

P-Channel 20 V (D-S) MOSFET

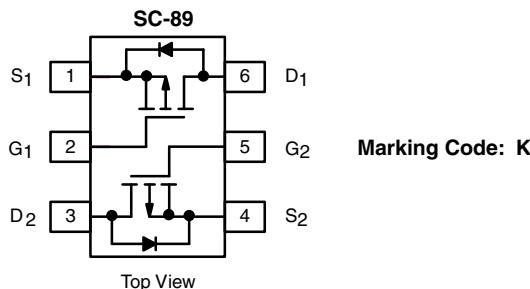
PRODUCT SUMMARY		
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (mA)
- 20	8 at V _{GS} = - 4.5 V	- 150
	12 at V _{GS} = - 2.5 V	- 125
	15 at V _{GS} = - 1.8 V	- 100
	20 at V _{GS} = - 1.5 V	- 30

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



Ordering Information: Si1033X-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	
Gate-Source Voltage	V _{GS}		± 5	V
Continuous Drain Current (T _J = 150 °C) ^a	T _A = 25 °C	I _D	- 155	mA
	T _A = 85 °C		- 110	
Pulsed Drain Current ^b	I _{DM}		- 650	
Continuous Source Current (Diode Conduction) ^a	I _S	- 450	- 380	
Maximum Power Dissipation ^a	T _A = 25 °C	P _D	280	mW
	T _A = 85 °C		145	
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 ($T_A = 25^\circ\text{C}$, unless otherwise noted)

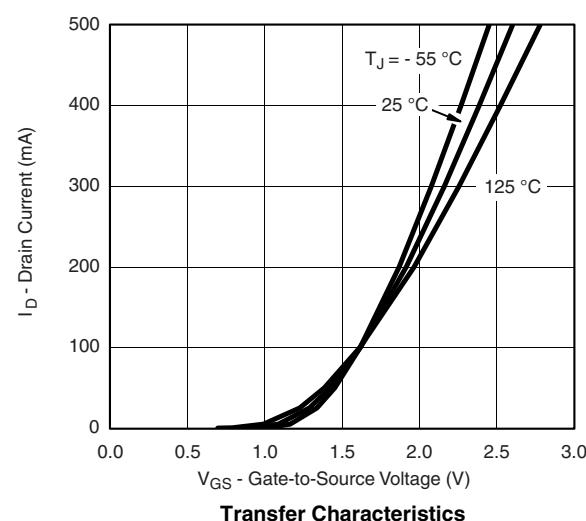
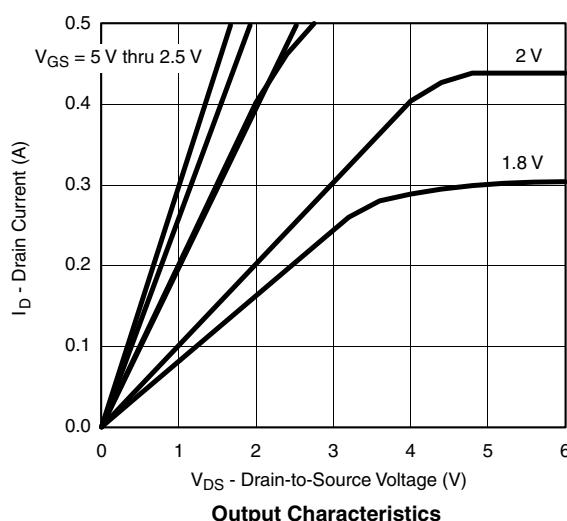
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = -250 \mu\text{A}$	- 0.40		- 1.20	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 2.8 \text{ V}$		± 0.5	± 1	μA
		$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 4.5 \text{ V}$		± 1	± 2	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -16 \text{ V}$, $V_{GS} = 0 \text{ V}$		- 1	- 500	nA
		$V_{DS} = -16 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 85^\circ\text{C}$			- 10	μA
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} = -5 \text{ V}$, $V_{GS} = -4.5 \text{ V}$	- 200			mA
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = -4.5 \text{ V}$, $I_D = -150 \text{ mA}$			8	Ω
		$V_{GS} = -2.5 \text{ V}$, $I_D = -125 \text{ mA}$			12	
		$V_{GS} = -1.8 \text{ V}$, $I_D = -100 \text{ mA}$			15	
		$V_{GS} = -1.5 \text{ V}$, $I_D = -30 \text{ mA}$			20	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -10 \text{ V}$, $I_D = -150 \text{ mA}$		0.4		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -150 \text{ mA}$, $V_{GS} = 0 \text{ V}$			- 1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -10 \text{ V}$, $V_{GS} = -4.5 \text{ V}$, $I_D = -150 \text{ mA}$		1500		pC
Gate-Source Charge	Q_{gs}			150		
Gate-Drain Charge	Q_{gd}			450		
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = -10 \text{ V}$, $R_L = 65 \Omega$ $I_D \approx -150 \text{ mA}$, $V_{GEN} = -4.5 \text{ V}$, $R_g = 10 \Omega$			55	ns
Rise Time	t_r				30	
Turn-Off Delay Time	$t_{d(\text{off})}$				60	
Fall Time	t_f				30	

