



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

## TrenchFET MOSFET



**ESD Protected  
2000 V**

PRODUCT SUMMARY			
$V_{(BR)DSS(min)}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$V_{GS(th)}$ (V)	$I_D$ (mA)
60	1.40 @ $V_{GS} = 10$ V	1 to 2.5	500

### FEATURES

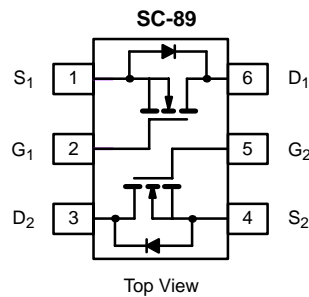
- Low On-Resistance: 1.40  $\Omega$
- Low Threshold: 2 V (typ)
- Low Input Capacitance: 30 pF
- Fast Switching Speed: 15 ns (typ)
- Low Input and Output Leakage
- Miniature Package

### BENEFITS

- Low Offset Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Error Voltage
- Small Board Area

### APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays



Marking Code: E

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	5 secs	Steady State	Unit	
Drain-Source Voltage	$V_{DS}$	60		V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$			
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>	$I_D$	$T_A = 25^\circ\text{C}$	320	305	mA
		$T_A = 85^\circ\text{C}$	230	220	
Pulsed Drain Current <sup>b</sup>	$I_{DM}$	-650			
Continuous Source Current (diode conduction) <sup>a</sup>	$I_S$	450	380		
Maximum Power Dissipation <sup>a</sup>	$P_D$	$T_A = 25^\circ\text{C}$	280	250	mW
		$T_A = 85^\circ\text{C}$	145	130	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150		$^\circ\text{C}$	
Gate-Source ESD Rating (HBM, Method 3015)	ESD	2000		V	

