

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

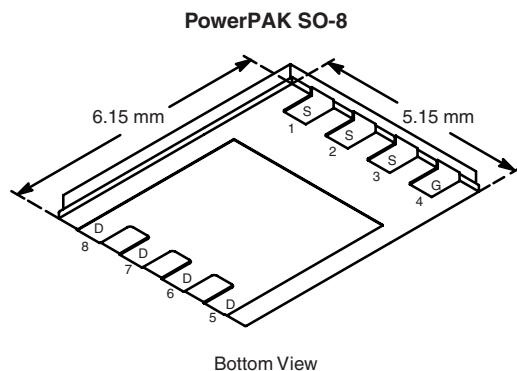
PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^{e,f}	Q_g (Typ.)
- 30	0.0100 at $V_{GS} = - 10$ V	- 35	24.6 nC
	0.0186 at $V_{GS} = - 4.5$ V	- 35	

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- Low Thermal Resistance PowerPAK[®] Package with Small Size and Low 1.07 mm Profile
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE

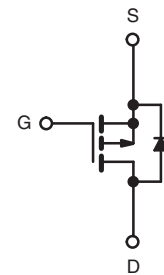


Bottom View

Ordering Information: Si7143DP-T1-GE3 (Lead (Pb)-free and Halogen-free)

APPLICATIONS

- Load Switch
- Adaptor Switch
- Notebook PC



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	- 30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	$T_C = 25$ °C	I_D	- 35 ^e	A
	$T_C = 70$ °C		- 35 ^e	
	$T_A = 25$ °C		- 16.1 ^{a, b}	
	$T_A = 70$ °C		- 12.9 ^{a, b}	
Pulsed Drain Current		I_{DM}	- 60	
Continuous Source-Drain Diode Current	$T_C = 25$ °C	I_S	- 30	
	$T_A = 25$ °C		- 3.5 ^{a, b}	
Avalanche Current	L = 0.1 mH	I_{AS}	- 25	
Single-Pulse Avalanche Energy		E_{AS}	31.25	mJ
Maximum Power Dissipation	$T_C = 25$ °C	P_D	35.7	W
	$T_C = 70$ °C		22.8	
	$T_A = 25$ °C		4.2 ^{a, b}	
	$T_A = 70$ °C		2.7 ^{a, b}	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 50 to 150	°C
Soldering Recommendations (Peak Temperature) ^{c, d}			260	

Notes:

- Surface mounted on 1" x 1" FR4 board.
- $t = 10$ s.
- See solder profile (www.vishay.com/ppg?73257). The PowerPAK 1212-8 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
- Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.
- Package limited.
- Based on $T_C = 25$ °C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, b}	$t \leq 10$ s	R_{thJA}	25	30	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	2.9	3.5	

Notes:

- a. Surface mounted on 1" x 1" FR4 board.
 b. Maximum under steady state conditions is 70 °C/W.

