

N-Channel 150-V (D-S) WFET

PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a	Q_g (Typ)
150	0.045 at $V_{GS} = 10$ V	7.7	23 nC
	0.047 at $V_{GS} = 8$ V	7.5	

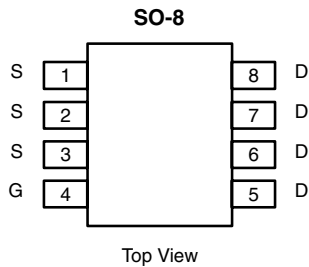
FEATURES

- Extremely Low Q_{gd} WFET[®] Technology for Switching Losses
- 100 % R_g Tested
- 100 % Avalanche Tested

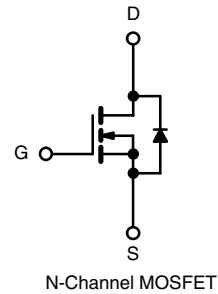


APPLICATIONS

- Primary Side Switch



Ordering Information: Si4472DY-T1-E3 (Lead (Pb)-free)



ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	$T_C = 25$ °C	I_D	7.7	A
	$T_C = 70$ °C		6.1	
	$T_A = 25$ °C		5.5 ^{b, c}	
	$T_A = 70$ °C		4.5 ^{b, c}	
Pulsed Drain Current		I_{DM}	50	
Continuous Source-Drain Diode Current	$T_C = 25$ °C	I_S	4.5	
	$T_A = 25$ °C		2.6 ^{b, c}	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	20	mJ
Single Pulse Avalanche Energy		E_{AS}	20	
Maximum Power Dissipation	$T_C = 25$ °C	P_D	5.9	W
	$T_C = 70$ °C		3.8	
	$T_A = 25$ °C		3.1 ^{b, c}	
	$T_A = 70$ °C		2 ^{b, c}	
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 ^{b, f}	$t \leq 10$ sec	R_{thJA}	33	40	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	17	21	

Notes:

- Based on $T_C = 25$ °C.
- Surface mounted on 1" x 1" FR4 board.
- $t = 10$ sec.
- Maximum under Steady State conditions is 80 °C/W.

