

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	0.0114 at V _{GS} = - 10 V	- 35	24.6 nC
	0.0200 at V _{GS} = - 4.5 V	- 35	

FEATURES

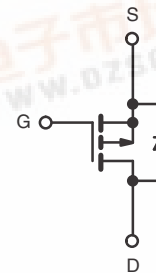
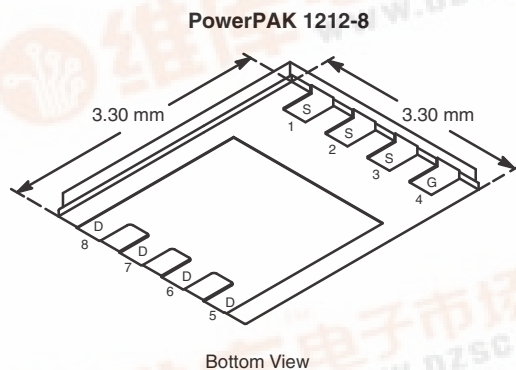
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- Low Thermal Resistance PowerPAK[®] Package with Small Size and Low 1.07 mm Profile
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Load Switch
- Adaptor Switch
- Notebook PC



Ordering Information: Si7129DN-T1-GE3 (Lead (Pb)-free and Halogen-free)

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)	I _D	T _C = 25 °C	- 35 ^e	A
		T _C = 70 °C	- 35 ^e	
		T _A = 25 °C	- 14.4 ^{a, b}	
		T _A = 70 °C	- 11.5 ^{a, b}	
Pulsed Drain Current	I _{DM}	- 60		
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	- 35 ^e	
		T _A = 25 °C	- 3.2 ^{a, b}	
Avalanche Current	I _{AS}	- 25		
Single-Pulse Avalanche Energy	E _{AS}	31.25	mJ	
Maximum Power Dissipation	P _D	T _C = 25 °C	52.1	W
		T _C = 70 °C	3.3	
		T _A = 25 °C	3.8 ^{a, b}	
		T _A = 70 °C	2.4 ^{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

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THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, b}	$t \leq 10$ s	R_{thJA}	26	33	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	1.9	2.4	

Notes:

- a. Surface mounted on 1" x 1" FR4 board.
b. Maximum under Steady State conditions is 81 °C/W.

