

BLF2425M7L250P; BLF2425M7LS250P

Power LDMOS transistor

Rev. 4 — 12 July 2013

Product data sheet

1. Product profile

1.1 General description

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

The BLF2425M7L250P and BLF2425M7LS250P 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

RF performance at $T_{case} = 25\text{ °C}$ 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	250	15	51

1.2 Features and benefits

- High efficiency
- Easy power control
- 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)

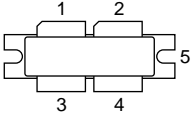
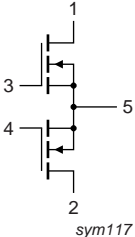
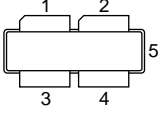
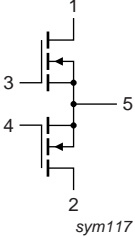
1.3 Applications

- RF power amplifiers for CW applications in the 2400 MHz to 2500 MHz frequency range such as ISM and industrial heating.



2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
BLF2425M7L250P (SOT539A)			
1	drain1		 sym117
2	drain2		
3	gate1		
4	gate2		
5	source		
BLF2425M7LS250P (SOT539B)			
1	drain1		 sym117
2	drain2		
3	gate1		
4	gate2		
5	source		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
BLF2425M7L250P	-	flanged balanced ceramic package; 2 mounting holes; 4 leads	SOT539A
BLF2425M7LS250P	-	earless flanged balanced ceramic package; 4 leads	SOT539B

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		-	225	°C

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-case)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C}; P_L = 250\text{ W}$	0.19	K/W

6. Characteristics

Table 6. DC characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 2.2\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 220\text{ mA}$	1.5	1.9	2.3	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$	-	-	3	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	-	39	-	A
I_{GSS}	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	300	nA
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 11\text{ A}$	-	16	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 7.7\text{ A}$	-	0.08	-	Ω

Table 7. RF characteristics

Test signal: CW at 2450 MHz; RF performance at $V_{DS} = 28\text{ V}; I_{Dq} = 20\text{ mA}; T_{case} = 25\text{ °C}$; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$P_L = 250\text{ W}$	14	15	-	dB
RL_{in}	input return loss	$P_L = 250\text{ W}$	-	-18	-10	dB
η_D	drain efficiency	$P_L = 250\text{ W}$	46	51	-	%

7. Test information

7.1 Ruggedness in class-AB operation

The BLF2425M7L250P and BLF2425M7LS250P are capable of withstanding a load mismatch corresponding to $VSWR = 10 : 1$ through all phases under the following conditions: $V_{DS} = 28\text{ V}; I_{Dq} = 20\text{ mA}; P_L = 250\text{ W}$ (CW); $f = 2450\text{ MHz}$.

7.2 Impedance information

Table 8. Typical impedance

Measured load-pull data half device. Typical values unless otherwise specified. $I_{Dq} = 20\text{ mA}$; $V_{DS} = 28\text{ V}$. Z_S and Z_L defined in Figure 1.

f (MHz)	Z_S (Ω)	Z_L (Ω)
2400	2.3 – 6.3j	3.8 – 2.7j
2450	3.3 – 6.0j	2.5 – 2.9j
2500	4.1 – 6.0j	3.3 – 2.3j

