

## P-Channel 60 V (D-S) MOSFET

### PRODUCT SUMMARY

V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (mΩ)(Typ.)	I <sub>D</sub> (A) <sup>a</sup>	Q <sub>g</sub> (Typ.)
-60	53 at V <sub>GS</sub> = -10 V	-5.2	13 nC

### FEATURES

- DT-Trench Power MOSFET
- 175 °C Operating Temperature
- Dynamic dV/dt Rating
- Low Thermal Resistance
- Lead (Pb)-free Available

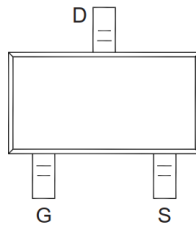


**RoHS**  
COMPLIANT

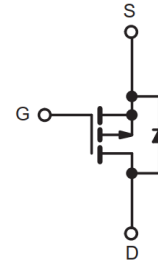
### APPLICATIONS

- Notebook PC Core
- VRM/POL

SOT-23-3L Pin Configuration



Top View



P-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	-60	V
Gate-Source Voltage	V <sub>GS</sub>	± 20	
Continuous Drain Current (T <sub>J</sub> = 175 °C)	I <sub>D</sub>	T <sub>C</sub> = 25 °C	-5.2 <sup>b, c</sup>
		T <sub>C</sub> = 100 °C	-3.8 <sup>b, c</sup>
Pulsed Drain Current	I <sub>DM</sub>	-21	A
Avalanche Current Pulse	I <sub>AS</sub>	-5.2	
Single Pulse Avalanche Energy	E <sub>AS</sub>	120	mJ
Continuous Source-Drain Diode Current	I <sub>S</sub>	-2.5 <sup>a</sup>	A
Maximum Power Dissipation	P <sub>D</sub>	T <sub>A</sub> = 25 °C	27 <sup>b, c</sup>
		T <sub>A</sub> = 100 °C	14 <sup>b, c</sup>
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 175	°C

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b</sup>	R <sub>thJA</sub>	40	65	°C/W
Maximum Junction-to-Case	R <sub>thJC</sub>	4	5.5	

Notes:

- Based on T<sub>C</sub> = 25 °C.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.

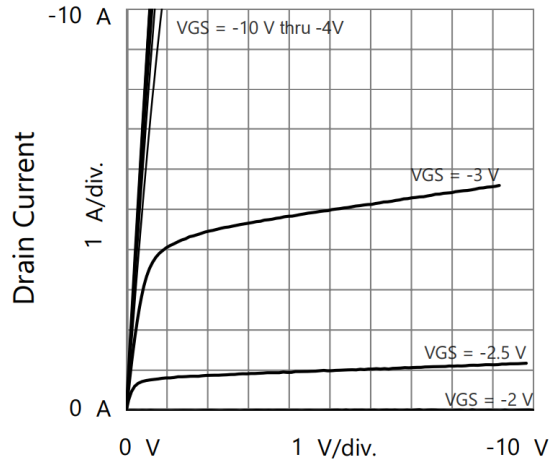
<b>SPECIFICATIONS</b> ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min .	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-60			V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1		-3	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$			-100	$\mu\text{A}$
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$			-500	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq -5\text{ V}, V_{GS} = -10\text{ V}$	6			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -3.2\text{ A}$		53	59	m $\Omega$
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -25\text{ V}, I_D = -3.2\text{ A}$		4		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -25\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1230		$\mu\text{F}$
Output Capacitance	$C_{oss}$			86		
Reverse Transfer Capacitance	$C_{rss}$			60		
Total Gate Charge	$Q_g$	$V_{DS} = -48\text{ V}, V_{GS} = -10\text{ V}, I_D = -3.2\text{ A}$		13		nC
Gate-Source Charge	$Q_{gs}$			4		
Gate-Drain Charge	$Q_{gd}$			6		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		8		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 2.5\text{ }\Omega$ $I_D \cong -3.2\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		12		ns
Rise Time	$t_r$			65		
Turn-Off Delay Time	$t_{d(off)}$			10		
Fall Time	$t_f$			30		
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_A = 25\text{ }^\circ\text{C}$			-5.2	A
Pulse Diode Forward Current <sup>a</sup>	$I_{SM}$				-21	
Body Diode Voltage	$V_{SD}$	$I_S = -1\text{ A}$		-0.6	-1	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -3.2\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		80	160	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$				90	

