



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

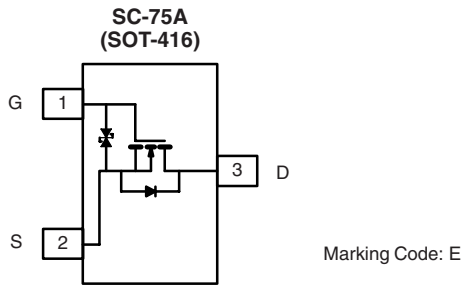
PRODUCT SUMMARY			
V _{DS(min.)} (V)	R _{DS(on)} (Ω)	V _{GS(th)} (V)	I _D (mA)
60	1.25 at V _{GS} = 10 V	1 to 2.5	330

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

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

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}	± 20	
Continuous Drain Current ^a	I _D	T _A = 25 °C	330
		T _A = 85 °C	240
Pulsed Drain Current ^a	I _{DM}	650	mA
Power Dissipation ^a	P _D	T _A = 25 °C	
		T _A = 85 °C	130
Thermal Resistance, Maximum Junction-to-Ambient ^a	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 ≤ 10 s.

Si1022R

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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}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 10\text{ V}$			± 150	nA
		$T_J = 85\text{ }^\circ\text{C}$			± 500	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 5\text{ V}$			± 20	
		$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}$			10	
		$T_J = 85\text{ }^\circ\text{C}$			100	μA
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			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	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 200\text{ mA}$			3.0	Ω
		$T_J = 125\text{ }^\circ\text{C}$			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 ^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		
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
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	

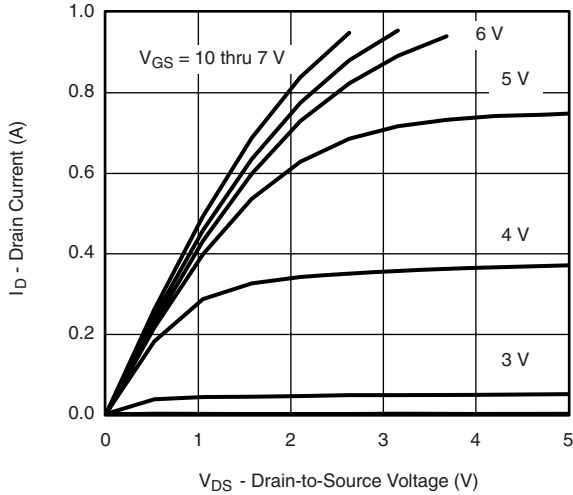
Notes:

- 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.

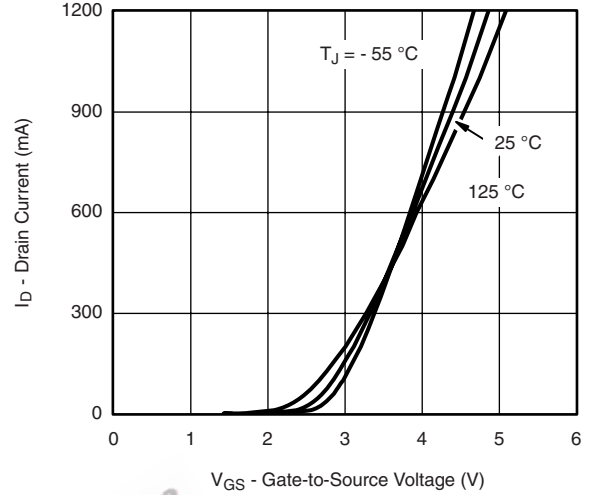
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



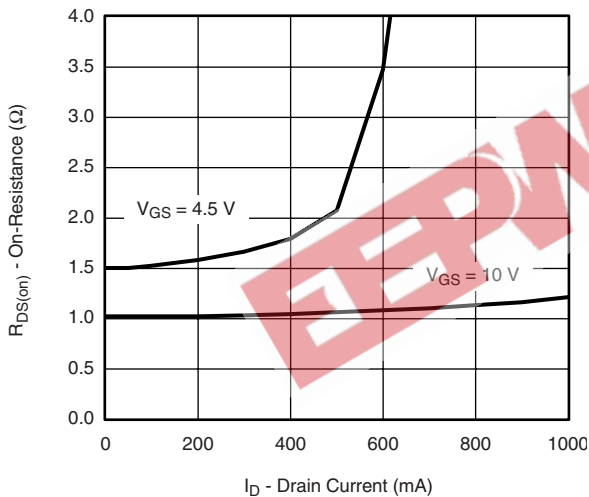
TYPICAL CHARACTERISTICS $T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted



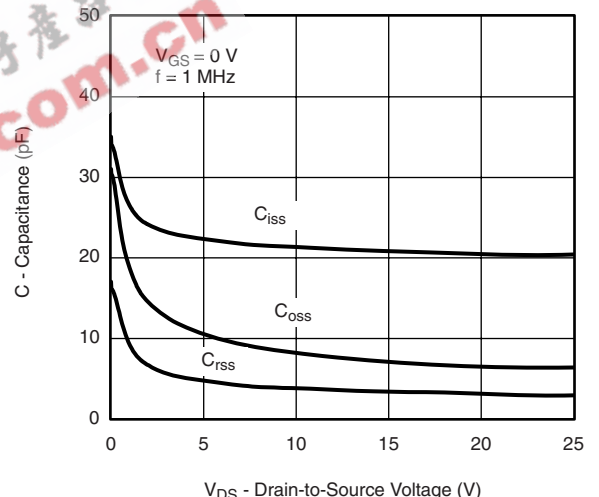
Output Characteristics



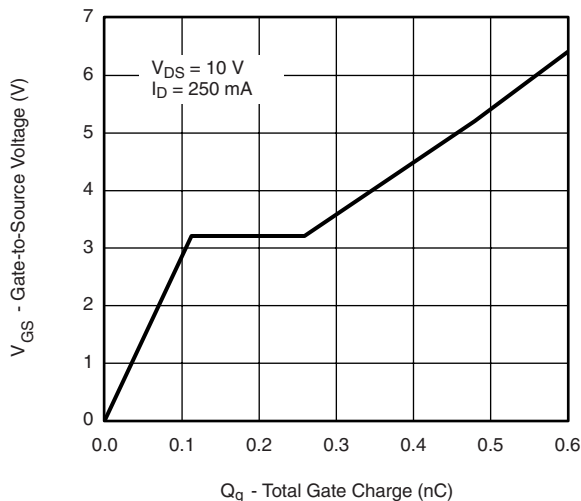
Transfer Characteristics



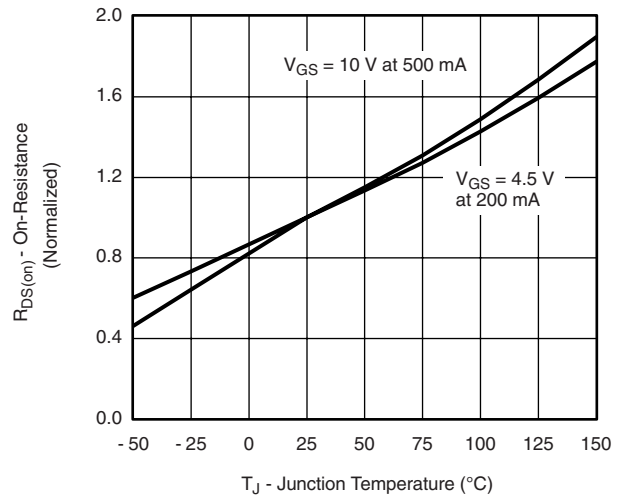
On-Resistance vs. Drain Current



Capacitance



Gate Charge



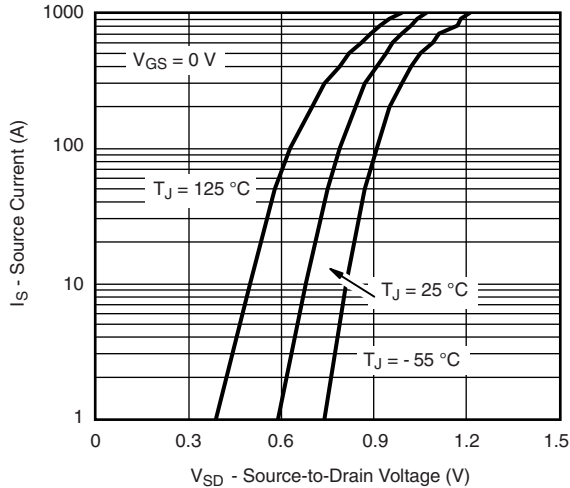
On-Resistance vs. Junction Temperature

Si1022R

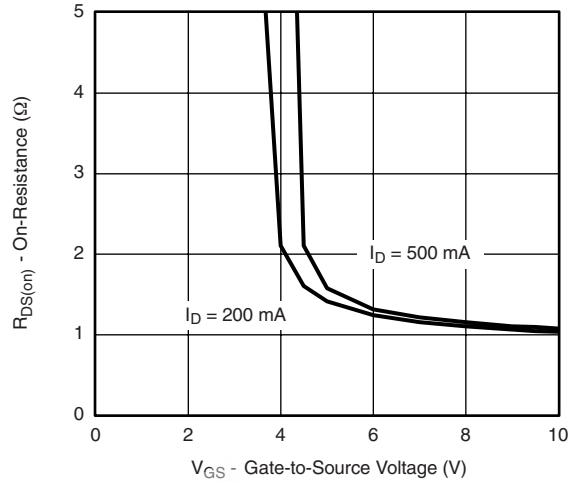
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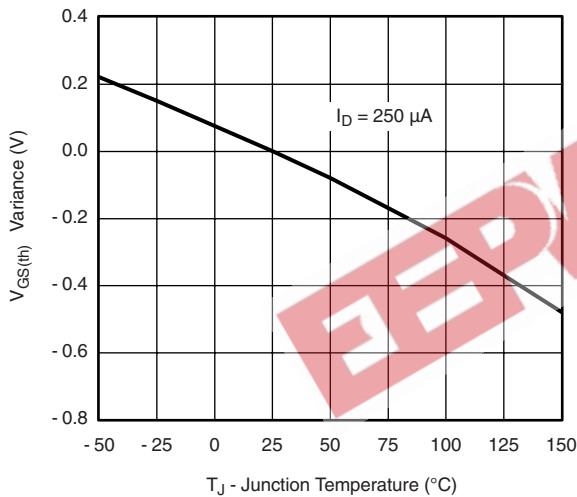
