

BLF2425M8L140; BLF2425M8LS140

Power LDMOS transistor

Rev. 1 — 27 August 2013

Product data sheet

1. Product profile

1.1 General description

140 W LDMOS power transistor for Industrial, Scientific and Medical (ISM) applications at frequencies from 2400 MHz to 2500 MHz.

The BLF2425M8L140 and BLF2425M8LS140 are designed for high-power CW applications and are assembled in high performance ceramic packages, available in eared and earless versions

Table 1. Typical performance

Typical RF performance at $T_{case} = 25\text{ }^{\circ}\text{C}$; $I_{DQ} = 1300\text{ mA}$ in a common source class-AB production test circuit.

Test signal	f (MHz)	V_{DS} (V)	$P_{L(AV)}$ (W)	G_p (dB)	η_D (%)
CW	2450	28	140	19	56

1.2 Features and benefits

- High efficiency
- High power gain
- Excellent ruggedness
- Excellent thermal stability
- Integrated ESD protection
- Designed for broadband operation (2400 MHz to 2500 MHz)
- Internally matched
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

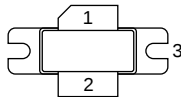
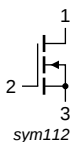
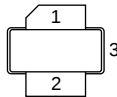
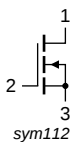
1.3 Applications

- Industrial, scientific and medical applications in the frequency range from 2400 MHz to 2500 MHz



2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
BLF2425M8L140 (SOT502A)			
1	drain		
2	gate		
3	source		
BLF2425M8LS140 (SOT502B)			
1	drain		
2	gate		
3	source		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF2425M8L140	-	flanged ceramic package; 2 mounting holes; 2 leads	SOT502A
BLF2425M8LS140	-	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	-	°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	$T_{case} = 80\text{ °C}$; $P_L = 125\text{ W}$	0.28	K/W

6. Characteristics

Table 6. 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	$V_{GS} = 0\text{ V}$; $V_{DS} = 28\text{ V}$	-	-	5	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $V_{DS} = 10\text{ V}$	-	41	-	A
I_{GSS}	gate leakage current	$V_{GS} = 11\text{ V}$; $V_{DS} = 0\text{ V}$	-	-	500	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	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $I_D = 7.56\text{ A}$	-	69	-	$\text{m}\Omega$

Table 7. RF characteristics

Test signal: CW; $f = 2450\text{ MHz}$; $V_{DS} = 28\text{ V}$; $I_{DQ} = 1300\text{ mA}$; $T_{case} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$P_L = 140\text{ W}$	17.5	19	-	dB
RL_{in}	input return loss	$P_L = 140\text{ W}$	-	-16	-8	dB
η_D	drain efficiency	$P_L = 140\text{ W}$	51	56	-	%

7. Test information

7.1 Ruggedness in class-AB operation

The BLF2425M8L140 and BLF2425M8LS140 are capable of withstanding a load mismatch corresponding to $V_{SWR} = 10 : 1$ through all phases under the following conditions: $V_{DS} = 28\text{ V}$; $I_{DQ} = 1300\text{ mA}$; $P_L = 140\text{ W}$ (CW); $f = 2450\text{ MHz}$.

7.2 Impedance information

Table 8. Typical impedance

Measured load-pull data. Typical values unless otherwise specified. $I_{DQ} = 1300\text{ mA}$; $V_{DS} = 28\text{ V}$. Z_S and Z_L defined in [Figure 1](#).

f (MHz)	Z_S (Ω)	Z_L (Ω)
2400	$3.7 - 5.4j$	$1.3 - 1.5j$
2450	$6.9 - 5.0j$	$1.5 - 1.6j$
2500	$8.7 - 2.0j$	$1.5 - 1.6j$

