

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

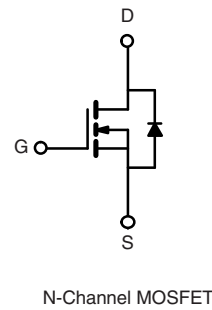
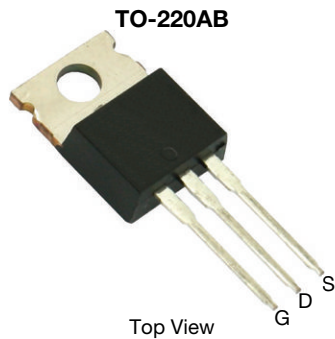
PRODUCT SUMMARY	
$V_{DS}$ (V)	60
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = 10$ V	0.0016
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = 4.5$ V	0.0020
$I_D$ (A)	270
Configuration	Single

### FEATURES

- TrenchFET® power MOSFET
- Package with low thermal resistance
- 100 %  $R_g$  and UIS tested



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**



ABSOLUTE MAXIMUM RATINGS ( $T_C = 25$ °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	$T_C = 25$ °C	$I_D$	270	A
	$T_C = 125$ °C		120 <sup>a</sup>	
Continuous Source Current (Diode Conduction)		$I_S$	120 <sup>a</sup>	
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	600	
Single Pulse Avalanche Current	L = 0.1 mH	$I_{AS}$	75	
Single Pulse Avalanche Energy		$E_{AS}$	281	
Maximum Power Dissipation <sup>b</sup>	$T_C = 25$ °C	$P_D$	375	W
	$T_C = 125$ °C		125	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	-55 to +175	°C

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount <sup>c</sup>	$R_{thJA}$	40	°C/W
Junction-to-Case (Drain)		$R_{thJC}$	0.4	

### Notes

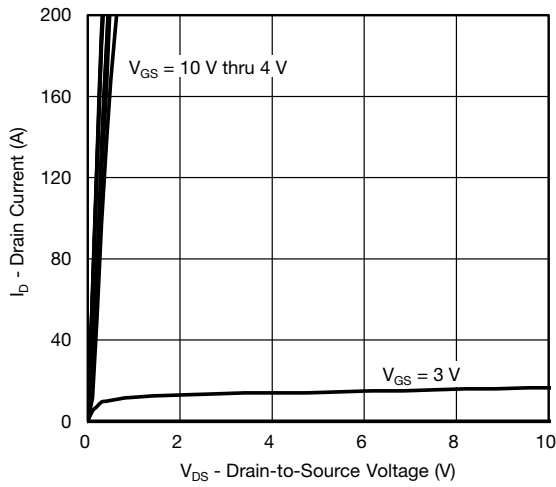
- Package limited.
- Pulse test; pulse width  $\leq 300$   $\mu$ s, duty cycle  $\leq 2$  %.
- When mounted on 1" square PCB (FR4 material).

SPECIFICATIONS ( $T_C = 25\text{ }^\circ\text{C}$ , 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	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.5	2.0	2.5		
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	-	-	$\pm 100$	nA	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 60\text{ V}$	-	-	1	$\mu\text{A}$
		$V_{GS} = 0\text{ V}$	$V_{DS} = 60\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = 60\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	1.5	mA
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{GS} = 10\text{ V}$	$V_{DS} \geq 5\text{ V}$	120	-	-	A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 30\text{ A}$	-	0.0016	-	$\Omega$
		$V_{GS} = 10\text{ V}$	$I_D = 30\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	0.0031	-	
		$V_{GS} = 10\text{ V}$	$I_D = 30\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	0.0037	-	
		$V_{GS} = 4.5\text{ V}$	$I_D = 20\text{ A}$	-	0.0020	-	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 30\text{ A}$		-	164	-	S
<b>Dynamic <sup>b</sup></b>							
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	-	12 060	15 100	pF
Output Capacitance	$C_{oss}$			-	5750	7200	
Reverse Transfer Capacitance	$C_{rss}$			-	860	1100	
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{GS} = 10\text{ V}$	$V_{DS} = 30\text{ V}, I_D = 80\text{ A}$	-	128	200	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			-	33	-	
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			-	11	-	
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		0.8	1.68	2.6	$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 0.375\text{ }\Omega$ $I_D \cong 80\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		-	20	25	ns
Rise Time <sup>c</sup>	$t_r$			-	15	40	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			-	65	100	
Fall Time <sup>c</sup>	$t_f$			-	12	20	
<b>Source-Drain Diode Ratings and Characteristics <sup>b</sup></b>							
Pulsed Current <sup>a</sup>	$I_{SM}$			-	-	300	A
Forward Voltage	$V_{SD}$	$I_F = 80\text{ A}, V_{GS} = 0\text{ V}$		-	0.88	1.5	V