SPECIFICATIONS $T_J = 25$ °C, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0$ V, $I_D = -250$ μ A	- 30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250$ μ A		- 20		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		5			
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250$ μ A	- 1.2		- 2.8	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30$ V, $V_{GS} = 0$ V			- 1	μ A
		$V_{DS} = -30$ V, $V_{GS} = 0$ V, $T_J = 55$ °C			- 10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5$ V, $V_{GS} = -10$ V	- 20			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10$ V, $I_D = -16.1$ A		0.0083	0.0100	Ω
		$V_{GS} = -4.5$ V, $I_D = 11.8$ A		0.0155	0.0186	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15$ V, $I_D = -16.1$ A		37		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -15$ V, $V_{GS} = 0$ V, $f = 1$ MHz		2230		pF
Output Capacitance	C_{oss}		385			
Reverse Transfer Capacitance	C_{rss}		322			
Total Gate Charge	Q_g	$V_{DS} = -15$ V, $V_{GS} = -10$ V, $I_D = -14.4$ A		47.5	71	nC
				24.6	37	
Gate-Source Charge	Q_{gs}	$V_{DS} = -15$ V, $V_{GS} = -4.5$ V, $I_D = -14.4$ A		7.7		
Gate-Drain Charge	Q_{gd}			12		
Gate Resistance	R_g	$f = 1$ MHz	0.3	1.5	3.0	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15$ V, $R_L = 1.5$ Ω $I_D \cong -10$ A, $V_{GEN} = -4.5$ V, $R_g = 1$ Ω		50	75	ns
Rise Time	t_r			43	65	
Turn-Off Delay Time	$t_{d(off)}$			30	45	
Fall Time	t_f			14	21	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15$ V, $R_L = 1.5$ Ω $I_D \cong -10$ A, $V_{GEN} = -10$ V, $R_g = 1$ Ω		14	21	
Rise Time	t_r			9	18	
Turn-Off Delay Time	$t_{d(off)}$			36	54	
Fall Time	t_f			10	20	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C			- 30	A
Pulse Diode Forward Current ^a	I_{SM}				- 60	
Body Diode Voltage	V_{SD}	$I_F = -10$ A		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -10$ A, $di/dt = 100$ A/ μ s, $T_J = 25$ °C		31	47	ns
Body Diode Reverse Recovery Charge	Q_{rr}			30	45	nC
Reverse Recovery Fall Time	t_a			15		ns
Reverse Recovery Rise Time	t_b			16		

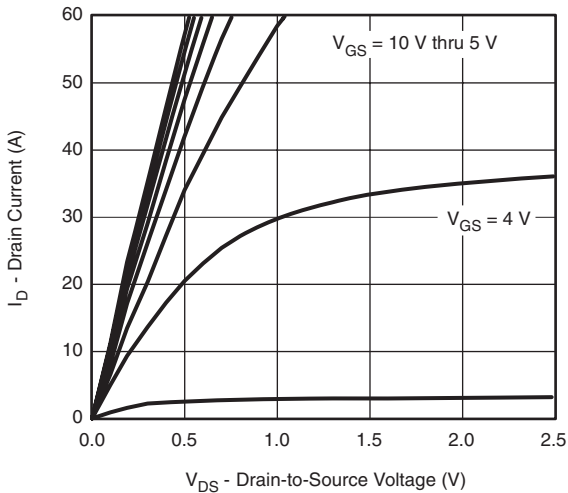
Notes:

- a. Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %.
 b. Guaranteed by design, not subject to production testing.

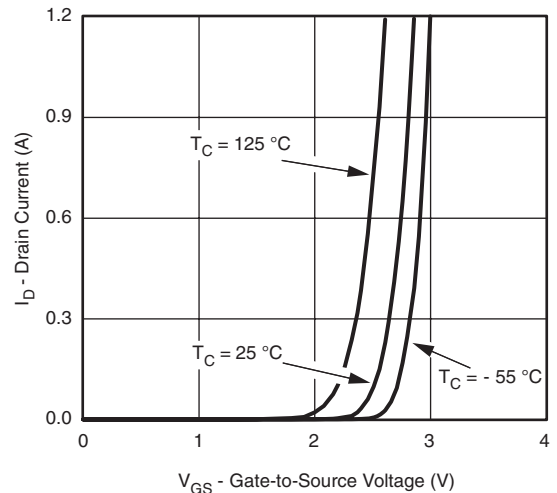
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



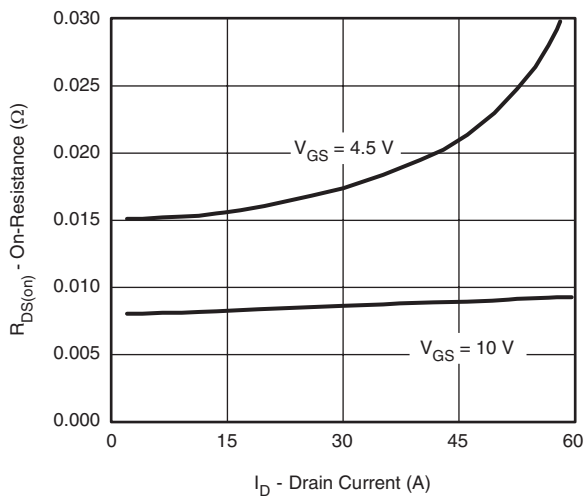
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