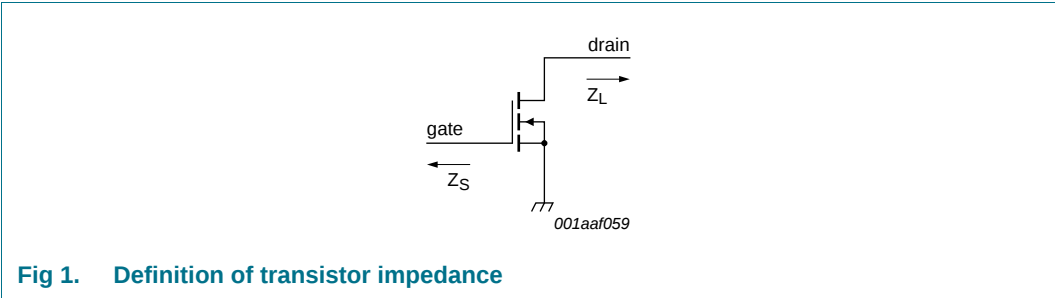
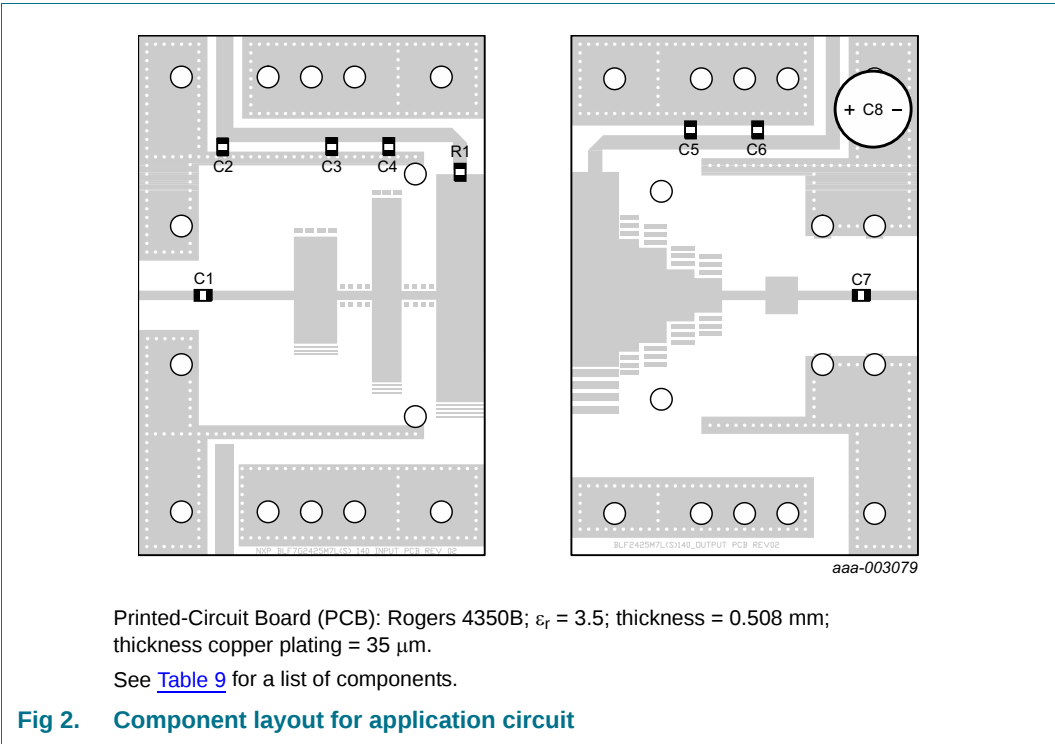


Fig 1. Definition of transistor impedance

7.3 Circuit information



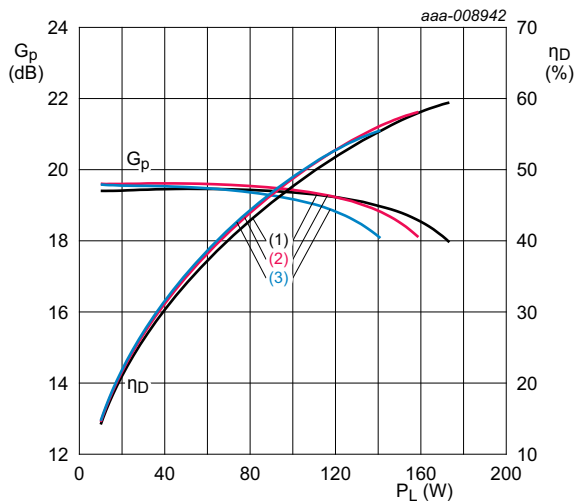
Printed-Circuit Board (PCB): Rogers 4350B; $\epsilon_r = 3.5$; thickness = 0.508 mm;
thickness copper plating = 35 μm .
See [Table 9](#) for a list of components.

Fig 2. Component layout for application circuit

Table 9. List of components
For test circuit see [Figure 2](#).

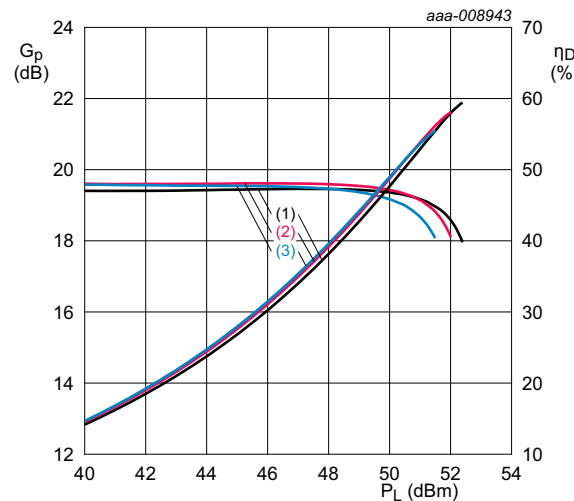
Component	Description	Value	Remarks
C1, C4, C5	multilayer ceramic chip capacitor	15 pF	ATC100B
C2, C6	multilayer ceramic chip capacitor	10 μF , 50 V	Murata
C3	multilayer ceramic chip capacitor	100 nF	Murata
C7	multilayer ceramic chip capacitor	62 pF	ATC100B
C8	electrolytic capacitor	22 μF , 63 V	
R1	resistor	10 Ω	SMD 0805; Bourns

