

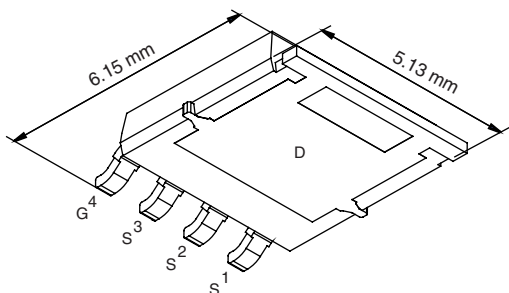


N-Channel 20 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^{a, g}	Q_g (Typ.)
20	0.0026 at $V_{GS} = 10$ V	50	28.7 nC
	0.0032 at $V_{GS} = 4.5$ V	50	

PowerPAK® SO-8L Single



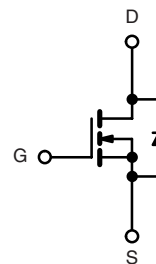
FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC


 RoHS
 COMPLIANT
 HALOGEN
 FREE

APPLICATIONS

- POL
- OR-ing
- DC/DC



N-Channel MOSFET

Ordering Information: SiJ420DP-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$)	$T_C = 25\text{ }^{\circ}\text{C}$	I_D	50 ^g	A
	$T_C = 70\text{ }^{\circ}\text{C}$		50 ^g	
	$T_A = 25\text{ }^{\circ}\text{C}$		32 ^{b, c}	
	$T_A = 70\text{ }^{\circ}\text{C}$		25.3 ^{b, c}	
Pulsed Drain Current		I_{DM}	80	
Continuous Source-Drain Diode Current	$T_C = 25\text{ }^{\circ}\text{C}$	I_S	50 ^g	
	$T_A = 25\text{ }^{\circ}\text{C}$		4.3 ^{b, c}	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	30	
Single Pulse Avalanche Energy		E_{AS}	45	mJ
Maximum Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	P_D	62.5	W
	$T_C = 70\text{ }^{\circ}\text{C}$		40	
	$T_A = 25\text{ }^{\circ}\text{C}$		4.8 ^{b, c}	
	$T_A = 70\text{ }^{\circ}\text{C}$		3.0 ^{b, c}	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	$^{\circ}\text{C}$
Soldering Recommendations (Peak Temperature) ^{d, e}			260	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, f}	R_{thJA}	22	26	$^\circ\text{C/W}$
Maximum Junction-to-Case (Drain)	R_{thJC}	1.4	2.0	

Notes:

 a. Based on $T_C = 25^\circ\text{C}$.

b. Surface mounted on 1" x 1" FR4 board.

 c. $t = 10$ s.

 d. See solder profile (www.vishay.com/ppg?73257). The PowerPAK SO-8L 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.

e. Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.

 f. Maximum under steady state conditions is 65°C/W .

g. Package limited.

