

N-Channel Q_g, Fast Switching WFET™

PRODUCT SUMMARY

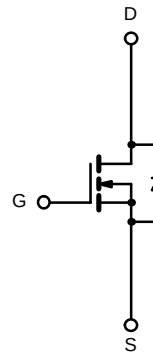
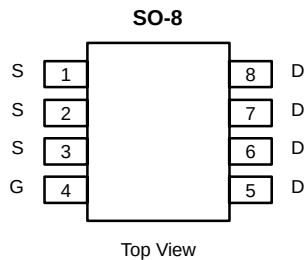
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)
30	0.0095 @ V _{GS} = 10 V	12.5
	0.0135 @ V _{GS} = 4.5 V	10.5

FEATURES

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

APPLICATIONS

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



N-Channel MOSFET

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

ABSOLUTE MAXIMUM RATINGS (T _A = 25°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°C) ^a	T _A = 25°C	I _D	12.5	8.5	A
	T _A = 70°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°C	P _D	3.0	1.4	W
	T _A = 70°C		1.9	0.9	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	t ≤ 10 sec	R _{thJA}	32	42	°C/W
	Steady State		68	90	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	15	20	

Notes

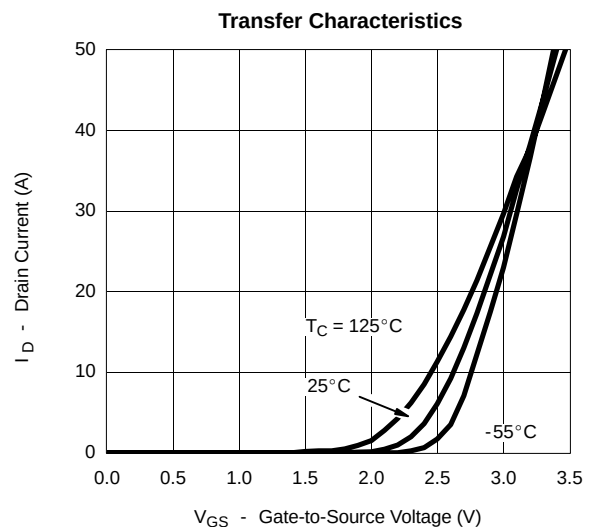
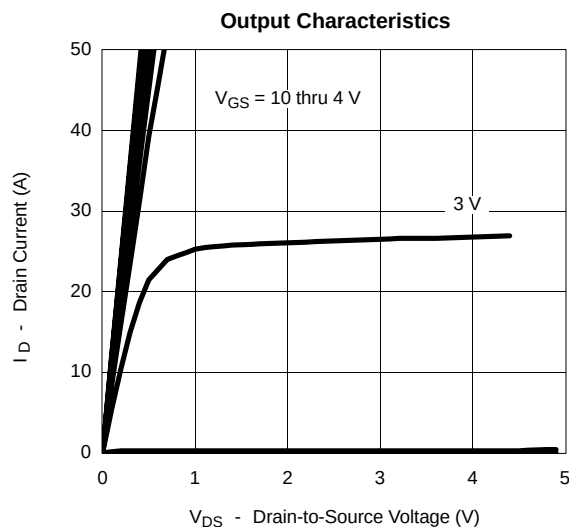
a. Surface Mounted on 1" x 1" FR4 Board.

