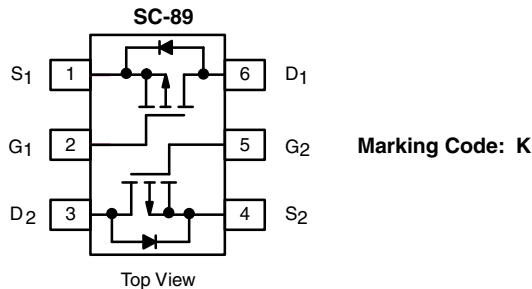


P-Channel 20 V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (mA)
- 20	8 at $V_{GS} = - 4.5$ V	- 150
	12 at $V_{GS} = - 2.5$ V	- 125
	15 at $V_{GS} = - 1.8$ V	- 100
	20 at $V_{GS} = - 1.5$ V	- 30



Ordering Information: Si1033X-T1-GE3 (Lead (Pb)-free and Halogen-free)

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET: 1.5 V Rated
- High-Side Switching
- Low On-Resistance: 8 Ω
- Low Threshold: 0.9 V (typ.)
- Fast Switching Speed: 45 ns (typ.)
- 1.5 V Operation
- Gate-Source ESD Protected: 2000 V
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
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}	± 5			
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	$T_A = 25$ °C	- 155	- 145	mA
		$T_A = 85$ °C	- 110	- 105	
Pulsed Drain Current ^b	I_{DM}	- 650			
Continuous Source Current (Diode Conduction) ^a	I_S	- 450	- 380		
Maximum Power Dissipation ^a	P_D	$T_A = 25$ °C	280	250	mW
		$T_A = 85$ °C	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:

- Surface mounted on FR4 board.
- Pulse width limited by maximum junction temperature.



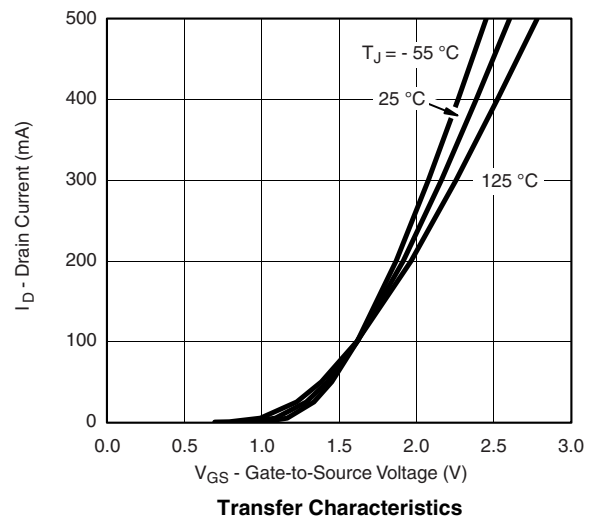
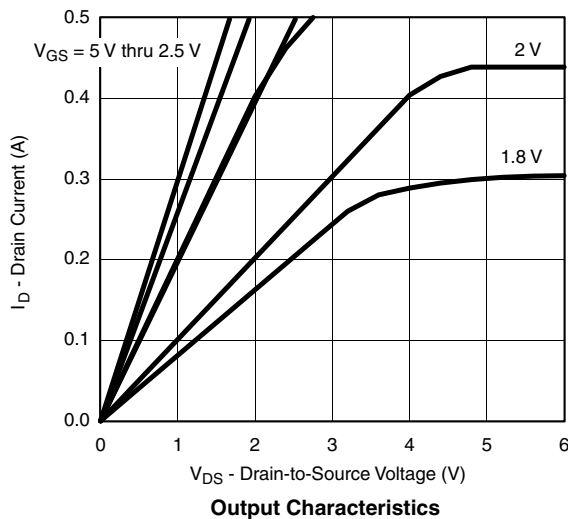
SPECIFICATIONS (T _A = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit
Static						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 250 μA	- 0.40		- 1.20	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 2.8 V		± 0.5	± 1	μA
		V _{DS} = 0 V, V _{GS} = ± 4.5 V		± 1	± 2	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = - 16 V, V _{GS} = 0 V		- 1	- 500	nA
		V _{DS} = - 16 V, V _{GS} = 0 V, T _J = 85 °C			- 10	μA
On-State Drain Current ^a	I _{D(on)}	V _{DS} = - 5 V, V _{GS} = - 4.5 V	- 200			mA
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 4.5 V, I _D = - 150 mA			8	Ω
		V _{GS} = - 2.5 V, I _D = - 125 mA			12	
		V _{GS} = - 1.8 V, I _D = - 100 mA			15	
		V _{GS} = - 1.5 V, I _D = - 30 mA			20	
Forward Transconductance ^a	g _{fs}	V _{DS} = - 10 V, I _D = - 150 mA		0.4		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 = - 150 mA		1500		pC
Gate-Source Charge	Q _{gs}			150		
Gate-Drain Charge	Q _{gd}			450		
Turn-On Delay Time	t _{d(on)}	V _{DD} = - 10 V, R _L = 65 Ω I _D ≅ - 150 mA, V _{GEN} = - 4.5 V, R _g = 10 Ω			55	ns
Rise Time	t _r				30	
Turn-Off Delay Time	t _{d(off)}				60	
Fall Time	t _f				30	

