



# LET9150

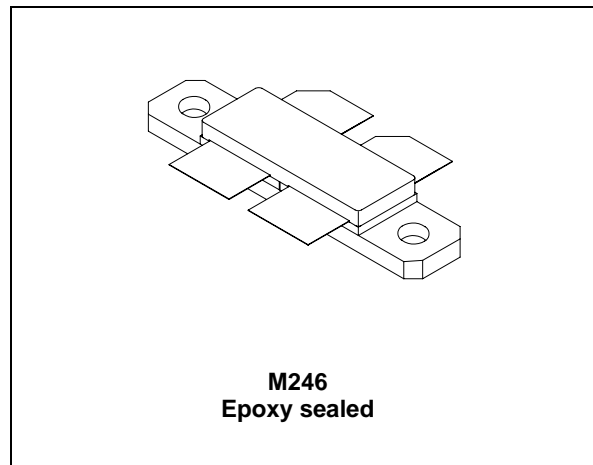
## RF power transistor from the LdmoST family of n-channel enhancement-mode lateral MOSFETs

### Features

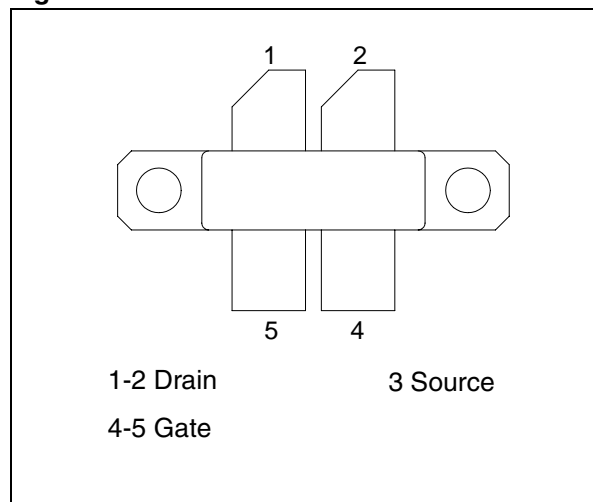
- Excellent thermal stability
- Common source configuration push-pull
- $P_{OUT} = 150\text{ W}$  with 20 dB gain @ 860 MHz
- BeO-free package

### Description

The LET9150 is a common source n-channel enhancement-mode lateral field-effect RF power transistor designed for broadband commercial and industrial applications at frequencies up to 2 GHz.



**Figure 1. Pin connection**



**Table 1. Device summary**

Order code	Package	Branding
LET9150	M246	LET9150

---

# Contents

<b>1</b>	<b>Electrical data</b> .....	<b>3</b>
1.1	Maximum ratings .....	3
1.2	Thermal data .....	3
<b>2</b>	<b>Electrical characteristics</b> .....	<b>4</b>
2.1	Static .....	4
2.2	Dynamic .....	4
<b>3</b>	<b>Impedance data</b> .....	<b>5</b>
<b>4</b>	<b>Typical performances</b> .....	<b>6</b>
<b>5</b>	<b>Test circuit</b> .....	<b>7</b>
<b>6</b>	<b>Package mechanical data</b> .....	<b>9</b>
<b>7</b>	<b>Revision history</b> .....	<b>11</b>

# 1 Electrical data

## 1.1 Maximum ratings

Table 2. Absolute maximum ratings ( $T_{CASE} = 25\text{ °C}$ )

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain-source voltage	80	V
$V_{GS}$	Gate-source voltage	- 0.5 / + 15	V
$I_D$	Drain current	20	A
$P_{DISS}$	Power dissipation	269	W
$T_J$	Max. operating junction temperature	200	°C
$T_{STG}$	Storage temperature	-65 to +150	°C

## 1.2 Thermal data

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thJC}$	Junction - case thermal resistance	0.65	°C/W

