



## LET9060F

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

### Features

- Excellent thermal stability
- Common source configuration
- $P_{OUT}$  (@ 28 V)= 60 W with 18 dB gain @ 945 MHz
- $P_{OUT}$  (@ 36 V)= 90 W with 18 dB gain @ 945 MHz
- BeO free package
- In compliance with the 2002/95/EC european directive

### Description

The LET9060F 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. The LET9060F is designed for high gain and broadband performance operating in common source mode at 28 V. It is ideal for base station applications requiring high linearity.

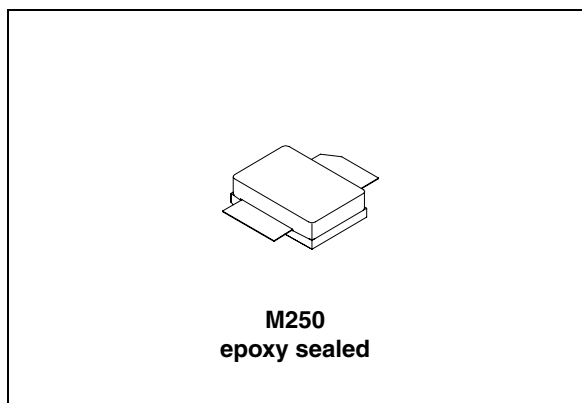


Figure 1. Pin out

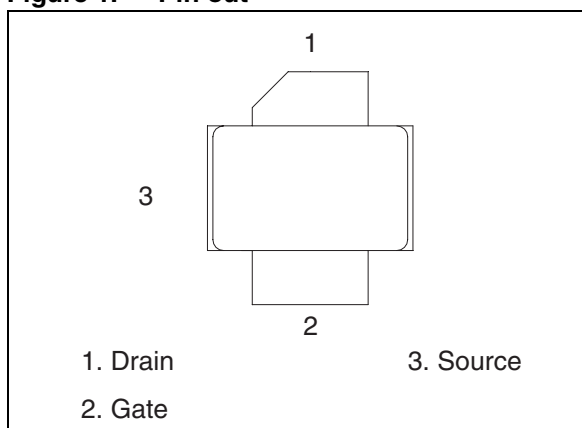


Table 1. Device summary

| Order code | Package | Branding |
|------------|---------|----------|
| LET9060F   | M250    | LET9060F |

# 1 Maximum ratings

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

| 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 (@ $T_C = 70\text{ }^{\circ}\text{C}$ ) | 130         | W                  |
| $T_J$         | Max. operating junction temperature                       | 200         | $^{\circ}\text{C}$ |
| $T_{STG}$     | Storage temperature                                       | -65 to +150 | $^{\circ}\text{C}$ |

**Table 3. Thermal data**

| Symbol       | Parameter                        | Value | Unit                 |
|--------------|----------------------------------|-------|----------------------|
| $R_{th(JC)}$ | Junction-case thermal resistance | 1.0   | $^{\circ}\text{C/W}$ |

## 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 |
|---------------|----------------------------------------------------------------------------------------------------------------|------|------|------|------|
| $P_{OUT}$     | $V_{DD} = 28\text{ V}; I_{DQ} = 400\text{ mA}; P_{IN} = 1.5\text{ W}; f = 945\text{ MHz}$                      | 60   | 75   | -    | W    |
| $G_{PS}$      | $V_{DD} = 28\text{ V}; I_{DQ} = 400\text{ mA}; P_{OUT} = 60\text{ W}; f = 945\text{ MHz}$                      | 16   | 18   | -    | dB   |
| $h_D$         | $V_{DD} = 28\text{ V}; I_{DQ} = 400\text{ mA}; P_{IN} = 1.5\text{ W}; f = 945\text{ MHz}$                      | 60   | 70   | -    | %    |
| Load mismatch | $V_{DD} = 35\text{ V}; I_{DQ} = 400\text{ mA}; P_{OUT} = 100\text{ W}; f = 945\text{ MHz}$<br>All phase angles |      | 20:1 |      | VSWR |

