



# LET9060

## RF power transistor, LdmoST plastic family N-channel enhancement-mode lateral MOSFETs

Preliminary data

### Features

- Excellent thermal stability
- Common source configuration
- $P_{OUT} = 60\text{ W}$  with 17.2 dB gain @ 960 MHz / 28 V
- New RF plastic package

### Description

The LET9060 is a common source N-channel, enhancement-mode lateral field-effect RF power MOSFET. It is designed for high gain, broadband, commercial and industrial applications. It operates at 28 V in common source mode at frequencies of up to 1 GHz. LET9060 boasts the excellent gain, linearity and reliability of ST's latest LDMOS technology mounted in the first true SMD plastic RF power package, PowerSO-10RF. LET9060's superior linearity performance makes it an ideal solution for base station applications. The PowerSO-10 plastic package, designed to offer high reliability, is the first ST JEDEC approved, high power SMD package. It has been specially optimized for RF needs and offers excellent RF performances and ease of assembly.

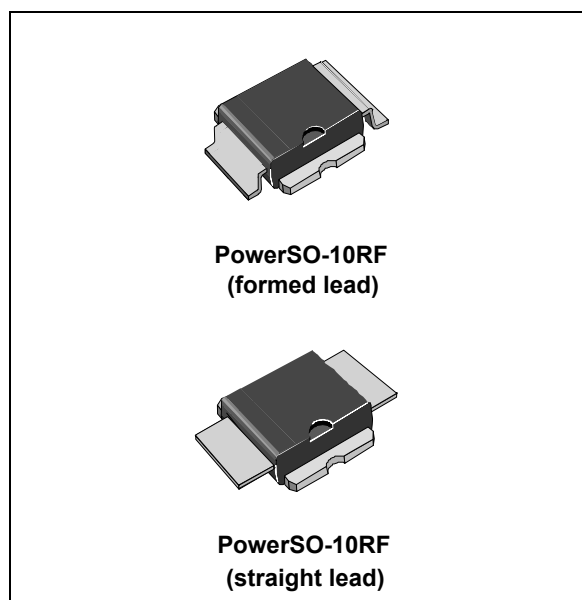


Figure 1. Pin connection

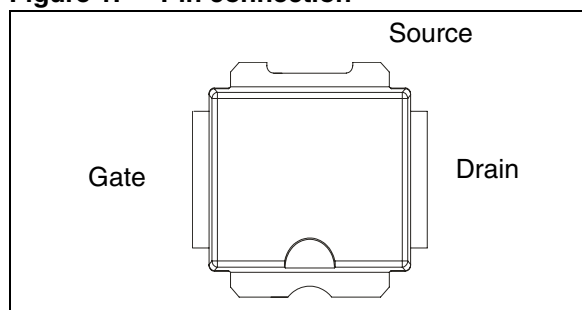


Table 1. Device summary

Order codes	Packages	Marking	Packaging
LET9060	PowerSO-10RF (formed lead)	LET9060	Tube
LET9060S	PowerSO-10RF (straight lead)	LET9060S	Tube
LET9060TR	PowerSO-10RF (formed lead)	LET9060	Tape and reel
LET9060STR	PowerSO-10RF (straight lead)	LET9060S	Tape and reel

# 1 Maximum ratings

$T_{CASE} = 25\text{ °C}$ .

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain-source voltage	80	V
$V_{GS}$	Gate-source voltage	-0.5 to +15	V
$I_D$	Drain current	12	A
$P_{DISS}$	Power dissipation (@ $T_C = 70\text{ °C}$ )	95	W
$T_J$	Max. operating junction temperature	165	°C
$T_{STG}$	Storage temperature	-65 to +150	°C

**Table 3. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thJC}$	Junction-case thermal resistance	1.0	°C/W

## 2 Electrical characteristics

$T_C = 25\text{ }^\circ\text{C}$

**Table 4. Static**

Symbol	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}; I_{DS} = 10\text{ mA}$	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	$\mu\text{A}$
$V_{GS(Q)}$	$V_{DS} = 28\text{ V}; I_D = 100\text{ mA}$	2.0		5.0	V
$V_{DS(ON)}$	$V_{GS} = 10\text{ V}; I_D = 3\text{ A}$		0.8	1.2	V
$G_{FS}$	$V_{DS} = 10\text{ V}; I_D = 3\text{ A}$	2.5			mho
$C_{ISS}$	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}; f = 1\text{ MHz}$		77		pF
$C_{OSS}$	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}; f = 1\text{ MHz}$		39		pF
$C_{RSS}$	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}; f = 1\text{ MHz}$		1.2		pF