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

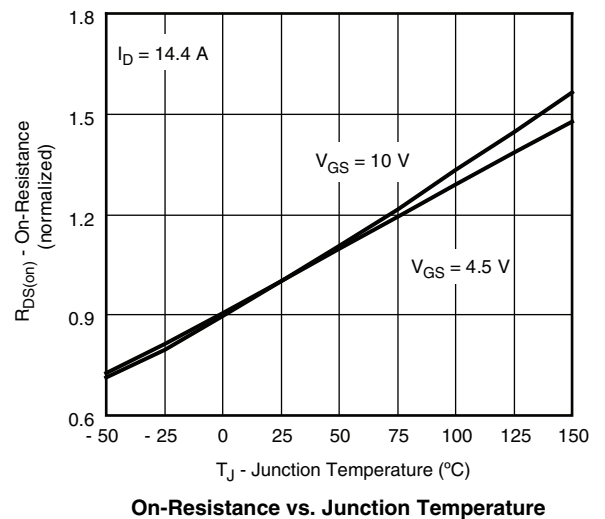
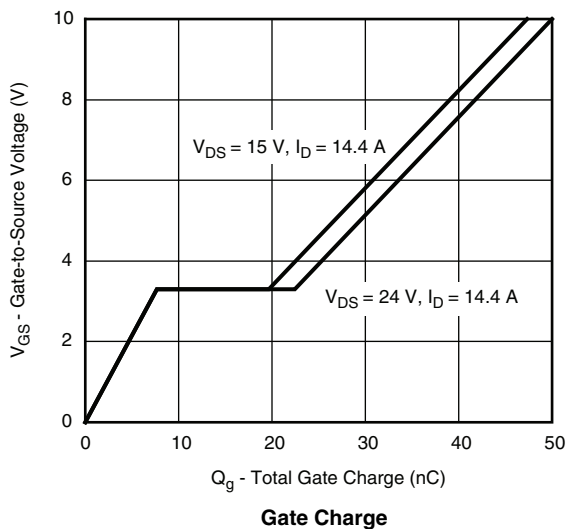
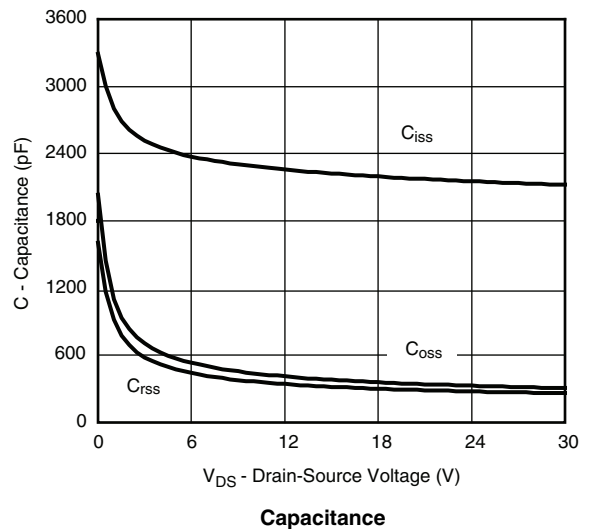
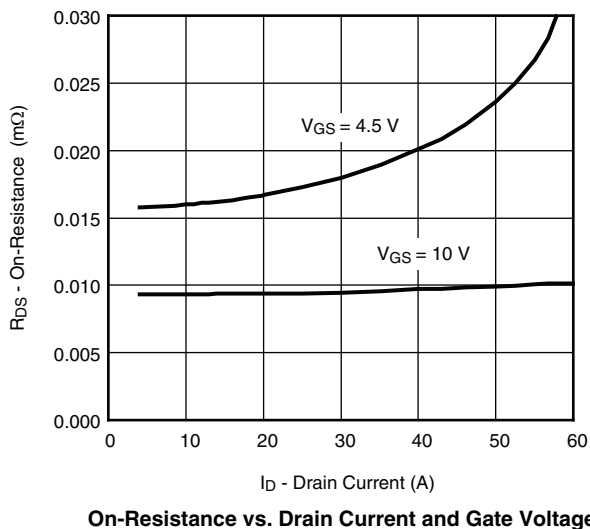
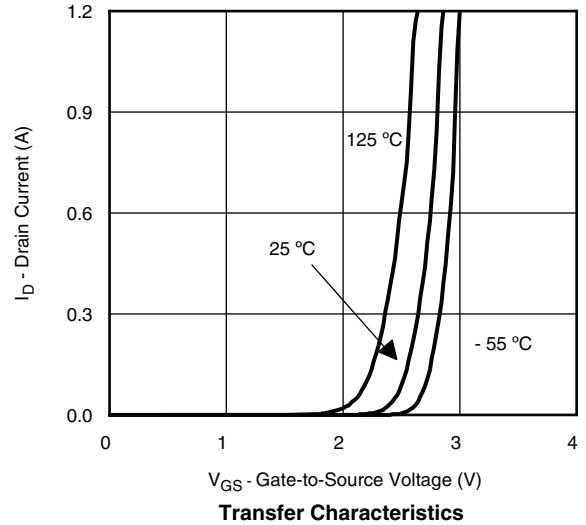
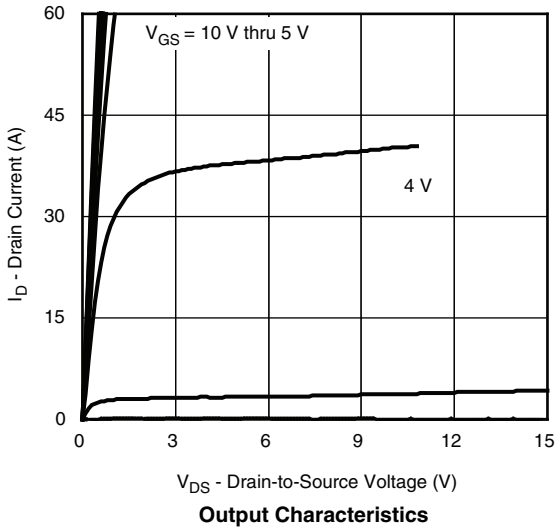
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0$ V, $I_D = -250$ μ A	-30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250$ μ A		-20		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		5			
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250$ μ A	-1.5		-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, $I_D = -14.4$ A		0.0095	0.0114	Ω
		$V_{GS} = -4.5$ V, $I_D = -11.5$ A		0.0160	0.0200	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15$ V, $I_D = -14.4$ A		37		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -15$ V, $V_{GS} = 0$ V, $f = 1$ MHz		2230	3345	pF
Output Capacitance	C_{oss}		385	578		
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		nC
Gate-Drain Charge	Q_{gd}		12			
Gate Resistance	R_g		$f = 1$ MHz	0.4	1.8	
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	ns
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			-35 ^e	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)

