

# BLF8G22LS-140

Power LDMOS transistor

Rev. 3 — 1 September 2015

AMPLEON

Product data sheet

## 1. Product profile

### 1.1 General description

140 W LDMOS power transistor for base station applications at frequencies from 2000 MHz to 2200 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 (MHz)	$I_{Dq}$ (mA)	$V_{DS}$ (V)	$P_{L(AV)}$ (W)	$G_p$ (dB)	$\eta_D$ (%)	ACPR (dBc)
2-carrier W-CDMA	2110 to 2170	900	28	33	18.5	32.5	-31 <sup>[1]</sup>

[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

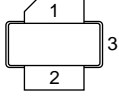
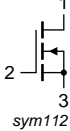
- Excellent ruggedness
- High efficiency
- Low  $R_{th}$  providing excellent thermal stability
- Designed for broadband operation (2000 MHz to 2200 MHz)
- Lower output capacitance for improved performance in Doherty applications
- Designed for low memory effects providing excellent digital pre-distortion capability
- 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 W-CDMA base stations and multi carrier applications in the 2000 MHz to 2200 MHz frequency range

## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	drain		 sym112
2	gate		
3	source		

[1] Connected to flange.

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF8G22LS-140	-	earless flanged ceramic package; 2 leads	SOT502B

## 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	$T_{case} = 80\text{ °C}; P_L = 33\text{ W}$	0.265	K/W

## 6. Characteristics

**Table 6. DC characteristics**

$T_j = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 1.53\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 153\text{ mA}$	1.5	1.9	2.3	V
$V_{GSq}$	gate-source quiescent voltage	$V_{DS} = 28\text{ V}; I_D = 900\text{ mA}$	1.7	2.0	2.5	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	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $V_{DS} = 10\text{ V}$	-	29.1	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	420	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 153\text{ mA}$	-	1.3	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $I_D = 5.355\text{ A}$	-	0.1	-	$\Omega$

**Table 7. RF characteristics**

Test signal: 2-carrier W-CDMA; PAR = 8.4 dB at 0.01 % probability on the CCDF; carrier spacing 5 MHz; 3GPP test model 1; 1 - 64 DPCH;  $f_1 = 2112.5\text{ MHz}; f_2 = 2117.5\text{ MHz}$ ; RF performance at  $V_{DS} = 28\text{ V}; I_{Dq} = 900\text{ mA}; T_{case} = 25\text{ °C}$ ; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$P_{L(AV)} = 33\text{ W}$	17.3	18.5	-	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 33\text{ W}$	29	32.5	-	%
$RL_{in}$	input return loss	$P_{L(AV)} = 33\text{ W}$	-	-10	-6	dB
ACPR	adjacent channel power ratio	$P_{L(AV)} = 33\text{ W}$	-	-31	-27	dBc

## 7. Test information

### 7.1 Ruggedness in class-AB operation

The BLF8G22LS-140 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions:  $V_{DS} = 28\text{ V}; I_{Dq} = 900\text{ mA}; P_L = 140\text{ W (CW)}; f = 2110\text{ MHz}$ .