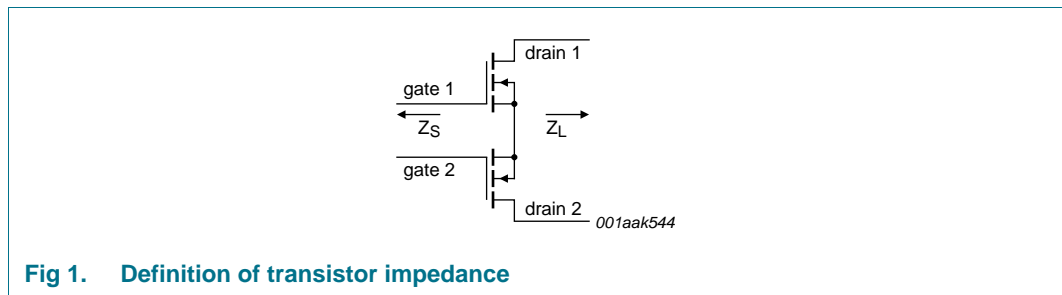
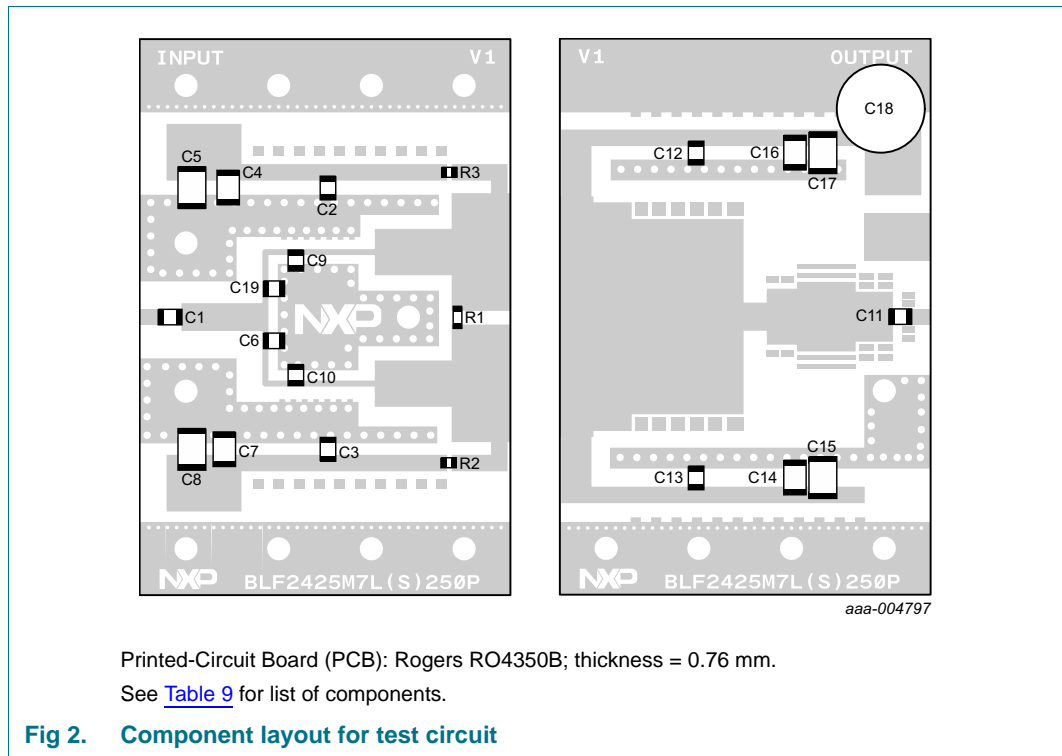


Fig 1. Definition of transistor impedance

7.3 Test circuit



Printed-Circuit Board (PCB): Rogers RO4350B; thickness = 0.76 mm. See Table 9 for list of components.

