

# BLF1043

UHF power LDMOS transistor

Rev. 9 — 1 September 2015

AMPLEON

Product data sheet

## 1. Product profile

### 1.1 General description

10 W LDMOS power transistor for base station applications at frequencies from HF to 1000 MHz.

**Table 1. Typical performance**

*RF performance at  $T_h = 25\text{ °C}$  in a common source test circuit.*

Mode of operation	f (MHz)	V <sub>DS</sub> (V)	I <sub>DQ</sub> (mA)	P <sub>L</sub> (W)	G <sub>p</sub> (dB)	η <sub>D</sub> (%)	d <sub>im</sub> (dBc)
CW, 2-tone, class-AB	f <sub>1</sub> = 960; f <sub>2</sub> = 960.1	26	85	10 (PEP)	18.5	40	≤-31
CW, 1-tone, class-AB	f = 960	26	85	10	18.5	52	-

#### CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

### 1.2 Features and benefits

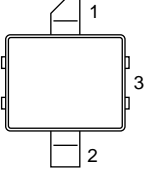
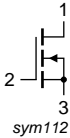
- Typical 2-tone performance at a supply voltage of 26 V and I<sub>DQ</sub> of 85 mA
  - ◆ Output power = 10 W (PEP)
  - ◆ Gain = 18.5 dB
  - ◆ Efficiency = 40%
  - ◆ d<sub>im</sub> = -31 dBc
- Easy power control
- Excellent ruggedness
- High power gain
- Excellent thermal stability
- Designed for broadband operation (HF to 1000 MHz)
- No internal matching for broadband operation
- SMD package.

### 1.3 Applications

- RF power amplifiers for GSM, EDGE and CDMA base stations and multicarrier applications in the 800 to 1000 MHz frequency range
- Broadcast drivers.

## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	drain		 sym112
2	gate		
3	source, connected to flange		

## 3. Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
BLF1043	-	ceramic surface mounted package; 2 leads	SOT538A

## 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		-	$\pm 15$	V
$I_D$	drain current (DC)		-	2.2	A
$T_{stg}$	storage temperature		-65	+150	$^{\circ}C$
$T_j$	junction temperature		-	200	$^{\circ}C$

## 5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th\ j-h}$	thermal resistance from junction to heatsink	$T_{mb} = 25\ ^{\circ}C$	[1] 9	K/W

[1] Thermal resistance is determined under RF operating conditions. Typical value with device soldered on PC board with 32 via holes (diameter 0.3 mm) and thermal compound between PCB and heatsink.

## 6. Characteristics

**Table 6. 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	$V_{GS} = 0; I_D = 0.2\text{ mA}$	65	-	-	V
$V_{GSth}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 20\text{ mA}$	4	-	5	V
$I_{DSS}$	drain-source leakage current	$V_{GS} = 0; V_{DS} = 26\text{ V}$	-	-	1.5	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GSth} + 9\text{ V}; V_{DS} = 10\text{ V}$	2.8	-	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = \pm 15\text{ V}; V_{DS} = 0$	-	-	40	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 0.75\text{ A}$	-	0.5	-	S
$R_{DSon}$	drain-source on-state resistance	$V_{DS} = 10\text{ V}; I_D = 0.75\text{ A}$	-	1.05	-	$\Omega$
$C_{iss}$	input capacitance	$V_{GS} = 0; V_{DS} = 26\text{ V}; f = 1\text{ MHz}$	-	11	-	pF
$C_{oss}$	output capacitance	$V_{GS} = 0; V_{DS} = 26\text{ V}; f = 1\text{ MHz}$	-	9	-	pF
$C_{rss}$	feedback capacitance	$V_{GS} = 0; V_{DS} = 26\text{ V}; f = 1\text{ MHz}$	-	0.5	-	pF

