



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

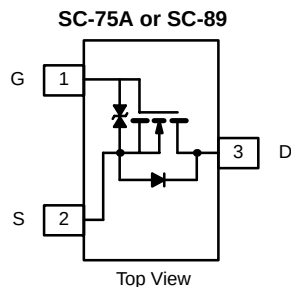
- High-Side Switching
- Low On-Resistance: 0.7 Ω
- Low Threshold: 0.8 V (typ)
- Fast Switching Speed: 10 ns
- 1.8-V Operation
- Gate-Source ESD Protection

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

**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.

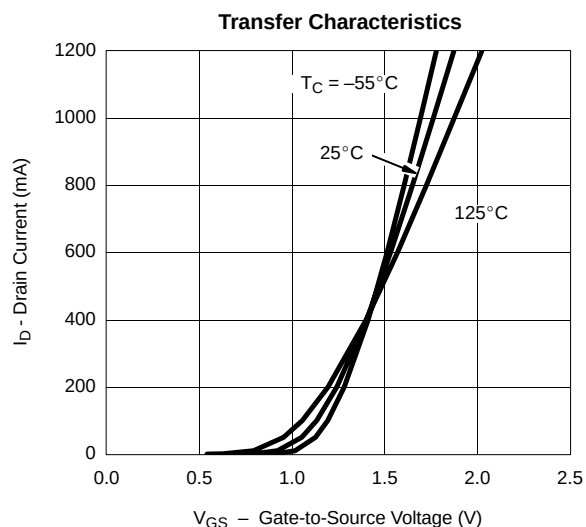
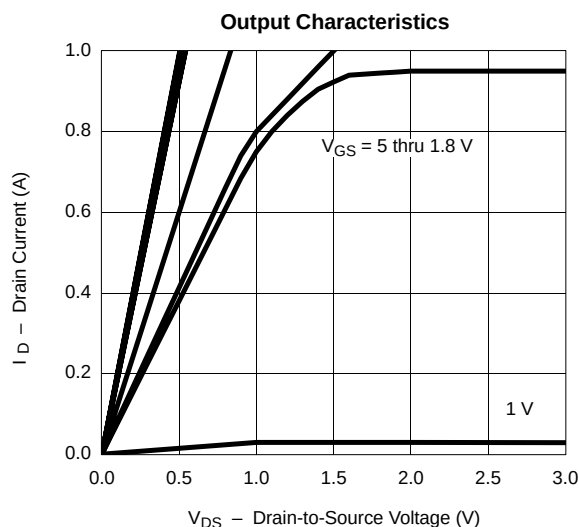
SPECIFICATIONS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

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

Notes

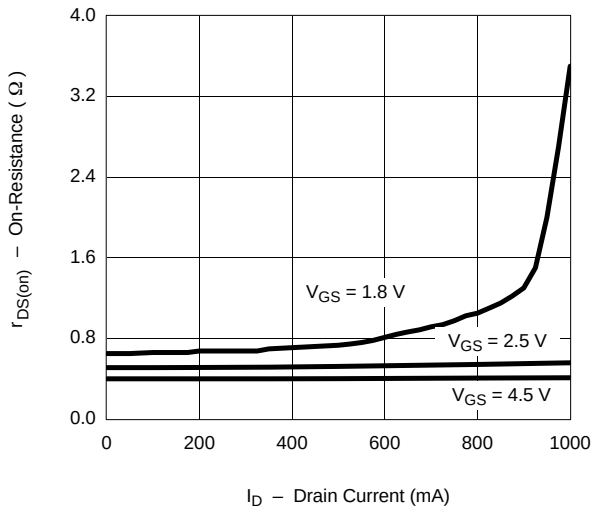
a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

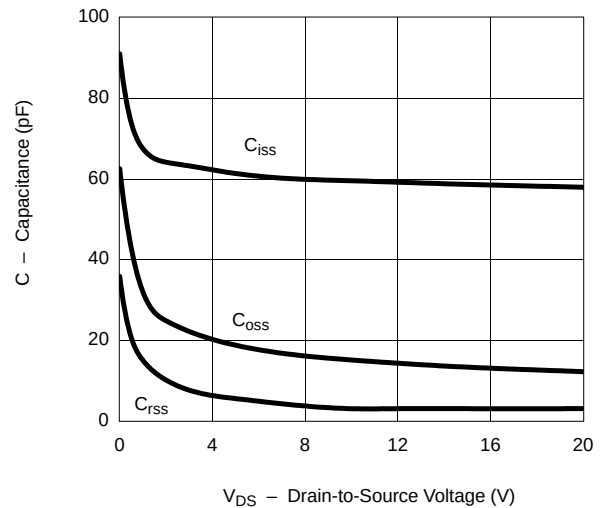
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS NOTED)