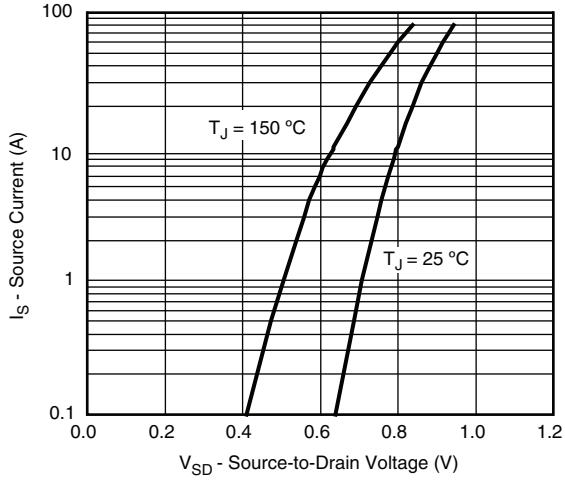


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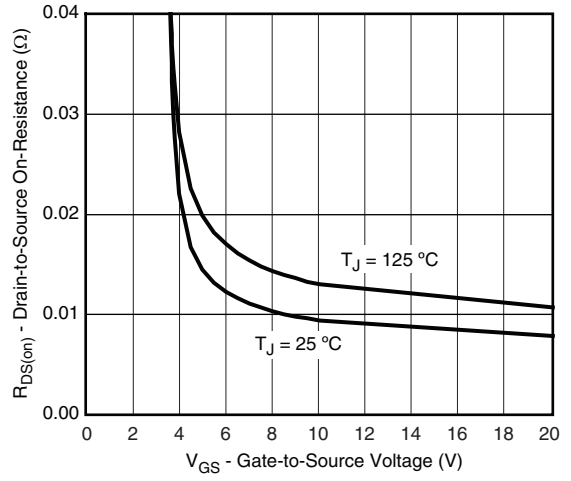


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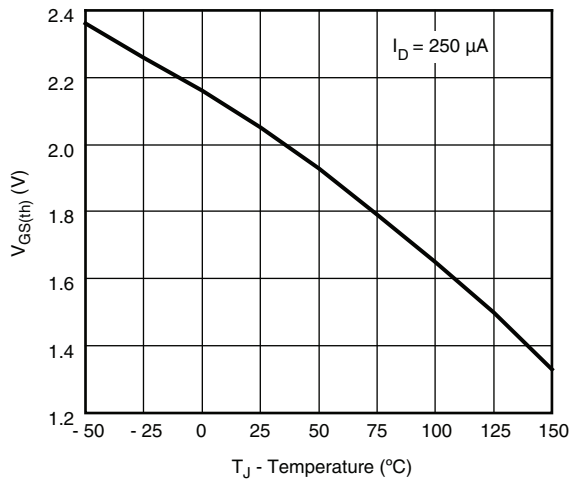
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



