

P-Channel 40-V (D-S) MOSFET

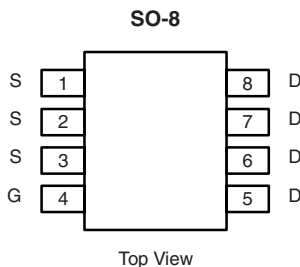
PRODUCT SUMMARY		
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
- 40	0.0155 at V _{GS} = - 10 V	- 10.5
	0.0225 at V _{GS} = - 4.5 V	- 8.7

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFETs

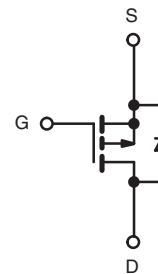


RoHS
COMPLIANT
HALOGEN
FREE
Available



Top View

Ordering Information: Si4401DY-T1-E3 (Lead (Pb)-free)
Si4401DY-T1-GE3 (Lead (Pb)-free and Halogen-free)



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted					
Parameter	Symbol	10 s	Steady State	Unit	
Drain-Source Voltage	V _{DS}	- 40		V	
Gate-Source Voltage	V _{GS}	± 20			
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	- 10.5	- 8.7	A
		T _A = 70 °C	- 8.3	- 5.9	
Pulsed Drain Current	I _{DM}	- 50			
Continuous Source Current (Diode Conduction) ^a	I _S	- 2.7	- 1.36		
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	3.0	1.5	W
		T _A = 70 °C	1.9	0.95	
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 s	R _{thJA}	33	42	°C/W
	Steady State		70	84	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	16	21	

Notes:

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

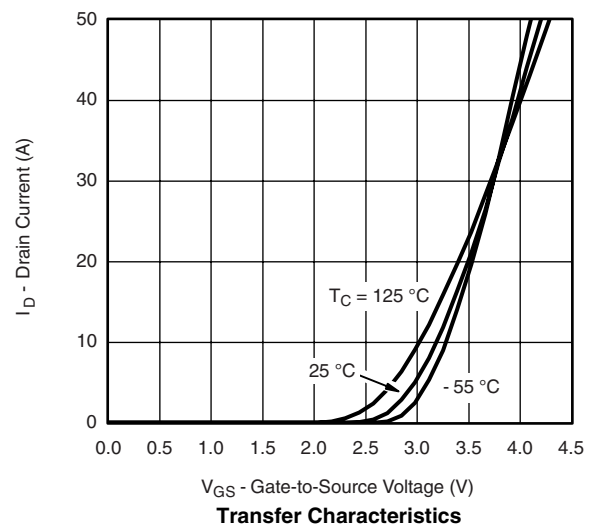
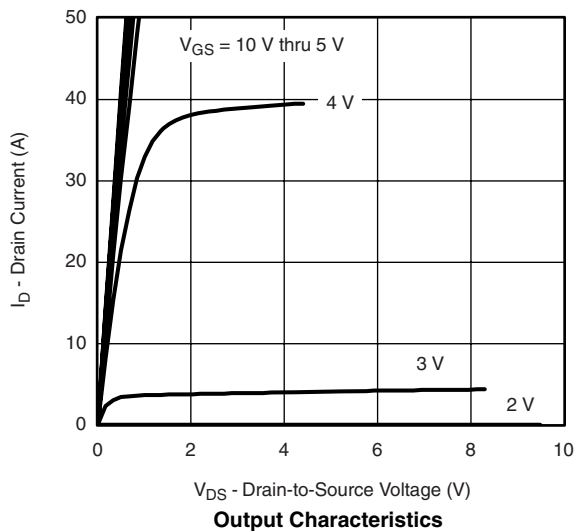
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1.0			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -32\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -32\text{ V}, V_{GS} = 0\text{ V}, T_J = 70\text{ }^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	-30			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -10.5\text{ A}$		0.013	0.0155	Ω
		$V_{GS} = -4.5\text{ V}, I_D = -8.7\text{ A}$		0.0185	0.0225	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -10.5\text{ A}$		26		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -2.7\text{ A}, V_{GS} = 0\text{ V}$		-0.74	-1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -15\text{ V}, V_{GS} = -5\text{ V}, I_D = -10.5\text{ A}$		37.5	50	nC
Gate-Source Charge	Q_{gs}			14.3		
Gate-Drain Charge	Q_{gd}			10.7		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -10\text{ V}, R_g = 6\text{ }\Omega$		17	30	ns
Rise Time	t_r			18	30	
Turn-Off Delay Time	$t_{d(off)}$			122	190	
Fall Time	t_f			55	85	
Gate Resistance	R_g				3.8	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -2.1\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		45		ns