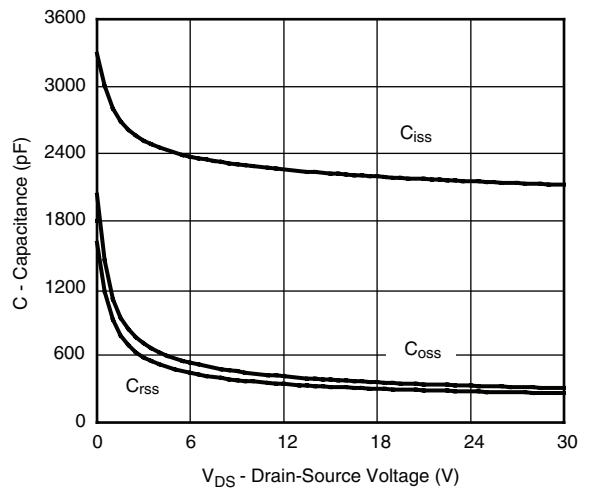
Output Characteristics



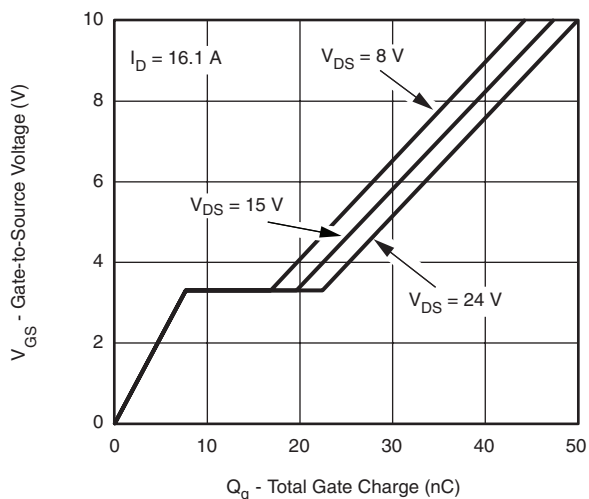
Transfer Characteristics



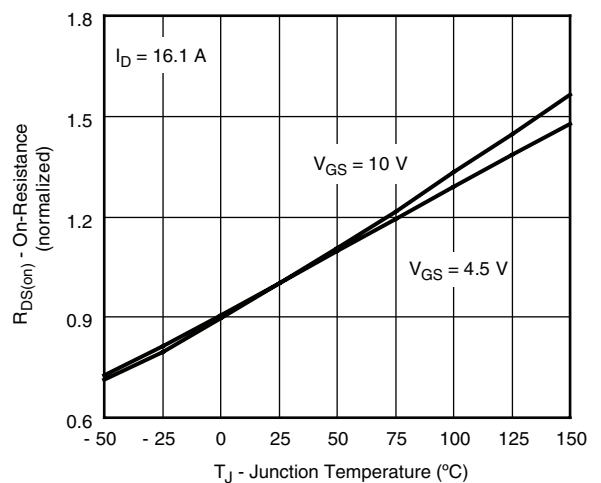
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