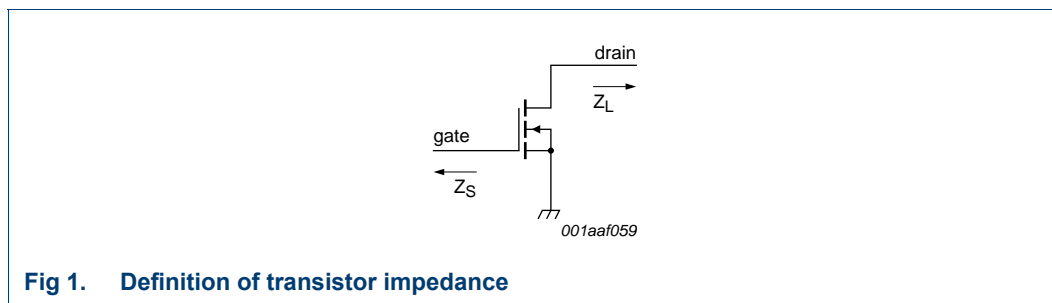
### 7.2 Impedance information

**Table 8. Typical impedance**

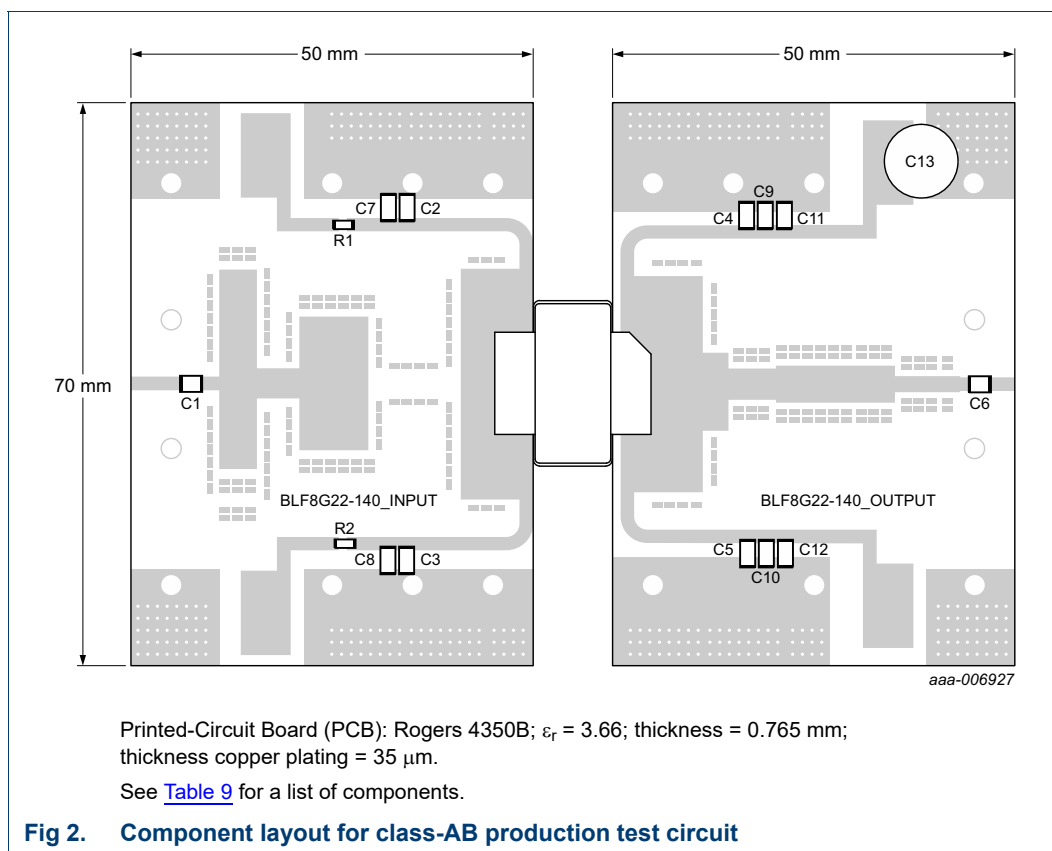
Measured load-pull data;  $I_{Dq} = 900\text{ mA}; V_{DS} = 28\text{ V}$ .

f (MHz)	$Z_S$ <sup>[1]</sup> ( $\Omega$ )	$Z_L$ <sup>[1]</sup> ( $\Omega$ )
2210	1.66 – j4.54	1.50 – j3.12
2140	1.87 – j4.70	1.50 – j3.12
2170	2.61 – j5.48	1.50 – j3.12