Notes:

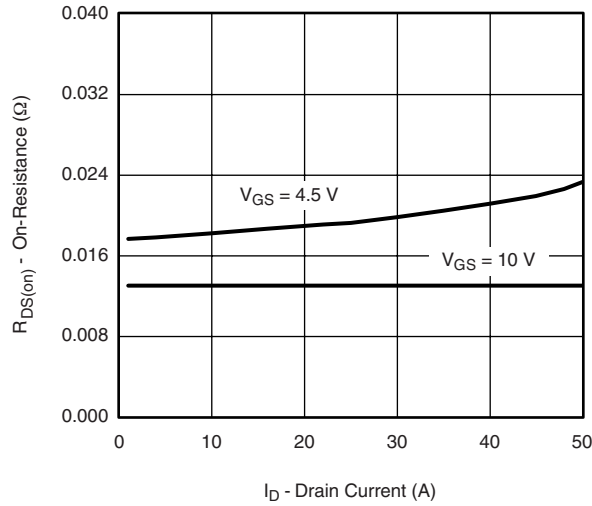
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

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.

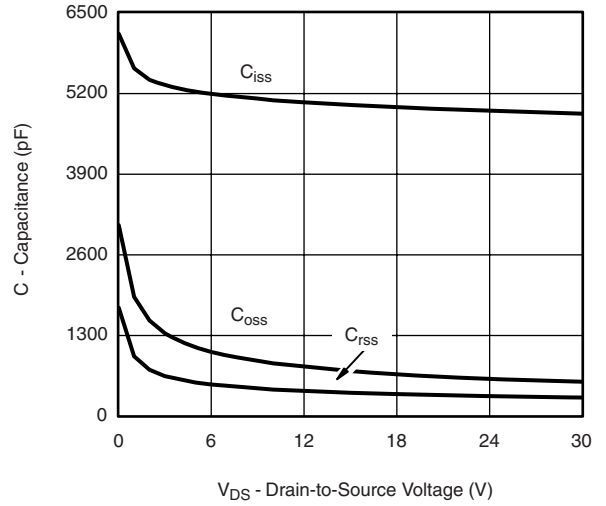
TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$, unless otherwise noted



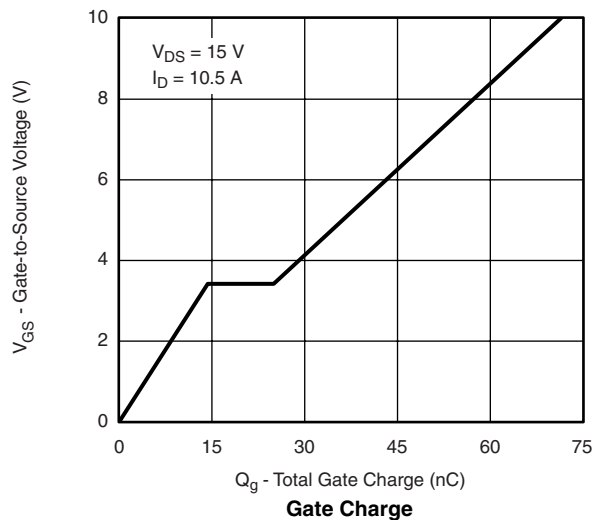
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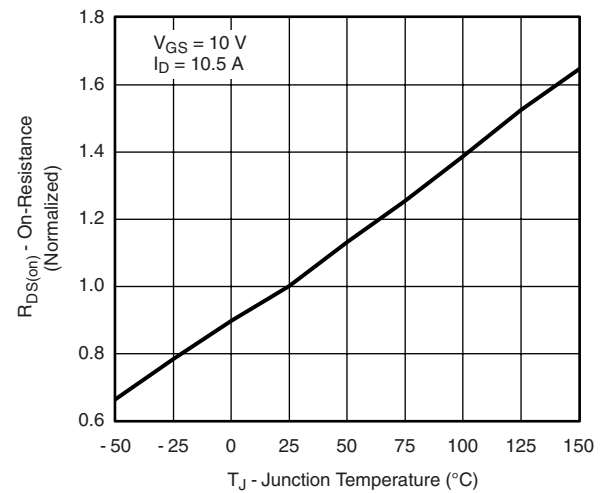
On-Resistance vs. Drain Current



