

# BLF2425M9L30; BLF2425M9LS30

Power LDMOS transistor

Rev. 5 — 13 June 2019

AMPLEON

Product data sheet

## 1. Product profile

### 1.1 General description

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

The BLF2425M9L30 and BLF2425M9LS30 are drivers designed for high power CW applications and are assembled in a high performance ceramic package.

**Table 1. Typical performance**

*RF performance at  $T_{case} = 25\text{ °C}$  in a common source class-AB production test circuit.*

Test signal	f	V <sub>DS</sub>	P <sub>L(AV)</sub>	G <sub>p</sub>	$\eta_D$
	(MHz)	(V)	(W)	(dB)	(%)
CW	2450	32	30	18.5	61

### 1.2 Features and benefits

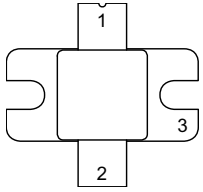
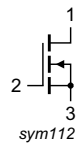
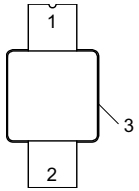
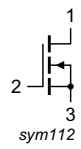
- High efficiency
- High power gain
- Excellent ruggedness
- Excellent thermal stability
- Integrated ESD protection
- Designed for broadband operation (2400 MHz to 2500 MHz)
- For RoHS compliance see the product details on the Ampleon website

### 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
<b>BLF2425M9L30 (SOT1135A)</b>			
1	drain		 sym112
2	gate		
3	source <a href="#">[1]</a>		
<b>BLF2425M9LS30 (SOT1135B)</b>			
1	drain		 sym112
2	gate		
3	source <a href="#">[1]</a>		

[1] Connected to flange.

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF2425M9L30	-	flanged ceramic package; 2 mounting holes; 2 leads	SOT1135A
BLF2425M9LS30	-	earless flanged ceramic package; 2 leads	SOT1135B

## 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	<a href="#">[1]</a>	-	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
$R_{th(j-case)}$	thermal resistance from junction to case	$T_{case} = 50\text{ °C}; P_L = 30\text{ W}$ [1]	0.9	K/W

[1] When operated with a CW signal.

## 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	$V_{GS} = 0\text{ V}; I_D = 0.3\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 30\text{ mA}$	1.4	1.9	2.4	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 32\text{ V}$	-	-	1.4	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	-	6.2	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	140	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 30\text{ mA}$	-	0.264	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 1\text{ A}$	-	0.41	0.76	$\Omega$

Table 7. RF characteristics

Test signal: CW at  $f = 2450\text{ MHz}$ ; RF performance at  $V_{DS} = 32\text{ V}; I_{Dq} = 20\text{ mA}; T_{case} = 25\text{ °C}$ ; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$P_L = 30\text{ W}$	17	18.5	-	dB
$RL_{in}$	input return loss	$P_L = 30\text{ W}$	-	-10	-7	dB
$\eta_D$	drain efficiency	$P_L = 30\text{ W}$	57	61	-	%

## 7. Test information

### 7.1 Ruggedness in class-AB operation

The BLF2425M9L30 and BLF2425M9LS30 are capable of withstanding a load mismatch corresponding to  $V_{SWR} = 10 : 1$  through all phases under the following conditions:

$V_{DS} = 32\text{ V}; I_{Dq} = 20\text{ mA}; P_L = 30\text{ W}$  (CW);  $f = 2450\text{ MHz}$ .

7.2 Impedance information

Table 8. Typical impedance

Measured load-pull data. Typical values unless otherwise specified.

f (MHz)	Z <sub>S</sub> (Ω)	Z <sub>L</sub> (Ω)
2400	9.0 – 12.5j	12.0 – 2.0j
2450	9.1 – 17.9j	10.4 – 4.3j
2500	16.0 – 17.3j	10.3 – 4.2j

