

## N-Channel 30-V (D-S) MOSFET

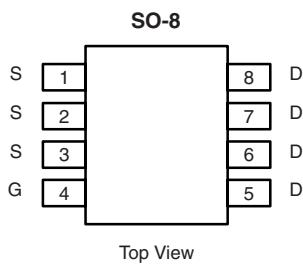
PRODUCT SUMMARY			
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>a</sup>	$Q_g$ (Typ.)
30	0.0046 at $V_{GS} = 10$ V	19.8	36 nC
	0.0054 at $V_{GS} = 4.5$ V	18.2	

### FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFET
- Optimized for "Low Side" Synchronous Rectifier Operation
- 100 %  $R_g$  Tested



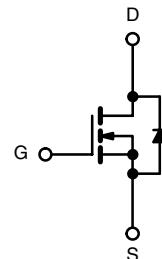
**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available



**Ordering Information:** Si4362BDY-T1-E3 (Lead-(Pb)-free)  
Si4362BDY-T1-GE3 (Lead-(Pb)-free and Halogen-free)

### APPLICATIONS

- DC/DC Converters
- Synchronous Rectifiers



N-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	$V_{GS}$	$\pm 12$	
Continuous Drain Current ( $T_J = 150$ °C)	$I_D$	29	A
		23	
		19.8 <sup>b, c</sup>	
		15.8 <sup>b, c</sup>	
Pulsed Drain Current	$I_{DM}$	60	
Continuous Source-Drain Diode Current	$I_S$	6	
		2.7 <sup>b, c</sup>	
Maximum Power Dissipation	$P_D$	6.6	W
		4.2	
		3.0 <sup>b, c</sup>	
		2 <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>	$R_{thJA}$	34	41	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	15	19	

Notes:

- Based on  $T_C = 25$  °C.
- Surface Mounted on 1" x 1" FR4 board.
- $t = 10$  s.
- Maximum under Steady State conditions is 80 °C/W.

