

N-Channel 30-V (D-S) MOSFET

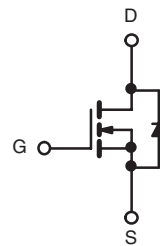
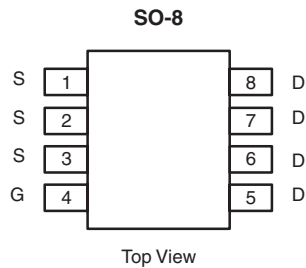
PRODUCT SUMMARY		
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)
30	0.0085 at V _{GS} = 10 V	13.5
	0.0110 at V _{GS} = 4.5 V	11

FEATURES

- TrenchFET[®] Power MOSFET
- 100 % R_G Tested



RoHS
COMPLIANT



Ordering Information: Si4420BDY-T1-E3 (Lead (Pb)-free)

N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter	Symbol	10 sec	Steady State	Unit
Drain-Source Voltage	V _{DS}	30		V
Gate-Source Voltage	V _{GS}	± 20		
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	13.5	9.5
		T _A = 70 °C	10.8	7.5
Pulsed Drain Current	I _{DM}	50		A
Continuous Source Current (Diode Conduction) ^a	I _S	2.3	1.26	
Single Pulse Avalanche Current	I _{AS}	L = 0.1 mH	20	
Avalanche Energy			E _{AS}	20
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	2.5	1.4
		T _A = 70 °C	1.6	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	R _{thJA}	t < 10 sec	40	50	°C/W
		Steady State	70	90	
Maximum Junction-to-Foot (Drain)	R _{thJF}	23	28		

Notes:

a. Surface Mounted on FR4 Board, t ≤ 10 sec.

For SPICE model information via the Worldwide Web: <http://www.vishay.com/www/product/spice.htm>.

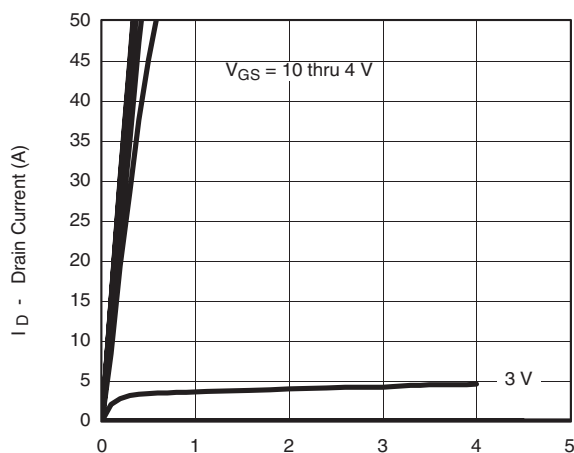
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1.0		3.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}$			1	μA
		$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55\text{ }^\circ\text{C}$			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	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 13.5\ \text{A}$		0.007	0.0085	Ω
		$V_{GS} = 4.5\ \text{V}, I_D = 11\ \text{A}$		0.009	0.0110	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\ \text{V}, I_D = 13.5\ \text{A}$		50		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 2.3\ \text{A}, V_{GS} = 0\ \text{V}$		0.75	1.1	V
Dynamic^b						
Gate Charge	Q_g	$V_{DS} = 15\ \text{V}, V_{GS} = 5\ \text{V}, I_D = 13.5\ \text{A}$		16	25	nC
Total Gate Charge	Q_{gt}	$V_{DS} = 15\ \text{V}, V_{GS} = 10\ \text{V}, I_D = 13.5\ \text{A}$		31	50	
Gate-Source Charge	Q_{gs}			6.6		
Gate-Drain Charge	Q_{gd}			4.0		
Gate Resistance	R_g		0.5	1.0	1.5	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_g = 6\ \Omega$		15	25	ns
Rise Time	t_r			11	18	
Turn-Off Delay Time	$t_{d(off)}$			40	60	
Fall Time	t_f			12	20	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 2.3\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		30	50	

Notes:

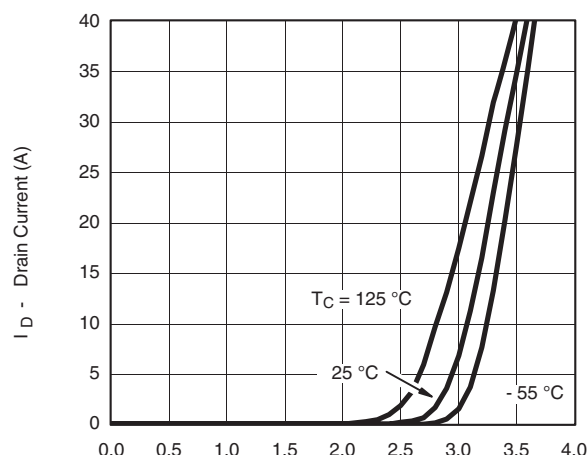
- a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