3 Impedance data

Figure 2. Impedance data

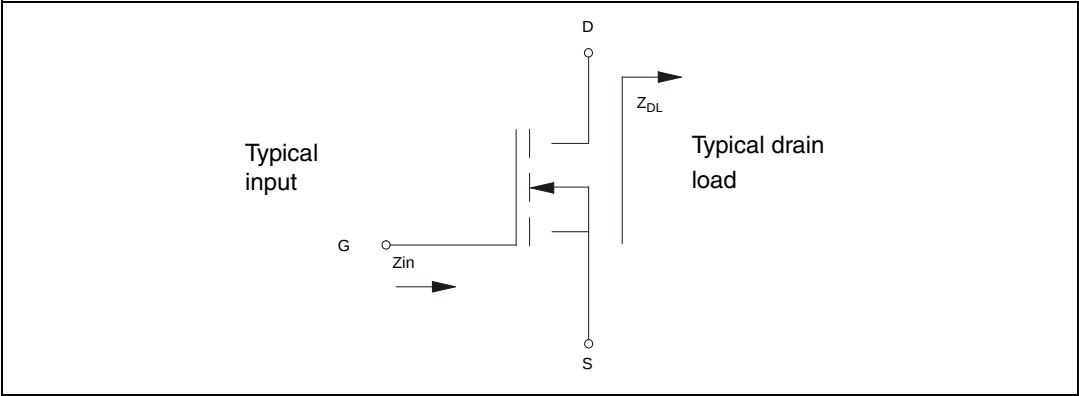


Table 6. Impedance data

| Frequency | $Z_{IN} (\Omega)$ | $Z_{DL} (\Omega)$ |
|-----------|-------------------|-------------------|
| 945       | $0.34 - j 0.31$   | $2.78 + j 0.66$   |

4 Typical performances

Figure 3. Gain vs output power freq = 945 MHz, Vdd = 28 V

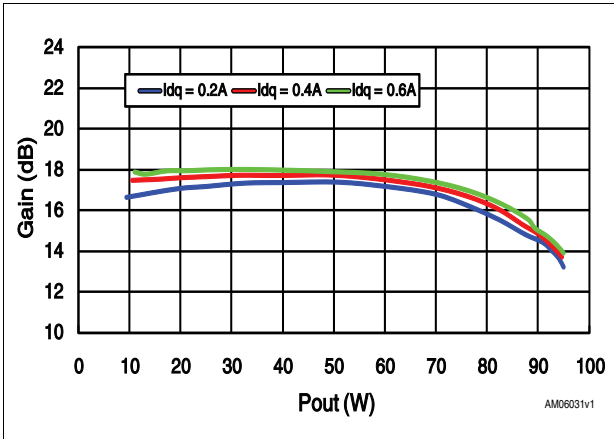


Figure 4. Gain and efficiency vs output power, freq = 945 MHz, Vdd = 28 V, Idq = 0.4 A

