

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


**RoHS**  
 COMPLIANT

### PRODUCT SUMMARY

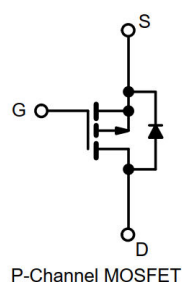
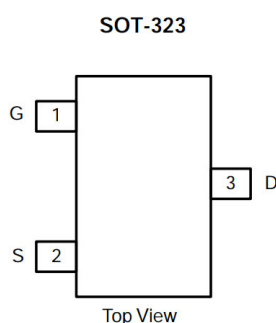
$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )(Typ.)	$I_D$ (A) <sup>a</sup>	$Q_g$ (Typ.)
- 60	170 at $V_{GS} = - 10$ V	- 1.8	2.8 nC
	210 at $V_{GS} = - 4.5$ V		

### FEATURES

- DT-Trench Power MOSFET
- 100 %  $R_g$  and UIS tested

### APPLICATIONS

- Load Switch
- DC/DC converter



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$ °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	- 60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 150$ °C)	$T_C = 25$ °C	- 1.8	A
	$T_C = 70$ °C	- 1.6	
Pulsed Drain Current	$I_{DM}$	- 7.2	
Single-Pulse Avalanche Energy	$E_{AS}$	2.9	mJ
Maximum Power Dissipation	$T_C = 25$ °C	3.0	W
	$T_C = 70$ °C	1.92	
	$T_A = 25$ °C	1.04 <sup>b,c</sup>	
	$T_A = 70$ °C	0.66 <sup>b,c</sup>	
Operating Junction and Storage Temperature Range	$T_J, T_{slg}$	- 55 to 150	°C

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b, d</sup>	$R_{thJA}$	105	120	°C/W
Maximum Junction-to-Case	$R_{thJC}$	35	41.6	

#### Notes

- $T_C = 25$  °C.
- Surface mounted on 1" x 1" FR4 board.
- $t = 10$  s.
- Maximum under steady state conditions is 150 °C/W

SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0, I <sub>D</sub> = - 250 μA	- 60			V
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = - 250 μA	- 1		- 3	V
Gate-Source Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = - 60 V, V <sub>GS</sub> = 0 V			- 1	μA
		V <sub>DS</sub> = - 48 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55 °C			- 50	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≤ - 5 V, V <sub>GS</sub> = - 10 V	- 1.8			A
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = - 10 V, I <sub>D</sub> = - 1 A		170	200	mΩ
		V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 1 A		210	280	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = - 10 V, I <sub>D</sub> = - 1 A		2.8		S
Dynamic <sup>b</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = - 30 V, V <sub>GS</sub> = 0 V, f = 1 MHz		417		pF
Output Capacitance	C <sub>oss</sub>			33		
Reverse Transfer Capacitance	C <sub>rss</sub>			17		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = - 30 V, V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 1 A		2.8		nC
Gate-Source Charge	Q <sub>gs</sub>			1		
Gate-Drain Charge	Q <sub>gd</sub>			1.5		
Gate Resistance	R <sub>g</sub>	f = 1 MHz		10		Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = - 30 V, R <sub>L</sub> = 30 Ω I <sub>D</sub> ≅ - 1 A, V <sub>GEN</sub> = - 4.5 V, R <sub>g</sub> = 1 Ω		40		ns
Rise Time	t <sub>r</sub>			25		
Turn-Off Delay Time	t <sub>d(off)</sub>			10		
Fall Time	t <sub>f</sub>			8		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I <sub>S</sub>	T <sub>C</sub> = 25 °C			- 1.8	A
Pulse Diode Forward Current	I <sub>SM</sub>				- 7.2	
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = - 1 A			- 1.2	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = - 1 A, dI/dt = 100 A/μs, T <sub>J</sub> = 25 °C		34		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			1.8		nC

