

## P-Channel 200-V (D-S) MOSFET

PRODUCT SUMMARY			
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>a</sup>	$Q_g$ (Typ)
- 200	1.61 at $V_{GS} = - 10$ V	- 0.95	8 nC
	1.65 at $V_{GS} = - 6$ V	- 0.93	

### FEATURES

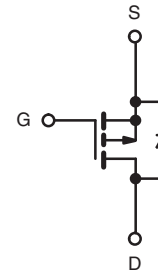
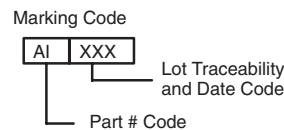
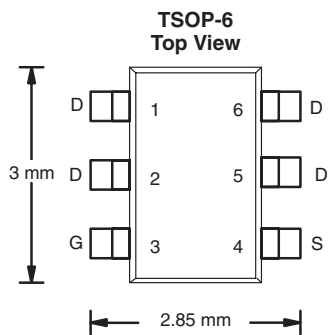
- TrenchFET<sup>®</sup> Power MOSFET
- 100 %  $R_g$  and UIS Tested



**RoHS**  
COMPLIANT

### APPLICATIONS

- Active Clamp Circuits in DC/DC Power Supplies



Ordering Information: Si3475DV-T1-E3 (Lead (Pb)-free)

P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	- 200	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 150$ °C)	$T_C = 25$ °C	- 0.95 <sup>a</sup>	A
	$T_C = 70$ °C	- 0.77	
	$T_A = 25$ °C	- 0.75 <sup>b,c</sup>	
	$T_A = 70$ °C	- 0.59 <sup>b,c</sup>	
Pulsed Drain Current	$I_{DM}$	- 3	A
Continuous Source-Drain Diode Current	$T_C = 25$ °C	- 2.6	
	$T_A = 25$ °C	1.6 <sup>b,c</sup>	
Avalanche Current	$I_{AS}$	3	mJ
Single-Pulse Avalanche Energy	$E_{AS}$	0.45	
Maximum Power Dissipation	$T_C = 25$ °C	3.2	W
	$T_C = 70$ °C	2.1	
	$T_A = 25$ °C	2 <sup>b,c</sup>	
	$T_A = 70$ °C	1.25 <sup>b,c</sup>	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b, d</sup>	$t \leq 5$ sec	$R_{thJA}$	51	62.5	°C/W
Maximum Junction-to-Foot	Steady State	$R_{thJF}$	32	39	

Notes:

- $T_C = 25$  °C.
- Surface Mounted on 1" x 1" FR4 board.
- $t = 5$  sec.
- Maximum under Steady State conditions is 110 °C/W.

