

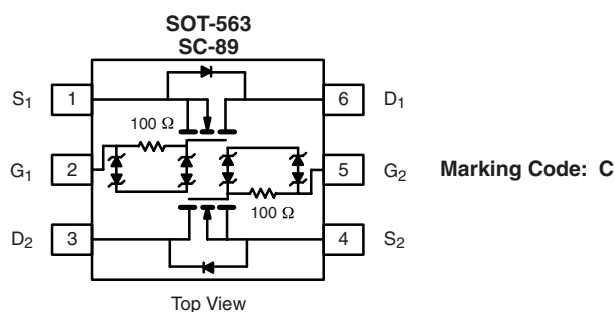
Dual N-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (mA)
20	0.70 at $V_{GS} = 4.5$ V	600
	0.85 at $V_{GS} = 2.5$ V	500
	1.25 at $V_{GS} = 1.8$ V	350

FEATURES

- Halogen-free Option Available
- TrenchFET® Power MOSFET: 1.8 V Rated
- Very Small Footprint
- High-Side Switching
- Low On-Resistance: 0.7 Ω
- Low Threshold: 0.8 V (typ.)
- Fast Switching Speed: 10 ns
- 1.8 V Operation
- Gate-Source ESD Protected: 2000 V


RoHS
COMPLIANT


Ordering Information: Si1024X-T1-E3 (Lead (Pb)-free)
Si1024X-T1-GE3 (Lead (Pb)-free and 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	5 s	Steady State	Unit
Drain-Source Voltage	V_{DS}	20		V
Gate-Source Voltage	V_{GS}	± 6		
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	515	485	mA
		370	350	
Pulsed Drain Current ^b	I_{DM}	650		
Continuous Source Current (Diode Conduction) ^a	I_S	450	380	mW
Maximum Power Dissipation ^a	P_D	280	250	
		145	130	
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.

b. Pulse width limited by maximum junction temperature.

SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	0.45		0.9	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 4.5\text{ V}$		± 0.5	± 1.0	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20\text{ V}$, $V_{GS} = 0\text{ V}$		0.3	100	nA
		$V_{DS} = 20\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 85\text{ }^{\circ}\text{C}$			5	μA
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5\text{ V}$, $V_{GS} = 4.5\text{ V}$	700			mA
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}$, $I_D = 600\text{ mA}$		0.41	0.70	Ω
		$V_{GS} = 2.5\text{ V}$, $I_D = 500\text{ mA}$		0.53	0.85	
		$V_{GS} = 1.8\text{ V}$, $I_D = 350\text{ mA}$		0.70	1.25	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 10\text{ V}$, $I_D = 400\text{ mA}$		1.0		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 150\text{ mA}$, $V_{GS} = 0\text{ V}$		0.8	1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 10\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 250\text{ mA}$		750		pC
Gate-Source Charge	Q_{gs}			75		
Gate-Drain Charge	Q_{gd}			225		
Turn-On Time	$t_{d(on)}$	$V_{DD} = 10\text{ V}$, $R_L = 47\text{ }\Omega$ $I_D \approx 200\text{ mA}$, $V_{GEN} = 4.5\text{ V}$, $R_G = 10\text{ }\Omega$		10		ns
Turn-Off Time	$t_{d(off)}$			36		