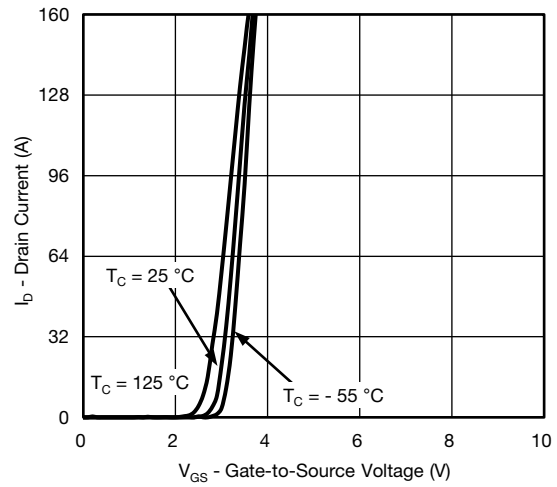
**Notes**

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

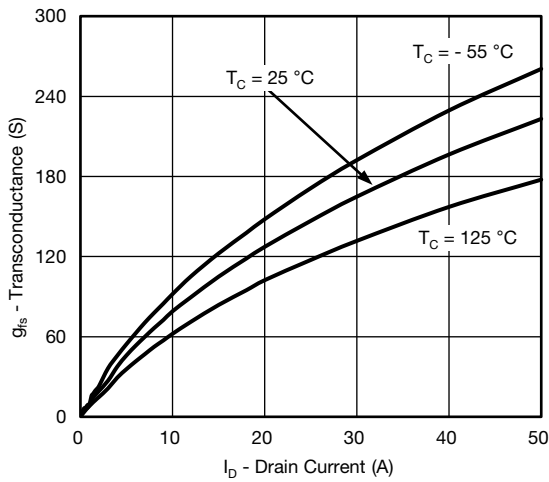
**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