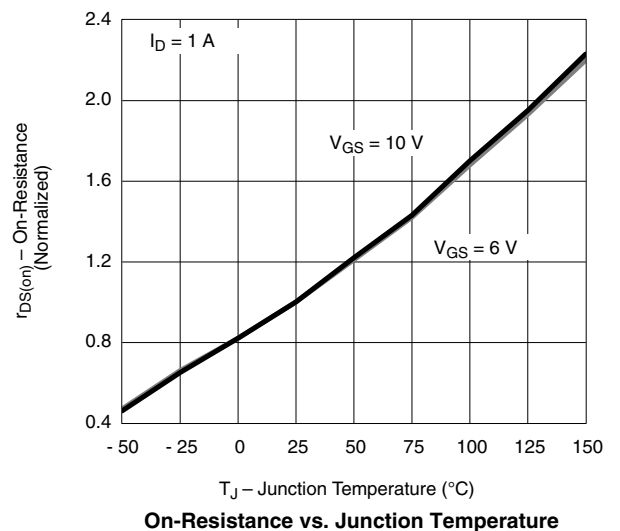
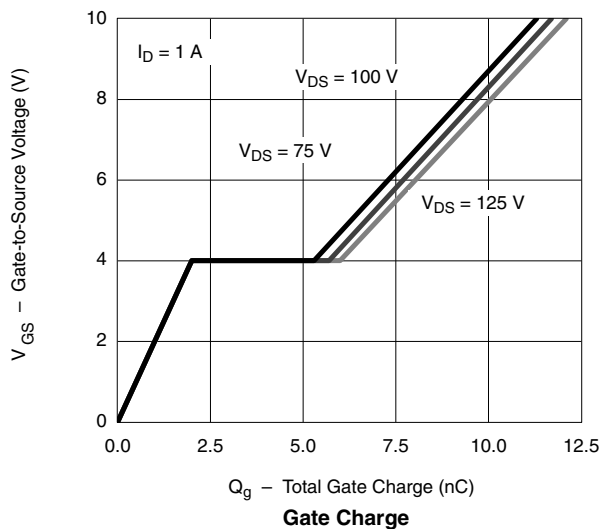
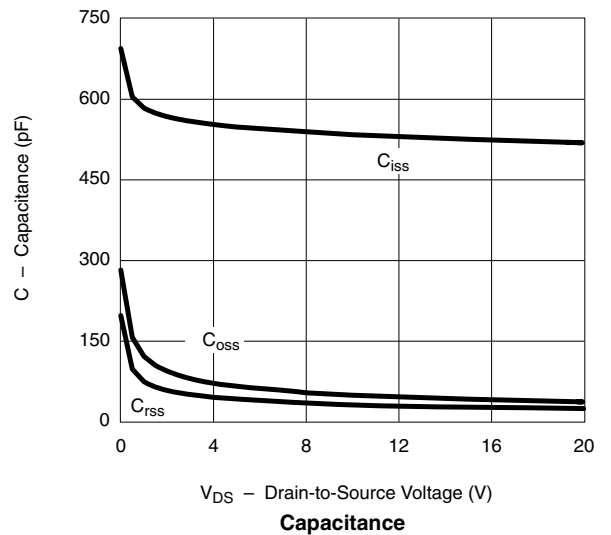
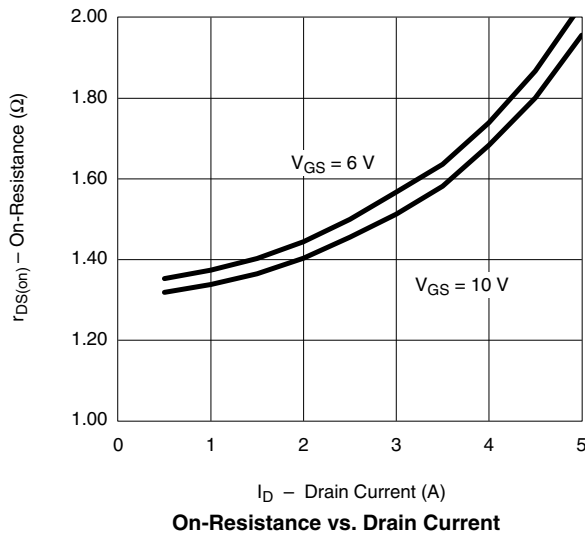
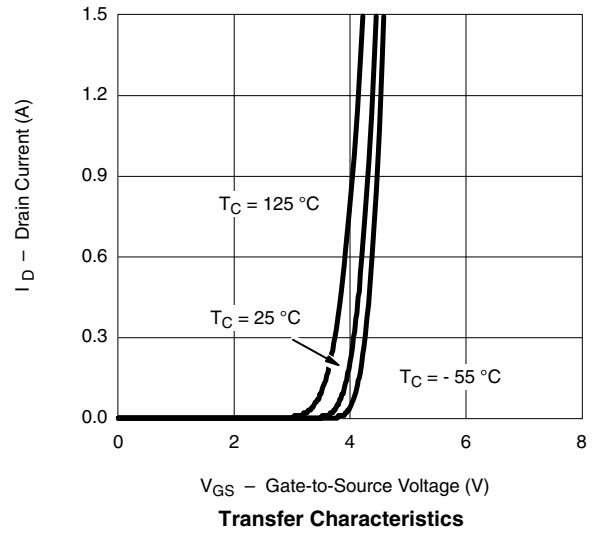
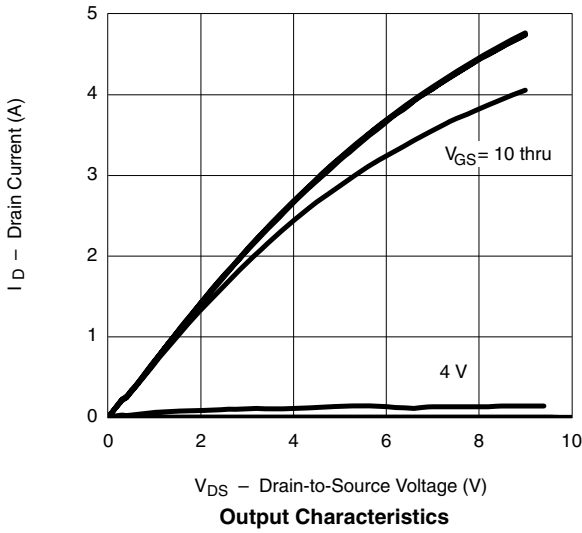
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}$ , $I_D = -250\text{ }\mu\text{A}$	-200			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		-240		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		6.2			
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = -250\text{ }\mu\text{A}$	-2		-4	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	$I_{DSS}$	$V_{DS} = -200\text{ V}$ , $V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -200\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 55\text{ }^\circ\text{C}$			-10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq -10\text{ V}$ , $V_{GS} = -10\text{ V}$	-2			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = -10\text{ V}$ , $I_D = -0.9\text{ A}$		1.34	1.61	$\Omega$
		$V_{GS} = -6\text{ V}$ , $I_D = -0.7\text{ A}$		1.37	1.65	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -10\text{ V}$ , $I_D = -0.9\text{ A}$		3.5		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -50\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1\text{ MHz}$		500		pF
Output Capacitance	$C_{oss}$		26			
Reverse Transfer Capacitance	$C_{rss}$		18			
