

BLF2425M7L140; BLF2425M7LS140

Power LDMOS transistor

Rev. 2 — 20 April 2012

Objective 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 BLF2425M7L140 and BLF2425M7LS140 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 $T_{case} = 25\text{ }^{\circ}\text{C}$ 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	17.5	52

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)

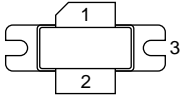
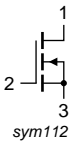
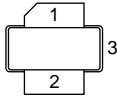
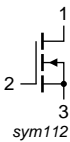
1.3 Applications

- 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
BLF2425M7L140 (SOT502A)			
1	drain		 sym112
2	gate		
3	source		
BLF2425M7LS140 (SOT502B)			
1	drain		 sym112
2	gate		
3	source		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF2425M7L140	-	flanged LDMOST ceramic package; 2 mounting holes; 2 leads	SOT502A
BLF2425M7LS140	-	earless flanged LDMOST 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		-	225	°C

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

$T_j = 25\text{ °C}$ 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	1.8	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	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $V_{DS} = 10\text{ V}$	-	42	-	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	114	$\text{m}\Omega$

Table 7. RF characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$P_L = 140\text{ W}$	15	17.5	-	dB
RL_{in}	input return loss	$P_L = 140\text{ W}$	-	-12	-8	dB
η_D	drain efficiency	$P_L = 140\text{ W}$	47	52	-	%

7. Test information

7.1 Ruggedness in class-AB operation

The BLF2425M7L140 and BLF2425M7LS140 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

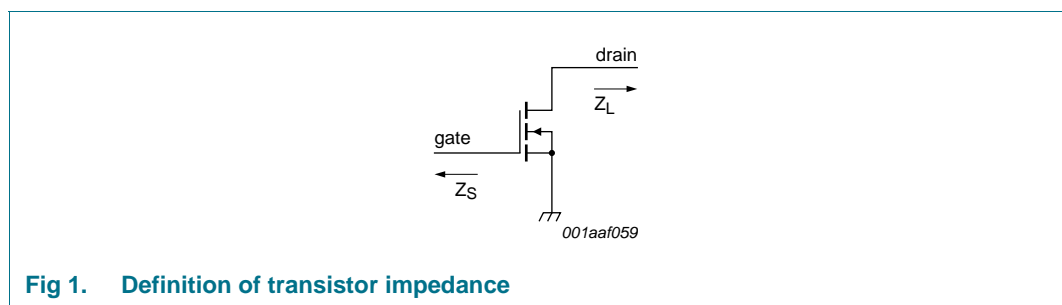
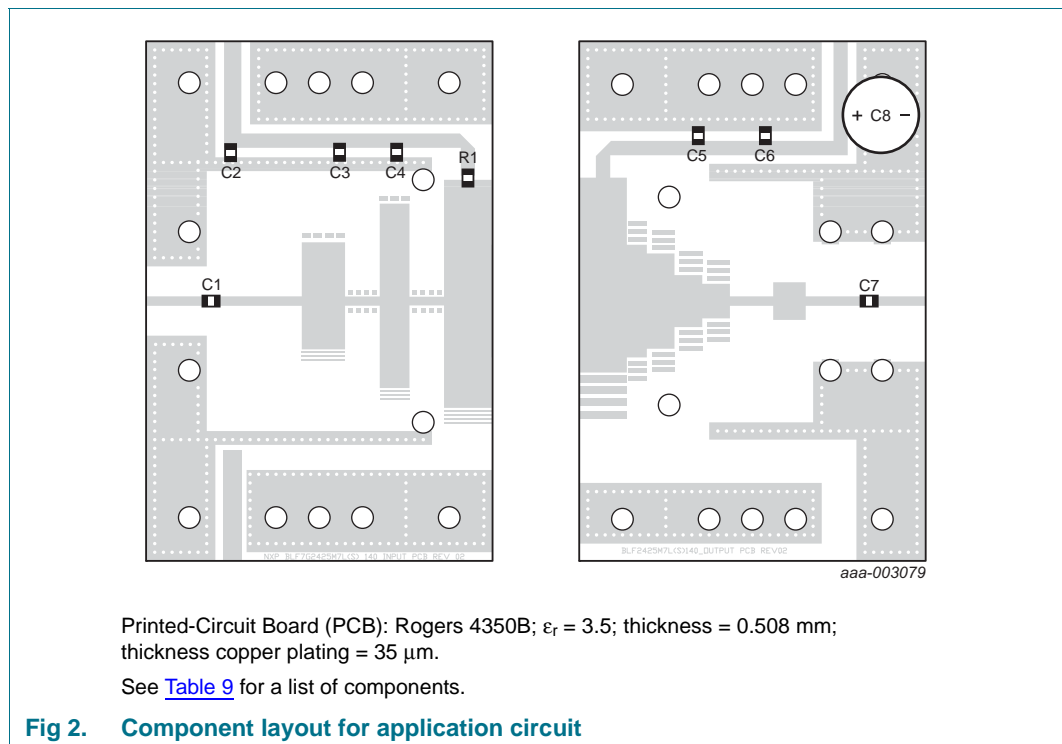


Fig 1. Definition of transistor impedance

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.