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 noted

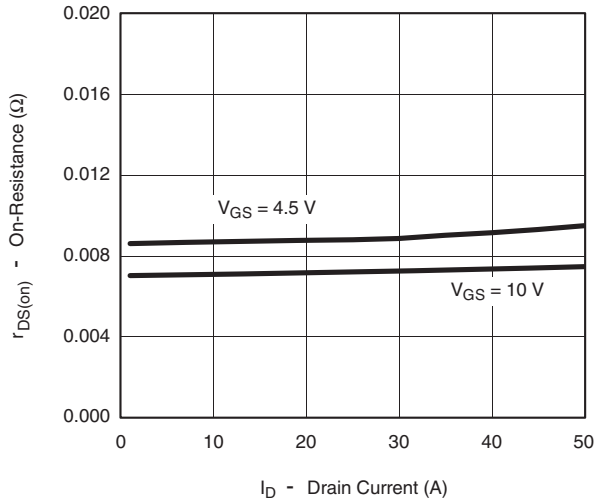


Output Characteristics

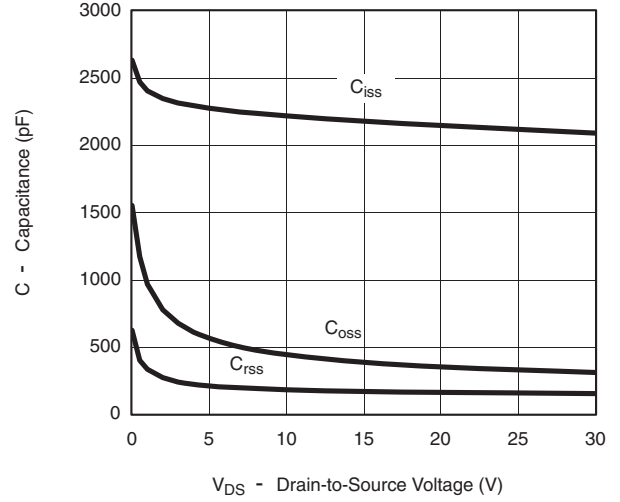


Transfer Characteristics

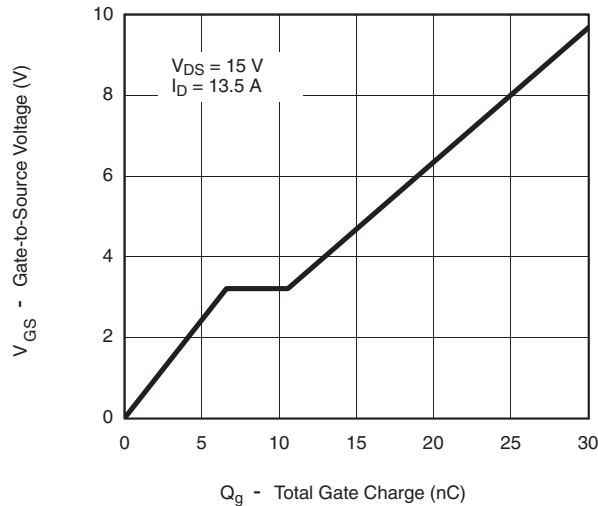
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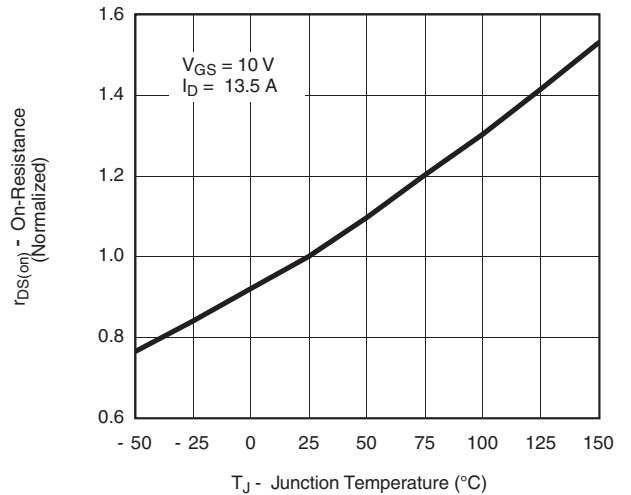
On-Resistance vs. Drain Current