Total Gate Charge	$Q_g$	$V_{DS} = -100\text{ V}$ , $V_{GS} = -10\text{ V}$ , $I_D = -1\text{ A}$		11.7	18	nC
				7.8	12	
Gate-Source Charge	$Q_{gs}$	$V_{DS} = -100\text{ V}$ , $V_{GS} = -6\text{ V}$ , $I_D = -1\text{ A}$		2		
Gate-Drain Charge	$Q_{gd}$			3.7		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		9	14	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -100\text{ V}$ , $R_L = 100\text{ }\Omega$ $I_D \cong -1\text{ A}$ , $V_{GEN} = -10\text{ V}$ , $R_g = 1\text{ }\Omega$		9	14	ns
Rise Time	$t_r$			11	18	
Turn-Off Delay Time	$t_{d(off)}$			28	42	
Fall Time	$t_f$			12	18	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -100\text{ V}$ , $R_L = 100\text{ }\Omega$ $I_D \cong -1\text{ A}$ , $V_{GEN} = -6\text{ V}$ , $R_g = 1\text{ }\Omega$		14	21	
Rise Time	$t_r$			29	44	
Turn-Off Delay Time	$t_{d(off)}$			23	35	
Fall Time	$t_f$			14	21	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			-0.95	A
Pulse Diode Forward Current	$I_{SM}$				-3	
Body Diode Voltage	$V_{SD}$	$I_S = -1\text{ A}$ , $V_{GS} = 0\text{ V}$		-0.81	-1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -1.2\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , $T_J = 25\text{ }^\circ\text{C}$		84	130	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			235	350	nC
Reverse Recovery Fall Time	$t_a$			46		ns
Reverse Recovery Rise Time	$t_b$			38		

