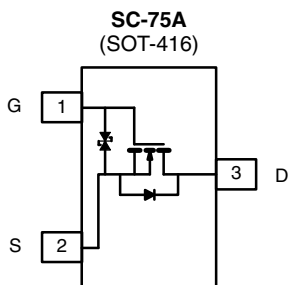


## N-Channel 60 V (D-S) MOSFET

### PRODUCT SUMMARY

$V_{DS(min.)}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$V_{GS(th)}$ (V)	$I_D$ (mA)
60	1.25 at $V_{GS} = 10$ V	1 to 2.5	330



Marking Code: E

**Ordering Information:** Si1022R-T1-GE3 (Lead (Pb)-free and Halogen-free)

### FEATURES

- **Halogen-free According to IEC 61249-2-21 Definition**
- TrenchFET® Power MOSFETs
- Low On-Resistance: 1.25  $\Omega$
- Low Threshold: 2.5 V
- Low Input Capacitance: 30 pF
- Fast Switching Speed: 25 ns
- Low Input and Output Leakage
- Miniature Package
- ESD Protected: 2000 V
- Compliant to RoHS Directive 2002/95/EC


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Solid State Relays

### BENEFITS

- Low Offset Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Error Voltage
- Small Board Area

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>a</sup>	$T_A = 25$ °C	$I_D$ 330	mA
	$T_A = 85$ °C	240	
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	650	
Power Dissipation <sup>a</sup>	$T_A = 25$ °C	$P_D$ 250	mW
	$T_A = 85$ °C	130	
Thermal Resistance, Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	500	°C/W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150	°C

Notes:

a. Surface mounted on FR4 board, power applied for  $t \leq 10$  s.

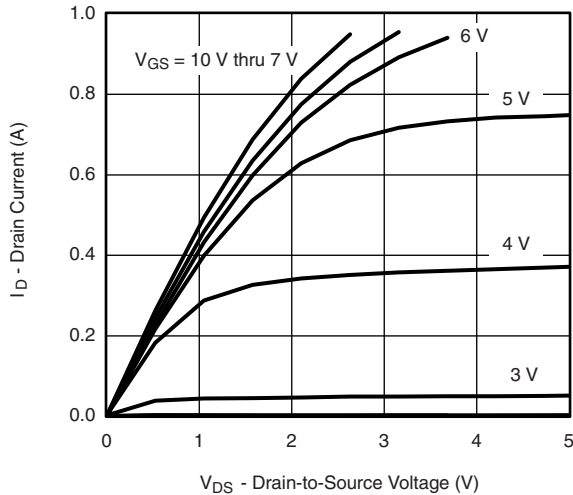
<b>SPECIFICATIONS</b> ( $T_J = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}$ , $I_D = 10\text{ }\mu\text{A}$	60			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 0.25\text{ mA}$	1		2.5	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 10\text{ V}$			$\pm 150$	nA
		$T_J = 85\text{ }^{\circ}\text{C}$			$\pm 500$	
		$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 5\text{ V}$			$\pm 20$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 50\text{ V}$ , $V_{GS} = 0\text{ V}$			10	
		$T_J = 85\text{ }^{\circ}\text{C}$			100	
		$V_{DS} = 60\text{ V}$ , $V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = 10\text{ V}$ , $V_{GS} = 4.5\text{ V}$	500			mA
		$V_{DS} = 7.5\text{ V}$ , $V_{GS} = 10\text{ V}$	800			
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}$ , $I_D = 200\text{ mA}$			3.0	$\Omega$
		$T_J = 125\text{ }^{\circ}\text{C}$			5.0	
		$V_{GS} = 10\text{ V}$ , $I_D = 500\text{ mA}$			1.25	
		$T_J = 125\text{ }^{\circ}\text{C}$			2.25	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 10\text{ V}$ , $I_D = 200\text{ mA}$	100			mS
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$V_{GS} = 0\text{ V}$ , $I_S = 200\text{ mA}$			1.3	V
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1\text{ MHz}$		30		pF
Output Capacitance	$C_{oss}$			6		
Reverse Transfer Capacitance	$C_{rss}$			2.5		
Gate Charge	$Q_g$	$V_{DS} = 10\text{ V}$ , $I_D = 250\text{ mA}$ , $V_{GS} = 4.5\text{ V}$			0.6	nC
<b>Switching<sup>b, c</sup></b>						
Turn-On Time	$t_{(on)}$	$V_{DD} = 30\text{ V}$ , $R_L = 150\text{ }\Omega$ , $I_D = 200\text{ mA}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 10\text{ }\Omega$			25	ns
Turn-Off Time	$t_{(off)}$				35	

