

BLF1043

UHF power LDMOS transistor

Rev. 9 — 1 September 2015

AMMPLION

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 _{DS} (V)	I _{DQ} (mA)	P _L (W)	G _p (dB)	η _D (%)	d _{im} (dBc)
CW, 2-tone, class-AB	f ₁ = 960; f ₂ = 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

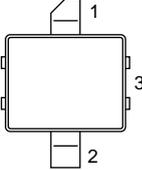
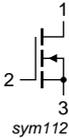
- Typical 2-tone performance at a supply voltage of 26 V and I_{DQ} of 85 mA
 - ◆ Output power = 10 W (PEP)
 - ◆ Gain = 18.5 dB
 - ◆ Efficiency = 40%
 - ◆ d_{im} = -31 dBc
- Easy power control
- Excellent ruggedness
- High power gain
- Excellent thermal stability
- Designed for broadband operation (HF 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		
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		-	± 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	μA
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	-	Ω
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

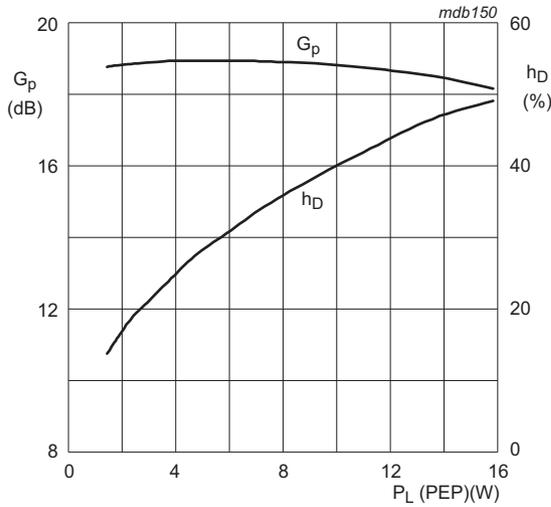
7. Application information

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)	η_D (%)	d_{im} (dBc)
CW, 2-tone, class-AB	$f_1 = 960; f_2 = 960.1$	26	85	10 (PEP)	>16.5	>38	≤ -25

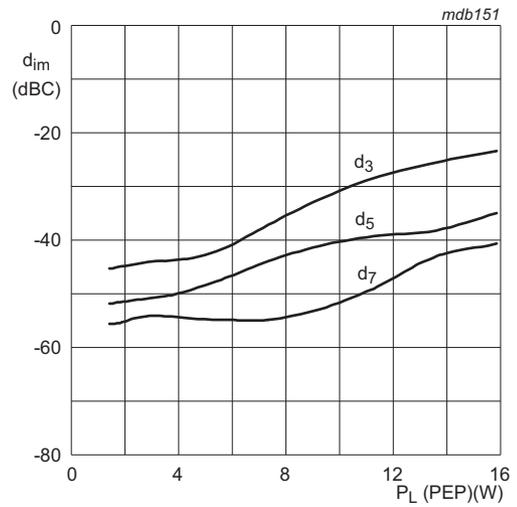
7.1 Ruggedness in class-AB operation

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.



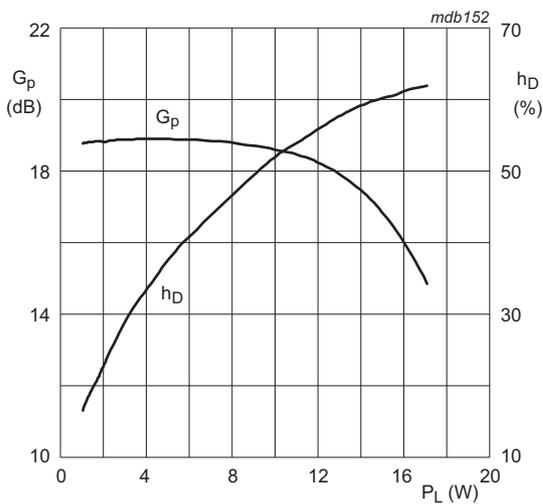
Two-tone performance.
 $V_{DS} = 26$ V; $I_{DQ} = 85$ mA; $T_h \leq 25$ °C;
 $f_1 = 960$ MHz; $f_2 = 960.1$ MHz.