SiJ420DP

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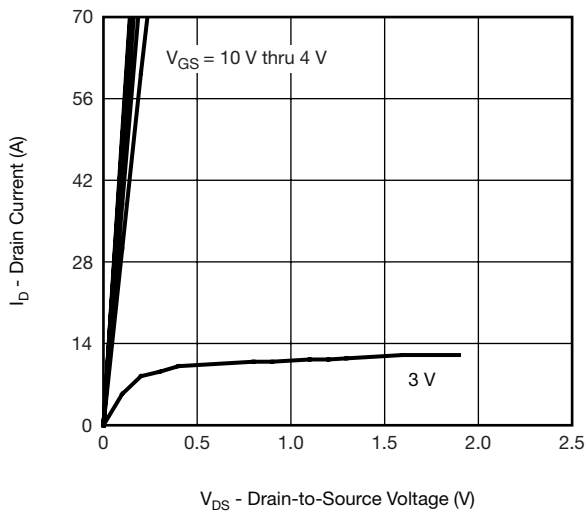
SPECIFICATIONS T _J = 25 °C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	20			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		20		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 6.7		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.2		2.4	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			1	μA
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 55 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	30			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 15 A		0.0021	0.0026	Ω
		V _{GS} = 4.5 V, I _D = 10 A		0.0026	0.0032	
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 15 A		63		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz		3630		pF
Output Capacitance	C _{oss}			1085		
Reverse Transfer Capacitance	C _{rss}			453		
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 10 V, I _D = 10 A		60	90	nC
		V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 10 A		28.7	44	
Gate-Source Charge	Q _{gs}			8.9		
Gate-Drain Charge	Q _{gd}			7.4		
Gate Resistance	R _g	f = 1 MHz	0.3	1.2	2.4	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10 V, R _L = 1 Ω I _D ≅ 10 A, V _{GEN} = 4.5 V, R _g = 1 Ω		29	55	ns
Rise Time	t _r			16	30	
Turn-Off Delay Time	t _{d(off)}			40	75	
Fall Time	t _f			13	26	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10 V, R _L = 1 Ω I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 1 Ω		12	24	
Rise Time	t _r			9	18	
Turn-Off Delay Time	t _{d(off)}			32	60	
Fall Time	t _f			9	18	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			50	A
Pulse Diode Forward Current ^a	I _{SM}				80	
Body Diode Voltage	V _{SD}	I _S = 4 A		0.74	1.1	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 10 A, dI/dt = 100 A/μs, T _J = 25 °C		30	60	ns
Body Diode Reverse Recovery Charge	Q _{rr}			20	40	nC
Reverse Recovery Fall Time	t _a			16		ns
Reverse Recovery Rise Time	t _b			14		

Notes:

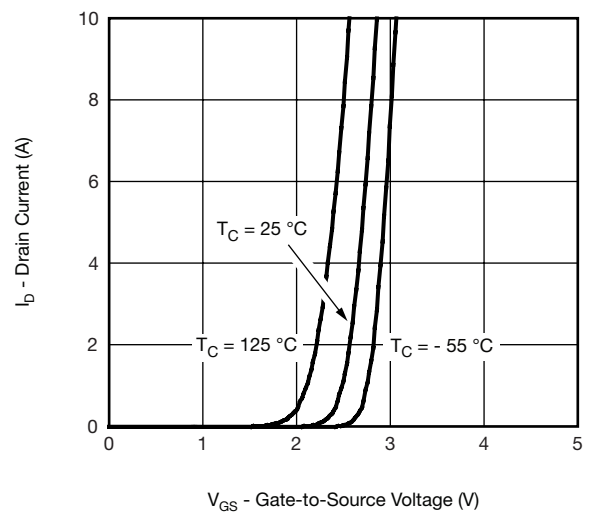
a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

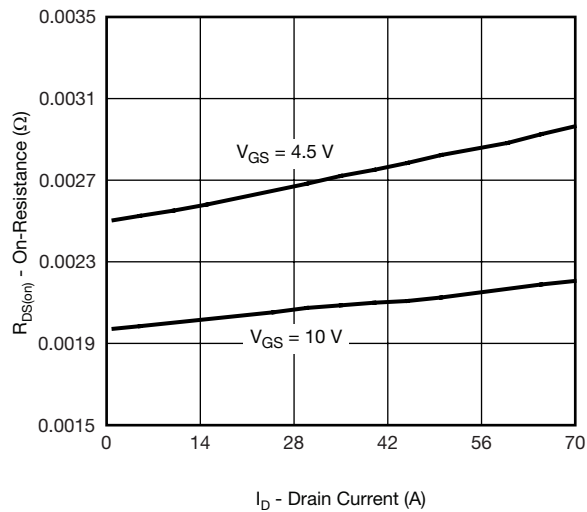
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


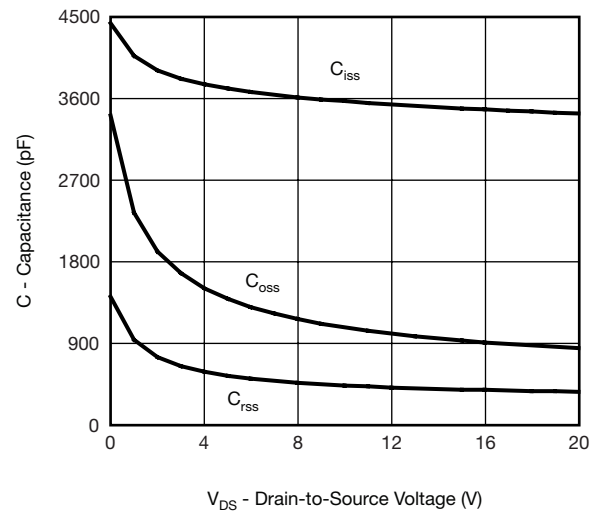
V_{DS} - Drain-to-Source Voltage (V)
Output Characteristics