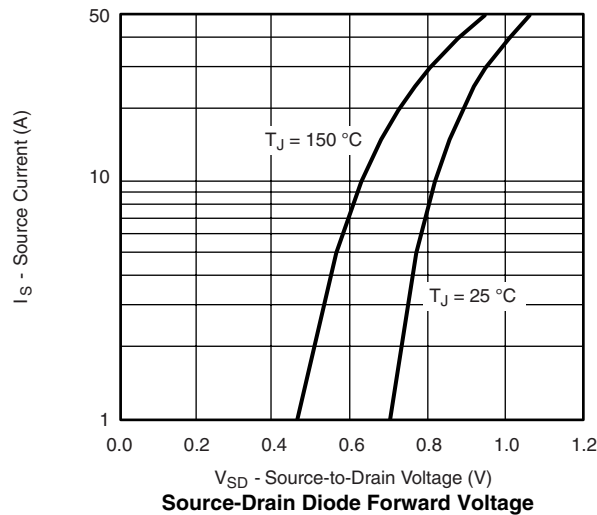
Capacitance



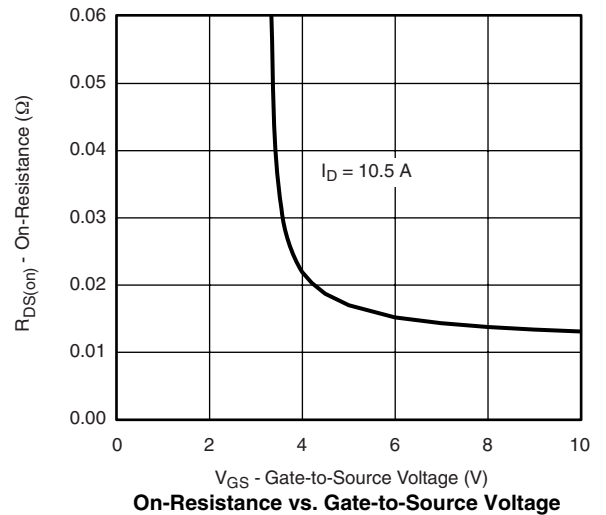
Gate Charge



On-Resistance vs. Junction Temperature

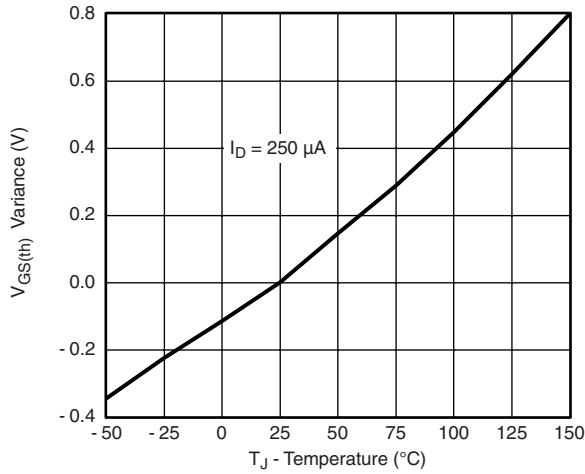


Source-Drain Diode Forward Voltage

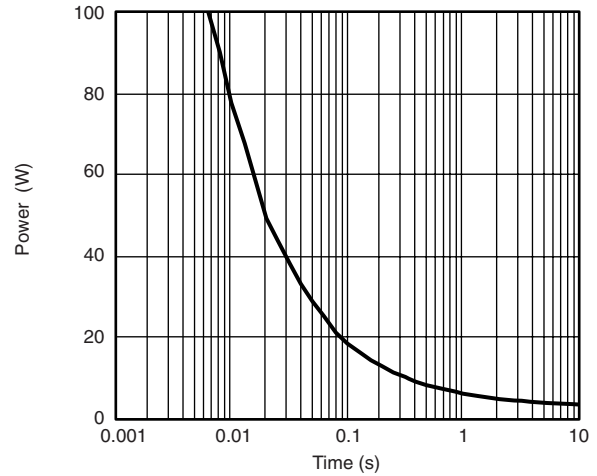


