



# 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	1.25 @ $V_{GS} = 10$ V	1 to 2.5	330

### FEATURES

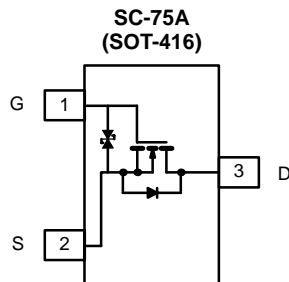
- Low On-Resistance: 1.25  $\Omega$
- Low Threshold: 2.5 V
- Low Input Capacitance: 30 pF
- Fast Switching Speed: 25 ns
- Low Input and Output Leakage
- Miniature Package

### 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	Limit	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>a</sup>	$I_D$	$T_A = 25^\circ\text{C}$	330
		$T_A = 85^\circ\text{C}$	240
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	650	mA
Power Dissipation <sup>a</sup>	$P_D$	$T_A = 25^\circ\text{C}$	
		$T_A = 85^\circ\text{C}$	130
Thermal Resistance, Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	500	$^\circ\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ\text{C}$

Notes  
c. Surface Mounted on FR4 Board, Power Applied for  $t \leq 10$  sec.

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
		T <sub>J</sub> = 85 °C			±500	
		V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±5 V			±20	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0 V			10	μA
		T <sub>J</sub> = 85 °C			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
		T <sub>J</sub> = 125 °C			5.0	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 500 mA			1.25	
		T <sub>J</sub> = 125 °C			2.25	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 200 mA	100			mS
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 200 mA			1.30	V
<b>Dynamic<sup>b</sup></b>						
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>			2.5		
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			0.6	nC
<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			25	ns
Turn-Off Time	t <sub>(off)</sub>				35	