## 2 Electrical characteristics

$$T_{CASE} = +25\text{ }^{\circ}\text{C}$$

### 2.1 Static

**Table 4. Static (per section)**

Symbol	Test conditions		Min	Typ	Max	Unit
$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$	$I_{DS} = 1\text{ mA}$	80			V
$I_{DSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 28\text{ V}$			1	$\mu\text{A}$
$I_{GSS}$	$V_{GS} = 5\text{ V}$	$V_{DS} = 0\text{ V}$			1	$\mu\text{A}$
$V_{GS(Q)}$	$V_{DS} = 28\text{ V}$	$I_D = 600\text{ mA}$	2.0		5.0	V
$V_{DS(ON)}$	$V_{GS} = 10\text{ V}$	$I_D = 3\text{ A}$		0.7	0.9	V
$G_{FS}$	$V_{DS} = 10\text{ V}$	$I_D = 3\text{ A}$	2.5			mho
$C_{ISS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 32\text{ V}$		68		pF
$C_{OSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 32\text{ V}$		33		pF
$C_{RSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 32\text{ V}$		0.65		pF

### 2.2 Dynamic

**Table 5. Dynamic**

Symbol	Test conditions		Min	Typ	Max	Unit
$P_{OUT}$	$V_{DD} = 32\text{ V}$	$I_{DQ} = 600\text{ mA}$ $f = 860\text{ MHz}$ $P_{IN} = 2.5\text{ W}$	150	175		W
$G_{PS}$	$V_{DD} = 32\text{ V}$	$I_{DQ} = 600\text{ mA}$ $P_{OUT} = 150\text{ W}$ $f = 860\text{ MHz}$	18	20	-	dB
$\eta_D$	$V_{DD} = 32\text{ V}$	$I_{DQ} = 600\text{ mA}$ $P_{OUT} = 150\text{ W}$ $f = 860\text{ MHz}$	60	69		%
RTL	$V_{DD} = 32\text{ V}$	$I_{DQ} = 600\text{ mA}$ $P_{OUT} = 150\text{ W}$ $f = 860\text{ MHz}$		12		dB
Load Mismatch	$V_{DD} = 32\text{ V}$	$I_{DQ} = 600\text{ mA}$ $P_{OUT} = 150\text{ W}$ $f = 860\text{ MHz}$ all phase angles			20:1	VSWR

### 3 Impedance data

Figure 2. Impedance data

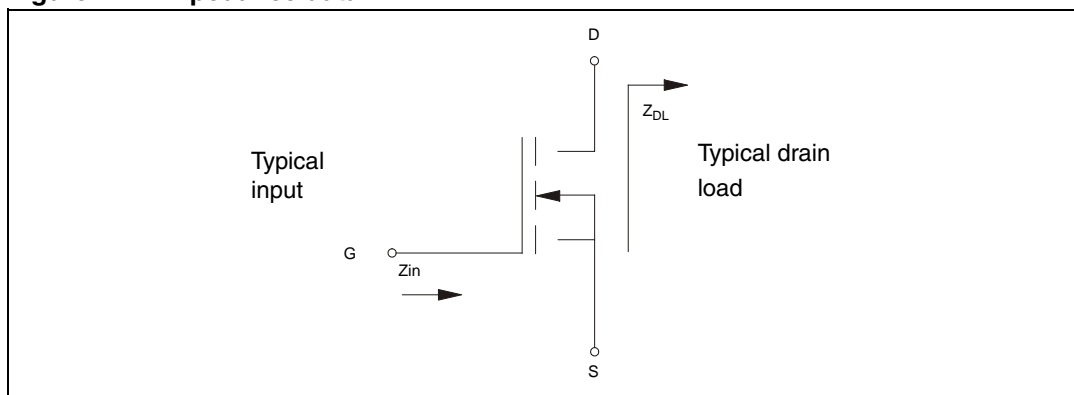
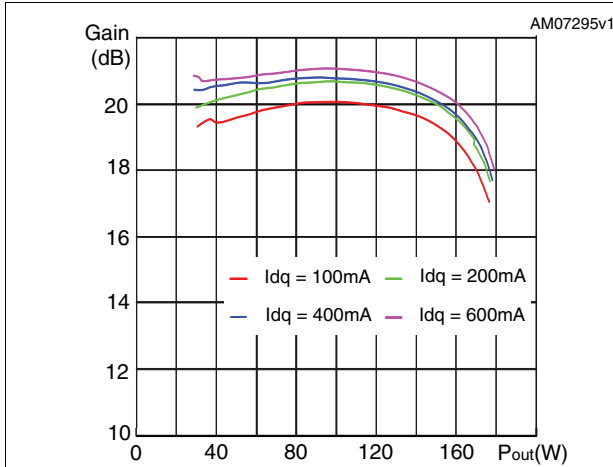