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



7.3 Test circuit



**Table 9. List of components**

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

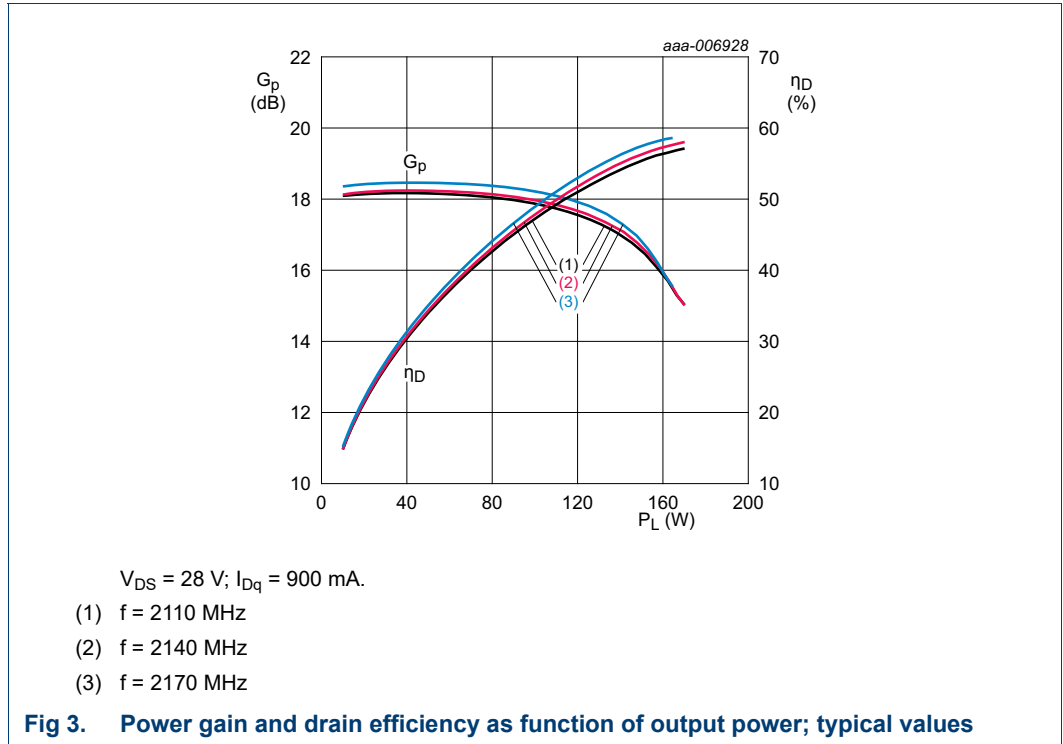
Component	Description	Value	Remarks
C1, C2, C3, C4, C5, C6	multilayer ceramic chip capacitor	9.7 pF	[1] ATC800B
C7, C8, C9, C10	multilayer ceramic chip capacitor	1 $\mu\text{F}$	[2] Murata
C11, C12	multilayer ceramic chip capacitor	10 $\mu\text{F}$	[2] Murata
C13	electrolytic capacitor	470 $\mu\text{F}$ , 63 V	
R1, R2	chip resistor	6.2 $\Omega$	Vishay Dale SMD 0805

[1] American Technical Ceramics type 800B or capacitor of same quality.

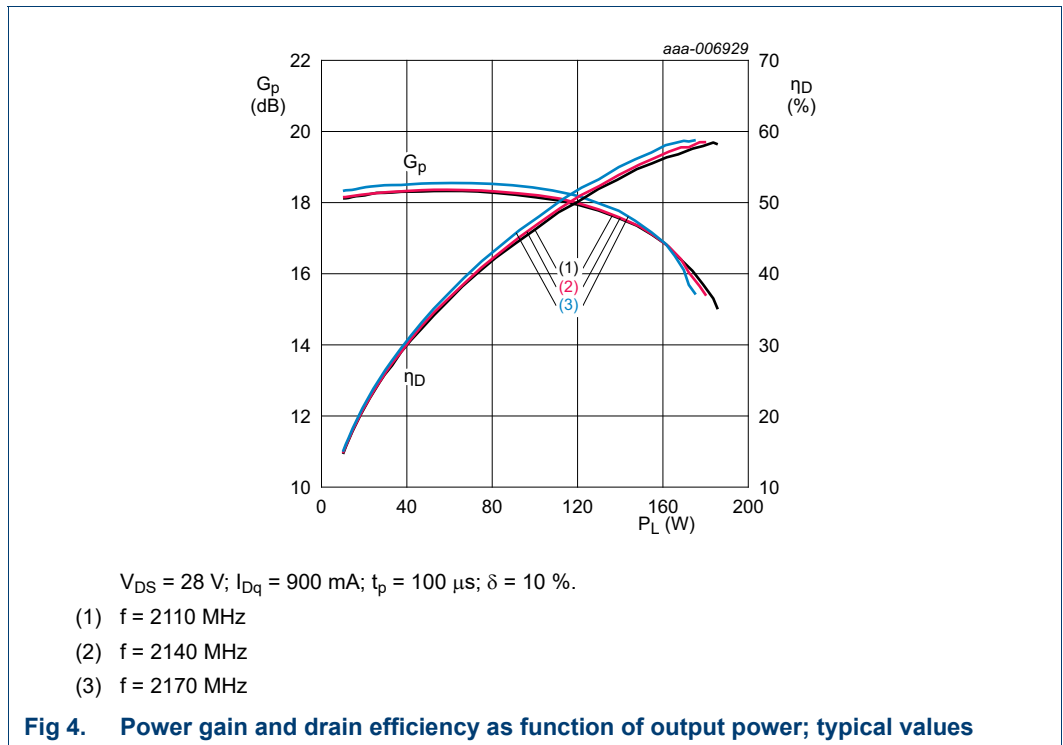
[2] Murata or capacitor of same quality.

