

N-Channel Reduced Q_{gd} , Fast Switching WFET[®]

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.00975 at $V_{GS} = 10$ V	12.5
	0.01375 at $V_{GS} = 4.5$ V	10.0

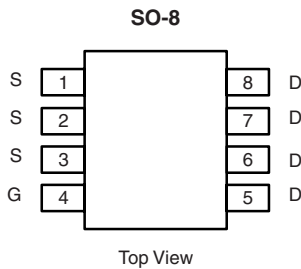
FEATURES

- Extremely Low Q_{gd} WFET Technology for Switching Losses
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested

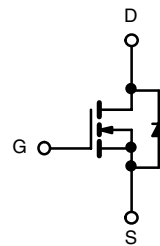


APPLICATIONS

- High-Side DC/DC Conversion
 - Notebook
 - Server



Ordering Information: Si4392DY-T1
Si4392DY-T1-E3 (Lead (Pb)-free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted ^a			
Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	$T_A = 25$ °C	12.5
		$T_A = 70$ °C	10
Pulsed Drain Current	I_{DM}	50	A
Continuous Source Current (Diode Conduction) ^a	I_S	2.7	
Single Pulse Avalanche Current	I_{AS}	30	
Avalanche Energy	E_{AS}	45	mJ
Maximum Power Dissipation ^a	P_D	$T_A = 25$ °C	3.0
		$T_A = 70$ °C	1.9
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS ^a				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient	R_{thJA}	33	42	°C/W
Maximum Junction-to-Foot (Drain)	R_{thJF}	16	20	

Notes:

a. Surface Mounted on 1" x 1" FR4 Board, $t \leq 10$ sec.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

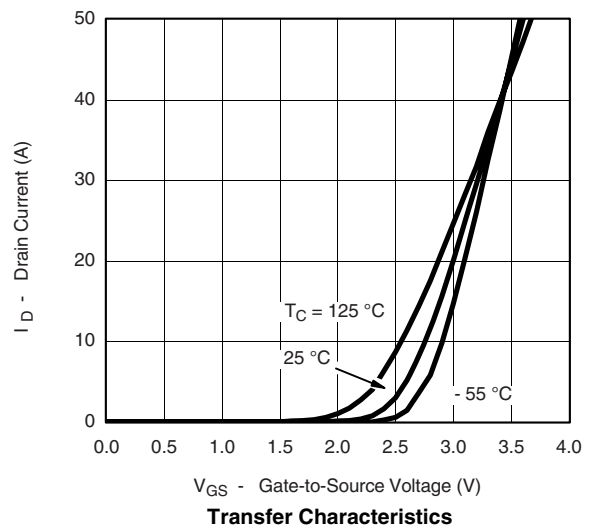
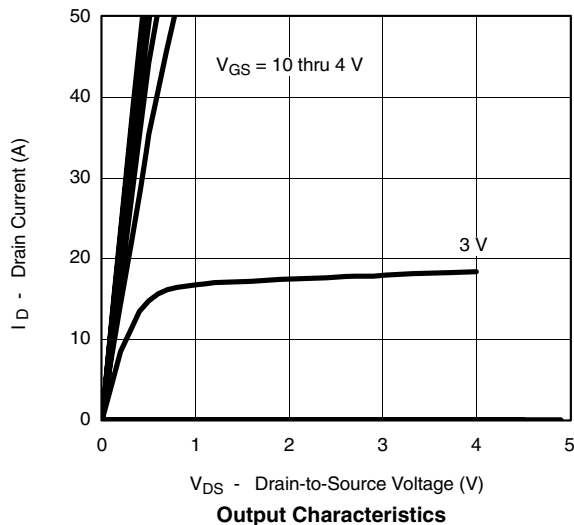
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0		3.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	30			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 12.5\text{ A}$		0.008	0.00975	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 10.0\text{ A}$		0.011	0.01375	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 12.5\text{ A}$		40		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 2.7\text{ A}, V_{GS} = 0\text{ V}$		0.73	1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 12.5\text{ A}$		10	15	nC
Gate-Source Charge	Q_{gs}		3.5			
Gate-Drain Charge	Q_{gd}		2.6			
Gate Resistance	R_g		0.5	1.6	2.7	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}, V_{GEN} = 10\text{ V}, R_g = 6\text{ }\Omega$		15	25	ns
Rise Time	t_r		5	10		
Turn-Off Delay Time	$t_{d(off)}$		45	70		
Fall Time	t_f		8	15		
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 2.7\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		30	60	

Notes:

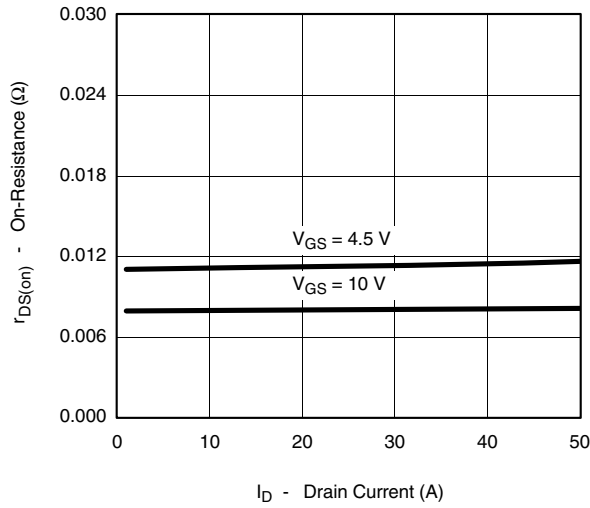
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

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.

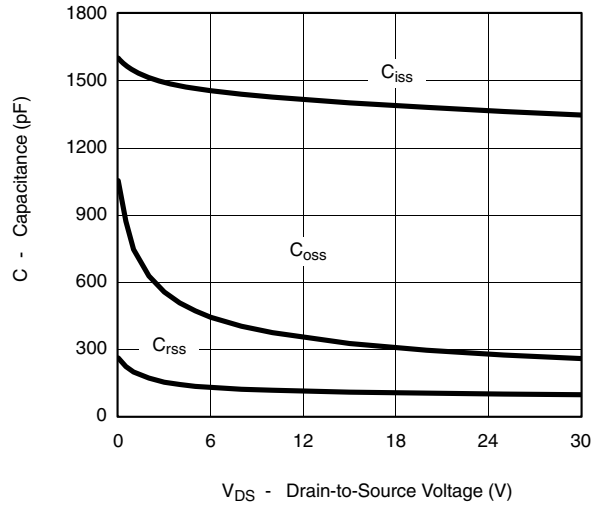
TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$ unless noted



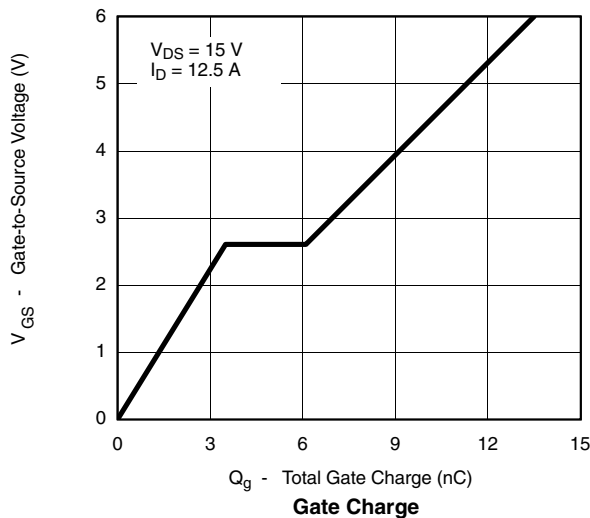
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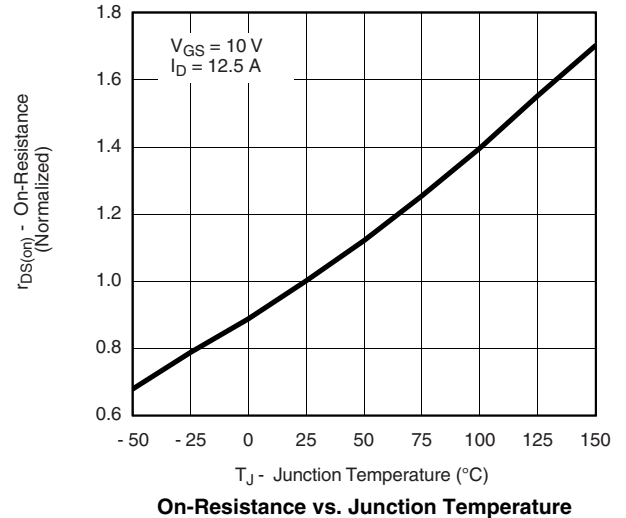
On-Resistance vs. Drain Current