Gate Charge



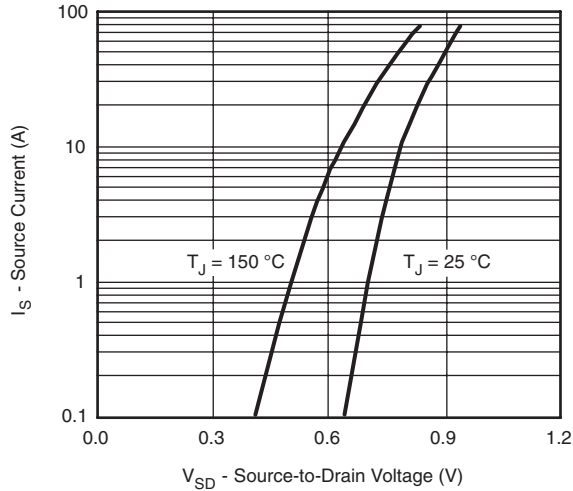
On-Resistance vs. Junction Temperature

Si7143DP

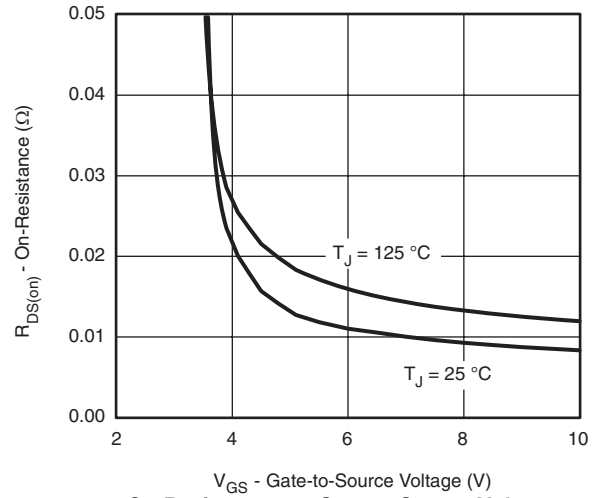
Vishay Siliconix



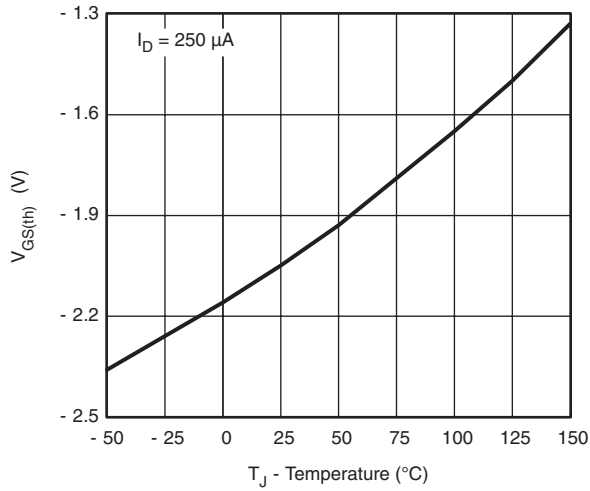
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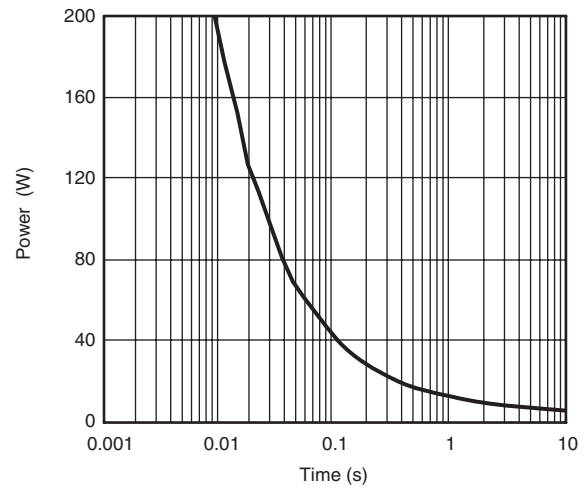
Source-Drain Diode Forward Voltage