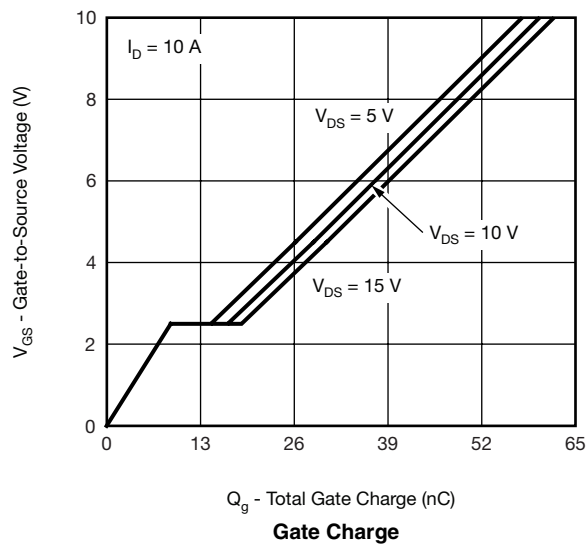
V_{GS} - Gate-to-Source Voltage (V)
Transfer Characteristics



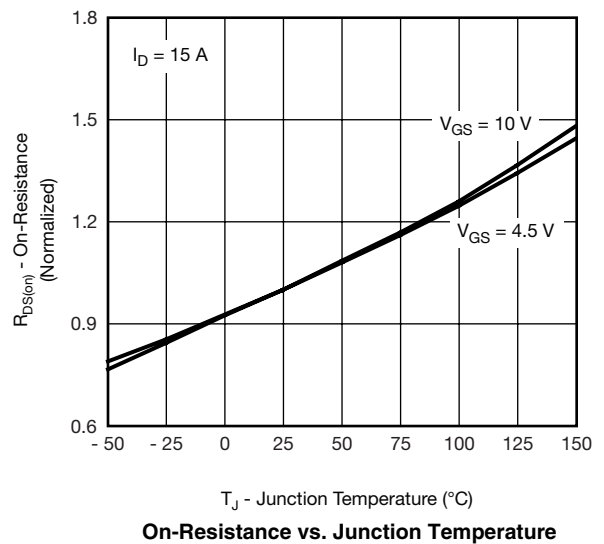
I_D - Drain Current (A)
On-Resistance vs. Drain Current and Gate Voltage



V_{DS} - Drain-to-Source Voltage (V)
Capacitance



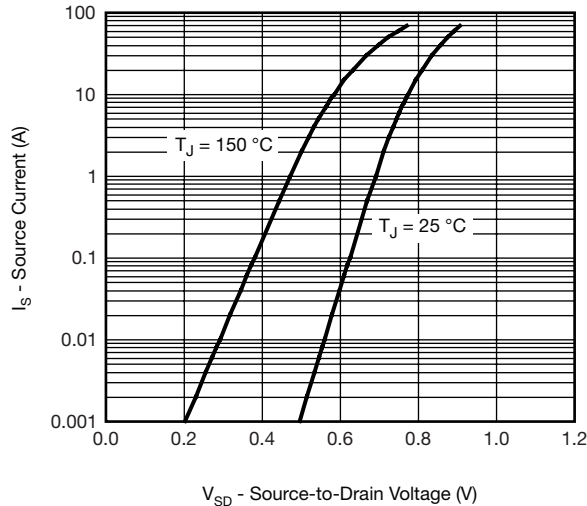
Q_g - Total Gate Charge (nC)
Gate Charge