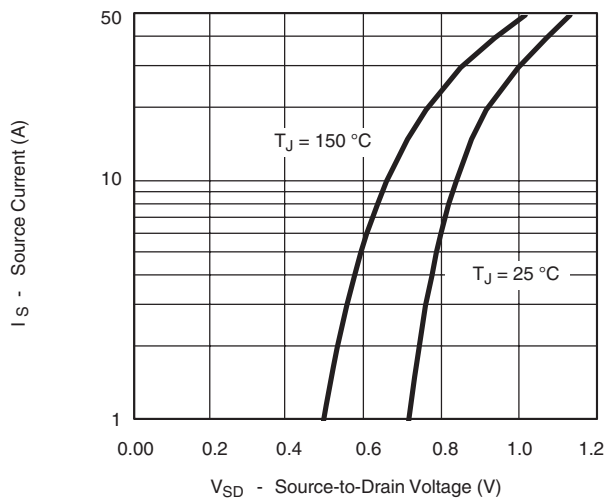
Capacitance



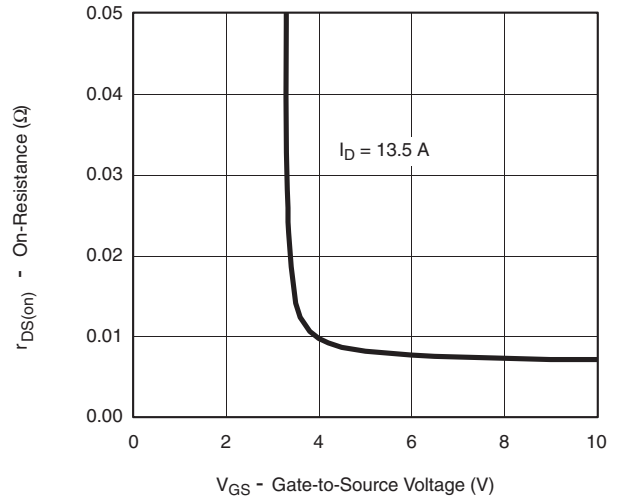
Gate Charge



On-Resistance vs. Junction Temperature

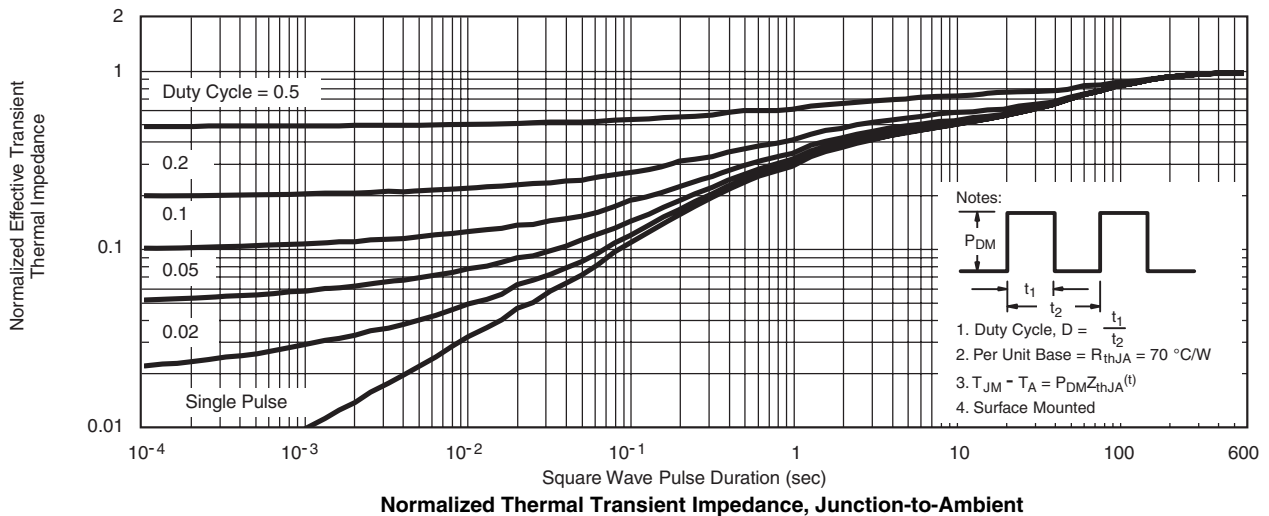
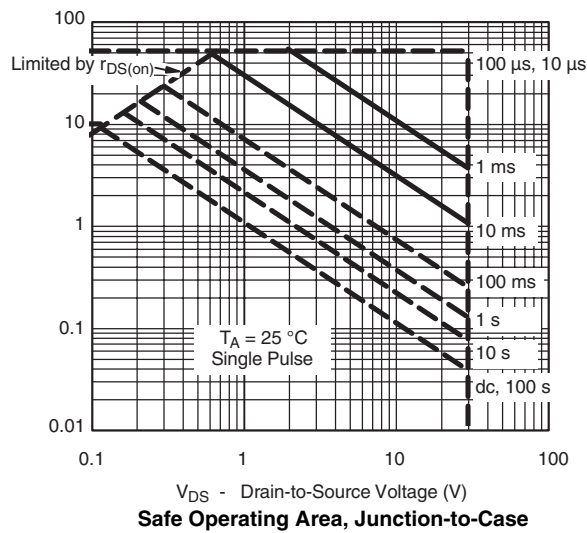
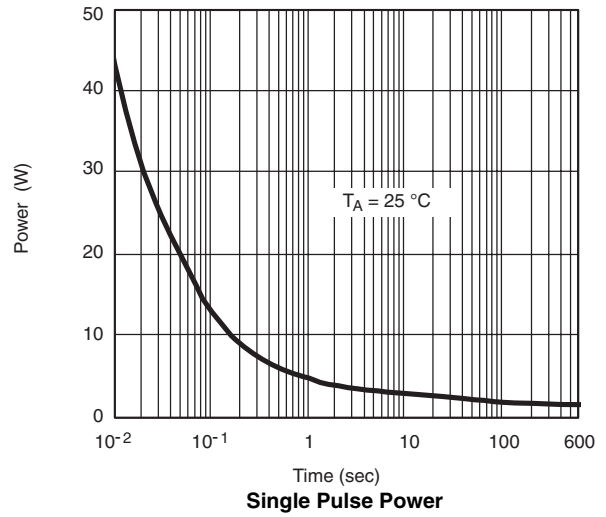
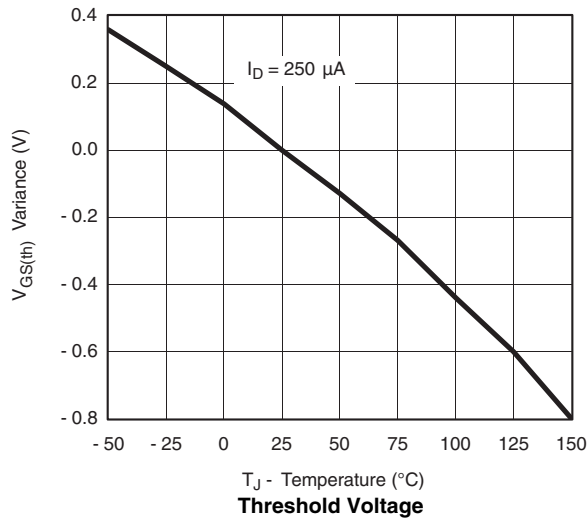