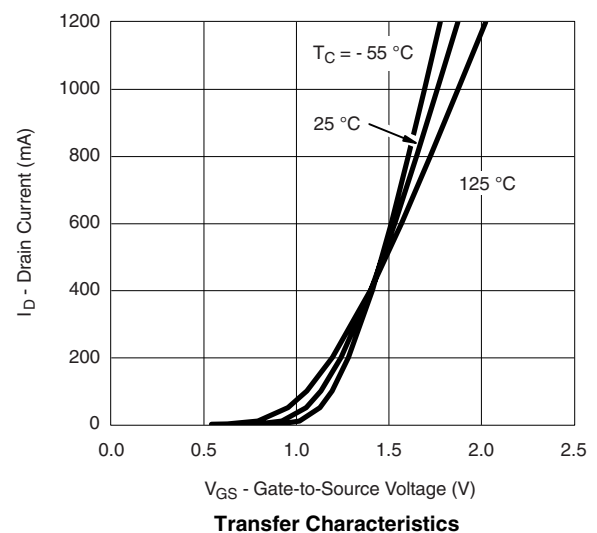
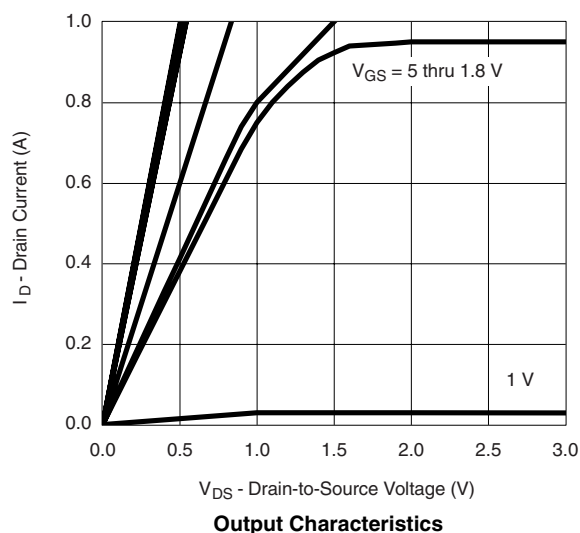
Notes:

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

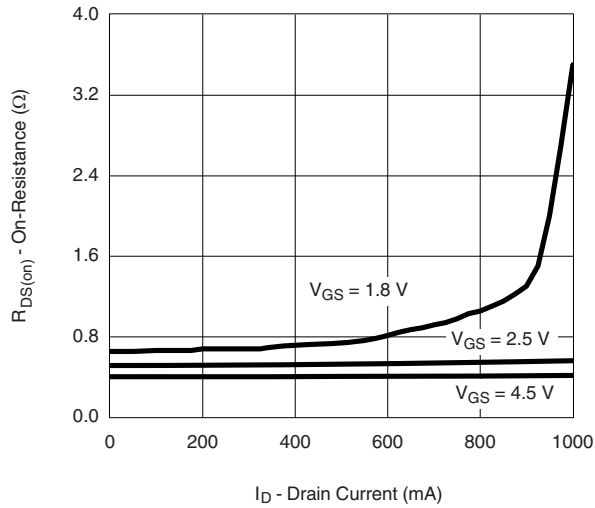
b. Guaranteed by design, not subject to production testing.

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.

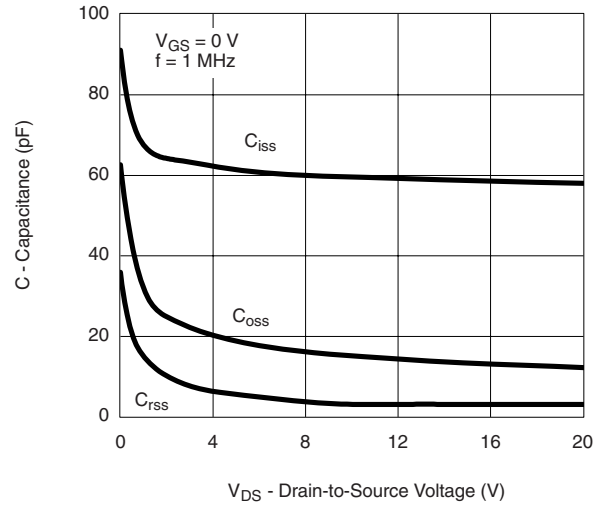
TYPICAL CHARACTERISTICS $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted



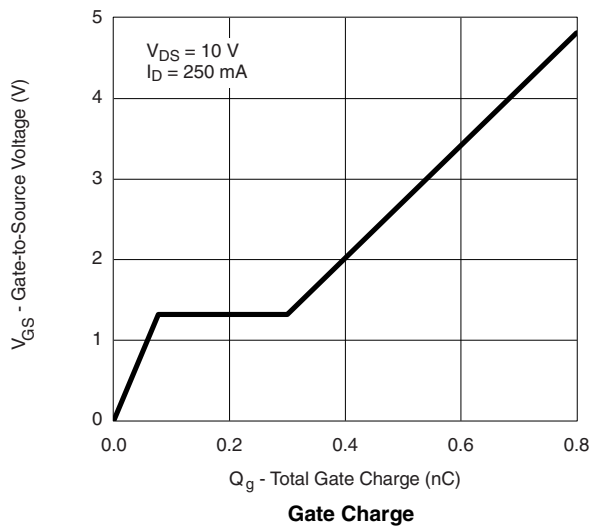
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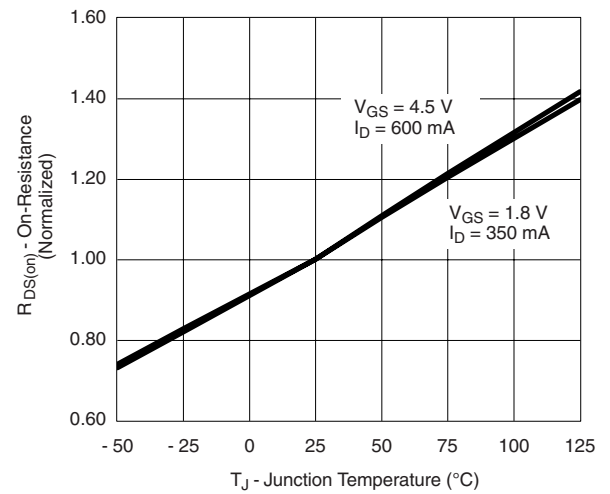
On-Resistance vs. Drain Current