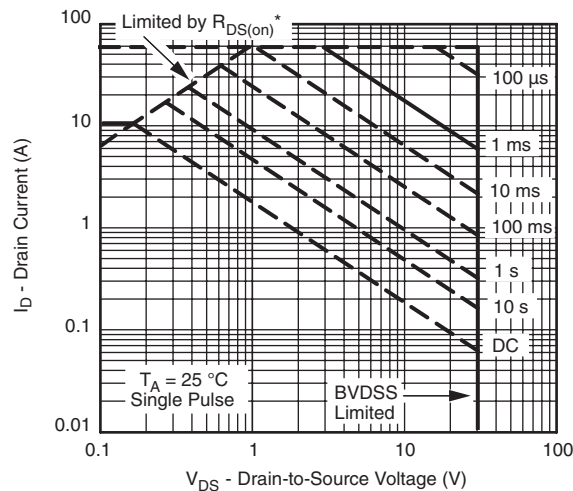
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient

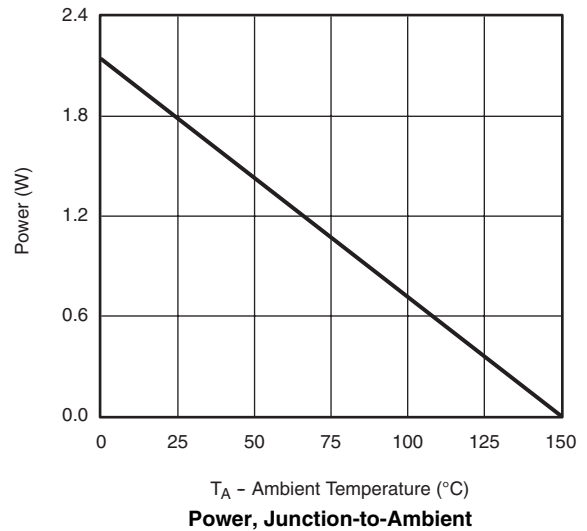
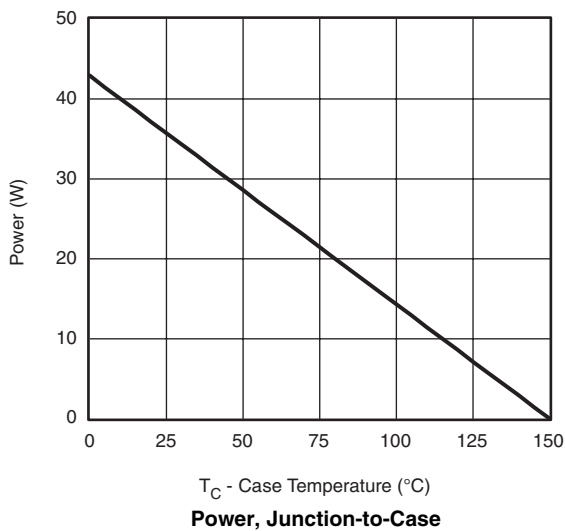
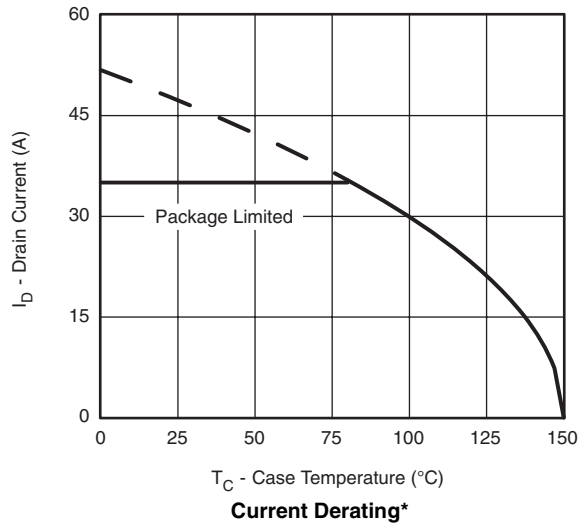