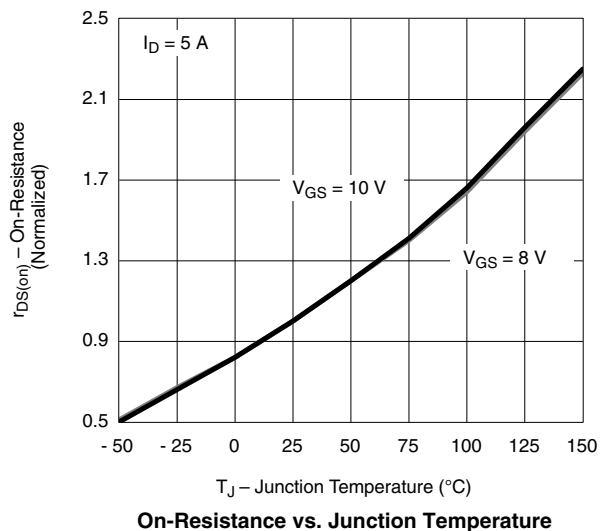
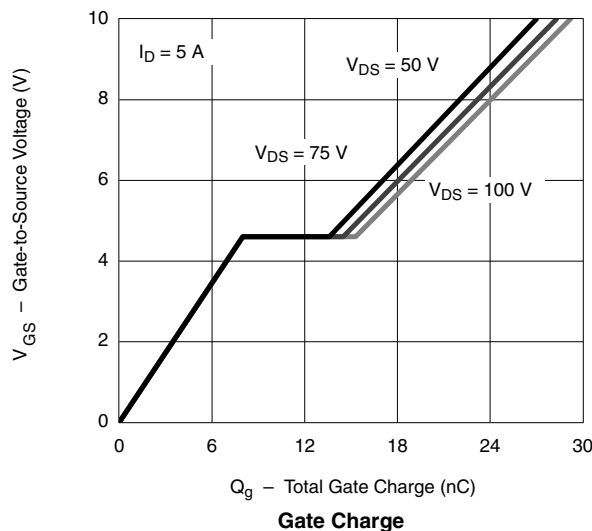
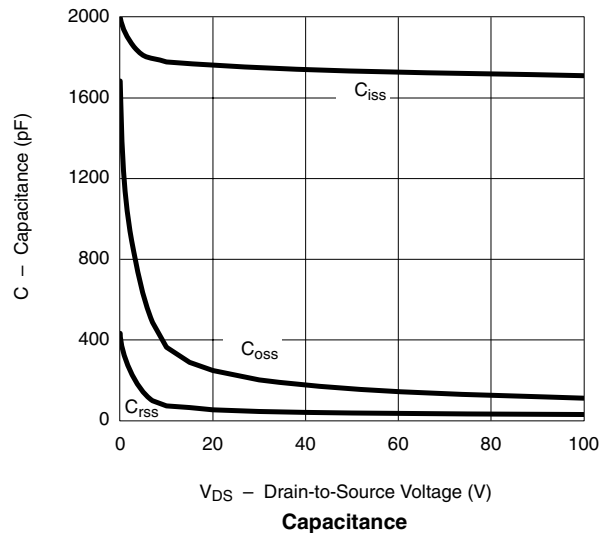
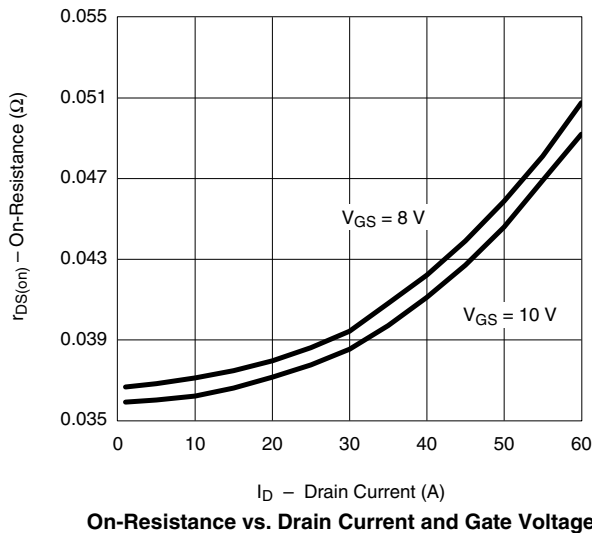
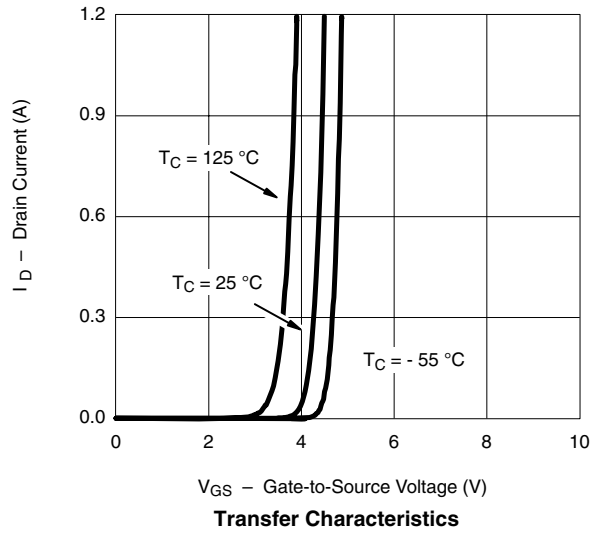
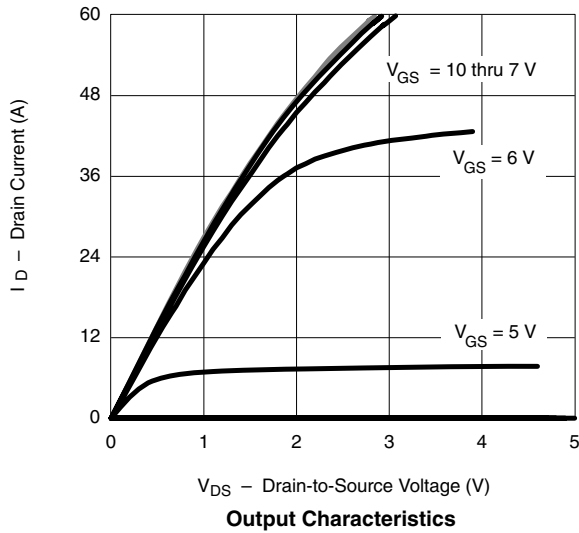
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	150			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		172		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			-10		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.5		4.5	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 150\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 150\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 10\text{ V}, V_{GS} = 10\text{ V}$	30			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 5\text{ A}$		0.036	0.045	Ω
		$V_{GS} = 8\text{ V}, I_D = 5\text{ A}$		0.0375	0.047	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 5\text{ A}$		23		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1735		μF
Output Capacitance	C_{oss}			160		
Reverse Transfer Capacitance	C_{rss}			37		
Total Gate Charge	Q_g	$V_{DS} = 75\text{ V}, V_{GS} = 10\text{ V}, I_D = 5\text{ A}$		28.5	43	nC
