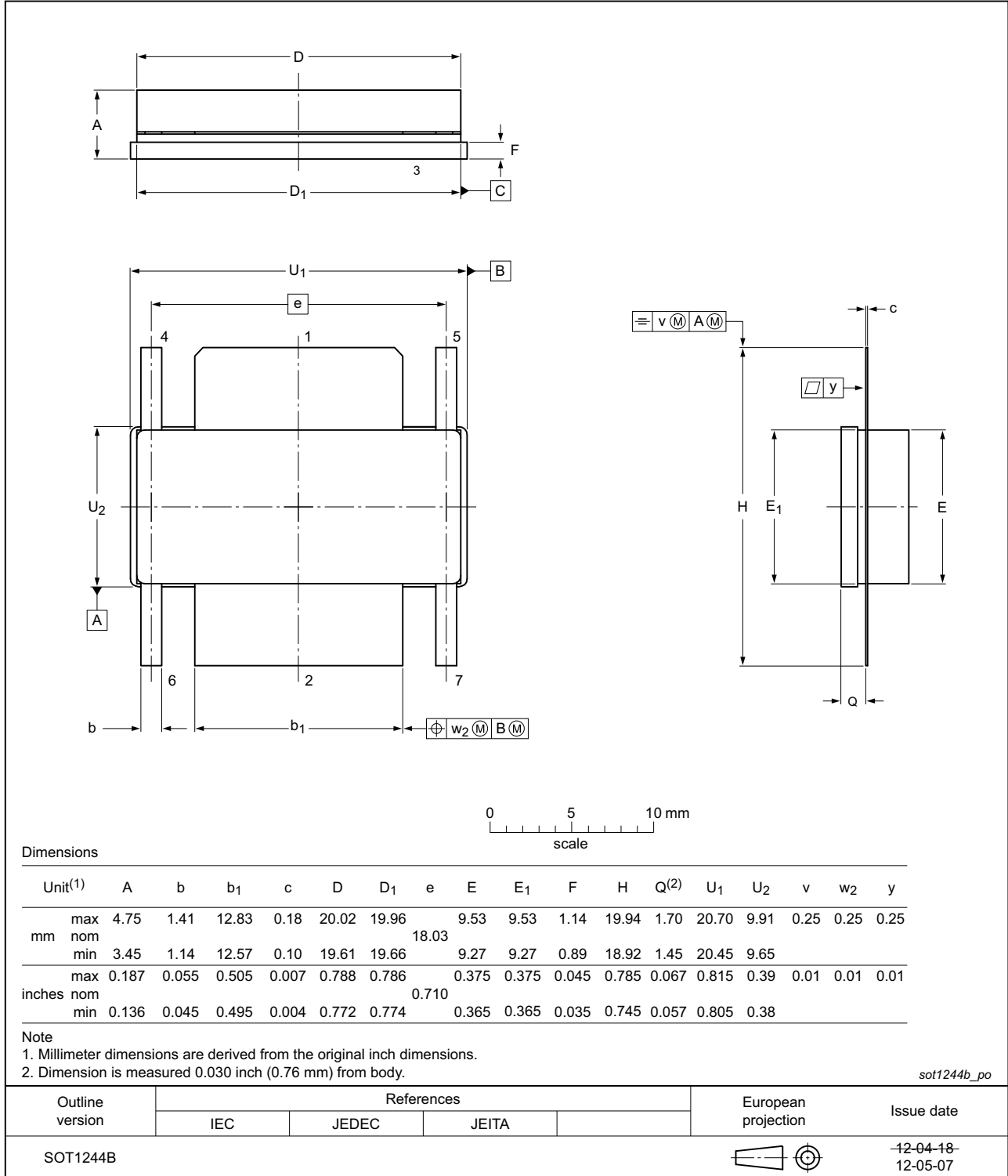


Fig 18. Package outline SOT1244B

Earless flanged ceramic package; 6 leads

SOT1244C

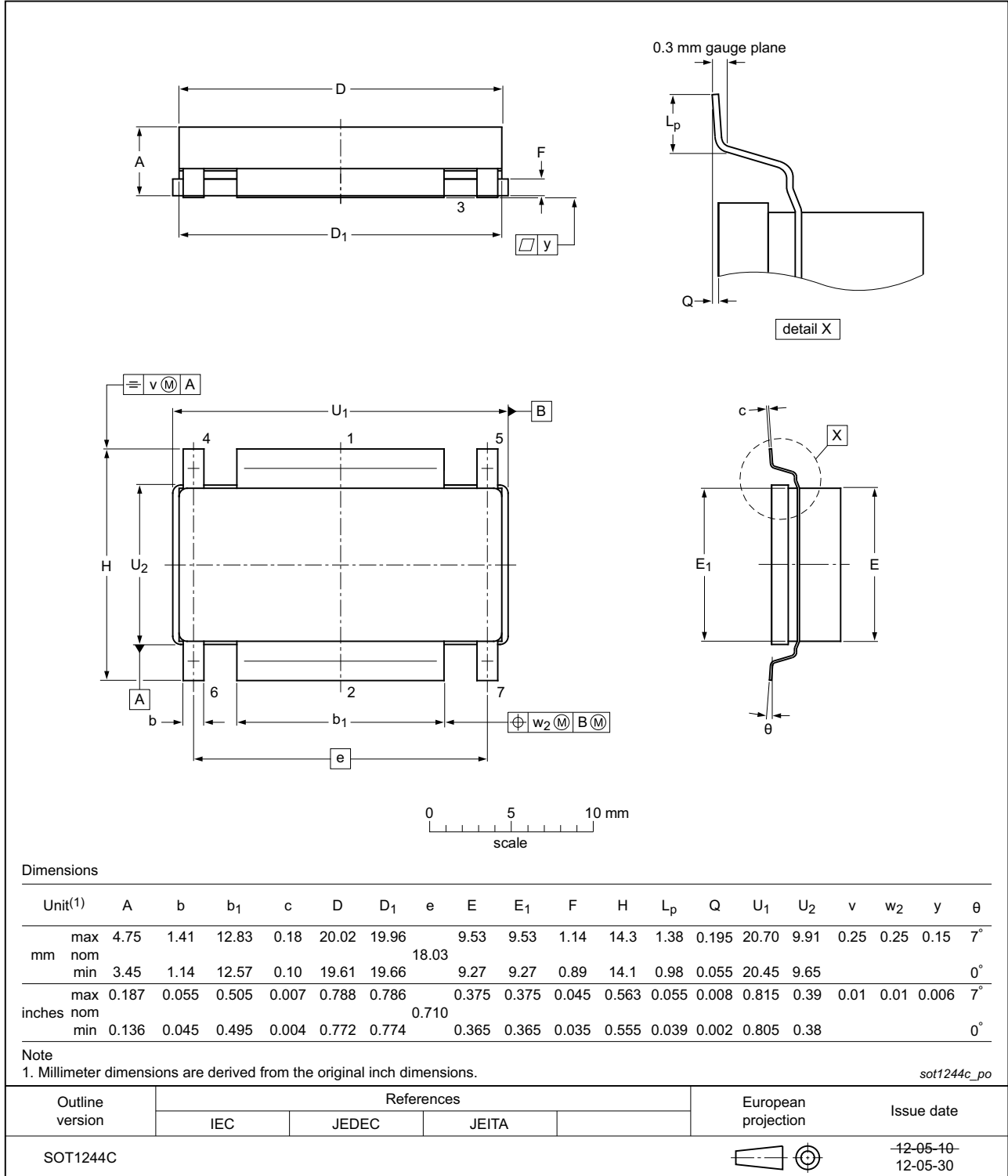


Fig 19. Package outline SOT1244C

## 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 v.1	20121203	Product data sheet	-	-

## 12. Legal information

### 12.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
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