



P-Channel 1.8 V (G-S) MOSFET

PRODUCT SUMMARY				
V _{DS} (V)	$V_{DS}(V)$ $R_{DS(on)}(\Omega)$ I_{D}			
	1.2 at V _{GS} = - 4.5 V	- 350		
- 20	1.6 at V _{GS} = - 2.5 V	- 300		
	2.7 at V _{GS} = - 1.8 V	- 150		

SC-75A or SC-89

SC-75A (SOT-416): Si1013R - Marking Code D SC-89 (SOT-490): Si1013X - Marking Code B

Ordering Information:

Si1013R-T1-GE3 (SC-75A, Lead (Pb)-free and Halogen-free) Si1013X-T1-GE3 (SC-89, Lead (Pb)-free and Halogen-free)

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- High-Side Switching
- Low On-Resistance: 1.2 Ω
 Low Threshold: 0.8 V (Typ.)
- Fast Switching Speed: 14 ns
- 1.8 V Operation
- TrenchFET[®] Power MOSFETs
- 2000 V ESD Protection
- Compliant to RoHS Directive 2002/95/EC

APPLICATIONS

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

BENEFITS

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

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)					
Parameter		Symbol	5 s	Steady State	Unit
Drain-Source Voltage		V_{DS}	- 20		V
Gate-Source Voltage		V_{GS}	± 6		
Continuous Drain Current (T _{.I} = 150 °C) ^b	T _A = 25 °C	I _D	- 400	- 350	
Continuous Drain Current (1 _J = 150 °C)	T _A = 85 °C		- 300	- 275	
Pulsed Drain Current ^a		I _{DM}	- 1000		mA
Continuous Source Current (Diode Conduction) ^b		I _S	- 275	- 250	
Mariana Barra Birainatianh (an 00 75	T _A = 25 °C	P _D	175	150	mW
Maximum Power Dissipation ^b for SC-75	T _A = 85 °C		90	80	
Mariana Barra Birainatianh (an 00 00	T _A = 25 °C		275	250	
Maximum Power Dissipation ^b for SC-89	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.

ROHS COMPLIANT HALOGEN FREE

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Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static	•				•		
Gate Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	- 0.45			V	
Gate-Body Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 4.5 \text{ V}$		± 1	± 2	μΑ	
Zero Gate Voltage Drain Current		V _{DS} = - 16 V, V _{GS} = 0 V		- 0.3	- 100	nA	
	I _{DSS}	V _{DS} = - 16 V, V _{GS} = 0 V, T _J = 85 °C			- 5	μΑ	
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		$V_{GS} = -4.5 \text{ V}, I_D = -350 \text{ mA}$		0.8	1.2	Ω	
	R _{DS(on)}	$V_{GS} = -2.5 \text{ V}, I_D = -300 \text{ mA}$		1.2	1.6		
		V _{GS} = - 1.8 V, I _D = - 150 mA		1.8	2.7		
Forward Transconductancea	9 _{fs}	V _{DS} = - 10 V, I _D = - 250 mA		0.4		S	
Diode Forward Voltage ^a	V_{SD}	I _S = - 150 mA, V _{GS} = 0 V		- 0.8	- 1.2	V	
Dynamic ^b				<u>'</u>		I.	
Total Gate Charge	Q_g			1500			
Gate-Source Charge	Q_{gs}	$V_{DS} = -10 \text{ V}, V_{GS} = -4.5 \text{ V}, I_{D} = -250 \text{ mA}$		150		рС	
Gate-Drain Charge	Q_{gd}			450		1	
Turn-On Delay Time	t _{d(on)}			5			
Rise Time	t _r	V_{DD} = - 10 V, R_L = 47 Ω		9			
Turn-Off Delay Time	t _{d(off)}	$I_D \cong$ - 200 mA, V_{GEN} = - 4.5 V, R_g = 10 Ω		35		ns	
Fall Time	t _f			11		1	

