# LET9120M

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

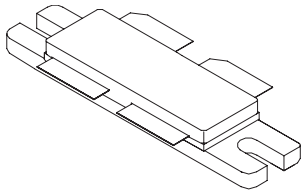
**Preliminary data**

## Features

- Excellent thermal stability
- Common source configuration push-pull
- $P_{OUT}$ = 120 W with 18 dB gain @ 860 MHz
- Internal input matching
- BeO-free package

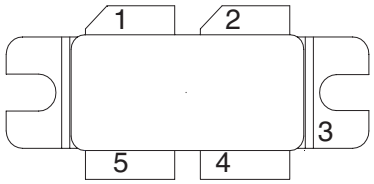
## Description

The LET9120M 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 1.0 GHz.



**M252**
**Epoxy sealed**

**Figure 1. Pin connection**




1. Drain
2. Drain
3. Source
4. Gate
5. Gate



**Table 1. Device summary**

| Order code | Package | Branding |
|---|---|---|
| LET9120M | M252 | LET9120M |

# Contents

# 1 Electrical data

## 1.1 Maximum ratings

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

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-source voltage | 80 | V |
| $V_{GS}$ | Gate-source voltage | ±20 | V |
| $I_D$ | Drain current | 18 | A |
| $P_{DISS}$ | Power dissipation (@ Tc = 70°C) | 217 | 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 | 0.6 | °C/W |

# 2 Electrical characteristics

$T_{CASE}$ = +25 °C

## 2.1 Static

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

| Symbol | Test conditions | | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | $V_{GS}$ = 0 V | $I_{DS}$ = 1 mA | | 80 | | | V |
| $I_{DSS}$ | $V_{GS}$ = 0 V | $V_{DS}$ = 28 V | | | | 1 | µA |
| $I_{GSS}$ | $V_{GS}$ = 5 V | $V_{DS}$ = 0 V | | | | 1 | µA |
| $V_{GS(Q)}$ | $V_{DS}$ = 28 V | $I_D$ = 100 mA | | 2.0 | | 5.0 | V |
| $V_{DS(ON)}$ | $V_{GS}$ = 10 V | $I_D$ = 3 A | | | 0.9 | 1.2 | V |
| $G_{FS}$ | $V_{DS}$ = 10 V | $I_D$ = 3 A | | 2.5 | | | mho |
| $C_{OSS}$ | $V_{GS}$ = 0 V | $V_{DS}$ = 28 V | f = 1 MHz | | 29 | | pF |

*Note: Device is internally input matched.*

## 2.2 Dynamic

**Table 5. Dynamic**

| Symbol | Test conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| $P_{OUT}$ | $V_{DD}$ = 32 V $I_{DQ}$ = 400 mA f = 860 MHz | 120 | | - | W |
| $G_{PS}$ | $V_{DD}$ = 32 V $I_{DQ}$ = 400 mA $P_{OUT}$ = 120 W f = 860 MHz | 16 | 18 | | dB |
| $\eta_D$ | $V_{DD}$ = 32 V $I_{DQ}$ = 400 mA $P_{OUT}$ = 120 W f = 860 MHz | 50 | 65 | | % |

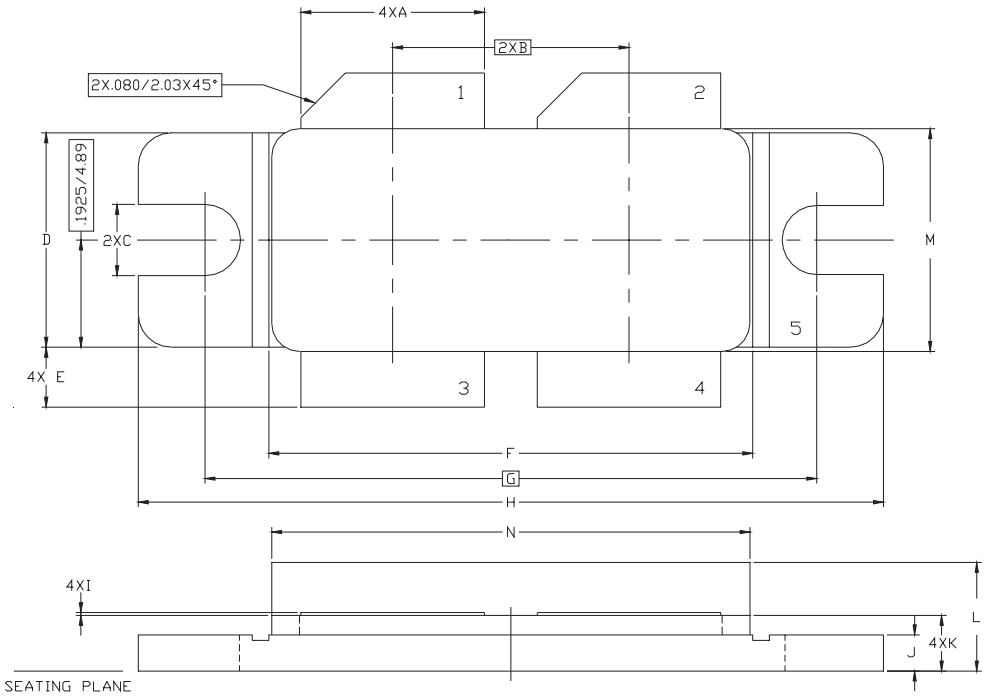
# 3 Package mechanical data

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*. ECOPACK® is an ST trademark.

**Table 6. M252 (.400 x .860 4L BAL N/HERM W/FLG) mechanical data**

| Dim. | mm. | | | inch | | |
|---|---|---|---|---|---|---|
| | Min | Typ | Max | Min | Typ | Max |
| A | 8.13 | | 8.64 | .320 | | .340 |
| B | | 10.80 | | | .425 | |
| C | 3.00 | | 3.30 | .118 | | .130 |
| D | 9.65 | | 9.91 | .380 | | .390 |
| E | 2.16 | | 2.92 | .085 | | .115 |
| F | 21.97 | | 22.23 | .865 | | .875 |
| G | | 27.94 | | | 1.100 | |
| H | 33.91 | | 34.16 | 1.335 | | 1.345 |
| I | 0.10 | | 0.15 | .004 | | .006 |
| J | 1.52 | | 1.78 | .060 | | .070 |
| K | 2.36 | | 2.74 | .093 | | .108 |
| L | 4.57 | | 5.33 | .180 | | .210 |
| M | 9.96 | | 10.34 | .392 | | .407 |
| N | 21.64 | | 22.05 | .852 | | .868 |

**Figure 2. Package dimensions**




Controlling dimension: Inches

Ref. 7145054A

# 4 Revision history

Table 7. Document revision history

| Date | Revision | Changes |
|---|---|---|
| 10-Nov-2009 | 1 | First Issue. |

**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.



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**