On-Resistance vs. Gate-to-Source Voltage

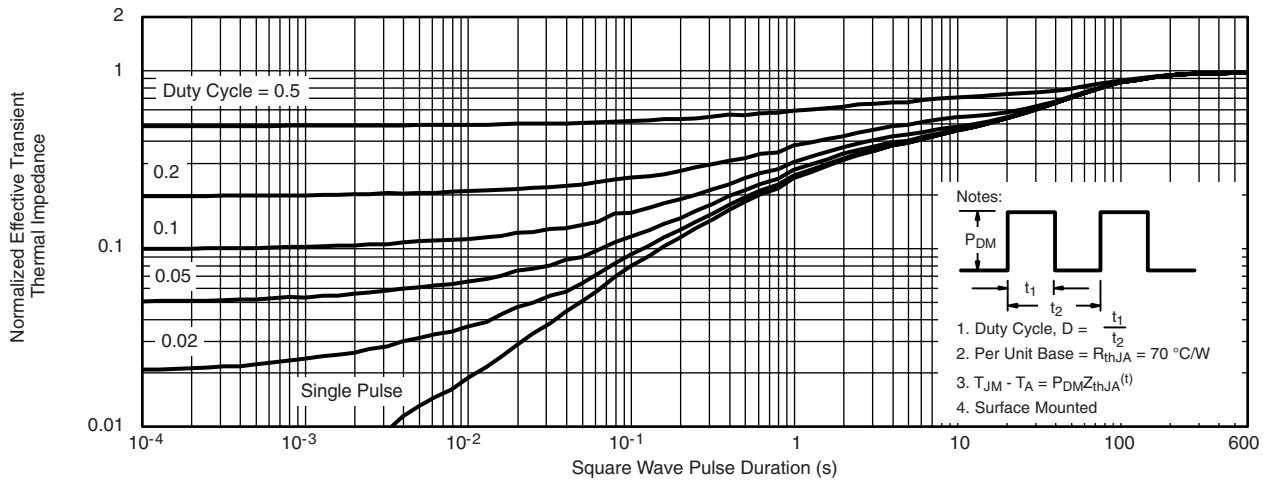
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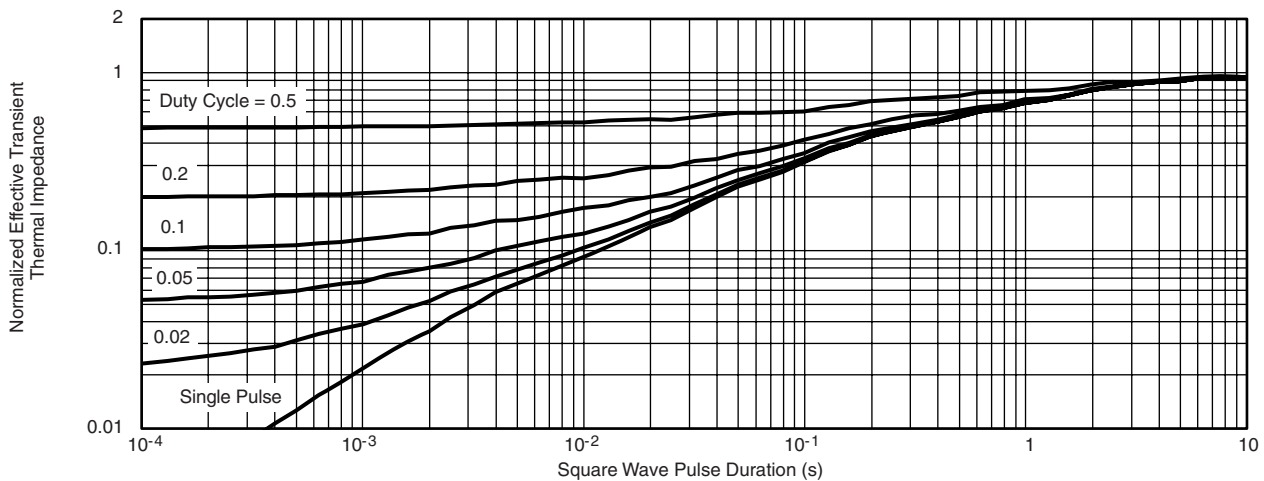
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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