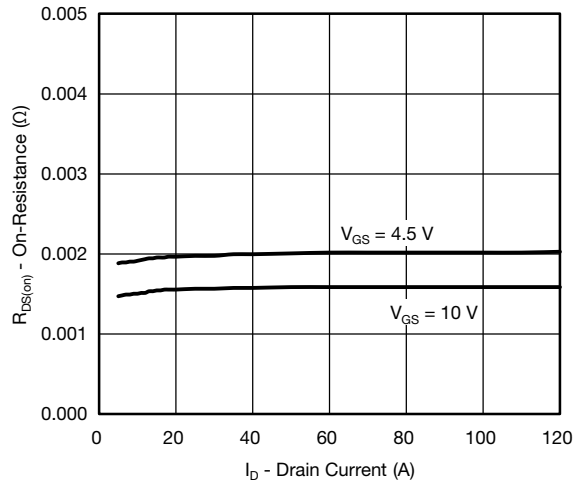
**Output Characteristics**



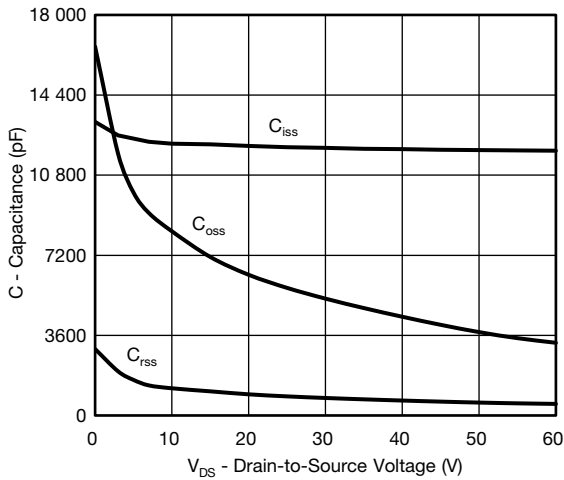
**Transfer Characteristics**



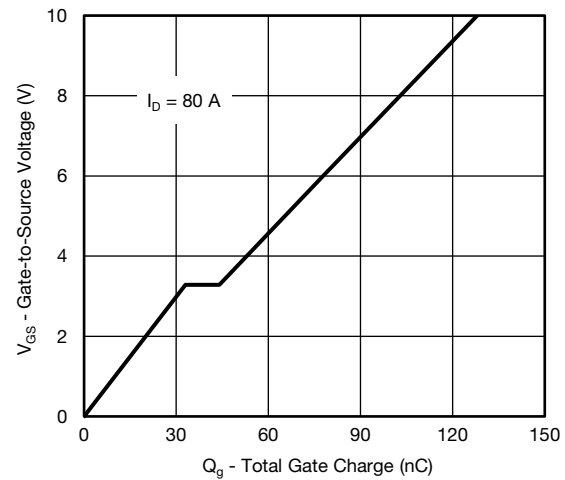
**Transconductance**



**On-Resistance vs. Drain Current**

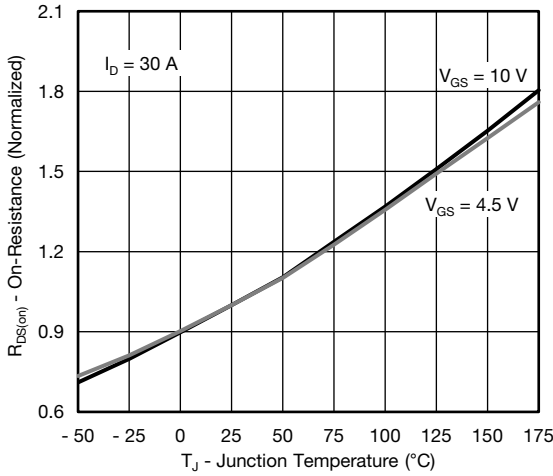


**Capacitance**

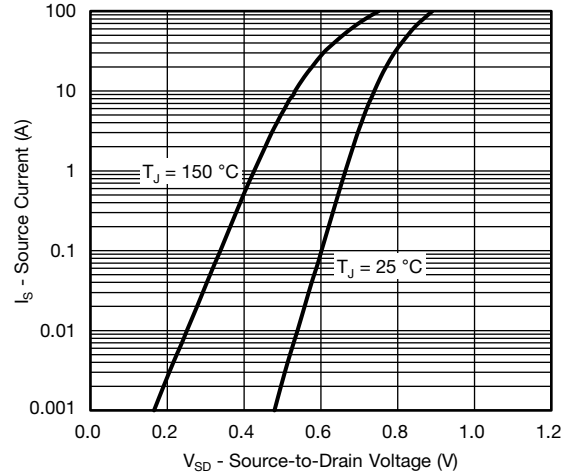