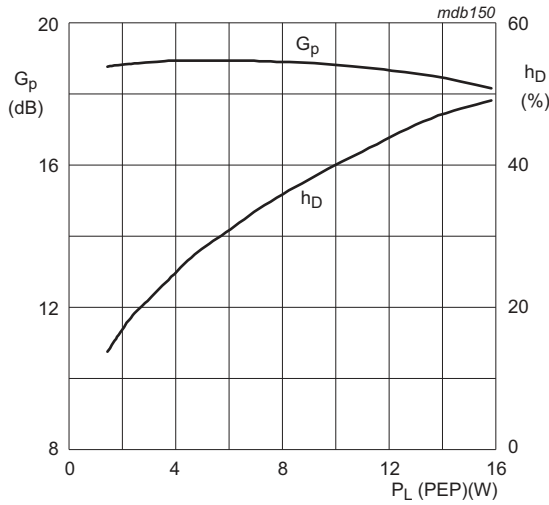
## 7. Application information

**Table 7. RF performance in a common source class-AB circuit**  
 $T_h = 25\text{ }^\circ\text{C}; R_{th\ j-h} = 9\text{ K/W}$ , unless otherwise specified.

Mode of operation	f (MHz)	$V_{DS}$ (V)	$I_{DQ}$ (mA)	$P_L$ (W)	$G_p$ (dB)	$\eta_D$ (%)	$d_{im}$ (dBc)
CW, 2-tone, class-AB	$f_1 = 960; f_2 = 960.1$	26	85	10 (PEP)	>16.5	>38	$\leq -25$

### 7.1 Ruggedness in class-AB operation

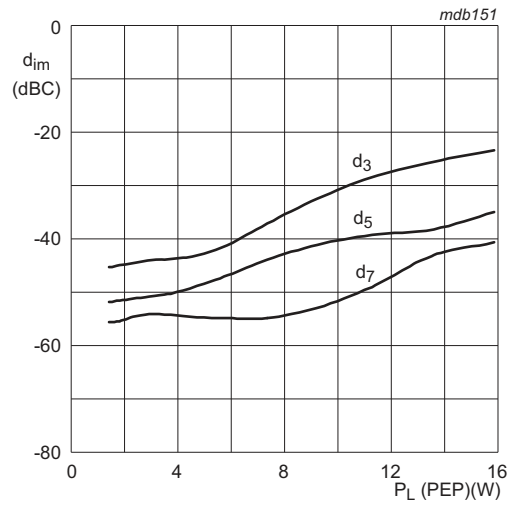
The BLF1043 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions:  $V_{DS} = 26\text{ V}; f = 960\text{ MHz}$  at rated load power.



Two-tone performance.

$V_{DS} = 26$  V;  $I_{DQ} = 85$  mA;  $T_h \leq 25$  °C;  
 $f_1 = 960$  MHz;  $f_2 = 960.1$  MHz.

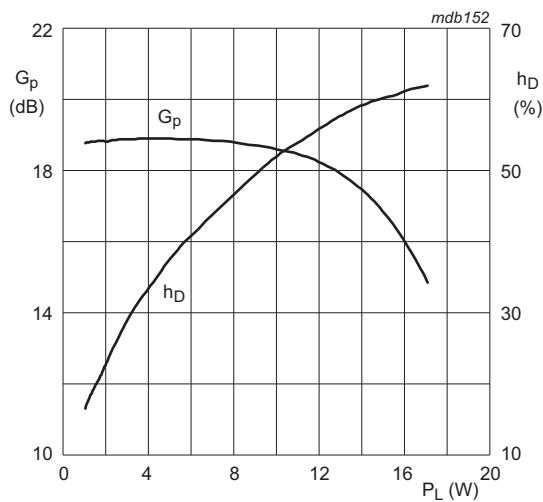
**Fig 1. Power gain and efficiency as functions of peak envelope load power; typical values.**



Two-tone performance.

$V_{DS} = 26$  V;  $I_{DQ} = 85$  mA;  $T_h \leq 25$  °C;  
 $f_1 = 960$  MHz;  $f_2 = 960.1$  MHz.