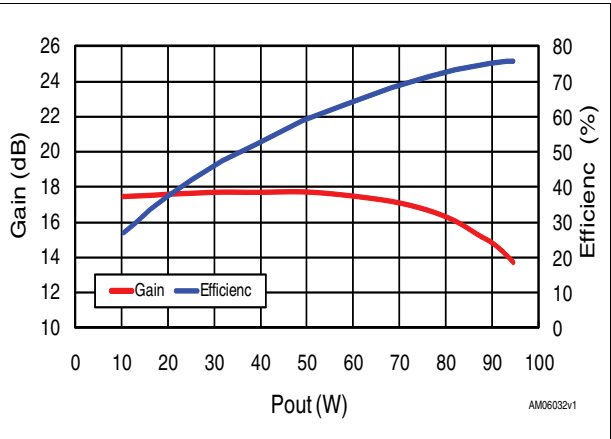


Table 7. Gain vs output power, freq = 945 MHz, Idq = 0.4 A

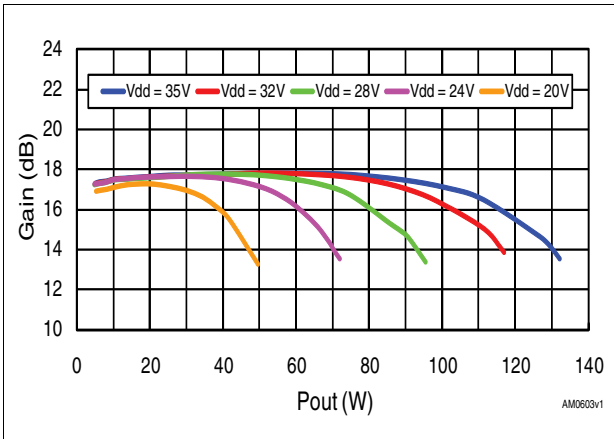


Figure 5. Gain and efficiency vs output power, freq = 945 MHz, Vdd = 35 V, Idq = 0.4 A

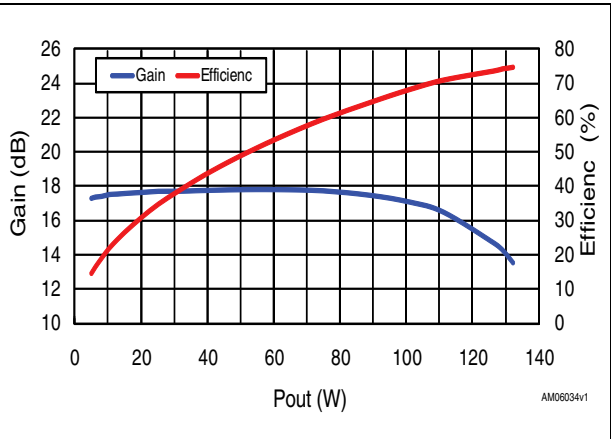


Table 8. Output power vs supply voltage  
freq = 945 MHz, Idq = 0.4 A

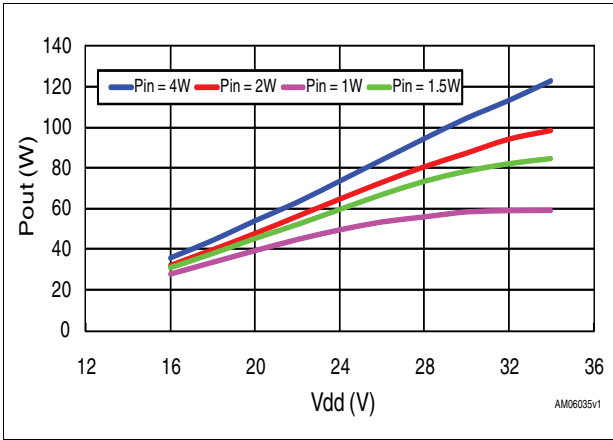
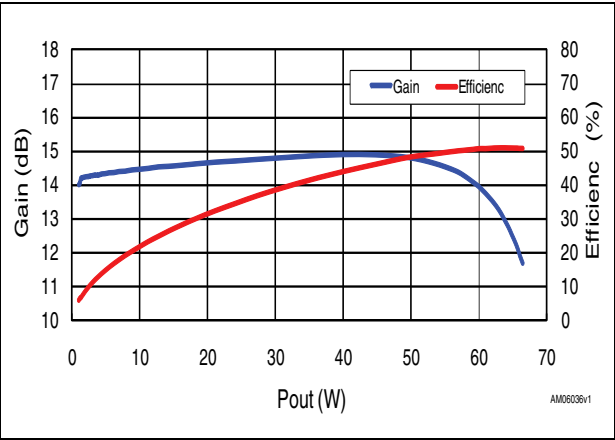


