



New Product

Si1905BDH
Vishay Siliconix

Dual P-Channel 1.8-V (G-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
- 8	0.542 at $V_{GS} = - 4.5$ V	- 0.63	10.5 nC
	0.798 at $V_{GS} = - 2.5$ V	- 0.52	
	1.2 at $V_{GS} = - 1.8$ V	- 0.20	

FEATURES

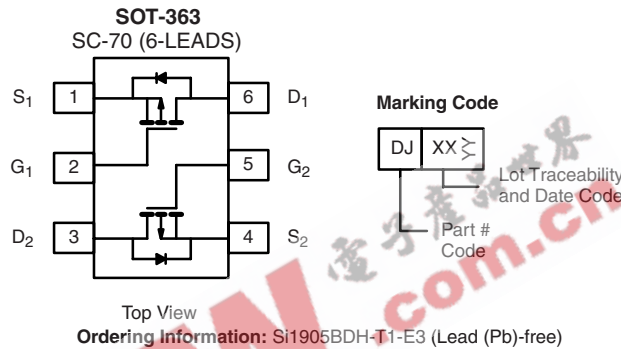
- TrenchFET[®] Power MOSFET

APPLICATIONS

- Load Switch for Portable Devices



RoHS
COMPLIANT



ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	- 8	V
Gate-Source Voltage	V_{GS}	± 8	
Continuous Drain Current ($T_J = 150$ °C) ^{a, b}	I_D	$T_C = 25$ °C	- 0.63
		$T_C = 70$ °C	- 0.50
		$T_A = 25$ °C	- 0.58 ^{a, b}
		$T_A = 70$ °C	- 0.47 ^{a, b}
Pulsed Drain Current (10 μ s Pulse Width)	I_{DM}	- 1.8	A
Continuous Source-Drain Diode Current ^{a, b}	I_S	$T_C = 25$ °C	
		$T_A = 25$ °C	- 0.25 ^{a, b}
Maximum Power Dissipation ^{a, b}	P_D	$T_C = 25$ °C	0.357
		$T_C = 70$ °C	- 0.301
		$T_A = 25$ °C	0.301 ^{a, b}
		$T_A = 70$ °C	0.95 ^{a, b}
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature) ^{c, d}		260	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, c}	$t \leq 5$ s	R_{thJA}	360	415	°C/W
	Steady State		400	460	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	300	350	

Notes:

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

b. $t = 5$ s.

c. Maximum under Steady State conditions is 400 °C/W.

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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}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 8			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		7.15		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 1.66		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 0.45		- 1.0	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = -8\text{ V}$			- 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -8\text{ V}, V_{GS} = 0\text{ V}$			- 1	μA
		$V_{DS} = -8\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			- 10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq 5\text{ V}, V_{GS} = -4.5\text{ V}$	- 1.8			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -0.58\text{ A}$		0.450	0.542	Ω
		$V_{GS} = -2.5\text{ V}, I_D = -0.47\text{ A}$		0.655	0.798	
		$V_{GS} = -1.8\text{ V}, I_D = -0.2\text{ A}$		0.950	1.2	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -4\text{ V}, I_D = -0.58\text{ A}$		1.2		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -4\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		62		pF
Output Capacitance	C_{oss}			30		
Reverse Transfer Capacitance	C_{rss}			12		
Total Gate Charge	Q_g	$V_{DS} = -4\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -0.58\text{ A}$		1.0	1.5	nC
Gate-Source Charge	Q_{gs}			0.19		
Gate-Drain Charge	Q_{gd}			0.20		
Gate Resistance	R_g	$f = 1\text{ MHz}$		6.3		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -4\text{ V}, R_L = 8.7\text{ }\Omega$ $I_D \cong -0.46\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		9	14	ns
Rise Time	t_r			40	60	
Turn-Off Delay Time	$t_{d(off)}$			50	75	
Fall Time	t_f			60	90	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			- 0.30	A
Pulse Diode Forward Current	I_{SM}				- 1.8	
Body Diode Voltage	V_{SD}	$I_S = -1.4\text{ A}, V_{GS} = 0\text{ V}$		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -1.4\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		25	38	ns
Body Diode Reverse Recovery Charge	Q_{rr}			7	11	nC
Reverse Recovery Fall Time	t_a			9		ns
Reverse Recovery Rise Time	t_b			16		