Notes

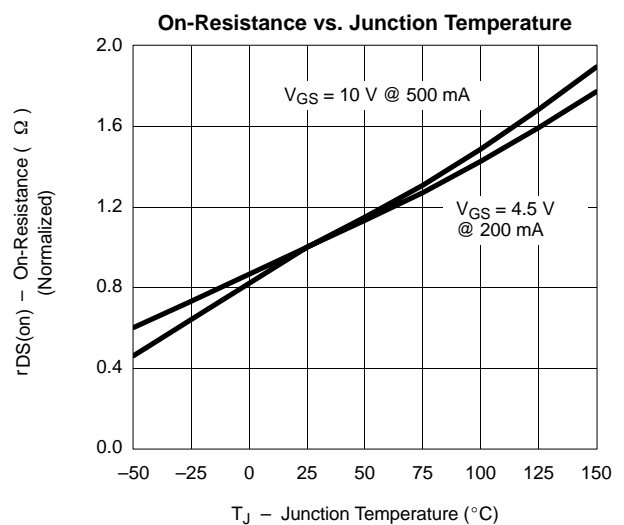
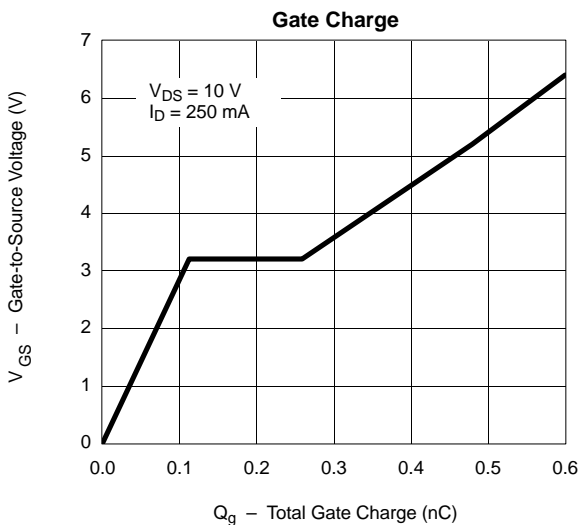
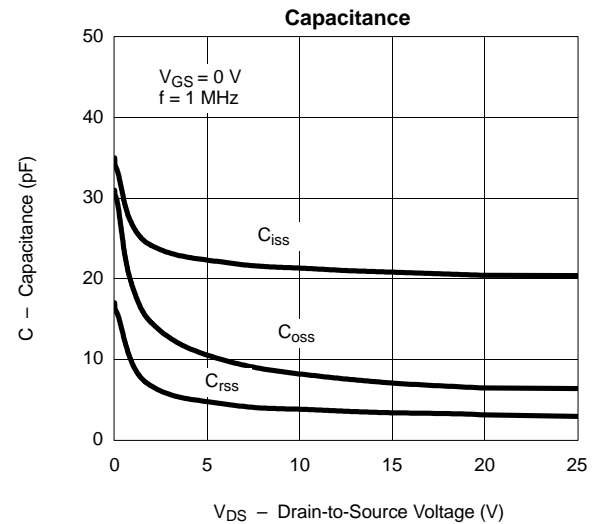
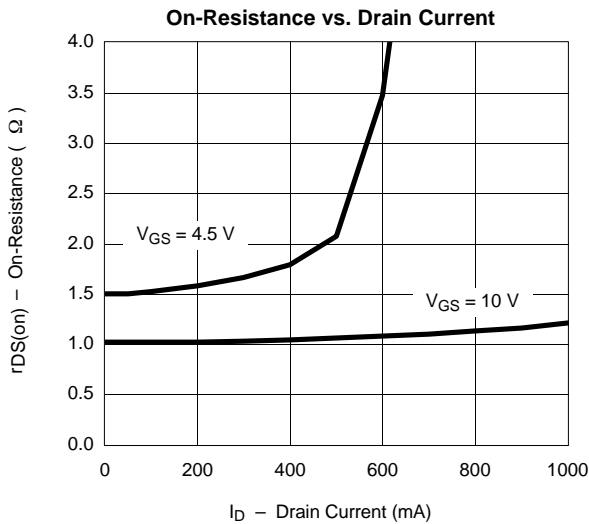
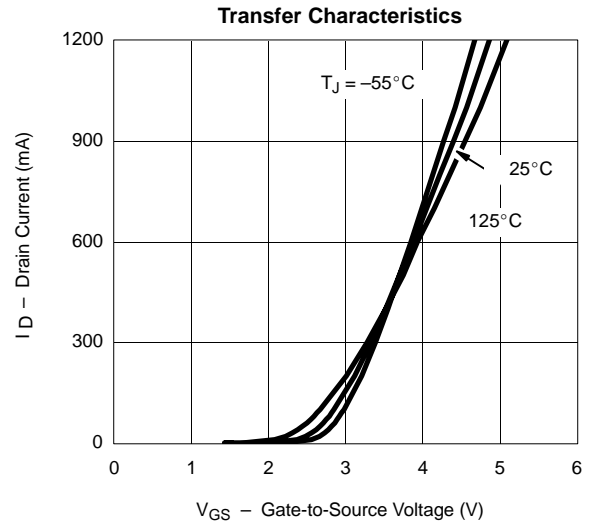
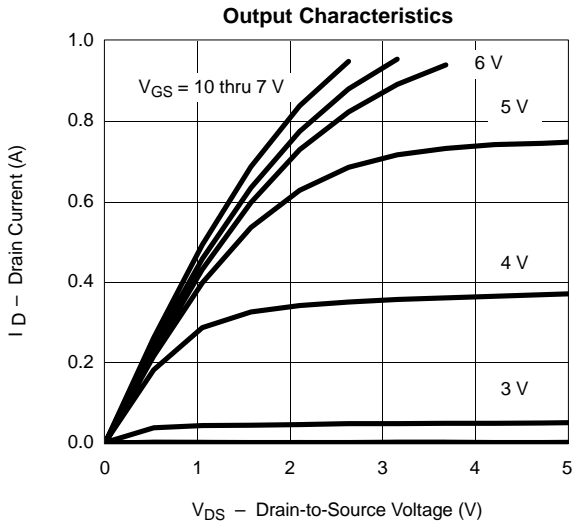
- a. Surface Mounted on FR4 Board.
- b. Pulse width limited by maximum junction temperature.

SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 10 μA	60			V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 0.25 mA	1		2.5	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±10 V			±150	nA
		V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±5 V			±50	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0 V T <sub>J</sub> = 85 °C			10 100	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V	500			mA
		V <sub>DS</sub> = 7.5 V, V <sub>GS</sub> = 10 V	800			
Drain-Source On-Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 200 mA			3.0	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 500 mA			1.40	
		T <sub>J</sub> = 125 °C			2.50	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 200 mA		200		mS
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 200 mA			1.40	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 250 mA V <sub>GS</sub> = 4.5 V		600		pC
Gate-Source Charge	Q <sub>gs</sub>			120		
Gate-Drain Charge	Q <sub>gd</sub>			225		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V f = 1 MHz		30		pF
Output Capacitance	C <sub>oss</sub>			6		
Reverse Transfer Capacitance	C <sub>rss</sub>			3		
<b>Switching<sup>b, c</sup></b>						
Turn-On Time	t <sub>(on)</sub>	V <sub>DD</sub> = 30 V, R <sub>L</sub> = 150 Ω I <sub>D</sub> = 200 mA, V <sub>GEN</sub> = 10 V R <sub>G</sub> = 10 Ω		15		ns
Turn-Off Time	t <sub>(off)</sub>			20		

