N-Channel 1.5 V (G-S) MOSFET

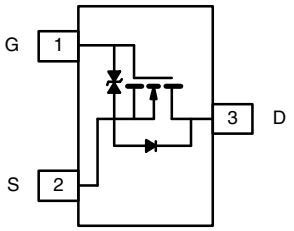
PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (mA)
20	5 at V_{GS} = 4.5 V	200
	7 at V_{GS} = 2.5 V	175
	9 at V_{GS} = 1.8 V	150
	10 at V_{GS} = 1.5 V	50

FEATURES

- **Halogen-free According to IEC 61249-2-21 Definition**
- Low-Side Switching
- Low On-Resistance: 5 Ω
- Low Threshold: 0.9 V (typ.)
- Fast Switching Speed: 35 ns
- TrenchFET® Power MOSFETs: 1.5 V Rated
- 2000 V ESD Protection
- Compliant to RoHS Directive 2002/95/EC

Pb-free
RoHS COMPLIANT
HALOGEN FREE

SC-75A or SC-89



Top View

Marking Code: G

Ordering Information:
Si1032R-T1-GE3 (SC-75A, Lead (Pb)-free and Halogen-free)
Si1032X-T1-GE3 (SC-89, Lead (Pb)-free -free Halogen-free)

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

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

Parameter		Symbol	Si1032R		Si1032X		Unit
			5 s	Steady State	5 s	Steady State	
Drain-Source Voltage		V_{DS}	20				V
Gate-Source Voltage		V_{GS}	± 6				
Continuous Drain Current (T_J = 150 °C)[a]	T_A = 25 °C	I_D	200	140	210	200	mA
	T_A = 85 °C		110	100	150	140	
Pulsed Drain Current[a]		I_{DM}	500		600		
Continuous Source Current (Diode Conduction)[a]		I_S	250	200	300	240	
Maximum Power Dissipation[a] for SC-75	T_A = 25 °C	P_D	280	250	340	300	mW
	T_A = 85 °C		145	130	170	150	
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. Surface mounted on FR4 board.

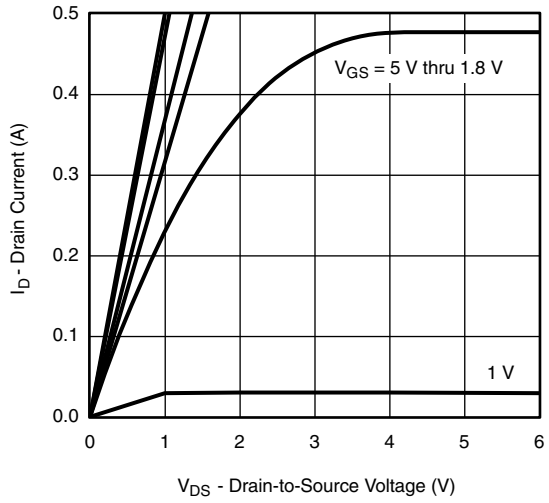
SPECIFICATIONS (T_A = 25 °C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	0.40	0.7	1.2	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 2.8 V		± 0.5	± 1.0	µA
		V_{DS} = 0 V, V_{GS} = ± 4.5 V		± 1.0	± 3.0	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0 V			1	
		V_{DS} = 20 V, V_{GS} = 0 V, T_J = 55 °C			10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 4.5 V	250			mA
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 200 mA			5	Ω
		V_{GS} = 2.5 V, I_D = 175 mA			7	
		V_{GS} = 1.8 V, I_D = 150 mA			9	
		V_{GS} = 1.5 V, I_D = 40 mA			10	
Forward Transconductance[a]	g_{fs}	V_{DS} = 10 V, I_D = 200 mA		0.5		S
Diode Forward Voltage[a]	V_{SD}	I_S = 150 mA, V_{GS} = 0 V			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			50	ns
Rise Time	t_r				25	
Turn-Off Delay Time	$t_{d(off)}$				50	
Fall Time	t_f				25	