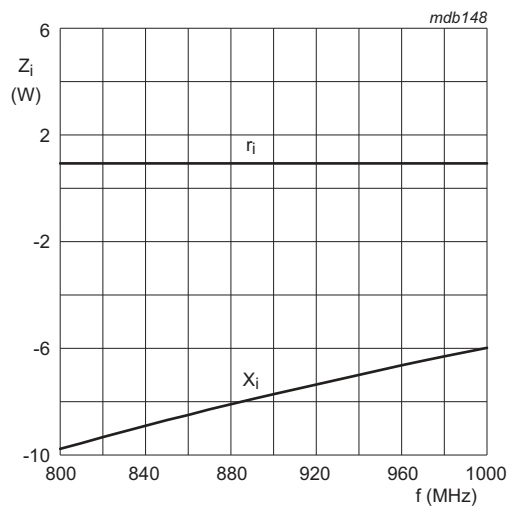
**Fig 2. Intermodulation distortion as a function of peak envelope load power; typical values.**



Single-tone performance.

$V_{DS} = 26$  V;  $I_{DQ} = 85$  mA;  $T_h \leq 25$  °C;  
 $f = 960$  MHz.

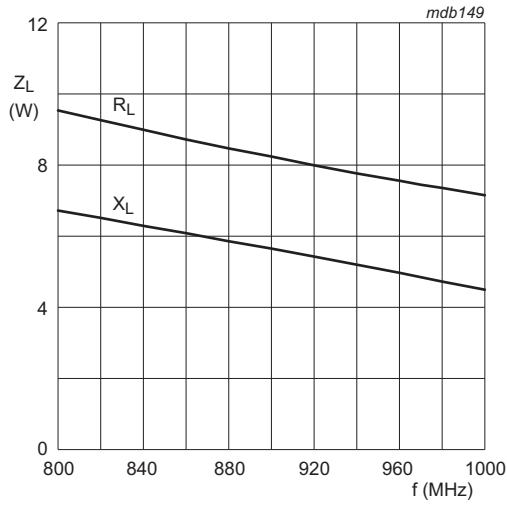
**Fig 3. Power gain and efficiency as functions of load power; typical values.**



$V_{DS} = 26$  V;  $I_{DQ} = 85$  mA;  $P_L = 10$  W;  $T_h \leq 25$  °C.

Impedance measured at reference planes; see [Figure 6](#).

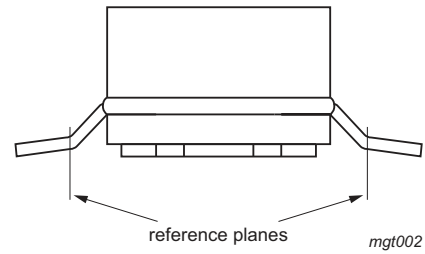
**Fig 4. Input impedance as a function of frequency (series components); typical values.**



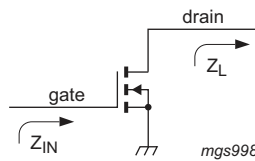
$V_{DS} = 26 \text{ V}$ ;  $I_{DQ} = 85 \text{ mA}$ ;  $T_h \leq 25 \text{ }^\circ\text{C}$ .

Impedance measured at reference planes; see [Figure 6](#).

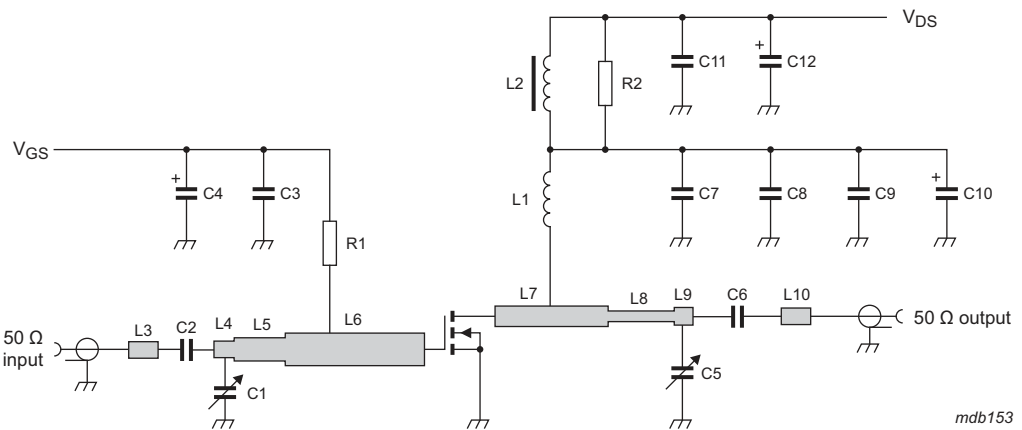
**Fig 5. Input impedance as a function of frequency (series components); typical values.**