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



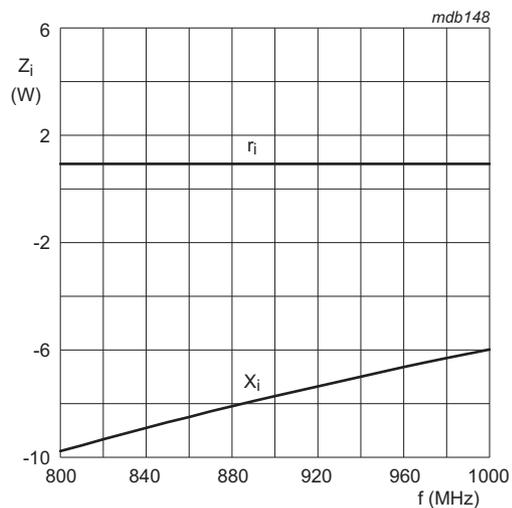
Two-tone performance.
 $V_{DS} = 26$ V; $I_{DQ} = 85$ mA; $T_h \leq 25$ °C;
 $f_1 = 960$ MHz; $f_2 = 960.1$ MHz.

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



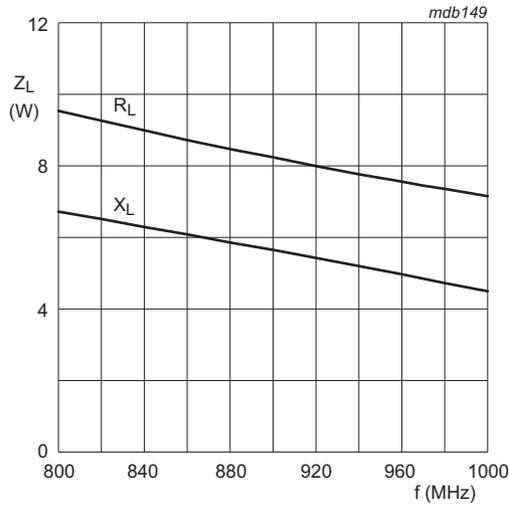
Single-tone performance.
 $V_{DS} = 26$ V; $I_{DQ} = 85$ mA; $T_h \leq 25$ °C;
 $f = 960$ MHz.

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.

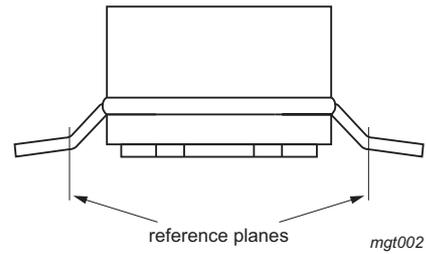


Fig 6. Measuring reference planes: SOT538A.

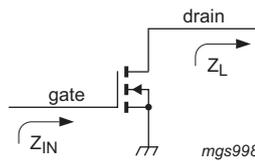


Fig 7. Definition of transistor impedance.

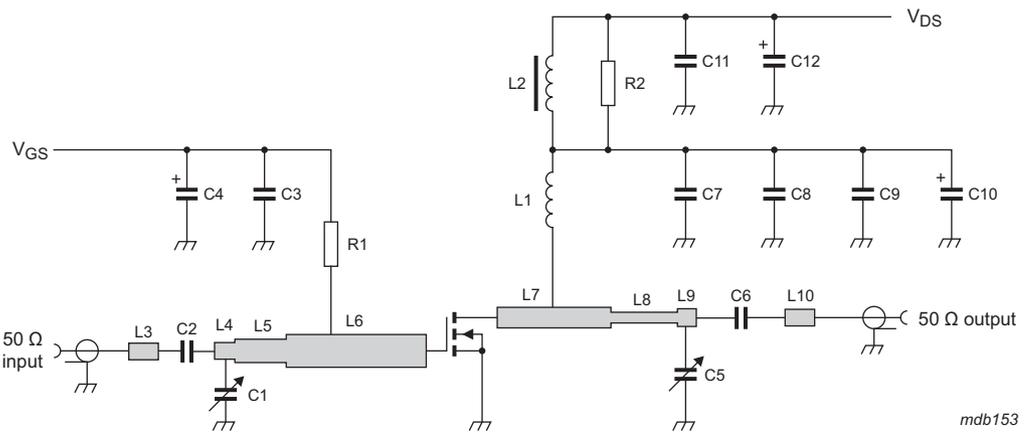


Fig 8. Class-AB test circuit for 960 MHz.