Notes:

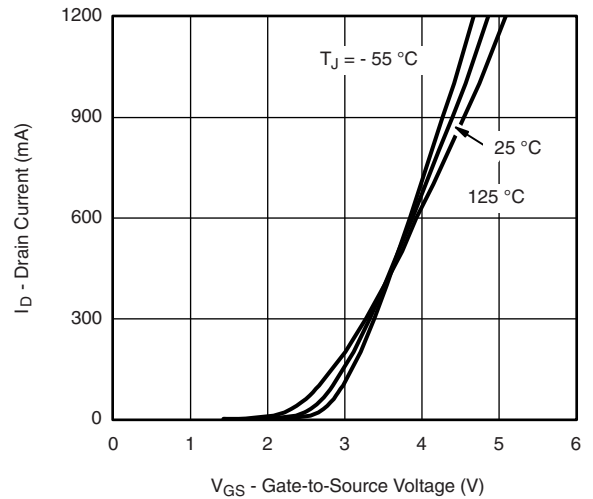
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. For DESIGN AID ONLY, not subject to production testing.  
c. Switching time is essentially independent of operating temperature.

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.

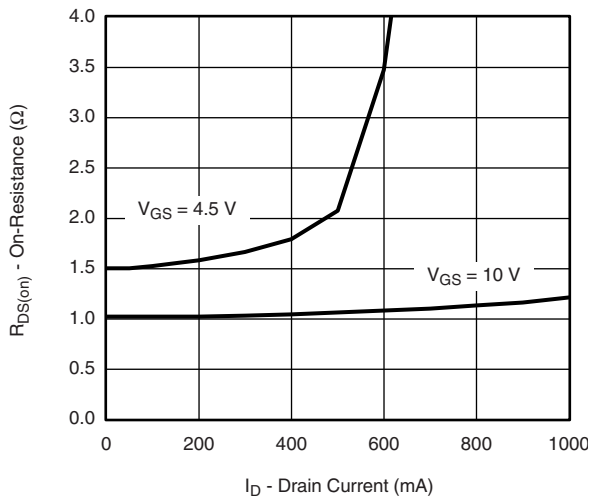
## TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)



