

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

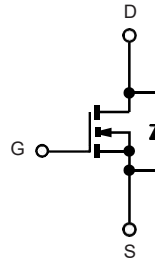
PRODUCT SUMMARY		
$V_{DS}$	60	V
$R_{DS(on)} V_{GS} = 10\text{ V}$	7	m $\Omega$
$R_{DS(on)} V_{GS} = 4.5\text{ V}$	9	m $\Omega$
$I_D$	120	A
Configuration	Single	

### FEATURES

- 175 °C Junction Temperature
- TrenchFET® Power MOSFET



**RoHS**  
COMPLIANT



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25\text{ °C}$ , unless otherwise noted)				
Parameter		Symbol	Limit	Unit
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_J = 175\text{ °C}$ ) <sup>b</sup>	$T_C = 25\text{ °C}$	$I_D$	120	A
	$T_C = 100\text{ °C}$		50 <sup>a</sup>	
Pulsed Drain Current		$I_{DM}$	350	
Continuous Source Current (Diode Conduction)		$I_S$	80 <sup>a</sup>	
Avalanche Current		$I_{AS}$	150	
Single Avalanche Energy (Duty Cycle $\leq 1\%$ )	$L = 0.1\text{ mH}$	$E_{AS}$	125	mJ
Maximum Power Dissipation	$T_C = 25\text{ °C}$	$P_D$	136	W
	$T_A = 25\text{ °C}$		3 <sup>b</sup> , 8.3 <sup>b, c</sup>	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	- 55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$t \leq 10\text{ sec}$	$R_{thJA}$	15	18	°C/W
	Steady State		40	50	
Maximum Junction-to-Case		$R_{thJC}$	0.85	1.1	

Notes:

- Package limited.
- Surface mounted on 1" x 1" FR4 board.
- $t \leq 10\text{ s}$ .

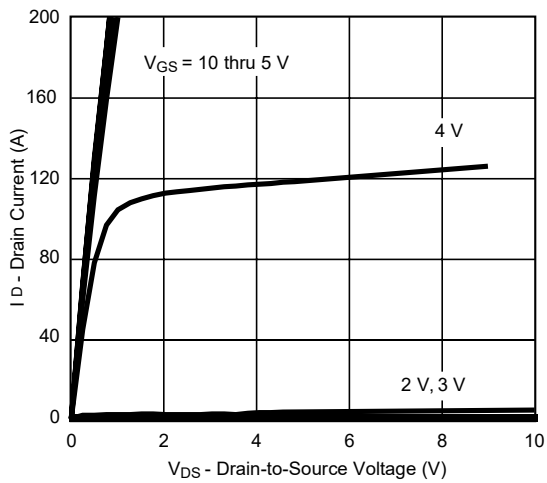
SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ. <sup>a</sup>	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	60			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1		3	
Gate-Body 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> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
		V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			250	
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	80			A
Drain-Source On-State Resistance <sup>b</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A		0.007		Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C		0.015		
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 175 °C		0.020		
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 15 A		0.009		
Forward Transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 20 A		60		S
<b>Dynamic</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		5800		pF
Output Capacitance	C <sub>oss</sub>			470		
Reverse Transfer Capacitance	C <sub>rss</sub>			225		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 50 A		47		nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			10		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			12		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 30 V, R <sub>L</sub> = 0.6 Ω I <sub>D</sub> ≅ 50 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 2.5 Ω		10	20	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			15	25	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			35	50	
Fall Time <sup>c</sup>	t <sub>f</sub>			20	30	
<b>Source-Drain Diode Ratings and Characteristics (T<sub>C</sub> = 25 °C)</b>						
Pulsed Current	I <sub>SM</sub>				120	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>F</sub> = 20 A, V <sub>GS</sub> = 0 V		1	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 20 A, di/dt = 100 A/μs		45	100	ns

Notes:

