P-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
- 30	0.167 at V_{GS} = - 10 V	0.96	3.25
	0.188 at V_{GS} = - 4.5 V	0.90	
	0.244 at V_{GS} = - 2.5 V	0.79	

FEATURES

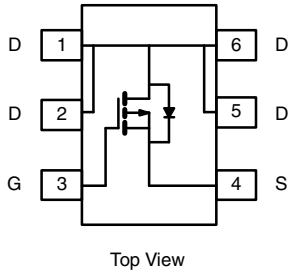
- **Halogen-free According to IEC 61249-2-21 Definition**
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC

Pb-free
RoHS COMPLIANT
HALOGEN FREE

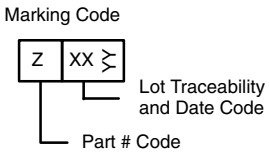
APPLICATIONS

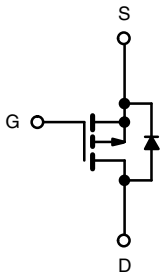
- Load Switch for Portable Devices

SC-89 (6-LEADS)



Top View





P-Channel MOSFET

Ordering Information: Si1071X-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	- 30	V
Gate-Source Voltage		V_{GS}	± 12	
Continuous Drain Current (T_J = 150 °C)	T_A = 25 °C	I_D	- 0.96[b, c]	A
	T_A = 70 °C		- 0.76[b, c]	
Pulsed Drain Current		I_{DM}	- 8	
Continuous Source-Drain Diode Current	T_A = 25 °C	I_S	- 0.2[b, c]	
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	0.236[b, c]	W
	T_A = 70 °C		0.151[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Maximum Junction-to-Ambient[a, b]	t ≤ 5 s	R_{thJA}	440	530	°C/W
	Steady State		540	650	

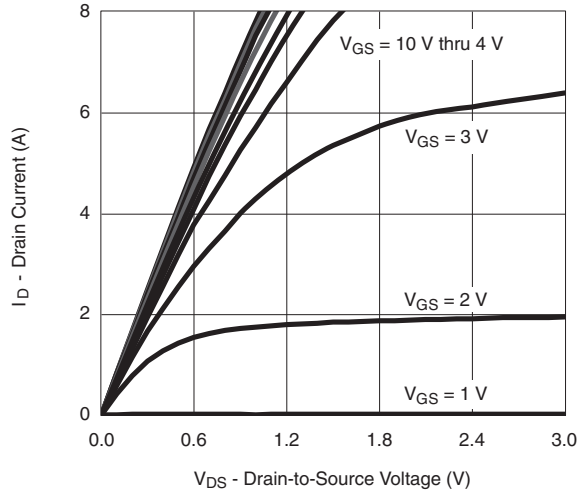
Notes:
a. Maximum under steady state conditions is 650 °C/W.
b. Surface mounted on 1" x 1" FR4 board.
c. t = 5 s.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = - 250 µA	- 30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = - 250 µA		- 32.07		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			3.02		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 0.7		- 1.45	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 12 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 30 V, V_{GS} = 0 V			- 1	nA
		V_{DS} = - 30 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} = - 10 V	- 8			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 0.96 A		0.139	0.167	Ω
		V_{GS} = - 4.5 V, I_D = - 0.9 A		0.147	0.177	
		V_{GS} = - 2.5 V, I_D = - 0.79 A		0.195	0.244	
Forward Transconductance	g_{fs}	V_{DS} = - 15 V, I_D = - 0.96 A		4.25		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = - 15 V, V_{GS} = 0 V, f = 1 MHz		315		pF
Output Capacitance	C_{oss}			60		
Reverse Transfer Capacitance	C_{rss}			45		
Total Gate Charge	Q_g	V_{DS} = - 15 V, V_{GS} = - 4.5 V, I_D = - 0.96 A		4.43	6.64	nC
		V_{DS} = - 15 V, V_{GS} = - 10 V, I_D = - 0.96 A		8.87	13.3	
Gate-Source Charge	Q_{gs}			0.83		
Gate-Drain Charge	Q_{gd}			1.57		
Gate Resistance	R_g	f = 1 MHz		9.8	14.7	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 15 V, R_L = 19.74 Ω $I_D \cong$ - 0.76 A, V_{GEN} = - 10 V, R_g = 1 Ω		3.8	5.7	ns
Rise Time	t_r			12	18	
Turn-Off DelayTime	$t_{d(off)}$			18	27	
Fall Time	t_f			7	10.5	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 15 V, R_L = 20.27 Ω $I_D \cong$ - 0.74 A, V_{GEN} = - 4.5 V, R_g = 1 Ω		13	20	
Rise Time	t_r			25	38	
Turn-Off DelayTime	$t_{d(off)}$			36	54	
Fall Time	t_f			14	21	
Drain-Source Body Diode Characteristics						
Pulse Diode Forward Current[a]	I_{SM}				8	A
Body Diode Voltage	V_{SD}	I_S = - 0.63 A		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = - 0.7 A, dI/dt = 100 A/µs		12.7	19.05	nC
Body Diode Reverse Recovery	Q_{rr}			5.7	8.6	ns
Reverse Recovery Fall Time	t_a			8.9		
Reverse Recovery Rise Time	t_b			3.8		