**Fig 6. Measuring reference planes: SOT538A.**



**Fig 7. Definition of transistor impedance.**



**Fig 8. Class-AB test circuit for 960 MHz.**

## 8. Test information

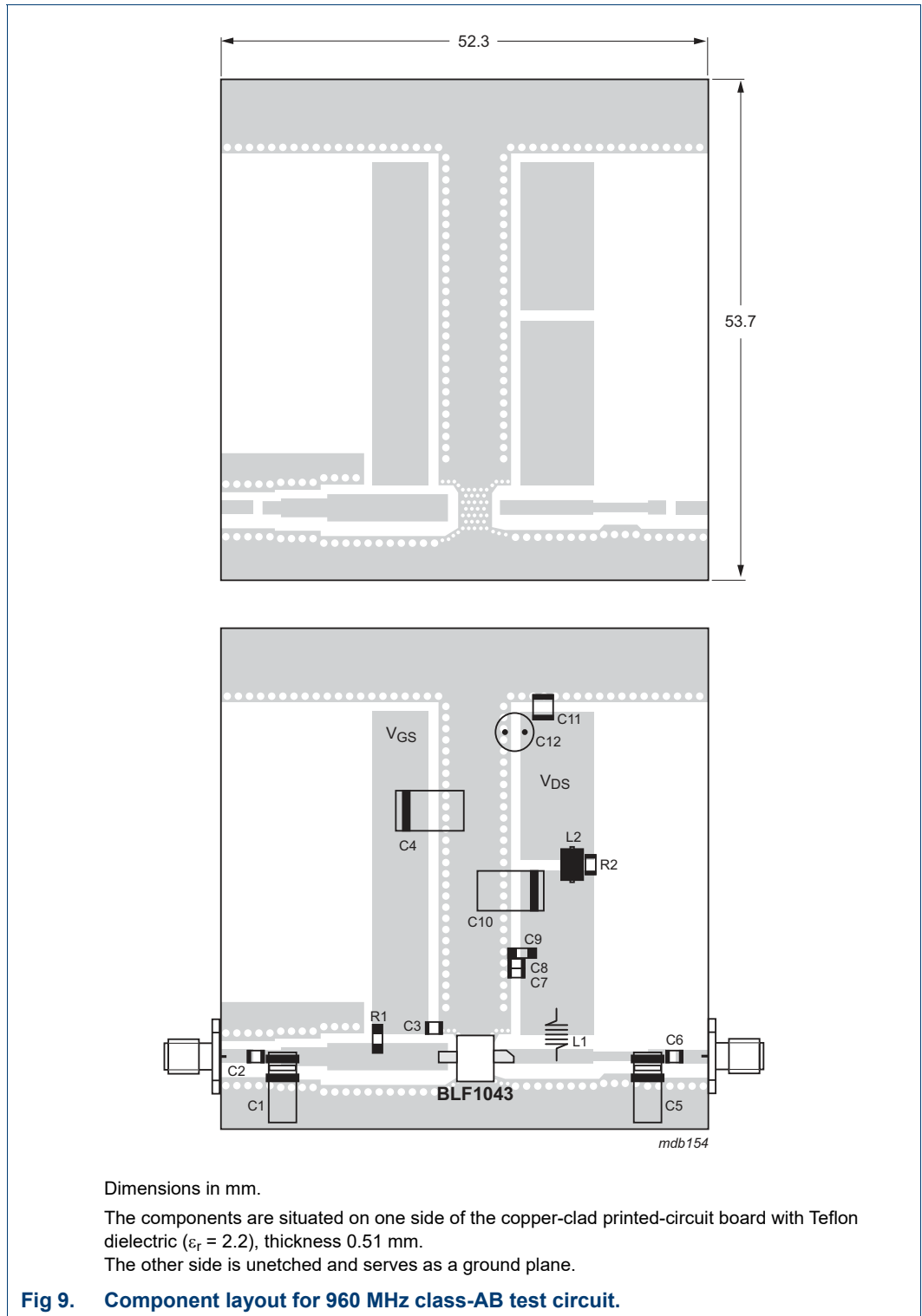
**Table 8. List of components**  
(see [Figure 8](#) and [Figure 9](#))