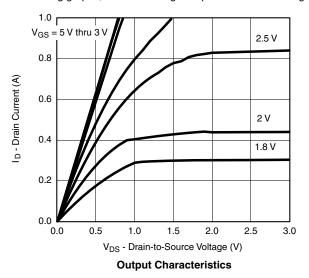
Notes

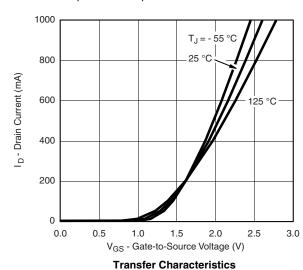
- a. Pulse test; pulse width \leq 300 $\mu s,$ duty cycle \leq 2 %.
- b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)

For the following graphs, P-Channel negative polarities for all voltage and current values are represented as positive values.



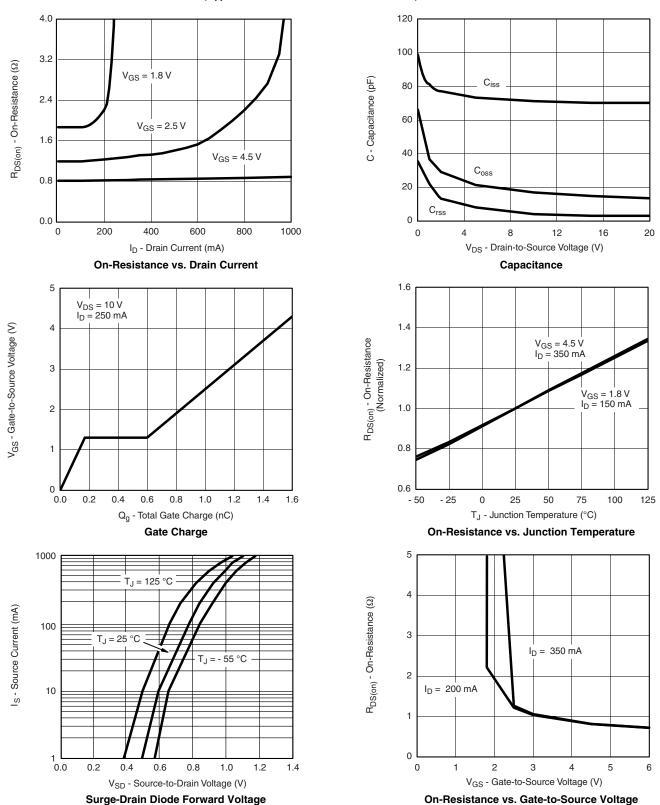








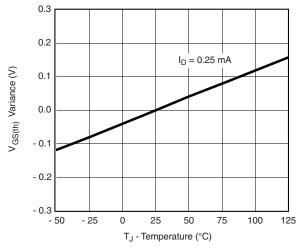
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)

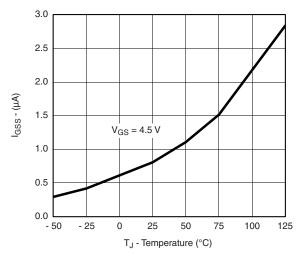


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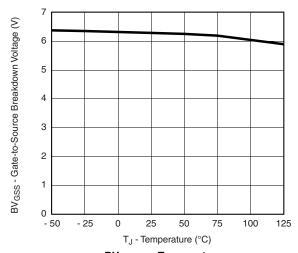
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