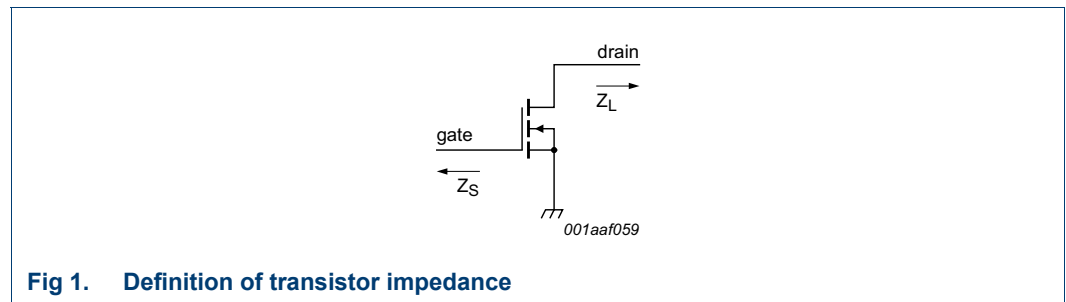
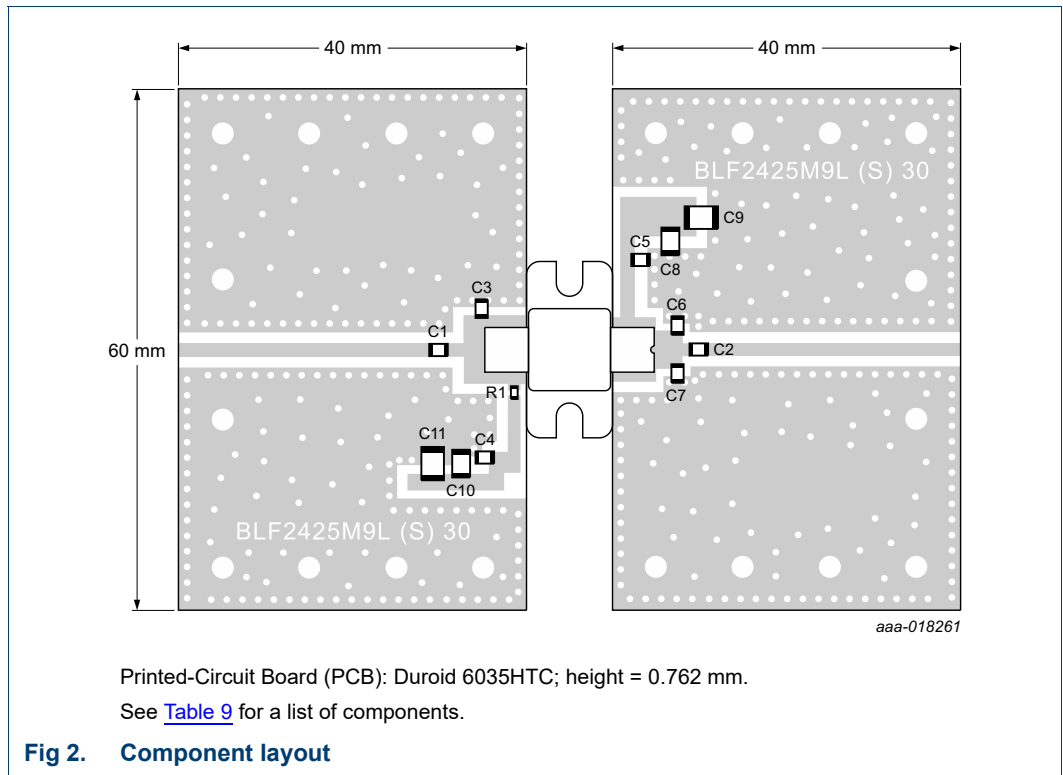


Fig 1. Definition of transistor impedance

7.3 Test circuit

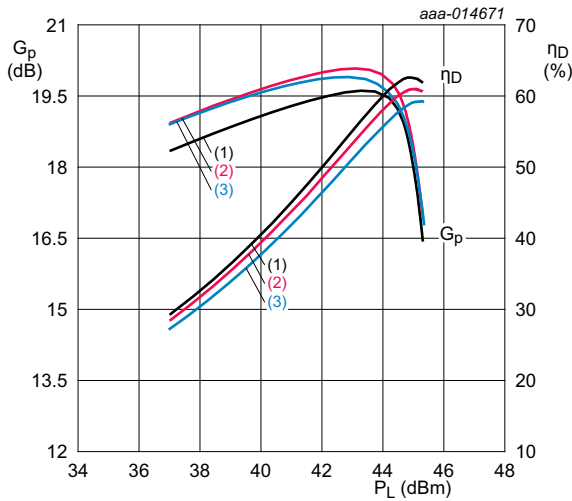


**Table 9. List of components**

See [Figure 2](#) for component layout.

