N-Channel 1.8-V (G-S) MOSFET

TrenchFET® MOSFETs 1.8-V Rated

ESD Protected 2000 V

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (mA)
20	0.70 @ V_{GS} = 4.5 V	600
	0.85 @ V_{GS} = 2.5 V	500
	1.25 @ V_{GS} = 1.8 V	350

FEATURES

- High-Side Switching
- Low On-Resistance: 0.7 Ω
- Low Threshold: 0.8 V (typ)
- Fast Swtiching Speed: 10 ns
- 1.8-V Operation
- Gate-Source ESD Protection

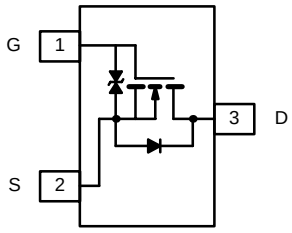
BENEFITS

- Ease in Driving Switches
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation

APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, Pagers

SC-75A or SC-89



Top View

Ordering Information:

SC-75A (SOT– 416):
Si1012R–Marking Code : C

SC-89 (SOT– 490):
Si1012X–Marking Code: A

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	5 secs	Steady State	Unit
Drain-Source Voltage		V_{DS}	20		V
Gate-Source Voltage		V_{GS}	±6		
Continuous Drain Current (T_J = 150°C)[b]	T_A = 25°C	I_D	600	500	mA
	T_A = 85°C		400	350	
Pulsed Drain Current[a]		I_{DM}	1000		
Continuous Source Current (diode conduction)[b]		I_S	275	250	
Maximum Power Dissipation[b] for SC-75	T_A = 25°C	P_D	175	150	mW
	T_A = 85°C		90	80	
Maximum Power Dissipation[b] for SC-89	T_A = 25°C		275	250	
	T_A = 85°C		160	140	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150		°C
Gate-Source ESD Rating (HBM, Method 3015)		ESD	2000		V

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

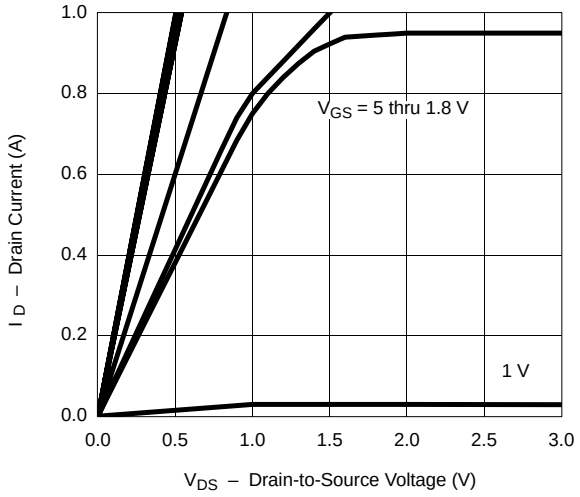
SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	0.45			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±4.5 V		±0.5	±1.0	μA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16 V, V_{GS} = 0 V		0.3	100	nA
		V_{DS} = 16 V, V_{GS} = 0 V, T_J = 85°C			5	μA
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 4.5 V	700			mA
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 600 mA		0.41	0.70	Ω
		V_{GS} = 2.5 V, I_D = 500 m A		0.53	0.85	
		V_{GS} = 1.8 V, I_D = 350 m A		0.70	1.25	
Forward Transconductance[a]	g_{fs}	V_{DS} = 10 V, I_D = 400 mA		1.0		S
Diode Forward Voltage[a]	V_{SD}	I_S = 150 mA, V_{GS} = 0 V		0.8	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 250 mA		750		pC
Gate-Source Charge	Q_{gs}			75		
Gate-Drain Charge	Q_{gd}			225		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 10 V, R_L = 47 Ω I_D ≅ 200 mA, V_{GEN} = 4.5 V, R_G = 10 Ω		5		ns
Rise Time	t_r			5		
Turn-Off Delay Time	$t_{d(off)}$			25		
Fall Time	t_f			11		