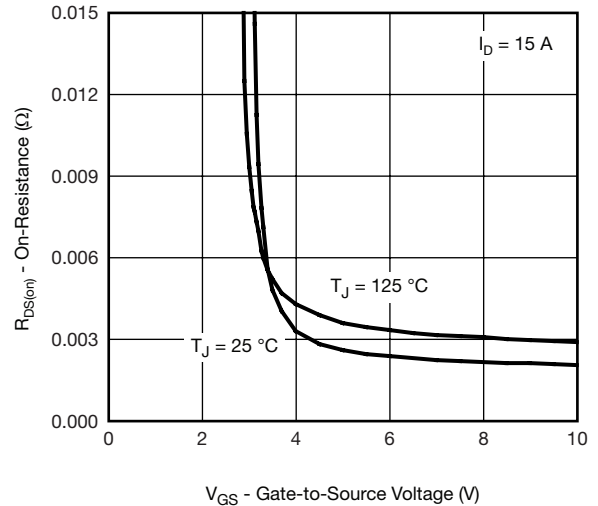
T_J - Junction Temperature ($^{\circ}\text{C}$)
On-Resistance vs. Junction Temperature

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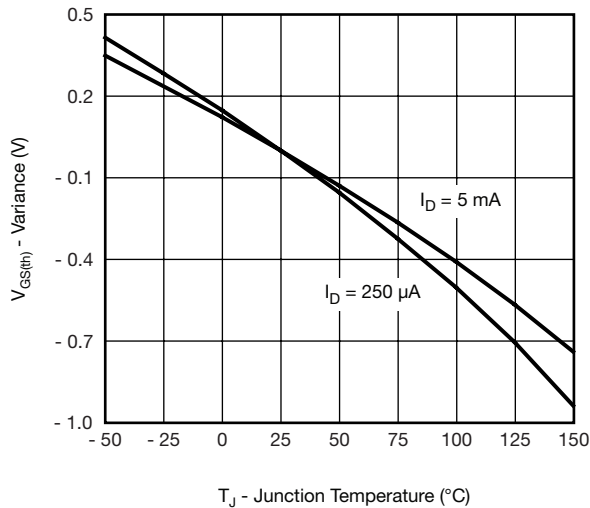
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**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

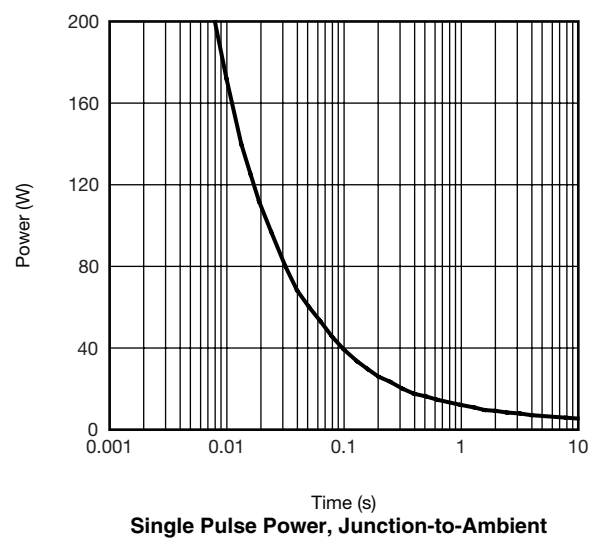
V_{SD} - Source-to-Drain Voltage (V)
Source-Drain Diode Forward Voltage



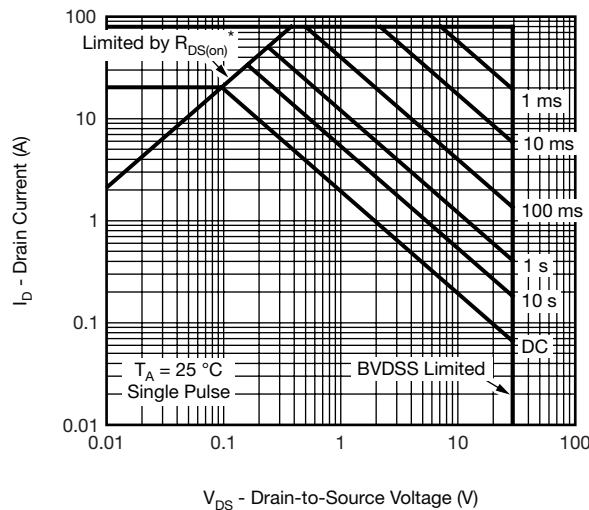
V_{GS} - Gate-to-Source Voltage (V)
On-Resistance vs. Gate-to-Source Voltage