**Notes:**

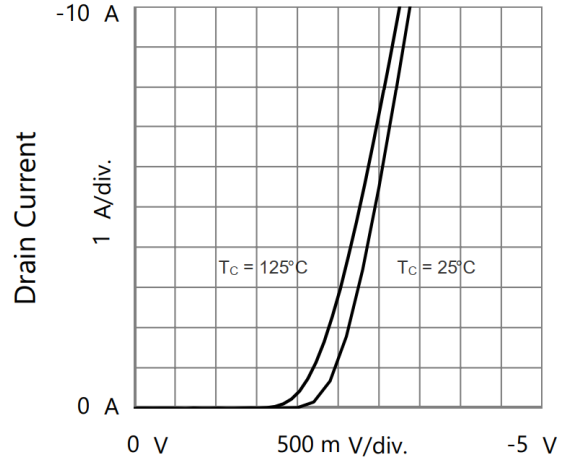
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

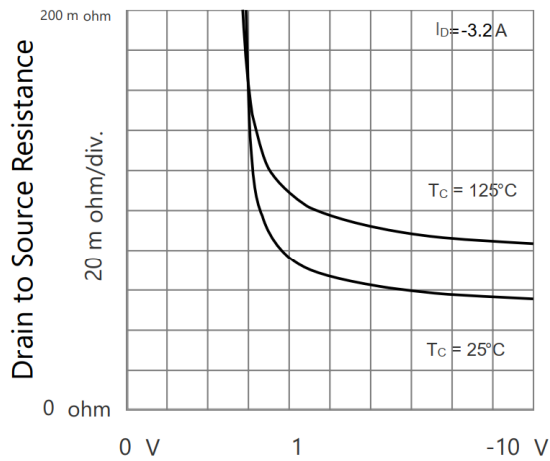
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



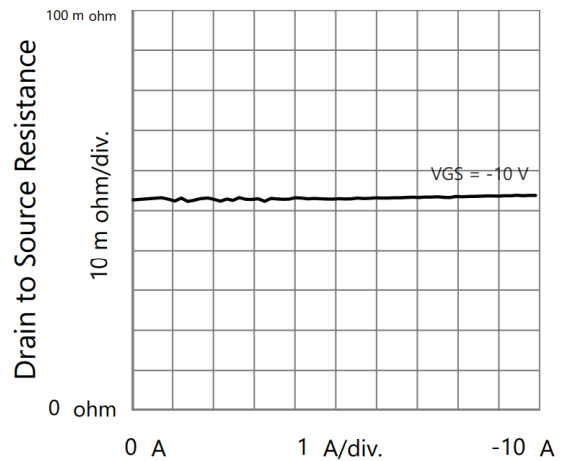
Drain to Source Voltage Output Characteristics



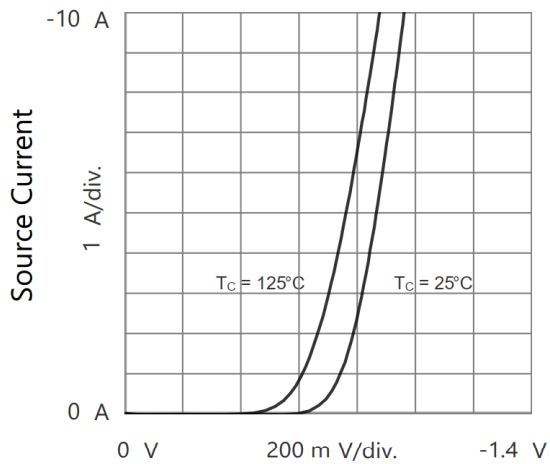
Gate to Source Voltage Transfer Characteristics



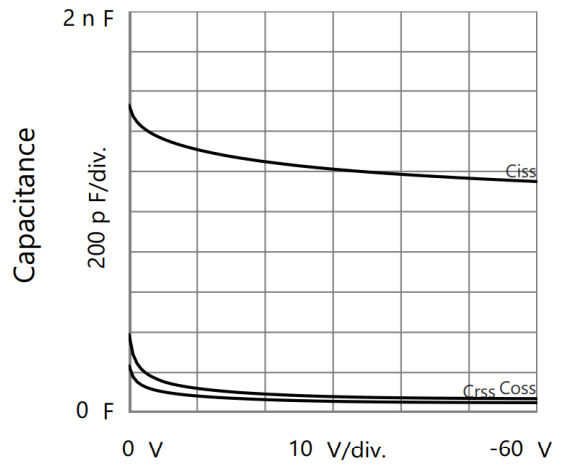
Gate to Source Voltage Drain to Source Resistance vs. Gate to Source Voltage