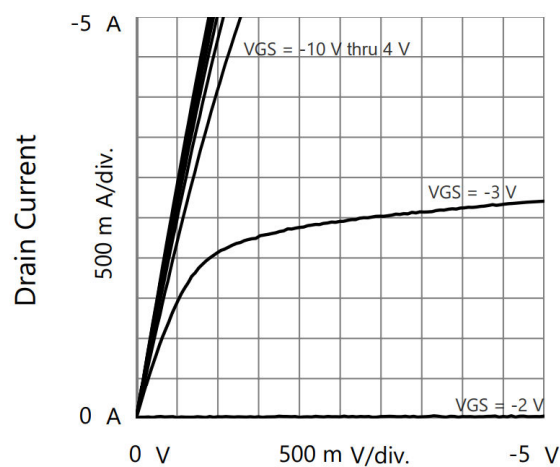
Notes:

a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

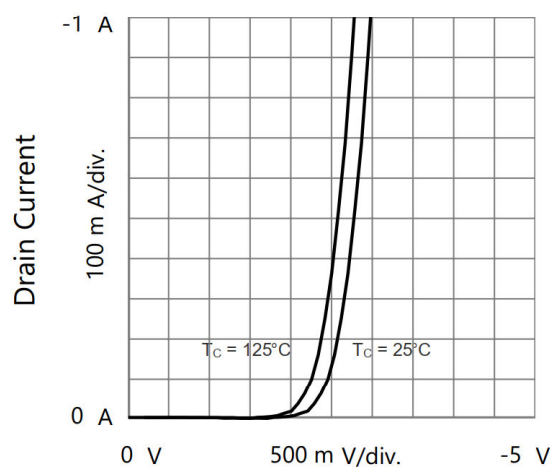
b. Guaranteed by design, not subject to production testing.

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.

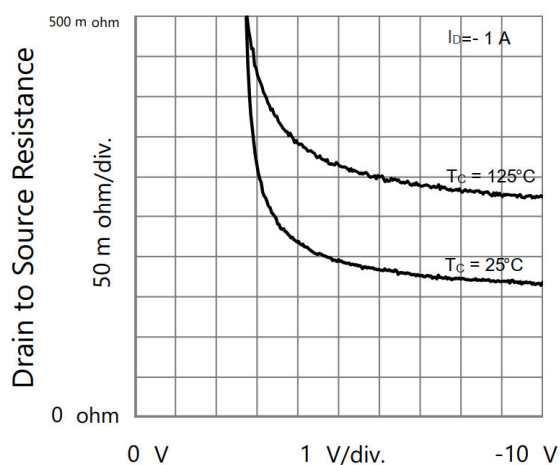
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



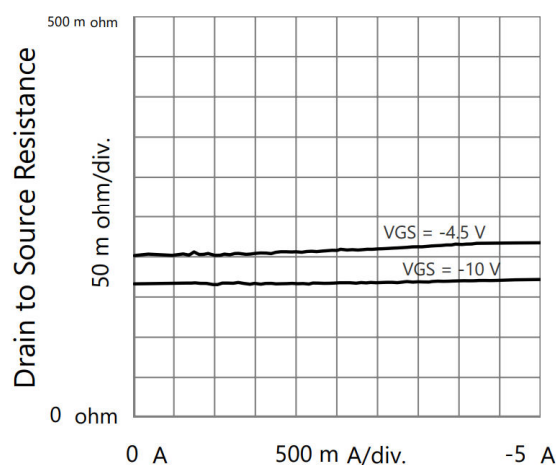
Drain to Source Voltage  
Output Characteristics



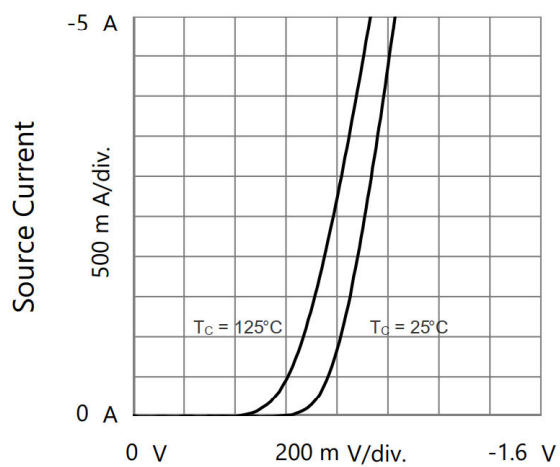
Gate to Source Voltage  
Transfer Characteristics



