



New Product

Si1012R/X  
Vishay Siliconix

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

**TrenchFET<sup>®</sup>**  
MOSFETs  
1.8-V Rated



**ESD Protected  
2000 V**

PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (mA)
20	0.70 @ V <sub>GS</sub> = 4.5 V	600
	0.85 @ V <sub>GS</sub> = 2.5 V	500
	1.25 @ V <sub>GS</sub> = 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

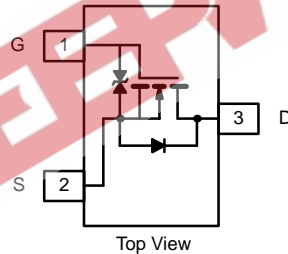
### BENEFITS

- 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

SC-75A or SC-89



### Ordering Information:

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

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

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)					
Parameter	Symbol	5 secs	Steady State	Unit	
Drain-Source Voltage	V <sub>DS</sub>	20		V	
Gate-Source Voltage	V <sub>GS</sub>	±6			
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>b</sup>	T <sub>A</sub> = 25 °C	I <sub>D</sub>	600	mA	
	T <sub>A</sub> = 85 °C		400		
Pulsed Drain Current <sup>a</sup>		I <sub>DM</sub>	1000		
Continuous Source Current (diode conduction) <sup>b</sup>		I <sub>S</sub>	275	250	
Maximum Power Dissipation <sup>b</sup> for SC-75	T <sub>A</sub> = 25 °C	P <sub>D</sub>	175	150	mW
	T <sub>A</sub> = 85 °C		90	80	
Maximum Power Dissipation <sup>b</sup> for SC-89	T <sub>A</sub> = 25 °C		275	250	
	T <sub>A</sub> = 85 °C		160	140	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 150		°C	
Gate-Source ESD Rating (HBM, Method 3015)	ESD	2000		V	

### Notes

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

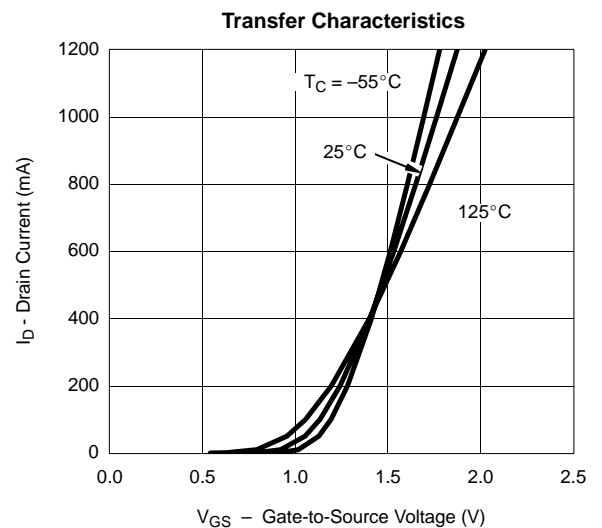
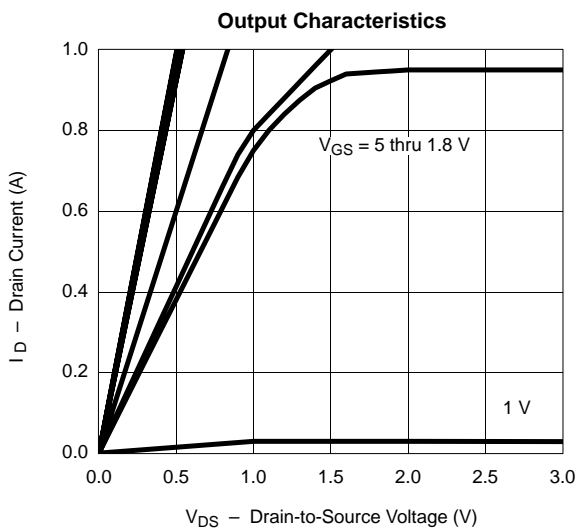


SPECIFICATIONS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	0.45			V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±4.5 V		±0.5	±1.0	μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0 V		0.3	100	nA
		V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C			5	μA
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 4.5 V	700			mA
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 600 mA		0.41	0.70	Ω
		V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 500 mA		0.53	0.85	
		V <sub>GS</sub> = 1.8 V, I <sub>D</sub> = 350 mA		0.70	1.25	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 400 mA		1.0		S
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = 150 mA, V <sub>GS</sub> = 0 V		0.8	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 250 mA		750		pC
Gate-Source Charge	Q <sub>gs</sub>			75		
Gate-Drain Charge	Q <sub>gd</sub>			225		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 10 V, R <sub>L</sub> = 47 Ω I <sub>D</sub> ≅ 200 mA, V <sub>GEN</sub> = 4.5 V, R <sub>G</sub> = 10 Ω		5		ns
Rise Time	t <sub>r</sub>			5		
Turn-Off Delay Time	t <sub>d(off)</sub>			25		
Fall Time	t <sub>f</sub>			11		

