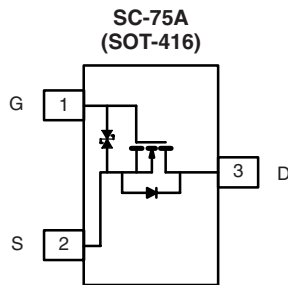


N-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY

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



Marking Code: E

Ordering Information: Si1022R-T1-E3 (Lead (Pb)-free)
Si1022R-T1-GE3 (Lead (Pb)-free and Halogen-free)

FEATURES

- Halogen-free Option Available
- TrenchFET® Power MOSFETs
- Low On-Resistance: 1.25 Ω
- 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



RoHS
COMPLIANT

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 $T_A = 25^\circ\text{C}$, unless otherwise noted

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

Notes:

a. Surface Mounted on FR4 board, Power Applied for $t \leq 10$ s.

SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
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}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 10\text{ V}$ $T_J = 85\text{ }^{\circ}\text{C}$			± 150	nA
		$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 5\text{ V}$			± 20	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 50\text{ V}$, $V_{GS} = 0\text{ V}$ $T_J = 85\text{ }^{\circ}\text{C}$			10	
		$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$			1	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 10\text{ V}$, $V_{GS} = 4.5\text{ V}$	500			mA
		$V_{DS} = 7.5\text{ V}$, $V_{GS} = 10\text{ V}$	800			
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}$, $I_D = 200\text{ mA}$ $T_J = 125\text{ }^{\circ}\text{C}$			3.0	Ω
		$V_{GS} = 10\text{ V}$, $I_D = 500\text{ mA}$ $T_J = 125\text{ }^{\circ}\text{C}$			5.0	
					1.25	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 10\text{ V}$, $I_D = 200\text{ mA}$	100			mS
Diode Forward Voltage ^a	V_{SD}	$V_{GS} = 0\text{ V}$, $I_S = 200\text{ mA}$			1.3	V
Dynamic^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		nC
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	
Switching^{b, c}						
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:

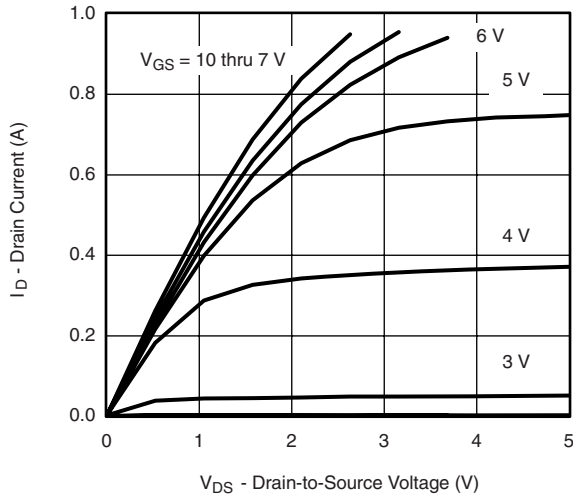
a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. For DESIGN AID ONLY, not subject to production testing.

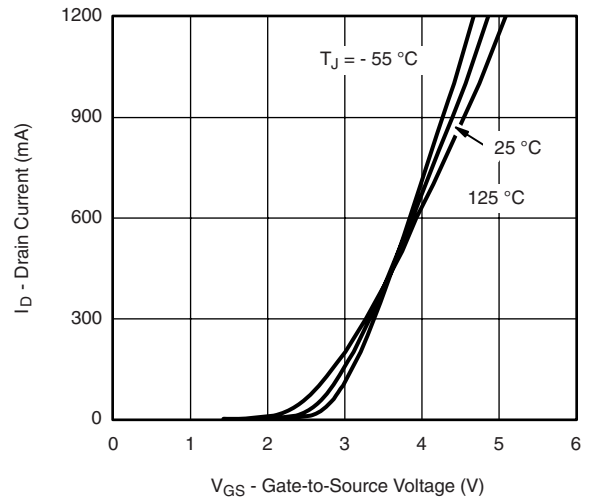
c. Switching time is essentially independent of operating temperature.

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.

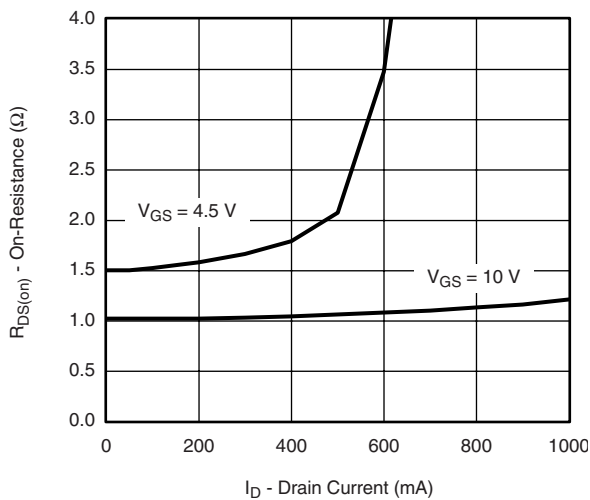
TYPICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$, unless otherwise noted



