



# Si4392DY

## Vishay Siliconix

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

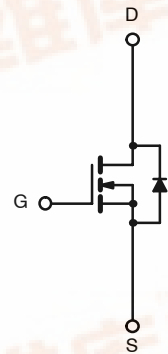
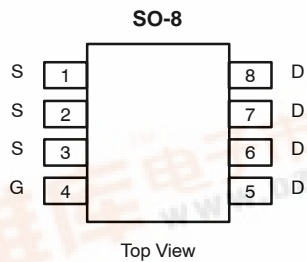
PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
30	0.00975 @ $V_{GS} = 10$ V	12.5
	0.01375 @ $V_{GS} = 4.5$ V	10.0

#### 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  
 Si4392DY-T1 (with Tape and Reel)  
 Si4392DY—E3 (Lead (Pb)-Free)  
 Si4392DY-T1—E3 (Lead (Pb)-Free with Tape and Reel)

N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) <sup>a</sup>			
Parameter	Symbol	Limits	Unit
Drain-Source Voltage	$V_{DS}$	30	A
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>	$T_A = 25^\circ\text{C}$	12.5	
	$T_A = 70^\circ\text{C}$	10	
Pulsed Drain Current	$I_{DM}$	50	
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	2.7	
Maximum Power Dissipation <sup>a</sup>	$T_A = 25^\circ\text{C}$	3.0	W
	$T_A = 70^\circ\text{C}$	1.9	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150	

THERMAL RESISTANCE RATINGS <sup>a</sup>				
Parameter		Typical	Maximum	Unit
Maximum Junction-to-Ambient	$R_{thJA}$	33	42	$^\circ\text{C/W}$
Maximum Junction-to-Foot (Drain)	$R_{thJF}$	16	20	

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

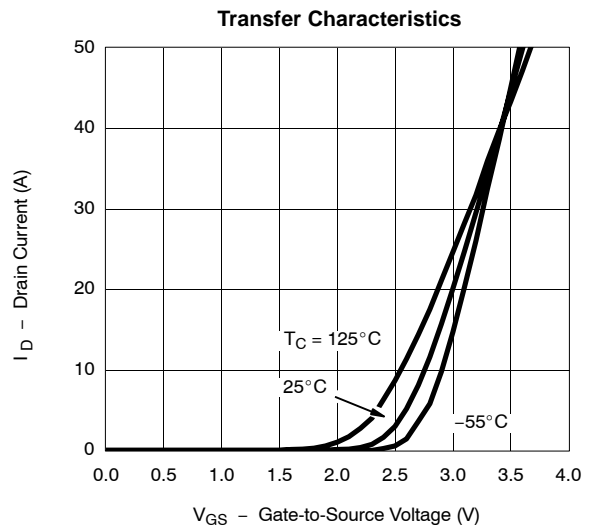
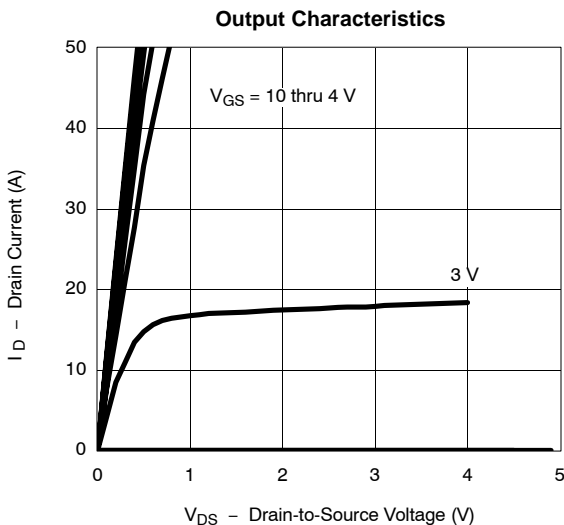


<b>SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)</b>						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1.0		3.0	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55 °C			5	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 10 V	30			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 12.5 A		0.008	0.00975	Ω
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 10.0 A		0.011	0.01375	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 12.5 A		40		S
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = 2.7 A, V <sub>GS</sub> = 0 V		0.73	1.1	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 12.5 A		10	15	nC
Gate-Source Charge	Q <sub>gs</sub>			3.5		
Gate-Drain Charge	Q <sub>gd</sub>			2.6		
Gate Resistance	R <sub>g</sub>		0.5	1.6	2.7	Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 15 Ω I <sub>D</sub> ≅ 1 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 6 Ω		15	25	ns
Rise Time	t <sub>r</sub>			5	10	
Turn-Off Delay Time	t <sub>d(off)</sub>			45	70	
Fall Time	t <sub>f</sub>			8	15	
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 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.

