

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

PRODUCT SUMMARY			
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>a</sup>	$Q_g$ (Typ)
150	0.045 at $V_{GS} = 10$ V	26	23 nC
	0.047 at $V_{GS} = 8$ V	25	

## FEATURES

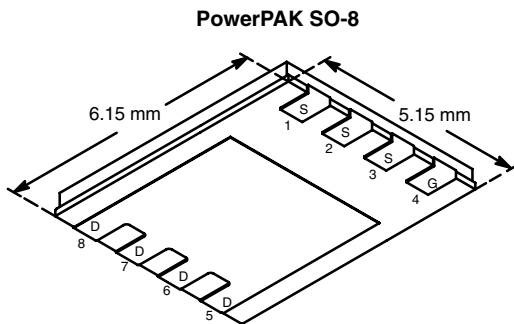
- Extremely Low  $Q_{gd}$  WFET<sup>®</sup> Technology for Reduced  $dV/dt$ ,  $Q_{gd}$  and Shoot-Through
- 100 %  $R_g$  Tested
- 100 % UIS Tested



RoHS  
COMPLIANT

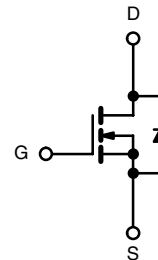
## APPLICATIONS

- Primary Side Switch
- Single-Ended Power Switch



Bottom View

Ordering Information: Si7430DP-T1-E3 (Lead (Pb)-free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	150	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 150$ °C)	$T_C = 25$ °C	26	A
	$T_C = 70$ °C	21	
	$T_A = 25$ °C	7.2 <sup>b, c</sup>	
	$T_A = 70$ °C	5.7 <sup>b, c</sup>	
Pulsed Drain Current	$I_{DM}$	50	A
Continuous Source-Drain Diode Current	$T_C = 25$ °C	32	
	$T_A = 25$ °C	4.5 <sup>b, c</sup>	
Single Pulse Avalanche Current	$I_{AS}$	20	mJ
Single Pulse Avalanche Energy	$E_{AS}$	20	
Maximum Power Dissipation	$T_C = 25$ °C	64	W
	$T_C = 70$ °C	44	
	$T_A = 25$ °C	5.2 <sup>b, c</sup>	
	$T_A = 70$ °C	3.3 <sup>b, c</sup>	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150	°C
Soldering Recommendations (Peak Temperature) <sup>d, e</sup>		260	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b, f</sup>	$t \leq 10$ sec	$R_{thJA}$	19	24	°C/W
Maximum Junction-to-Case (Drain)	Steady State	$R_{thJC}$	1.5	1.8	

Notes:

- Based on  $T_C = 25$  °C.
- Surface mounted on 1" x 1" FR4 board.
- $t = 10$  sec.
- See Solder Profile (<http://www.vishay.com/ppg?73257>). The PowerPAK SO-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.
- Maximum under Steady State conditions is 65 °C/W.