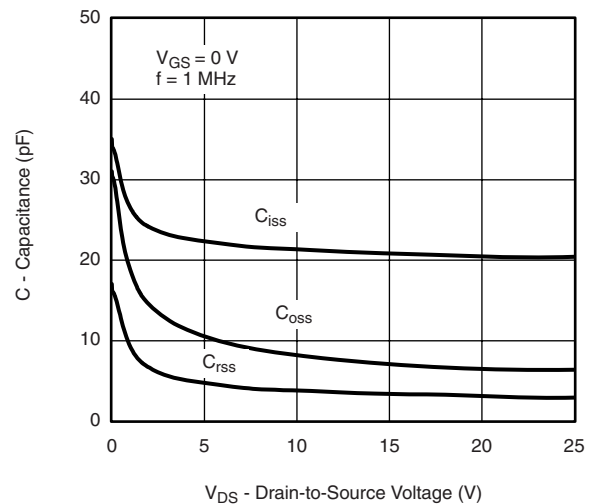
Output Characteristics



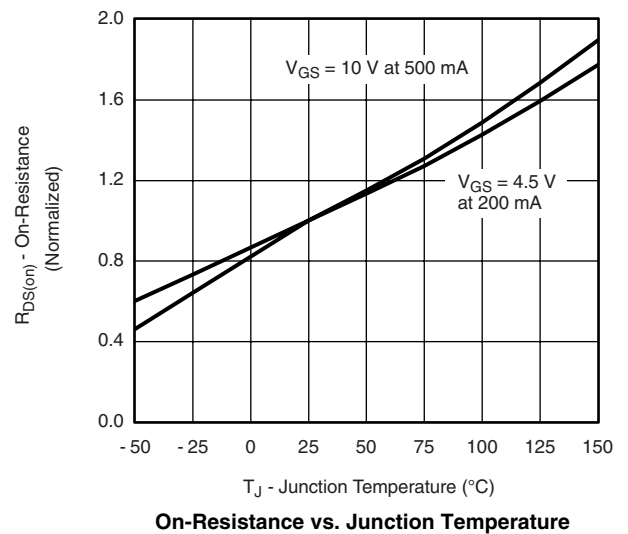
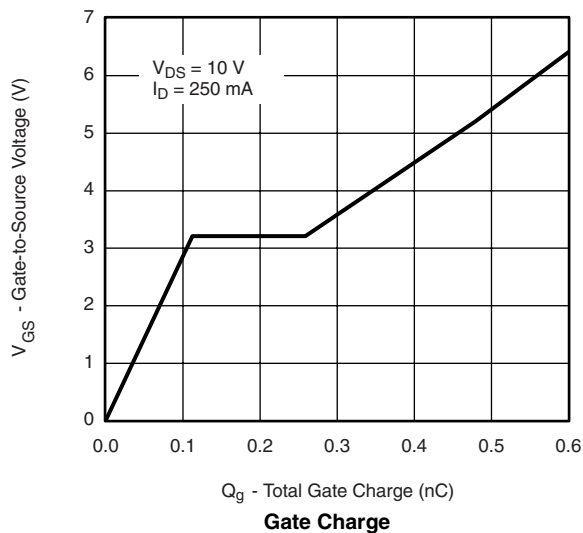
Transfer Characteristics