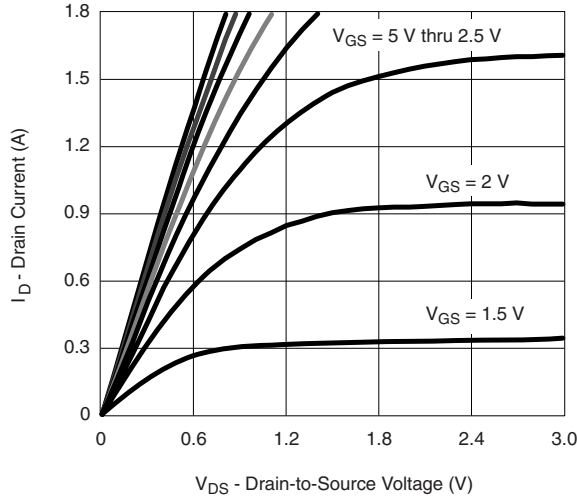
Notes:

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

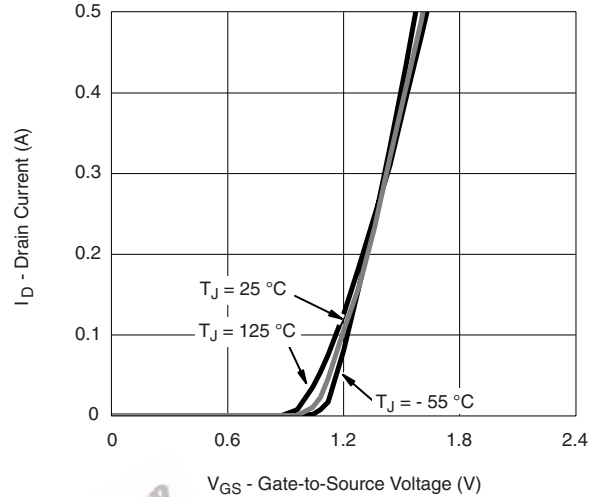
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



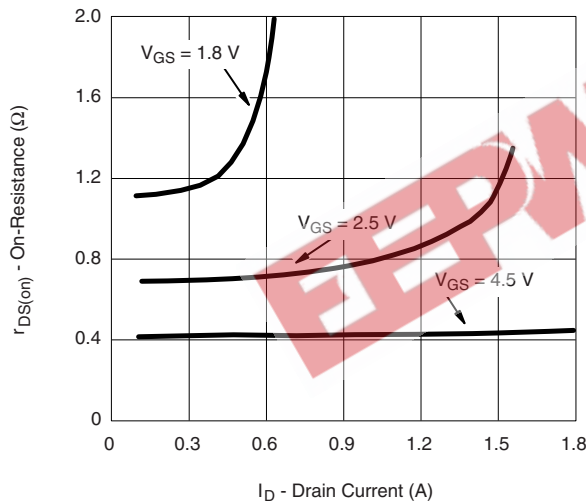
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