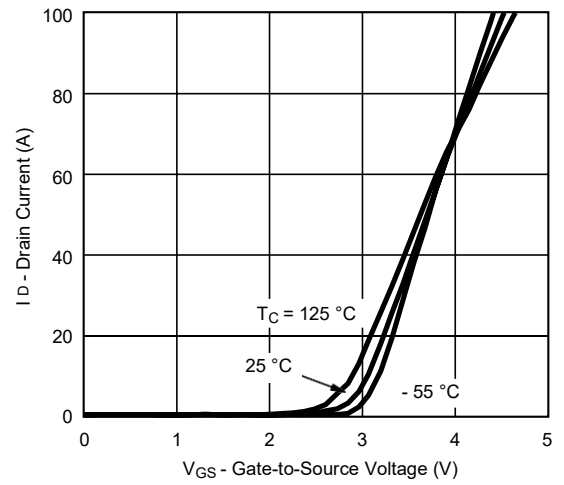
- a. For design aid only; not subject to production testing.
- b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- c. Independent of operating temperature.

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.

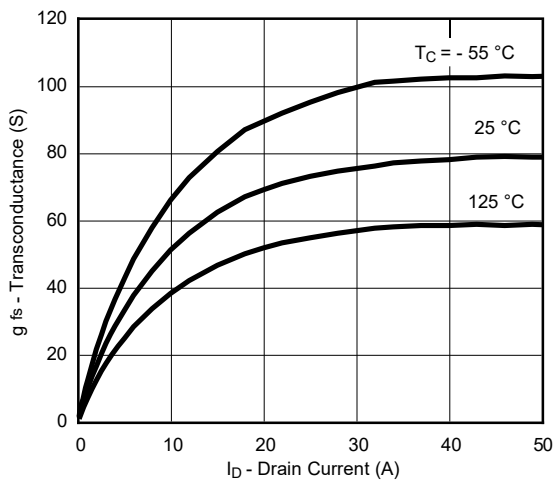
**TYPICAL CHARACTERISTICS (25 °C unless noted)**



