



**THE DATASHEET OF  
SI3475DV-T1-E3**



## 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

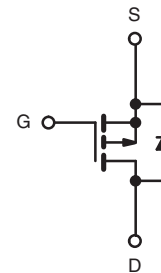
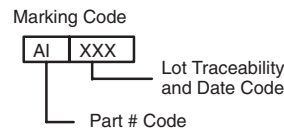
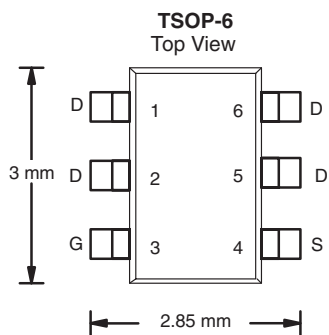
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET<sup>®</sup> Power MOSFET
- 100 %  $R_g$  and UIS Tested
- Compliant to RoHS Directive 2002/95/EC



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

### APPLICATIONS

- Active Clamp Circuits in DC/DC Power Supplies



**Ordering Information:** Si3475DV-T1-E3 (Lead (Pb)-free)  
Si3475DV-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	$V_{DS}$	- 200	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current ( $T_J = 150$ °C)	$I_D$	$T_C = 25$ °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		
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25$ °C	- 2.6	
		$T_A = 25$ °C	1.6 <sup>b,c</sup>	
Avalanche Current	$I_{AS}$	3		
Single-Pulse Avalanche Energy	$E_{AS}$	0.45	mJ	
Maximum Power Dissipation	$P_D$	$T_C = 25$ °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>	$R_{thJA}$	51	62.5	°C/W	
Maximum Junction-to-Foot	$R_{thJF}$	32	39		

**Notes:**

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

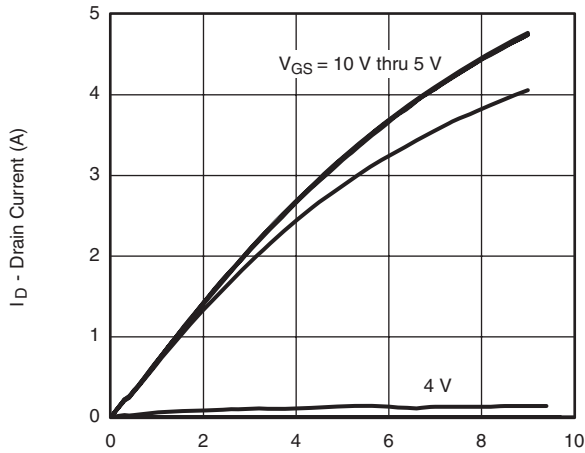
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-200			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		-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		nC
Gate-Drain Charge	$Q_{gd}$		3.7			
Gate Resistance	$R_g$		$f = 1\text{ MHz}$		9	
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	ns
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:

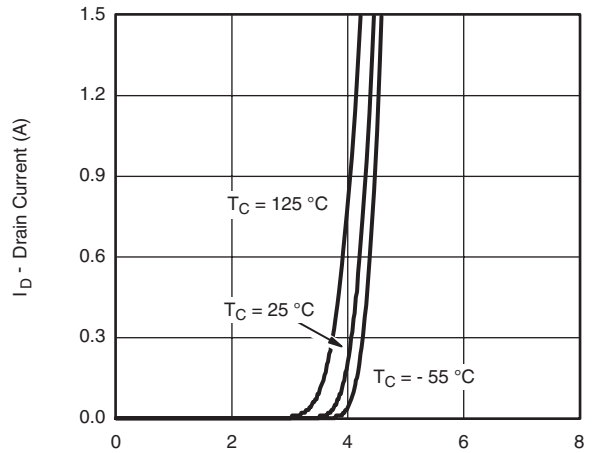
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

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.