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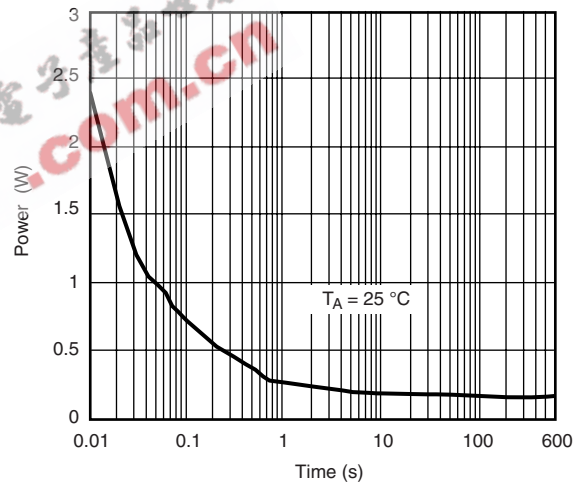
Source-Drain Diode Forward Voltage



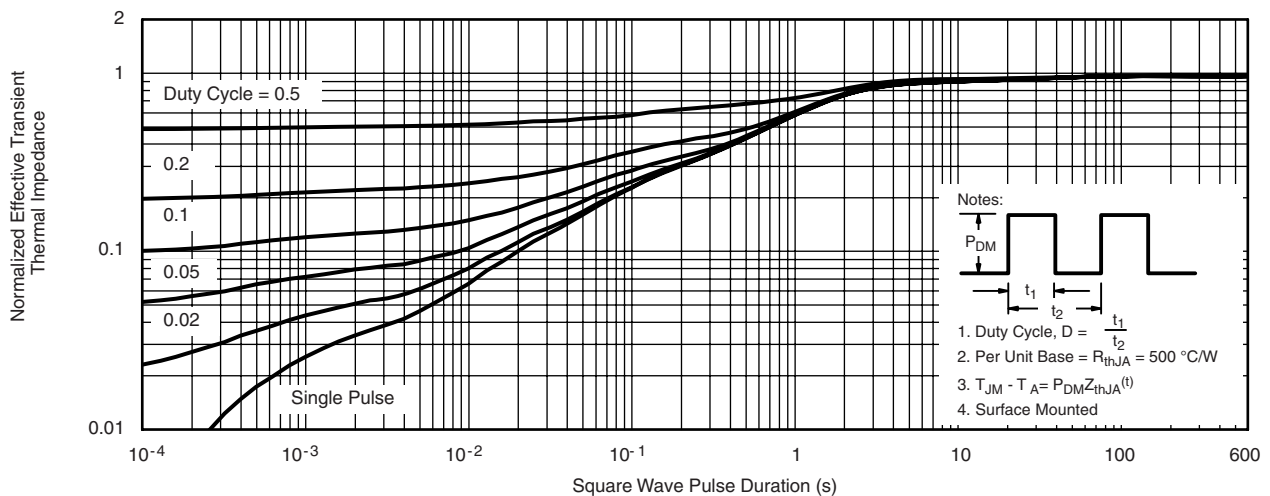
On-Resistance vs. Gate-Source Voltage



Threshold Voltage Variance Over Temperature



Single Pulse Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

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