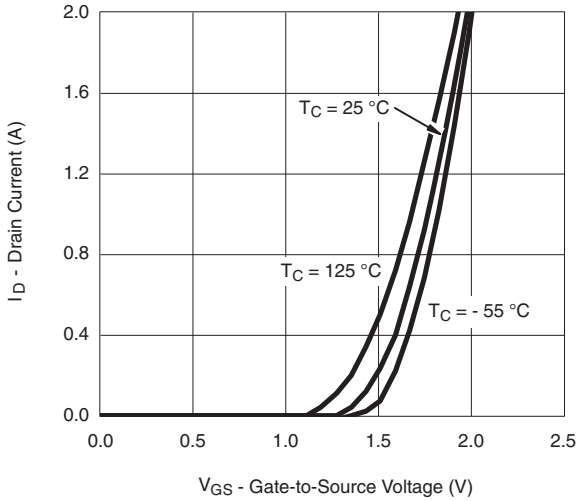
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

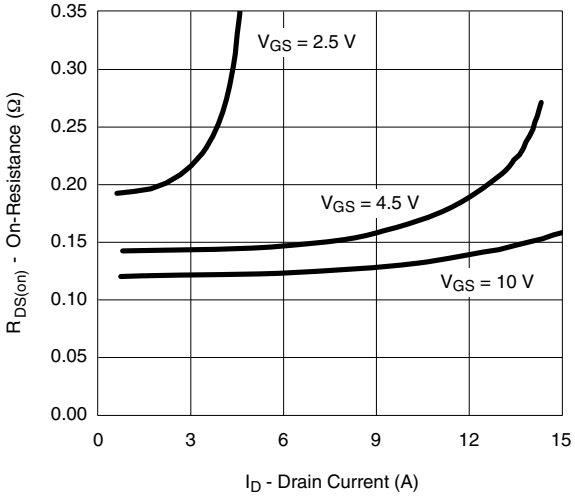
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



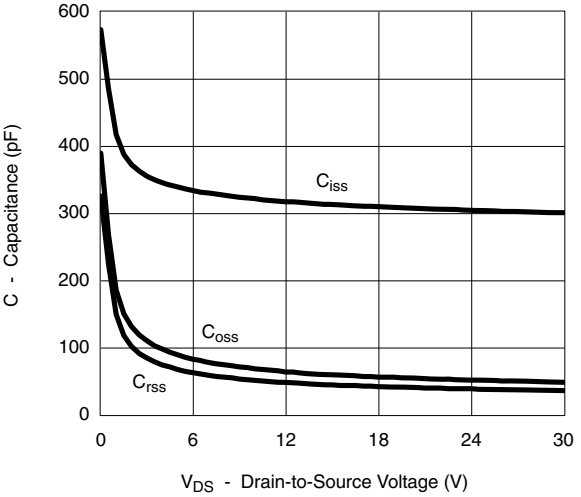
Output Characteristics



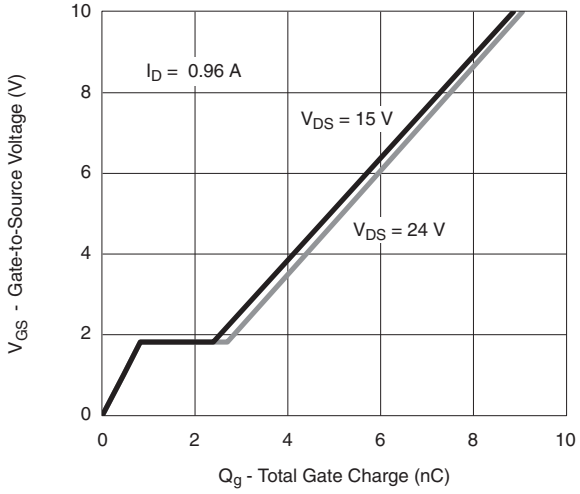
Transfer Characteristics Curves vs. Temp.



