

N-Channel Q_g , Fast Switching WFET™

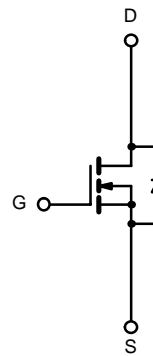
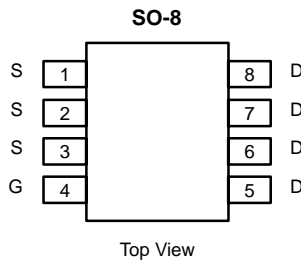
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.0095 @ $V_{GS} = 10$ V	12.5
	0.0135 @ $V_{GS} = 4.5$ V	10.5

FEATURES

- Extremely Low Q_{gd} WFET Technology for Switching Losses
- TrenchFET® Power MOSFET

APPLICATIONS

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



Ordering Information: Si4390DY
Si4390DY-T1 (with Tape and Reel)

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter		Symbol	10 secs	Steady State	Unit
Drain-Source Voltage		V_{DS}	30		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	$T_A = 25^\circ\text{C}$	I_D	12.5	8.5	A
	$T_A = 70^\circ\text{C}$		10	6.8	
Pulsed Drain Current		I_{DM}	20		
Continuous Source Current (Diode Conduction) ^a		I_S	2.7	1.3	A
Maximum Power Dissipation ^a	$T_A = 25^\circ\text{C}$	P_D	3.0	1.4	W
	$T_A = 70^\circ\text{C}$		1.9	0.9	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		$^\circ\text{C}$

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	R_{thJA}	32	42	$^\circ\text{C}/\text{W}$
	Steady State		68	90	
Maximum Junction-to-Foot (Drain)		R_{thJF}	15	20	

Notes

a. Surface Mounted on 1" x 1" FR4 Board.

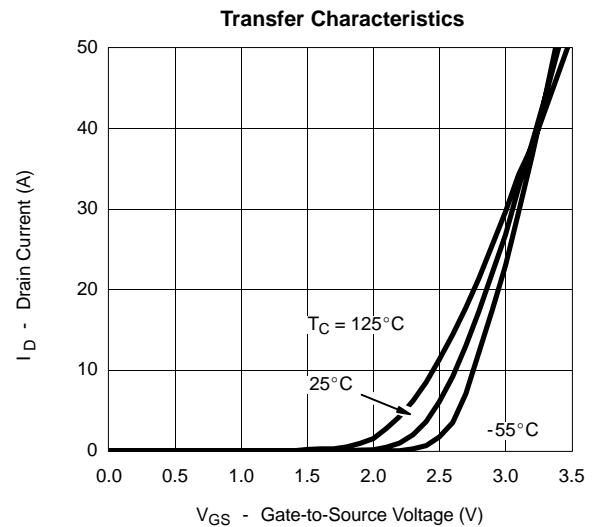
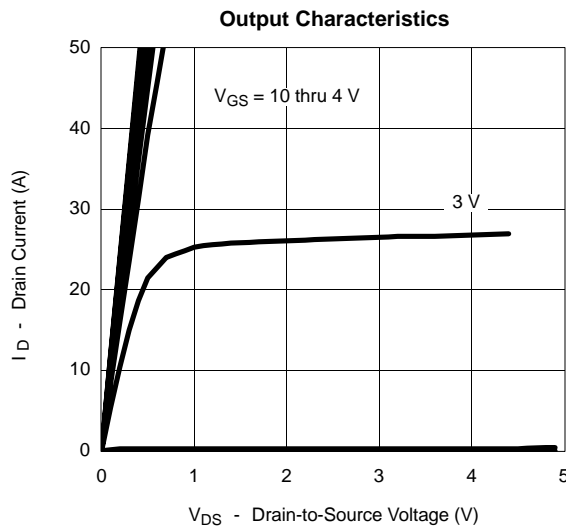


SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.8		2.8	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24 V, V _{GS} = 0 V			1	μA
		V _{DS} = 24 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		0.0075	0.0095	Ω
		V _{GS} = 4.5 V, I _D = 10.5 A		0.0105	0.0135	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 12.5 A		38		S
Diode Forward Voltage ^a	V _{SD}	I _S = 2.7 A, V _{GS} = 0 V		0.7	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}			2.1		
Gate Resistance	R _g			0.8		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		16	30	ns
Rise Time	t _r			6	12	
Turn-Off Delay Time	t _{d(off)}			43	70	
Fall Time	t _f			14	25	
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 2.7 A, di/dt = 100 A/μs		35	60	

Notes

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

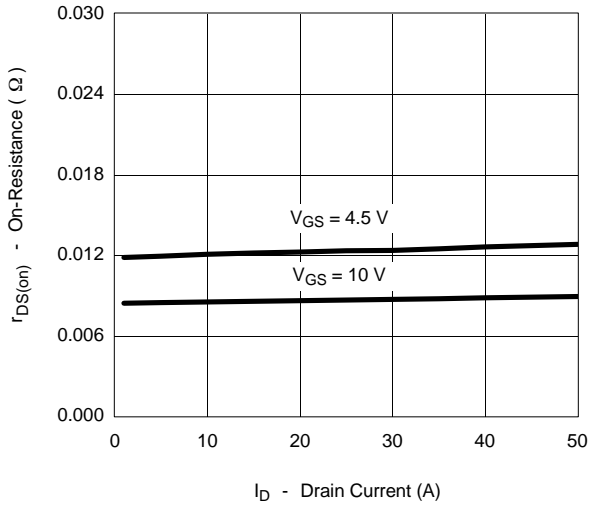
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



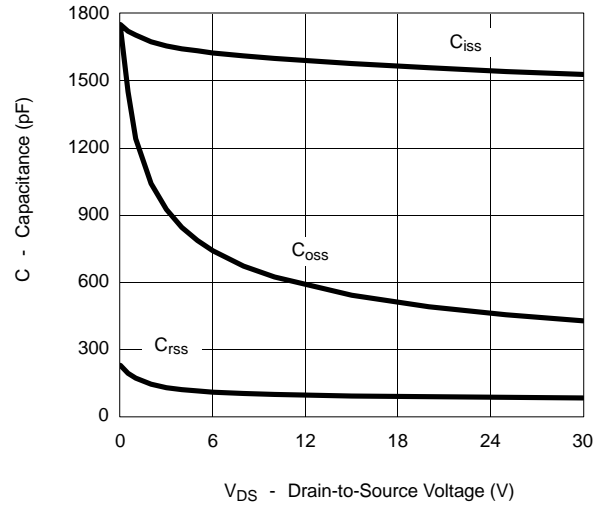


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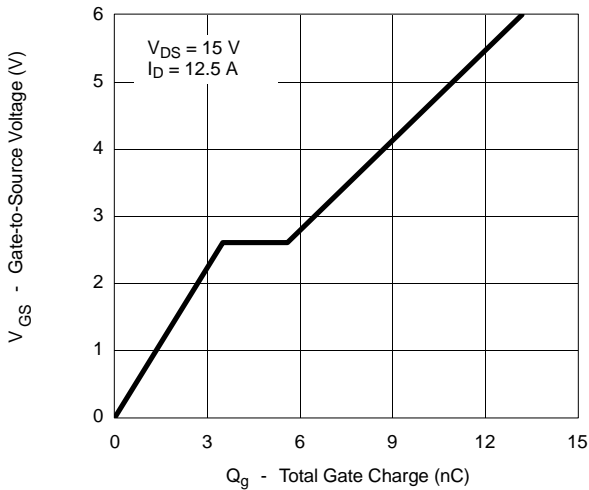
On-Resistance vs. Drain Current