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

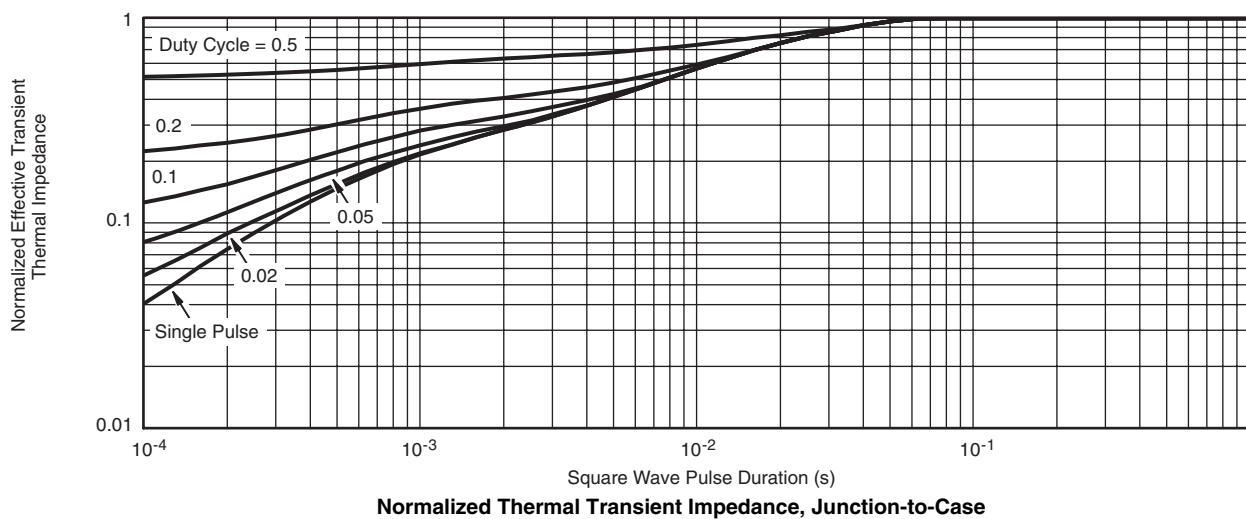
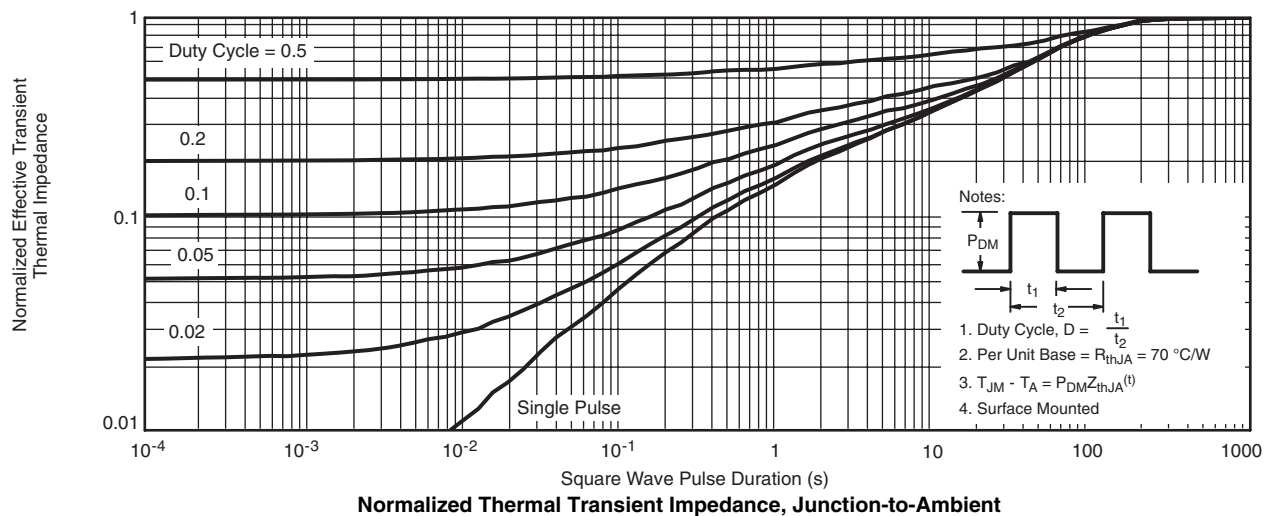


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



* 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.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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