

# 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  $T_{case} = 25\text{ °C}$  in a common source class-AB production test circuit.*

Test signal	f	I <sub>DQ</sub>	V <sub>DS</sub>	P <sub>L(AV)</sub>	G <sub>p</sub>	η <sub>D</sub>	ACPR
	(MHz)	(mA)	(V)	(W)	(dB)	(%)	(dBc)
2-carrier W-CDMA	2600 to 2700	1300	32	45	17.4	30	-32 <a href="#">[1]</a>
2-carrier W-CDMA	2600 to 2700	1300	28	35	17.0	29	-33 <a href="#">[1]</a>

[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		<p>aaa-003884</p>
2	gate		
3	source <a href="#">[1]</a>		
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	<a href="#">[1]</a>	-	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	$T_{case} = 80\text{ °C}; P_L = 55\text{ W}$	0.27	K/W

## 7. Characteristics

**Table 7. DC characteristics**

$T_j = 25\text{ }^\circ\text{C}$ ; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}$ ; $I_D = 2.16\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}$ ; $I_D = 216\text{ mA}$	1.5	1.9	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	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$ ; $V_{DS} = 10\text{ V}$	-	40	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}$ ; $V_{DS} = 0\text{ V}$	-	-	420	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}$ ; $I_D = 10.8\text{ A}$	-	16	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$ ; $I_D = 7.56\text{ A}$	-	0.06	-	$\Omega$

**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;  $f_1 = 2627.5\text{ MHz}$ ;  $f_2 = 2687.5\text{ MHz}$ ; RF performance at  $V_{DS} = 32\text{ V}$ ;  $I_{Dq} = 1300\text{ mA}$ ;  $T_{case} = 25\text{ }^\circ\text{C}$ ; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$P_{L(AV)} = 45\text{ W}$	15.8	17.4	18.7	dB
$RL_{in}$	input return loss	$P_{L(AV)} = 45\text{ W}$	-	-18	-8	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 45\text{ W}$	27	30	-	%
$ACPR_{5M}$	adjacent channel power ratio (5 MHz)	$P_{L(AV)} = 45\text{ W}$	-	-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:  $V_{DS} = 32\text{ V}$ ;  $I_{Dq} = 1300\text{ mA}$ ;  $P_L = 180\text{ W (CW)}$ ;  $f = 2620\text{ MHz}$ .

### 8.2 Impedance information

**Table 9. Typical impedance**

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

f (MHz)	$Z_S$ <sup>[1]</sup> ( $\Omega$ )	$Z_L$ <sup>[1]</sup> ( $\Omega$ )
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](#).