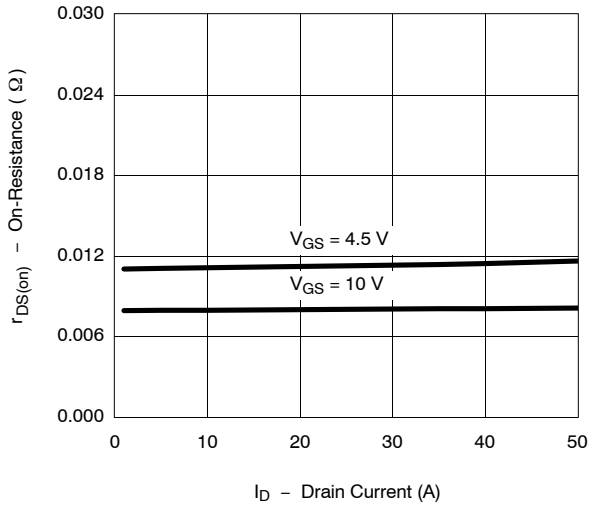
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**



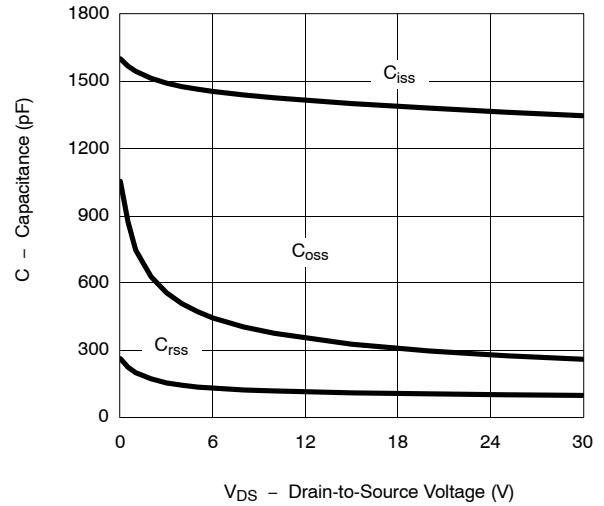


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

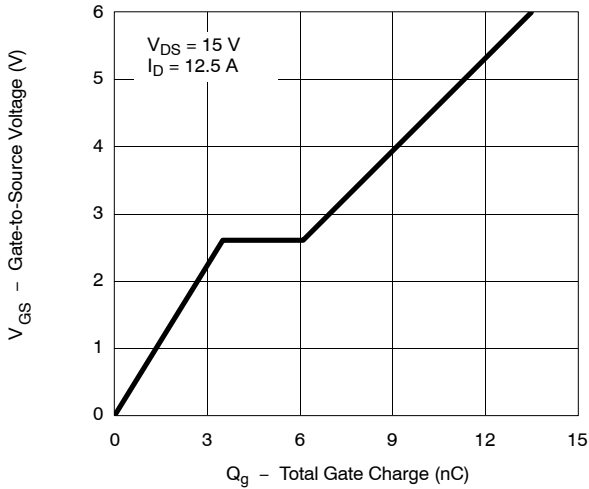