		$V_{DS} = 75\text{ V}, V_{GS} = 8\text{ V}, I_D = 5\text{ A}$		23	35	
Q_{gs}			8			
Q_{gd}			6.5			
Gate Resistance	R_g	$f = 1\text{ MHz}$		0.85	1.3	Ω
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 50\text{ V}, R_L = 10\text{ }\Omega$ $I_D \cong 5\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		14	21	ns
Rise Time	t_r			12	18	
Turn-Off Delay Time	$t_{d(off)}$			22	33	
Fall Time	t_f			6	10	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 50\text{ V}, R_L = 10\text{ }\Omega$ $I_D \cong 5\text{ A}, V_{GEN} = 8\text{ V}, R_g = 1\text{ }\Omega$		16	24	
Rise Time	t_r			12	18	
Turn-Off Delay Time	$t_{d(off)}$			20	30	
Fall Time	t_f			7	12	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			7.7	A
Pulse Diode Forward Current ^a	I_{SM}				50	
Body Diode Voltage	V_{SD}	$I_S = 2.6\text{ A}$		0.77	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 5\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		63	95	ns
Body Diode Reverse Recovery Charge	Q_{rr}			110	165	nC
Reverse Recovery Fall Time	t_a			49		ns
Reverse Recovery Rise Time	t_b			14		