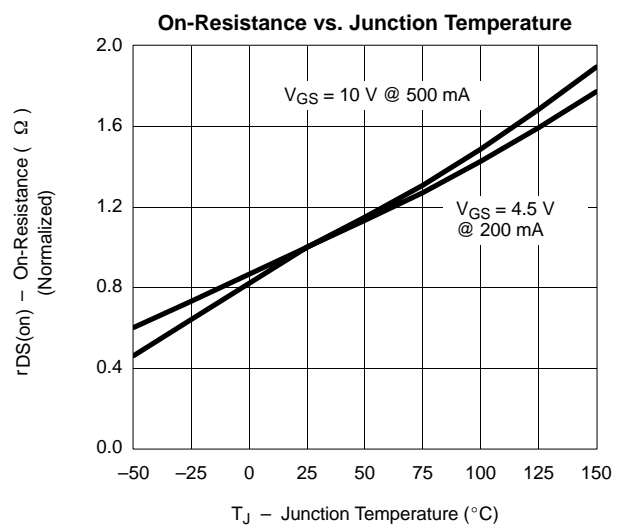
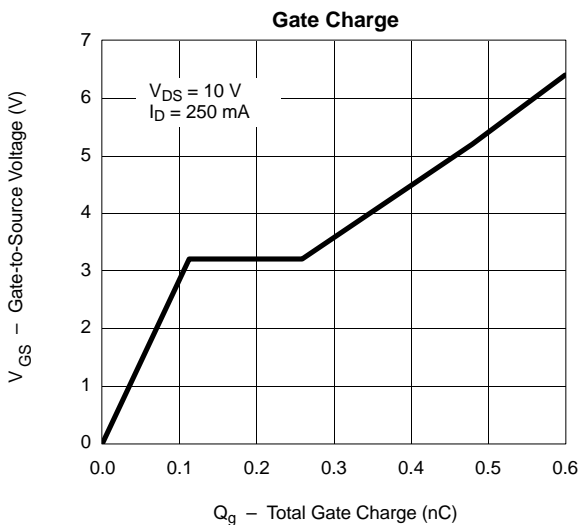
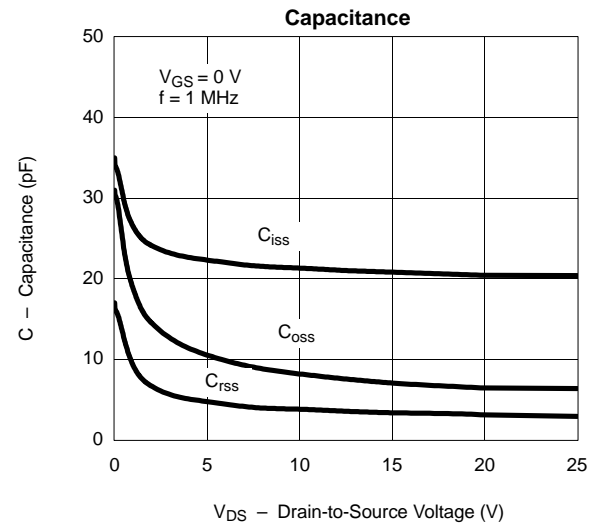
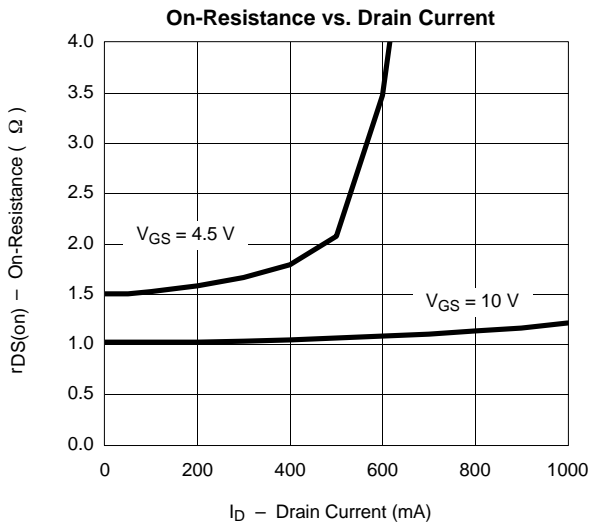
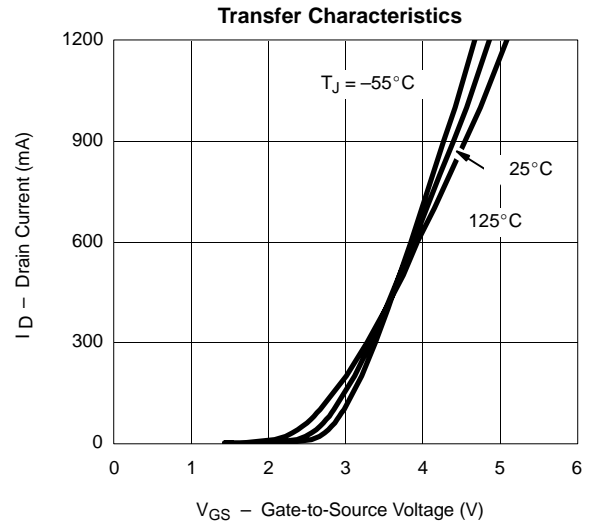
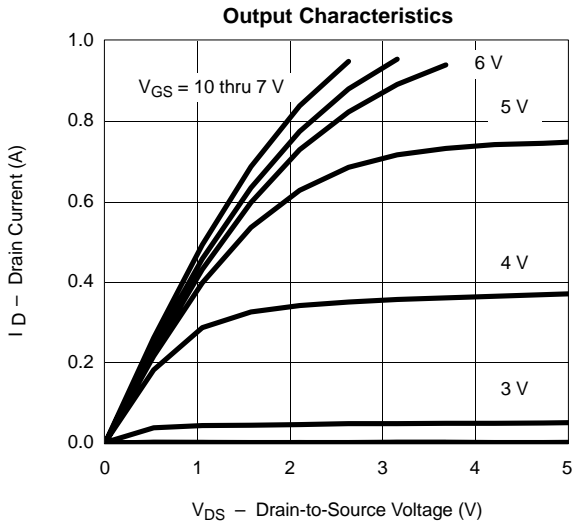
## Notes

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

TNJO60



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



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