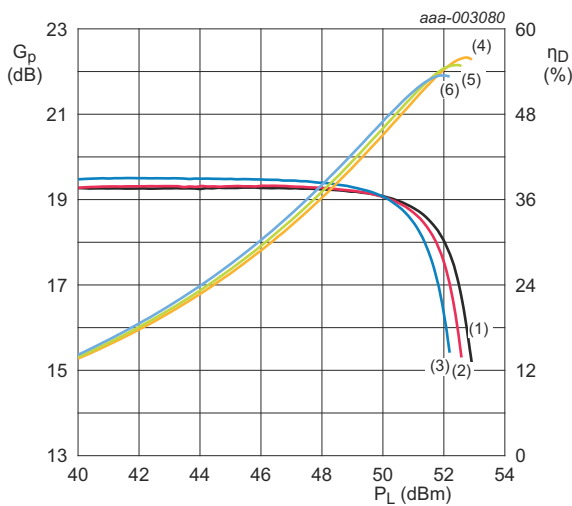
Fig 2. Component layout for application circuit

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 μ F; 50 V	Murata
C3	multilayer ceramic chip capacitor	100 nF	Murata
C7	multilayer ceramic chip capacitor	62 pF	ATC100B
C8	electrolytic capacitor	22 μ F; 63 V	
R1	SMD resistor	10 Ω	Bourns 0805

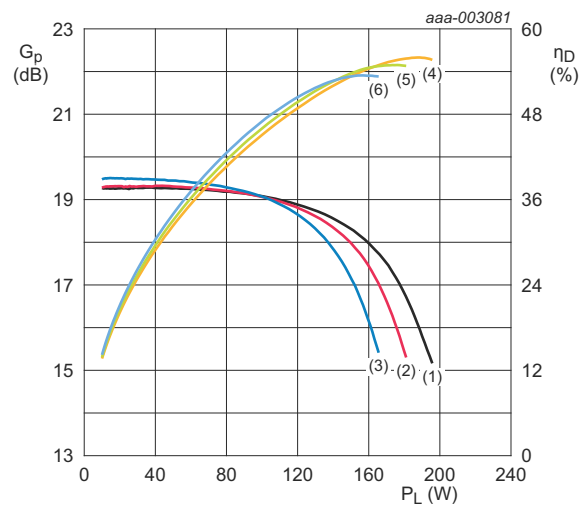
7.4 Graphical data



$V_{DS} = 28 \text{ V}; I_{Dq} = 1300 \text{ mA}.$

- (1) G_p at $f = 2400 \text{ MHz}$
- (2) G_p at $f = 2450 \text{ MHz}$
- (3) G_p at $f = 2500 \text{ MHz}$
- (4) η_D at $f = 2400 \text{ MHz}$
- (5) η_D at $f = 2450 \text{ MHz}$
- (6) η_D at $f = 2500 \text{ MHz}$

Fig 3. Power gain and drain efficiency as function of load power; typical values



$V_{DS} = 28 \text{ V}; I_{Dq} = 1300 \text{ mA}.$

- (1) G_p at $f = 2400 \text{ MHz}$
- (2) G_p at $f = 2450 \text{ MHz}$
- (3) G_p at $f = 2500 \text{ MHz}$
- (4) η_D at $f = 2400 \text{ MHz}$
- (5) η_D at $f = 2450 \text{ MHz}$
- (6) η_D at $f = 2500 \text{ MHz}$