**Gate Charge**

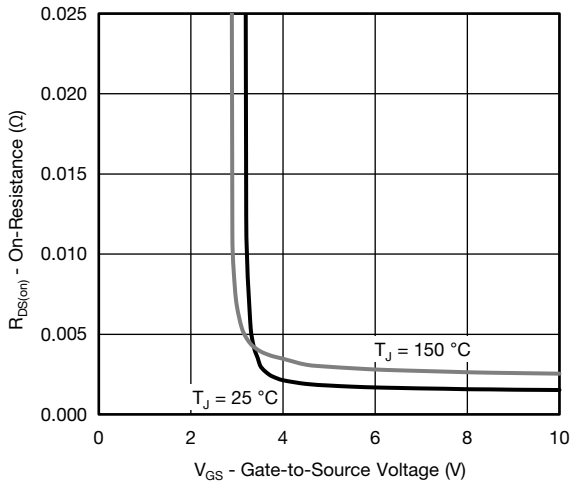
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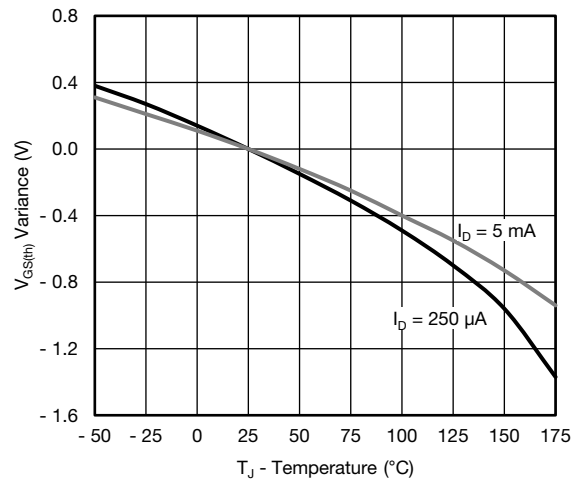
**On-Resistance vs. Junction Temperature**



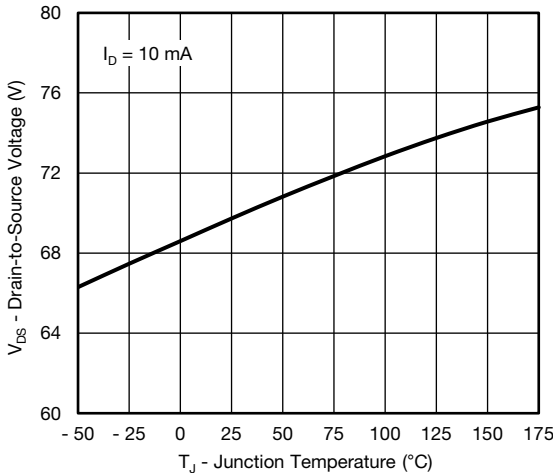
**Source Drain Diode Forward Voltage**



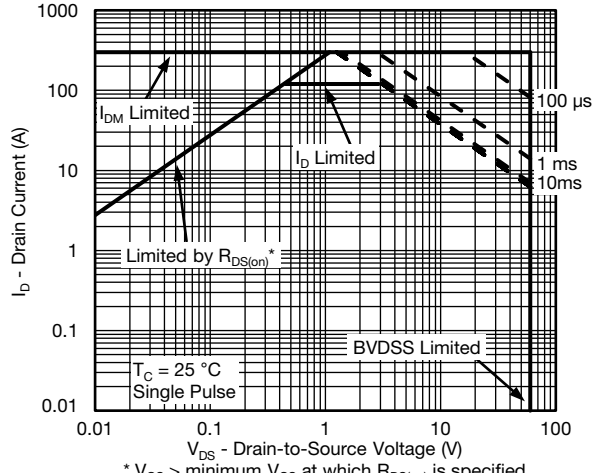
**On-Resistance vs. Gate-to-Source Voltage**