Notes

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

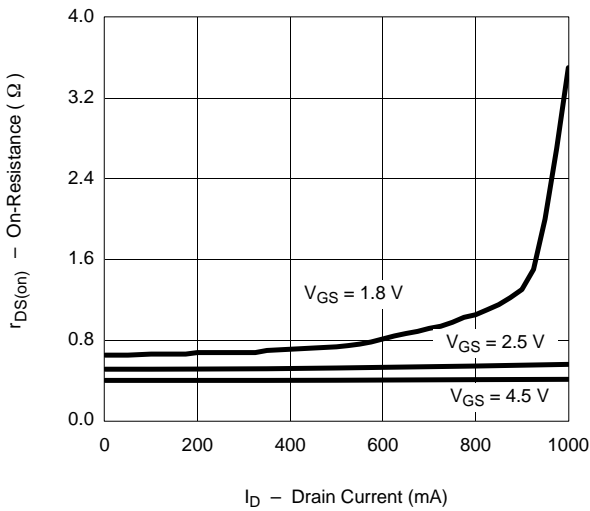
**TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C UNLESS NOTED)**



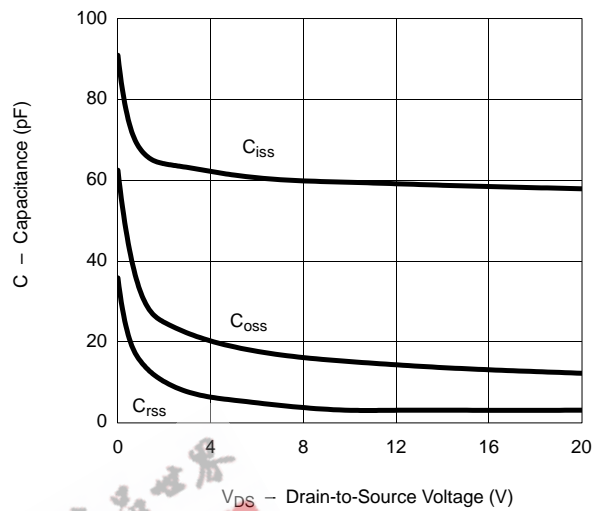


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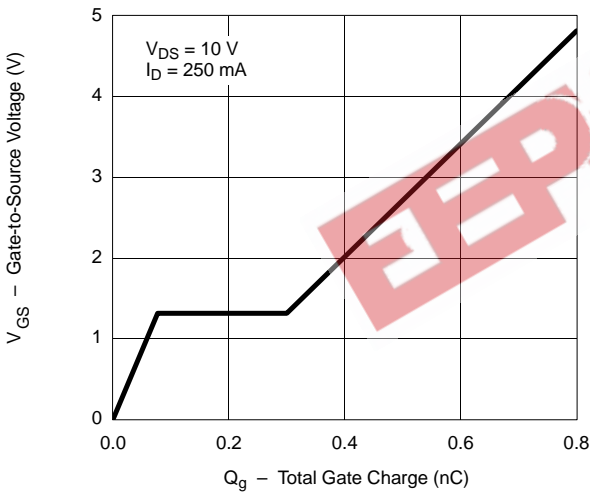
On-Resistance vs. Drain Current



