N-Channel Reduced Q_g, Fast Switching MOSFET

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} for Low Switching Losses
- TrenchFET® Power MOSFET
- 100 % R_g Tested

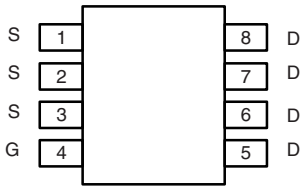
Pb Available

RoHS* COMPLIANT

APPLICATIONS

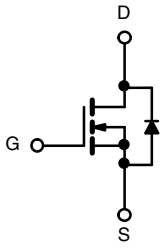
- High-Side DC/DC Conversion
  - Notebook
  - Server

SO-8



Top View

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]	T_A = 25 °C	I_D	12.5	A
	T_A = 70 °C		10	
Pulsed Drain Current		I_{DM}	50	
Continuous Source Current (Diode Conduction)[a]		I_S	2.7	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	30	
Avalanche Energy		E_{AS}	45	mJ
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	3.0	W
	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 ≤ 10 s.

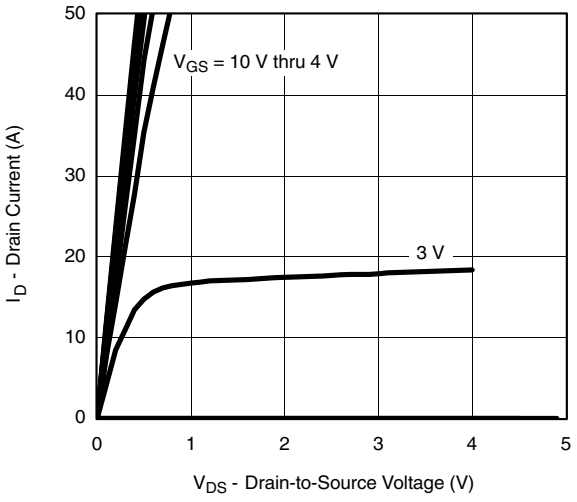
* Pb containing terminations are not RoHS compliant, exemptions may apply.

SPECIFICATIONS (T_J = 25 °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 µA	1.0		3.0	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V			1	µA
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 55 °C			5	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 10 V	30			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 12.5 A		0.008	0.00975	Ω
		V_{GS} = 4.5 V, I_D = 10.0 A		0.011	0.01375	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 12.5 A		40		S
Diode Forward Voltage[a]	V_{SD}	I_S = 2.7 A, V_{GS} = 0 V		0.73	1.1	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 12.5 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 V, R_L = 15 Ω I_D ≅ 1 A, V_{GEN} = 10 V, R_g = 6 Ω		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 A, dI/dt = 100 A/µs		30	60	

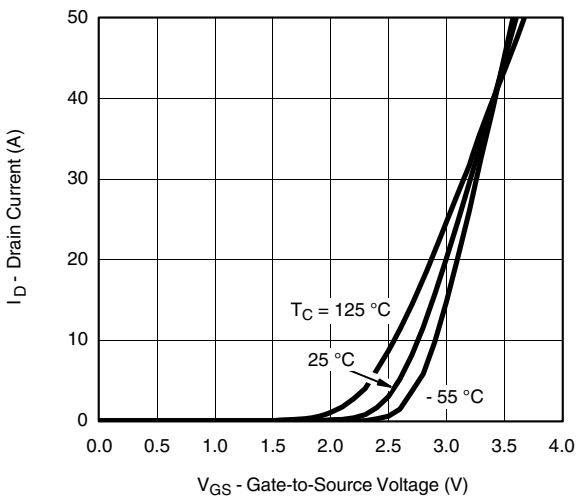
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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 (25 °C, unless otherwise noted)