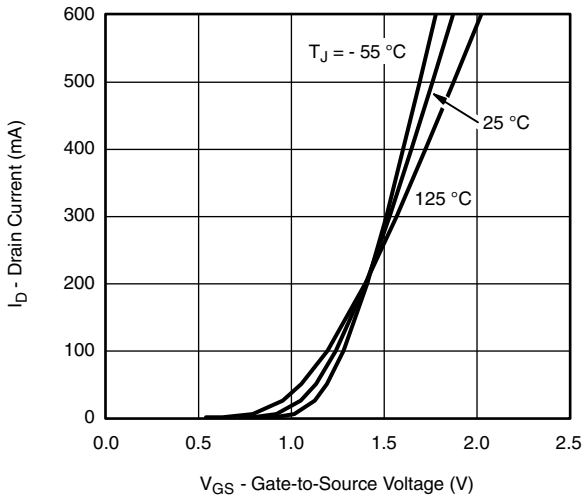
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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)

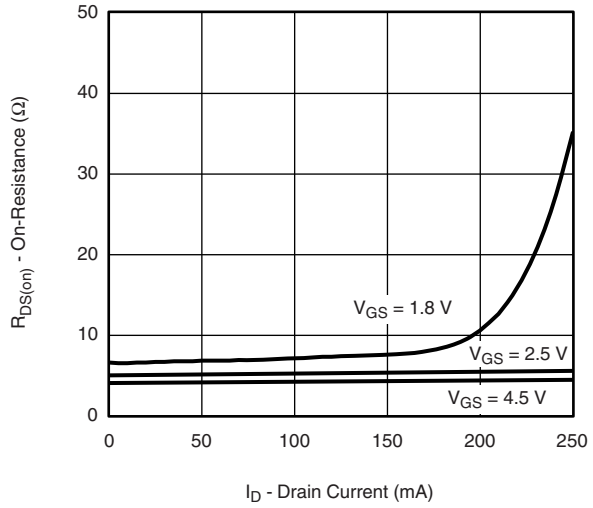


Output Characteristics

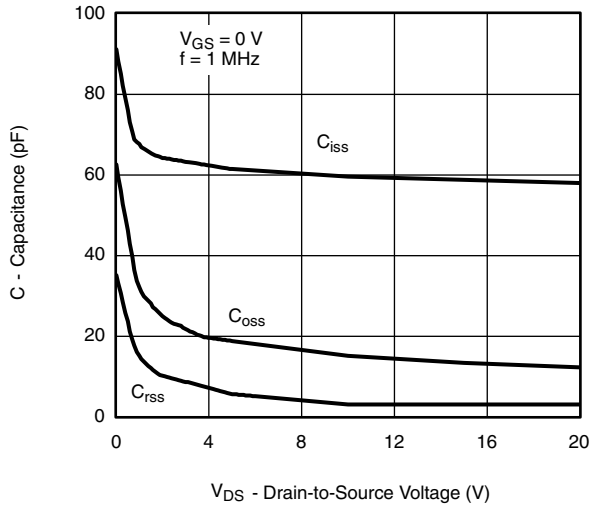


Transfer Characteristics

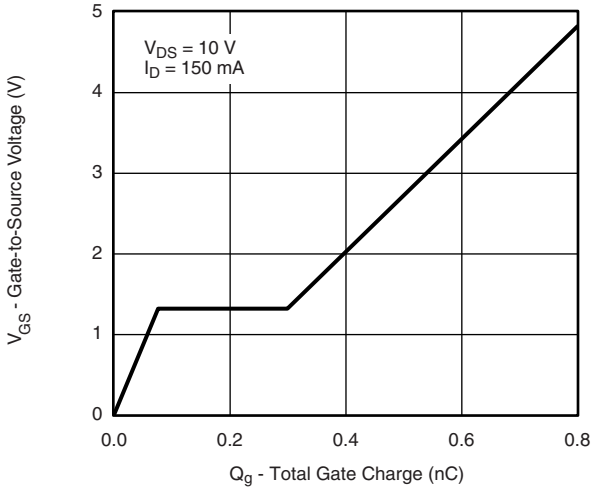
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