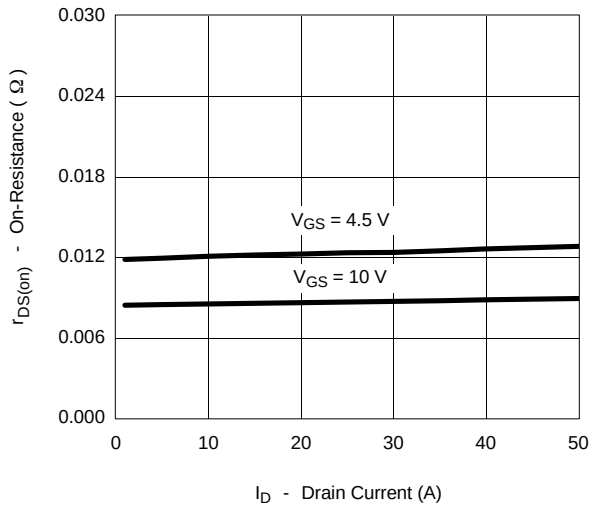
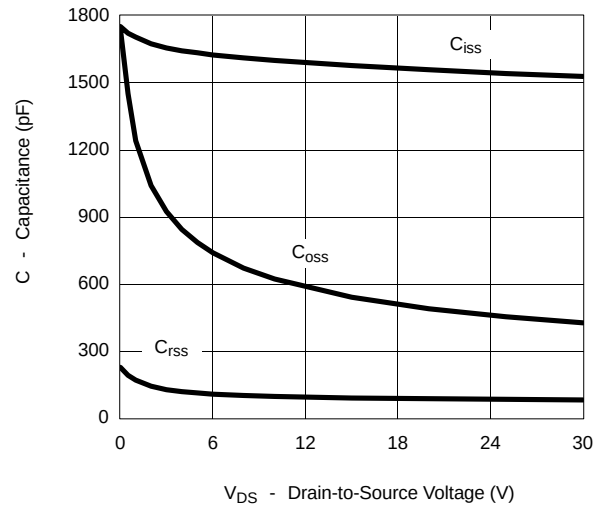
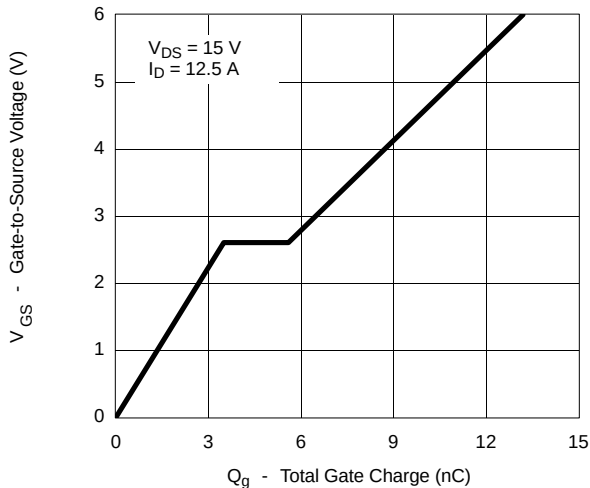
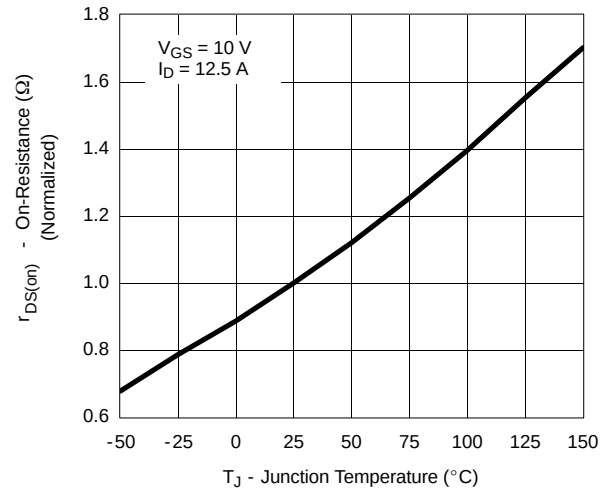
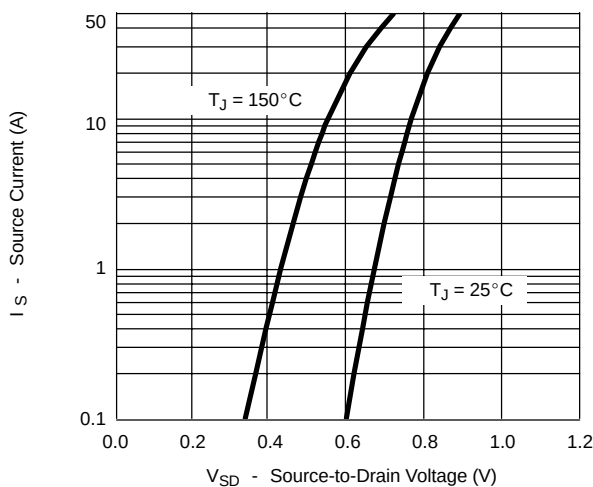
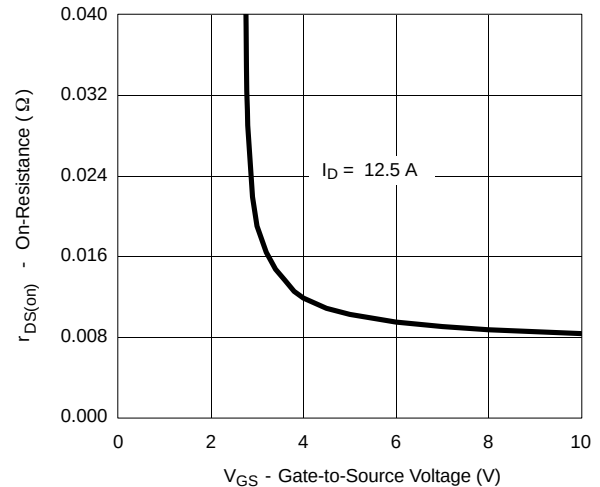
SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

