



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

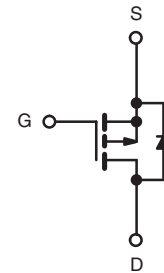
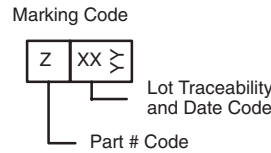
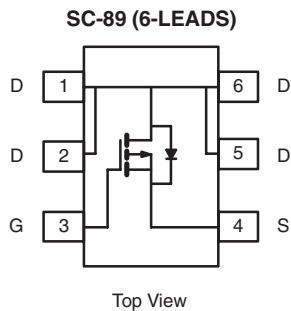
- Halogen-free Option Available
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested



RoHS
COMPLIANT

APPLICATIONS

- Load Switch for Portable Devices



Ordering Information: Si1071X-T1-E3 (Lead (Pb)-free)
Si1071X-T1-GE3 (Lead (Pb)-free and Halogen-free)

P-Channel MOSFET

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)	I _D	T _A = 25 °C	A	
		T _A = 70 °C		
Pulsed Drain Current	I _{DM}	- 8		
Continuous Source-Drain Diode Current	I _S	- 0.2 ^{b, c}		
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	W	
		T _A = 70 °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}	R _{thJA}	t ≤ 5 s	440	530	°C/W
		Steady State	540	650	

Notes:

- Maximum under Steady State conditions is 650 °C/W.
- Surface Mounted on 1" x 1" FR4 board.
- t = 5 s.



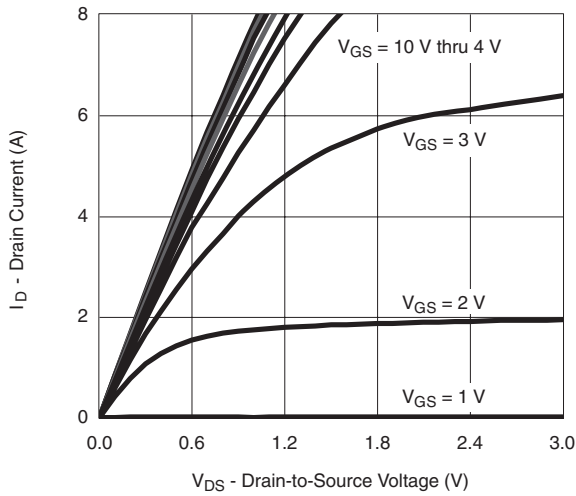
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted							
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 30			V	
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		- 32.07		mV/ $^\circ\text{C}$	
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			3.02			
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 0.7		- 1.45	V	
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 12\text{ V}$			± 100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$			- 1	nA	
		$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, T_J = 85\text{ }^\circ\text{C}$			- 10	μA	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = -10\text{ V}$	- 8			A	
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -0.96\text{ A}$		0.139	0.167	Ω	
		$V_{GS} = -4.5\text{ V}, I_D = -0.9\text{ A}$		0.147	0.177		
		$V_{GS} = -2.5\text{ V}, I_D = -0.79\text{ A}$		0.195	0.244		
Forward Transconductance	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -0.96\text{ A}$		4.25		S	
Dynamic^b							
Input Capacitance	C_{iss}	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		315		pF	
Output Capacitance	C_{oss}			60			
Reverse Transfer Capacitance	C_{rss}			45			
Total Gate Charge	Q_g	$V_{DS} = -15\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -0.96\text{ A}$		4.43	6.64	nC	
				8.87	13.3		
Gate-Source Charge	Q_{gs}	$V_{DS} = -15\text{ V}, V_{GS} = -10\text{ V}, I_D = -0.96\text{ A}$		0.83			
Gate-Drain Charge	Q_{gd}			1.57			
Gate Resistance	R_g	$f = 1\text{ MHz}$		9.8	14.7	Ω	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 19.74\text{ }\Omega$ $I_D \cong -0.76\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		3.8	5.7	ns	
Rise Time	t_r			12	18		
Turn-Off Delay Time	$t_{d(off)}$			18	27		
Fall Time	t_f			7	10.5		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 20.27\text{ }\Omega$ $I_D \cong -0.74\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		13	20		
Rise Time	t_r			25	38		
Turn-Off Delay Time	$t_{d(off)}$			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}	$I_S = -0.63\text{ A}$		0.8	1.2	V	
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -0.7\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		12.7	19.05	nC	
Body Diode Reverse Recovery Charge	Q_{rr}				5.7	8.6	ns
Reverse Recovery Fall Time	t_a				8.9		
Reverse Recovery Rise Time	t_b				3.8		