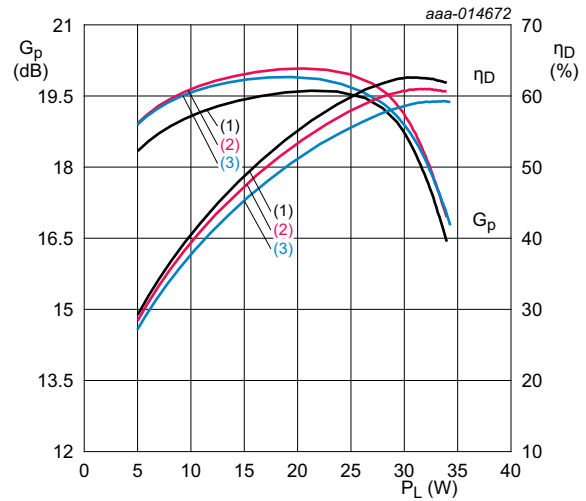
Component	Description	Value	Remarks
C1, C2, C4, C5	multilayer ceramic chip capacitor	15 pF	ATC100A150FT150XT
C3	multilayer ceramic chip capacitor	0.6 pF	ATC100A0R6BT150XTV
C6, C7	multilayer ceramic chip capacitor	0.8 pF	ATC100A0R8BT150XTV
C8, C10	multilayer ceramic chip capacitor	100 nF	GRM21BR71H104KA01L
C9, C11	multilayer ceramic chip capacitor	4.7 μF	GRM32ER71H475KA88L
R1	SMD resistor	9.1 Ω	SMD 0603

7.4 Graphical data



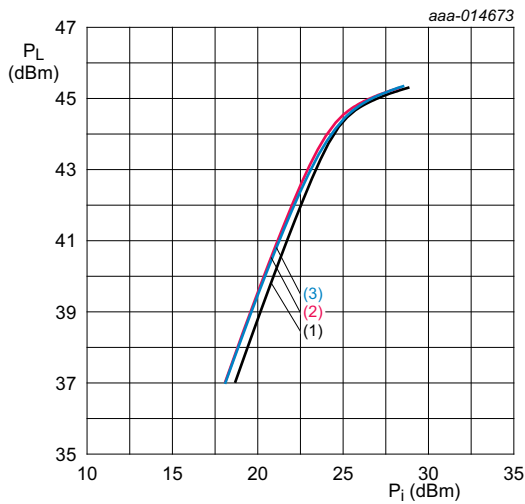
$V_{DS} = 32\text{ V}; I_{Dq} = 20\text{ mA}.$   
 (1)  $f = 2400\text{ MHz}$   
 (2)  $f = 2450\text{ MHz}$   
 (3)  $f = 2500\text{ MHz}$

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



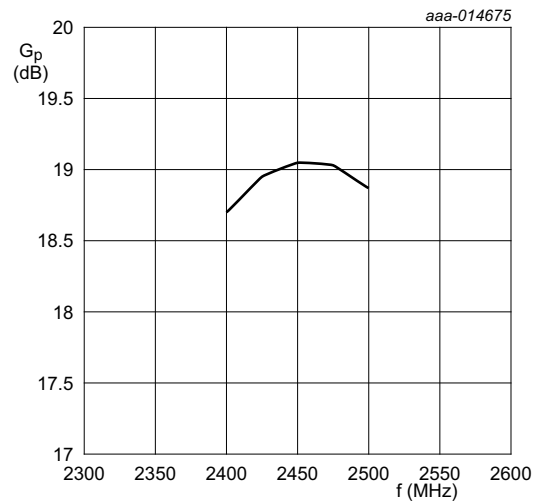
$V_{DS} = 32\text{ V}; I_{Dq} = 20\text{ mA}.$   
 (1)  $f = 2400\text{ MHz}$   
 (2)  $f = 2450\text{ MHz}$   
 (3)  $f = 2500\text{ MHz}$

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



$V_{DS} = 32\text{ V}; I_{Dq} = 20\text{ mA}.$   
 (1)  $f = 2400\text{ MHz}$   
 (2)  $f = 2450\text{ MHz}$   
 (3)  $f = 2500\text{ MHz}$

