BLF2425M9LS140

Power LDMOS transistor

Rev. 2 — 21 October 2016

AMPLEON

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 BLF2425M9LS140 is designed for high power CW applications and is assembled in a high performance ceramic package.

Table 1. Typical performance

Typical RF performance at T_{case} = 25 °C, I_{Dq} = 60 mA in a common source class-AB production test circuit.

Test signal	f	V_{DS}	$P_{L(AV)}$	G_p	η_D
	(MHz)	(V)	(W)	(dB)	(%)
CW	2450	28	140	20	60

1.2 Features and benefits

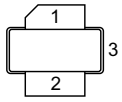
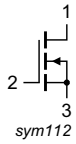
- High efficiency
- High power gain
- Excellent ruggedness
- Excellent reliability
- Integrated ESD protection
- Designed for broadband operation (2400 MHz to 2500 MHz)
- Internally matched
- Compliant to Directive 2002/95/EC, regarding restriction of hazardous substances (RoHS)

1.3 Applications

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

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	drain		
2	gate		
3	source [1]		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF2425M9LS140	-	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		−6	+13	V
T_{stg}	storage temperature		−65	+150	°C
T_j	junction temperature	[1]	-	225	°C

[1] Continuous use at maximum temperature will affect the reliability, for details refer to the online MTF calculator.

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-c)}$	thermal resistance from junction to case	T_{case} = 100 °C; P_L = 140 W	0.23	K/W

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6. Characteristics

Table 6. DC characteristics

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	V_{GS} = 0 V; I_D = 1.806 mA	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	V_{DS} = 10 V; I_D = 180.6 mA	1.5	2.08	3.1	V
I_{DSS}	drain leakage current	V_{GS} = 0 V; V_{DS} = 32 V	-	-	4.2	μA
I_{DSX}	drain cut-off current	V_{GS} = $V_{GS(th)}$ + 3.75 V; V_{DS} = 10 V	-	36	-	A
I_{GSS}	gate leakage current	V_{GS} = 11 V; V_{DS} = 0 V	-	-	420	nA
g_{fs}	forward transconductance	V_{DS} = 10 V; I_D = 9 A	-	13	-	S
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = $V_{GS(th)}$ + 3.75 V; I_D = 6.32 A	-	69	-	mΩ

Table 7. RF characteristics

Test signal: CW; f = 2450 MHz; V_{DS} = 28 V; I_{Dq} = 60 mA; T_{case} = 25 °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 W	17.5	19	-	dB
RL_{in}	input return loss	P_L = 140 W	-	−10	−6	dB
η_D	drain efficiency	P_L = 140 W	53	58	-	%

7. Test information

7.1 Ruggedness in class-AB operation

The BLF2425M9LS140 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: V_{DS} = 28 V; I_{Dq} = 60 mA; P_L = 140 W (CW); f = 2450 MHz.

7.2 Impedance information

Table 8. Typical impedance

Measured load-pull data. Typical values unless otherwise specified. I_{Dq} = 60 mA; V_{DS} = 28 V. Z_S and Z_L defined in Figure 1.

f	Z_S	Z_L
(MHz)	(Ω)	(Ω)
2400	1.85 – j4.12	1.40 – j1.28
2450	1.81 – j5.00	1.32 – j1.48
2500	4.06 – j2.98	1.22 – j1.66

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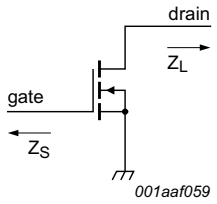
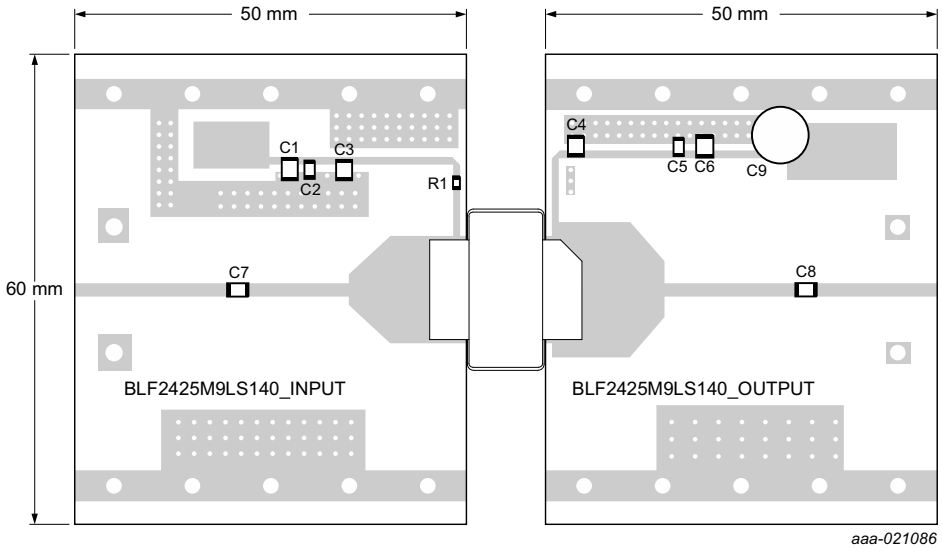


Fig 1. Definition of transistor impedance

7.3 Circuit information



Printed-Circuit Board (PCB): Rogers 4350B; ε_r = 3.66; thickness = 0.762 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.