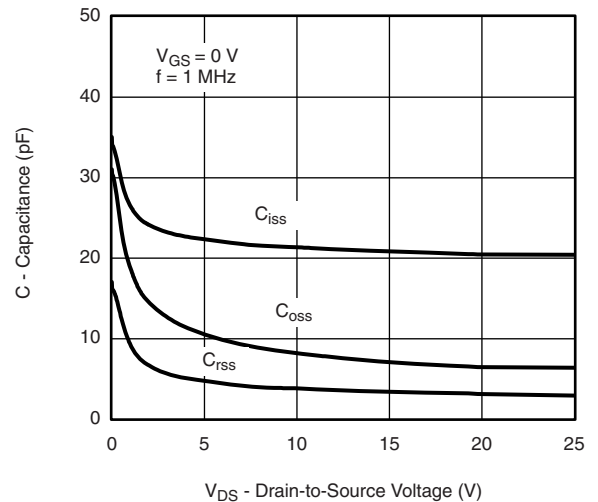
Output Characteristics



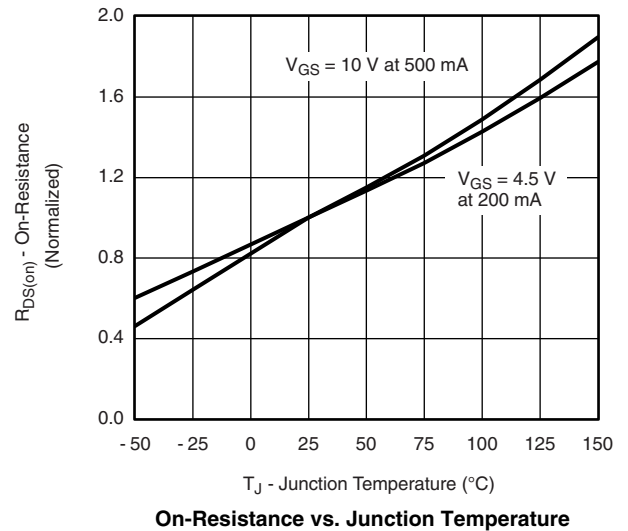
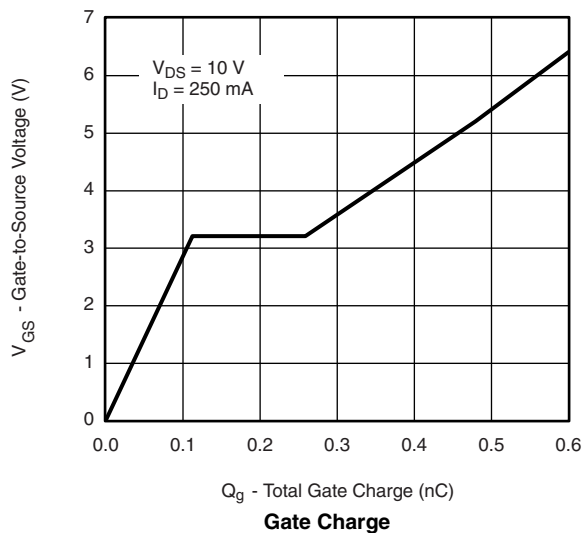
Transfer Characteristics

