

## N-Channel Reduced $Q_{gd}$ , Fast Switching MOSFET

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

### FEATURES

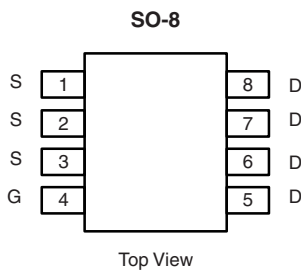
- Extremely Low  $Q_{gd}$  for Low Switching Losses
- TrenchFET<sup>®</sup> Power MOSFET
- 100 %  $R_g$  Tested



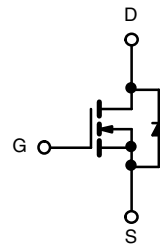
**RoHS\***  
COMPLIANT

### 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) <sup>a</sup>			
Parameter	Symbol	Limits	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 150$ °C) <sup>a</sup>	$I_D$	$T_A = 25$ °C	12.5
		$T_A = 70$ °C	10
Pulsed Drain Current	$I_{DM}$	50	A
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	2.7	
Single Pulse Avalanche Current	$I_{AS}$	30	
Avalanche Energy	$E_{AS}$	45	mJ
Maximum Power Dissipation <sup>a</sup>	$P_D$	$T_A = 25$ °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 <sup>a</sup>				
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,  $t \leq 10$  s.

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



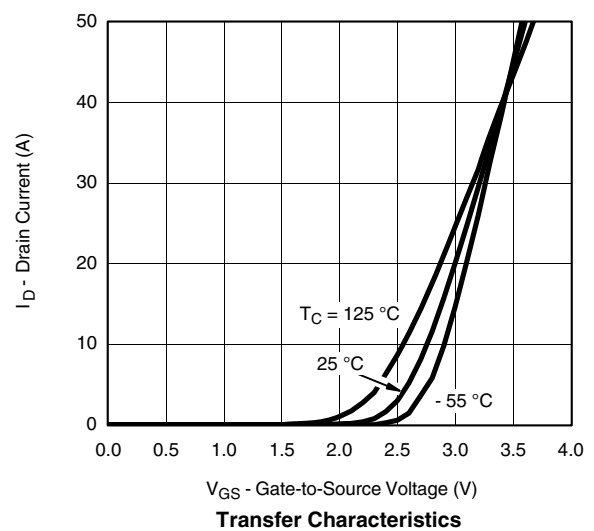
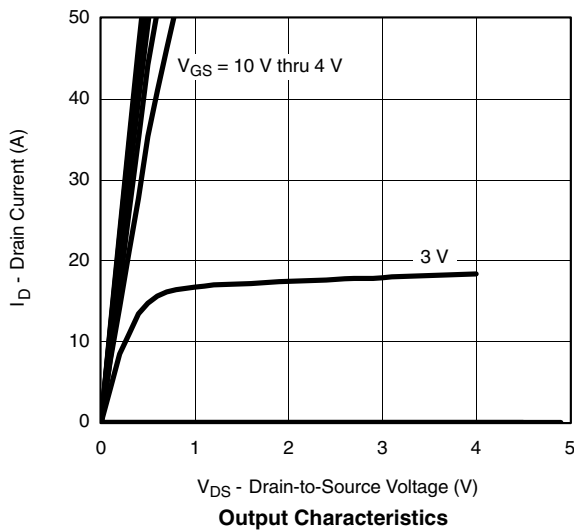
<b>SPECIFICATIONS</b> ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0		3.0	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			5	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	30			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 12.5\text{ A}$		0.008	0.00975	$\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 10.0\text{ A}$		0.011	0.01375	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 12.5\text{ A}$		40		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 2.7\text{ A}, V_{GS} = 0\text{ V}$		0.73	1.1	V
<b>Dynamic<sup>b</sup></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	$\Omega$
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	

Notes:

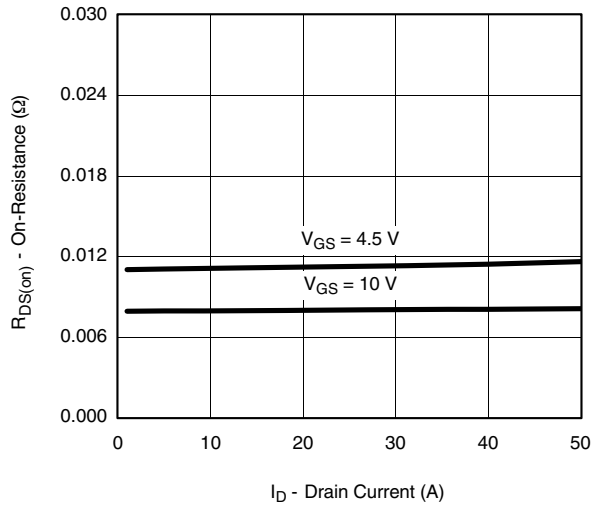
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

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.