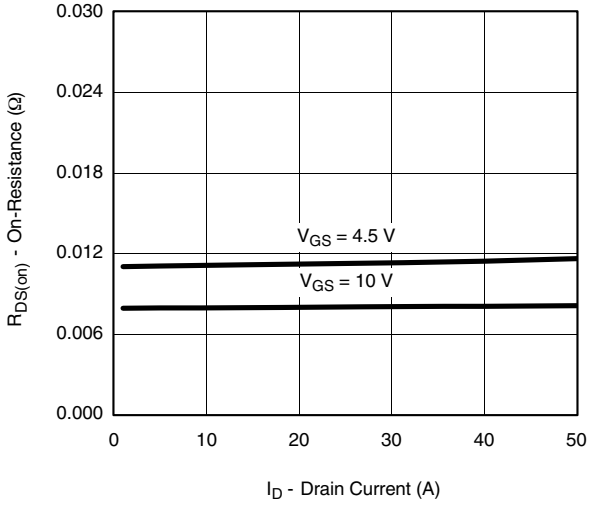


Output Characteristics

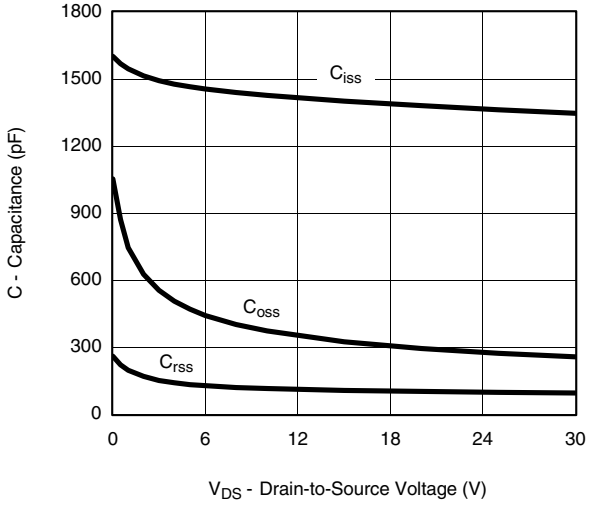


Transfer Characteristics

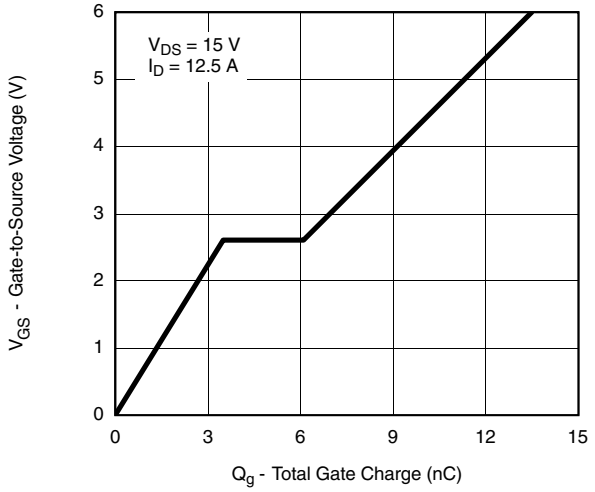
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