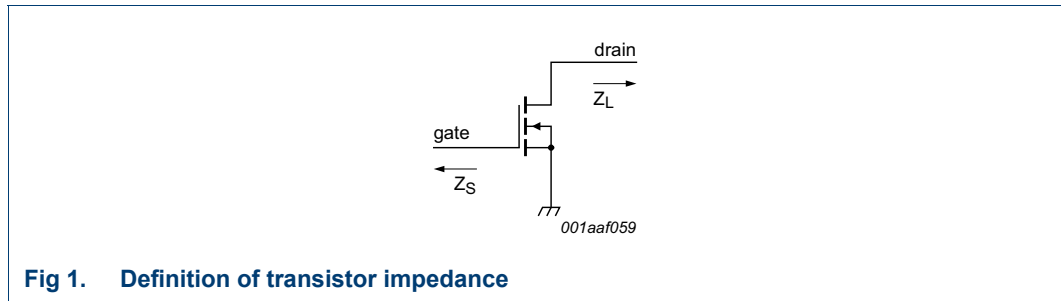
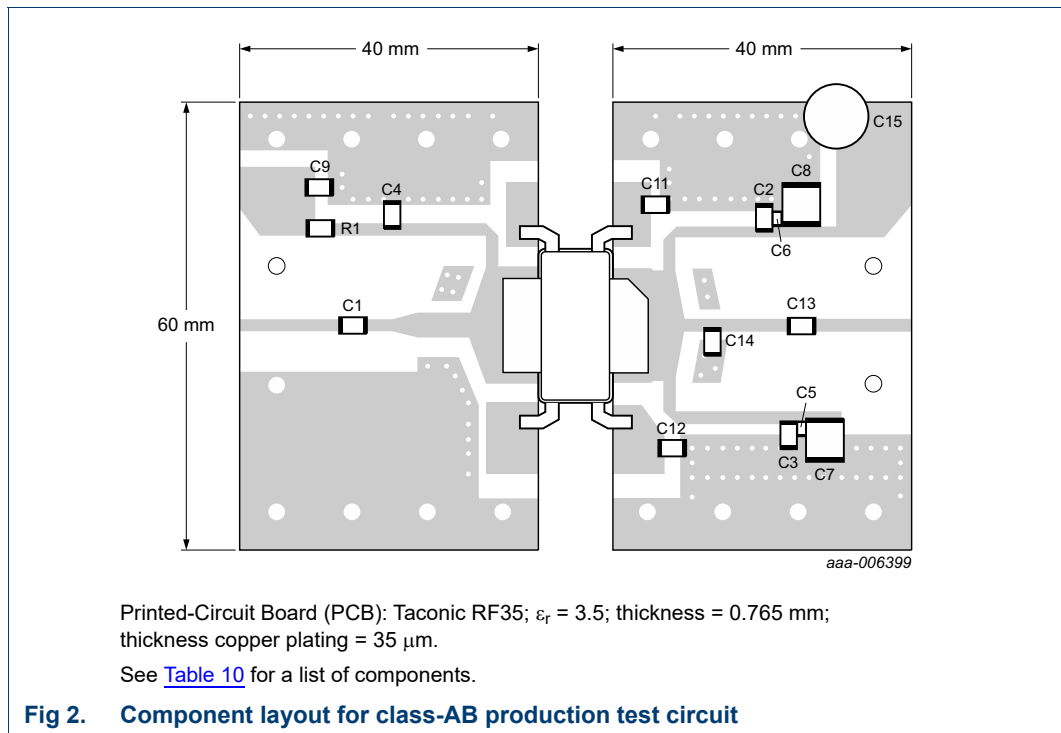


Fig 1. Definition of transistor impedance

### 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  $V_{DS} = 32\text{ V}$  and  $I_{DQ} = 1.3\text{ A}$ .

### 8.4 Test circuit



Printed-Circuit Board (PCB): Taconic RF35;  $\epsilon_r = 3.5$ ; thickness = 0.765 mm; thickness copper plating = 35  $\mu\text{m}$ .

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 $\mu\text{F}$ , 50 V	[2] Murata
C7, C8	multilayer ceramic chip capacitor	10 $\mu\text{F}$ , 50 V	[2] Murata
C9	multilayer ceramic chip capacitor	4.7 $\mu\text{F}$ , 50 V	[2] Murata