Notes:

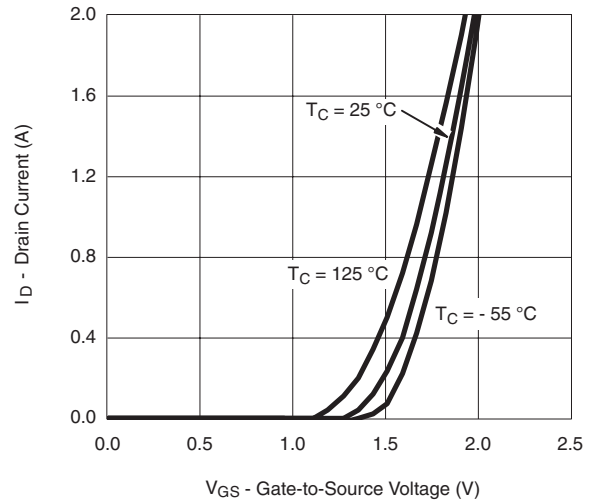
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

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.

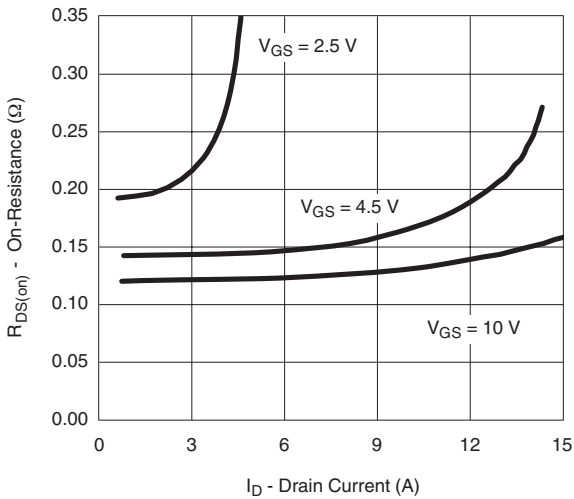
TYPICAL CHARACTERISTICS $T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted



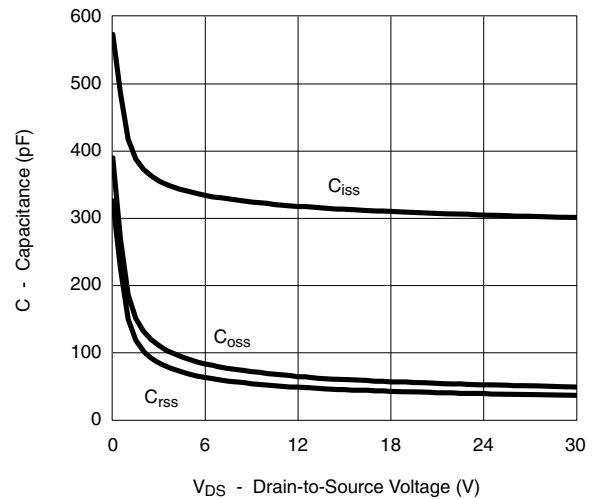
Output Characteristics



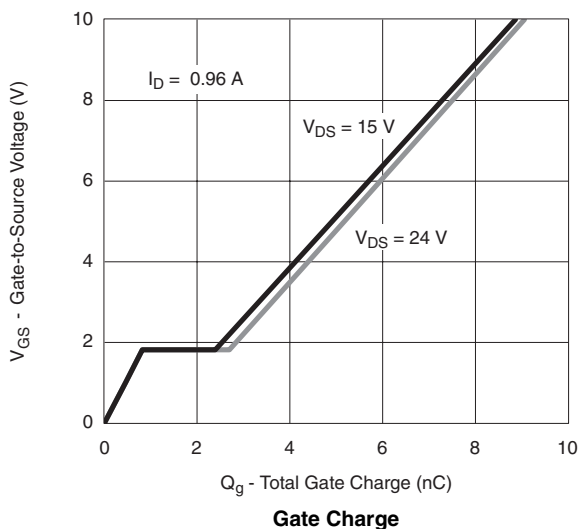
Transfer Characteristics Curves vs. Temp.