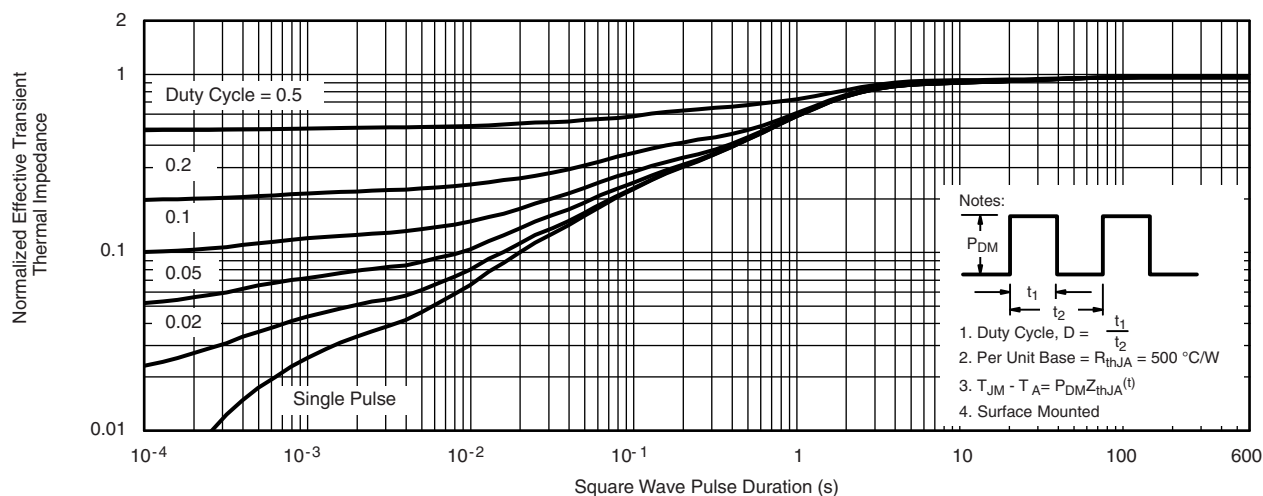
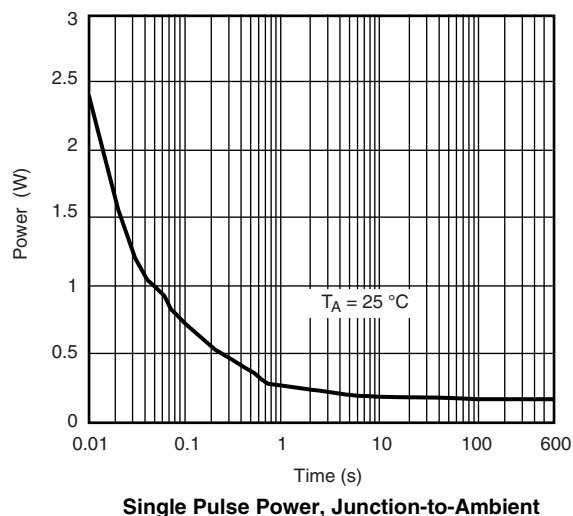
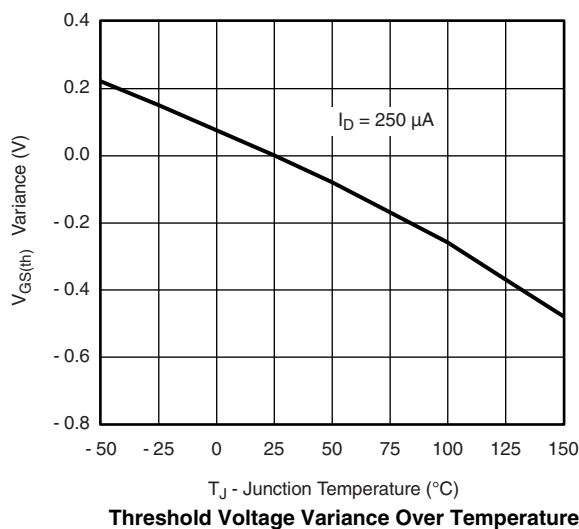
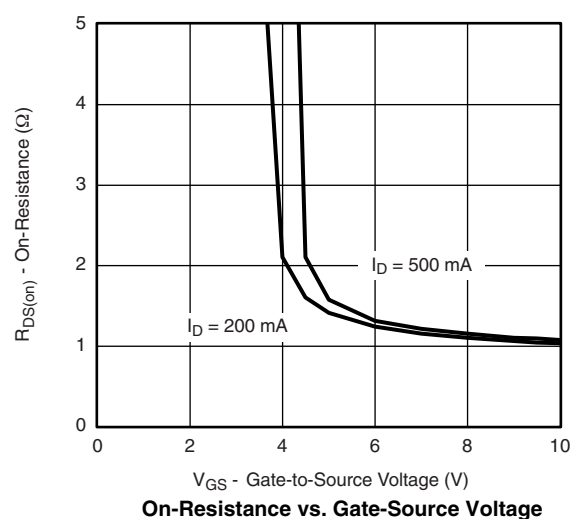
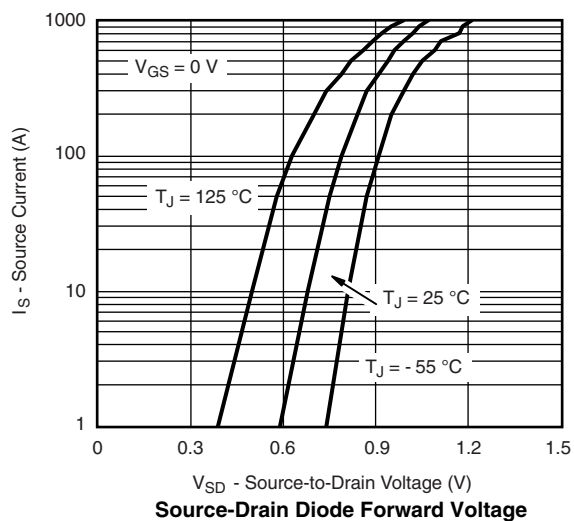