Component	Description	Value	Dimension	Catalogue no.
C1, C5	Tekelec variable capacitor	0.8 to 8 pF		
C2, C3, C6, C7	multilayer ceramic chip capacitor	[1] 56 pF		
C4, C10	tantalum SMD capacitor	10 $\mu$ F; 35 V		
C8	multilayer ceramic chip capacitor	[1] 1 nF		
C9	multilayer ceramic chip capacitor	100 nF		2222 581 16641
C11	multilayer ceramic chip capacitor	[2] 1 nF		
C12	electrolytic capacitor	100 $\mu$ F; 63 V		2222 037 58101
L1	3 turns enamelled 0.5 mm copper wire		3 loops; d = 3.5 mm	
L2	ferrite bead; ferroxcube CBD4.6/3/3-4S2			
L3	stripline	[3] 50 $\Omega$	3.5 x 1.5 mm	
L4	stripline	[3] 50 $\Omega$	2 x 1.5 mm	
L5	stripline	[3] 42 $\Omega$	5 x 2 mm	
L6	stripline	[3] 31 $\Omega$	13 x 3 mm	
L7	stripline	[3] 50 $\Omega$	10 x 1.5 mm	
L8	stripline	[3] 65 $\Omega$	5.9 x 1 mm	
L9	stripline	[3] 50 $\Omega$	2 x 1.5 mm	
L10	stripline	[3] 50 $\Omega$	3.5 x 1.5 mm	
R1	metal film resistor	39 $\Omega$ , 0.6 W		
R2	metal film resistor	10 $\Omega$ , 0.6 W		2322 256 11009

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

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

[3] The striplines are on a double copper-clad printed-circuit board with Rogers 5880 dielectric ( $\epsilon_r = 2.2$ ); thickness 0.51 mm.