Notes:

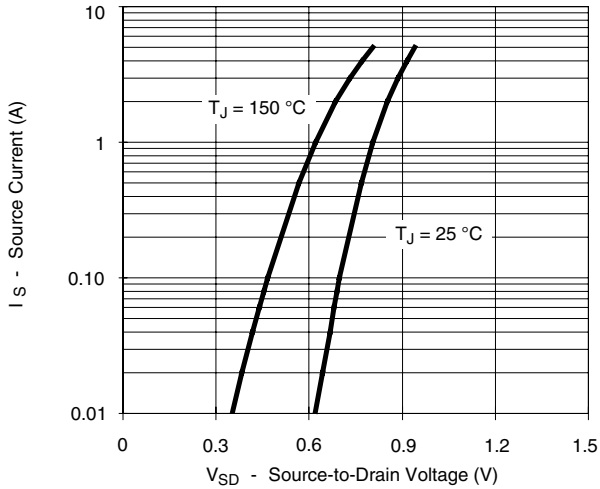
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

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.

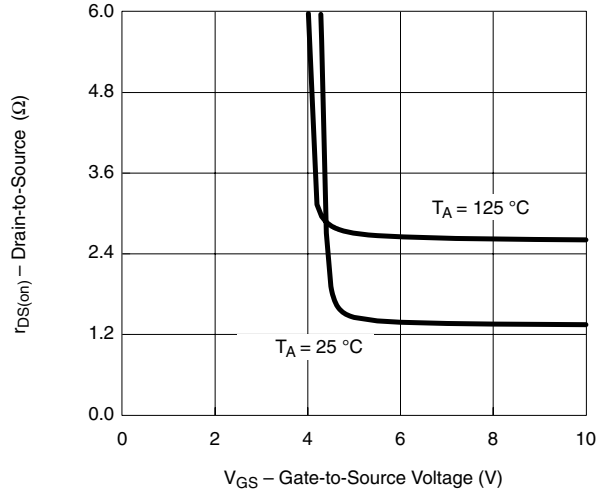
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



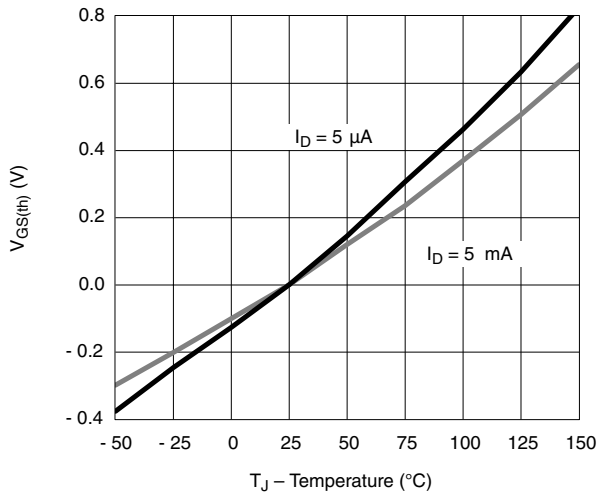
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



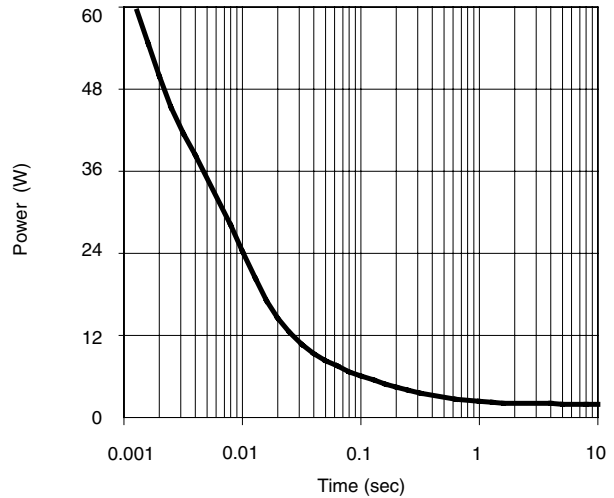
Source-Drain Diode Forward Voltage



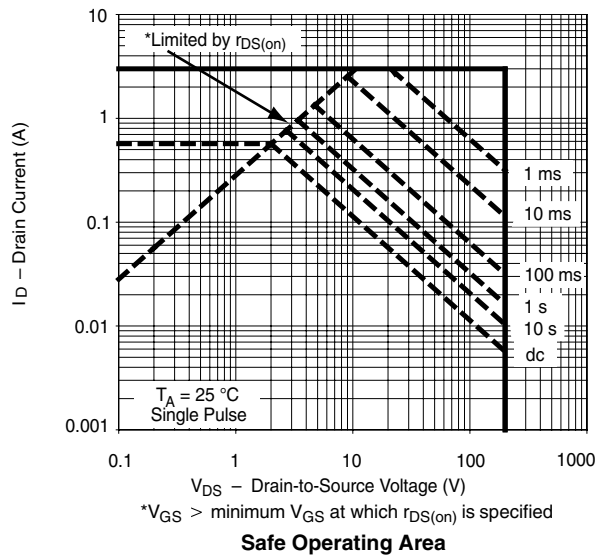
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

