



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

TrenchFET®

MOSFETs



ESD Protected 2000 V

PRODUCT SUMMARY			
$V_{(BR)DSS(min)}$ (V)	$r_{DS(on)}$ (Ω)	$V_{GS(th)}$ (V)	I_D (mA)
-60	4 @ $V_{GS} = -10$ V	-1 to -3.0	-500

FEATURES

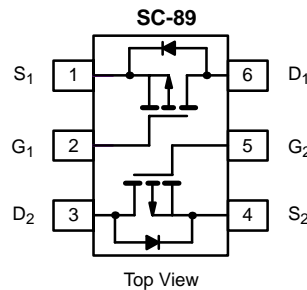
- High-Side Switching
- Low On-Resistance: 4 Ω
- Low Threshold: -2 V (typ)
- Fast Switching Speed: 20 ns (typ)
- Low Input Capacitance: 23 pF (typ)
- Miniature Package
- Gate-Source ESD Protection

BENEFITS

- Ease in Driving Switches
- Low Offset Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Easily Driven Without Buffer
- Small Board Area

APPLICATIONS

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



Marking Code: D

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}	± 20			
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	$T_A = 25^\circ\text{C}$	-200	-190	mA
		$T_A = 85^\circ\text{C}$	-145	-135	
Pulsed Drain Current ^b	I_{DM}	-650			
Continuous Source Current (diode conduction) ^a	I_S	-450	-380		
Maximum Power Dissipation ^a	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.