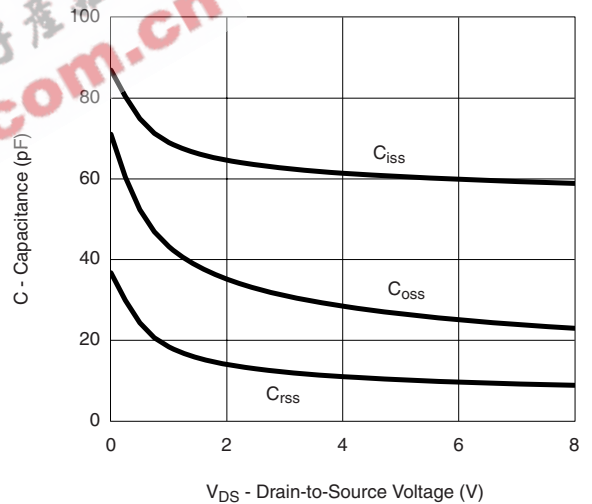
Output Characteristics



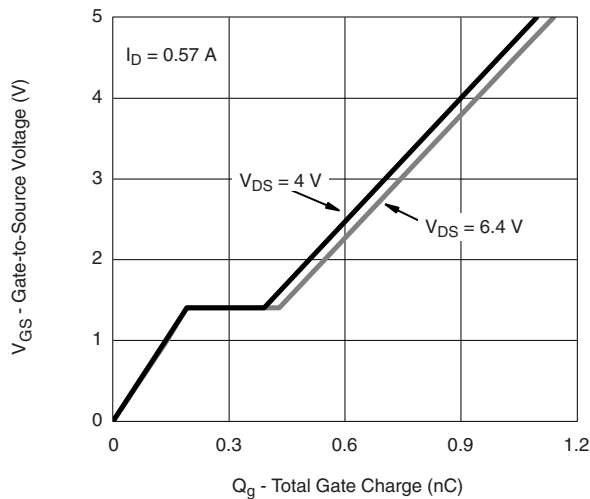
Transfer Characteristics



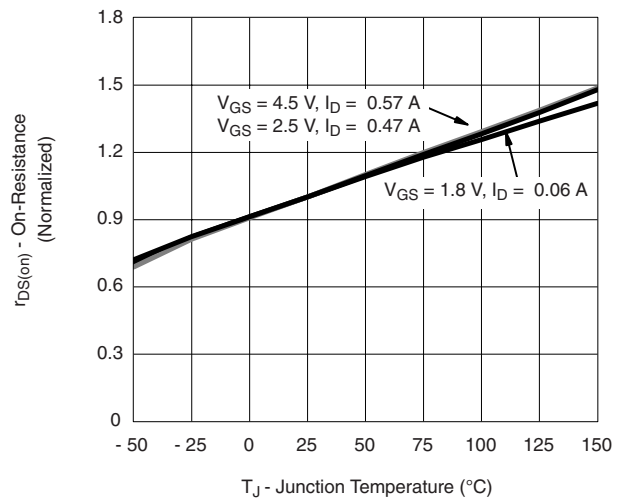
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



Gate Charge



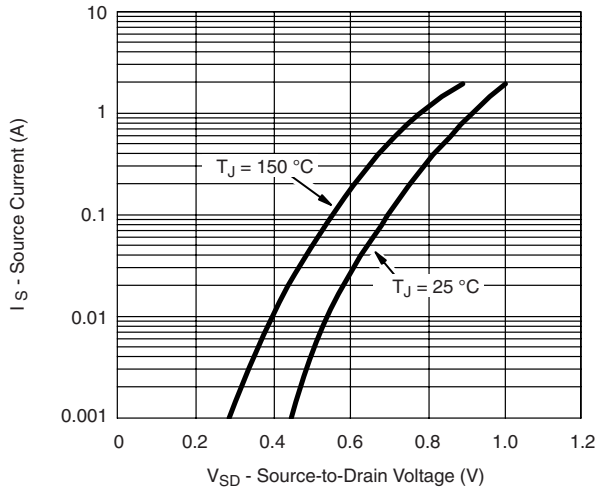
On-Resistance vs. Junction Temperature



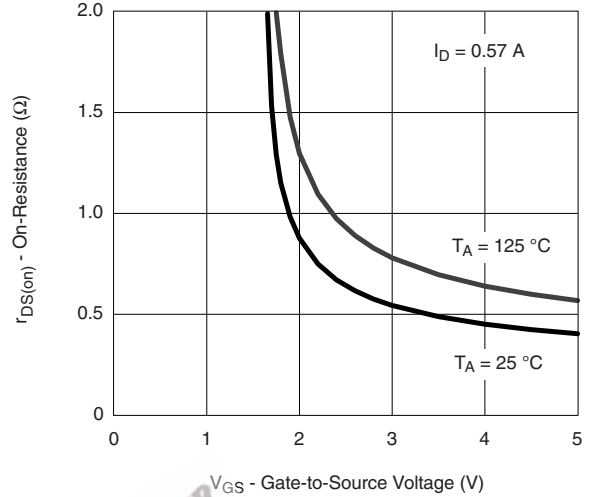
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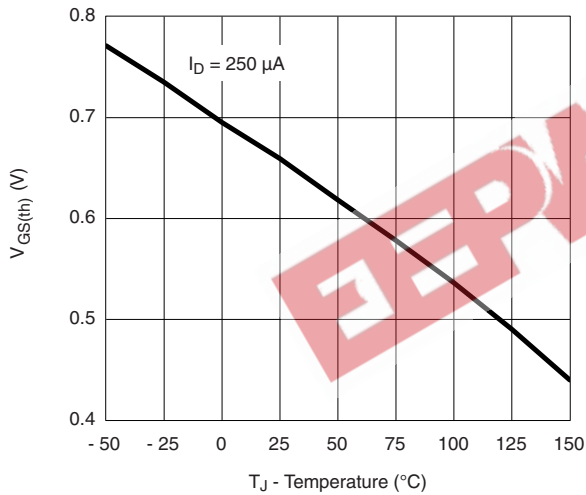
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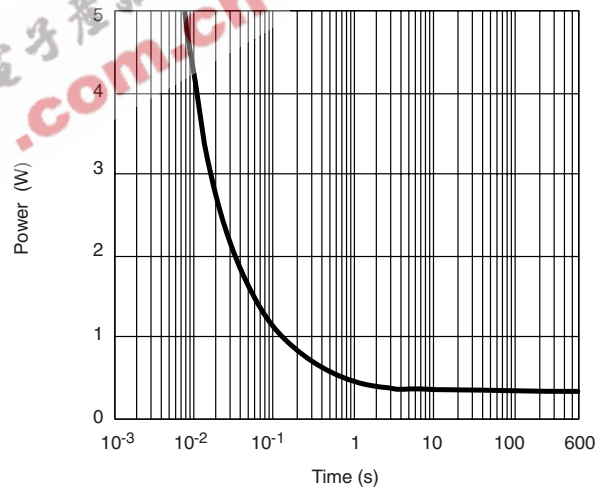
Source-Drain Diode Forward Voltage