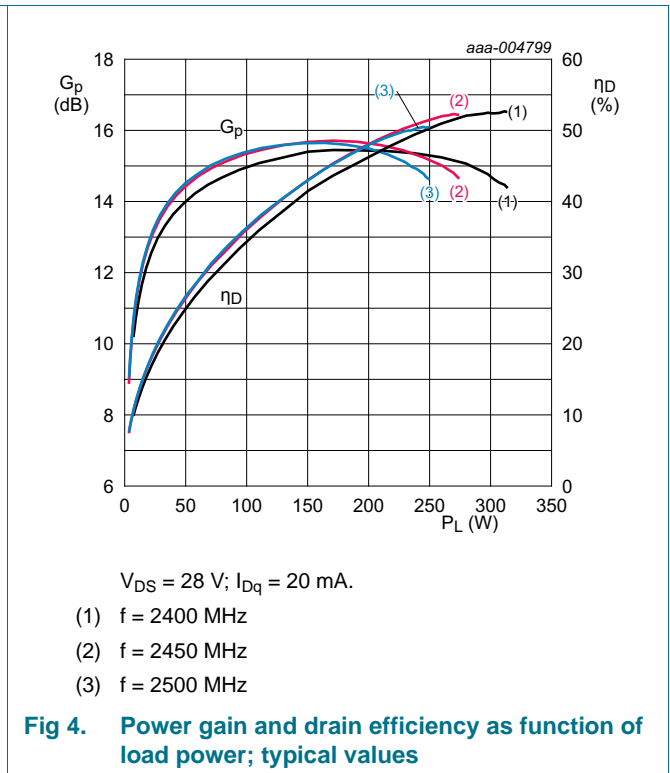
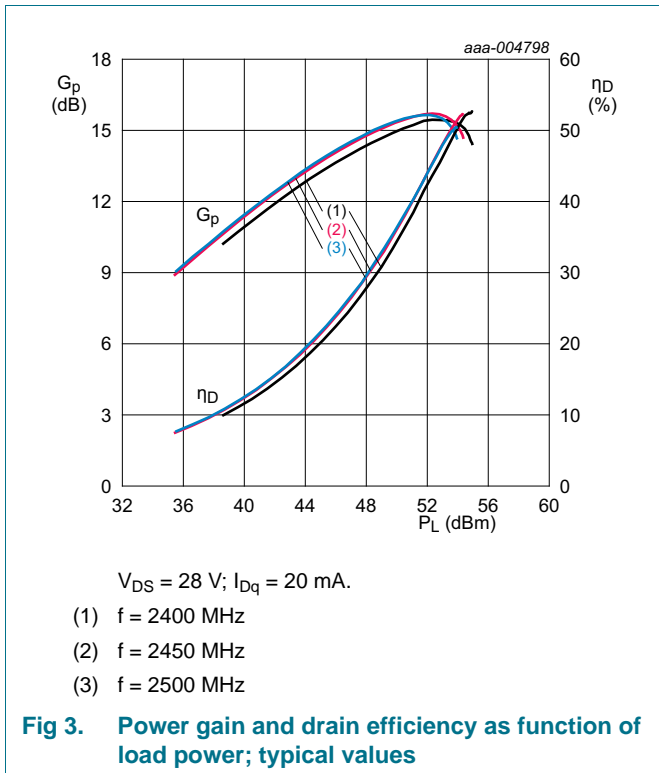
Fig 2. Component layout for test circuit

Table 9. List of components

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

Component	Description	Value	Remarks
C1, C2, C3, C11, C12, C13	multilayer ceramic chip capacitor	36 pF	ATC800B
C4, C7, C14, C16	SMD capacitor	470 nF, 50 V	
C5, C8, C15, C17	SMD capacitor	10 μF, 50 V	
C6, C19	multilayer ceramic chip capacitor	1.4 pF	ATC100B
C9, C10	multilayer ceramic chip capacitor	1.8 pF	ATC100B
C18	electrolytic capacitor	470 μF, 63 V	
R1	resistor	9.1 Ω	SMD 0805
R2, R3	resistor	5.1 Ω	SMD 0805