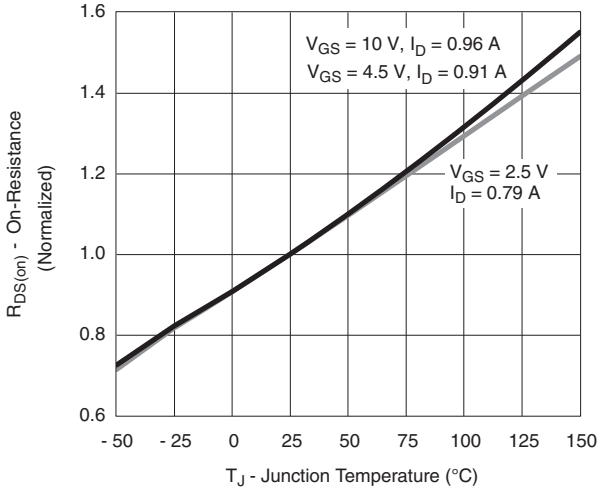
On-Resistance vs. Drain Current



Capacitance

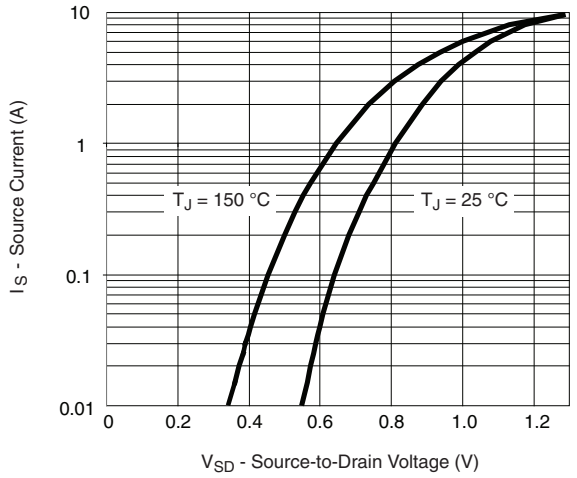


Gate Charge

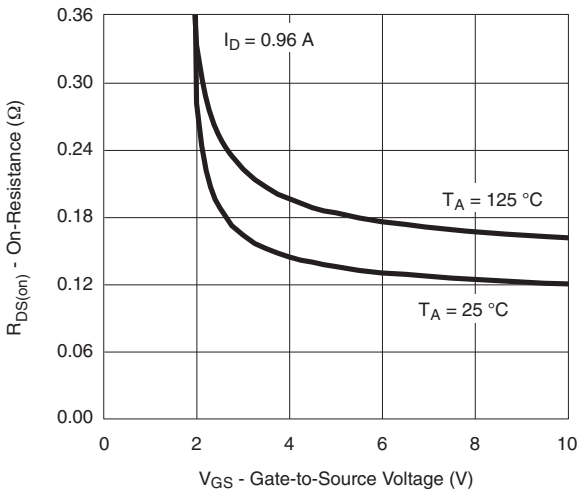


On-Resistance vs. Junction Temperature

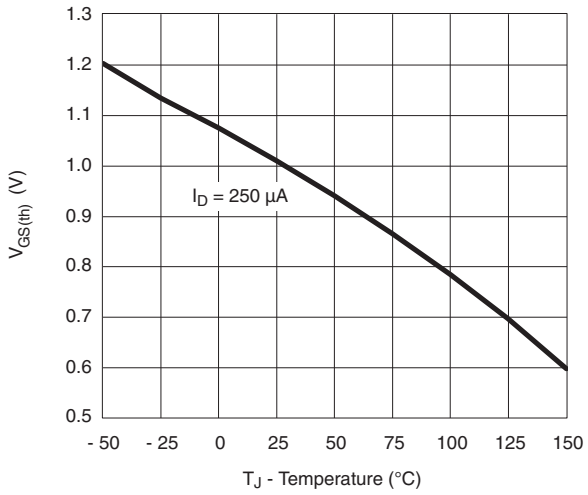
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