Table 6. Impedance data

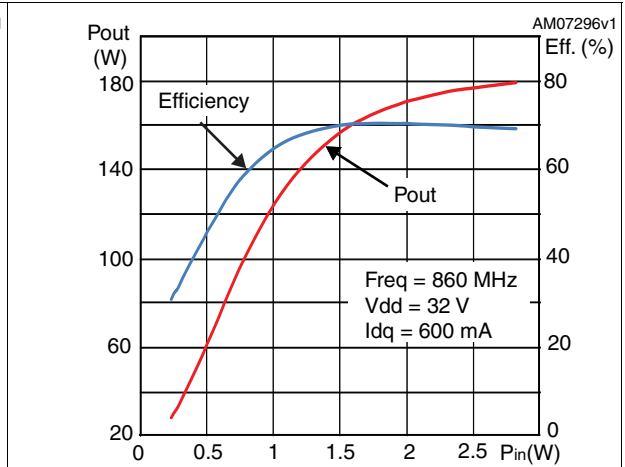
Frequency MHz	Z source ( $\Omega$ )	Z load ( $\Omega$ )
860	$0.8 - j 1.3$	$4.8 - j 2.4$

# 4 Typical performances

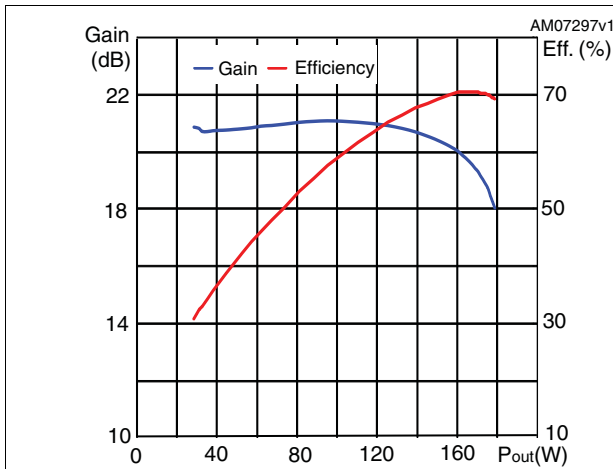
**Figure 3. Gain vs output power and bias current @ f= 860 MHz, Vdd = 32 V**



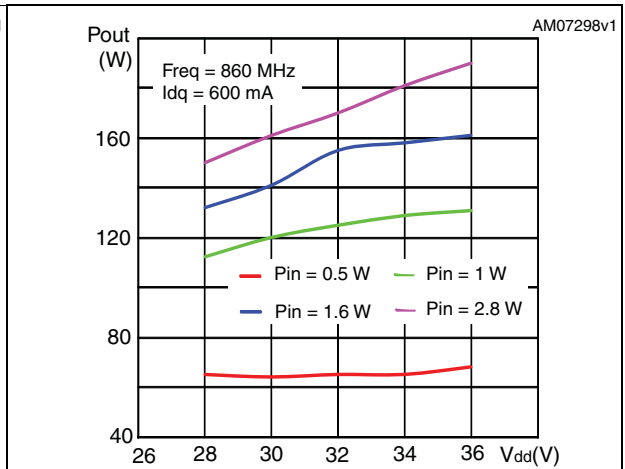
**Figure 4. Output power and efficiency vs input power**



