

### **LET9060**

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

Preliminary data

#### **Features**

- Excellent thermal stability
- Common source configuration
- P<sub>OUT</sub> = 60 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.

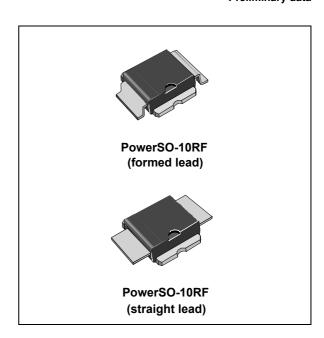


Figure 1. Pin connection

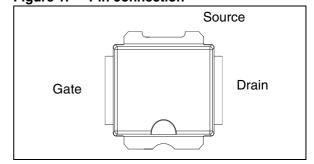


Table 1. Device summary

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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				

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Maximum ratings LET9060

## 1 Maximum ratings

 $T_{CASE} = 25 \, ^{\circ}C.$ 

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V <sub>(BR)DSS</sub>	Drain-source voltage	80	V
V <sub>GS</sub>	Gate-source voltage	-0.5 to +15	V
I <sub>D</sub>	Drain current	12	Α
P <sub>DISS</sub>	Power dissipation (@ T <sub>C</sub> = 70 °C)	95	W
TJ	Max. operating junction temperature	165	°C
T <sub>STG</sub>	Storage temperature	-65 to +150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R <sub>thJC</sub>	Junction-case thermal resistance	1.0	°C/W

### 2 Electrical characteristics

 $T_C = 25$  °C

Table 4. Static

Symbol	Test conditions	Min.	Тур.	Max.	Unit
V <sub>(BR)DSS</sub>	$V_{GS} = 0 \text{ V}; I_{DS} = 10 \text{ mA}$	80			V
I <sub>DSS</sub>	V <sub>GS</sub> = 0 V; V <sub>DS</sub> = 28 V			1	μΑ
I <sub>GSS</sub>	V <sub>GS</sub> = 5 V; V <sub>DS</sub> = 0 V			1	μΑ
V <sub>GS(Q)</sub>	$V_{DS} = 28 \text{ V}; I_D = 100 \text{ mA}$	2.0		5.0	V
V <sub>DS(ON)</sub>	$V_{GS} = 10 \text{ V}; I_D = 3 \text{ A}$		0.8	1.2	V
G <sub>FS</sub>	$V_{DS} = 10 \text{ V}; I_D = 3 \text{ A}$	2.5			mho
C <sub>ISS</sub>	V <sub>GS</sub> = 0 V; V <sub>DS</sub> = 28 V; f = 1 MHz		77		pF
C <sub>OSS</sub>	V <sub>GS</sub> = 0 V; V <sub>DS</sub> = 28 V; f = 1 MHz		39		pF
C <sub>RSS</sub>	V <sub>GS</sub> = 0 V; V <sub>DS</sub> = 28 V; f = 1 MHz		1.2		pF

#### Table 5. Dynamic

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

#### Table 6. ESD protection characteristics

Test conditions	Class
Human body model	2
Machine model	МЗ

#### Table 7. Moisture sensitivity level

Test conditions	Rating
J-STD-020B	MSL 3

Electrical characteristics LET9060

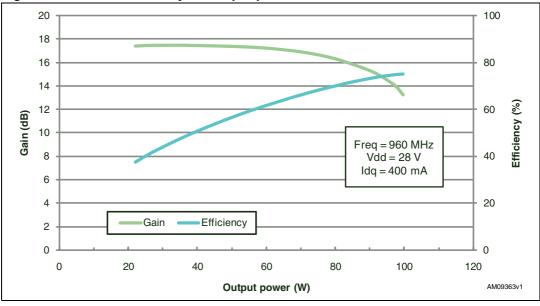


Figure 2. Gain & efficiency vs. output power

### 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. ECOPACK<sup>®</sup> is an ST trademark.

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

Dim.		mm.			Inch.	
	Min.	Тур.	Max.	Min.	Тур.	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
а		0.2			0.007	
b	5.4	5.53	5.65	0.212	0.217	0.221
С	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
Е	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

SEE BETAIL K.

Critical dimensions:

- Stand-off (A1)
- Overall width (L)

Table 9. PowerSO-10RF straight lead mechanical data

Dim.		mm.			Inch.	
	Min.	Тур.	Max.	Min.	Тур.	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
а		0.2			0.007	
b	5.4	5.53	5.65	0.212	0.217	0.221
С	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
Е	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

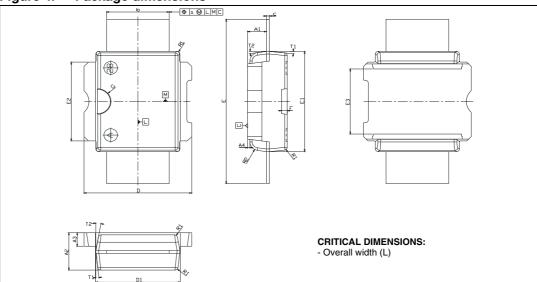


Figure 5. **Tube information** 5,000 SCALE 5,000 SCALE SCALE 2,000 (9) 0,8#0,1 (\*) (A) (B) (A) 532±0,5 (\*) (£) S,0±2,4 (<u>4</u>) 8) (B) ® <u>"</u> 14,3±0,2 (\*)@ 10,1±0,2 (\*)@ 17,2±0,2 (\*) (4) 18,8±0,2 (3) 9,9±0,2 (₹) n 🖺 -Marking area "PART 1" (\*) Z'0#<u>5</u>7'E (4) S'0 (\*) CRITICAL DIMENSIONS ® \*(\*) Z'0∓E 10,000 © S,0±3,4 (\*) 2'0<del>1</del>5'9 (A)

| Section Y-Y | Section Y-Y | Section X-X |

Figure 6. Reel information

Revision history LET9060

## 4 Revision history

Table 10. Document revision history

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

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