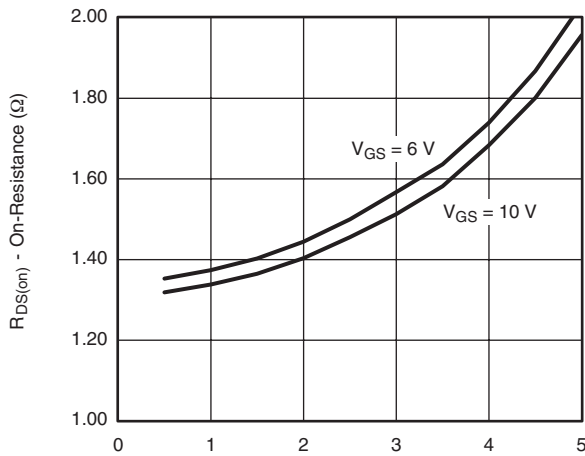
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



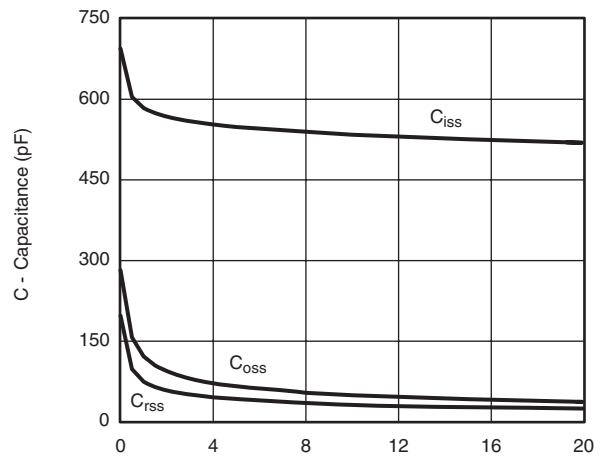
$V_{GS} = 10\text{ V thru } 5\text{ V}$   
 $V_{DS}$  - Drain-to-Source Voltage (V)  
**Output Characteristics**



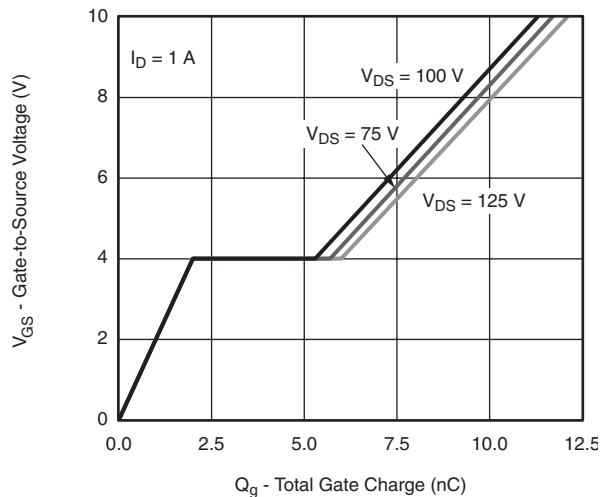
$T_C = 125\text{ }^\circ\text{C}$   
 $T_C = 25\text{ }^\circ\text{C}$   
 $T_C = -55\text{ }^\circ\text{C}$   
 $V_{GS}$  - Gate-to-Source Voltage (V)  
**Transfer Characteristics**



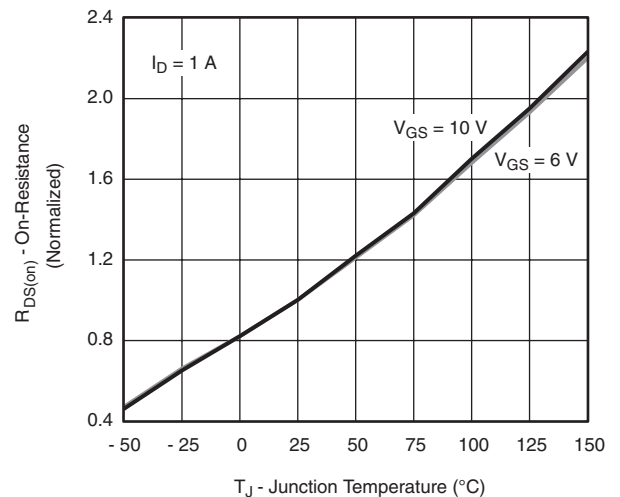
$V_{GS} = 6\text{ V}$   
 $V_{GS} = 10\text{ V}$   
 $R_{DS(on)}$  - On-Resistance ( $\Omega$ )  
 $I_D$  - Drain Current (A)  
**On-Resistance vs. Drain Current**



$C_{iss}$   
 $C_{oss}$   
 $C_{rss}$   
 $V_{DS}$  - Drain-to-Source Voltage (V)  
**Capacitance**