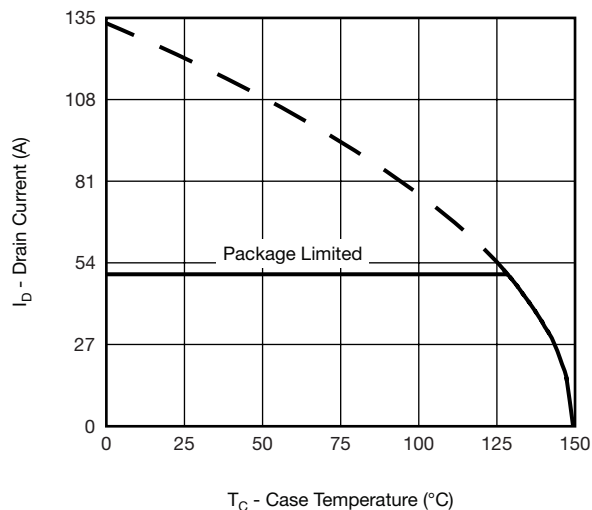
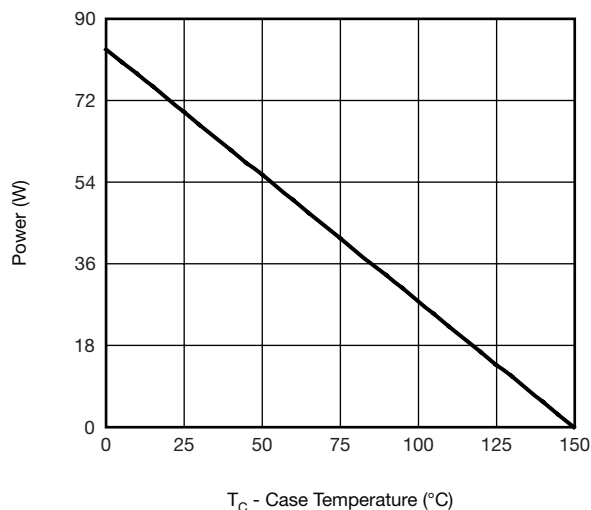
T_J - Junction Temperature ($^\circ\text{C}$)
Threshold Voltage

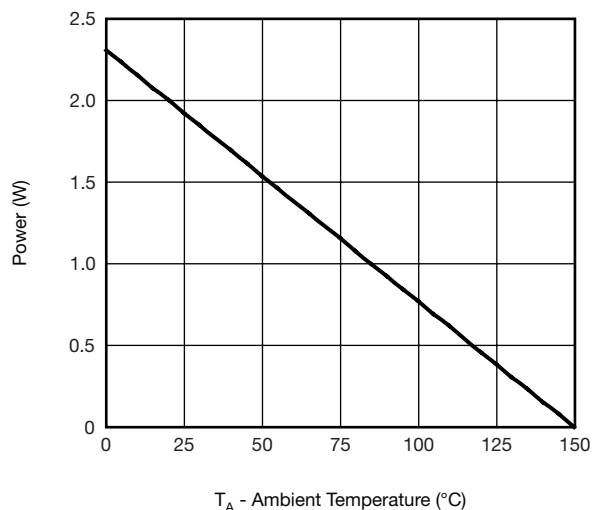


Time (s)
Single Pulse Power, Junction-to-Ambient



V_{DS} - Drain-to-Source Voltage (V)
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified
Safe Operating Area, Junction-to-Ambient


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Current Derating*

 T_C - Case Temperature (°C)