Notes:

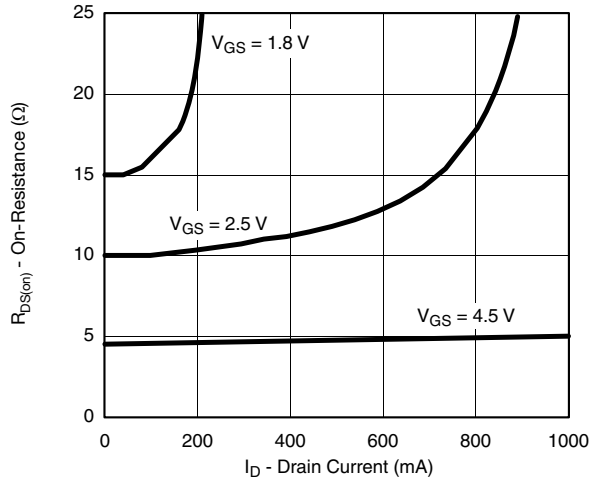
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- b. Guaranteed by design, not subject to production testing.

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.

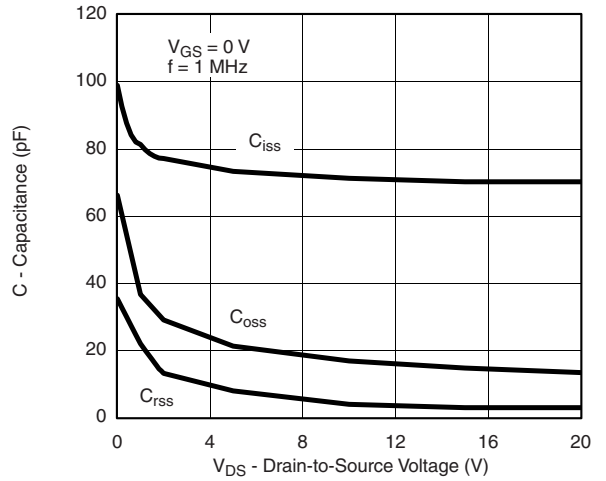
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



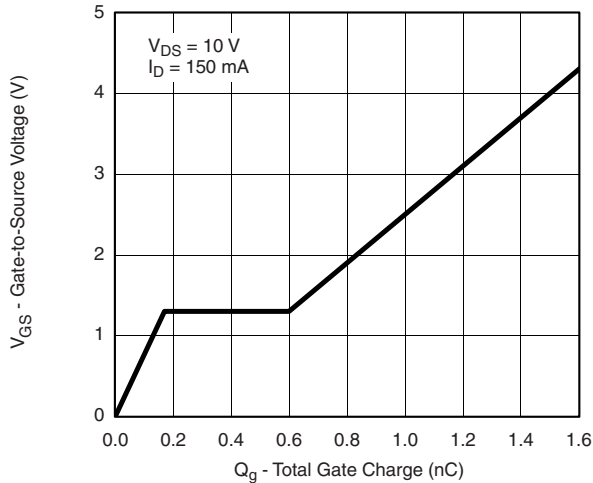
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