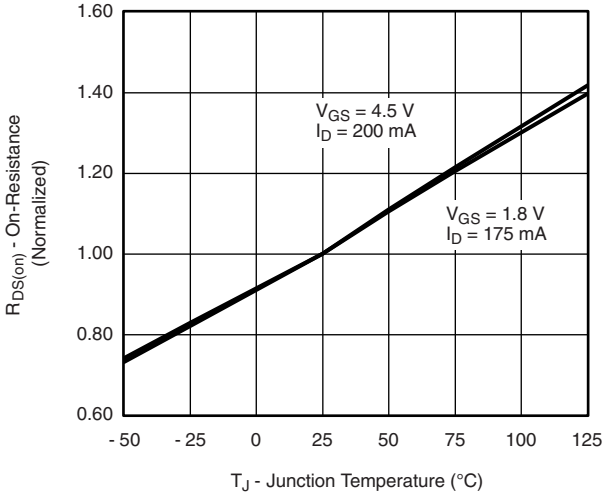
On-Resistance vs. Drain Current



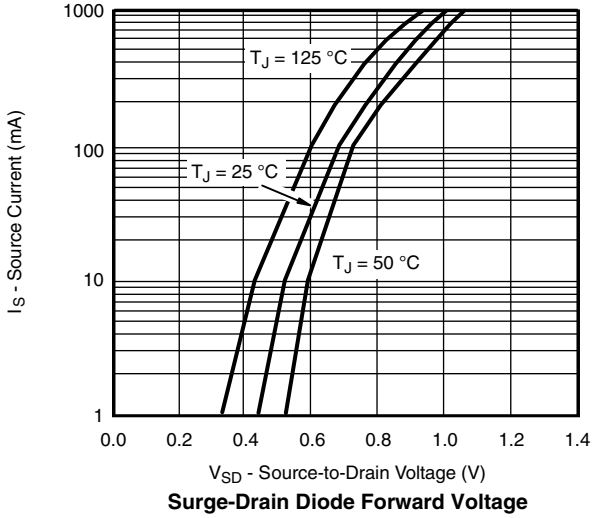
Capacitance



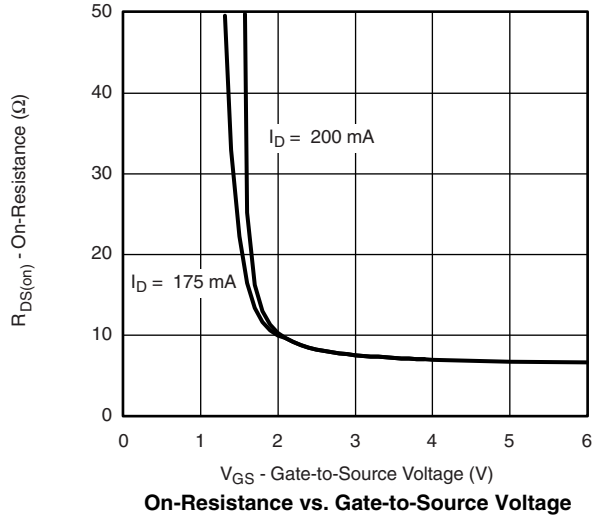
Gate Charge



On-Resistance vs. Junction Temperature

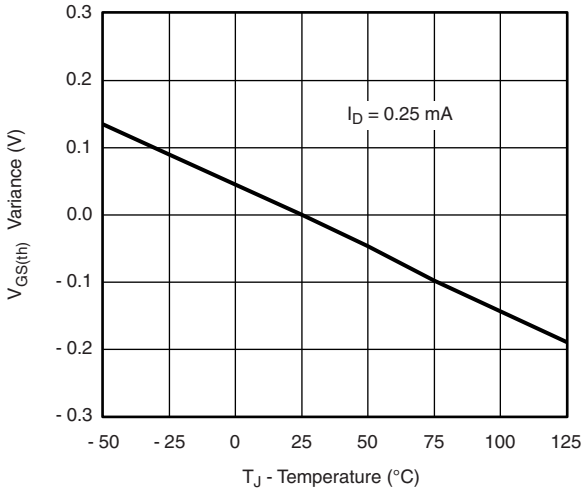


Surge-Drain Diode Forward Voltage

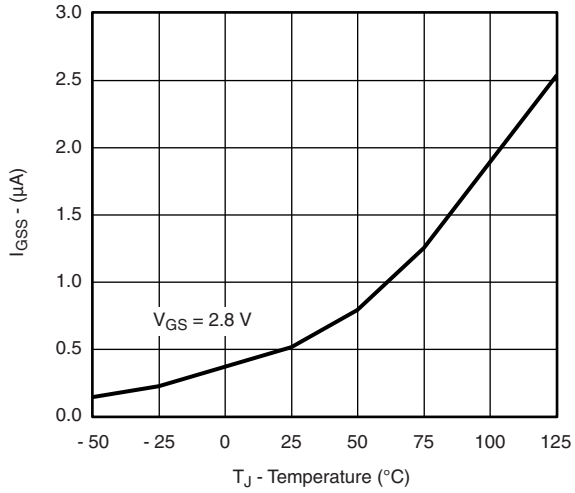