On-Resistance vs. Drain Current



Capacitance

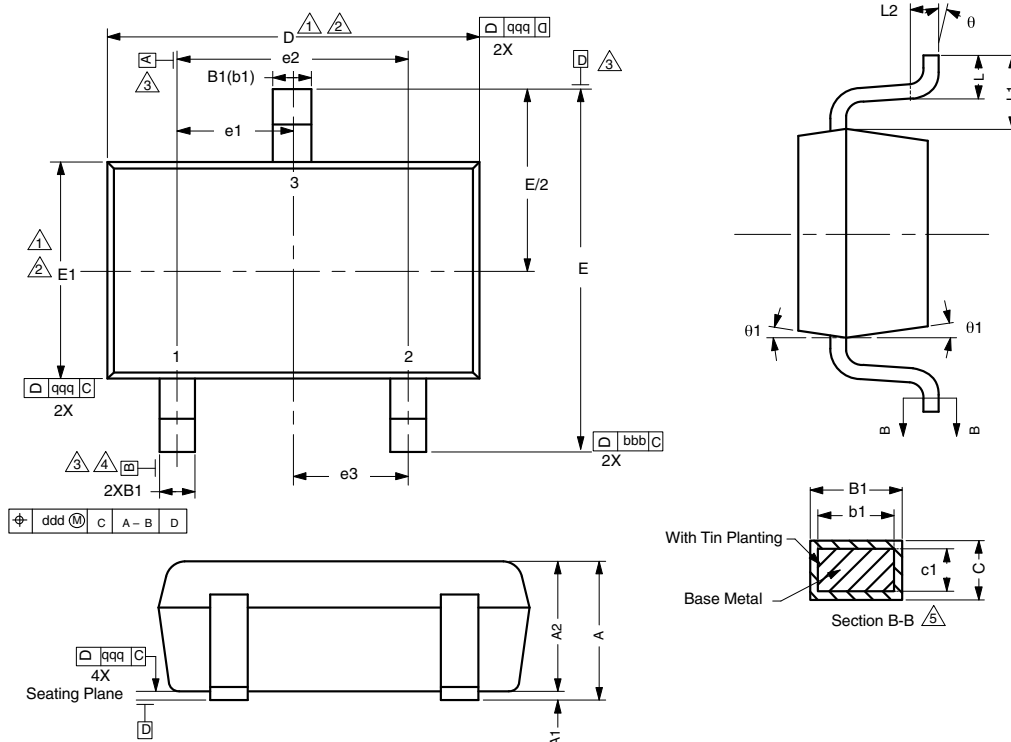


**TYPICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)


Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see [www.vishay.com/ppg?71331](http://www.vishay.com/ppg?71331).



## SC-75A: 3-LEADS



## Notes

Dimensions in millimeters will govern.

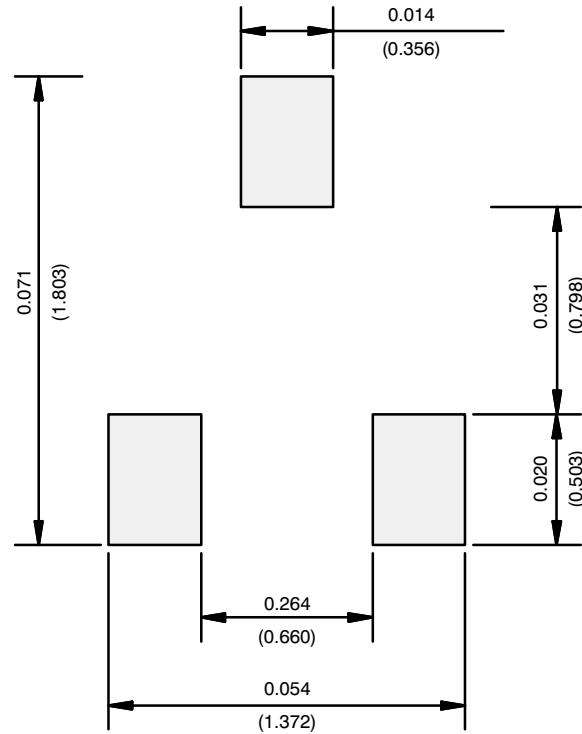
1. Dimension D does not include mold flash, protrusions or gate burrs. Mold flash protrusions or gate burrs shall not exceed 0.10 mm per end. Dimension E1 does not include Interlead flash or protrusion. Interlead flash or protrusion shall not exceed 0.10 mm per side.
2. Dimensions D and E1 are determined 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	
A <sub>1</sub>	0.00	-	0.10	
A <sub>2</sub>	0.65	0.70	0.80	
B <sub>1</sub>	0.19	-	0.24	5
b <sub>1</sub>	0.17	-	0.21	
c	0.13	-	0.15	5
c <sub>1</sub>	0.10	-	0.12	5
D	1.48	1.575	1.68	1, 2
E	1.50	1.60	1.70	
E <sub>1</sub>	0.66	0.76	0.86	1, 2
e <sub>1</sub>	0.50 BSC			
e <sub>2</sub>	1.00 BSC			
e <sub>3</sub>	0.50 BSC			
L	0.15	0.205	0.30	
L <sub>1</sub>	0.40 REF			
L <sub>2</sub>	0.15 BSC			
θ	0°	-	8°	
θ <sub>1</sub>	4°	-	10°	

ECN: E11-2210-Rev. D, 08-Aug-11  
DWG: 5868

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



Recommended Minimum Pads  
Dimensions in Inches/(mm)

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