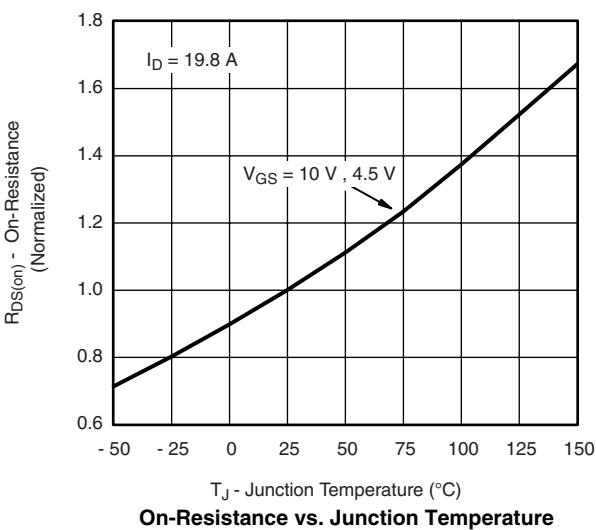
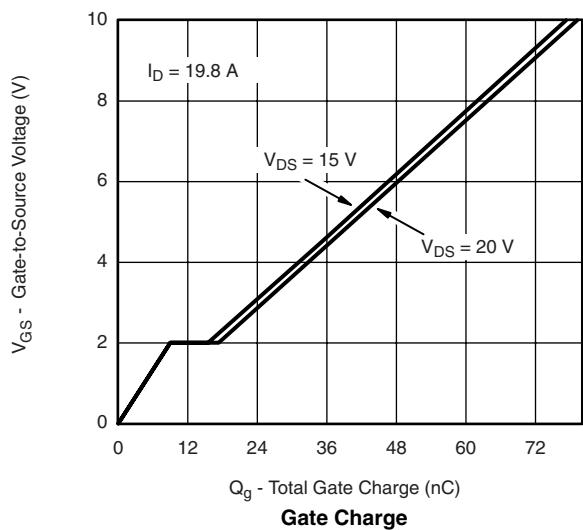
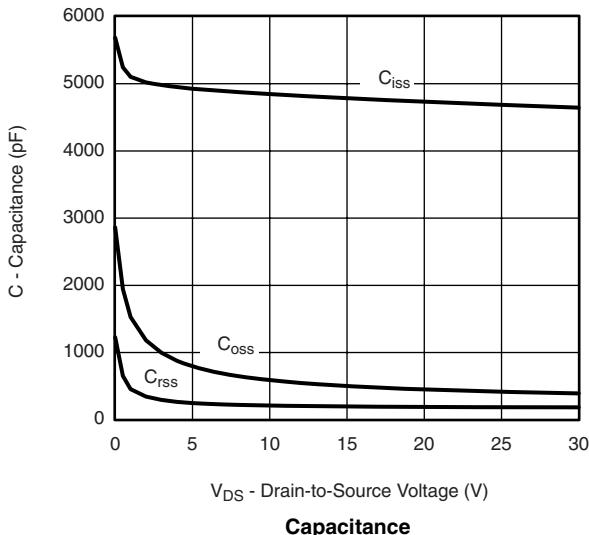
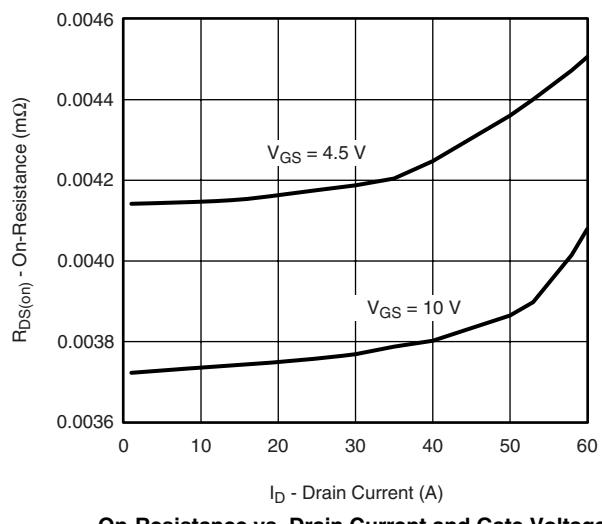
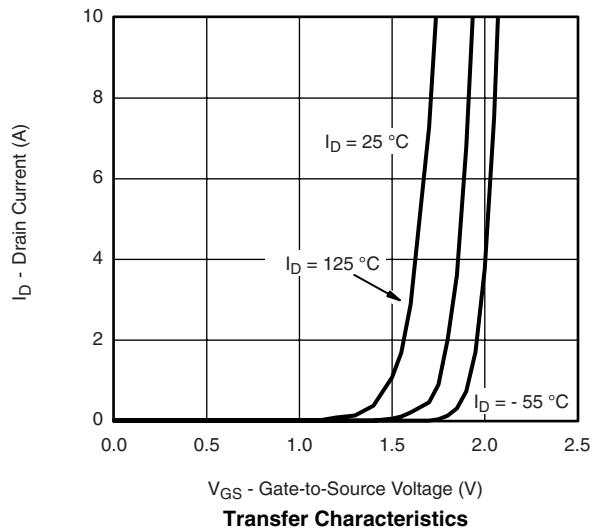
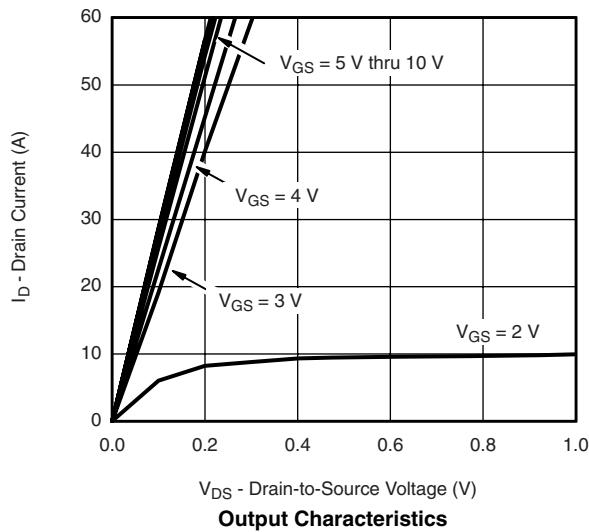
**SPECIFICATIONS**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0 \text{ V}, I_D = 1 \text{ mA}$	30			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250 \mu\text{A}$		31.4		mV/°C
$V_{GS(\text{th})}$ Temperature Coefficient	$\Delta V_{GS(\text{th})}/T_J$			- 4.9		
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	0.6		2.0	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 12 \text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}$		1		$\mu\text{A}$
		$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$			10	
On-State Drain Current <sup>a</sup>	$I_{D(\text{on})}$	$V_{DS} \geq 5 \text{ V}, V_{GS} = 10 \text{ V}$	30			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}, I_D = 19.8 \text{ A}$		0.0038	0.0046	$\Omega$
		$V_{GS} = 4.5 \text{ V}, I_D = 18.2 \text{ A}$		0.0043	0.0054	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}, I_D = 19.8 \text{ A}$		120		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		4800		pF
Output Capacitance	$C_{oss}$			500		
Reverse Transfer Capacitance	$C_{rss}$			200		
Total Gate Charge	$Q_g$	$V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 19.8 \text{ A}$		75	115	nC