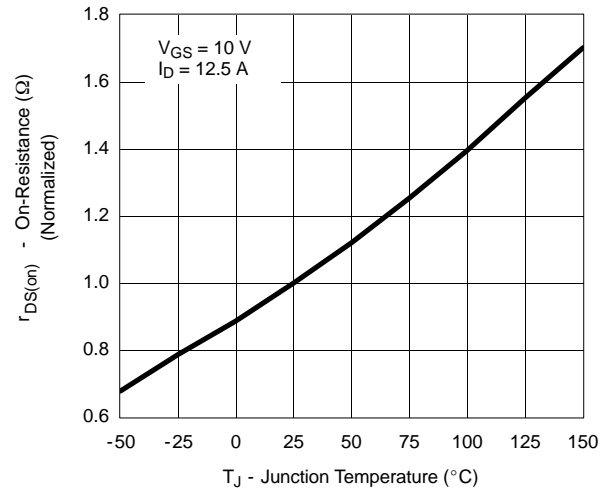
Capacitance



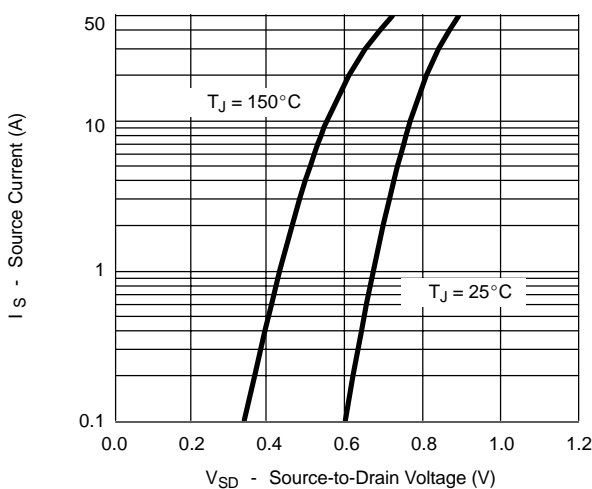
Gate Charge



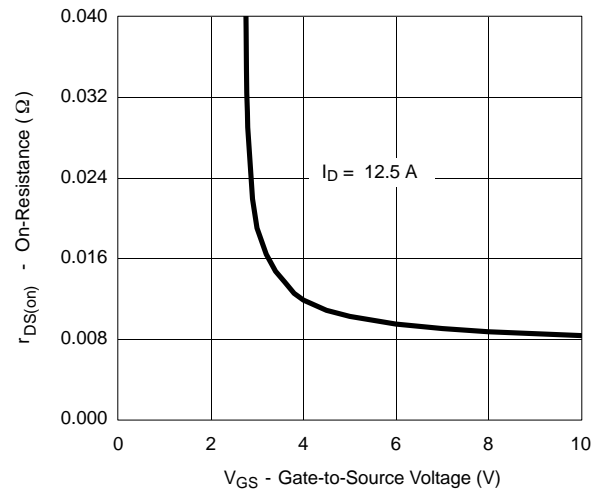
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