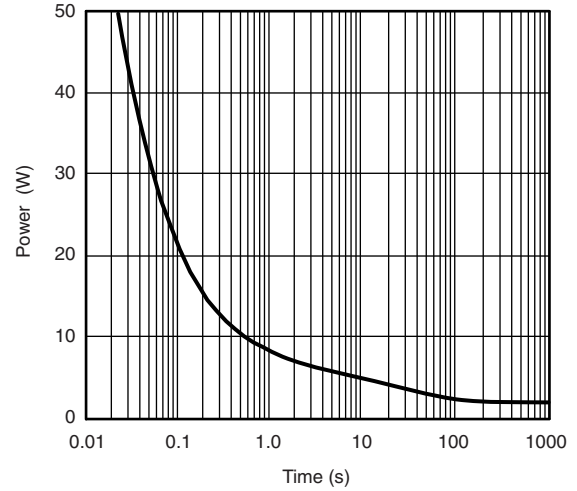
Source-Drain Diode Forward Voltage



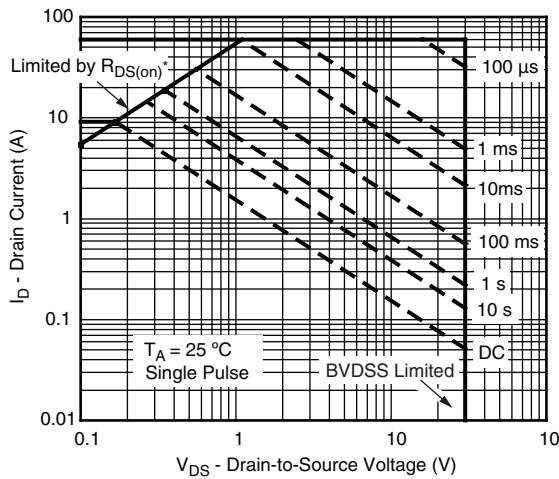
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

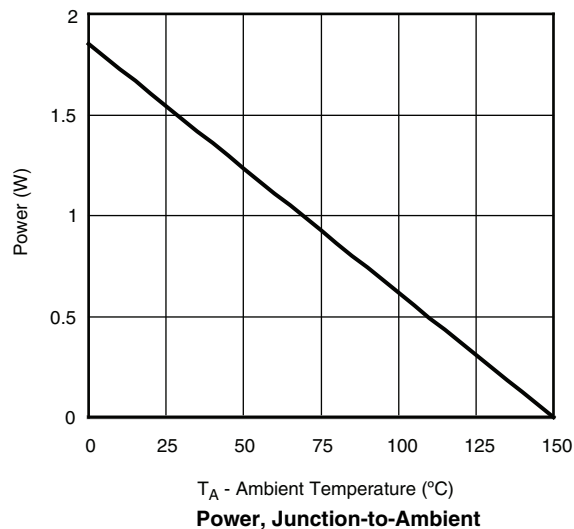
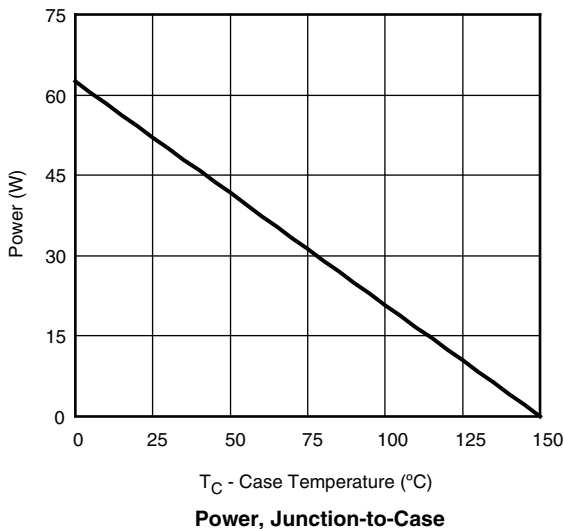
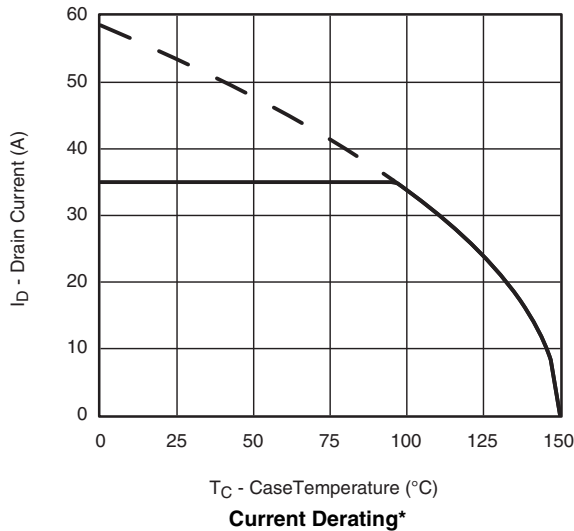