Drain Current Drain to Source Resistance vs. Drain Current

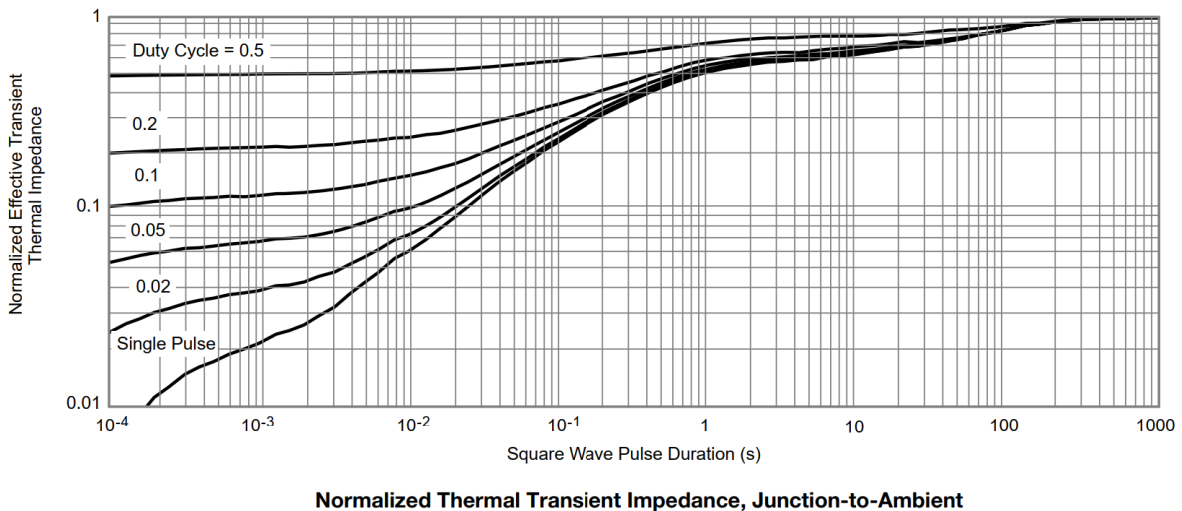
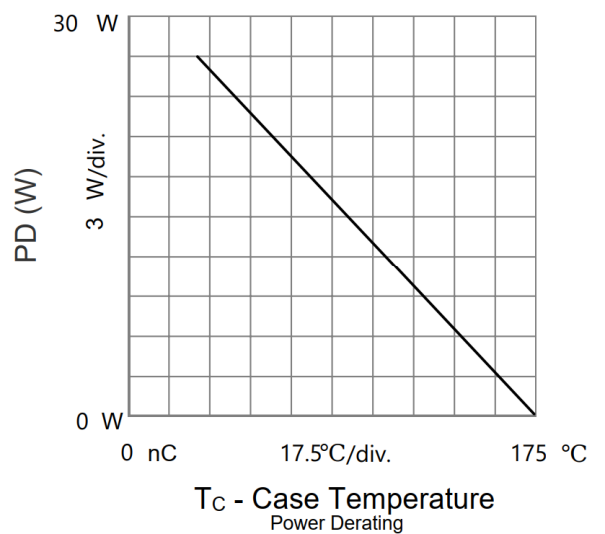
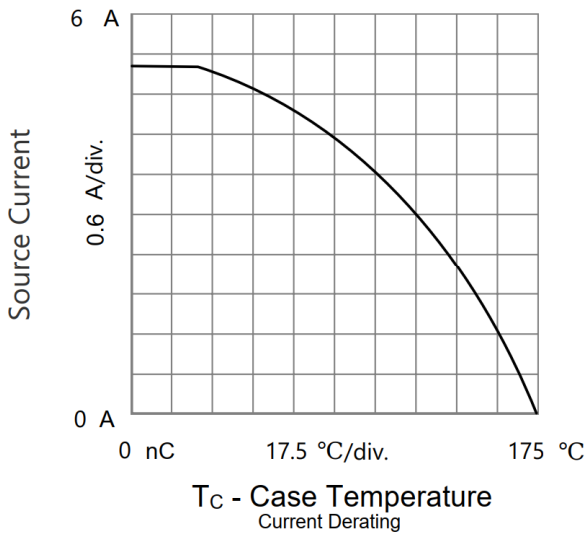
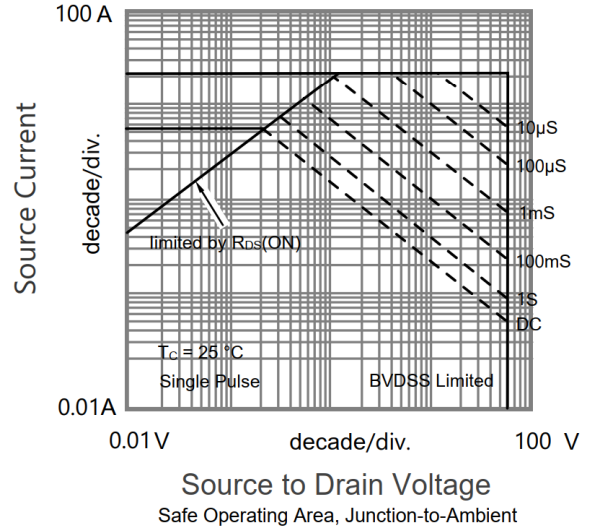
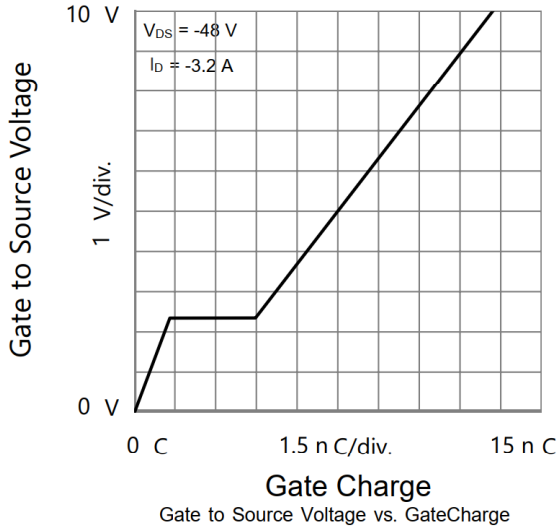