**Figure 5. Gain and efficiency vs output power @ f= 860 MHz, Vdd = 32 V, Idq= 600 mA**



**Figure 6. Output power vs drain supply voltage**



## 5 Test circuit

Figure 7. Test circuit schematic

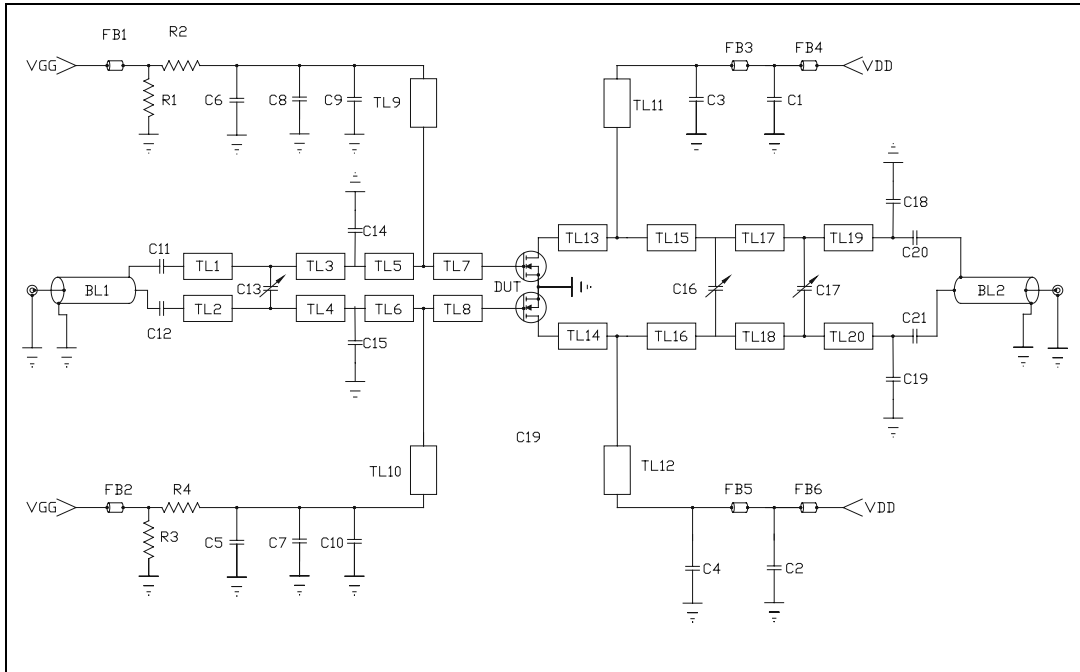


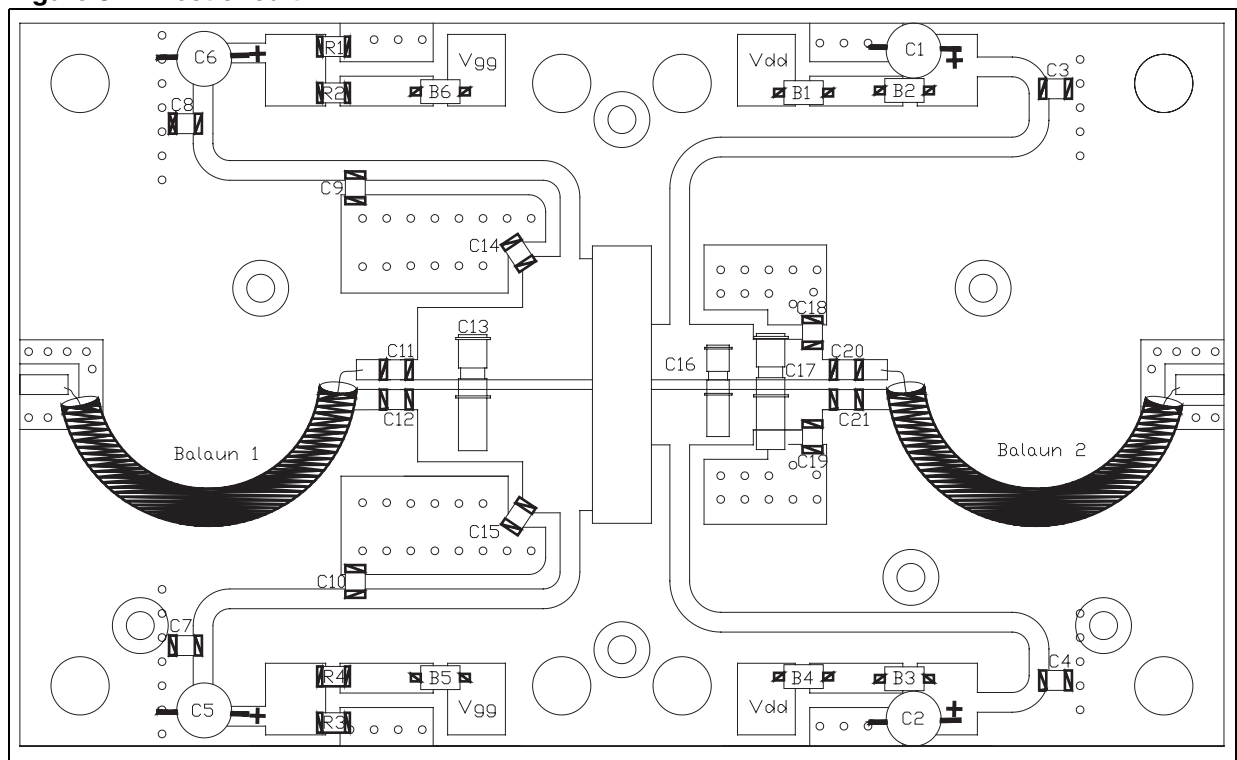
Table 7. Test circuit component part list