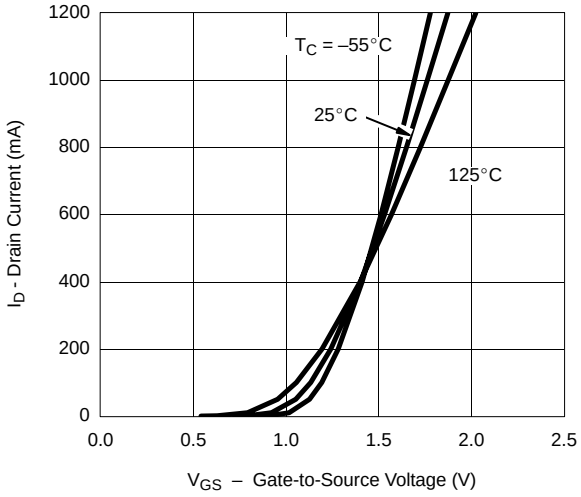
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS NOTED)

Output Characteristics



Transfer Characteristics



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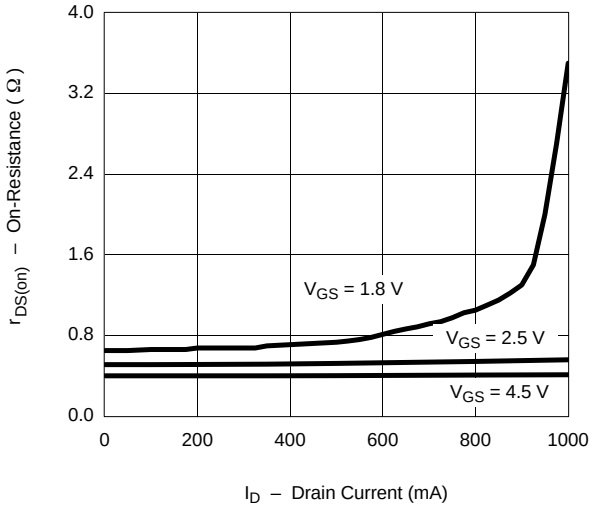
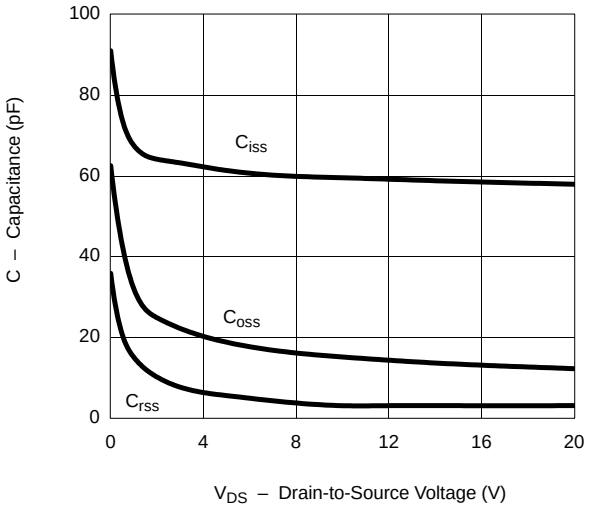
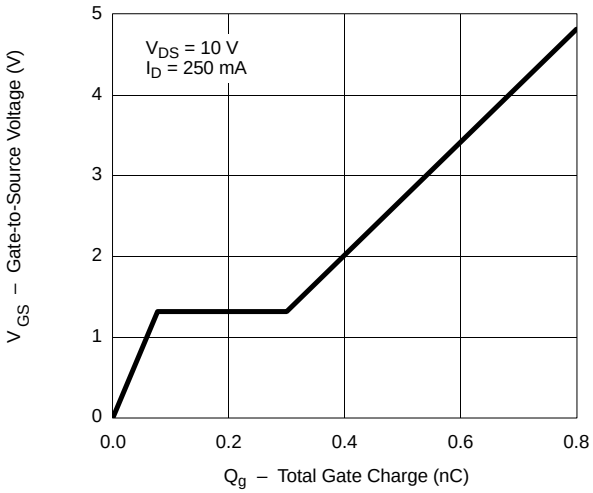
On-Resistance vs. Drain Current