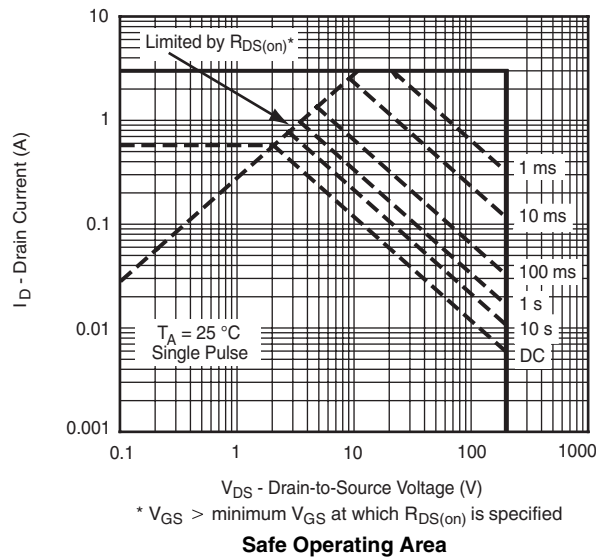
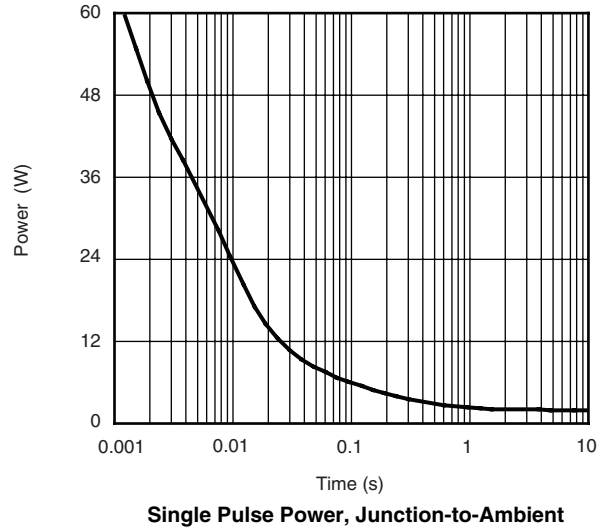
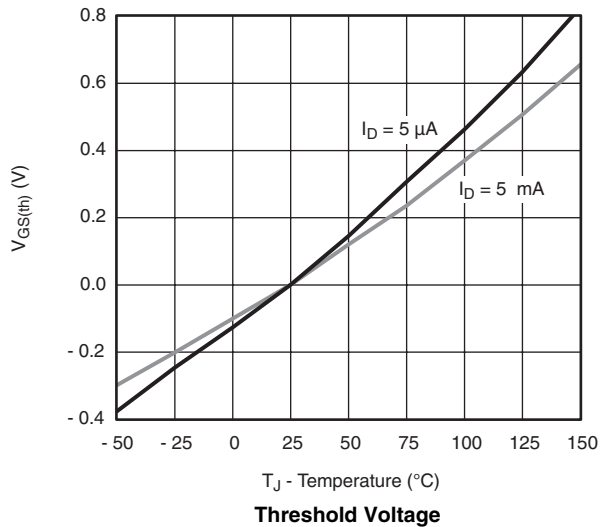
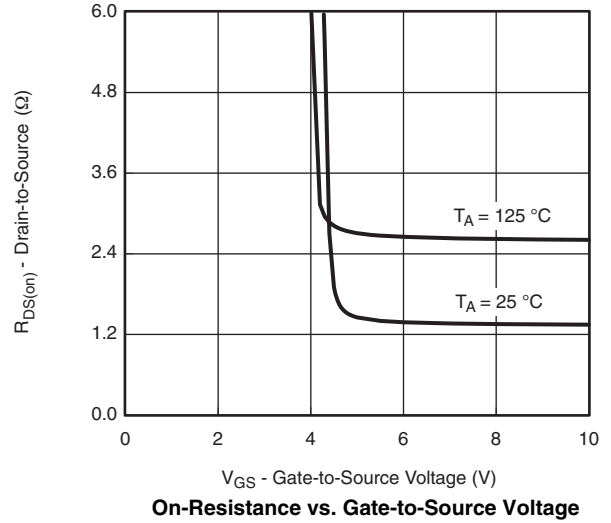
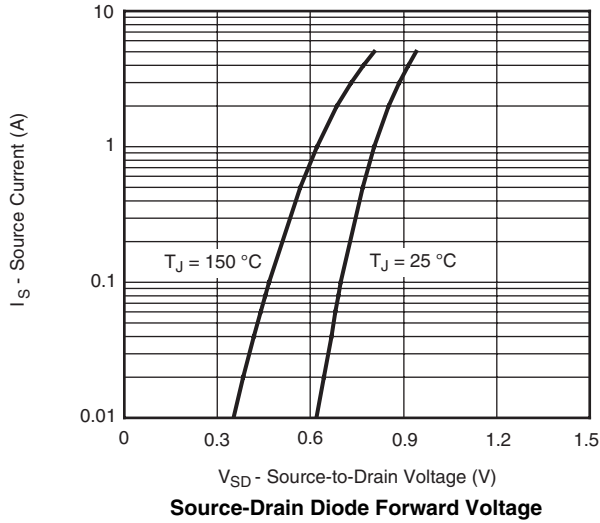