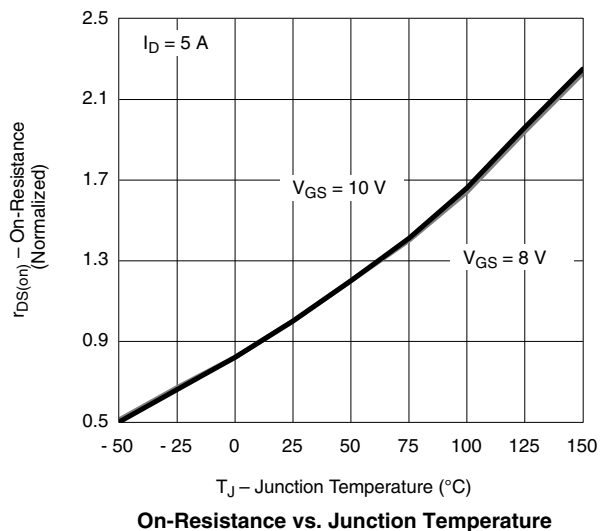
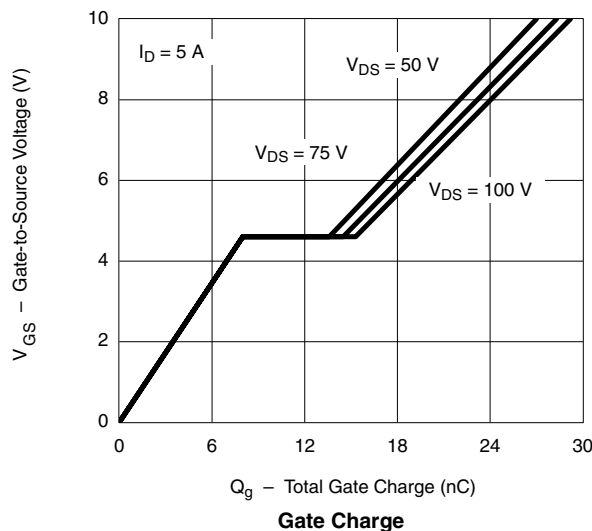
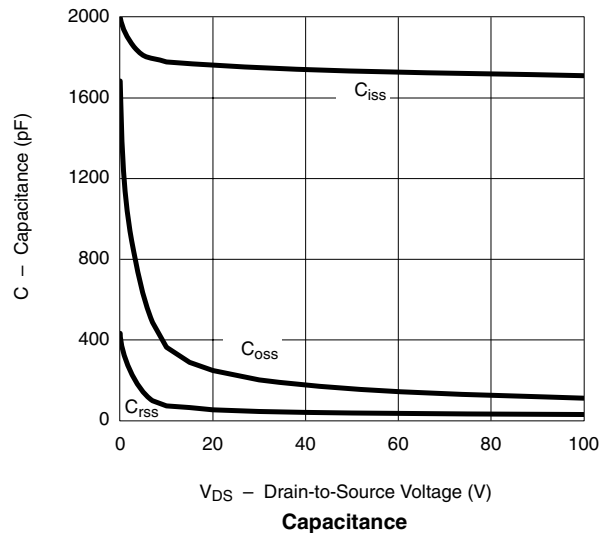
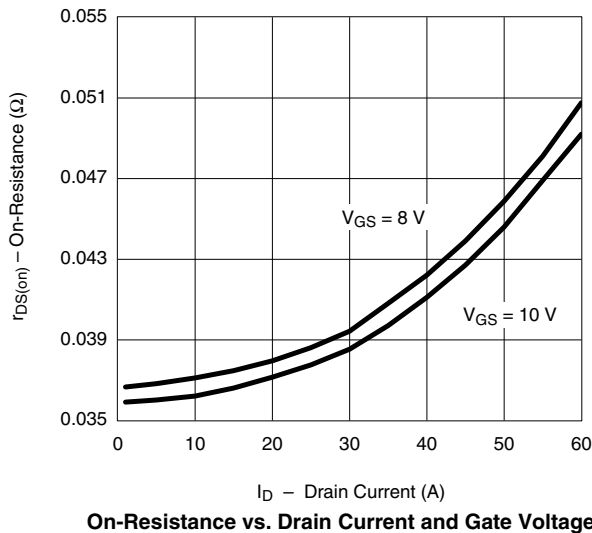
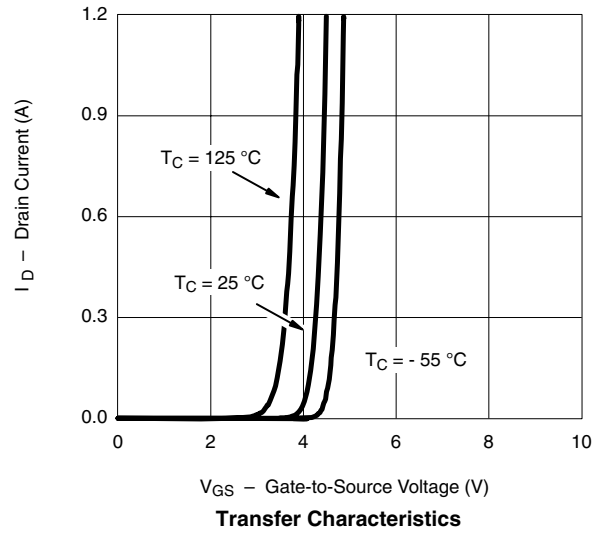
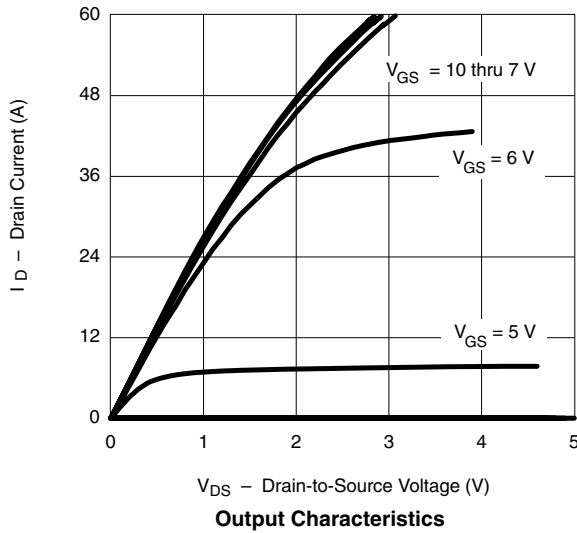
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	150			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		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	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 150\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 150\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 10\text{ V}, V_{GS} = 10\text{ V}$	30			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 5\text{ A}$		0.036	0.045	$\Omega$
		$V_{GS} = 8\text{ V}, I_D = 5\text{ A}$		0.0375	0.047	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 5\text{ A}$		23		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1735		$\mu\text{F}$
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	$\Omega$
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	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			32	A
Pulse Diode Forward Current <sup>a</sup>	$I_{SM}$				50	
Body Diode Voltage	$V_{SD}$	$I_S = 3\text{ A}$		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:

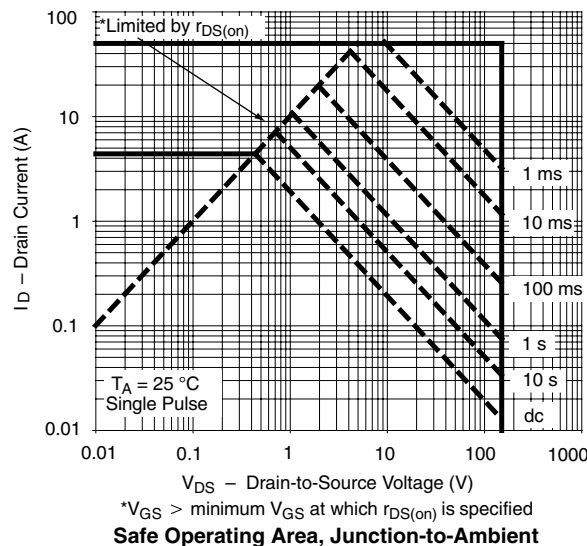
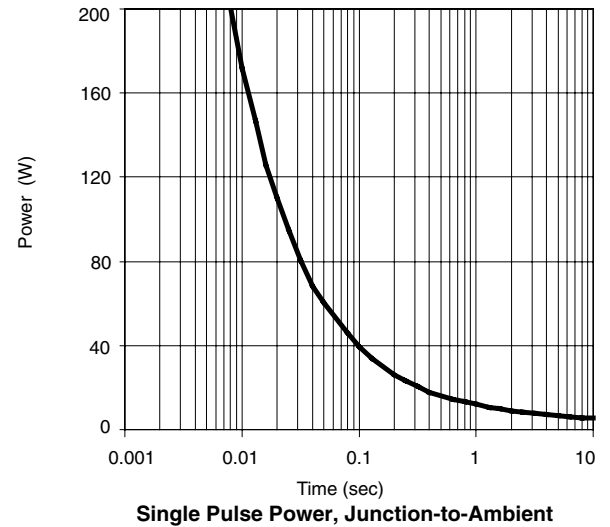
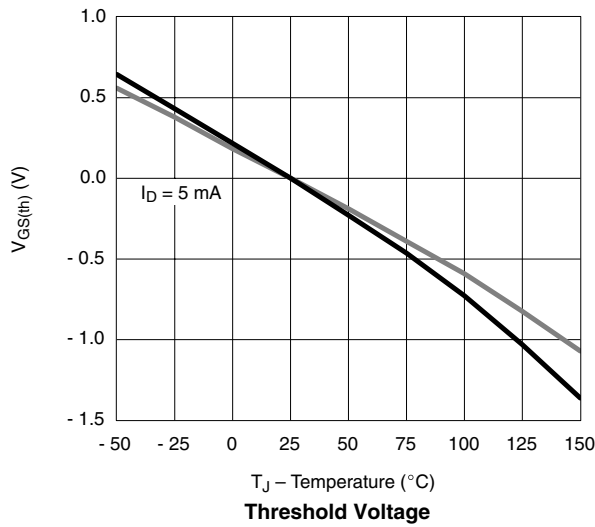
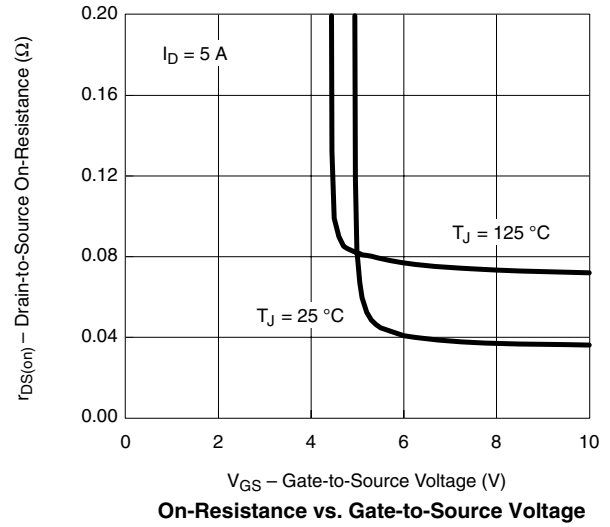
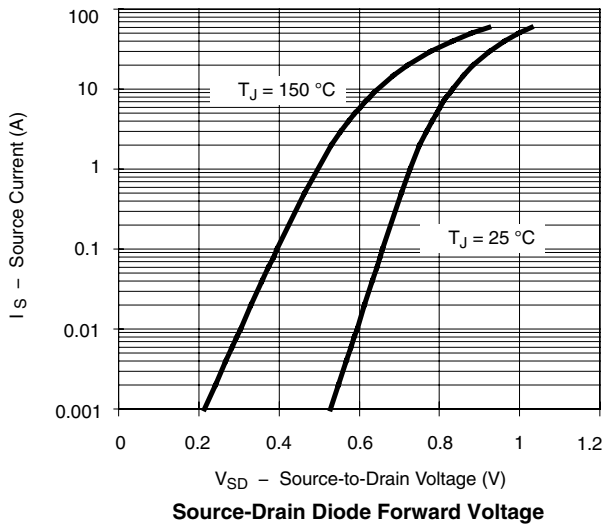
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$   
a. Guaranteed by design, not subject to production testing.