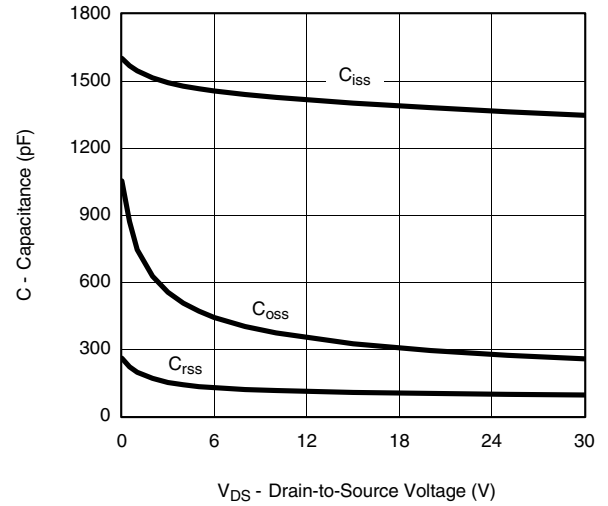
## TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



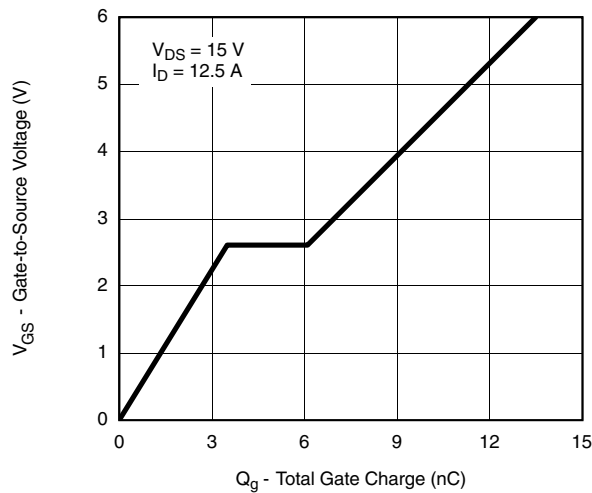
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