Figure 6. Gain and efficiency vs output power, freq = 1850 MHz, Vdd = 28 V, Idq = 0.4 A



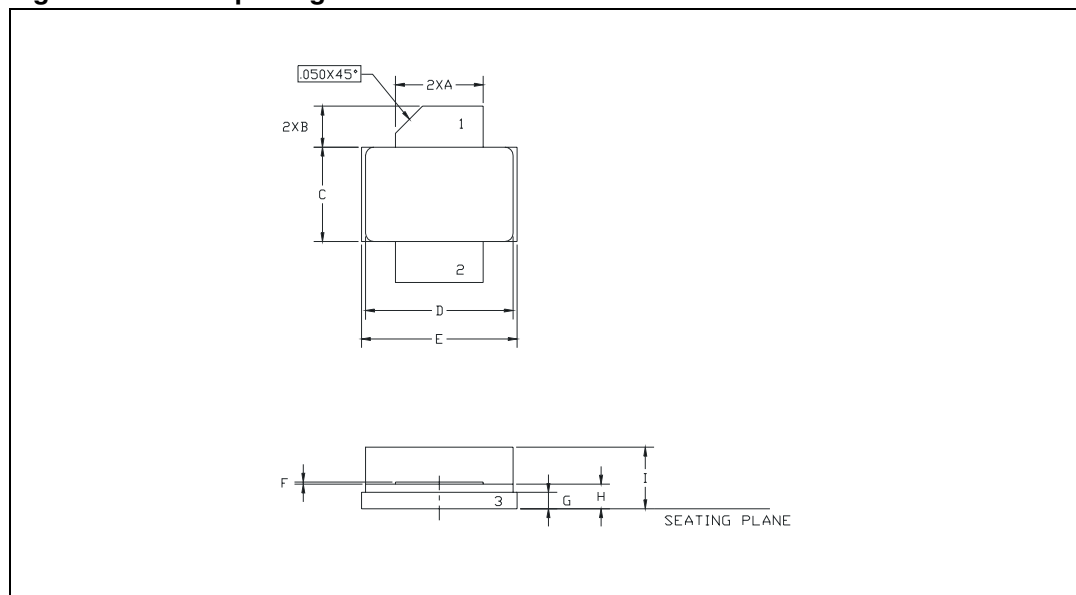
## 5 Package mechanical data

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**Table 9. M250 (.230 x .360 2L N/HERM W/FLG) mechanical data**

| Dim. | mm.  |     |      | Inch  |     |       |
|------|------|-----|------|-------|-----|-------|
|      | Min  | Typ | Max  | Min   | Typ | Max   |
| A    | 5.21 |     | 5.71 | 0.205 |     | 0.225 |
| B    | 2.16 |     | 2.92 | 0.085 |     | 0.115 |
| C    | 5.59 |     | 6.09 | 0.220 |     | 0.240 |
| D    | 8.89 |     | 9.40 | 0.350 |     | 0.370 |
| E    | 9.40 |     | 9.91 | 0.370 |     | 0.390 |
| F    | 0.11 |     | 0.15 | 0.004 |     | 0.006 |
| G    | 0.89 |     | 1.14 | 0.035 |     | 0.045 |
| H    | 1.45 |     | 1.70 | 0.057 |     | 0.067 |
| I    | 2.67 |     | 3.94 | 0.105 |     | 0.155 |

**Figure 7. M250 package dimensions**



## 6 Revision history

**Table 10. Document revision history**

| Date        | Revision | Changes                                                                       |
|-------------|----------|-------------------------------------------------------------------------------|
| 03-Dec-2009 | 1        | Initial release.                                                              |
| 11-Feb-2010 | 2        | Changed test condition for $V_{(BR)DSS}$ in <a href="#">Table 4: Static</a> . |
| 04-Apr-2011 | 3        | Updated features on cover page.                                               |

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