On-Resistance vs. Gate-to-Source Voltage

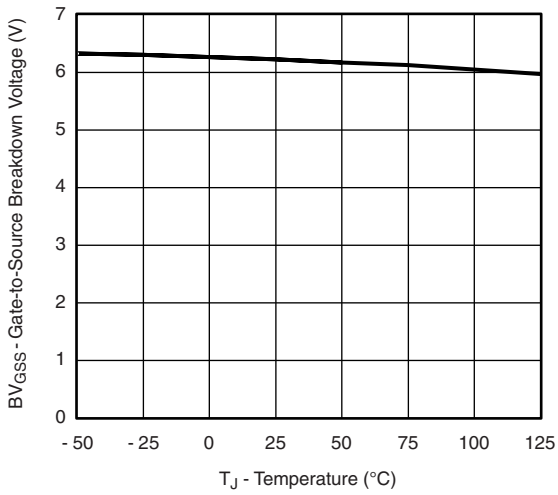
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



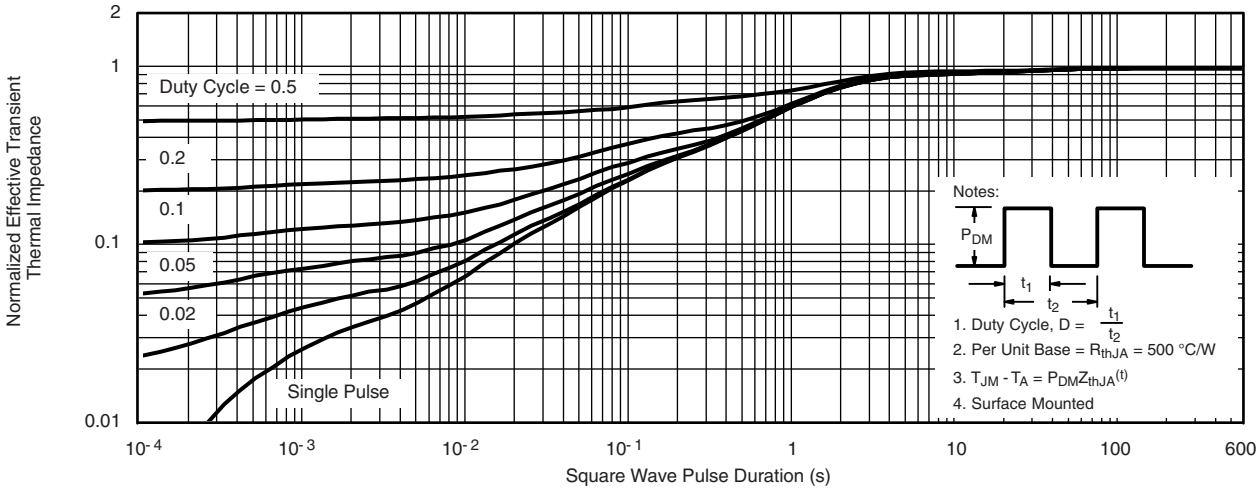
Threshold Voltage Variance vs. Temperature



I_{GSS} vs. Temperature



BV_{GSS} vs. Temperature



Normalized Thermal Transient Impedance, Junction-to-Ambient (SC-75A, Si1032R Only)