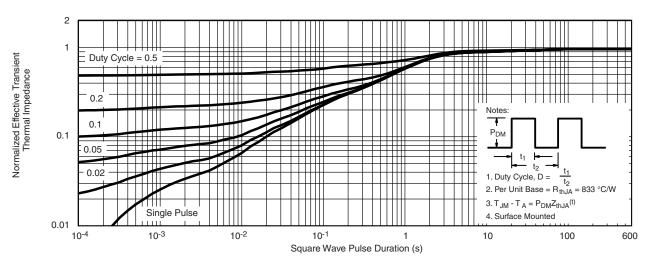


Threshold Voltage Variance vs. Temperature

 $I_{\mbox{\footnotesize GSS}}$ vs. Temperature



BV_{GSS} vs. Temperature

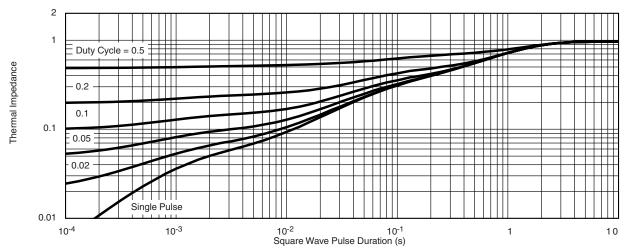


Normalized Thermal Transient Impedance, Junction-to-Ambient (SC-75A)





TYPICAL CHARACTERISTICS ($T_A = 25$ °C, unless otherwise noted)

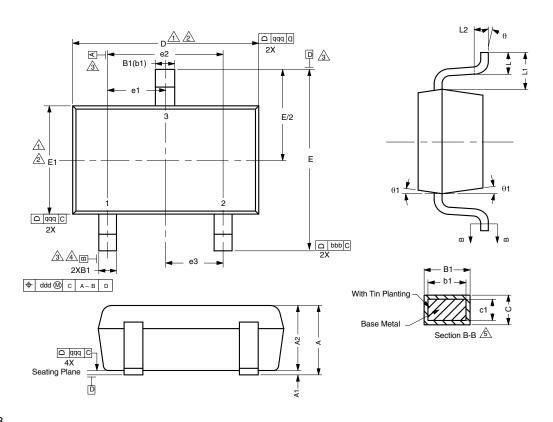


Normalized Thermal Transient Impedance, Junction-to-Foot

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SC-75A: 3 Leads



DWG: 5868

Notes

Dimensions in millimeters will govern.

- Dimension D does not include mold flash, protrusions or gate burrs. Mold flash protrusions or gate burrs shall not exceed 0.10 mm per end. Dimension E1 does not include Interlead flash or protrusion. Interlead flash or protrusion shall not exceed 0.10 mm per side.
- Dimensions D and E1 are determined at the outmost extremes of the plastic body exclusive of mold flash, tie bar burrs, gate burrs and interlead flash, but including any mismatch between the top and bottom of the plastic body.
- Datums A, B and D to be determined 0.10 mm from the lead tip.

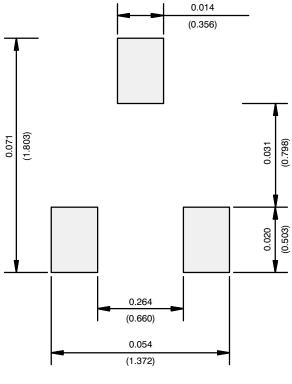
 Atterminal positions are shown for reference only.
- These dimensions apply to the flat section of the lead between 0.08 mm and 0.15 mm from the lead tip.

DIMENSIONS	TOLERANCES		
aaa	0.10		
bbb	0.10		
ccc	0.10		
ddd	0.10		

DIM.	MILLIMETERS			NOTE	
Dilvi.	MIN.	NOM.	MAX.	NOTE	
Α	-	-	0.80		
A1	0.00	-	0.10		
A2	0.65	0.70	0.80		
B1	0.19	-	0.24	5	
b1	0.17	-	0.21		
С	0.13	-	0.15	5	
c1	0.10	-	0.12	5	
D	1.48	1.575	1.68	1, 2	
E	1.50	1.60	1.70		
E1	0.66	0.76	0.86	1, 2	
e1		0.50 BSC			
e2	1.00 BSC				
e3	0.50 BSC				
L	0.15	0.205	0.30		
L1	0.40 ref.				
L2	0.15 BSC				
q	0°	-	8°		
q1	4°	-	10°		



RECOMMENDED MINIMUM PADS FOR SC-75A: 3-Lead



Recommended Minimum Pads Dimensions in Inches/(mm)

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APPLICATION NOTE



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