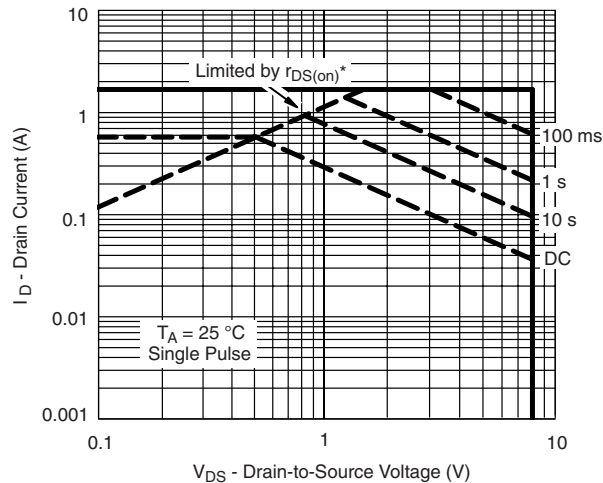
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient



* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified

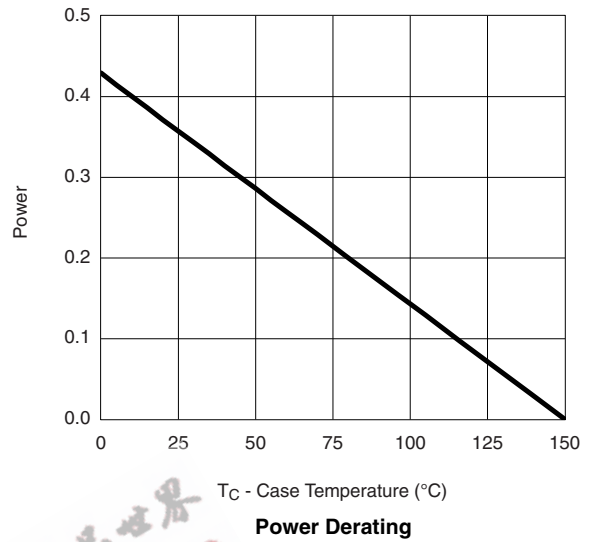
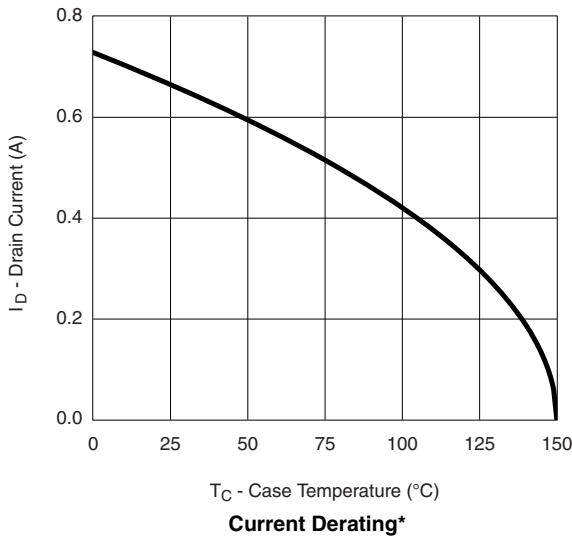
Safe Operating Area, Junction-to-Ambient