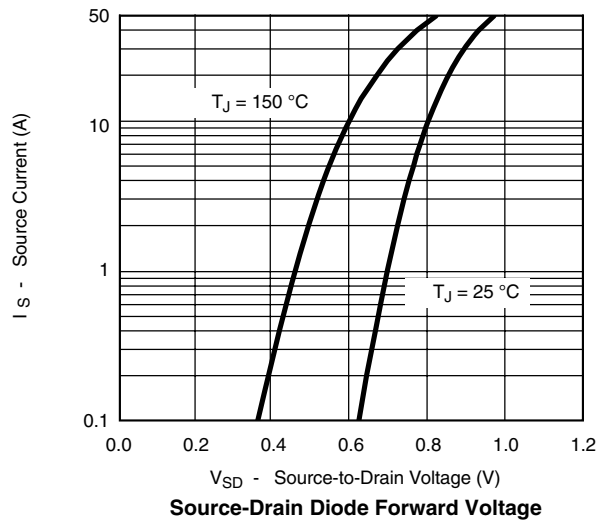
Capacitance



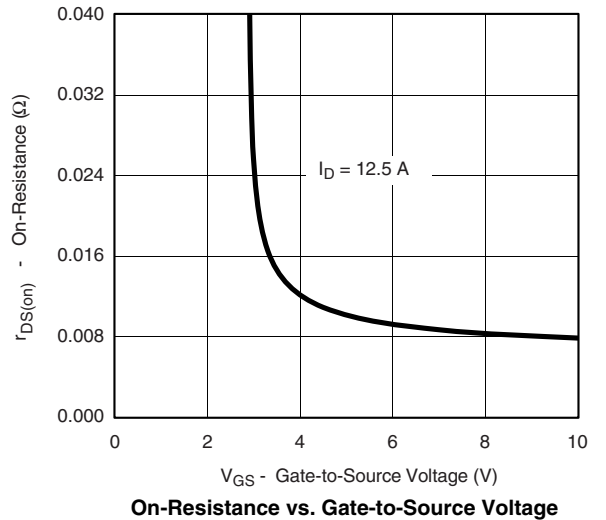
Gate Charge



On-Resistance vs. Junction Temperature

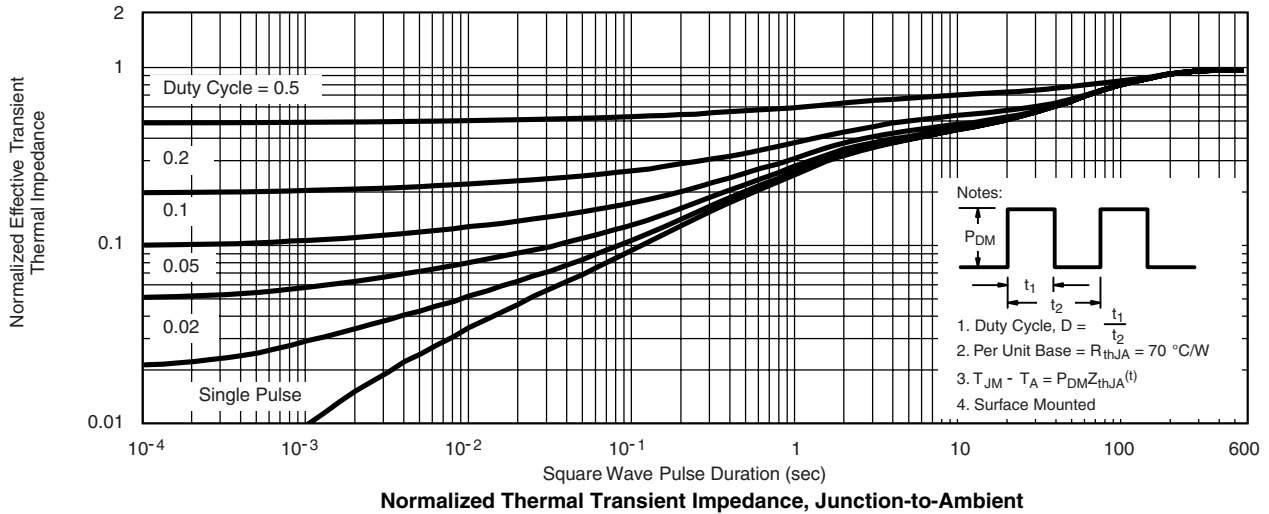
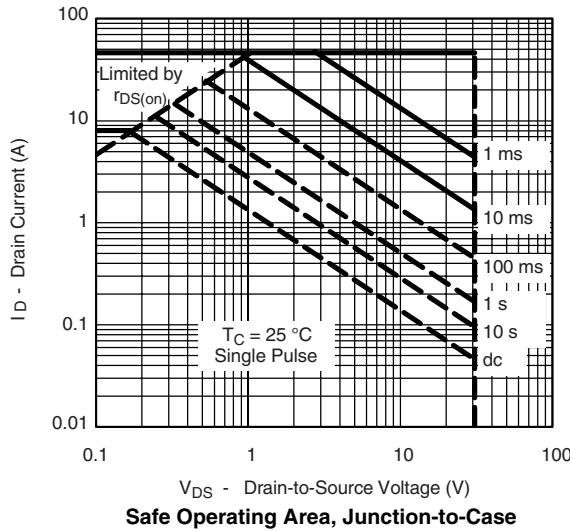
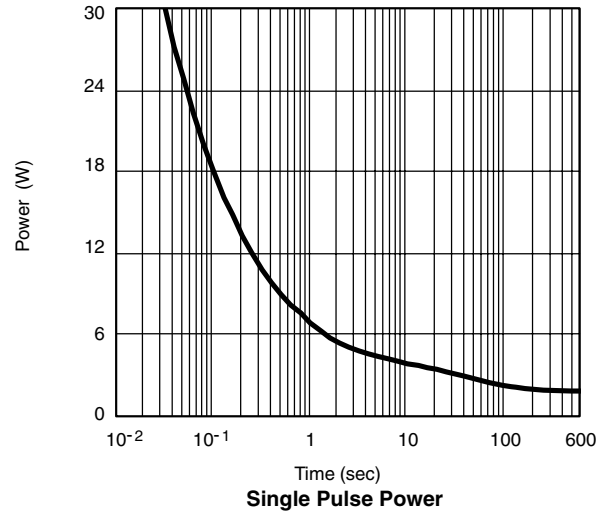
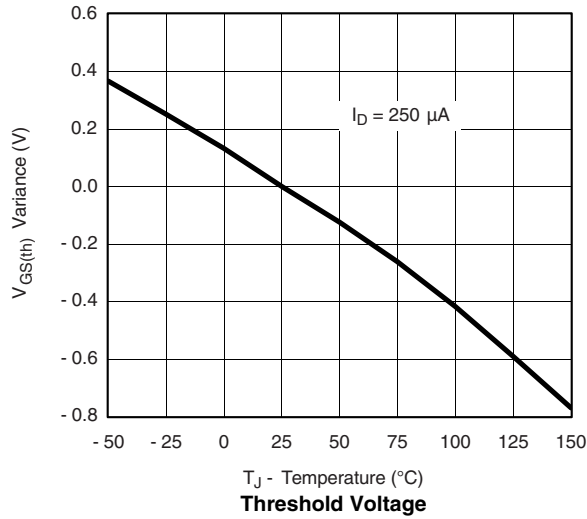