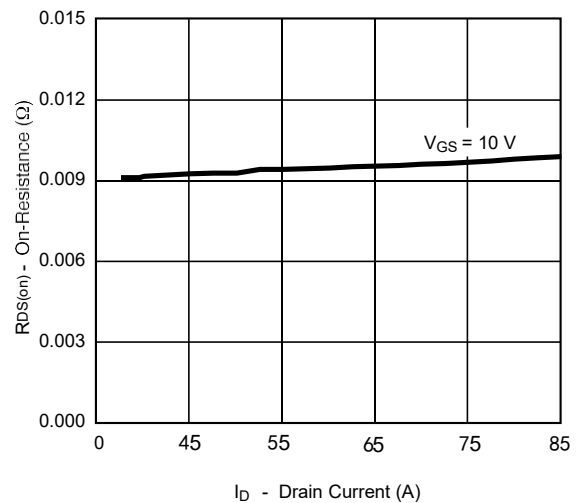
**Output Characteristics**



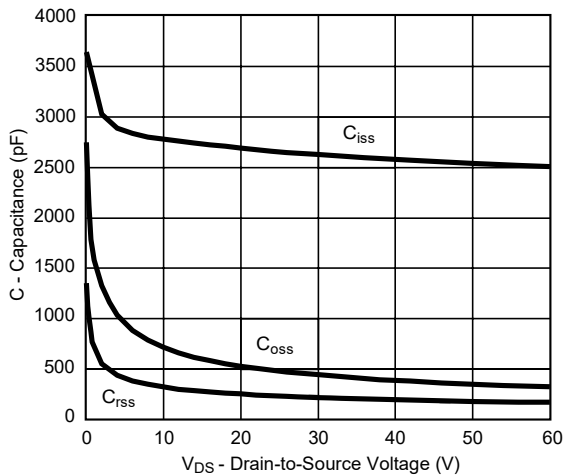
**Transfer Characteristics**



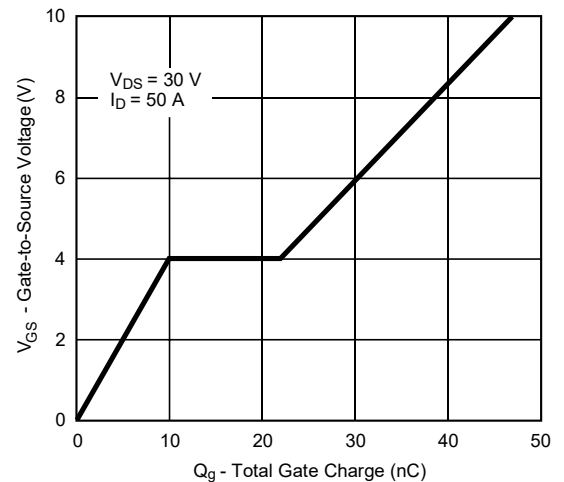
**Transconductance**



**$R_{DS(on)}$  vs. Drain Current**

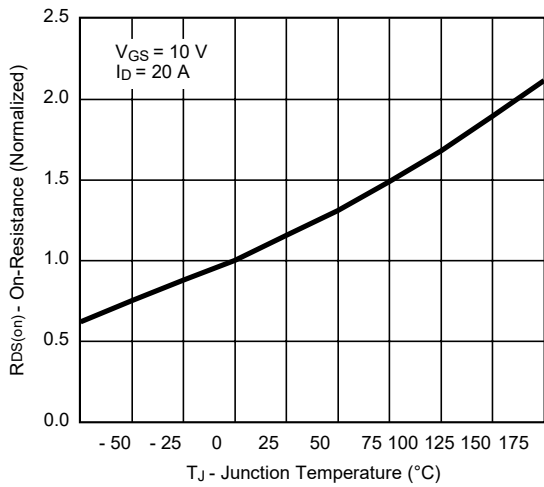


**Capacitance**

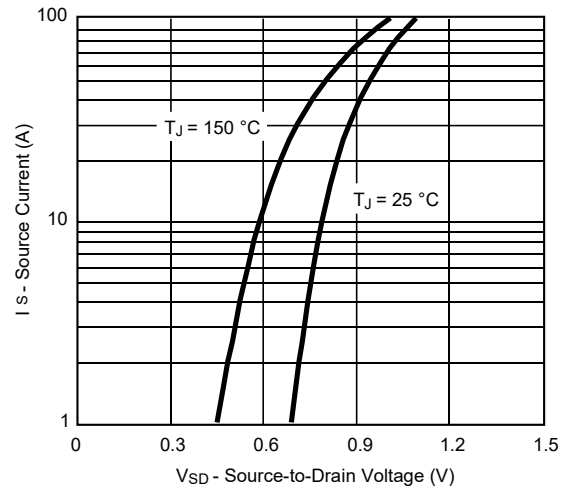


**Gate Charge**

TYPICAL CHARACTERISTICS (25 °C unless noted)