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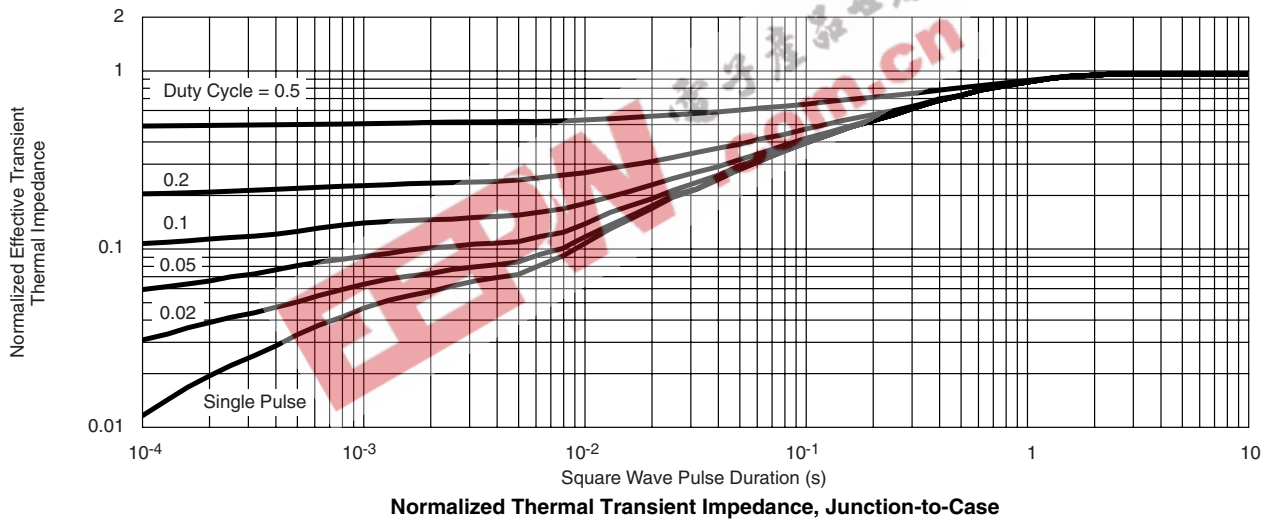
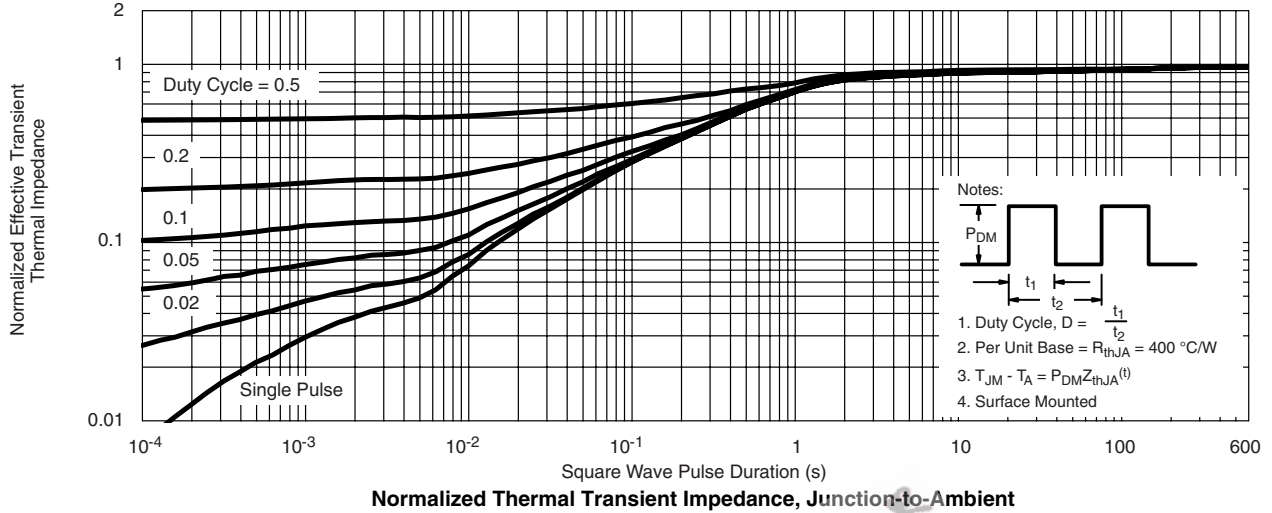
* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



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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?74638>.



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