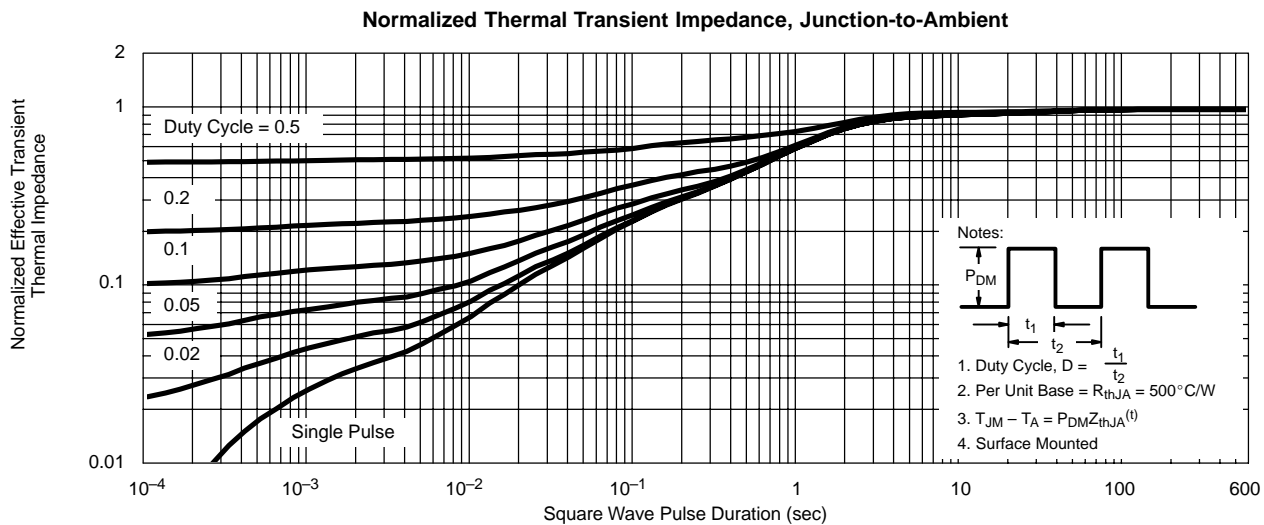
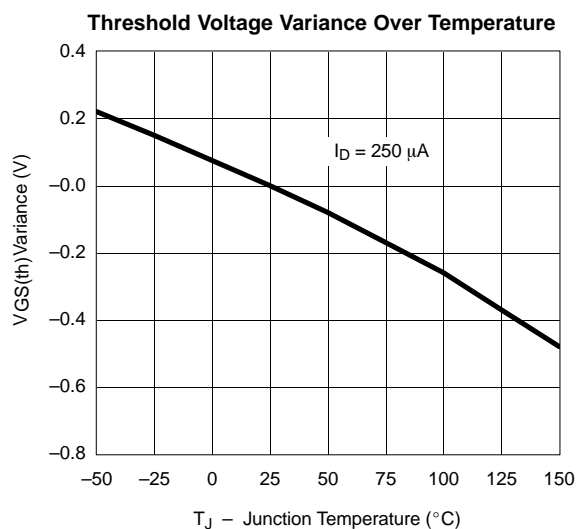
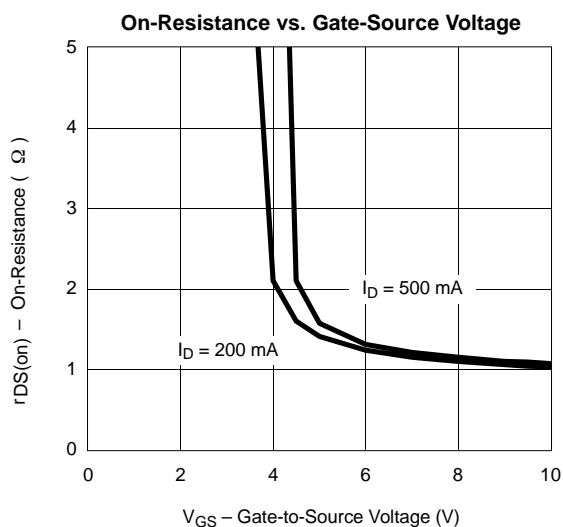
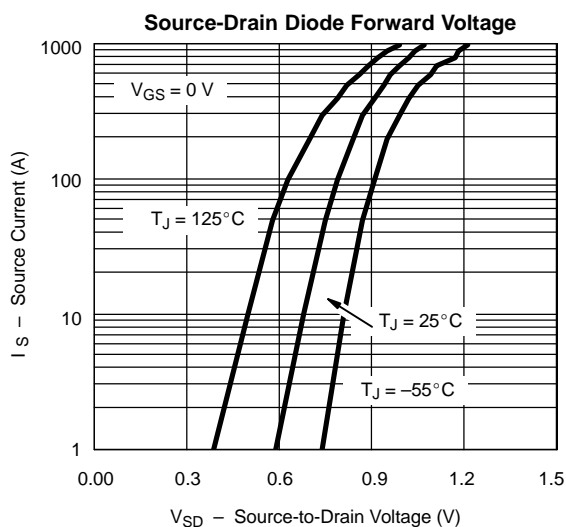
## Notes

- a. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.  
b. For DESIGN AID ONLY, not subject to production testing.  
c. Switching time is essentially independent of operating temperature.

**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**



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