7.4 Graphical data

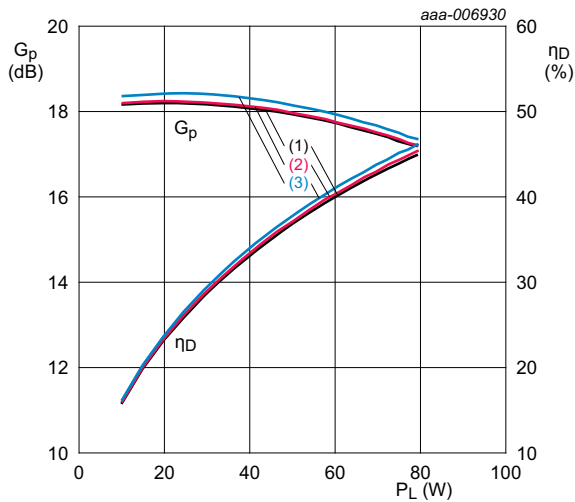
7.4.1 1-Tone CW



7.4.2 CW pulsed

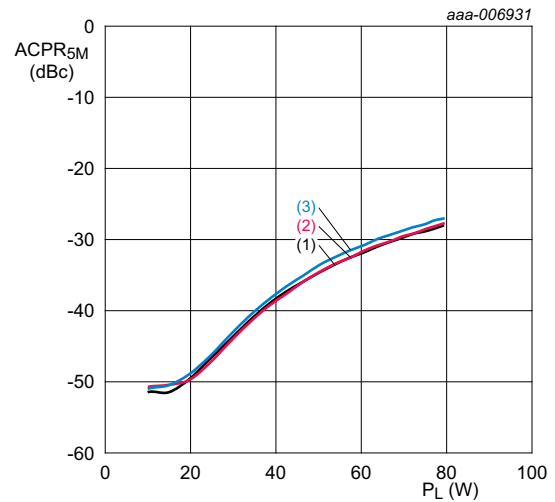


7.4.3 1-Carrier W-CDMA



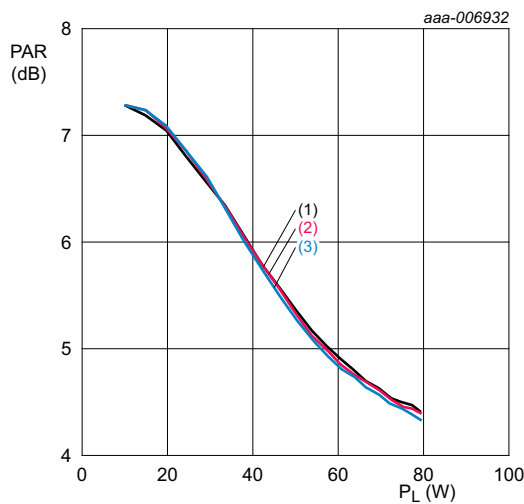
$V_{DS} = 28\text{ V}; I_{Dq} = 900\text{ mA}$ .  
 (1)  $f = 2110\text{ MHz}$   
 (2)  $f = 2140\text{ MHz}$   
 (3)  $f = 2170\text{ MHz}$

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



$V_{DS} = 28\text{ V}; I_{Dq} = 900\text{ mA}$ .  
 (1)  $f = 2110\text{ MHz}$   
 (2)  $f = 2140\text{ MHz}$   
 (3)  $f = 2170\text{ MHz}$