Fig 4. Power gain and drain efficiency as function of load power; typical values

8. Package outline

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads

SOT502A

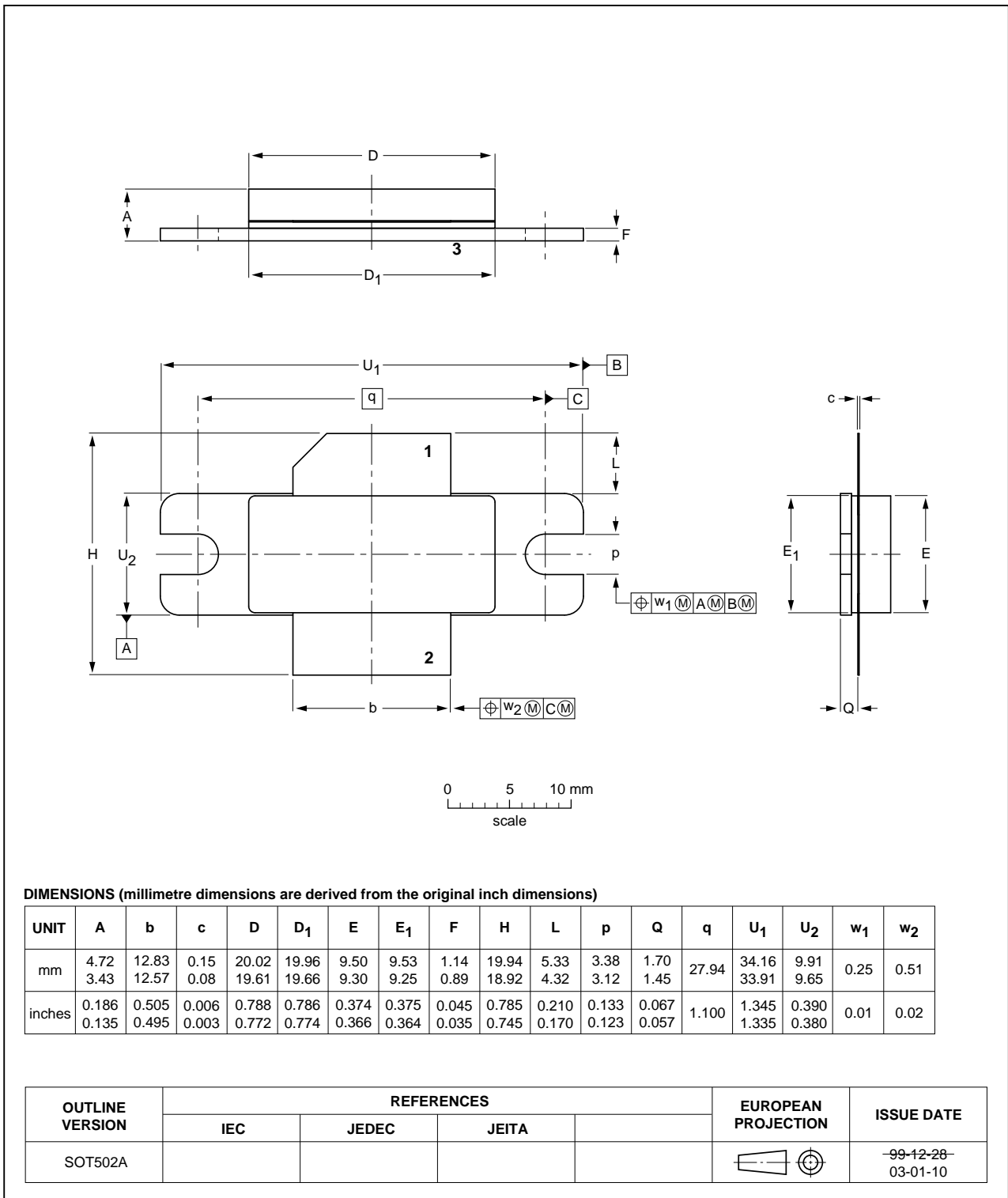


Fig 5. Package outline SOT502A

Earless flanged LDMOST ceramic package; 2 leads

SOT502B

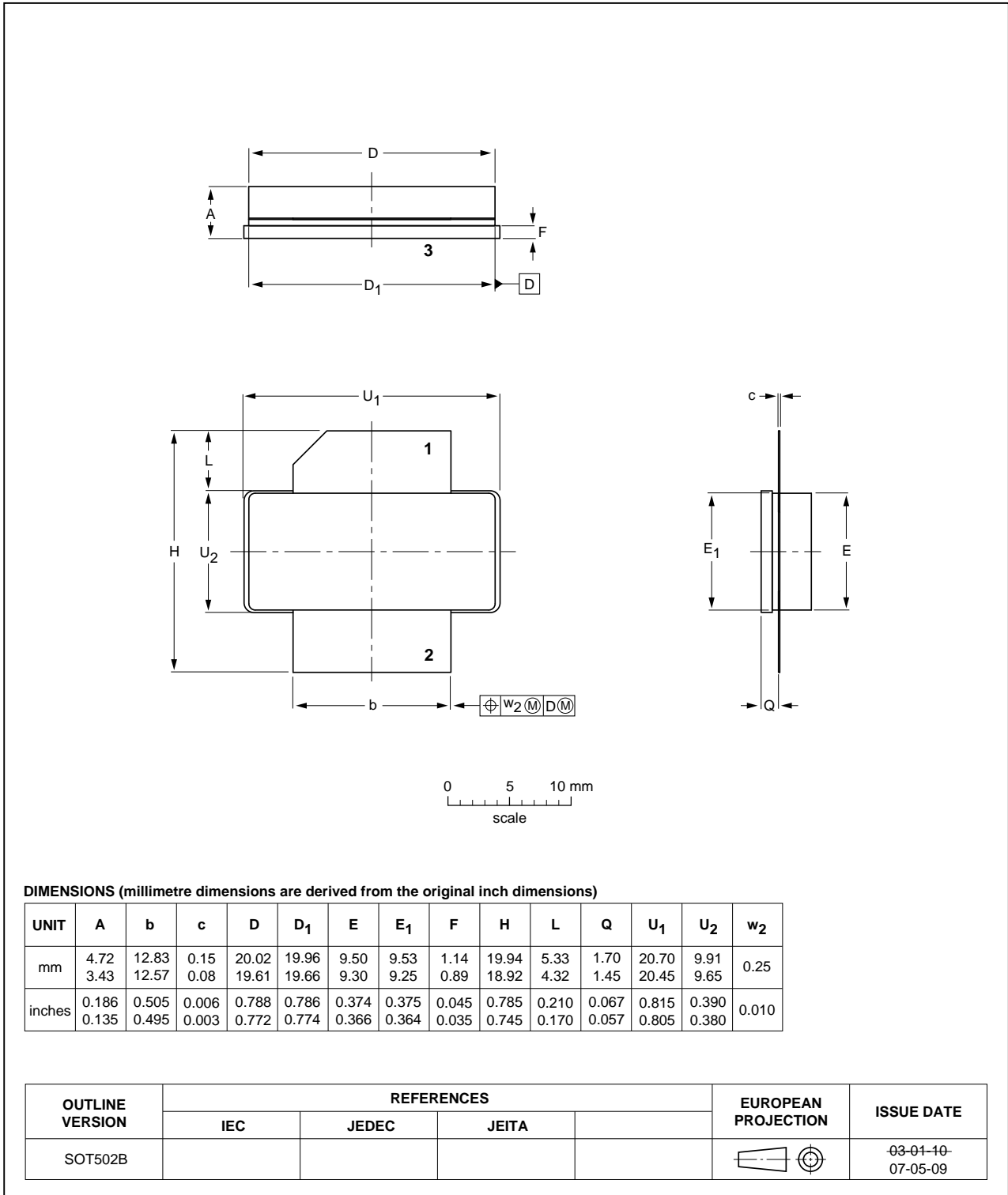


Fig 6. Package outline SOT502B

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
CW	Continuous Wave
ESD	ElectroStatic Discharge
LDMOS	Laterally Diffused Metal Oxide Semiconductor
LDMOST	Laterally Diffused Metal Oxide Semiconductor Transistor
RF	Radio Frequency
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
BLF2425M7L140_2425M7LS140 v.2	20120420	Objective data sheet	-	BLF2425M7L140_2425M7LS140 v.1
Modifications:		<ul style="list-style-type: none"> • Section 1.2 on page 1: row 7 changed to 'Internally matched' • Table 4 on page 2: T_{stg} max. value removed' • Table 6 on page 3: several changes • Table 7 on page 3: description, value changed to 2450 MHz • Section 7.2 on page 4: added values to table • Section 7.3 on page 4: section has been added • Section 7.4 on page 5: section has been added 		
BLF2425M7L140_2425M7LS140 v.1	20120130	Objective 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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14. Contents

1 Product profile 1

1.1 General description 1

1.2 Features and benefits 1

1.3 Applications 1

2 Pinning information 2

3 Ordering information 2

4 Limiting values 2

5 Thermal characteristics 2

6 Characteristics 3

7 Test information 3

7.1 Ruggedness in class-AB operation 3

7.2 Impedance information 4

7.3 Circuit information 4

7.4 Graphical data 5

8 Package outline 6

9 Handling information 8

10 Abbreviations 8

11 Revision history 8

12 Legal information 9

12.1 Data sheet status 9

12.2 Definitions 9

12.3 Disclaimers 9

12.4 Trademarks 10

13 Contact information 10

14 Contents 11

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