**Table 5. Dynamic**

Symbol	Test conditions	Min.	Typ.	Max.	Unit
$P_{OUT}$	$V_{DD} = 28\text{ V}; I_{DQ} = 300\text{ mA}; f = 960\text{ MHz}$	60	80	-	W
$G_{PS}$	$V_{DD} = 28\text{ V}; I_{DQ} = 300\text{ mA}; P_{OUT} = 60\text{ W}; f = 960\text{ MHz}$	16	17.2	-	dB
$\eta_D$	$V_{DD} = 28\text{ V}; I_{DQ} = 300\text{ mA}; P_{IN} = 2\text{ W}; f = 960\text{ MHz}$	60	70	-	%
Load mismatch	$V_{DD} = 28\text{ V}; I_{DQ} = 300\text{ mA}; P_{OUT} = 60\text{ W}; f = 960\text{ MHz}$ All phase angles		20:1		VSWR

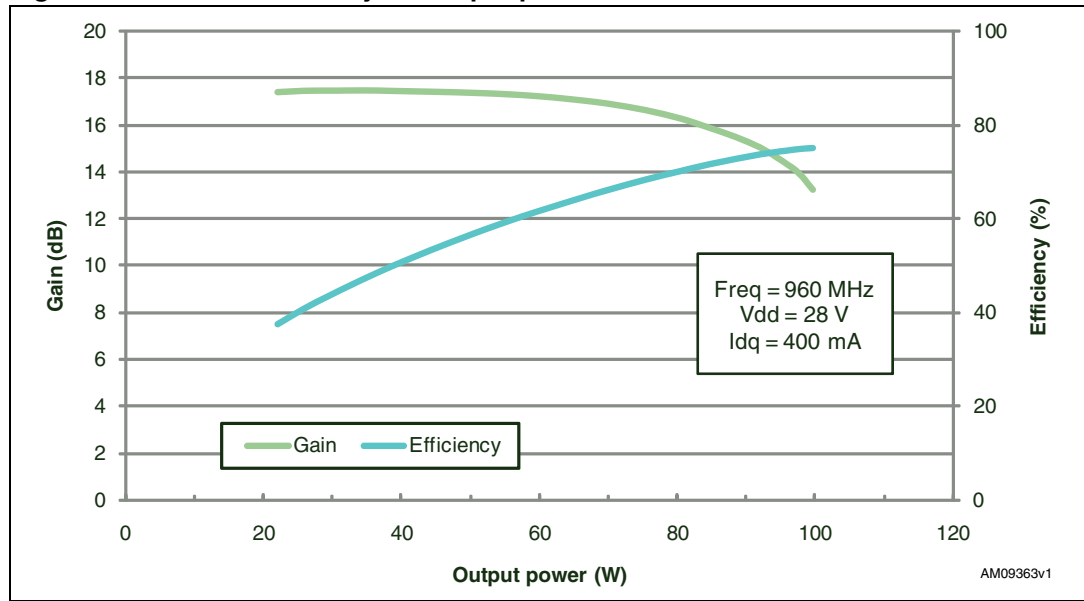
**Table 6. ESD protection characteristics**