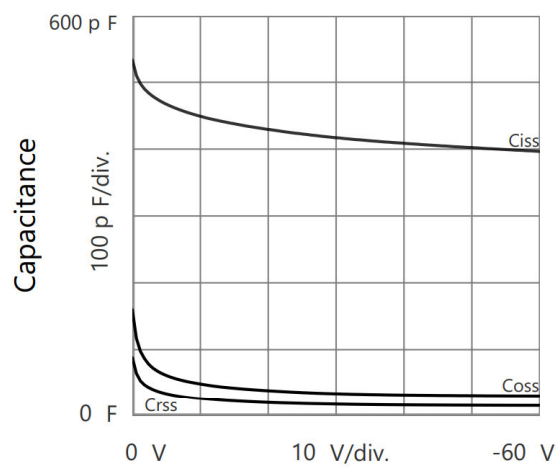
Gate to Source Voltage  
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current  
Drain to Source Resistance vs. Drain Current

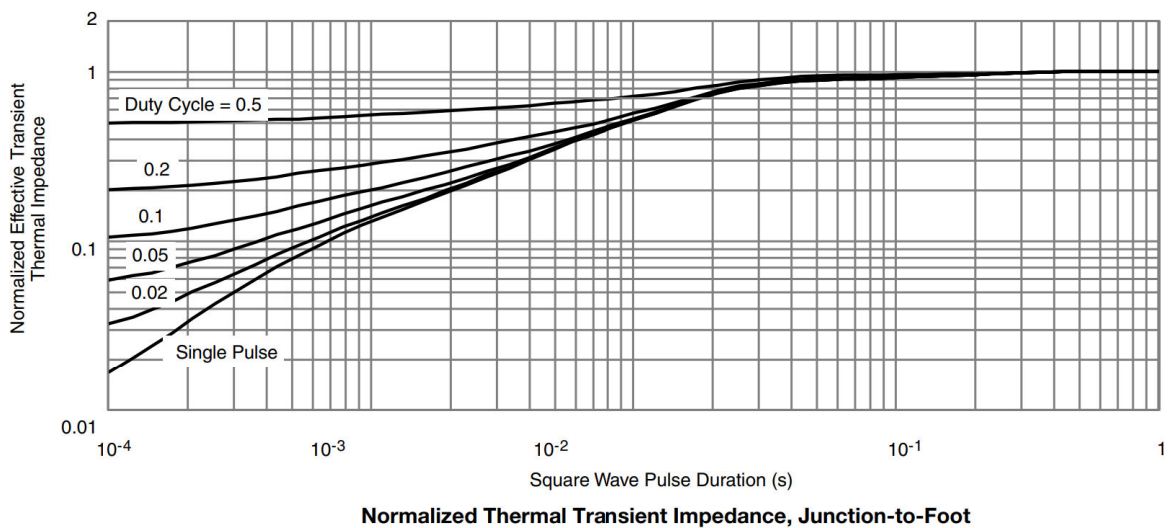
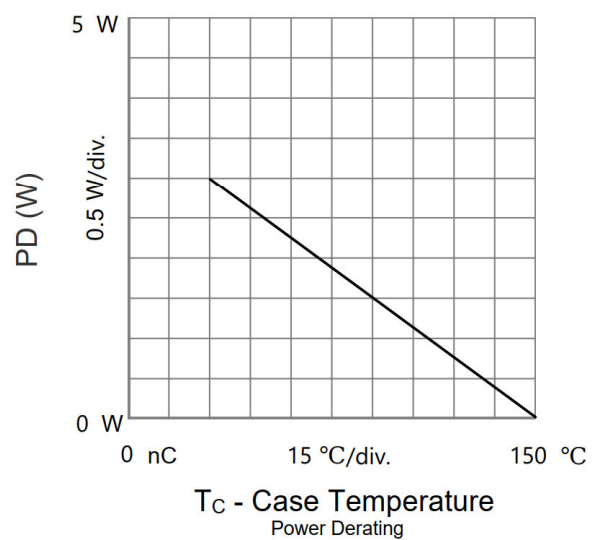
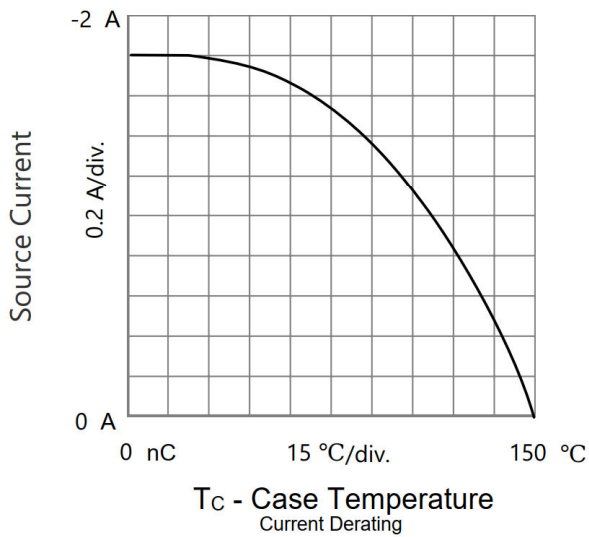