**Table 10. List of components ...continued**  
For test circuit see [Figure 2](#).

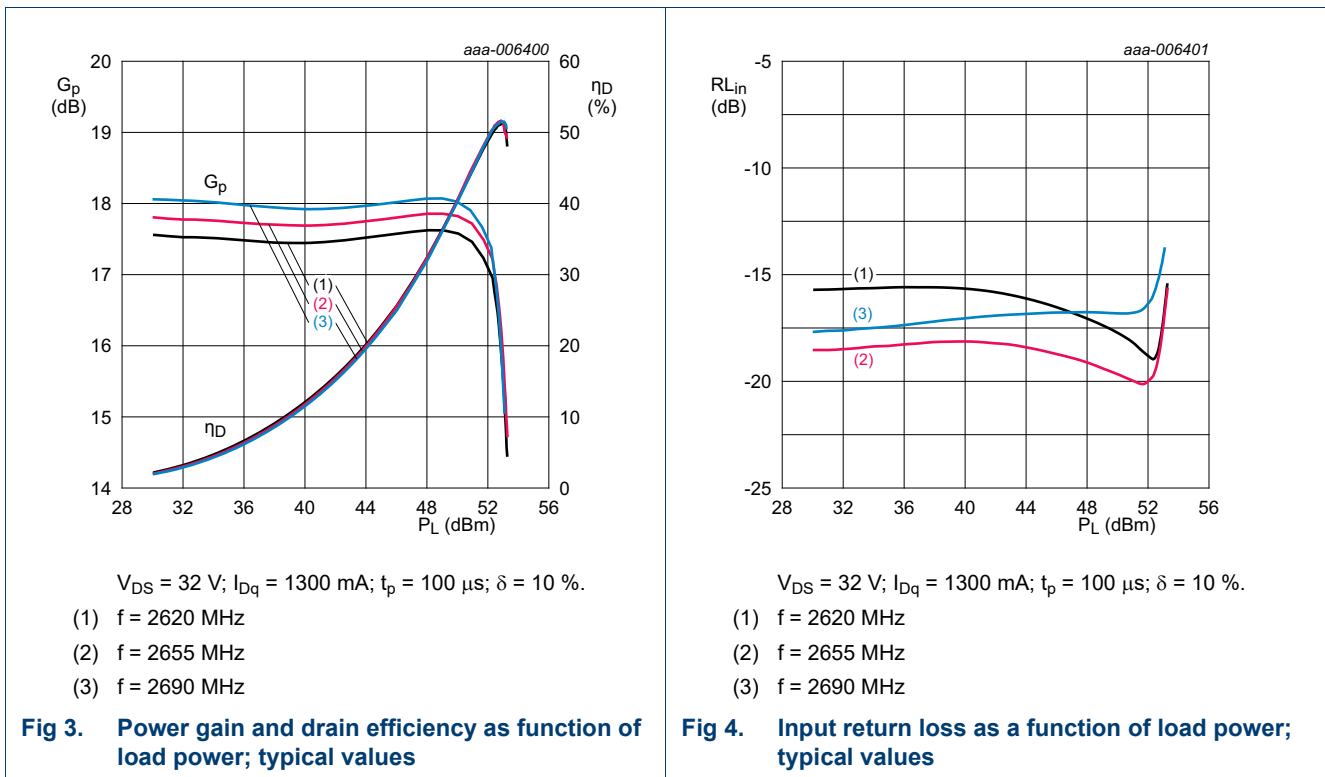
Component	Description	Value	Remarks
C11, C12	multilayer ceramic chip capacitor	4.7 $\mu$ F, 50 V <a href="#">[2]</a>	Murata
C15	electrolytic capacitor	470 $\mu$ F, 63 V	
R1	chip resistor	3.9 $\Omega$	Philips SMD 1206

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

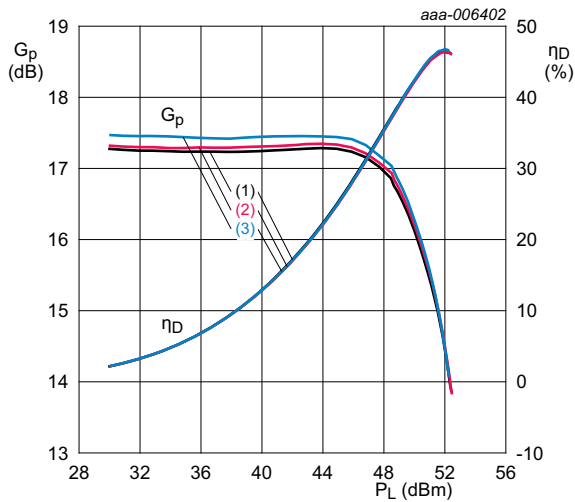
[2] Murata or capacitor of same quality.