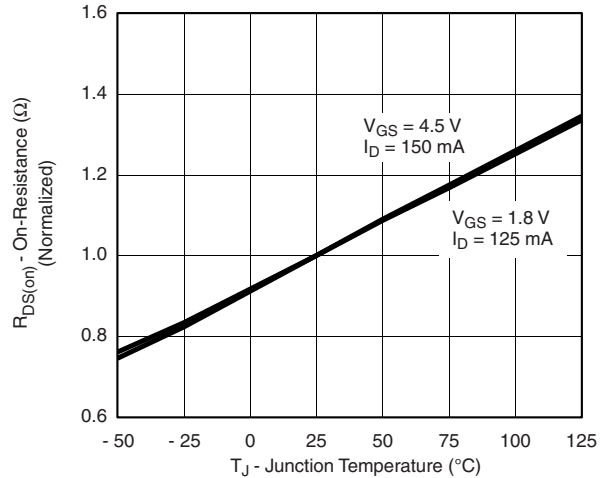
On-Resistance vs. Drain Current



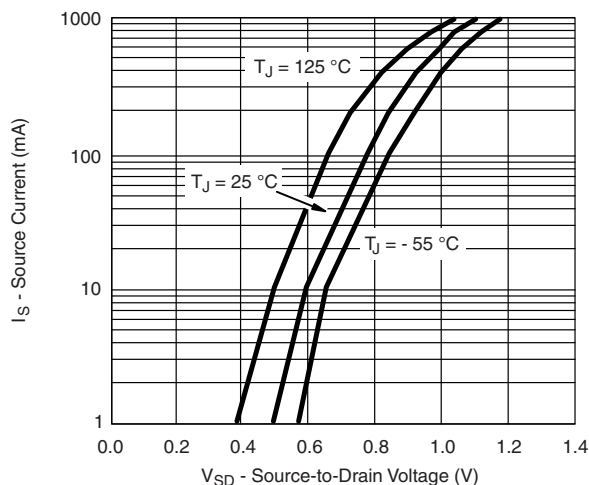
Capacitance



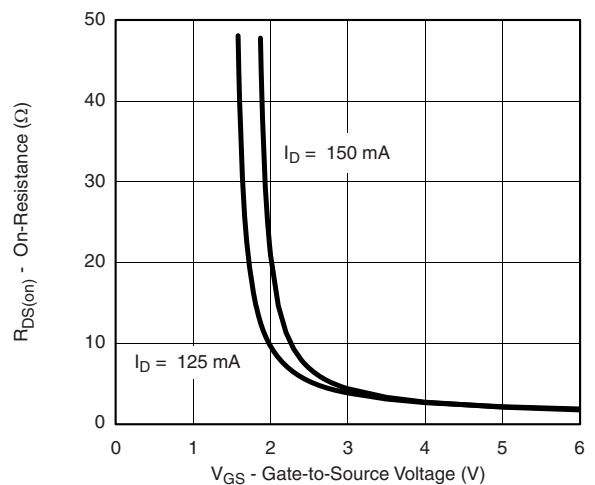
Gate Charge



On-Resistance vs. Junction Temperature

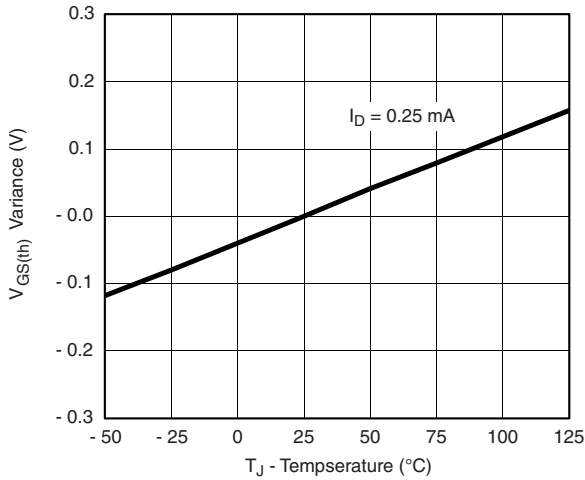


Surge-Drain Diode Forward Voltage

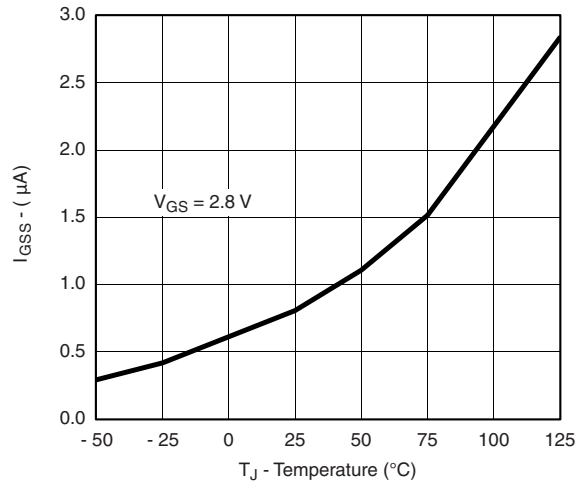


On-Resistance vs. Gate-to-Source Voltage