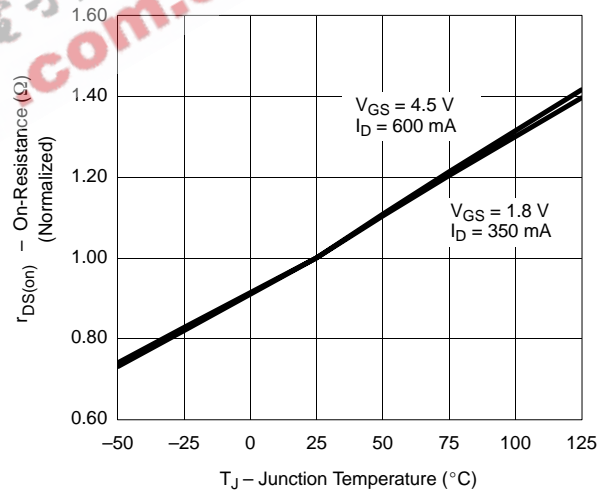
Capacitance



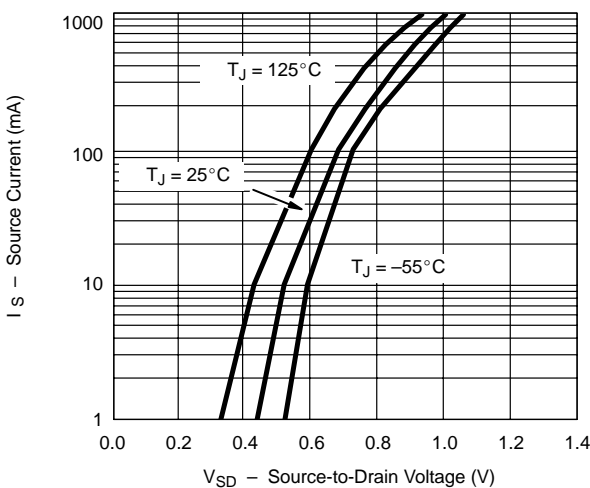
Gate Charge



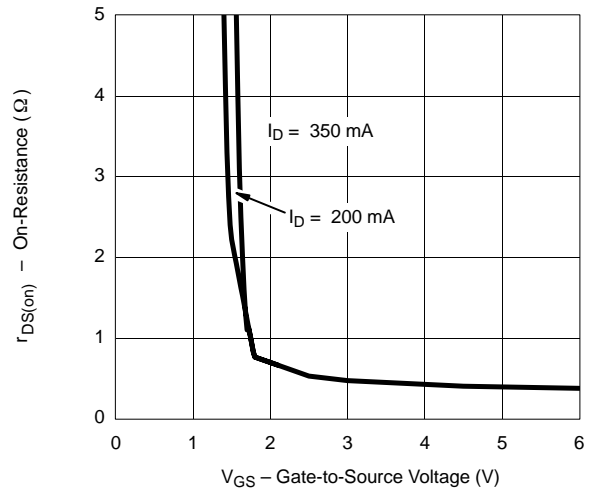
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

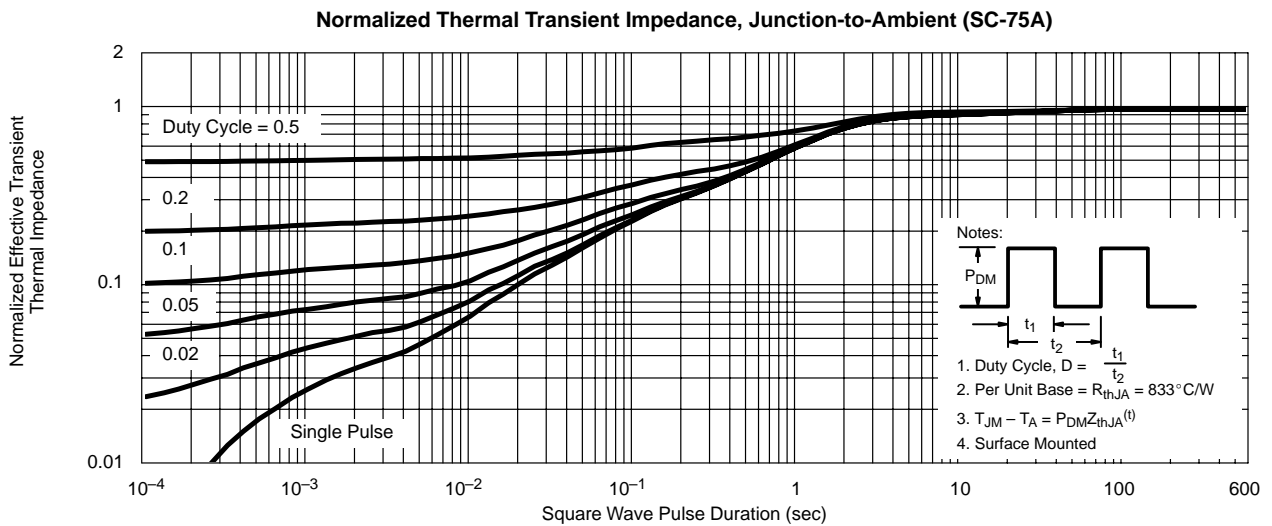
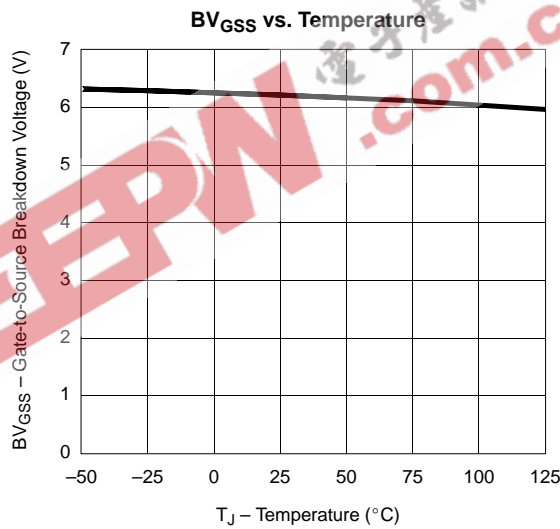
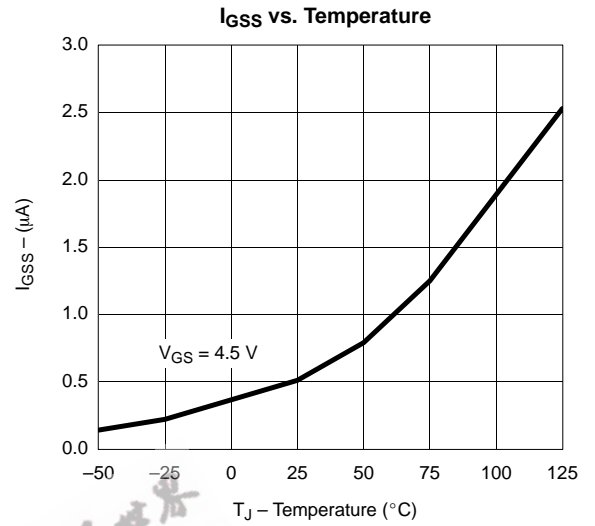
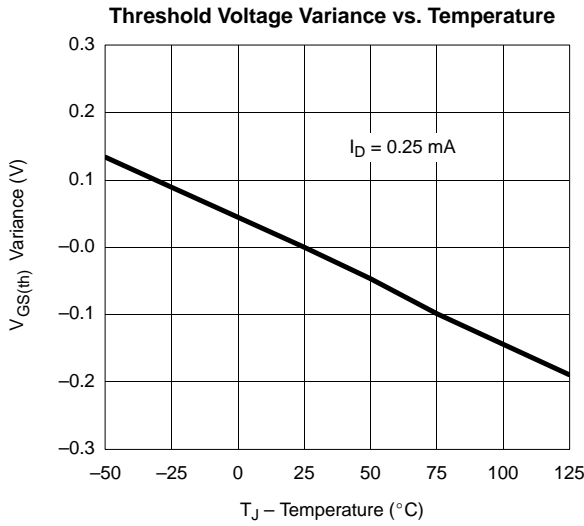