## 8.5 Graphical data

### 8.5.1 CW pulse

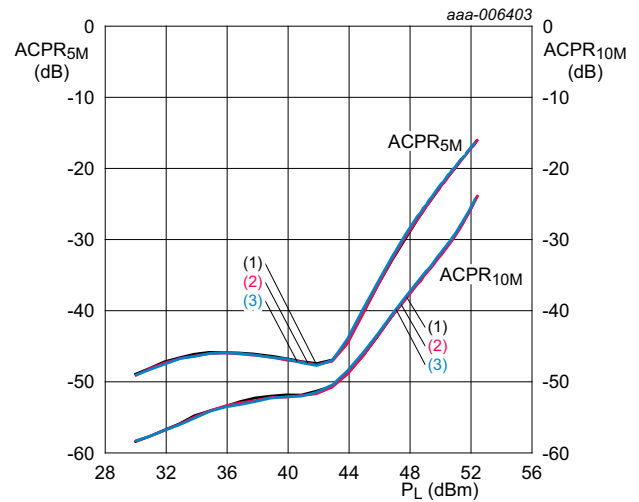


8.5.2 2-Carrier W-CDMA



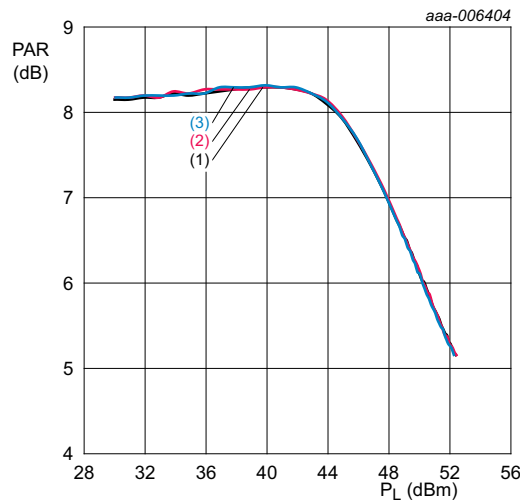
$V_{DS} = 32\text{ V}; I_{Dq} = 1300\text{ mA}$ .  
 (1)  $f = 2620\text{ MHz}$   
 (2)  $f = 2655\text{ MHz}$   
 (3)  $f = 2690\text{ MHz}$

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



$V_{DS} = 32\text{ V}; I_{Dq} = 1300\text{ mA}$ .  
 (1)  $f = 2620\text{ MHz}$   
 (2)  $f = 2655\text{ MHz}$   
 (3)  $f = 2690\text{ MHz}$

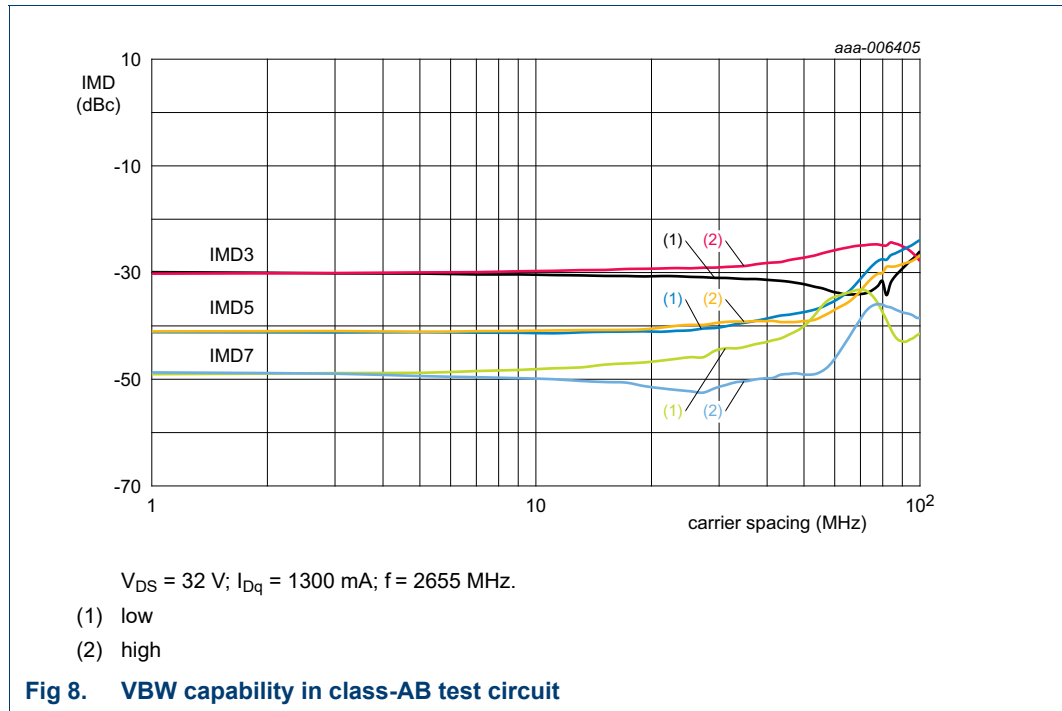
Fig 6. Adjacent channel power ratio (5MHz) and adjacent channel power ratio (10MHz) as function of load power; typical values



$V_{DS} = 32\text{ V}; I_{Dq} = 1300\text{ mA}$ .  
 (1)  $f = 2620\text{ MHz}$   
 (2)  $f = 2655\text{ MHz}$   
 (3)  $f = 2690\text{ MHz}$