**Threshold Voltage**



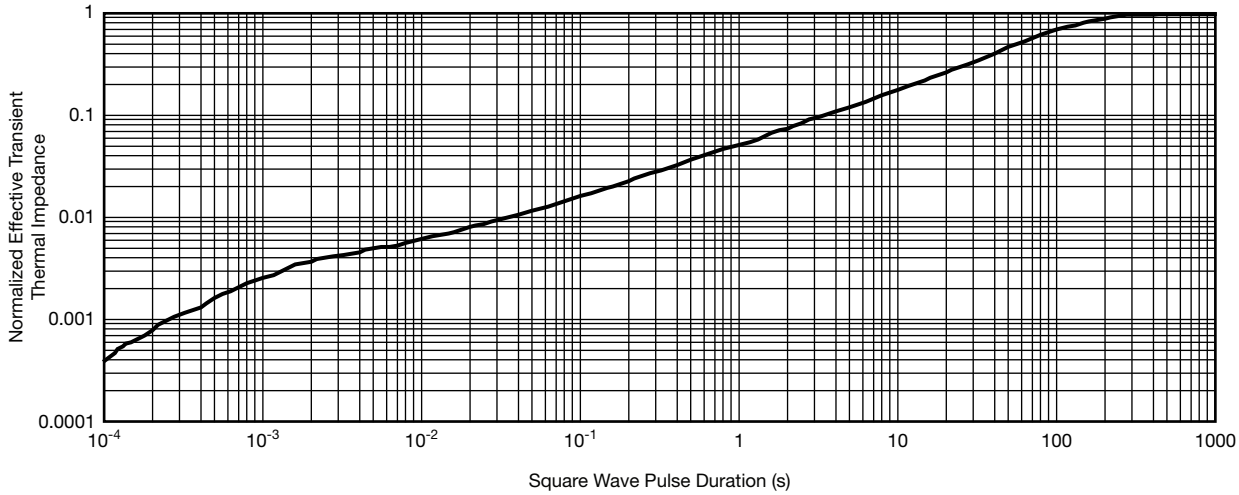
**Drain Source Breakdown vs. Junction Temperature**



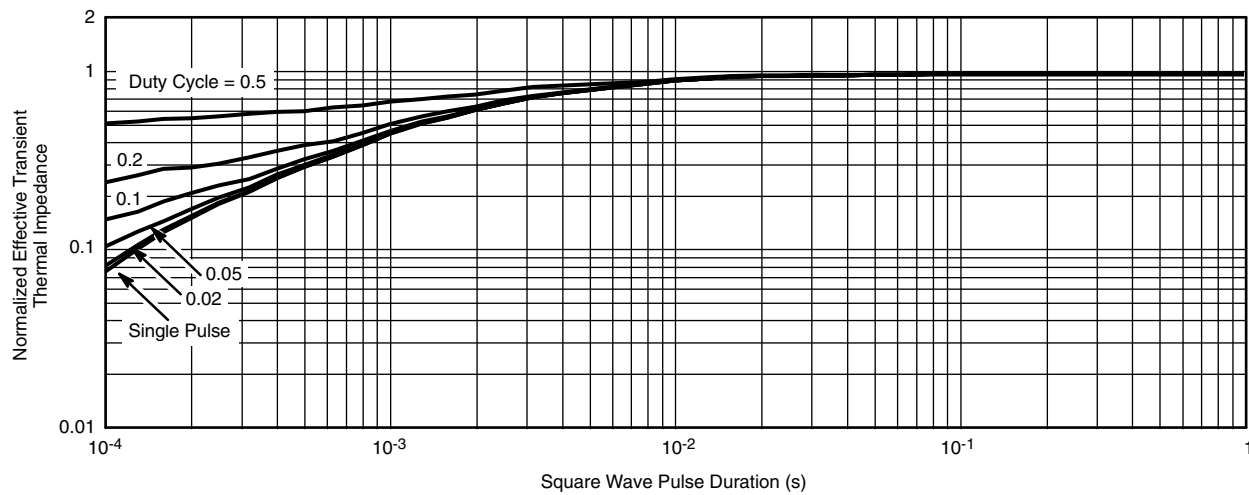
**Safe Operating Area**

\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

**THERMAL RATINGS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



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



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

**Note**

- The characteristics shown in the two graphs
    - Normalized Transient Thermal Impedance Junction-to-Ambient ( $25\text{ }^\circ\text{C}$ )
    - Normalized Transient Thermal Impedance Junction-to-Case ( $25\text{ }^\circ\text{C}$ )
- are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.



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