Test conditions	Class
Human body model	2
Machine model	M3

**Table 7. Moisture sensitivity level**

Test conditions	Rating
J-STD-020B	MSL 3

Figure 2. Gain & efficiency vs. output power



### 3 Package mechanical data

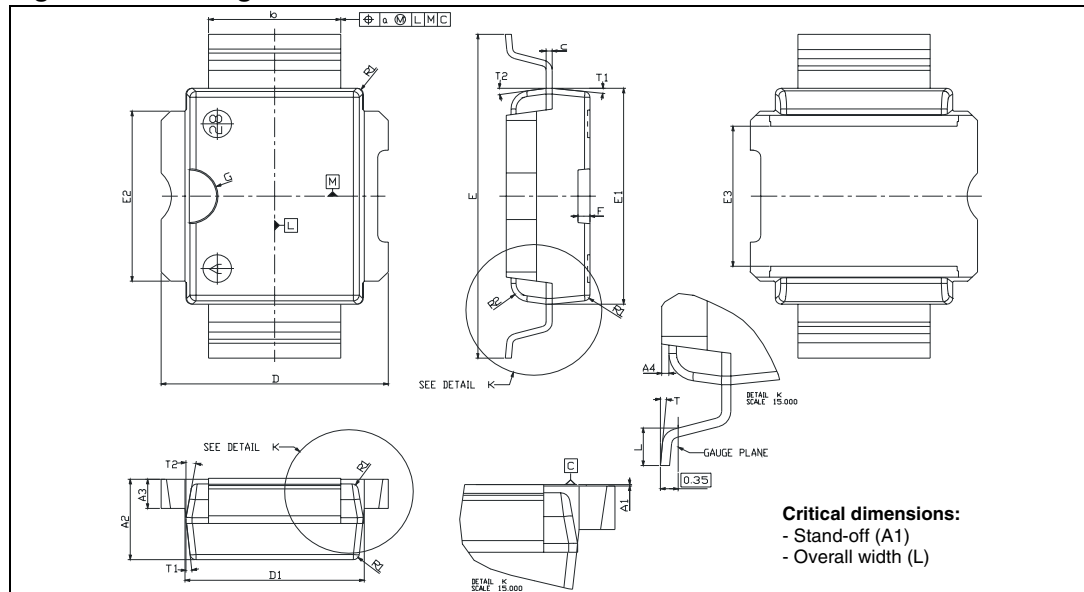
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK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

**Table 8. PowerSO-10RF formed lead (gull wing) mechanical data**

Dim.	mm.			Inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A1	0	0.05	0.1	0.	0.0019	0.0038
A2	3.4	3.5	3.6	0.134	0.137	0.142
A3	1.2	1.3	1.4	0.046	0.05	0.054
A4	0.15	0.2	0.25	0.005	0.007	0.009
a		0.2			0.007	
b	5.4	5.53	5.65	0.212	0.217	0.221
c	0.23	0.27	0.32	0.008	0.01	0.012
D	9.4	9.5	9.6	0.370	0.374	0.377
D1	7.4	7.5	7.6	0.290	0.295	0.298
E	13.85	14.1	14.35	0.544	0.555	0.565
E1	9.3	9.4	9.5	0.365	0.37	0.375
E2	7.3	7.4	7.5	0.286	0.292	0.294
E3	5.9	6.1	6.3	0.231	0.24	0.247
F		0.5			0.019	
G		1.2			0.047	
L	0.8	1	1.1	0.030	0.039	0.042
R1			0.25			0.01
R2		0.8			0.031	
T	2 deg	5 deg	8 deg	2 deg	5 deg	8 deg
T1		6 deg			6 deg	
T2		10 deg			10 deg	

*Note: Resin protrusions not included (max value: 0.15 mm per side).*

**Figure 3. Package dimensions**



**Table 9. PowerSO-10RF straight lead mechanical data**

Dim.	mm.			Inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A1	1.62	1.67	1.72	0.064	0.065	0.068
A2	3.4	3.5	3.6	0.134	0.137	0.142
A3	1.2	1.3	1.4	0.046	0.05	0.054
A4	0.15	0.2	0.25	0.005	0.007	0.009
a		0.2			0.007	
b	5.4	5.53	5.65	0.212	0.217	0.221
c	0.23	0.27	0.32	0.008	0.01	0.012
D	9.4	9.5	9.6	0.370	0.374	0.377
D1	7.4	7.5	7.6	0.290	0.295	0.298
E	15.15	15.4	15.65	0.595	0.606	0.615
E1	9.3	9.4	9.5	0.365	0.37	0.375
E2	7.3	7.4	7.5	0.286	0.292	0.294
E3	5.9	6.1	6.3	0.231	0.24	0.247
F		0.5			0.019	
G		1.2			0.047	
R1			0.25			0.01
R2		0.8			0.031	
T1		6 deg			6 deg	
T2		10 deg			10 deg	

*Note:* Resin protrusions not included (max value: 0.15 mm per side)