Source-Drain Diode Forward Voltage



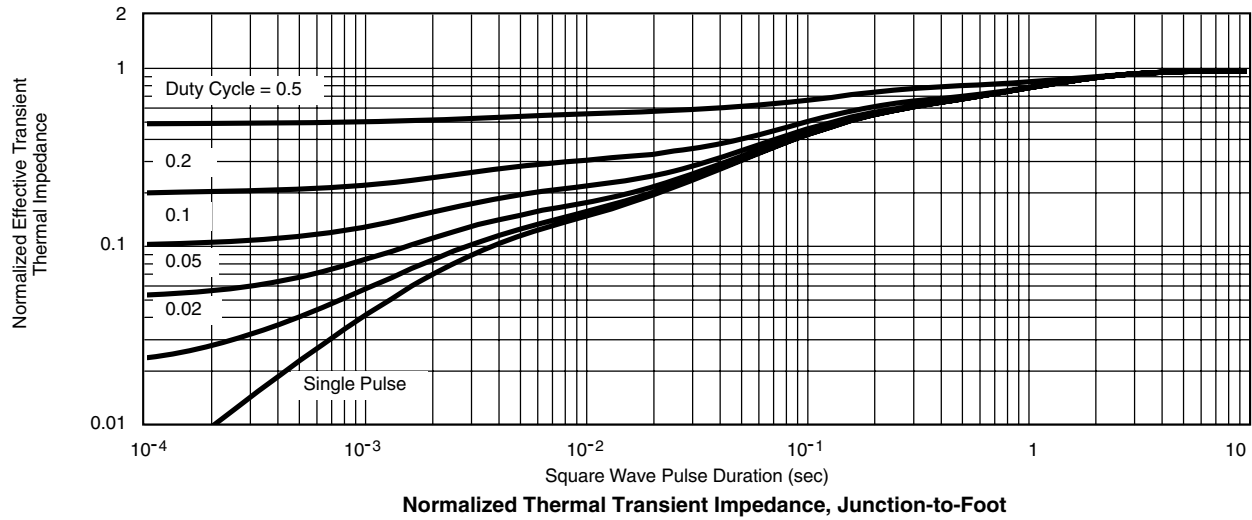
On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C unless noted





TYPICAL CHARACTERISTICS 25 °C unless noted



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