7.4 Graphical data



8. Package outline

Flanged balanced ceramic package; 2 mounting holes; 4 leads

SOT539A

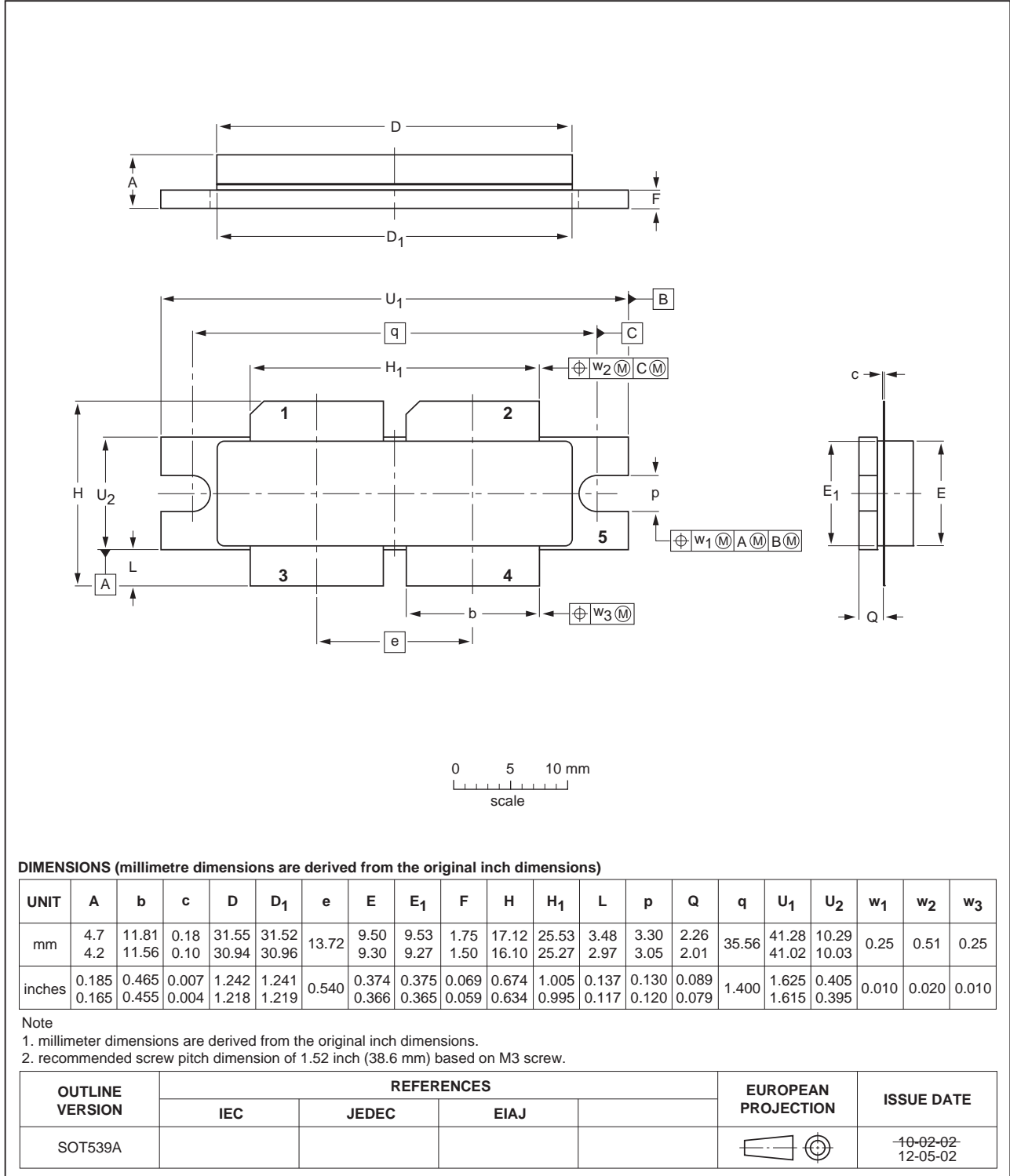


Fig 5. Package outline SOT539A

Earless flanged balanced ceramic package; 4 leads

SOT539B

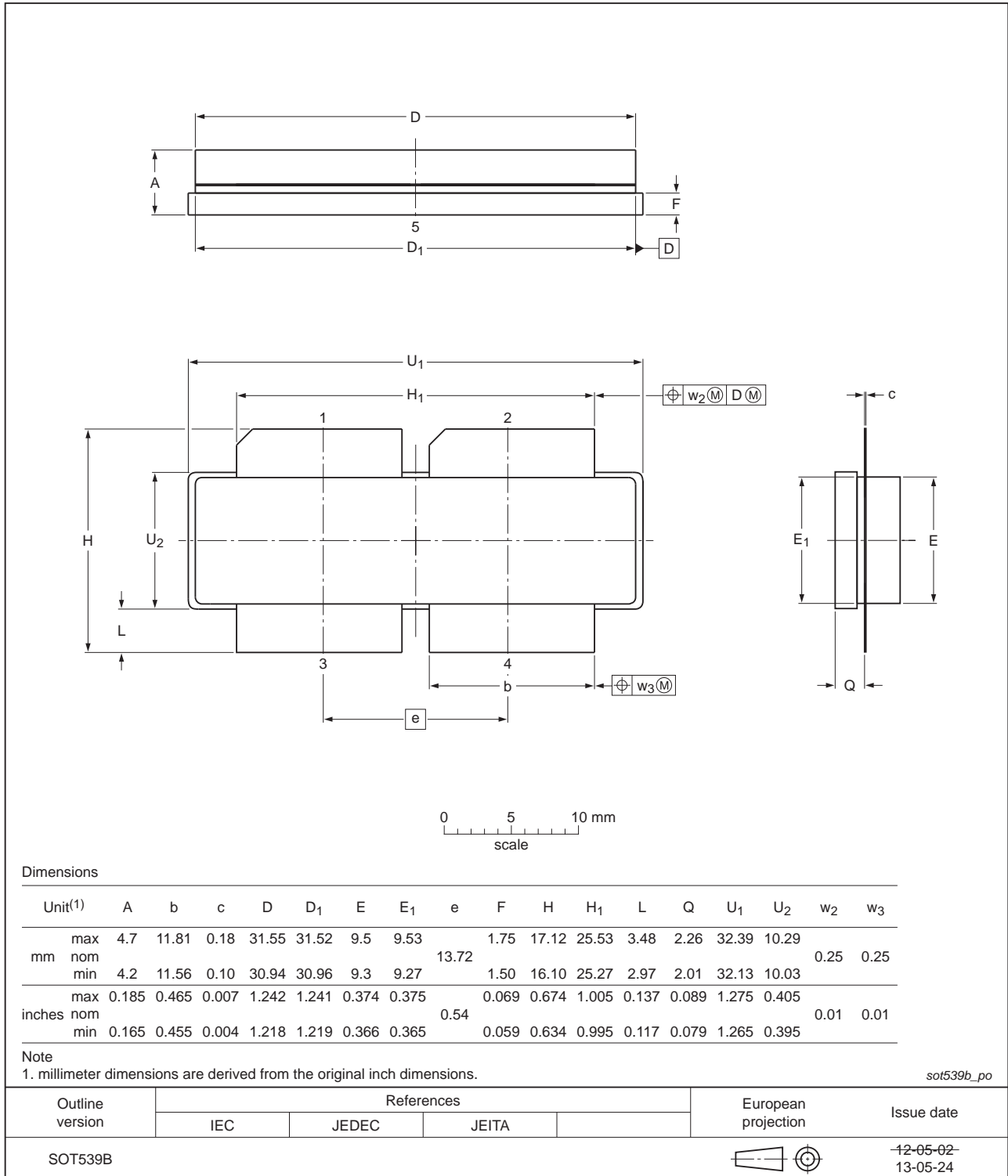


Fig 6. Package outline SOT539B

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
BLF2425M7L250P_2425M7LS250P v.4	20130712	Product data sheet	-	BLF2425M7L250P_2425M7LS250P v.3
Modifications:	<ul style="list-style-type: none"> The package outline Figure 6 is updated. 			
BLF2425M7L250P_2425M7LS250P v.3	20130226	Product data sheet	-	BLF2425M7L250P_2425M7LS250P v.2
Modifications:	<ul style="list-style-type: none"> Section 1.1 on page 1: updated Section 1.2 on page 1: updated Table 4 on page 2: removed row T_{case} Table 6 on page 3: changed typical value $R_{DS(on)}$ Table 7 on page 3: updated Figure 1 on page 4: replaced figure 			
BLF2425M7L250P_2425M7LS250P v.2	20120906	Objective data sheet	-	BLF2425M7L250P_2425M7LS250P v.1
BLF2425M7L250P_2425M7LS250P v.1	20110718	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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[2] The term 'short data sheet' is explained in section "Definitions".

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