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.

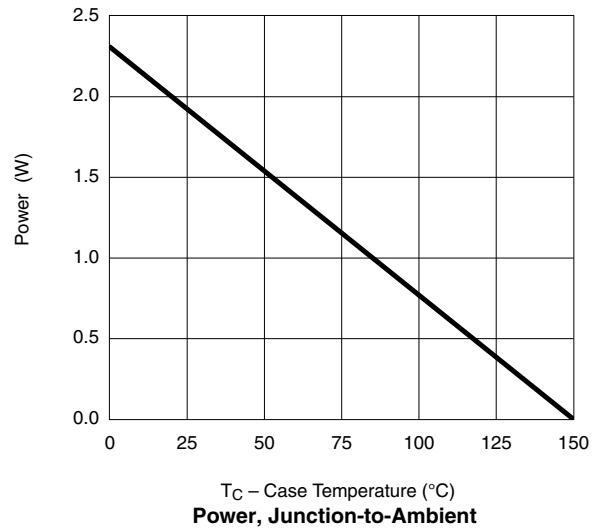
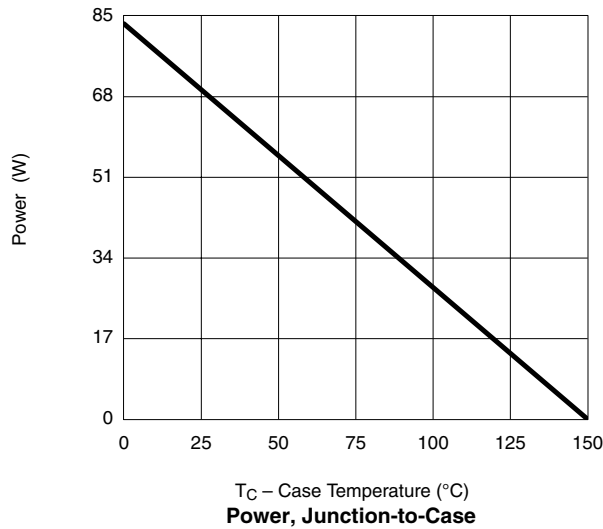
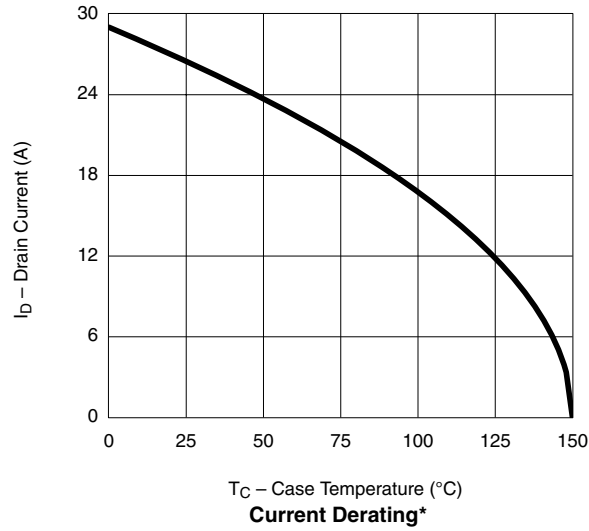
## TYPICAL CHARACTERISTICS 25 °C, unless noted



