



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

## PRODUCT SUMMARY

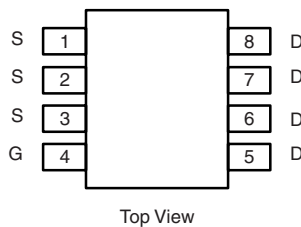
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ)
- 40	0.014 at V <sub>GS</sub> = - 10 V	- 10.5	40
	0.021 at V <sub>GS</sub> = - 4.5 V	- 8.7	

## FEATURES

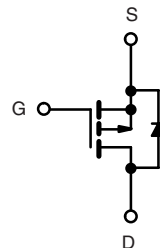
- TrenchFET<sup>®</sup> Power MOSFET
- 100 % R<sub>g</sub> Tested

RoHS  
COMPLIANT

SO-8



Ordering Information: Si4401BDY-T1-E3 (Lead (Pb)-free)



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T<sub>A</sub> = 25 °C, unless otherwise noted

Parameter	Symbol	10 sec	Steady State	Unit	
Drain-Source Voltage	V <sub>DS</sub>	- 40		V	
Gate-Source Voltage	V <sub>GS</sub>	± 20			
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25 °C	- 10.5	- 8.7	A
		T <sub>A</sub> = 70 °C	- 8.3	- 5.9	
Pulsed Drain Current	I <sub>DM</sub>	- 50			
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	- 2.6	- 1.36		
Avalanche Current	I <sub>AS</sub>	30		mJ	
Single Pulse Avalanche Energy	E <sub>AS</sub>	45			
Maximum Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25 °C	2.9	1.5	W
		T <sub>A</sub> = 70 °C	1.85	0.95	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150		°C	

## THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient <sup>a</sup>	R <sub>thJA</sub>	t ≤ 10 sec	36	43	°C/W
		Steady State	70	84	
Maximum Junction-to-Foot (Drain)	R <sub>thJF</sub>	16	21		

Notes:

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



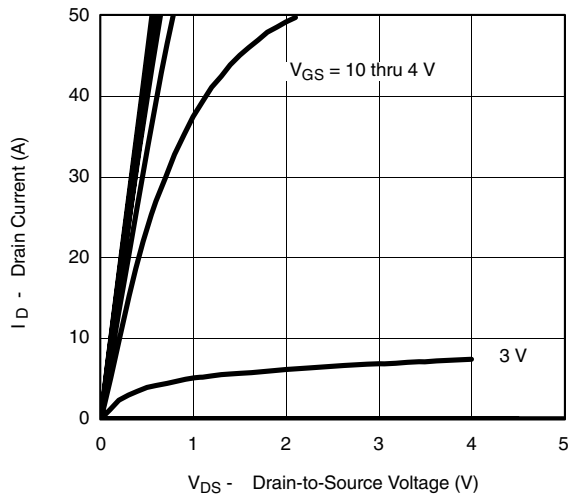
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1.0		-3.0	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -40\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -40\text{ V}, V_{GS} = 0\text{ V}, T_J = 70\text{ }^\circ\text{C}$			-10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	-30			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -10.5\text{ A}$		0.011	0.014	$\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -8.7\text{ A}$		0.0165	0.021	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -10.5\text{ A}$		26		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -2.7\text{ A}, V_{GS} = 0\text{ V}$		-0.74	-1.1	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -15\text{ V}, V_{GS} = -5\text{ V}, I_D = -10.5\text{ A}$		40	55	nC
Gate-Source Charge	$Q_{gs}$		10			
Gate-Drain Charge	$Q_{gd}$		14			
Gate Resistance	$R_g$		1.4	2.8	4.2	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -10\text{ V}, R_g = 6\text{ }\Omega$		16	25	ns
Rise Time	$t_r$		15	25		
Turn-Off Delay Time	$t_{d(off)}$		97	150		
Fall Time	$t_f$		47	75		
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = -2.1\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		35	55	

Notes:

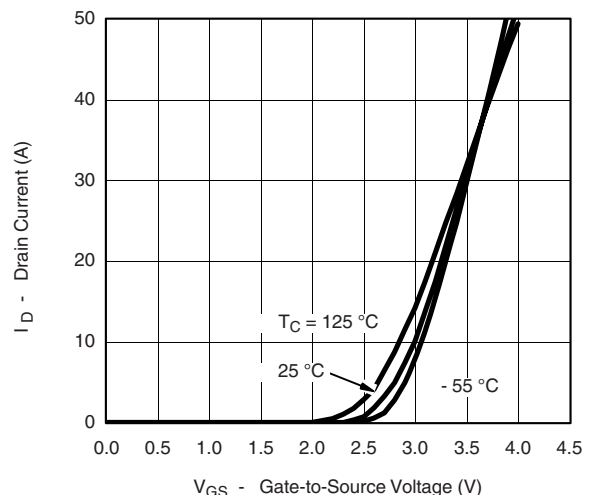
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