7.4 Graphical data



$V_{DS} = 28\text{ V}; I_{DQ} = 1300\text{ mA}$.
(1) $f = 2400\text{ MHz}$
(2) $f = 2450\text{ MHz}$
(3) $f = 2500\text{ MHz}$

Fig 3. Power gain and drain efficiency as function of output power, typical values



$V_{DS} = 28\text{ V}; I_{DQ} = 1300\text{ mA}$.
(1) $f = 2400\text{ MHz}$
(2) $f = 2450\text{ MHz}$
(3) $f = 2500\text{ MHz}$

Fig 4. Power gain and drain efficiency as function of output power, typical values

8. Package outline

Flanged ceramic package; 2 mounting holes; 2 leads

SOT502A

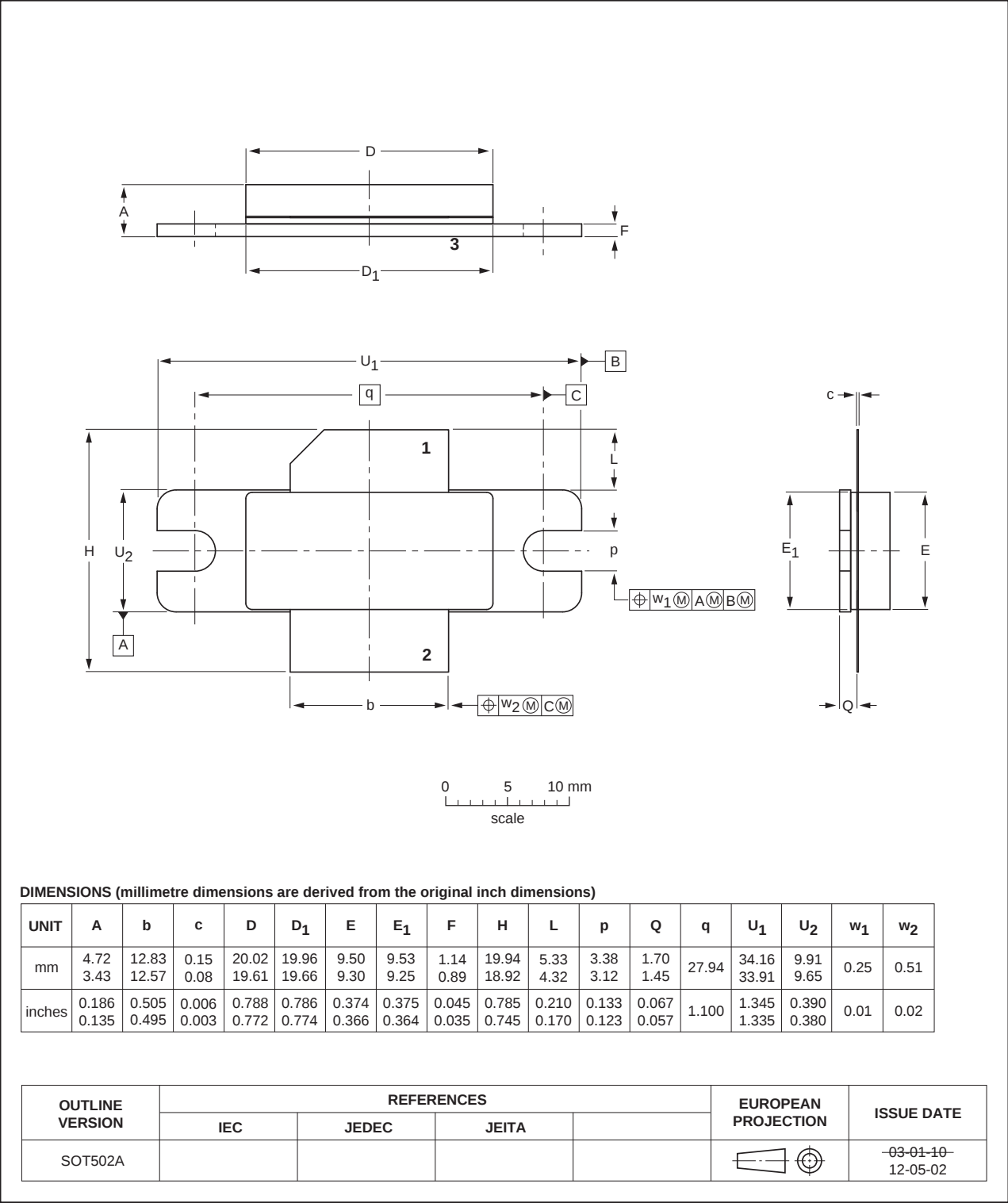
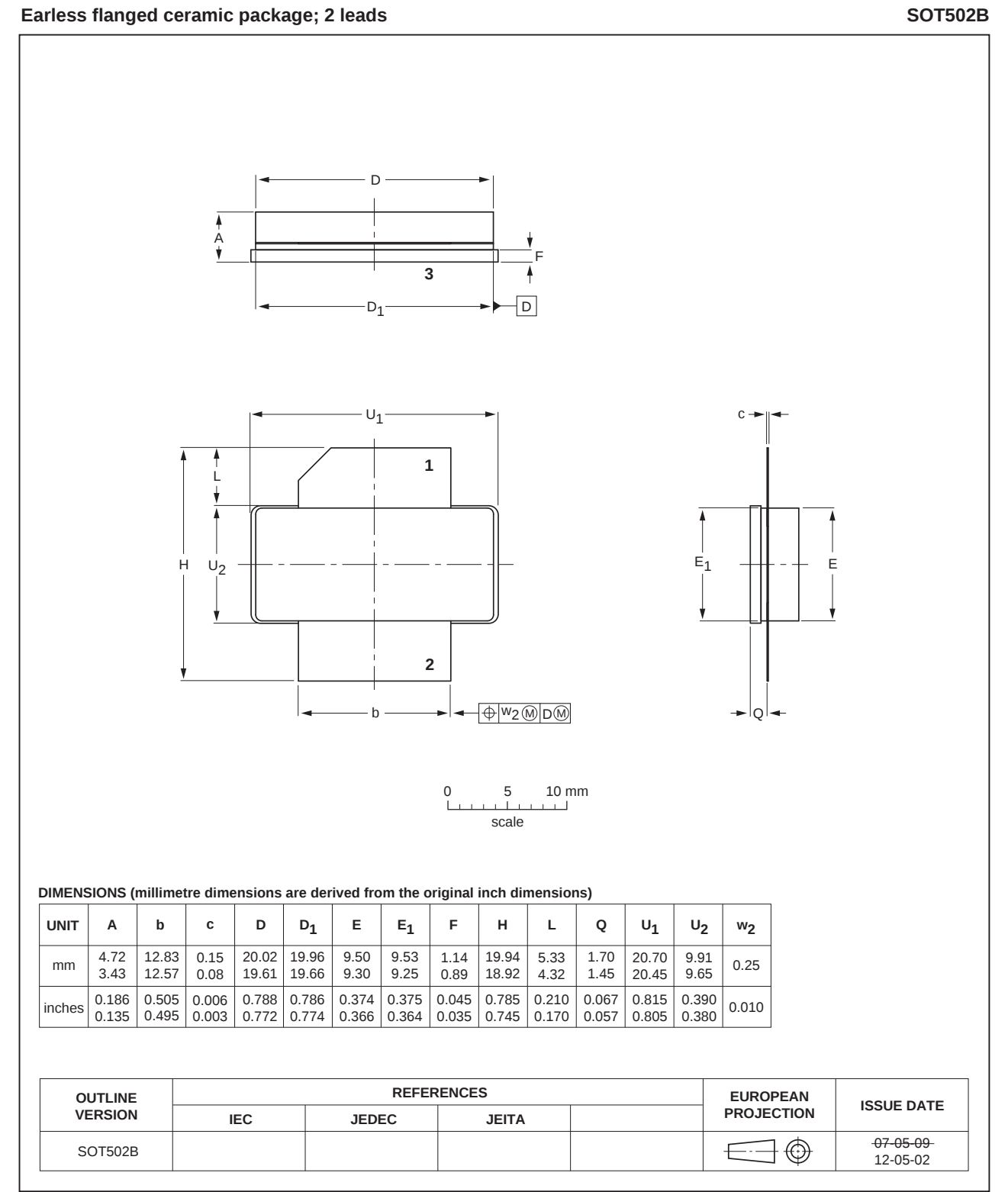


Fig 5. Package outline SOT502A



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
CW	Continuous Wave
ESD	ElectroStatic Discharge
LDMOS	Laterally Diffused Metal Oxide Semiconductor
SMD	Surface Mounted Device
VSWR	Voltage Standing Wave Ratio

11. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF2425M8L140_2425M8LS140 v.1	20130827	Product data sheet	-	-

12. Legal information

12.1 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.

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

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Date of release: 27 August 2013

Document identifier: BLF2425M8L140_2425M8LS140