9. Package outline

Ceramic surface-mounted package; 2 leads

SOT538A

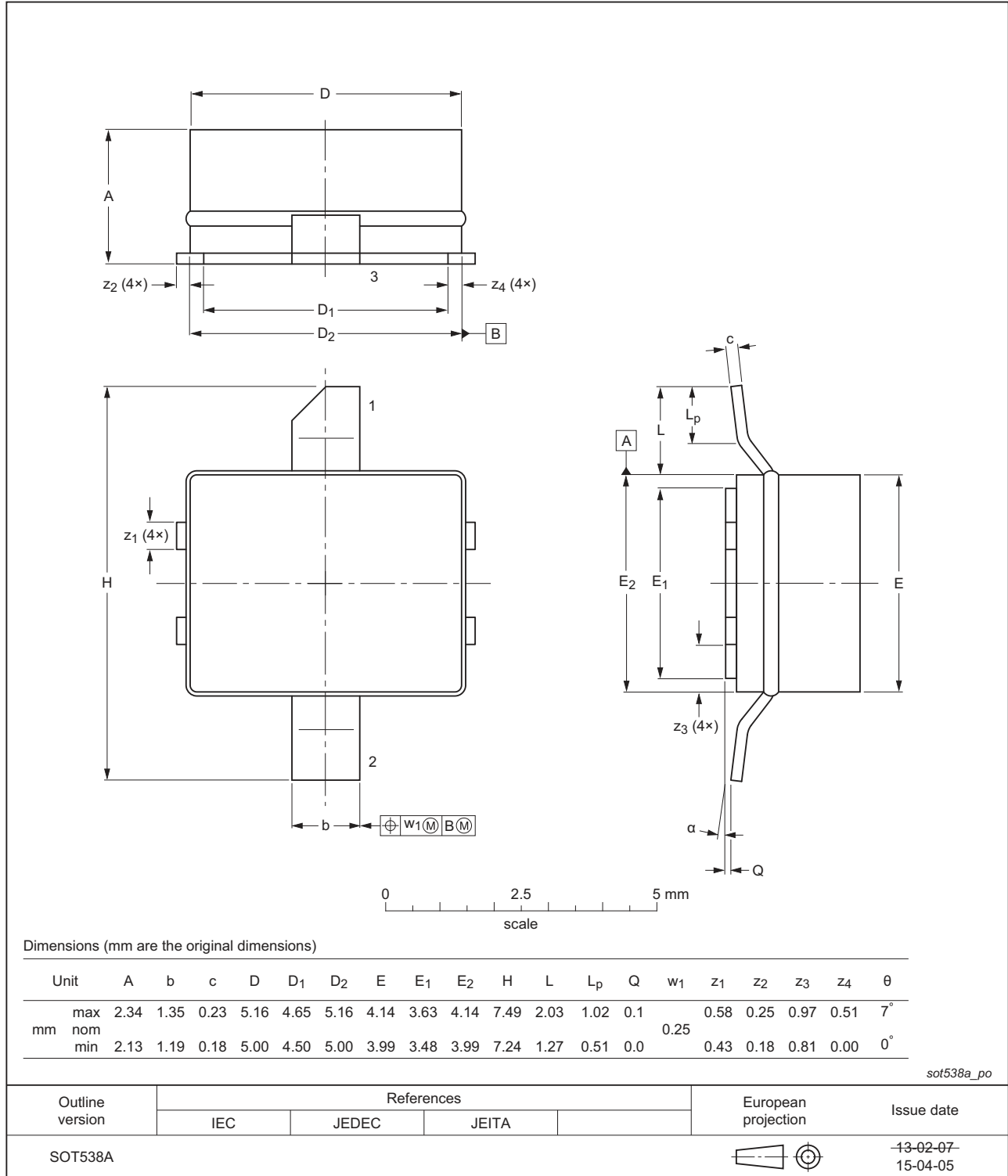


Fig 10. Package outline SOT538A



## 10. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF1043#9	20150901	Product data sheet	-	BLF1043 v.8
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>			
BLF1043 v.8	20130506	Product data sheet	-	BLF1043 v.7
BLF1043 v.7	20030313	Product specification	-	BLF1043 v.6

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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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Product [short] data sheet	Production	This document contains the product specification.

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## 13. Contents

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<b>1</b>	<b>Product profile</b> . . . . .	<b>1</b>
1.1	General description . . . . .	1
1.2	Features and benefits . . . . .	1
1.3	Applications . . . . .	1
<b>2</b>	<b>Pinning information</b> . . . . .	<b>2</b>
<b>3</b>	<b>Ordering information</b> . . . . .	<b>2</b>
<b>4</b>	<b>Limiting values</b> . . . . .	<b>2</b>
<b>5</b>	<b>Thermal characteristics</b> . . . . .	<b>2</b>
<b>6</b>	<b>Characteristics</b> . . . . .	<b>3</b>
<b>7</b>	<b>Application information</b> . . . . .	<b>3</b>
7.1	Ruggedness in class-AB operation . . . . .	3
<b>8</b>	<b>Test information</b> . . . . .	<b>6</b>
<b>9</b>	<b>Package outline</b> . . . . .	<b>8</b>
<b>10</b>	<b>Revision history</b> . . . . .	<b>9</b>
<b>11</b>	<b>Legal information</b> . . . . .	<b>10</b>
11.1	Data sheet status . . . . .	10
11.2	Definitions . . . . .	10
11.3	Disclaimers . . . . .	10
11.4	Trademarks . . . . .	11
<b>12</b>	<b>Contact information</b> . . . . .	<b>11</b>
<b>13</b>	<b>Contents</b> . . . . .	<b>12</b>

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Date of release: 1 September 2015

Document identifier: BLF1043#9