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



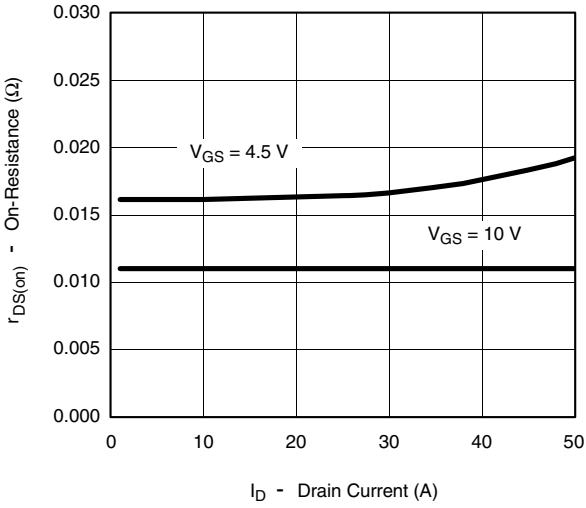
Output Characteristics



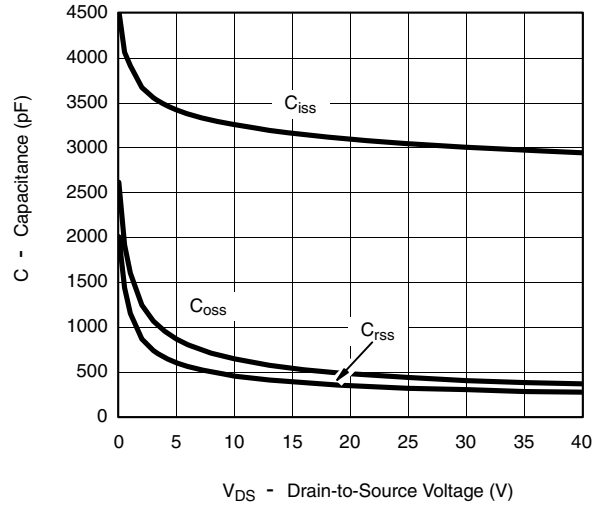
Transfer Characteristics



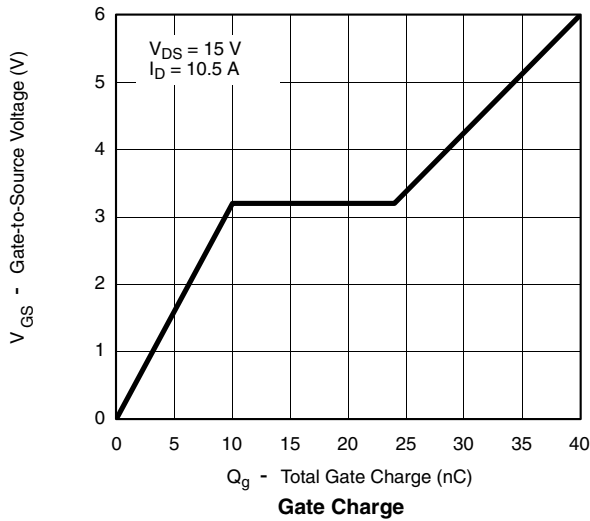
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