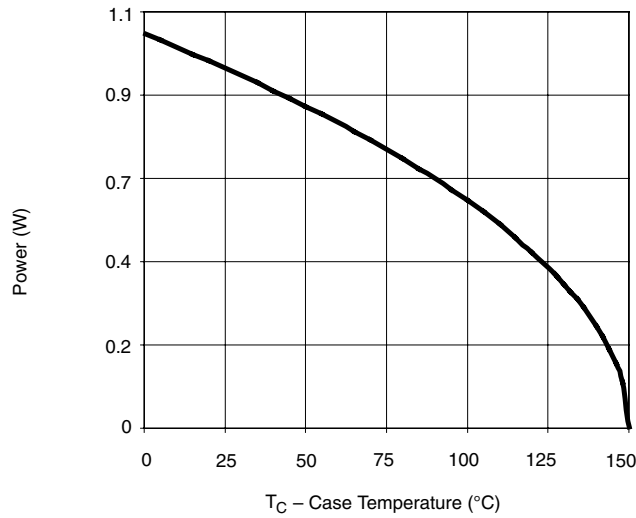


Single Pulse Power, Junction-to-Ambient

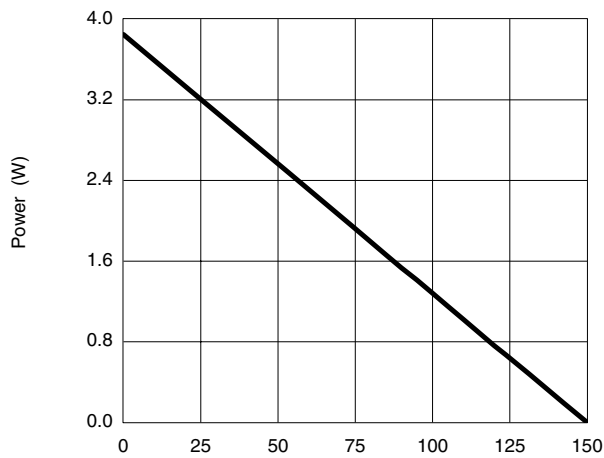


Safe Operating Area

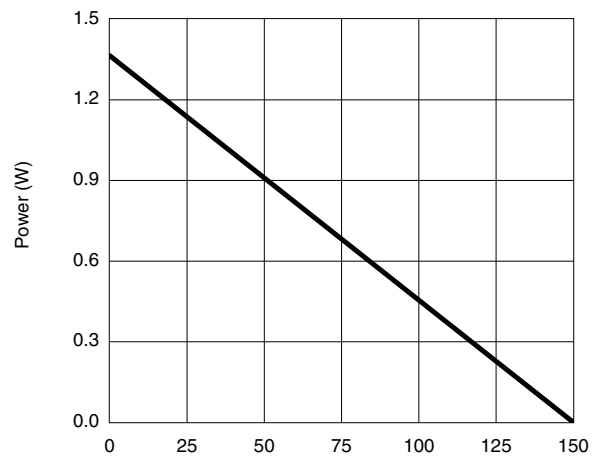
**MOSFET TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**Current Derating\***