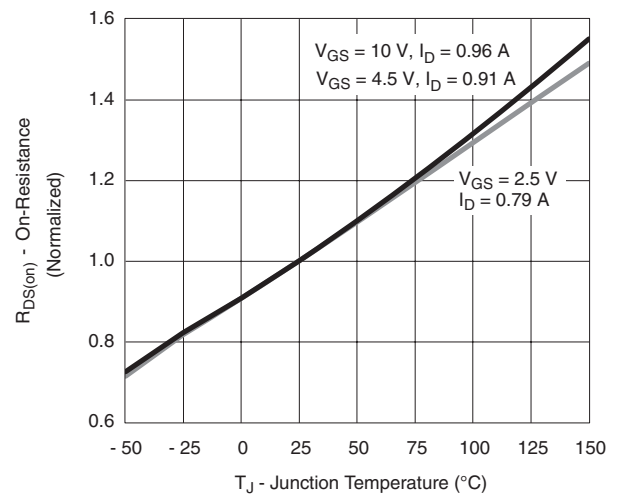
On-Resistance vs. Drain Current



Capacitance



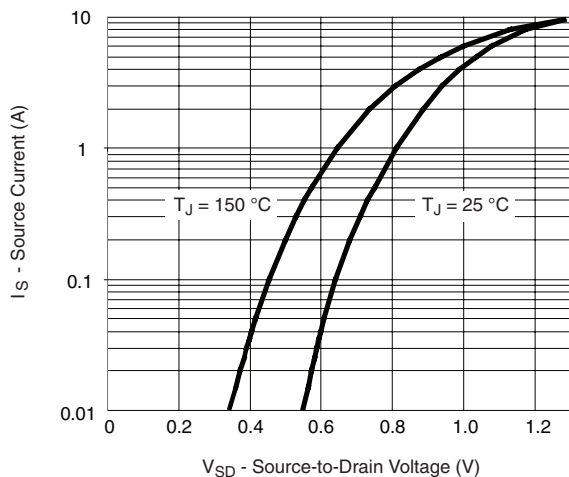
Gate Charge



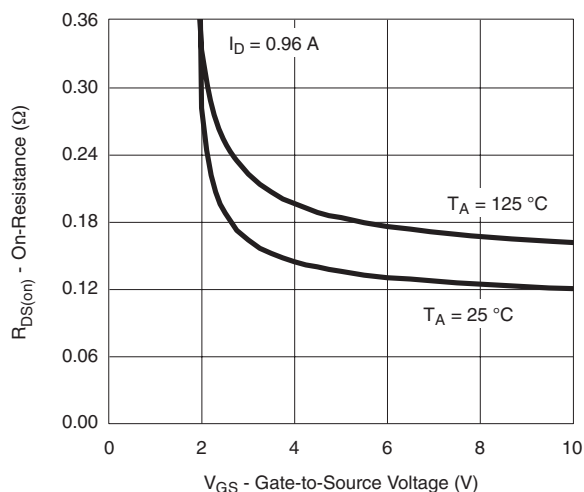
On-Resistance vs. Junction Temperature



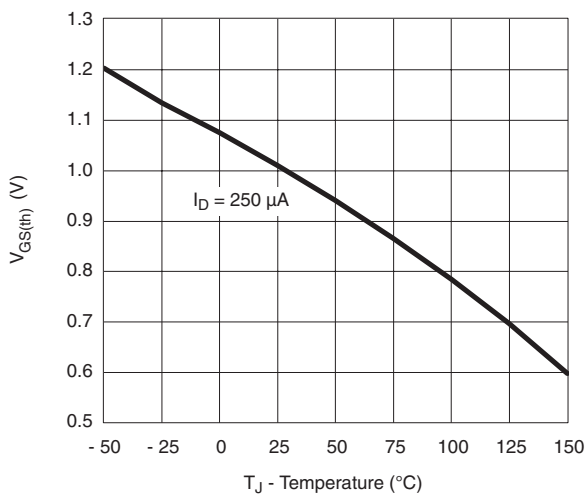
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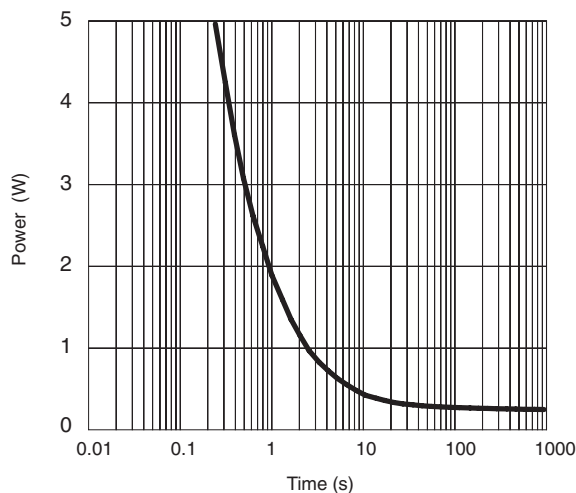