8. Test information

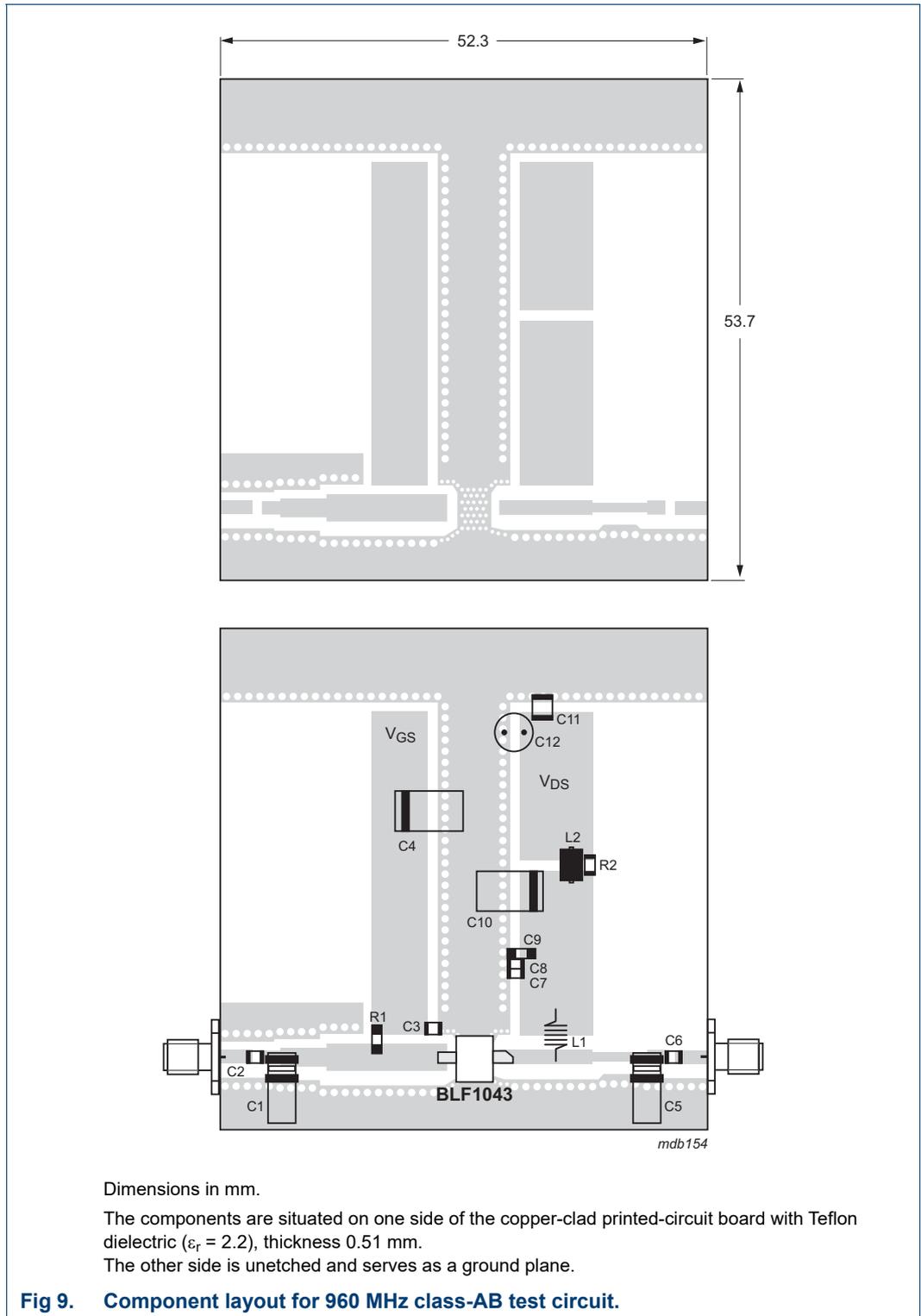
Table 8. List of components
(see [Figure 8](#) and [Figure 9](#))

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 μ 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 μ 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 Ω	3.5 x 1.5 mm	
L4	stripline	[3] 50 Ω	2 x 1.5 mm	
L5	stripline	[3] 42 Ω	5 x 2 mm	
L6	stripline	[3] 31 Ω	13 x 3 mm	
L7	stripline	[3] 50 Ω	10 x 1.5 mm	
L8	stripline	[3] 65 Ω	5.9 x 1 mm	
L9	stripline	[3] 50 Ω	2 x 1.5 mm	
L10	stripline	[3] 50 Ω	3.5 x 1.5 mm	
R1	metal film resistor	39 Ω , 0.6 W		
R2	metal film resistor	10 Ω , 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