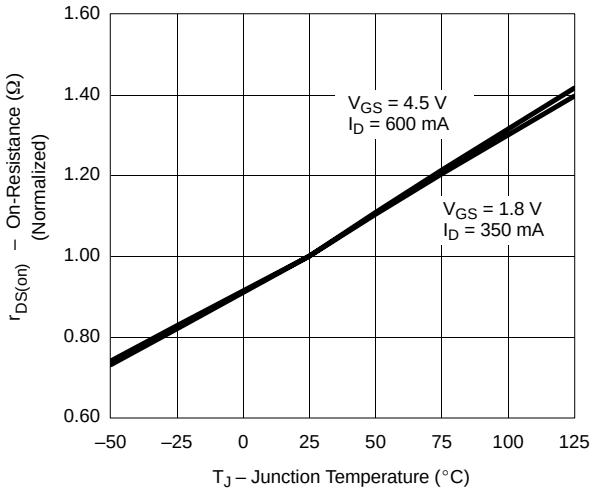
Capacitance



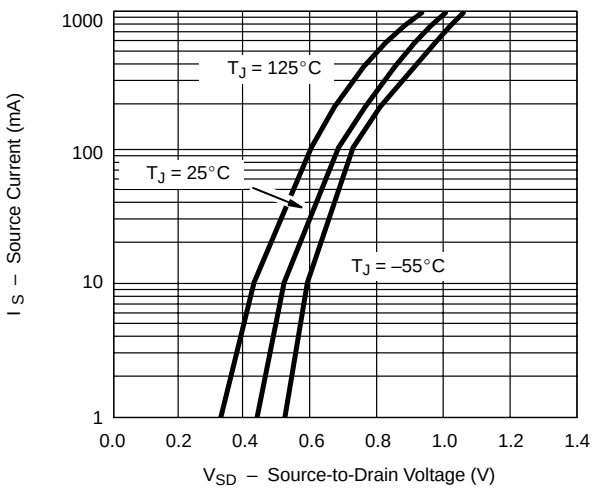
Gate Charge



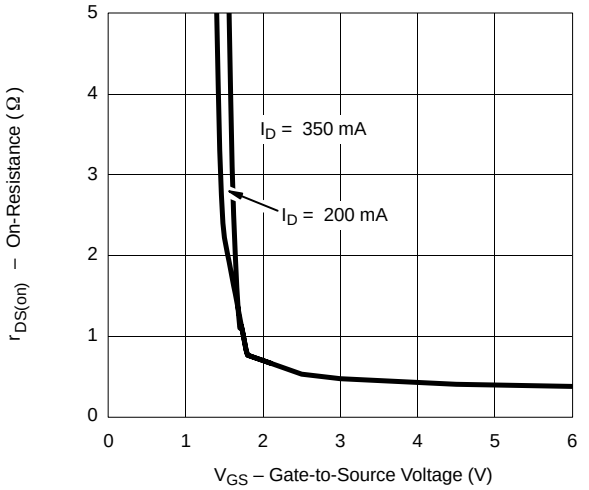
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