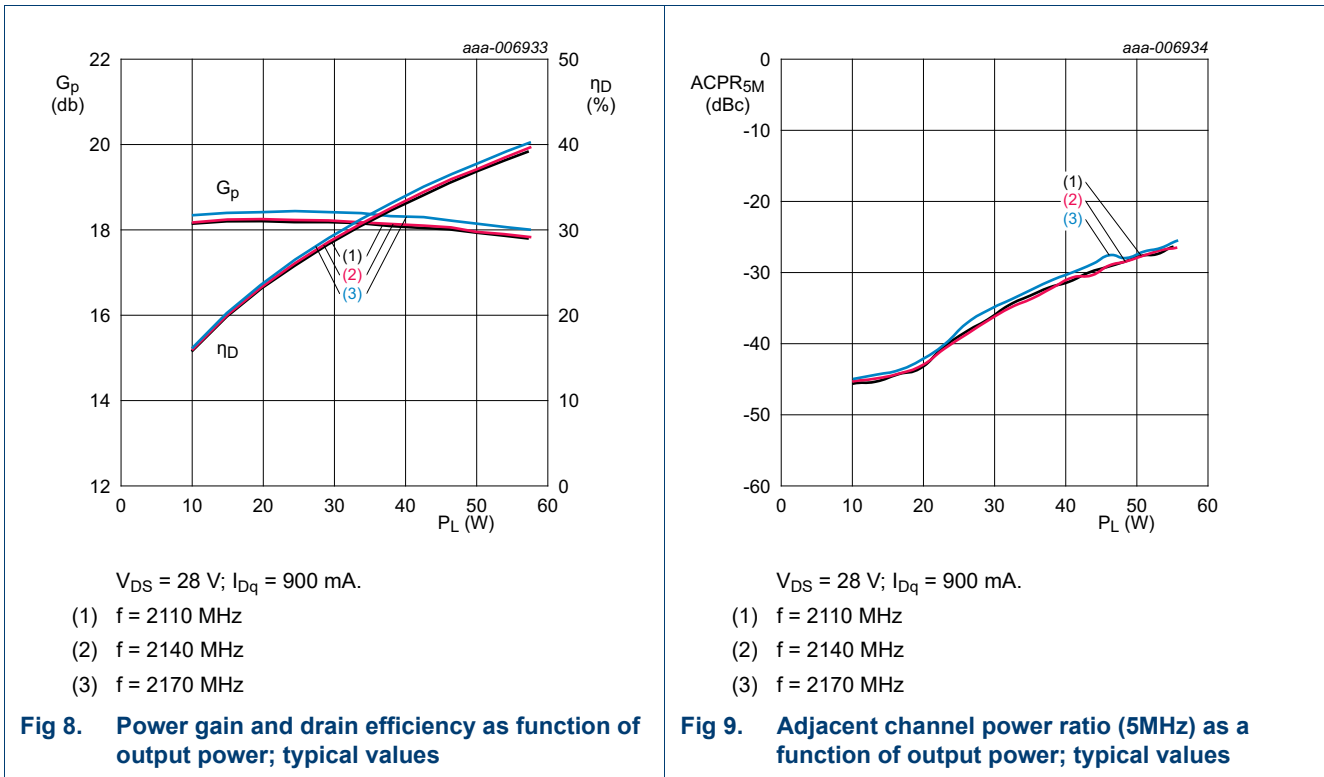
**Fig 6. Adjacent channel power ratio (5MHz) as a function of output power; typical values**



$V_{DS} = 28\text{ V}; I_{Dq} = 900\text{ mA}$ .  
 (1)  $f = 2110\text{ MHz}$   
 (2)  $f = 2140\text{ MHz}$   
 (3)  $f = 2170\text{ MHz}$