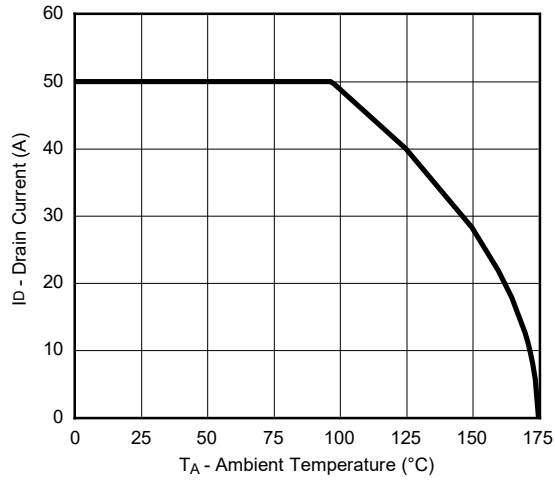


On-Resistance vs. Junction Temperature

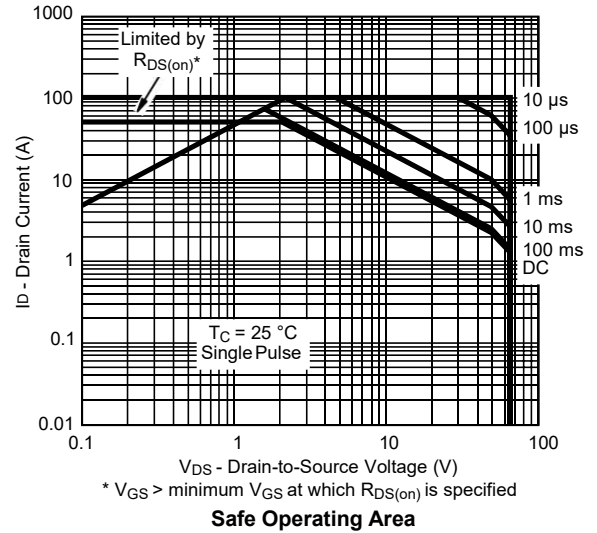


Source-Drain Diode Forward Voltage

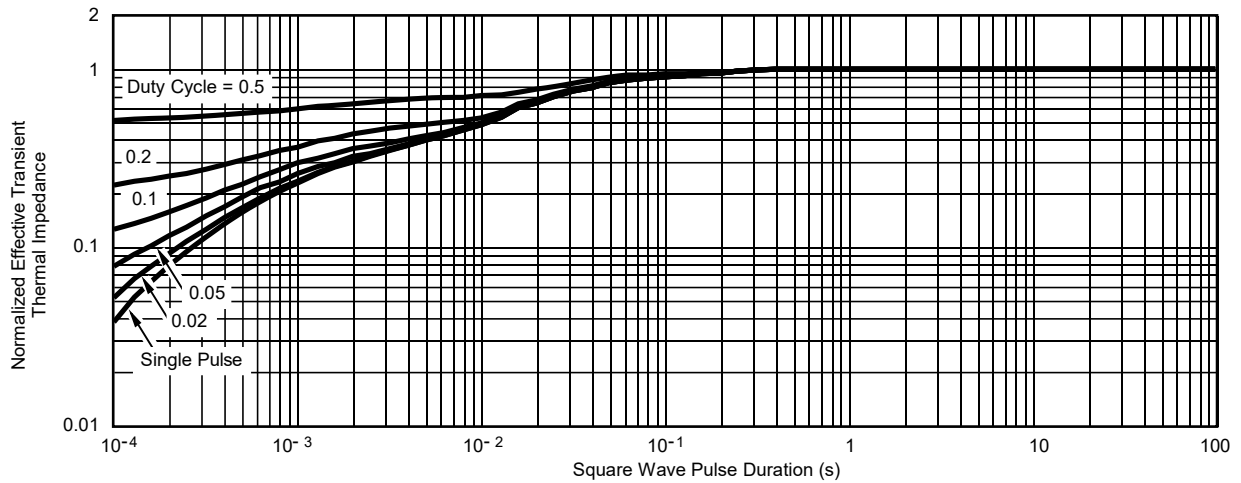
**THERMAL RATINGS**



**Maximum Drain Current vs. Ambient Temperature**



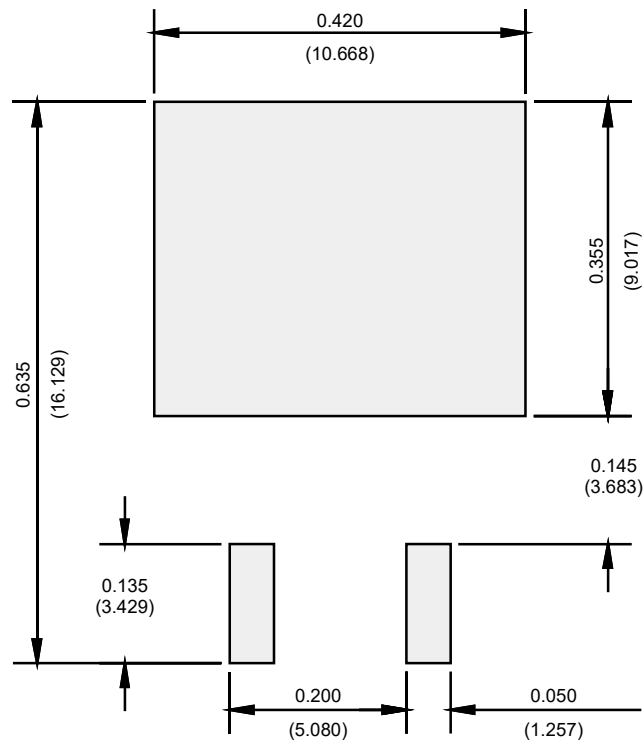
**Safe Operating Area**



**Normalized Thermal Transient Impedance, Junction-to-Case**



**RECOMMENDED MINIMUM PADS FOR D<sup>2</sup>PAK: 3-Lead**



Recommended Minimum Pads  
Dimensions in Inches/(mm)

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