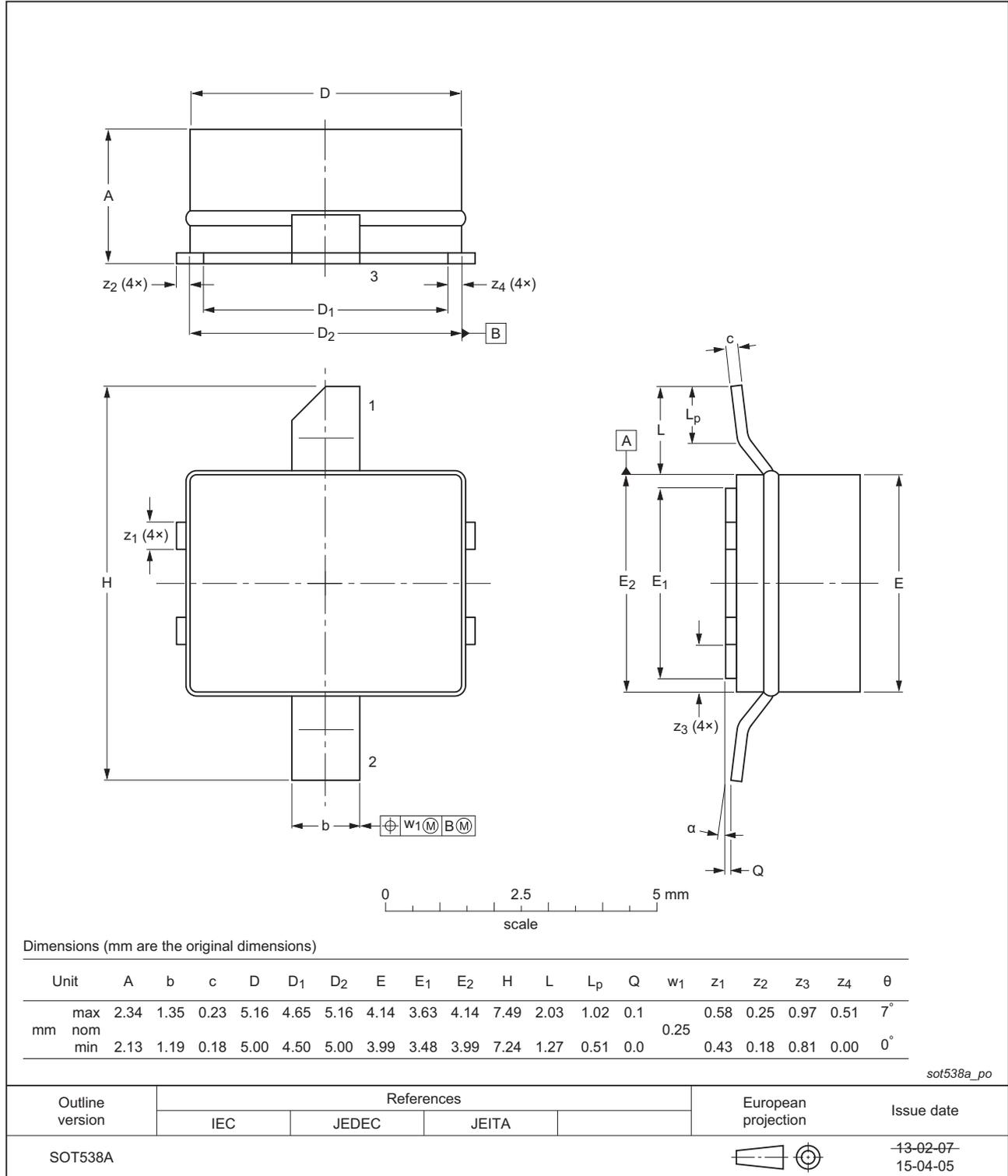


Fig 10. Package outline SOT538A

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">• The format of this document has been redesigned to comply with the new identity guidelines of Ampleon.• Legal texts have been adapted to the new company name where appropriate.			
BLF1043 v.8	20130506	Product data sheet	-	BLF1043 v.7
BLF1043 v.7	20030313	Product specification	-	BLF1043 v.6

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11.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	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.

[1] Please consult the most recently issued document before initiating or completing a design.

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

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