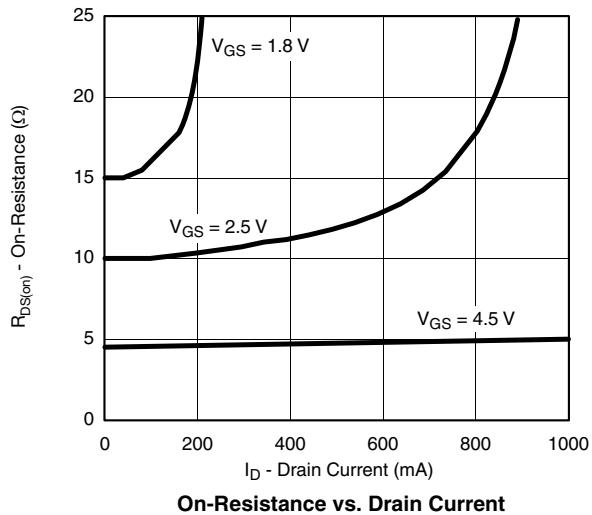
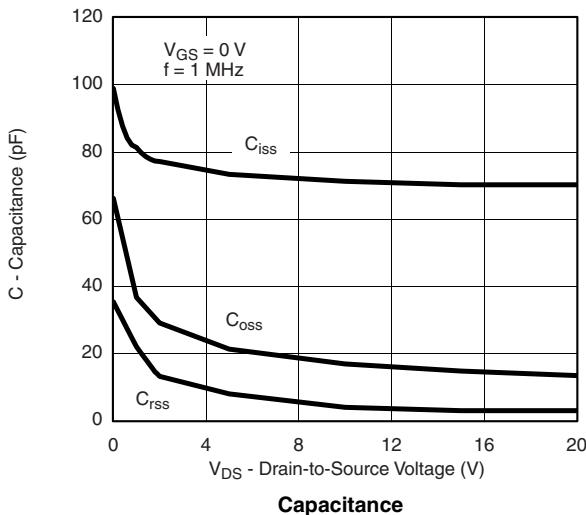
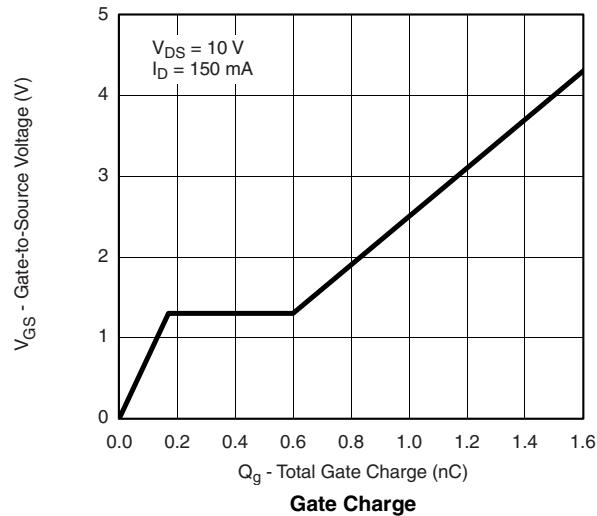