**Fig 5. Output power as a function of input power; typical values**



$V_{DS} = 32\text{ V}; I_{Dq} = 20\text{ mA}; P_L = 30\text{ W}.$

**Fig 6. Power gain as a function of frequency; typical values**

8. Package outline

Flanged ceramic package; 2 mounting holes; 2 leads

SOT1135A

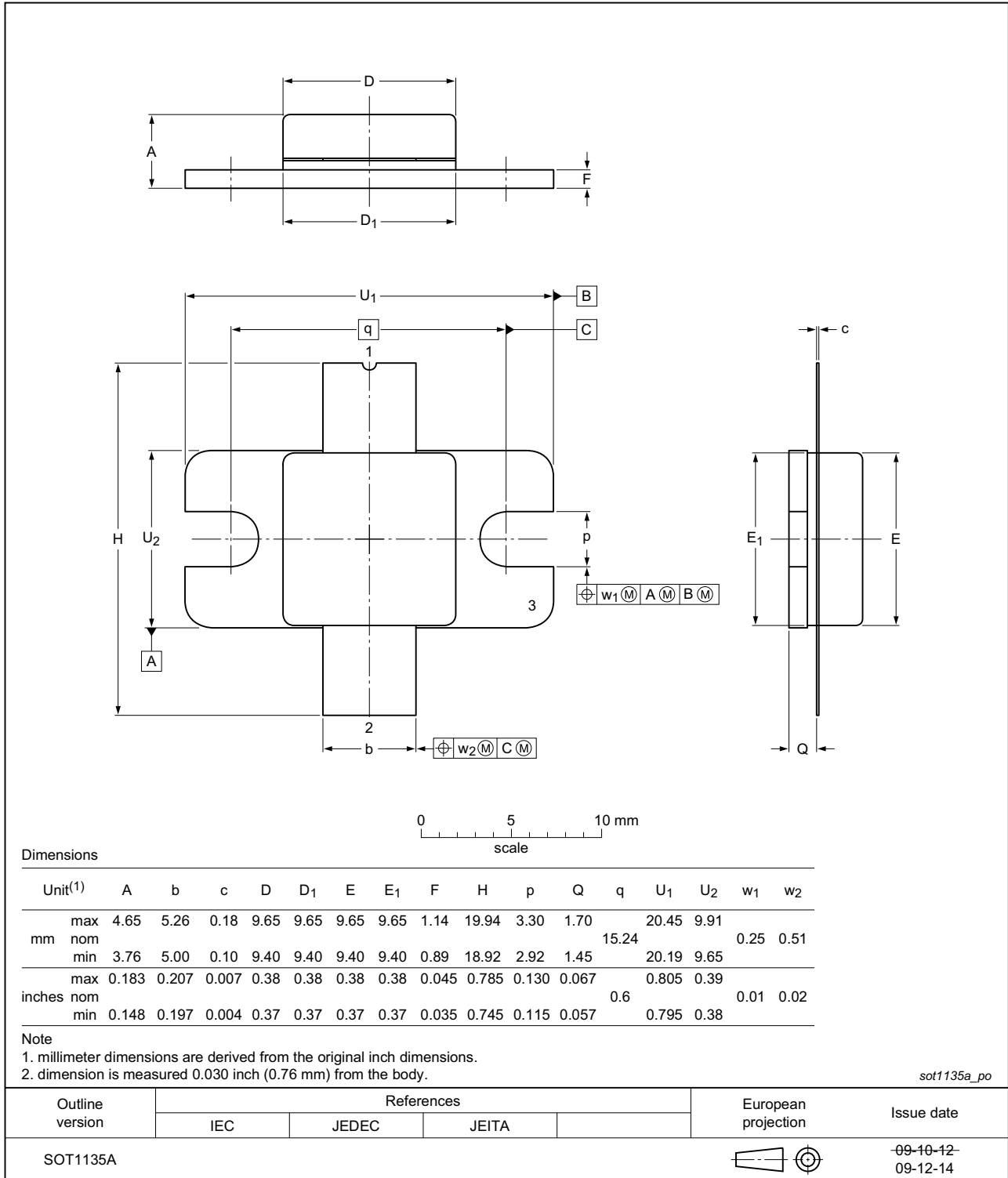
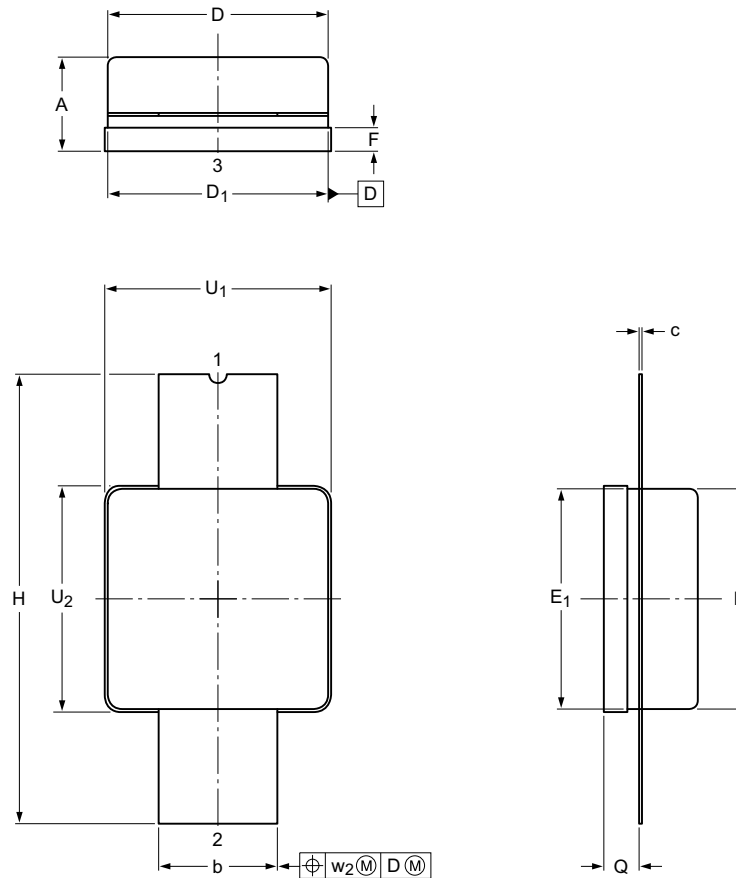