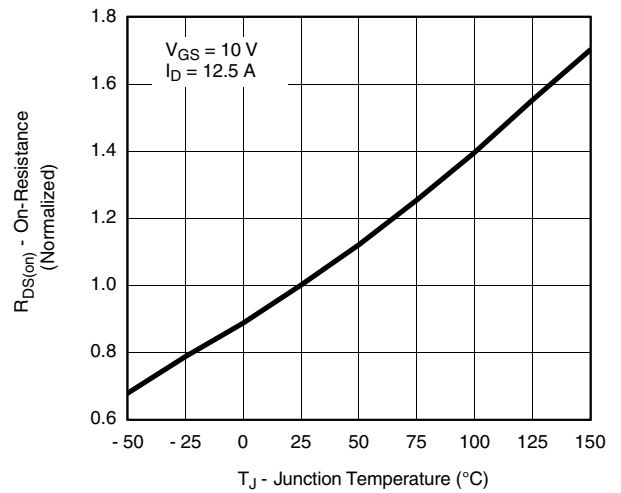
**On-Resistance vs. Drain Current**



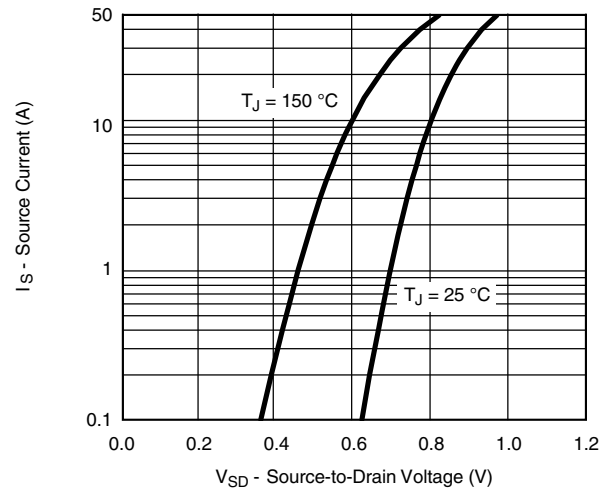
**Capacitance**



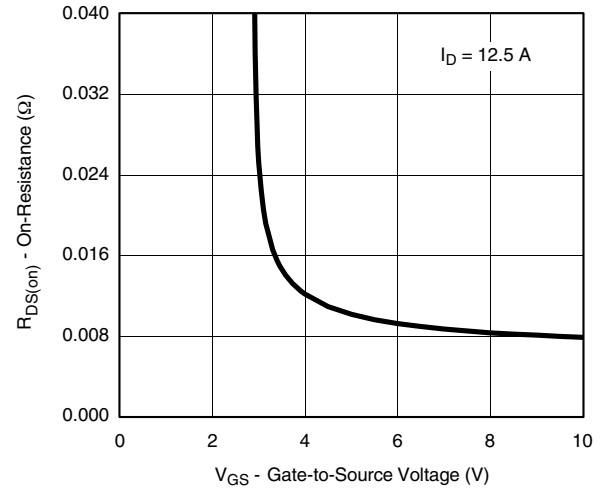
**Gate Charge**



**On-Resistance vs. Junction Temperature**

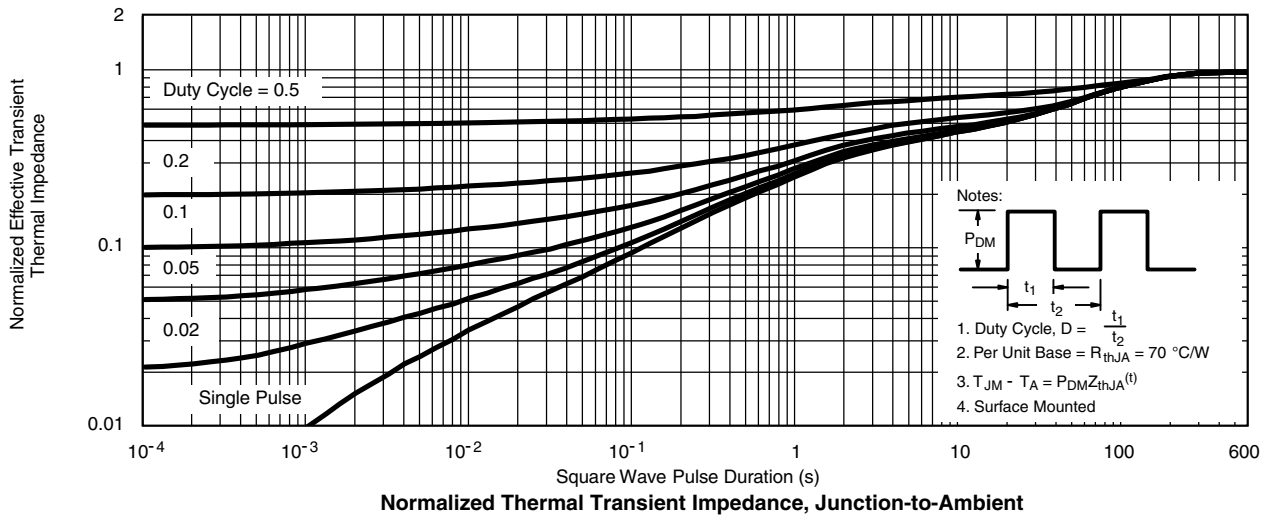
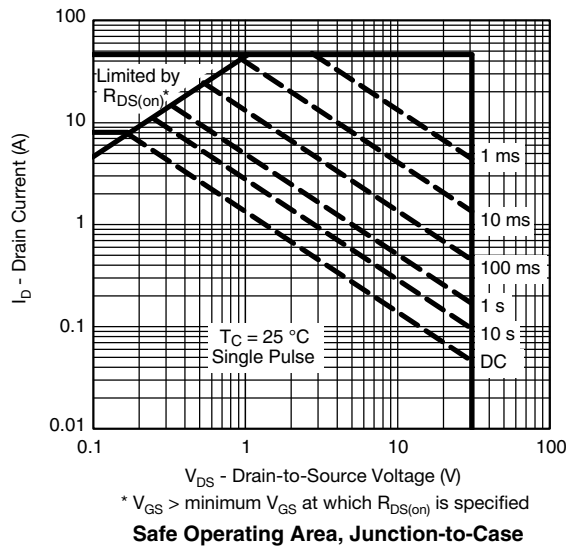
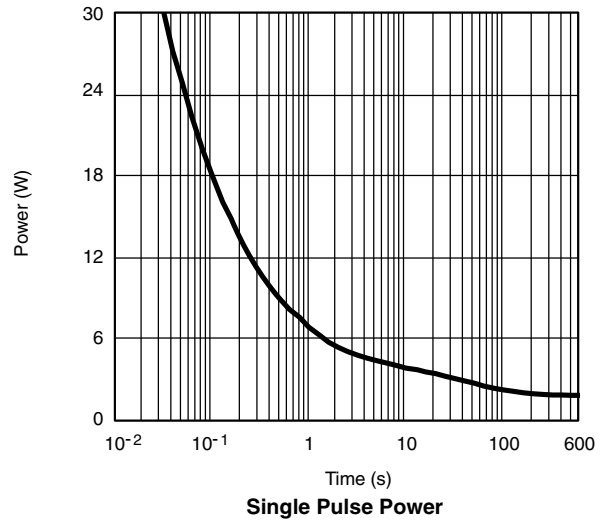
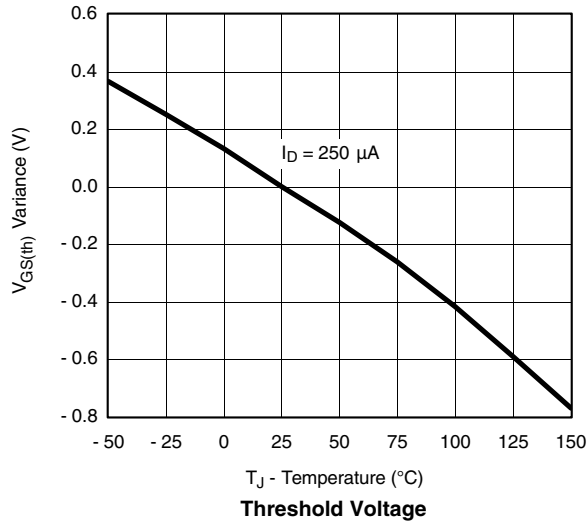