Source-Drain Diode Forward Voltage

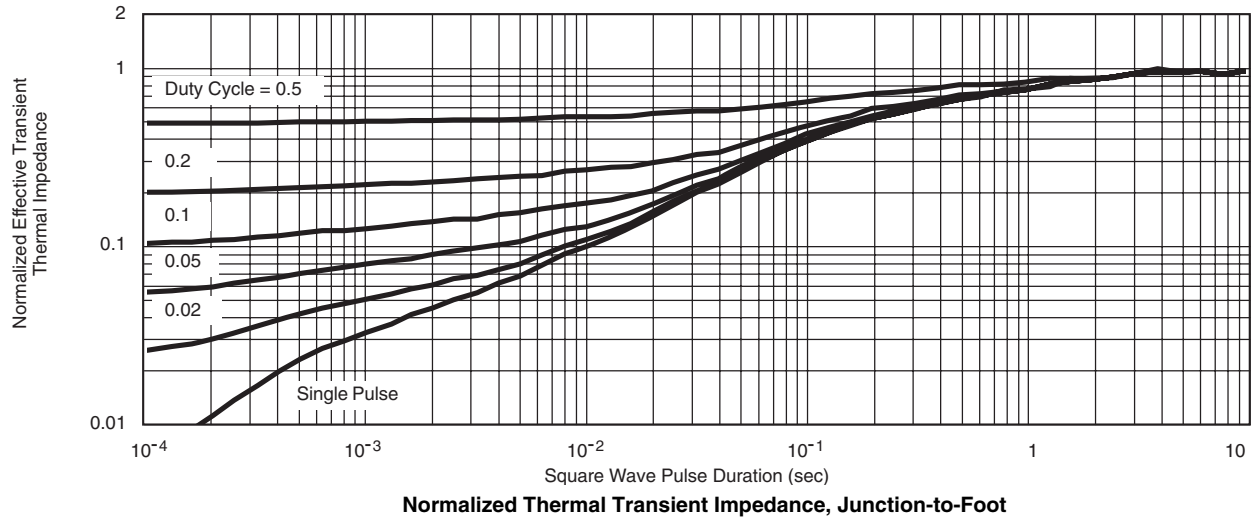


On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C unless noted



TYPICAL CHARACTERISTICS 25 °C unless noted



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