**On-Resistance vs. Drain Current**



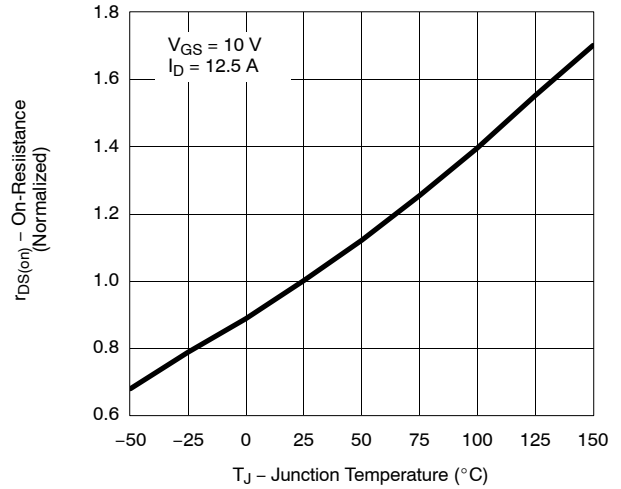
**Capacitance**



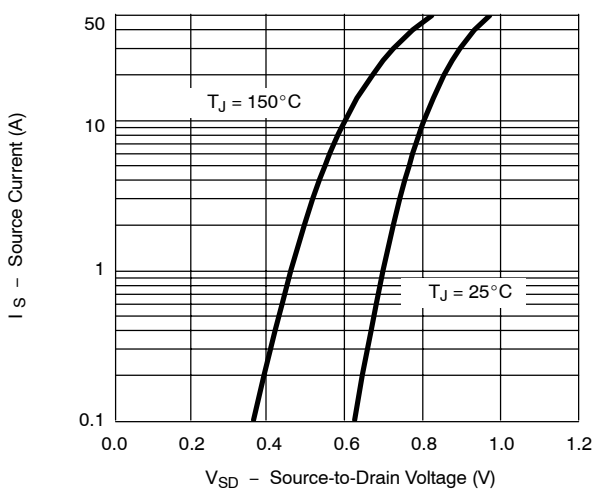
**Gate Charge**



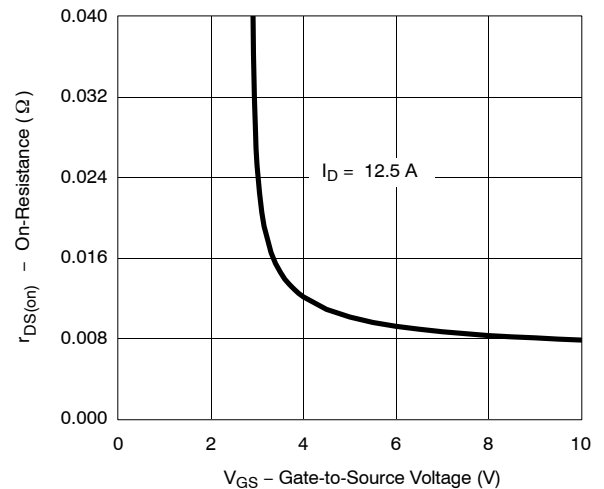
**On-Resistance vs. Junction Temperature**