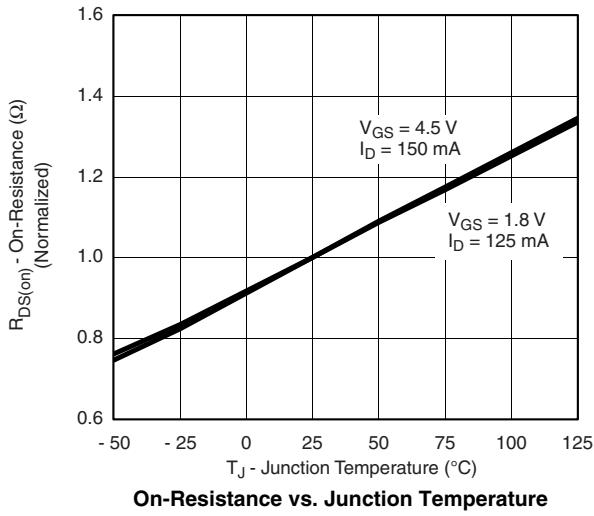
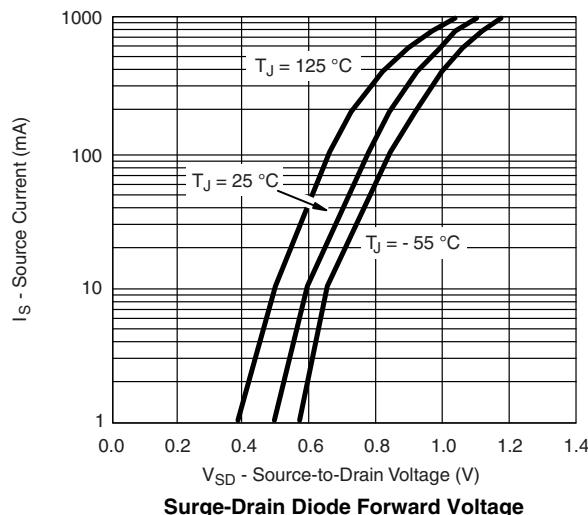
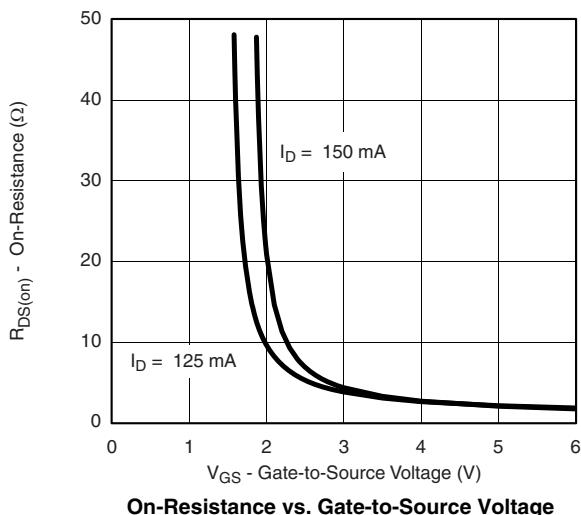
Notes:

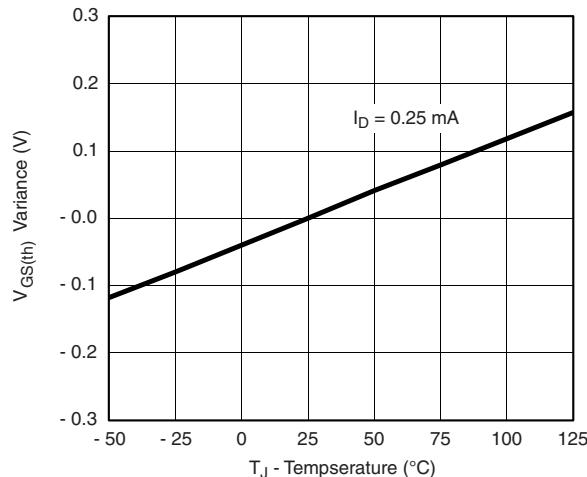
a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

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

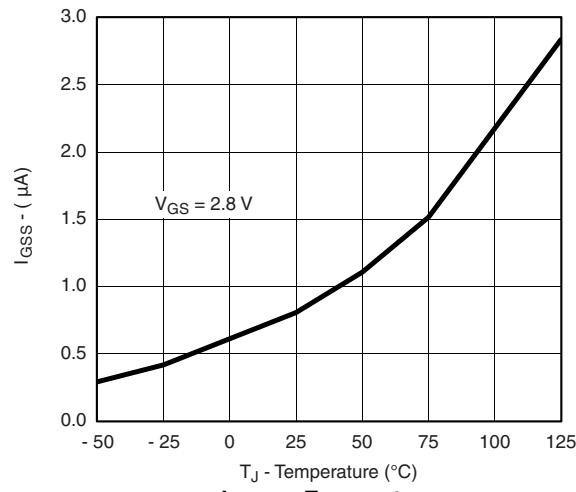
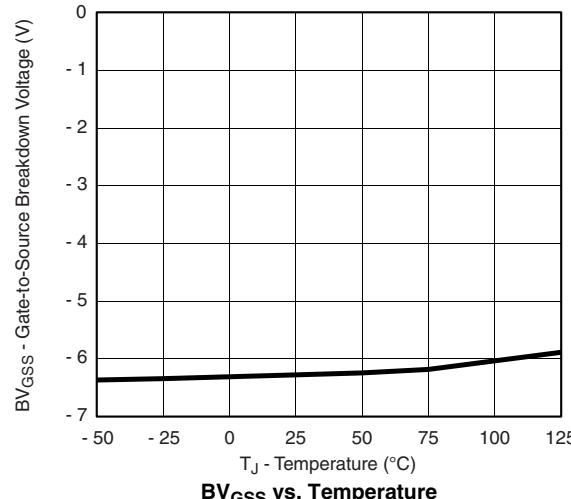
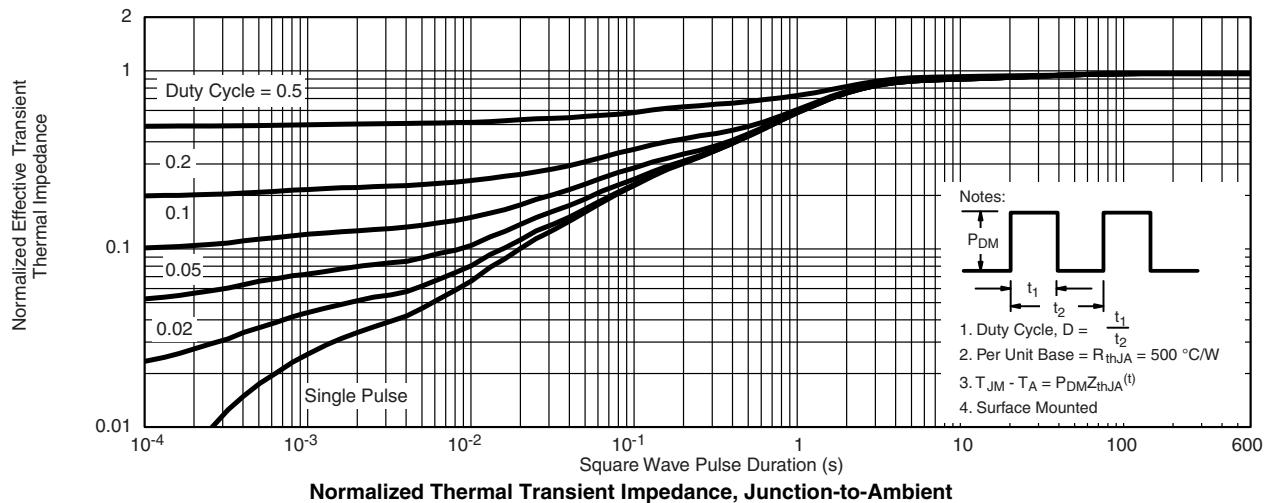
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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

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