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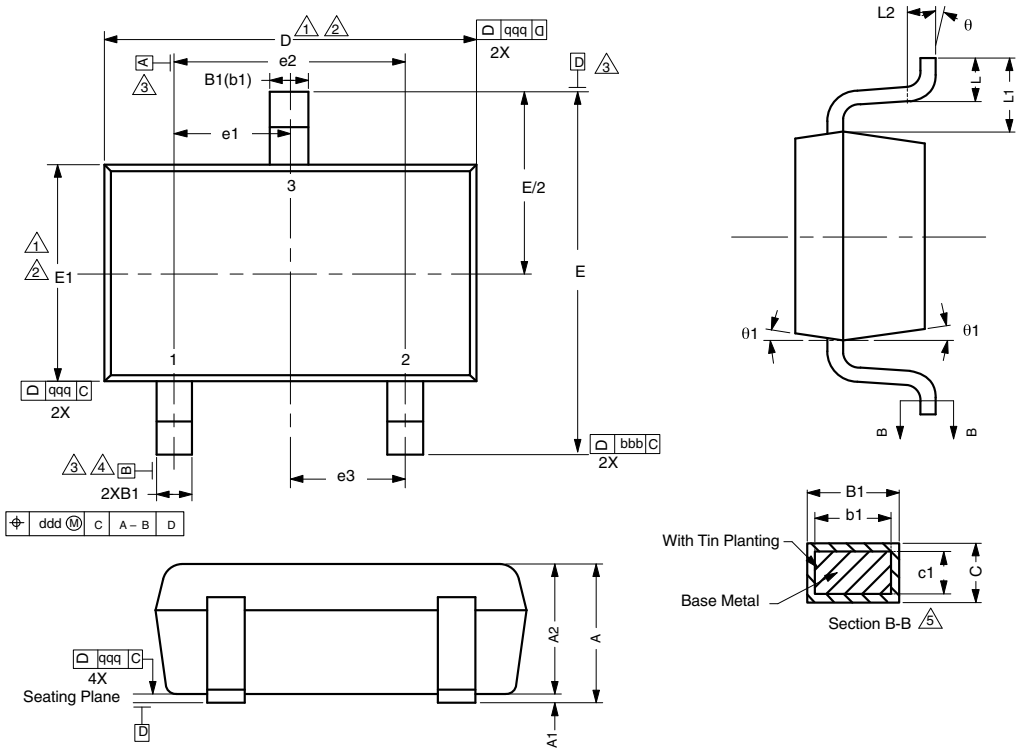
SC-75A: 3 Leads



DWG: 5868

Notes

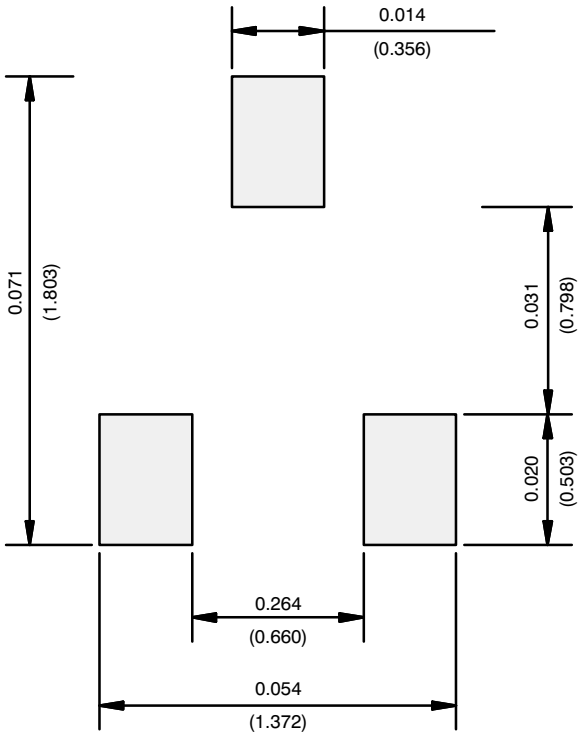
Dimensions in millimeters will govern.

1. 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.
2. 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.
3. Datums A, B and D to be determined 0.10 mm from the lead tip.
4. Terminal positions are shown for reference only.
5. 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
	MIN.	NOM.	MAX.	
A	-	-	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	
c	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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