Single Pulse Power, Junction-to-Ambient



Safe Operating Area, Junction-to-Ambient

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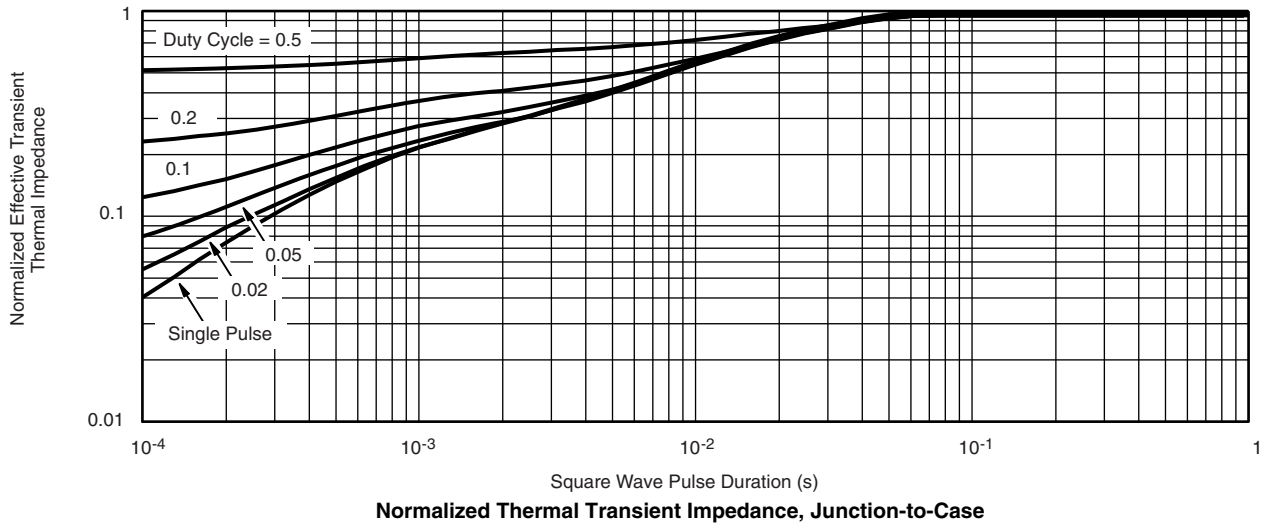
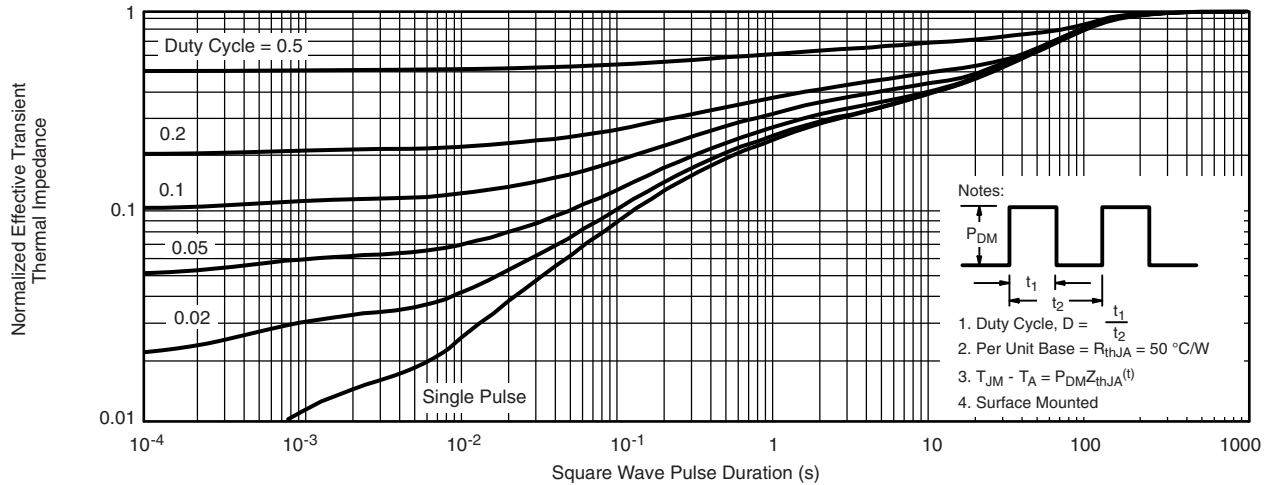
* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper power limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

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TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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