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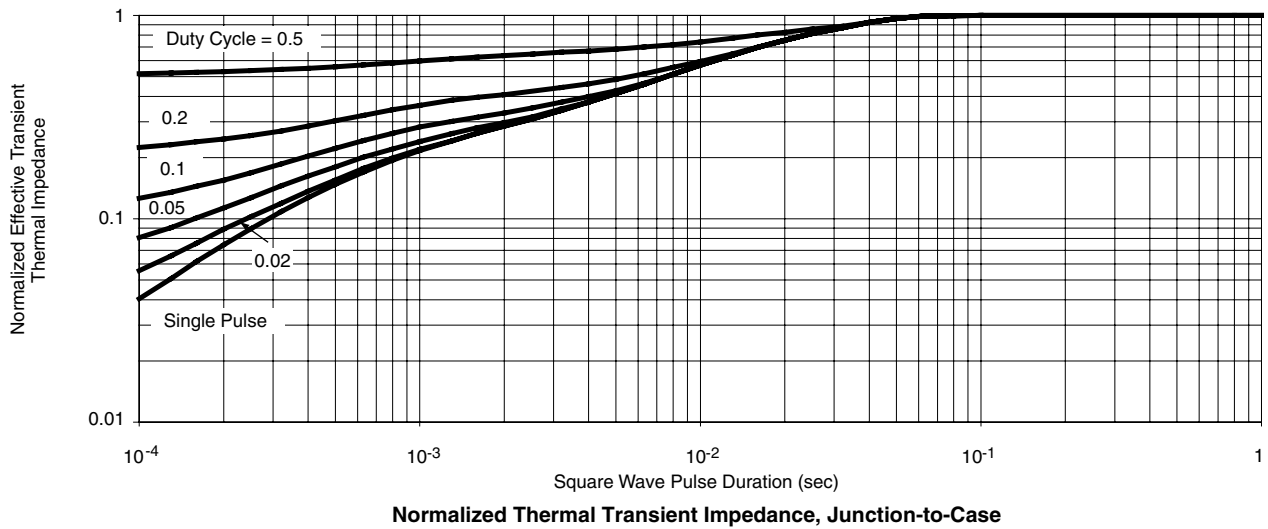
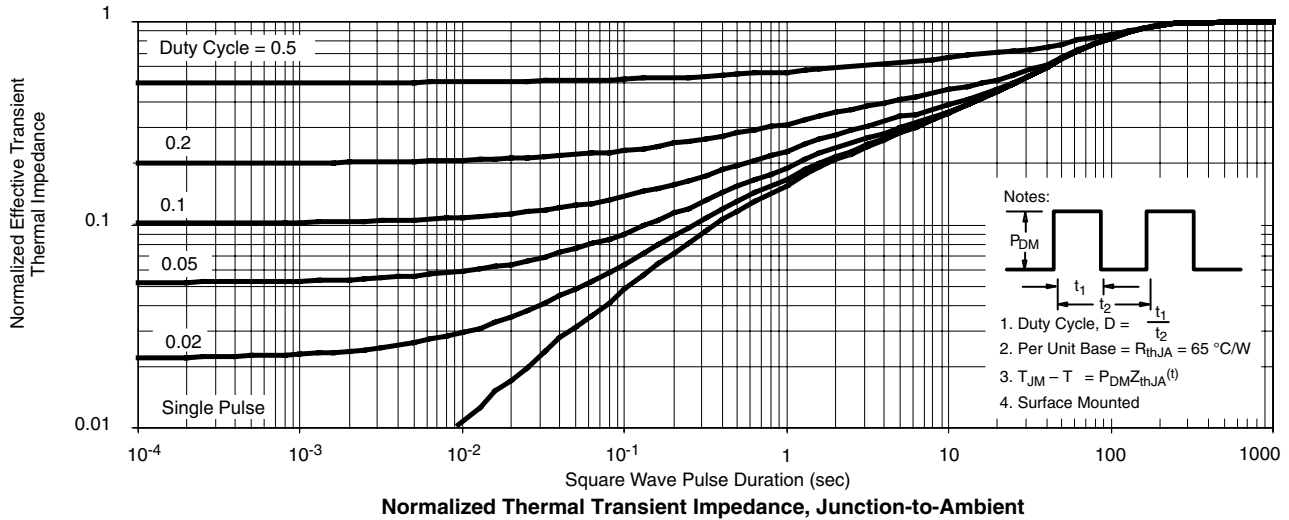


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\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 175$  °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the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

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