Notes:

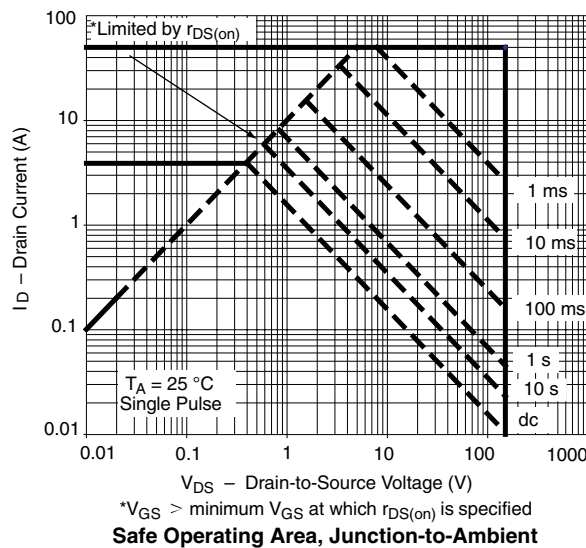
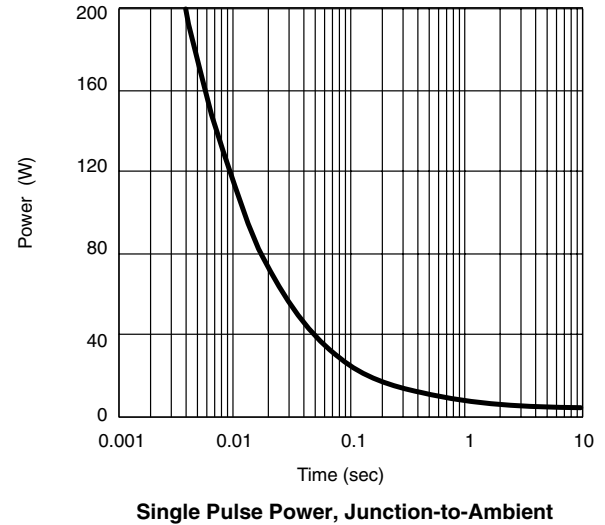
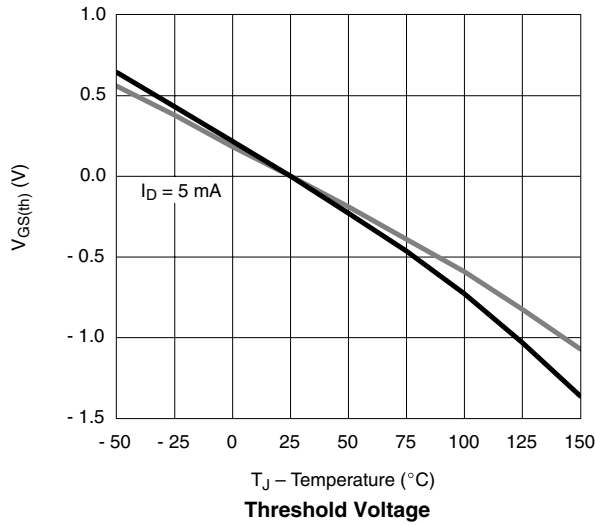
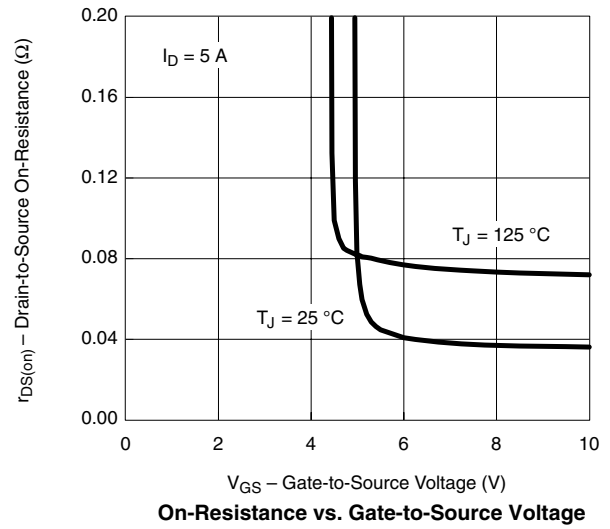
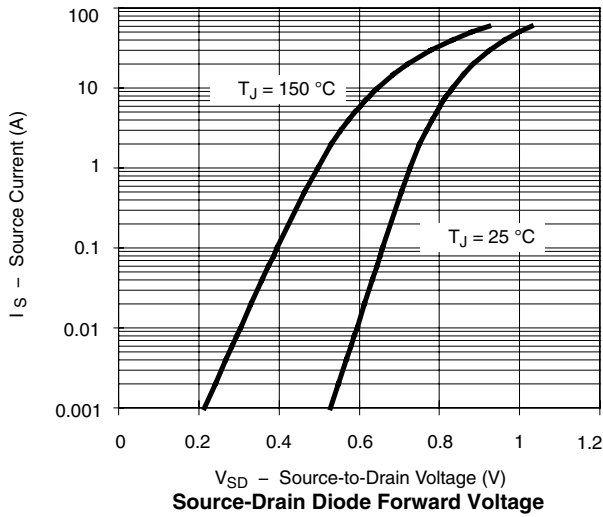
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
a. Guaranteed by design, not subject to production testing.