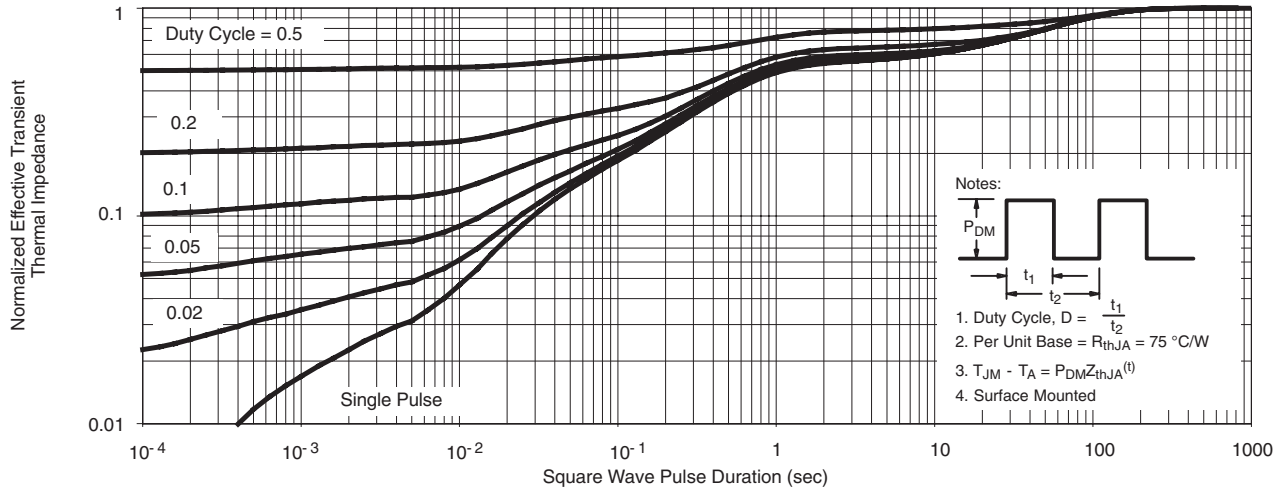
**Power, Junction-to-Foot**



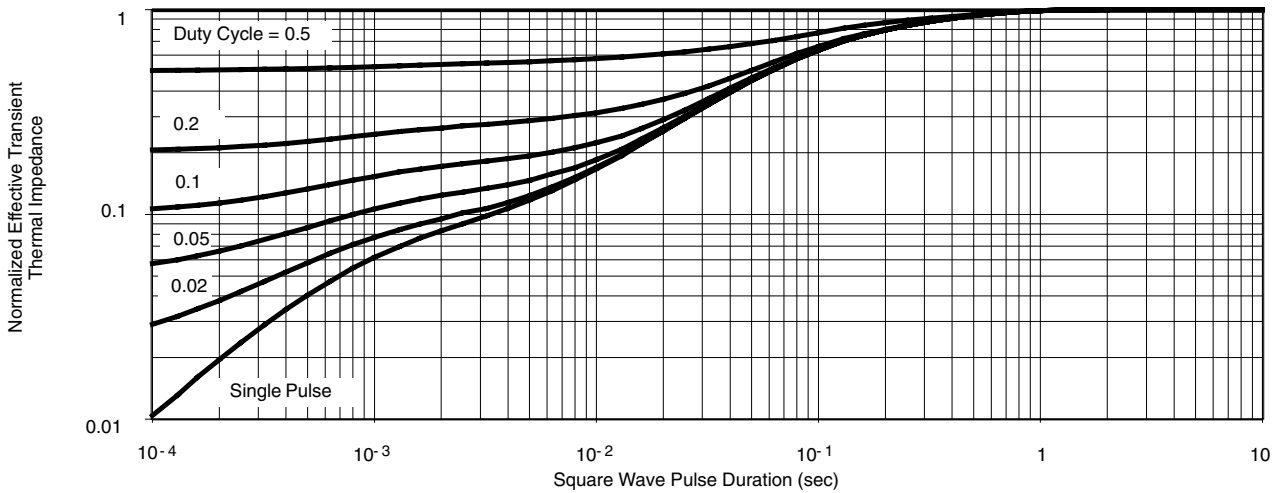
**Power Derating, Junction-to-Ambient**

\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 175\text{ °C}$ , 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



**Normalized Thermal Transient Impedance, Junction-to-Ambient**



**Normalized Thermal Transient Impedance, Junction-to-Foot**

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