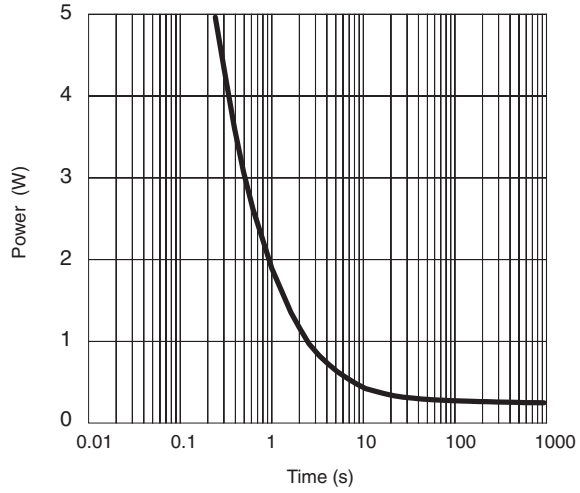
Source-Drain Diode Forward Voltage



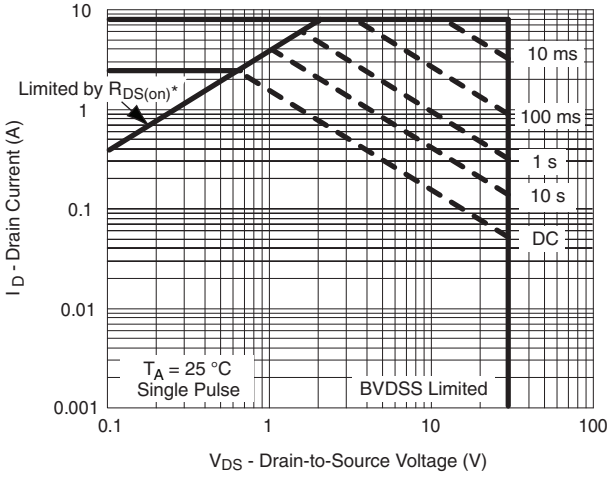
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



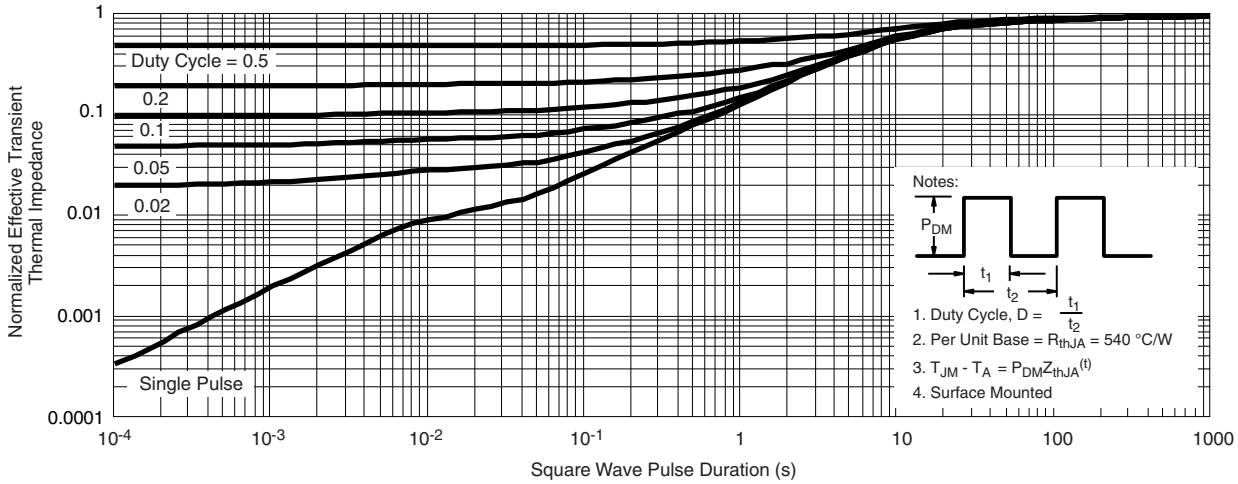
Single Pulse Power



* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

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



Normalized Thermal Transient Impedance, Junction-to-Ambient

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