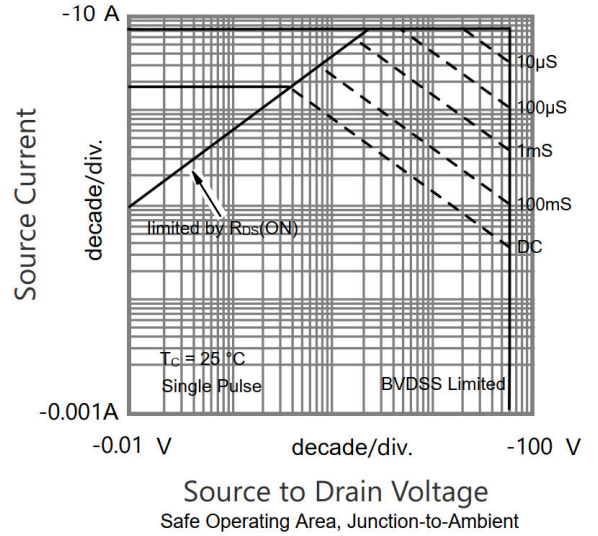
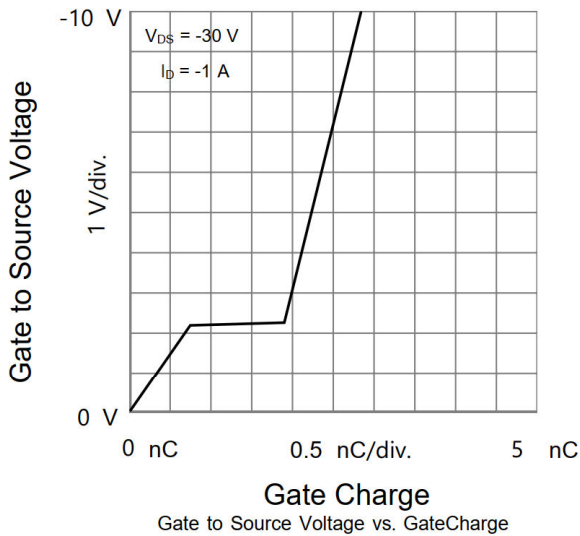


Source to Drain Voltage  
Body Diode Forward Characteristics



Drain to Source Voltage  
Capacitances

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





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