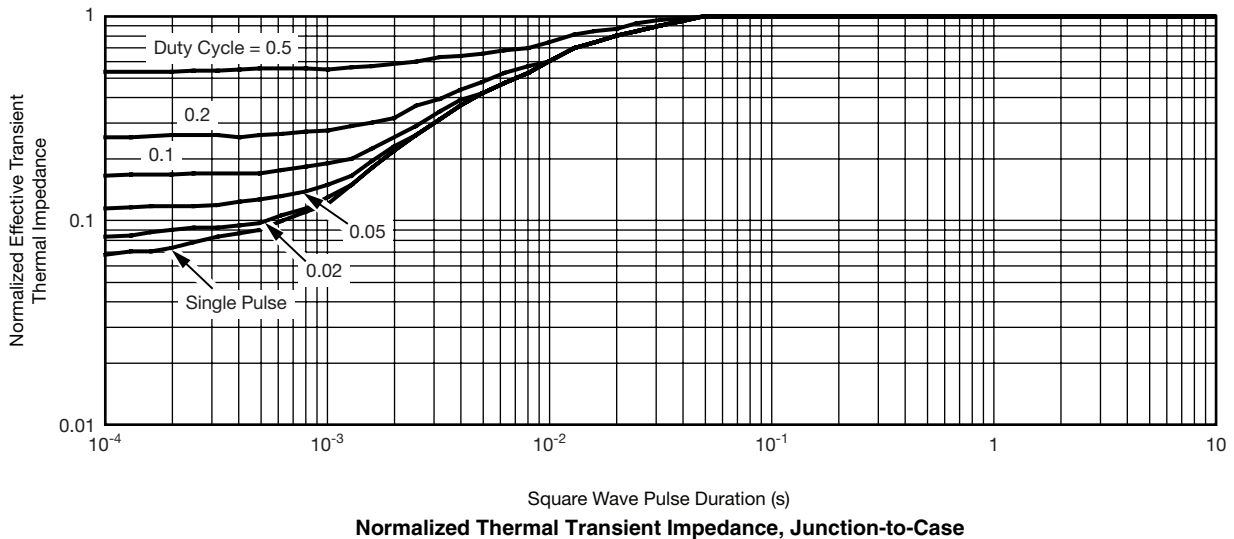
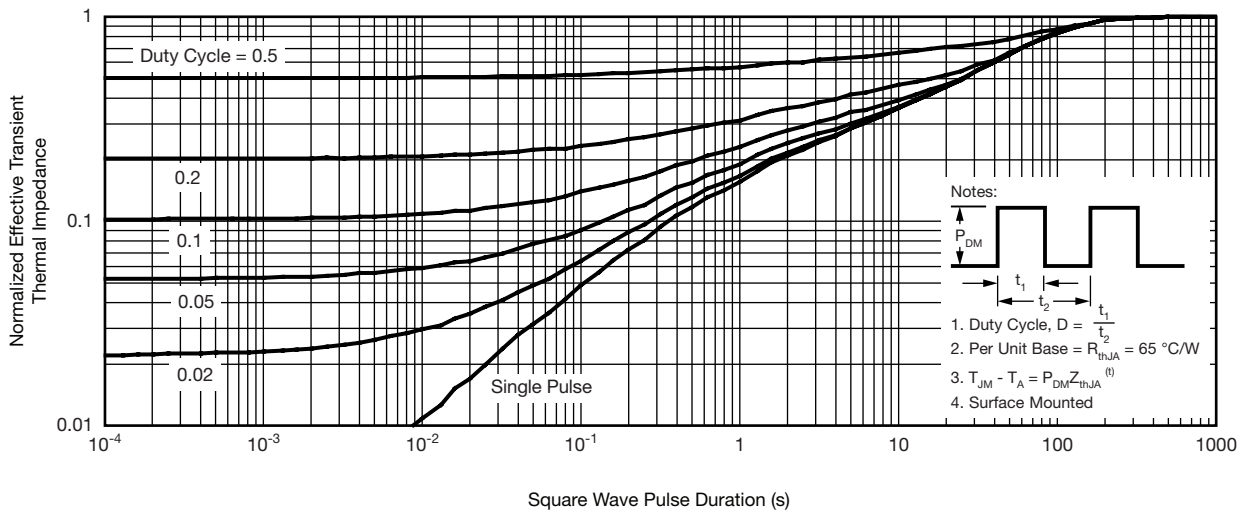
Power, Junction-to-Case

 T_A - Ambient Temperature (°C)

Power, Junction-to-Ambient

* 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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