**Source-Drain Diode Forward Voltage**

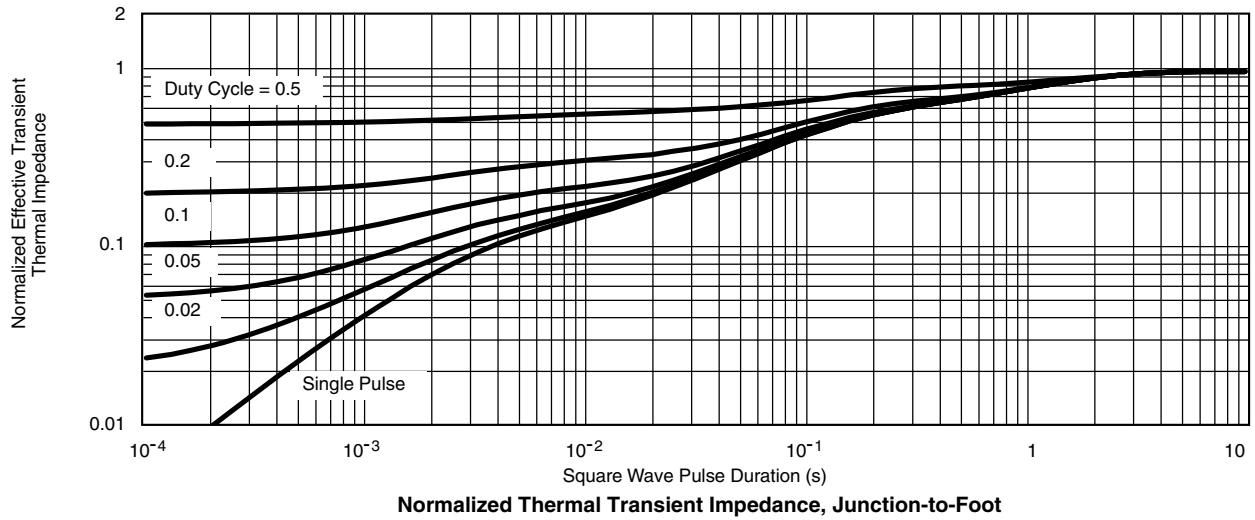


**On-Resistance vs. Gate-to-Source Voltage**

**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



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