Source to Drain Voltage Body Diode Forward Characteristics

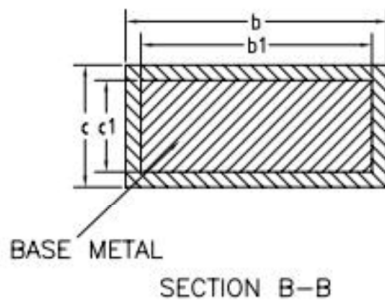
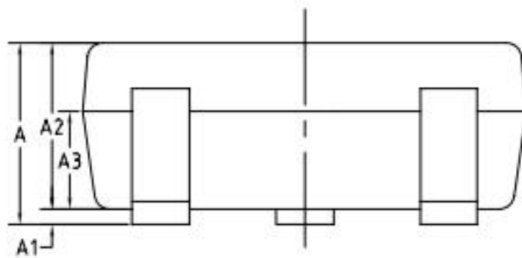
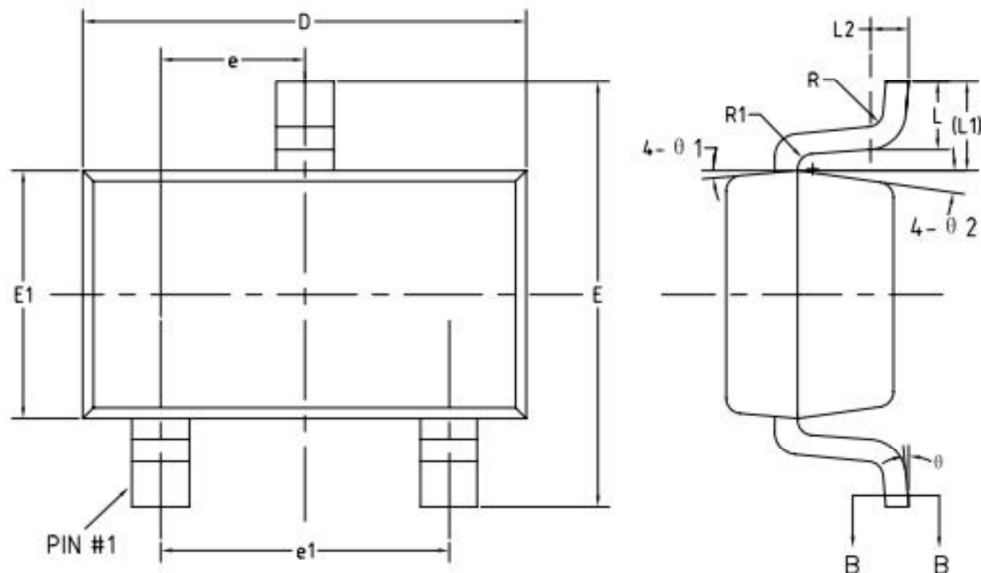


Drain to Source Voltage Capacitances

**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



SOT-23-3L PACKAGE OUTLINE



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX
A	-	-	1.50
A1	0.00	-	0.18
A2	0.85	1.10	1.35
A3	0.58	0.65	0.72
b	0.23	-	0.53
b1	0.20	0.40	0.50
c	0.09	-	0.22
c1	0.08	0.13	0.21
D	2.78	2.95	3.10
E	2.58	2.80	3.03
E1	1.55	1.65	1.78
e	0.83	0.95	1.07
e1	1.78	1.90	2.02
L	0.28	0.45	0.62
L1	0.59REF		
L2	0.25BSC		
R	0.04	-	-
R1	0.04	-	0.21
θ	0°	-	8°
θ 1	8°	10°	12°
θ 2	8°	10°	12°

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