**Figure 4. Package dimensions**

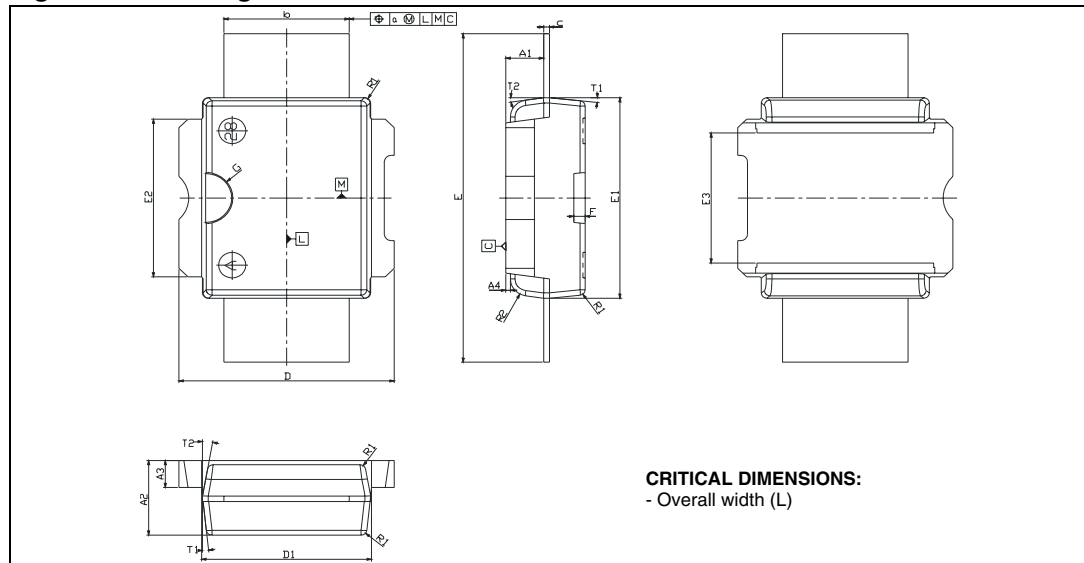


Figure 5. Tube information

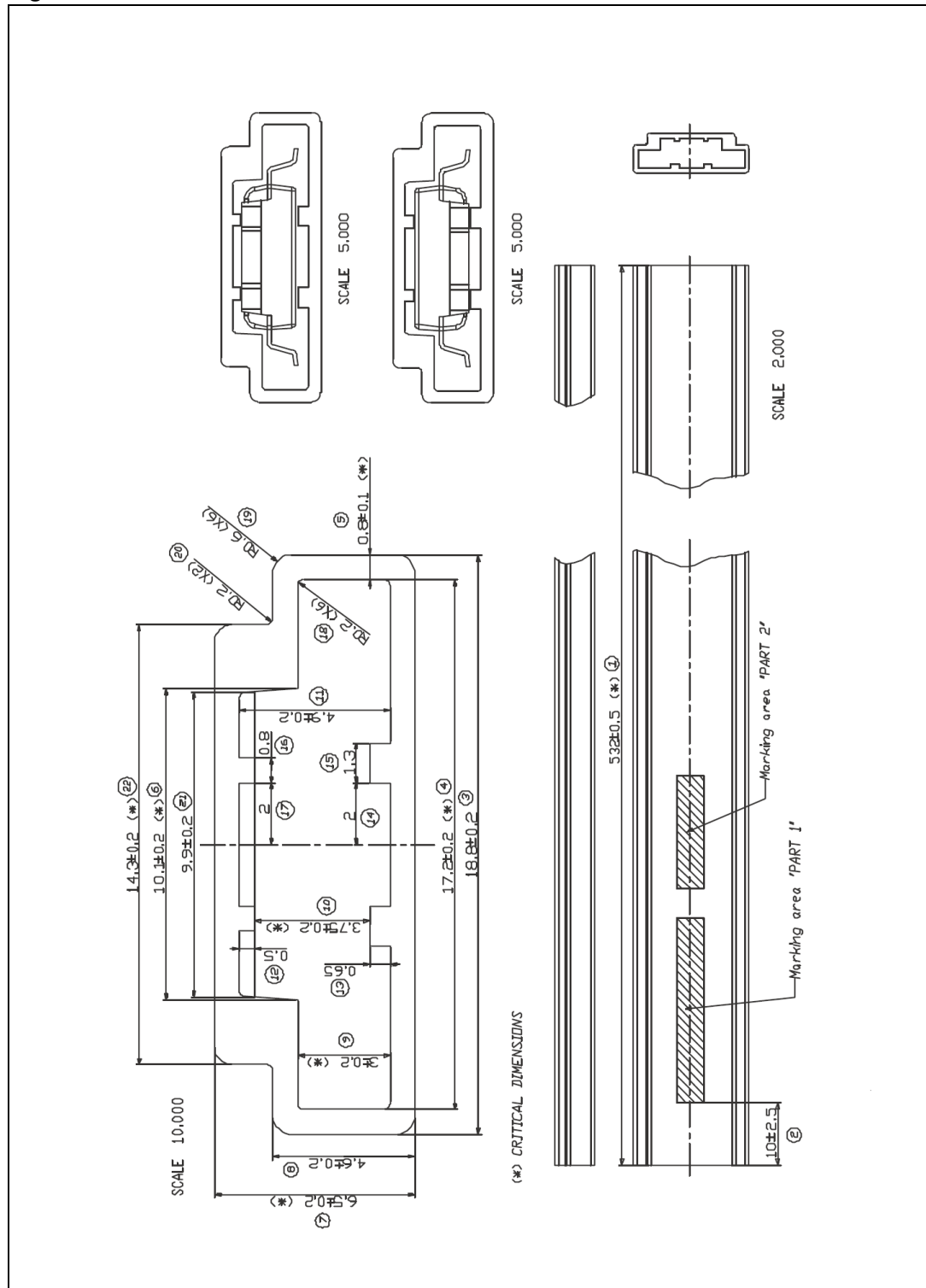
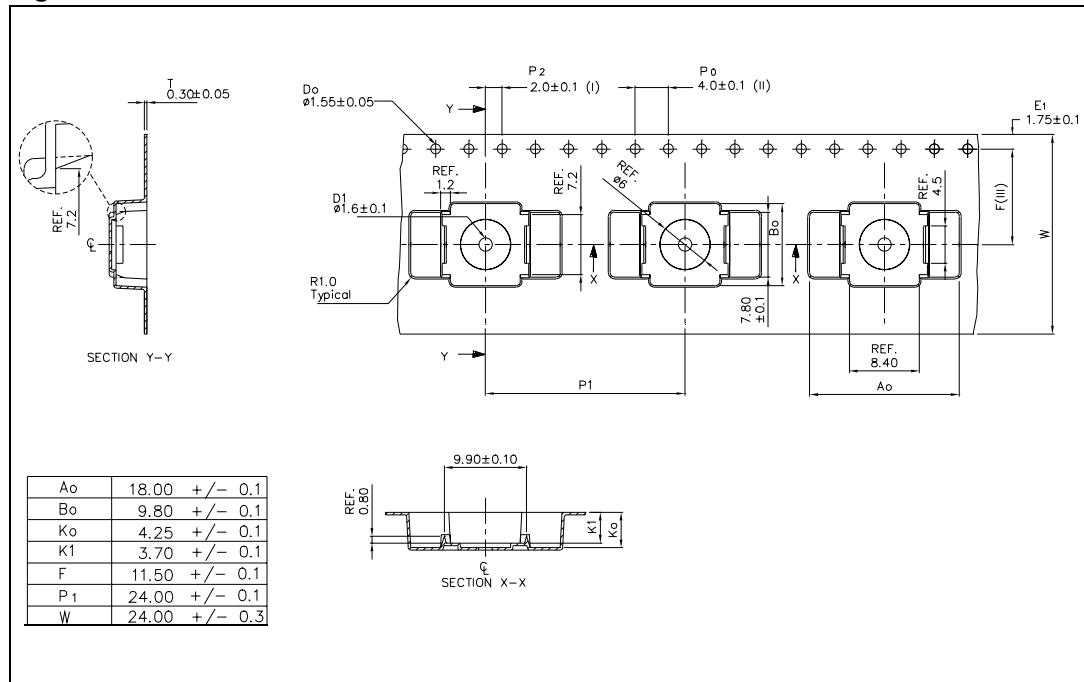




Figure 6. Reel information



## 4 Revision history

**Table 10. Document revision history**

Date	Revision	Changes
24-Feb-2011	1	Initial release.

**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.

© 2011 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)