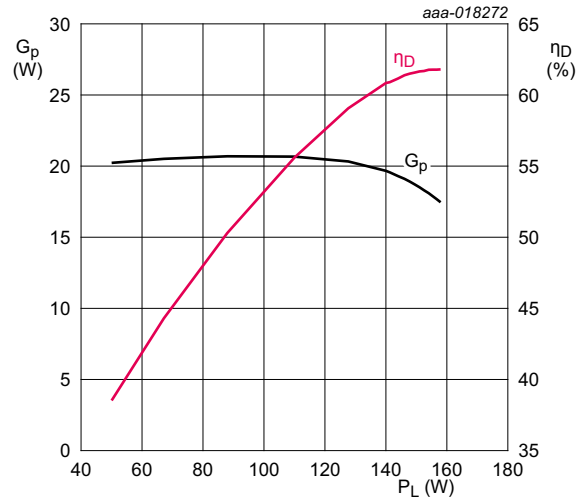
Component	Description	Value	Remarks
C1, C6	multilayer ceramic chip capacitor	10 μF, 50 V [1]	Murata
C2, C5	multilayer ceramic chip capacitor	1 μF, 50 V [1]	Murata
C3, C4, C7, C8	multilayer ceramic chip capacitor	10 pF [2]	ATC 800B
C9	electrolytic capacitor	1000 μF, 100 V	
R1	resistor	5.1 Ω	SMD 0805

[1] Murata or capacitor of same quality

[2] American Technical Ceramics type 800B or capacitor of same quality

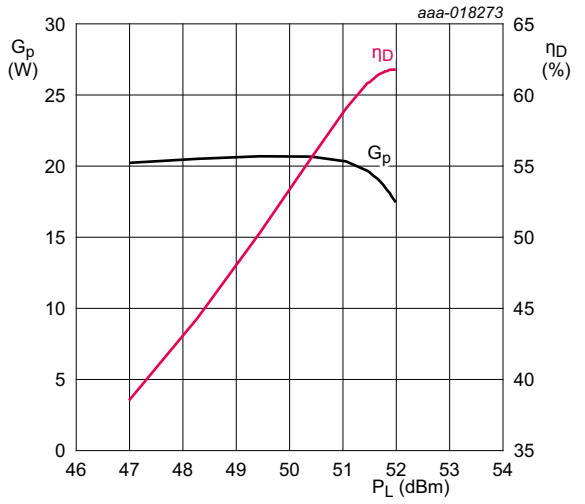
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7.4 Graphical data



V_{DS} = 28 V; I_{Dq} = 60 mA; f = 2450 MHz.

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



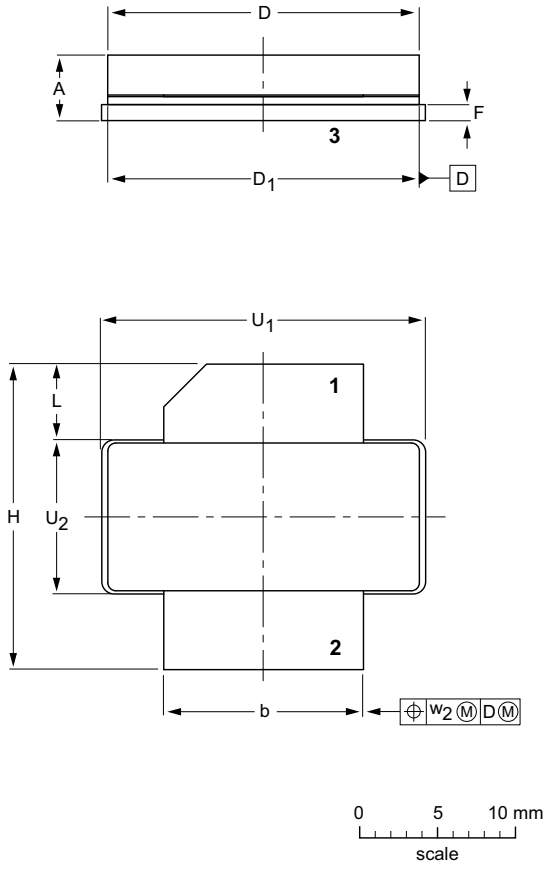
V_{DS} = 28 V; I_{Dq} = 60 mA; f = 2450 MHz.

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

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8. Package outline

Earless flanged ceramic package; 2 leads **SOT502B**



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	b	c	D	D_1	E	E_1	F	H	L	Q	U_1	U_2	w_2
mm	4.72 3.43	12.83 12.57	0.15 0.08	20.02 19.61	19.96 19.66	9.50 9.30	9.53 9.25	1.14 0.89	19.94 18.92	5.33 4.32	1.70 1.45	20.70 20.45	9.91 9.65	0.25
inches	0.186 0.135	0.505 0.495	0.006 0.003	0.788 0.772	0.786 0.774	0.374 0.366	0.375 0.364	0.045 0.035	0.785 0.745	0.210 0.170	0.067 0.057	0.815 0.805	0.390 0.380	0.010

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT502B						~~07-05-09~~ 12-05-02

Fig 5. Package outline SOT502B

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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
MTF	Median Time to Failure
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
BLF2425M9LS140 v.2	20161021	Product data sheet	-	BLF2425M9LS140 v.1
Modifications:	• Table 4 on page 2: changed V_{GS} minimum value from −0.5 V to −6 V			
BLF2425M9LS140 v.1	20160602	Product data sheet	-	-

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Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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