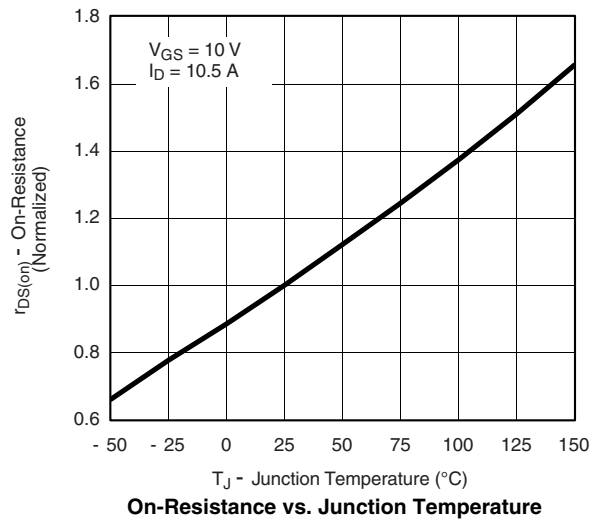
**On-Resistance vs. Drain Current**



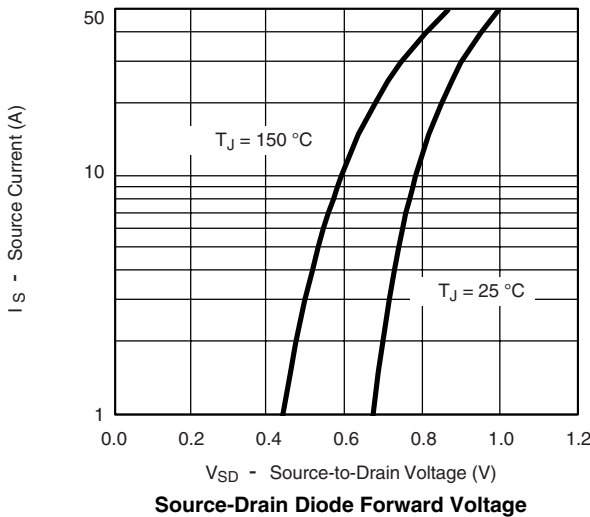
**Capacitance**



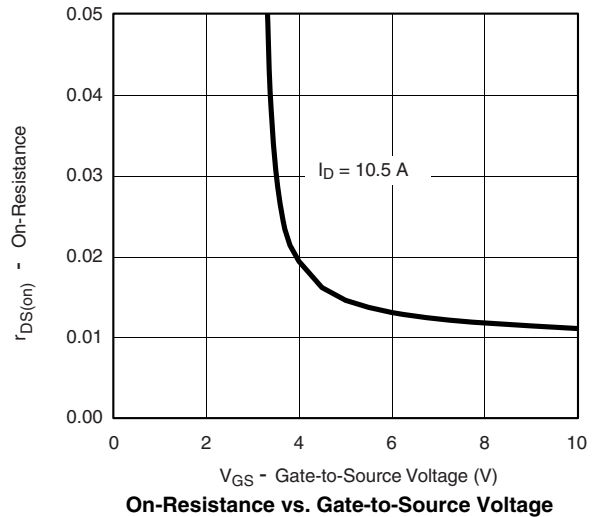
**Gate Charge**



**On-Resistance vs. Junction Temperature**



**Source-Drain Diode Forward Voltage**



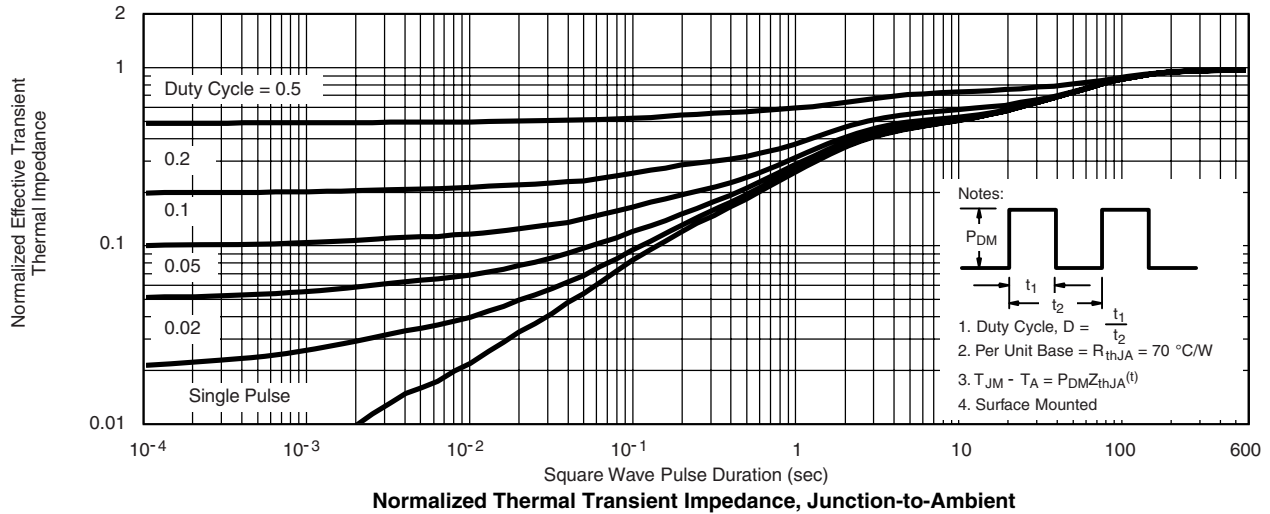
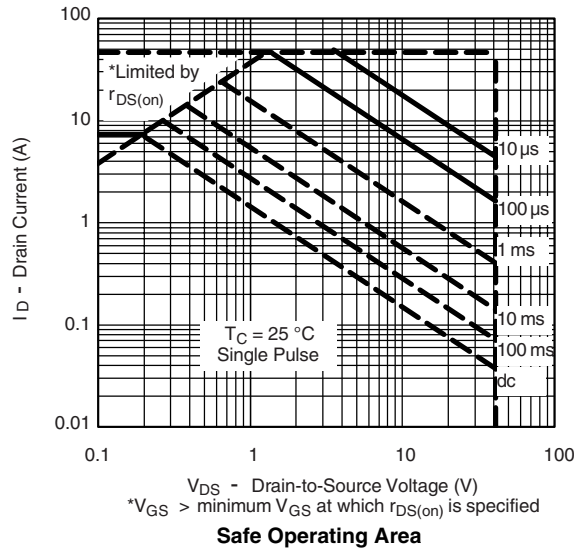
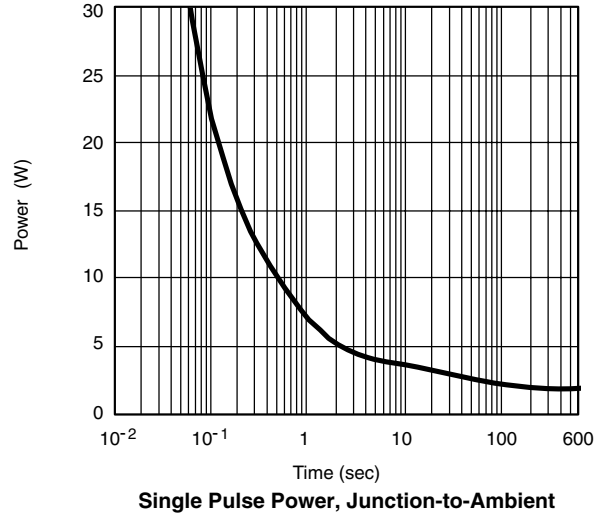
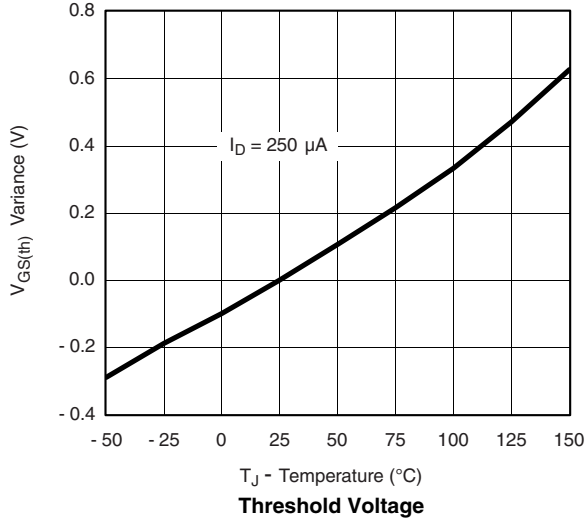
**On-Resistance vs. Gate-to-Source Voltage**