Source-Drain Diode Forward Voltage



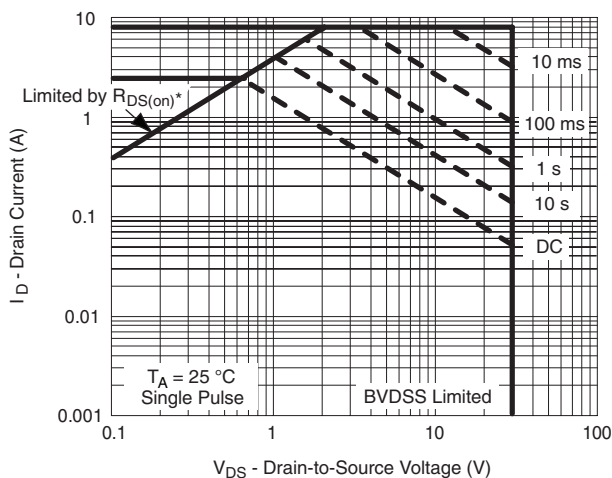
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



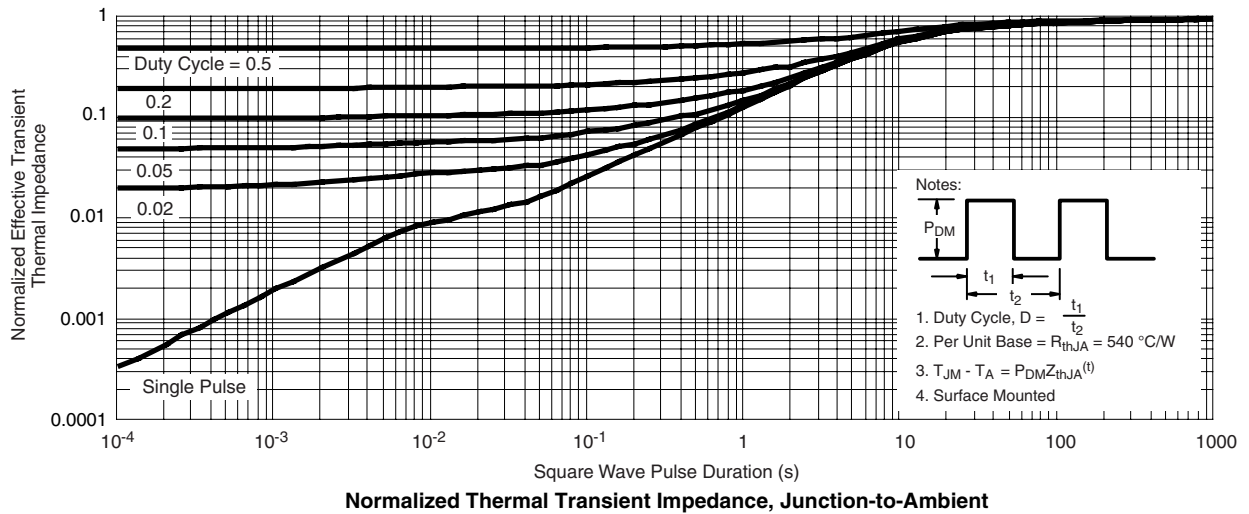
Single Pulse Power



* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified
Safe Operating Area, Junction-to-Ambient



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