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

7.4.4 2-Carrier W-CDMA



8. Package outline

Earless flanged ceramic package; 2 leads

SOT502B

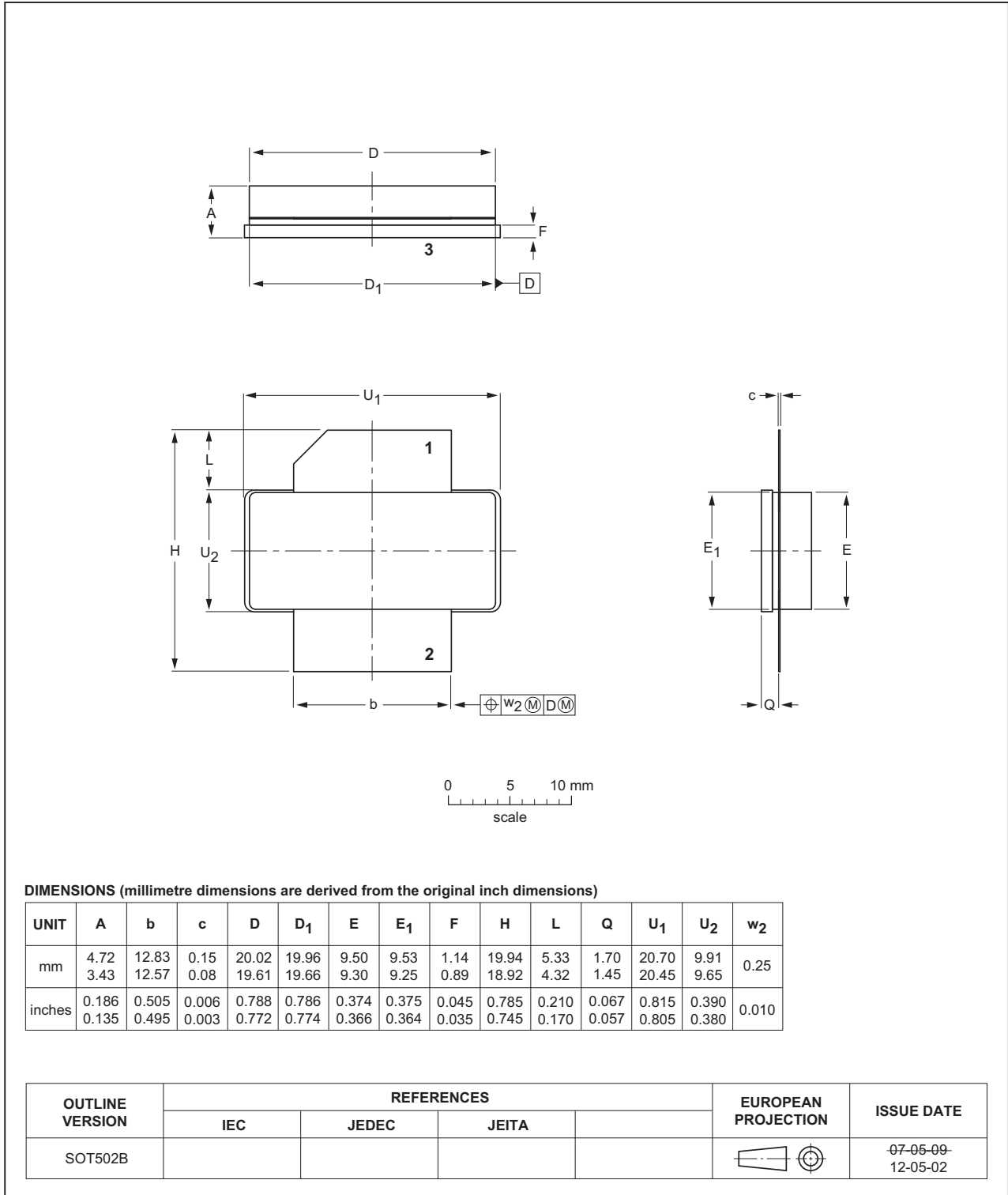


Fig 10. Package outline SOT502B



## 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
LDMOS	Laterally Diffused Metal Oxide Semiconductor
PAR	Peak-to-Average Ratio
SMD	Surface Mounted Device
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
BLF8G22LS-140#3	20150901	Product data sheet		BLF8G22LS-140 v.2
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>		
BLF8G22LS-140 v.2	20130410	Product data sheet	-	BLF8G22LS-140 v.1
BLF8G22LS-140 v.1	20120925	Objective 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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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[2] The term 'short data sheet' is explained in section "Definitions".

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Date of release: 1 September 2015  
 Document identifier: BLF8G22LS-140#3