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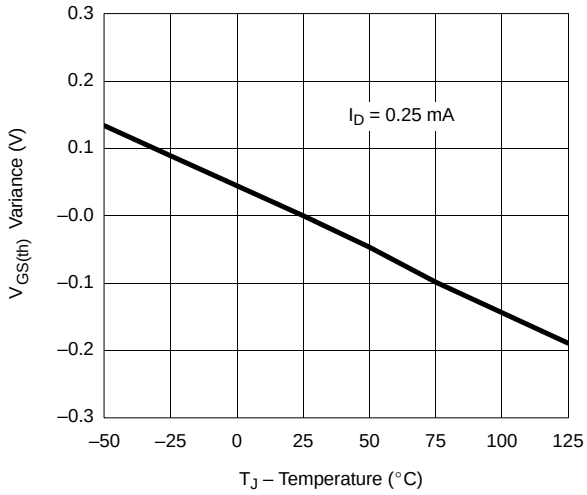
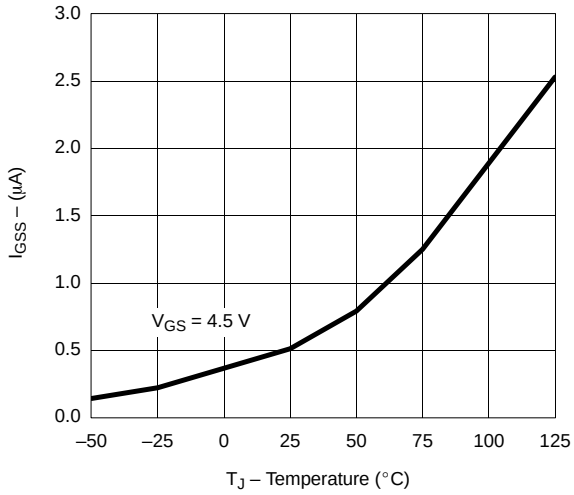
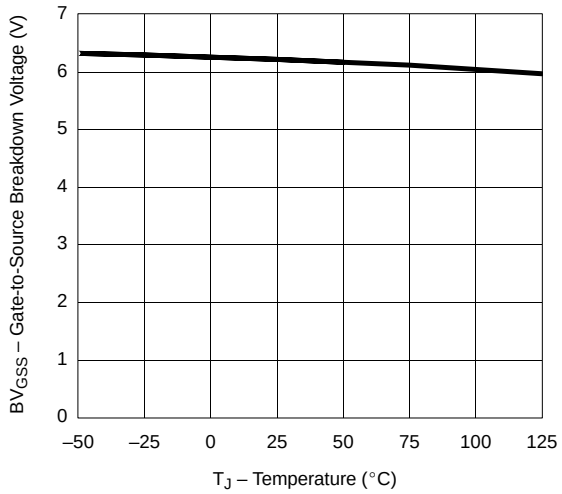
Threshold Voltage Variance vs. Temperature



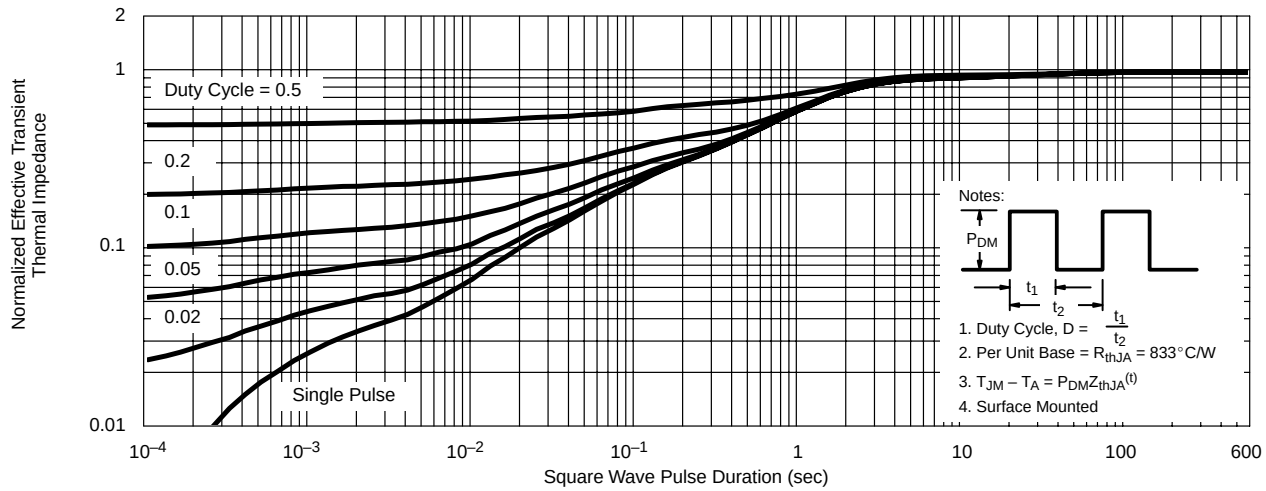
I_{GSS} vs. Temperature



BV_{GSS} vs. Temperature



Normalized Thermal Transient Impedance, Junction-to-Ambient (SC-75A)



TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS NOTED)