$I_D = 1\text{ A}$   
 $V_{DS} = 100\text{ V}$   
 $V_{DS} = 75\text{ V}$   
 $V_{DS} = 125\text{ V}$   
 $Q_g$  - Total Gate Charge (nC)  
**Gate Charge**

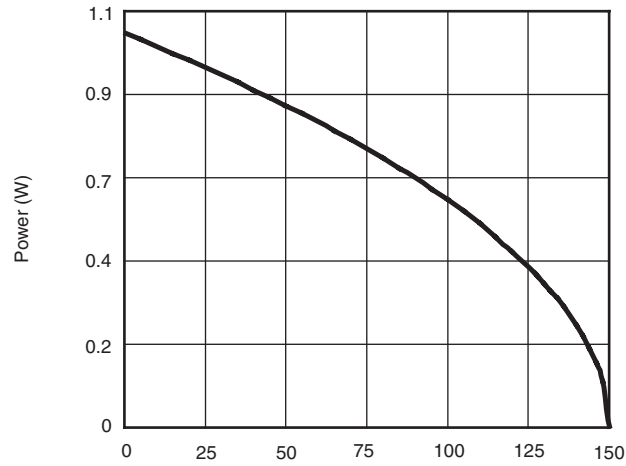


$I_D = 1\text{ A}$   
 $V_{GS} = 10\text{ V}$   
 $V_{GS} = 6\text{ V}$   
 $R_{DS(on)}$  - On-Resistance (Normalized)  
 $T_J$  - Junction Temperature ( $^\circ\text{C}$ )  
**On-Resistance vs. Junction Temperature**

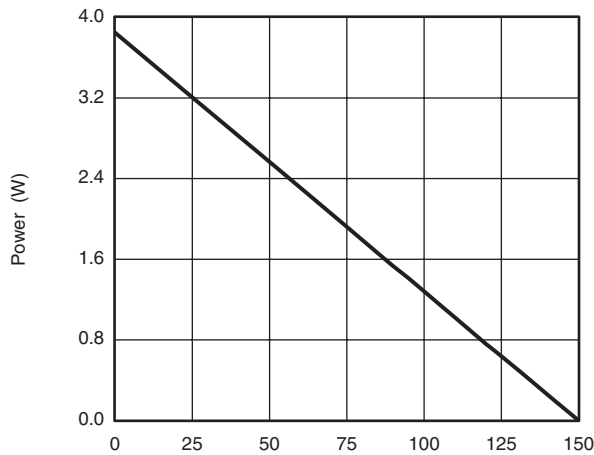
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



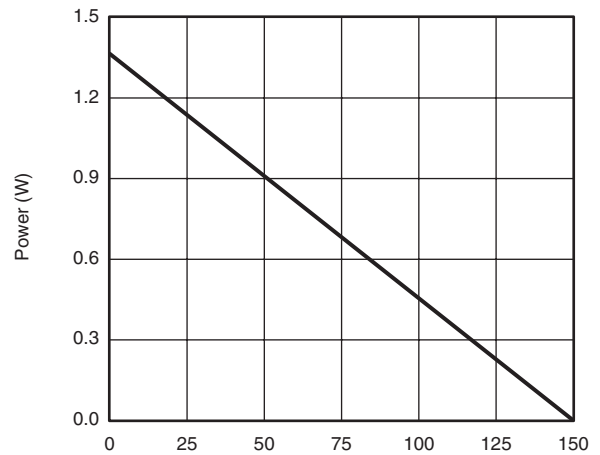
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