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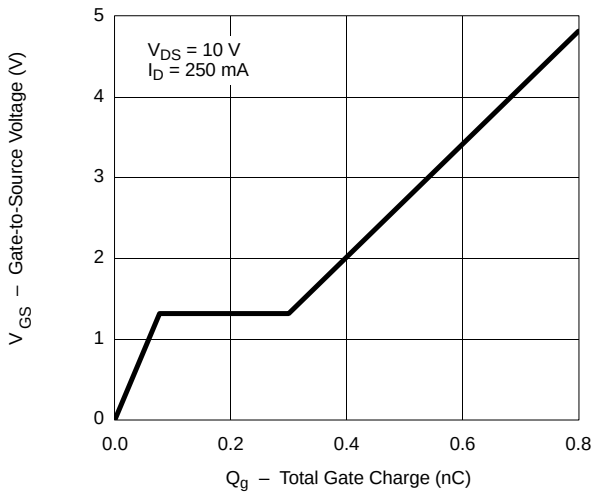
On-Resistance vs. Drain Current



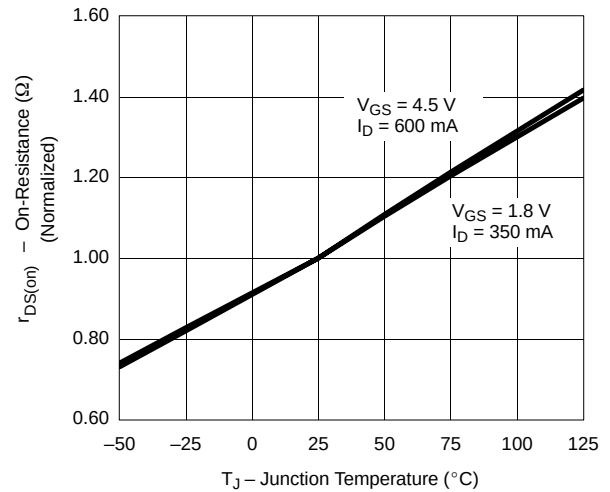
Capacitance



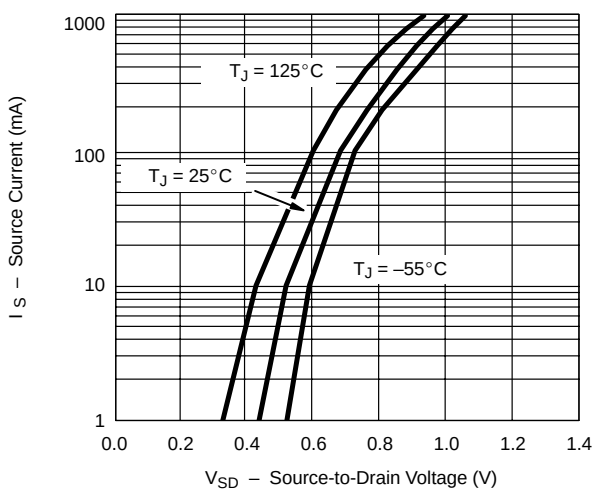
Gate Charge



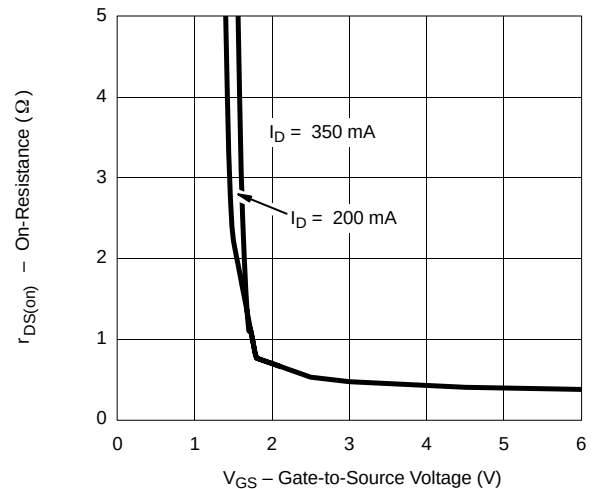