Item	Qty.	Part number	Vender	Description
R1, R3	2	CR1206-8W-130JB	VENKEL	1.2 K $\Omega$ , 1/8 W surface mount chip resistor
R2,R4	2	CR1206-8W-122JB	VENKEL	13 $\Omega$ , 1/8 W surface mount chip resistor
FB1,2,3,4,4,6	2	2743021447	FAIR-RITE CORP	Surface mount EMI sheild bead
C1,C2,C5,C6	4			100 $\mu$ F, 63 V electrolytic capacitor
C3,C4,C7,C8	4	ATC100B200XXXX	ATC	20 pF chip capacitor
C9,C10	2	ATC200B203MW	ATC	20000 pF chip capacitor
C11, C12	2	ATC100B510XXXX	ATC	51 pF chip capacitor
C13,17	2	27291PC	JOHANSON	0.8-8 pF giga trim variable capacitor
C14,15	2	ATC100B130XXXX	ATC	13 pF chip capacitor
C16	1		JOHANSON	0.6-4.5 pF giga trim variable capacitor
C18,19	1	ATC100B1R3XXXX	ATC	1.3 pF chip capacitor
C20,C21	1	ATC100B180XXXX	ATC	18 pF chip capacitor
B1,B2	2	EZ 141	HUBER-SUHNER	BALUN , 50 $\Omega$ SUCOFORM, OD 0.141. 2.37 LG coaxial cable or equivalent
TL21, TL22	2			L= 0.200in [5.08mm] W=0.082in [2.08mm]

Table 7. Test circuit component part list (continued)

Item	Qty.	Part number	Vender	Description
TL1, TL2	2			L= 0.229in [5.81mm] W=0.300in [7.62mm]
TL3, TL4	2			L= 0.207in [5.27mm] W=0.300in [7.62mm]
TL5, TL6	2			L= 0.156in [3.96mm] W=0.503in [12.76mm]
TL7, TL8	2			L= 0.134in [3.41mm] W=0.503in [12.76mm]
TL9, TL10, TL11, TL12	4			L= 2.37in [60.19mm] W=0.082in [2.08mm]
TL13, TL14	2			L= 0.077in [1.94mm] W=0.230in [5.84mm]
TL15, TL16	2			L= 0.200in [5.08mm] W=0.230in [5.84mm]
TL17, TL18	2			L= 0.235in [5.96mm] W=0.230in [5.84mm]
TL17, TL19	2			L= 0.287in [7.29mm] W=0.168in [4.27mm]
Board 3X5	1		Rogers Corp	Er=2.55 t=0.0026in h=0.030in