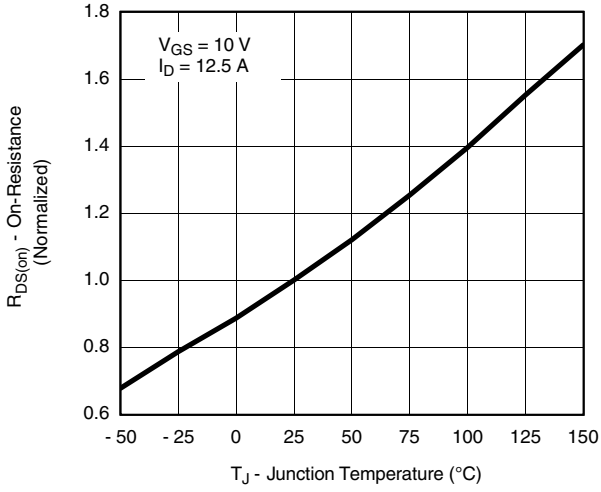
On-Resistance vs. Drain Current



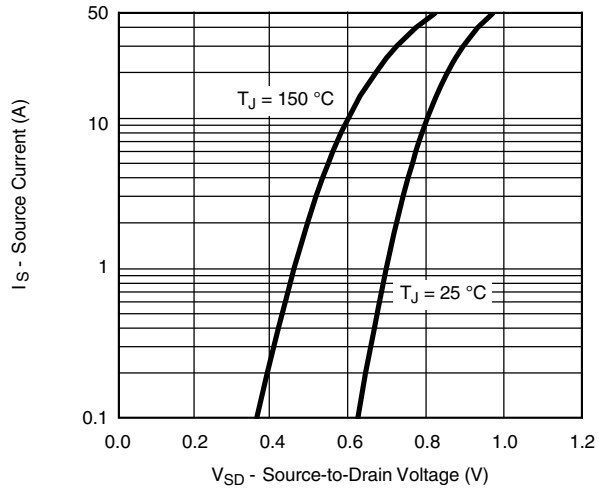
Capacitance



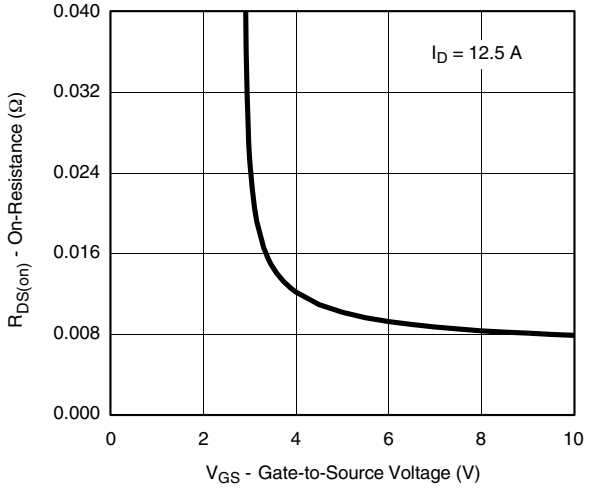
Gate Charge



On-Resistance vs. Junction Temperature

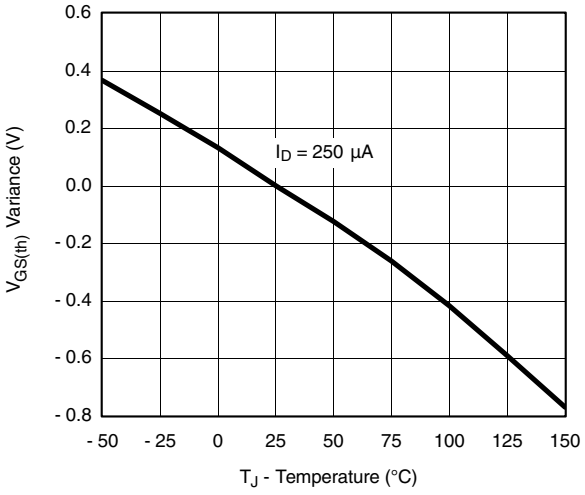


Source-Drain Diode Forward Voltage

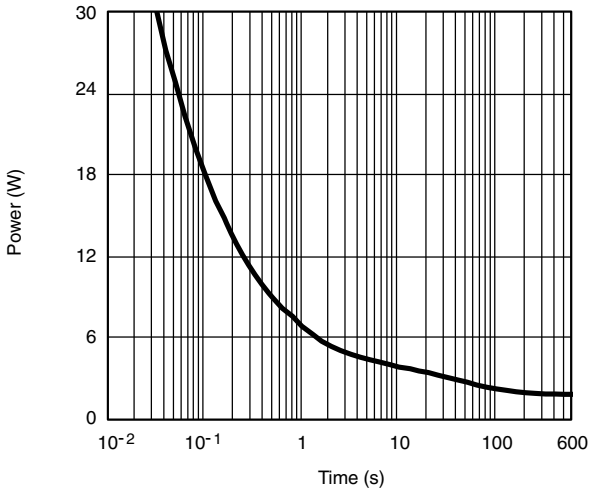


On-Resistance vs. Gate-to-Source Voltage

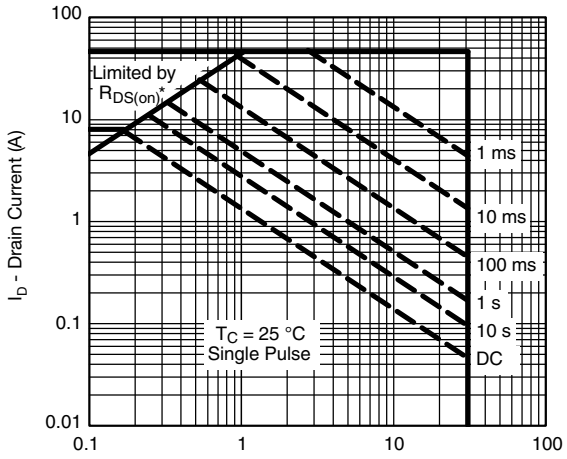
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Threshold Voltage