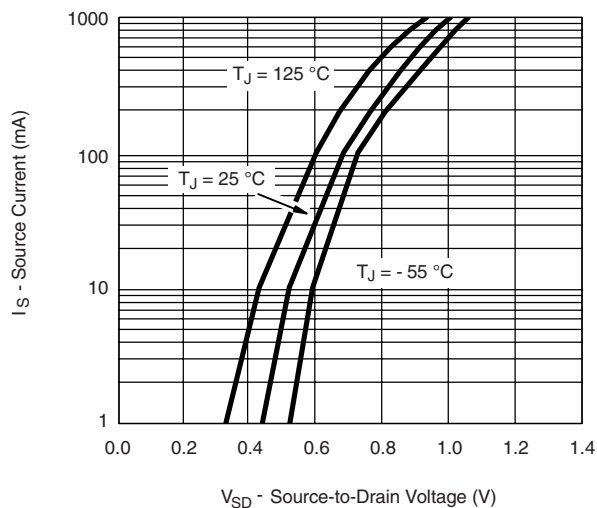
Capacitance



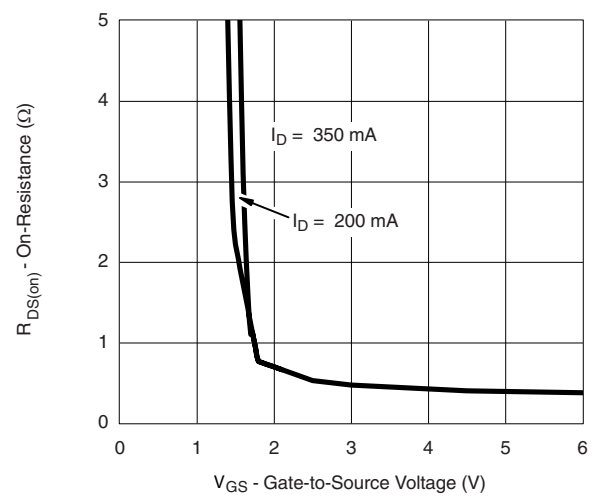
Gate Charge



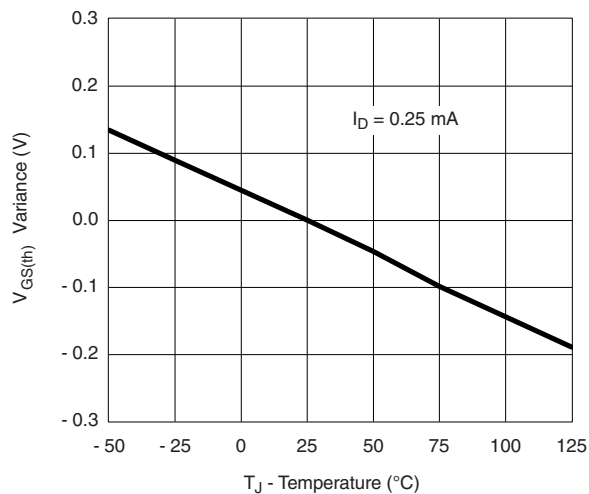
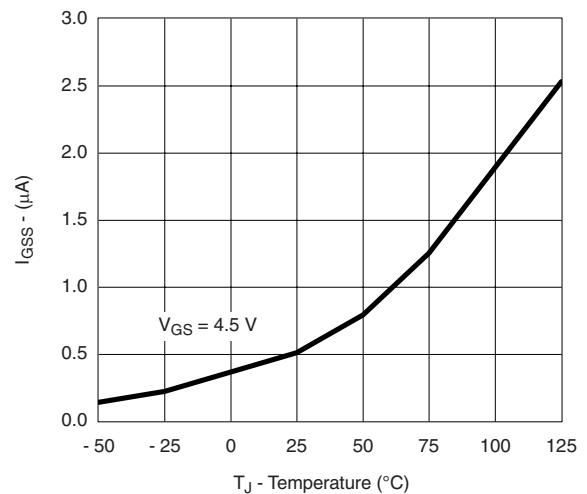
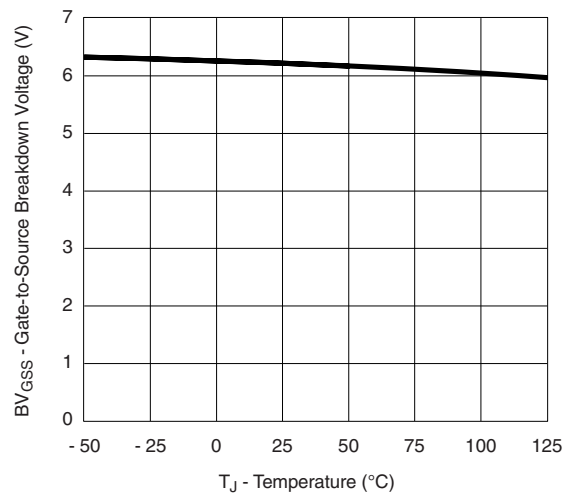
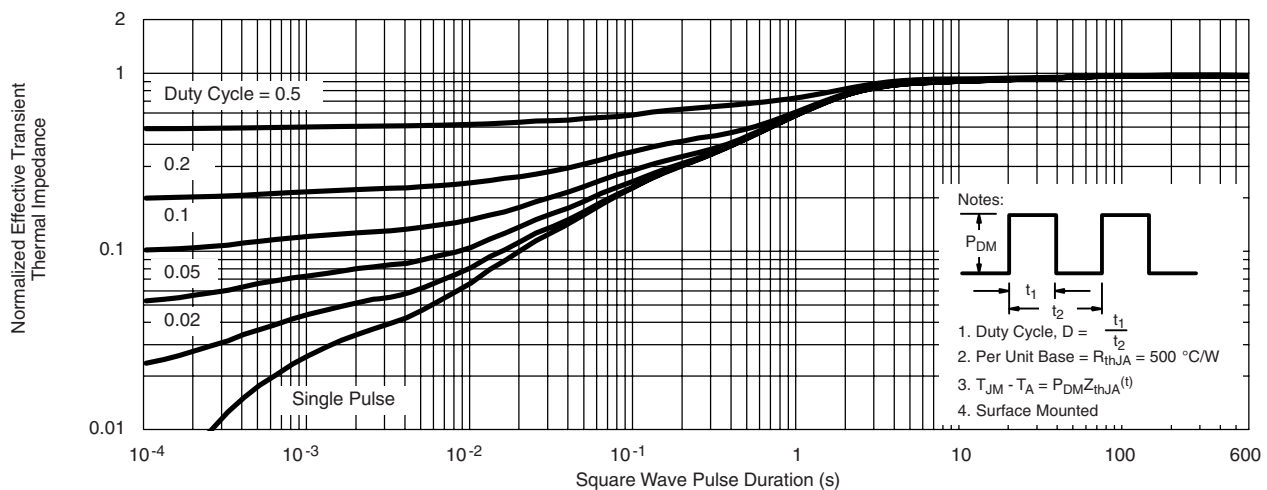
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$, unless otherwise noted**Threshold Voltage Variance vs. Temperature** **I_{GSS} vs. Temperature** **BV_{GSS} vs. Temperature****Normalized Thermal Transient Impedance, Junction-to-Ambient**

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