T<sub>C</sub> - Case Temperature (°C)  
**Current Derating\***



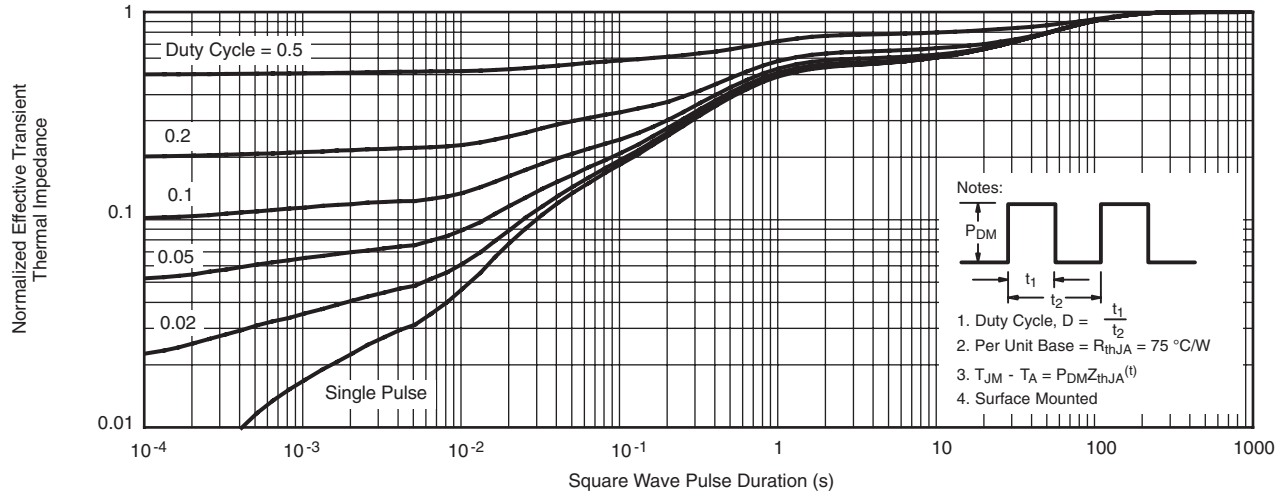
T<sub>C</sub> - Case Temperature (°C)  
**Power, Junction-to-Foot**



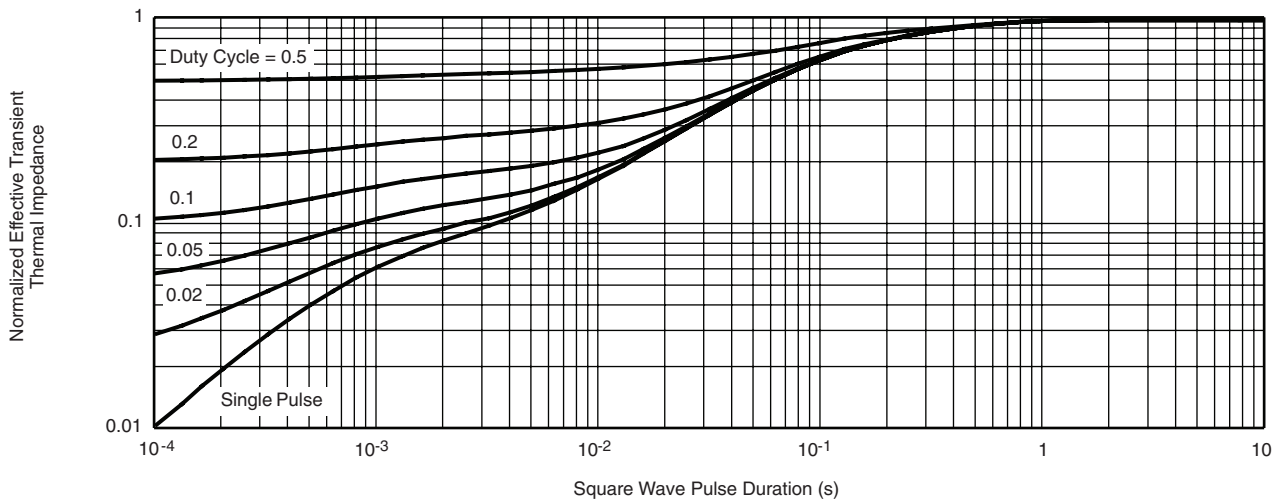
T<sub>A</sub> - Ambient Temperature (°C)  
**Power Derating, Junction-to-Ambient**

\* The power dissipation P<sub>D</sub> is based on T<sub>J(max)</sub> = 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



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



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

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