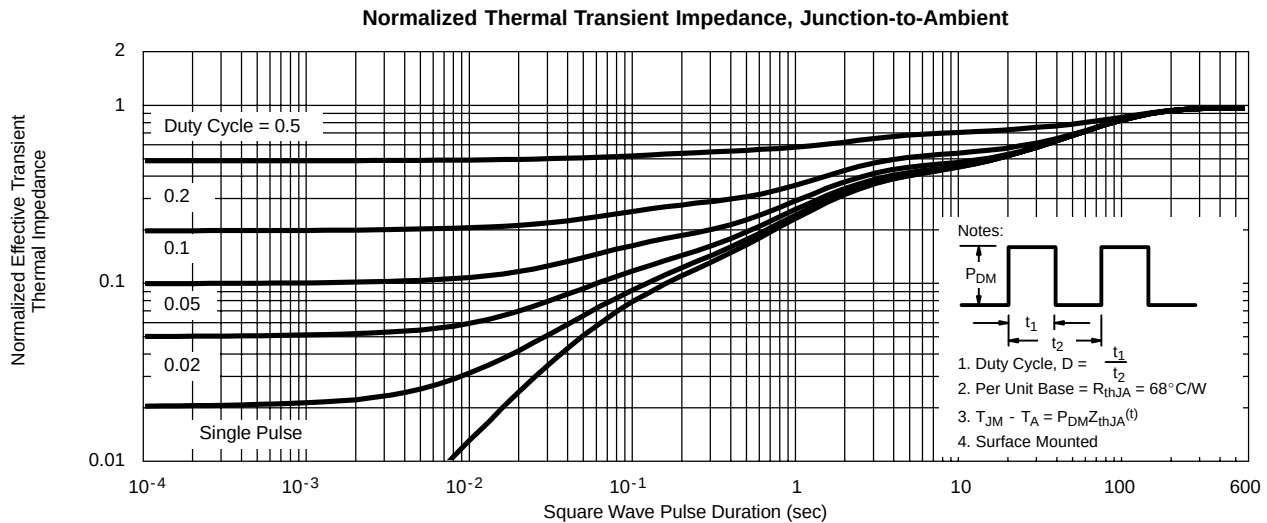
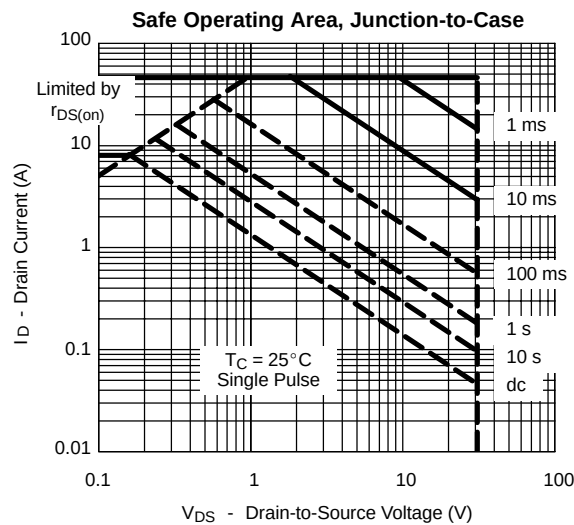
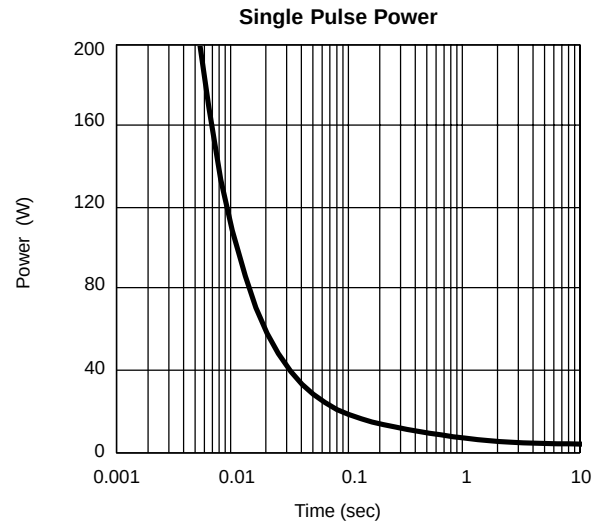
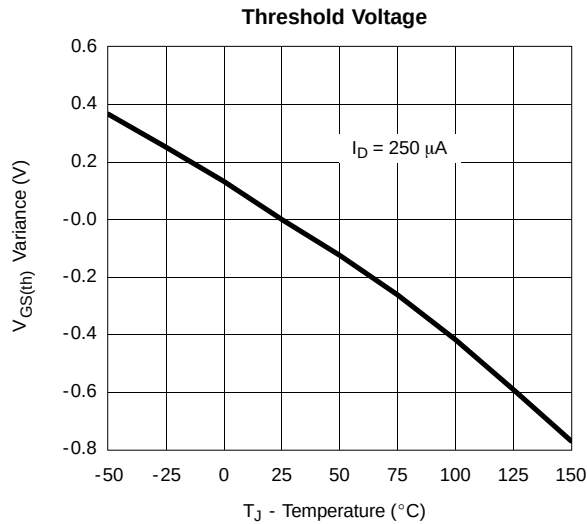
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	0.8		2.8	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}$, $V_{GS} = \pm 20\ \text{V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24\ \text{V}$, $V_{GS} = 0\ \text{V}$			1	μA
		$V_{DS} = 24\ \text{V}$, $V_{GS} = 0\ \text{V}$, $T_J = 55^\circ\text{C}$			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	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}$, $I_D = 12.5\ \text{A}$		0.0075	0.0095	Ω
		$V_{GS} = 4.5\ \text{V}$, $I_D = 10.5\ \text{A}$		0.0105	0.0135	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\ \text{V}$, $I_D = 12.5\ \text{A}$		38		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 2.7\ \text{A}$, $V_{GS} = 0\ \text{V}$		0.7	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}			2.1		
Gate Resistance	R_g			0.8		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\ \text{V}$, $R_L = 15\ \Omega$ $I_D \approx 1\ \text{A}$, $V_{GEN} = 10\ \text{V}$, $R_G = 6\ \Omega$		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}	$I_F = 2.7\ \text{A}$, $di/dt = 100\ \text{A}/\mu\text{s}$		35	60	

Notes

- a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
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)




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