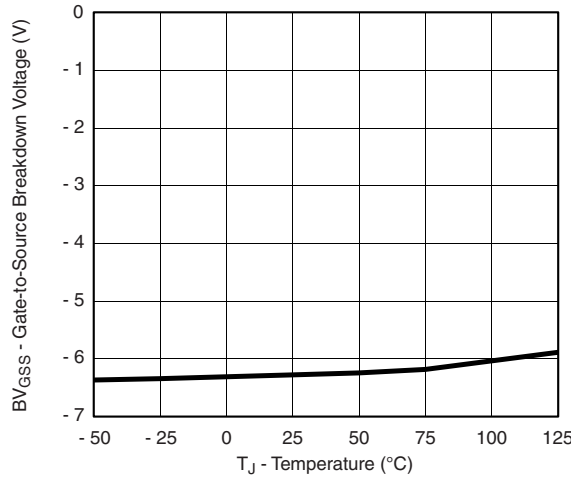
TYPICAL CHARACTERISTICS $T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



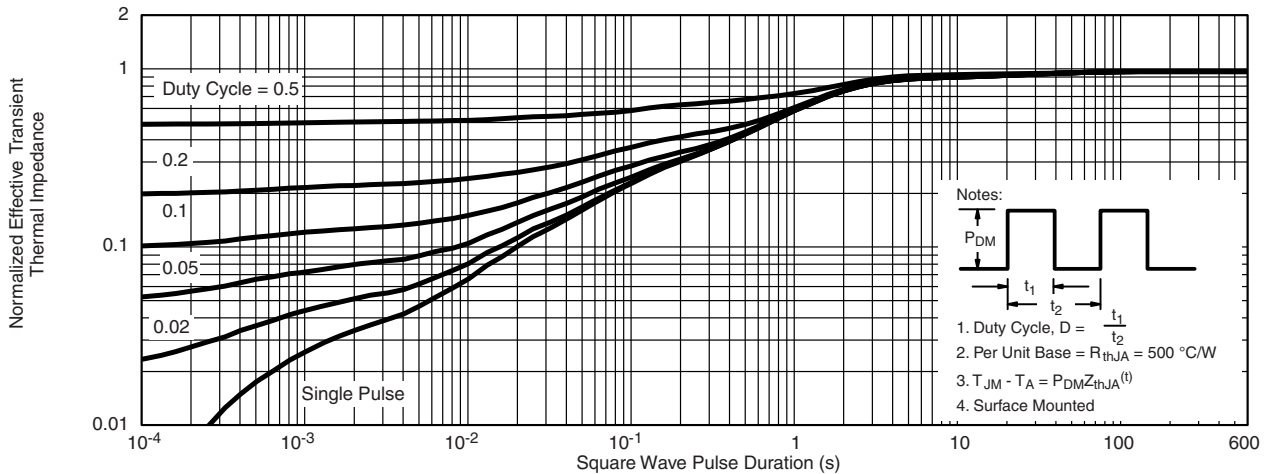
Threshold Voltage Variance vs. Temperature



I_{GSS} vs. Temperature



BV_{GSS} vs. Temperature



Normalized Thermal Transient Impedance, Junction-to-Ambient

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