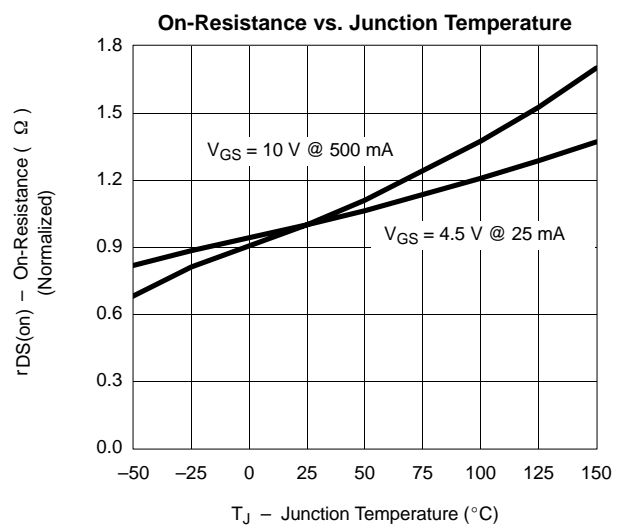
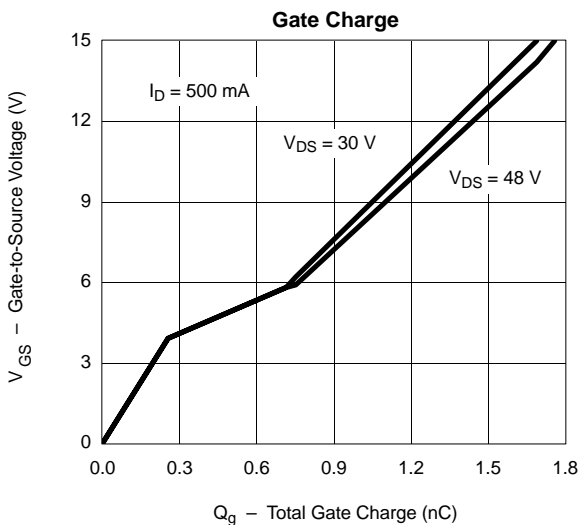
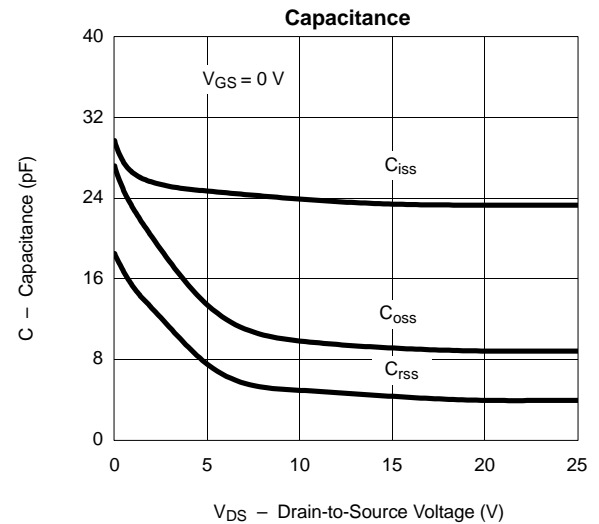
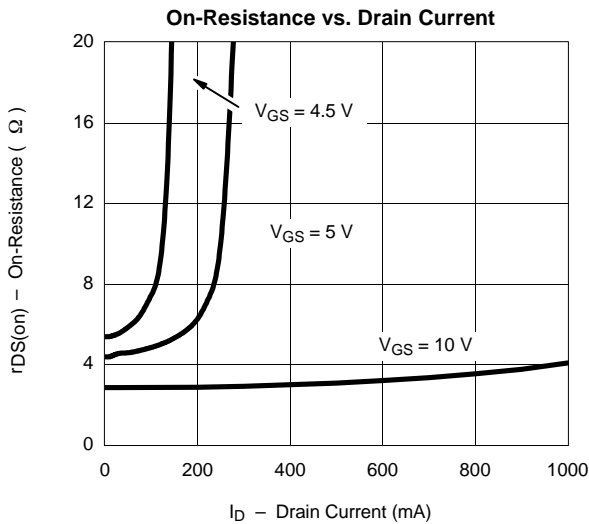
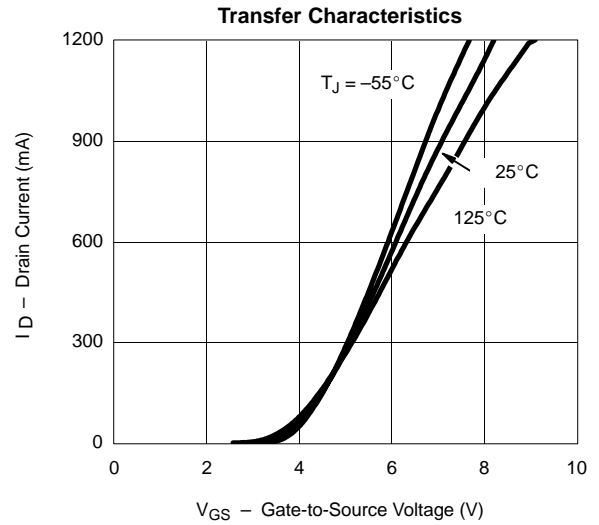
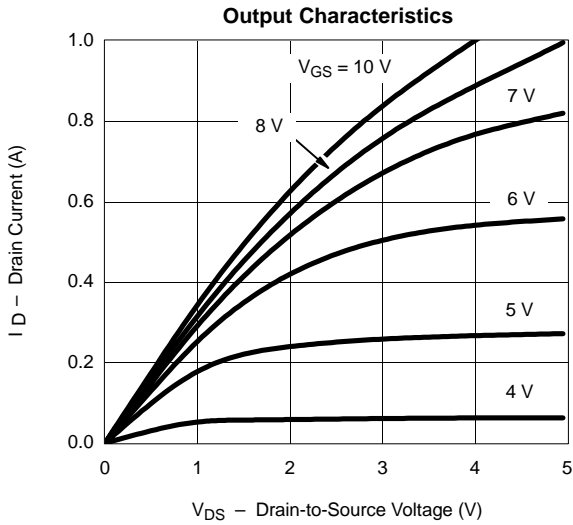
SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = -10 μA	-60			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -0.25 mA	-1		-3.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±10 V			±200	nA
		V _{DS} = 0 V, V _{GS} = ±5 V			±100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -50 V, V _{GS} = 0 V			-25	
		V _{DS} = -50 V, V _{GS} = 0 V, T _J = 85 °C			-250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = -10 V, V _{GS} = -4.5 V	-50			mA
		V _{DS} = -10 V, V _{GS} = -10 V	-600			
Drain-Source On-Resistance ^a	r _{DS(on)}	V _{GS} = -4.5 V, I _D = -25 mA			8	Ω
		V _{GS} = -10 V, I _D = -500 mA			4	
		V _{GS} = -10 V, I _D = -500 mA, T _J = 125 °C			6	
Forward Transconductance ^a	g _{fs}	V _{DS} = -10 V, I _D = -100 mA		100		mS
Diode Forward Voltage ^a	V _{SD}	I _S = -200 mA, V _{GS} = 0 V			-1.4	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = -30 V, V _{GS} = -15 V, I _D ≅ -500 mA		1.7		nC
Gate-Source Charge	Q _{gs}			0.26		
Gate-Drain Charge	Q _{gd}			0.46		
Input Capacitance	C _{iss}	V _{DS} = -25 V, V _{GS} = 0 V, f = 1 MHz		23		pF
Output Capacitance	C _{oss}			10		
Reverse Transfer Capacitance	C _{rss}			5		
Switching^{b, c}						
Turn-On Time	t _{ON}	V _{DD} = -25 V, R _L = 150 Ω I _D ≅ -165 mA, V _{GEN} = -10 V R _G = 10 Ω		20		ns
Turn-Off Time	t _{OFF}			35		

Notes

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



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



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