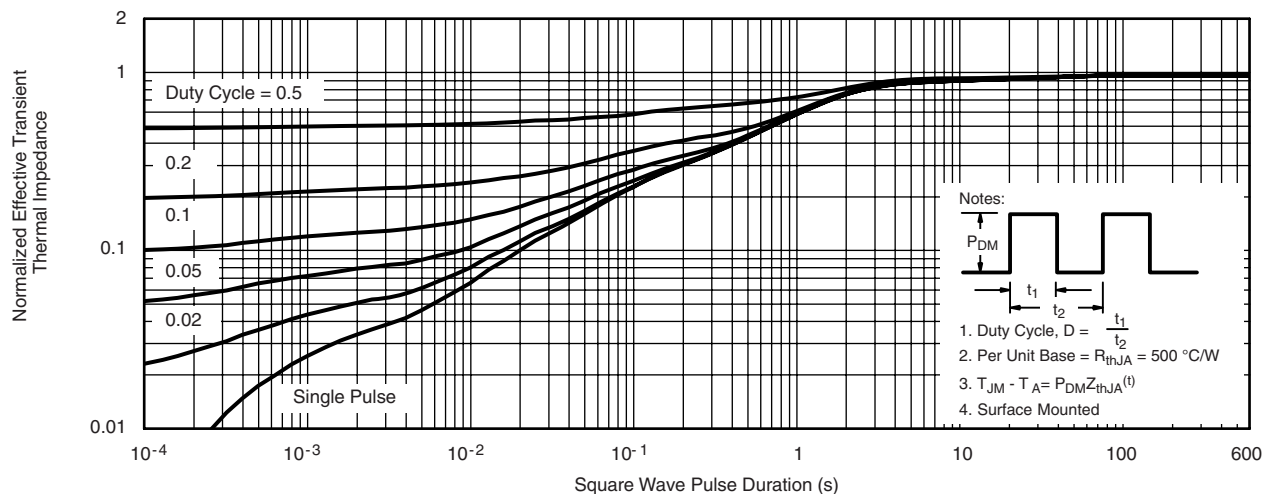
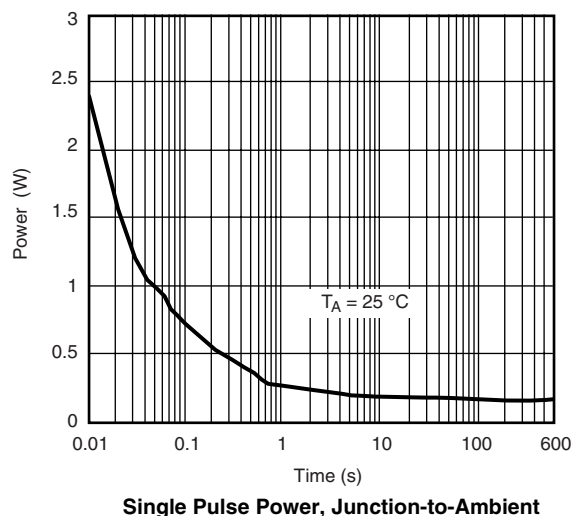
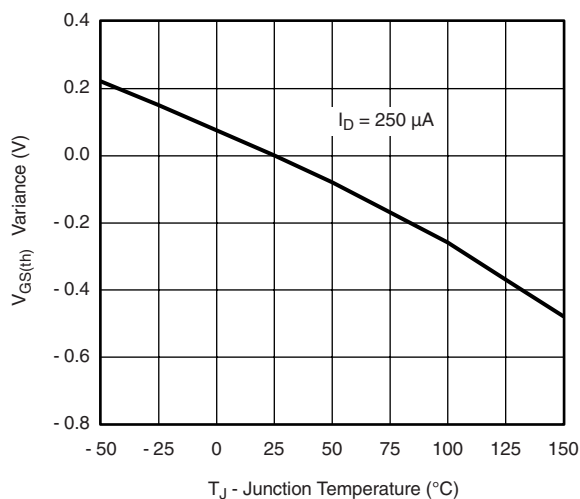
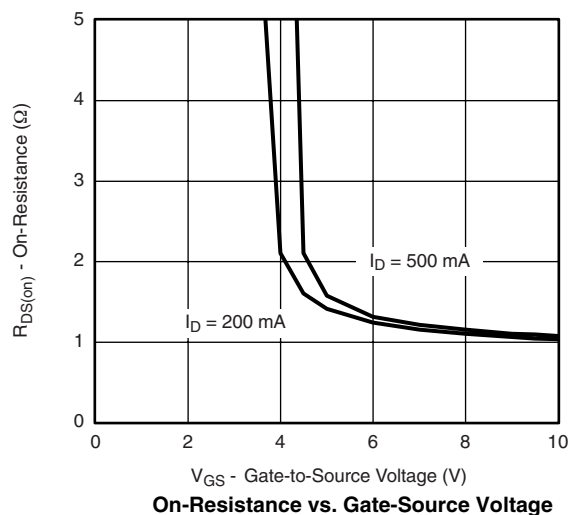
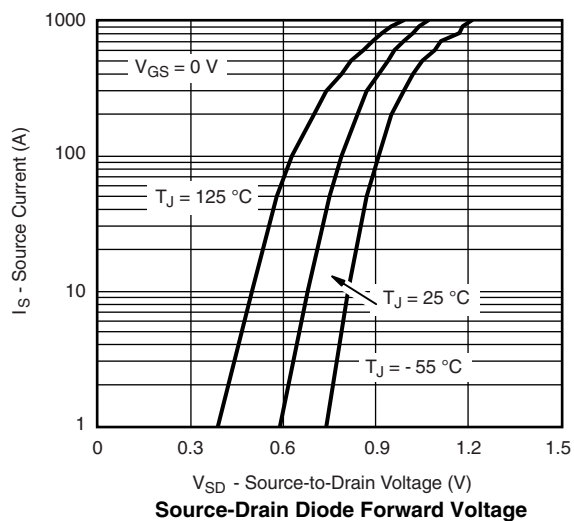


On-Resistance vs. Drain Current



Capacitance



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


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