Fig 7. Package outline SOT1135A

Earless flanged ceramic package; 2 leads

SOT1135B



Dimensions

Unit <sup>(1)</sup>	A	b	c	D	D <sub>1</sub>	E	E <sub>1</sub>	F	H	Q	U <sub>1</sub>	U <sub>2</sub>	w <sub>2</sub>
mm	max	4.65	5.26	0.18	9.65	9.65	9.65	1.14	19.94	1.70	9.91	9.91	0.51
	nom												
	min	3.76	5.00	0.10	9.40	9.40	9.40	9.40	0.89	18.92	1.45	9.65	
inches	max	0.183	0.207	0.007	0.38	0.38	0.38	0.045	0.785	0.067	0.39	0.39	0.02
	nom												
	min	0.148	0.197	0.004	0.37	0.37	0.37	0.37	0.035	0.745	0.057	0.38	

Note

1. millimeter dimensions are derived from the original inch dimensions.
2. dimension is measured 0.030 inch (0.76 mm) from the body.

sot1135b\_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT1135B					09-10-12 09-12-14

Fig 8. Package outline SOT1135B



## 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.

**Table 10. ESD sensitivity**

ESD model	Class
Charged Device Model (CDM); According to ANSI/ESDA/JEDEC standard JS-002	C2A <a href="#">[1]</a>
Human Body Model (HBM); According to ANSI/ESDA/JEDEC standard JS-001	2 <a href="#">[2]</a>

[1] CDM classification C2A is granted to any part that passes after exposure to an ESD pulse of 500 V.

[2] HBM classification 2 is granted to any part that passes after exposure to an ESD pulse of 2000 V.

## 10. Abbreviations

**Table 11. Abbreviations**

Acronym	Description
CW	Continuous Wave
ESD	ElectroStatic Discharge
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
MTF	Median Time to Failure
RoHS	Restriction of Hazardous Substances
SMD	Surface Mounted Device
VSWR	Voltage Standing-Wave Ratio

## 11. Revision history

**Table 12. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF2425M9L30_M9LS30 v.5	20190613	Product data sheet	-	BLF2425M9L30_M9LS30 v.4
Modifications:	<ul style="list-style-type: none"> <li><a href="#">Table 9 on page 5</a>: changed C3 value from 0.3 pF V to 0.6 pF</li> <li><a href="#">Table 10 on page 9</a>: added table</li> </ul>			
BLF2425M9L30_M9LS30 v.4	20161021	Product data sheet	-	BLF2425M9L30_M9LS30 v.3
BLF2425M9L30_M9LS30 v.3	20160218	Product data sheet	-	BLF2425M9L30_M9LS30#2
BLF2425M9L30_M9LS30#2	20150901	Objective data sheet	-	BLF2425M9L30_M9LS30 v.1
BLF2425M9L30_M9LS30 v.1	20150603	Objective data sheet	-	-

## 12. Legal information

### 12.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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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