On-Resistance vs. Junction Temperature

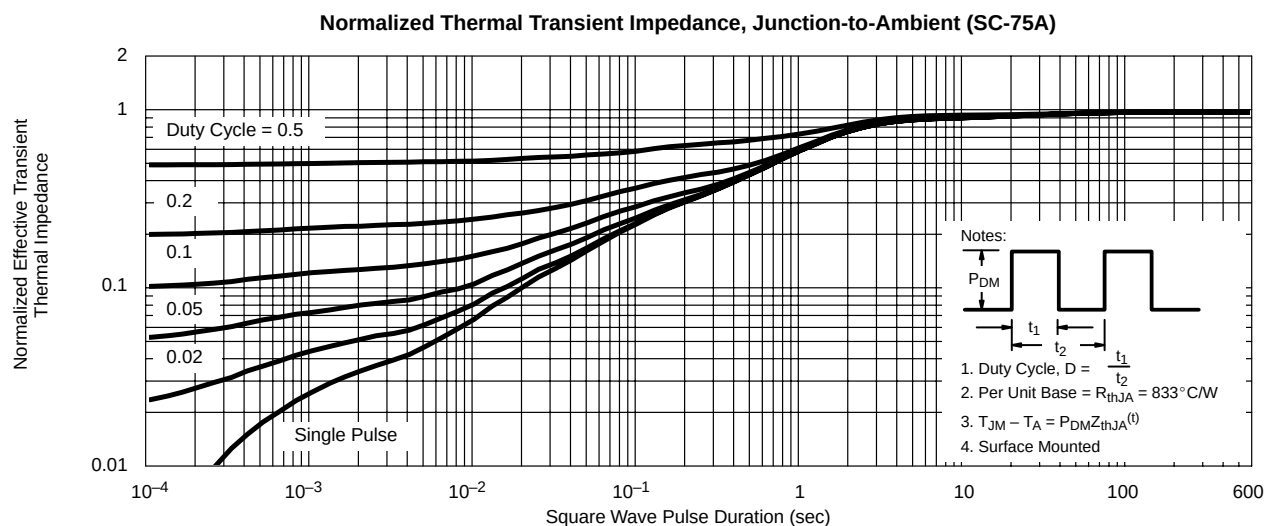
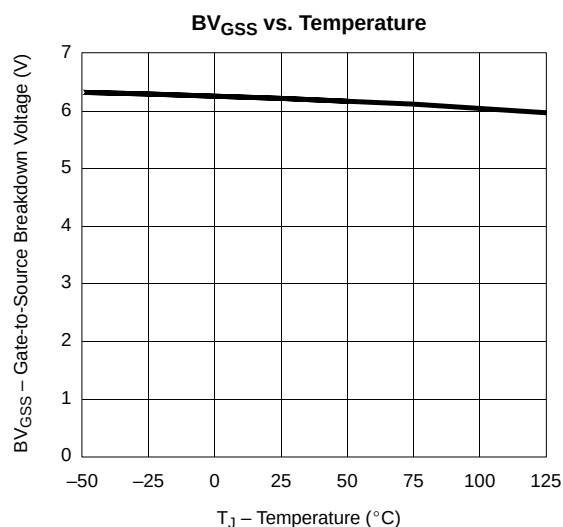
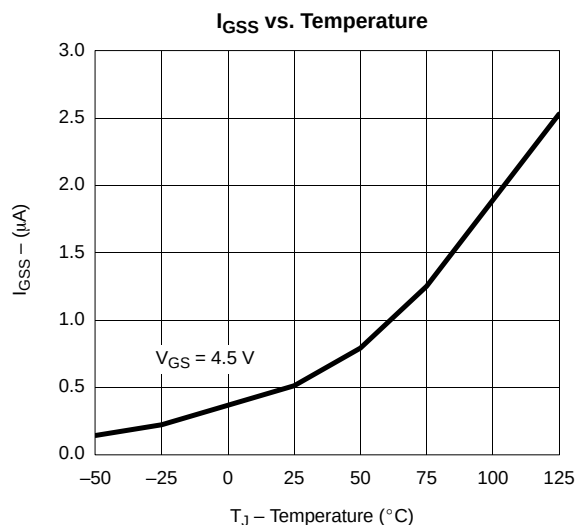
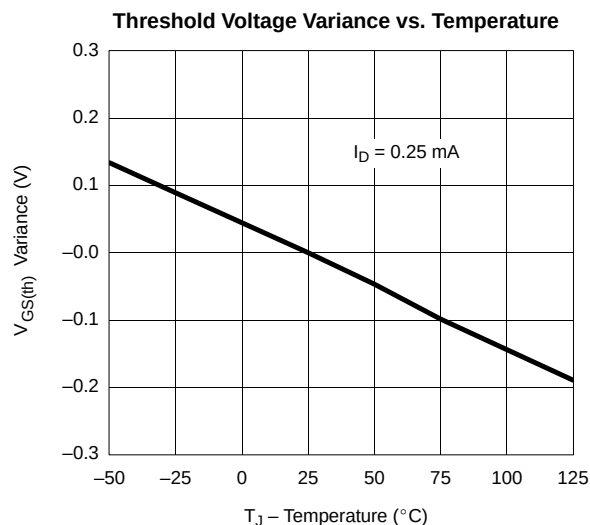


Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



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