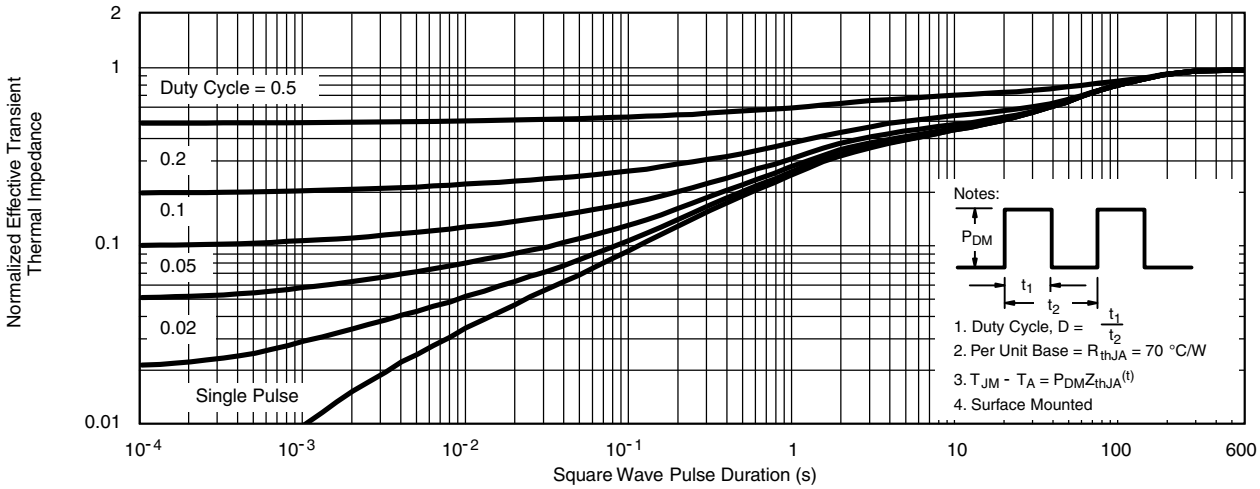


Single Pulse Power



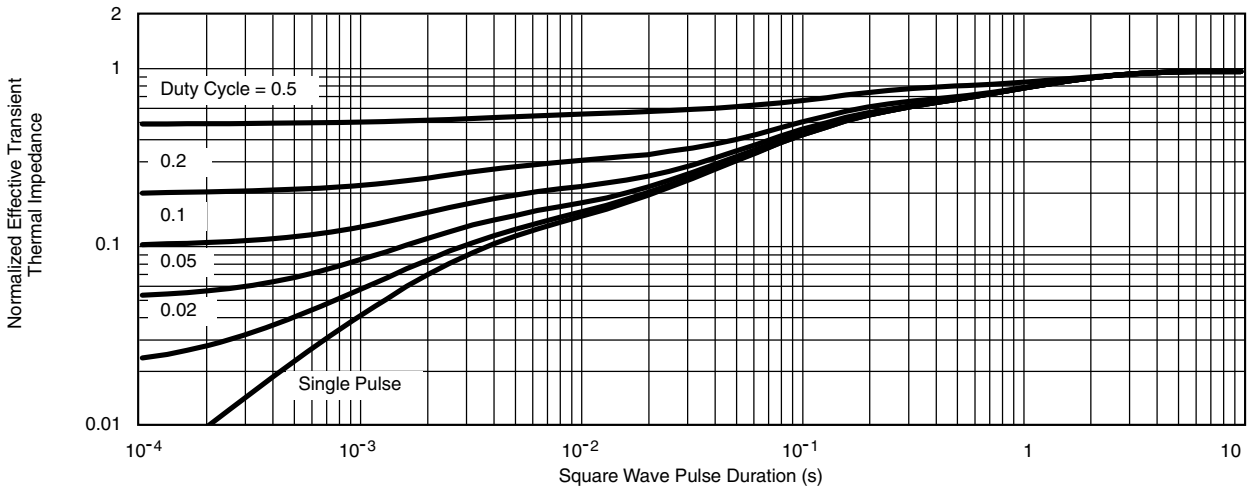
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Ambient

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Foot

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