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

8.5.3 2-Tone VBW



9. Package outline

Earless flanged LDMOST ceramic package; 6 leads

SOT1120B

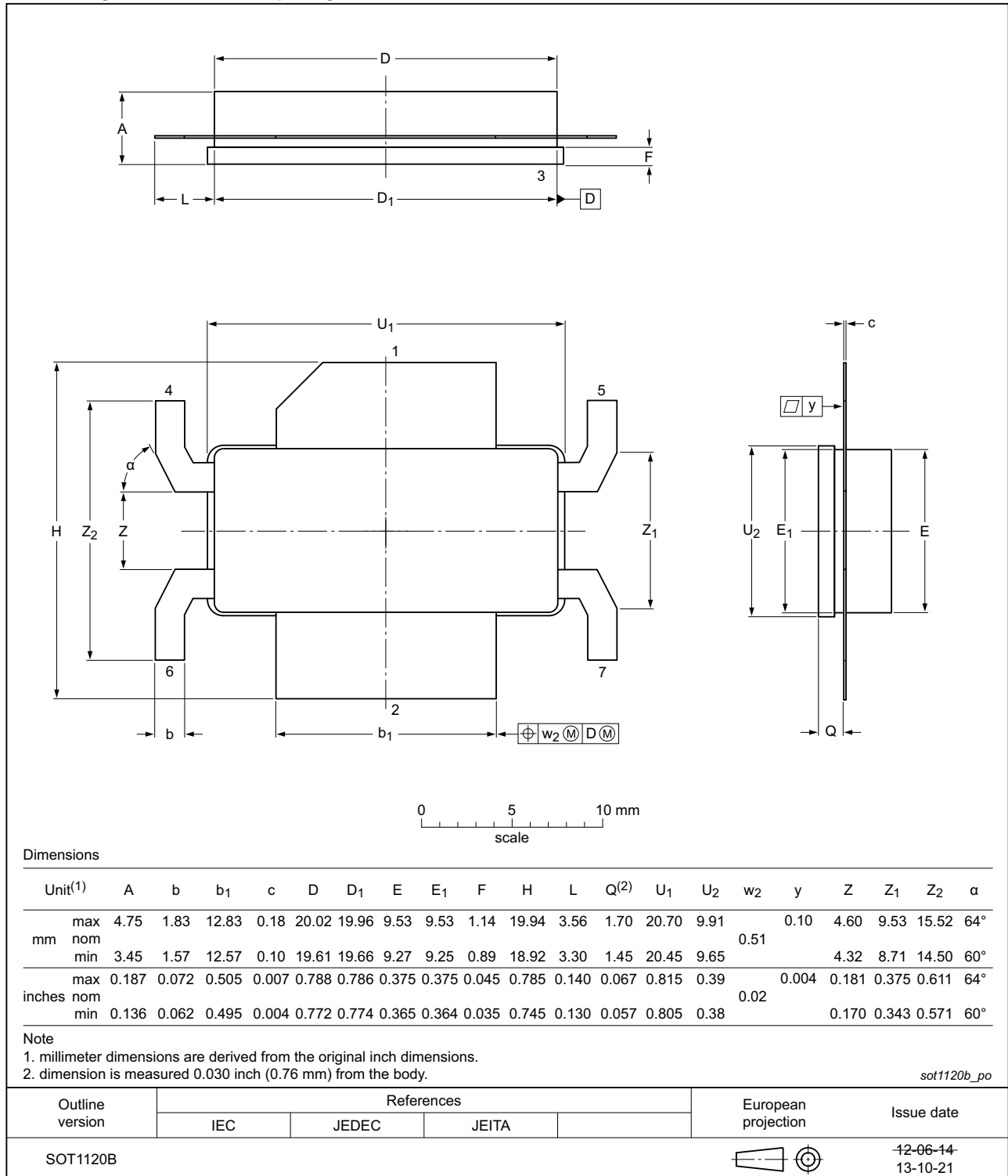


Fig 9. Package outline SOT1120B



## 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:	<ul style="list-style-type: none"> <li>The format of this document has been redesigned to comply with the new identity guidelines of Ampleon.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> </ul>			
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	-	-

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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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