On-Resistance vs. Gate-to-Source Voltage



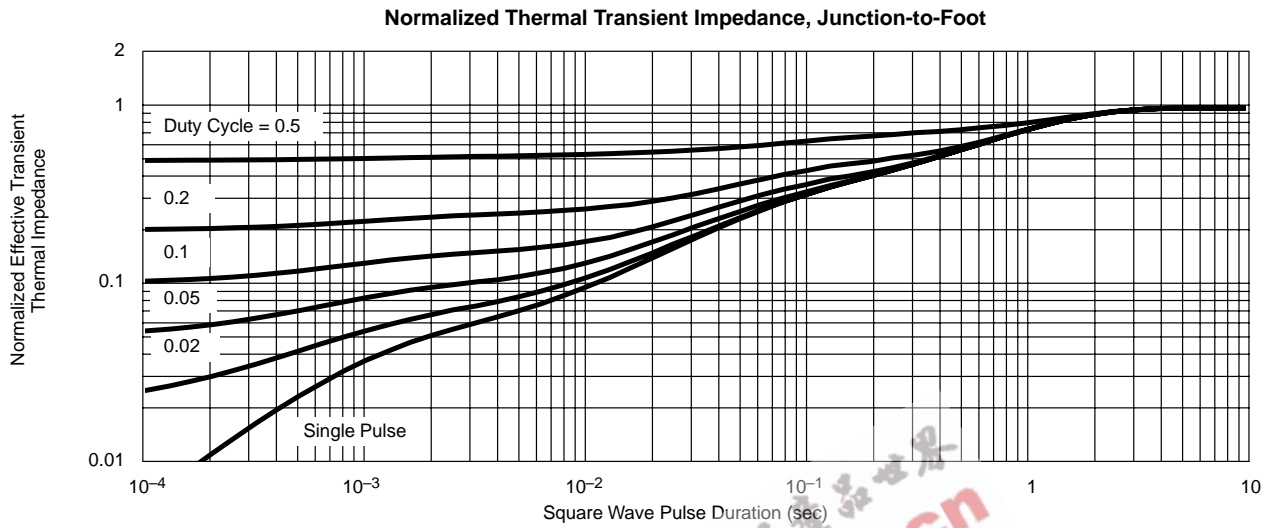


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