Figure 8. Test circuit





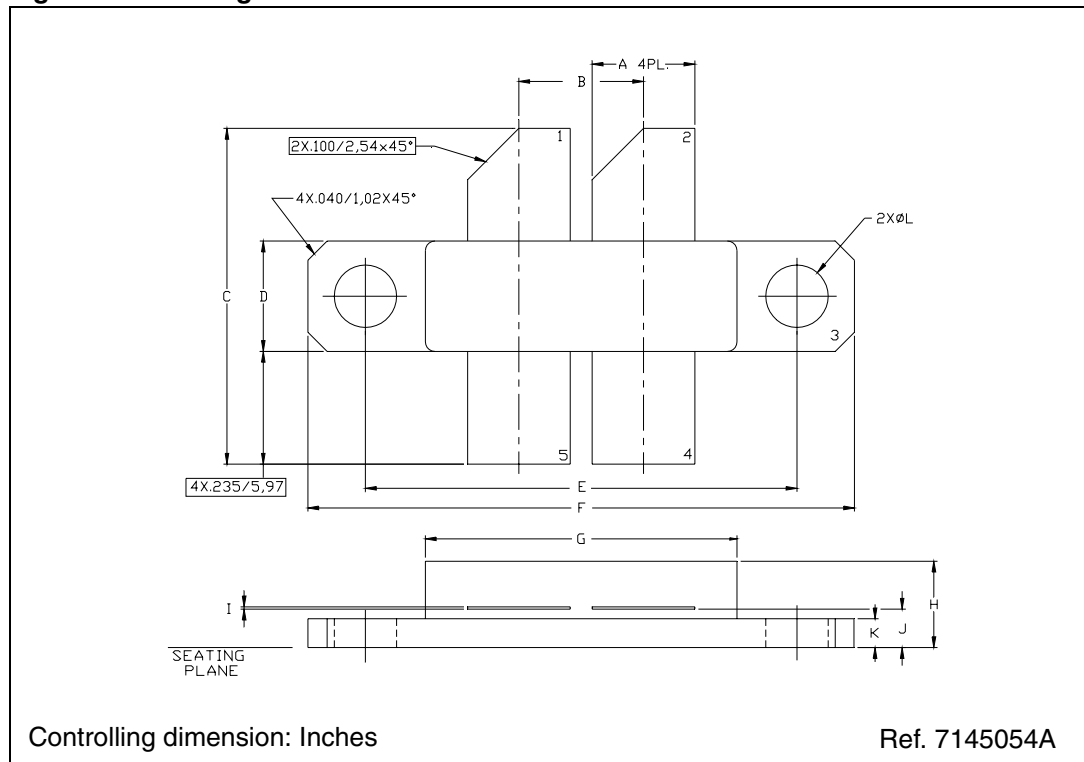
## 6 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

**Table 8. M246 (0.230 x 0.650 WIDE 4/L BAL N/HERM W/FLG) mechanical data**

Dim.	mm.			Inch		
	Min	Typ	Max	Min	Typ	Max
A	5.33		5.59	0.210		0.220
B	6.48		6.73	0.255		0.265
C	17.27		18.29	0.680		0.720
D	5.72		5.97	0.225		0.235
E		22.86			.900	
F	28.83		29.08	1.135		1.145
G	16.26		16.76	0.640		0.660
H	4.19		5.08	0.165		0.200
I	0.08		0.15	0.003		0.006
J	1.83		2.24	0.072		0.088
K	1.40		1.65	0.055		0.065
L	3.18		3.43	0.125		0.135

**Figure 9. Package dimensions**



## 7 Revision history

**Table 9. Document revision history**

Date	Revision	Changes
05-Oct-2009	1	First Issue.
18-Oct-2009	2	Updated $V_{GS}$ in <i>Table 2</i> .
11-Feb-2010	3	Changed test condition for $V_{(BR)DSS}$ in <i>Table 4: Static (per section)</i> .
29-Jun-2010	4	Added <i>Section 3: Impedance data</i> and <i>Section 4: Typical performances</i> . Updated <i>Table 5</i> .
12-Jul-2010	5	Updated <i>Figure 4: Output power and efficiency vs input power</i> and <i>Figure 6: Output power vs drain supply voltage</i> .
22-Dec-2010	6	Inserted new <i>Section 5: Test circuit</i> .

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2010 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[STMicroelectronics:](#)

[LET9150](#)