# Si4401BDY

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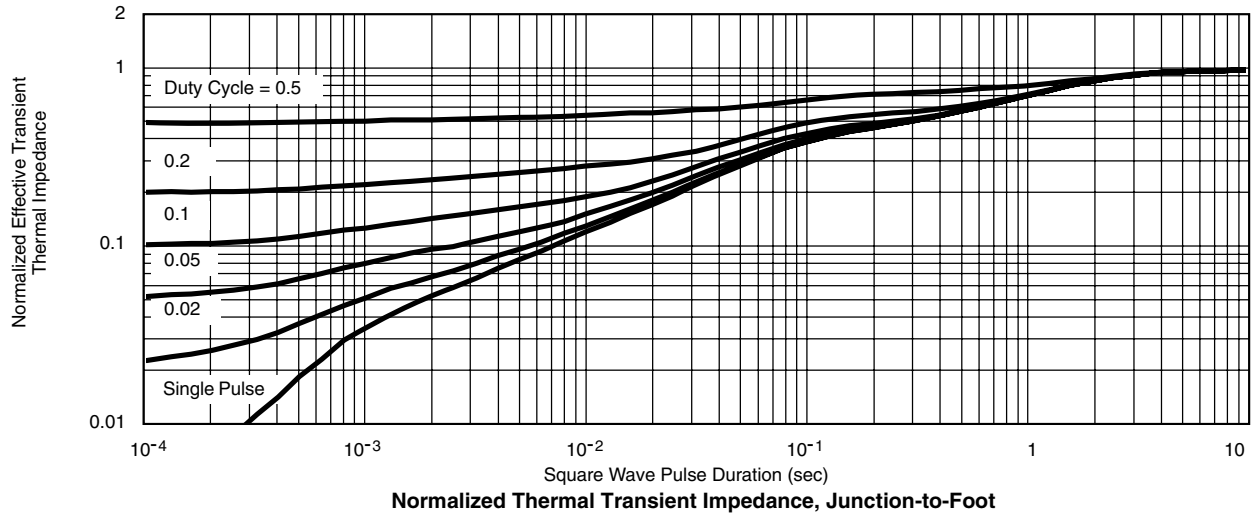


## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



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