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.

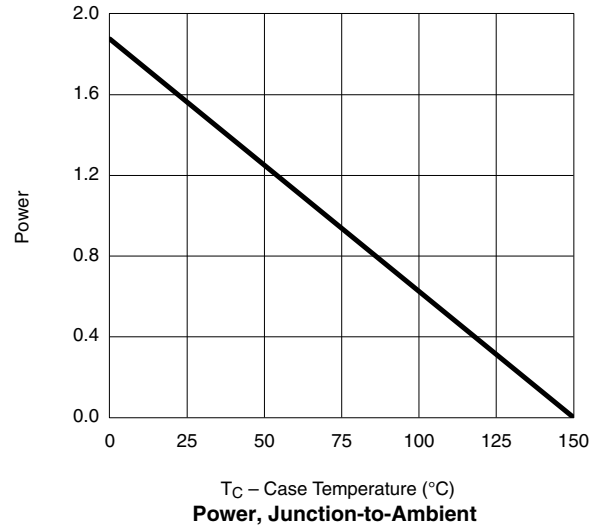
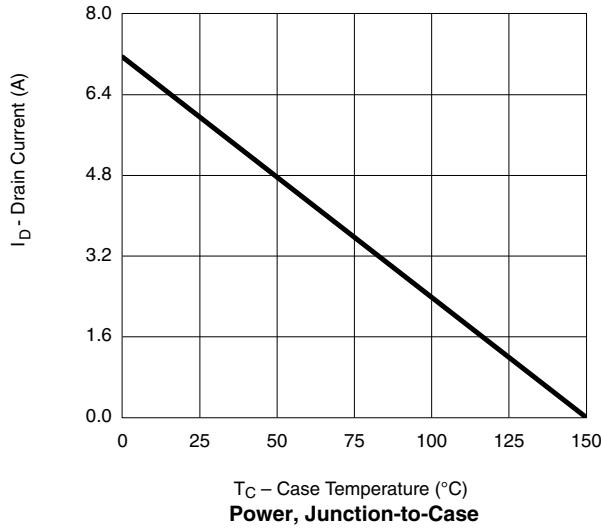
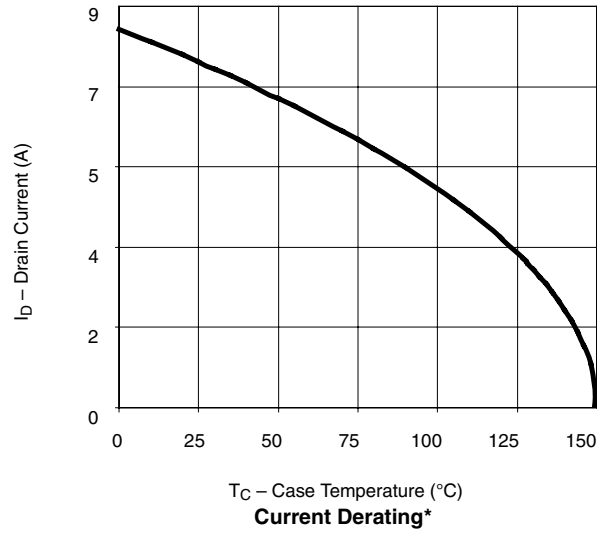
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