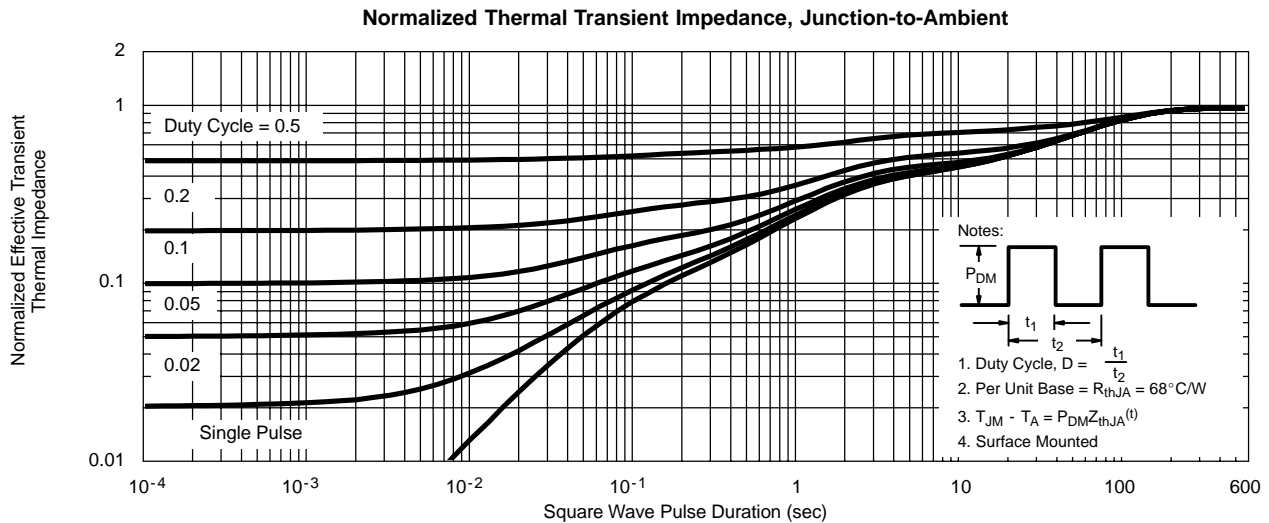
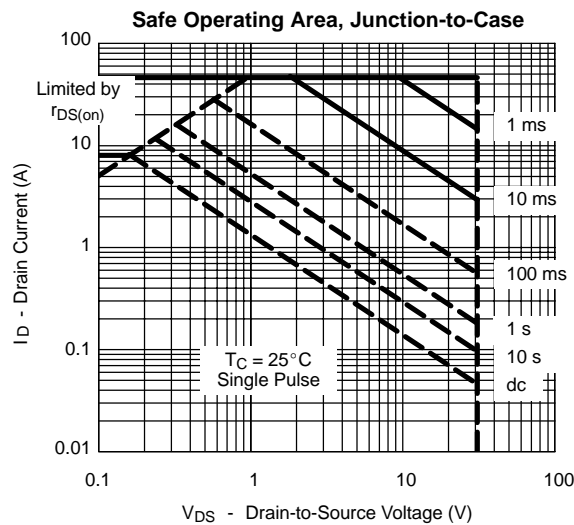
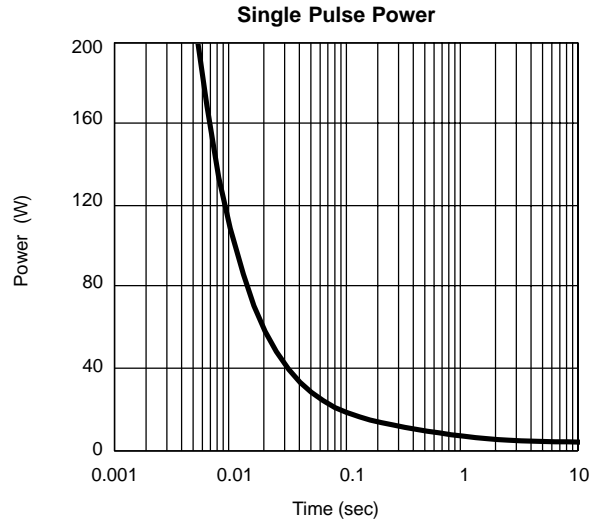
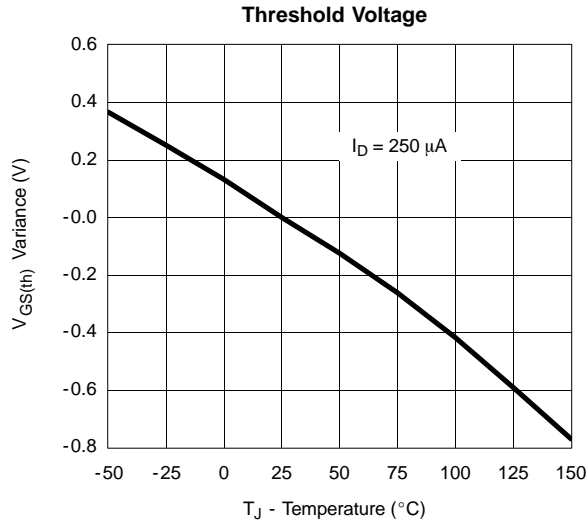


On-Resistance vs. Gate-to-Source Voltage





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