**Source-Drain Diode Forward Voltage**

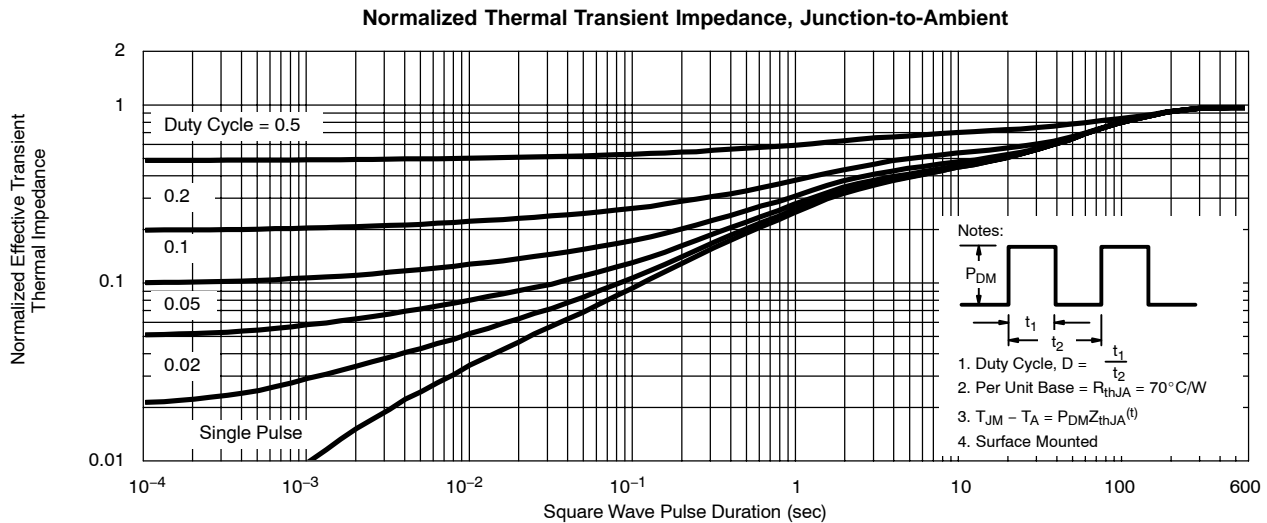
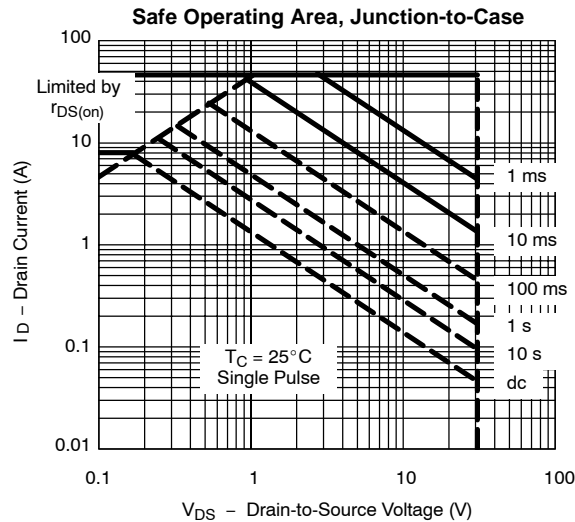
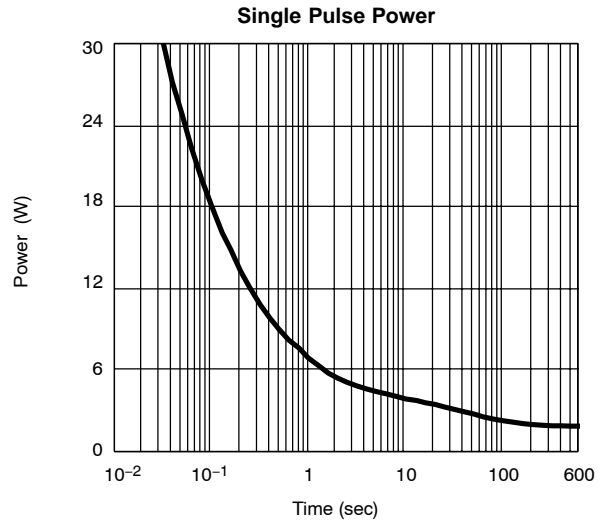
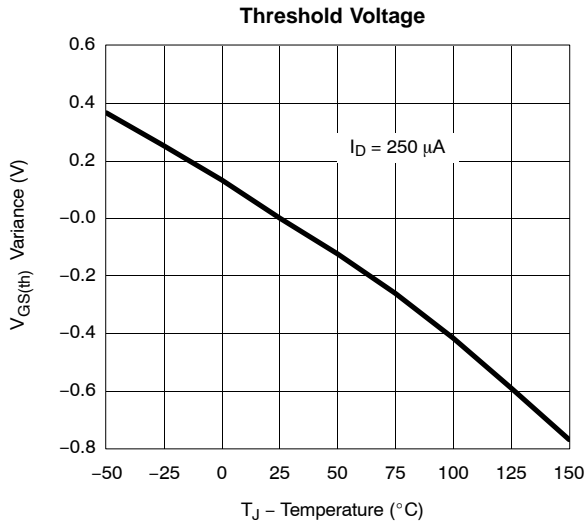


**On-Resistance vs. Gate-to-Source Voltage**





**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**





**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