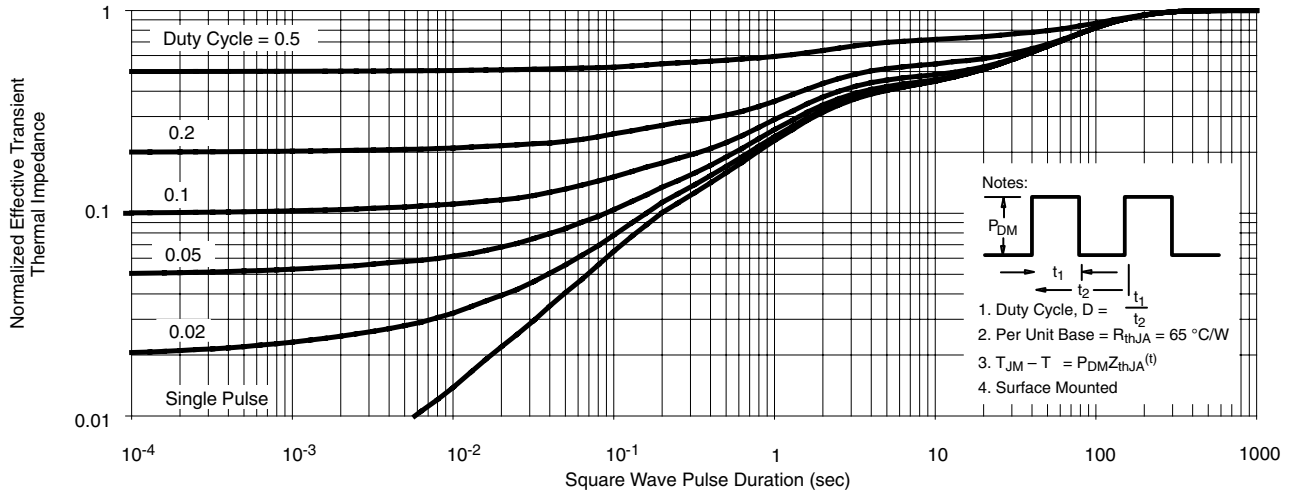


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

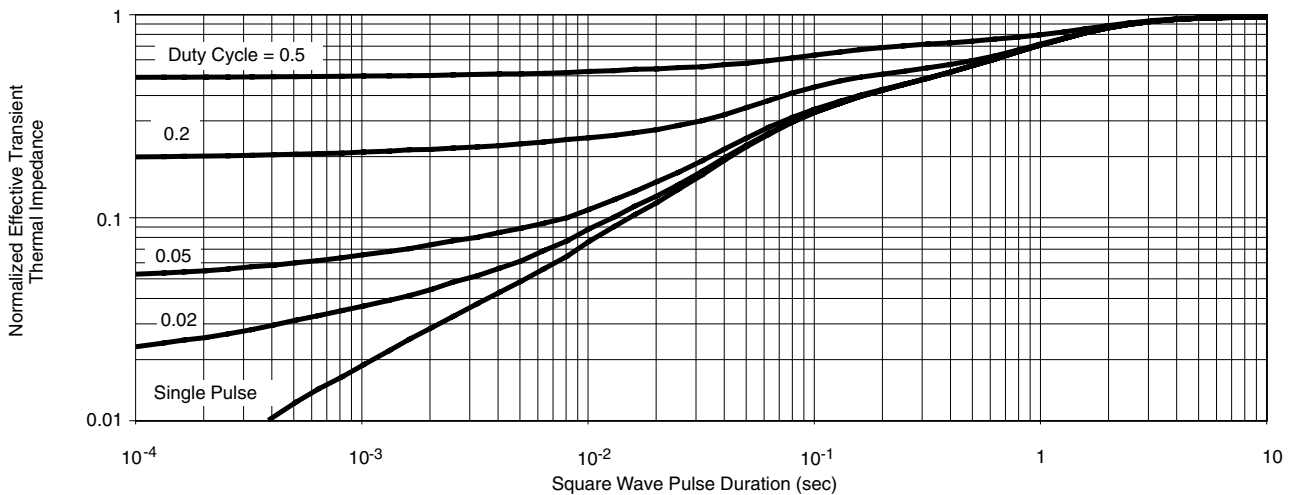


* The power dissipation P_D is based on $T_{J(max)} = 175$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg?74283>.



Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.