				36	54	
Gate-Source Charge	$Q_{gs}$	$V_{DS} = 15 \text{ V}, V_{GS} = 4.5 \text{ V}, I_D = 19.8 \text{ A}$		9		
Gate-Drain Charge	$Q_{gd}$			6.5		
Gate Resistance	$R_g$	$f = 1 \text{ MHz}$		1.05	1.6	$\Omega$
Turn-On Delay Time	$t_{d(\text{on})}$		26	40	ns	
Rise Time	$t_r$	$V_{DD} = 15 \text{ V}, R_L = 1.5 \Omega$ $I_D \cong 10 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_g = 1 \Omega$		11		20
Turn-Off Delay Time	$t_{d(\text{off})}$			41		65
Fall Time	$t_f$			7		15
Turn-On Delay Time	$t_{d(\text{on})}$			12		20
Rise Time	$t_r$	$V_{DD} = 15 \text{ V}, R_L = 1.5 \Omega$ $I_D \cong 10 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 1 \Omega$		10		15
Turn-Off Delay Time	$t_{d(\text{off})}$			47		70
Fall Time	$t_f$			8		15
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25^\circ\text{C}$			6	A
Pulse Diode Forward Current <sup>a</sup>	$I_{SM}$				60	
Body Diode Voltage	$V_{SD}$	$I_S = 5 \text{ A}$		0.7	1.1	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 10 \text{ A}, dI/dt = 100 \text{ A}/\mu\text{s}, T_J = 25^\circ\text{C}$		35	60	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			30	60	nC
Reverse Recovery Fall Time	$t_a$			18		ns
Reverse Recovery Rise Time	$t_b$			17		

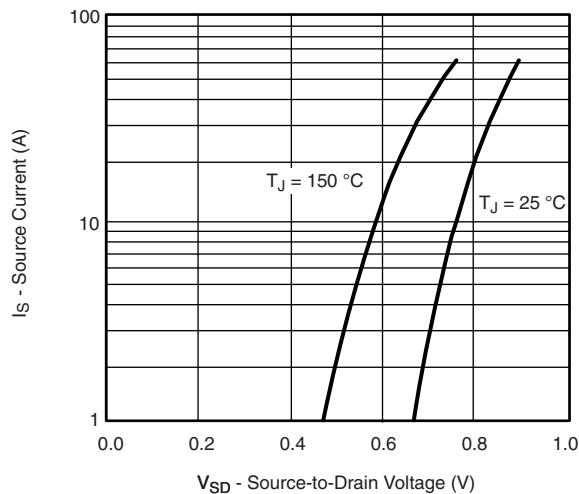
Notes:

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

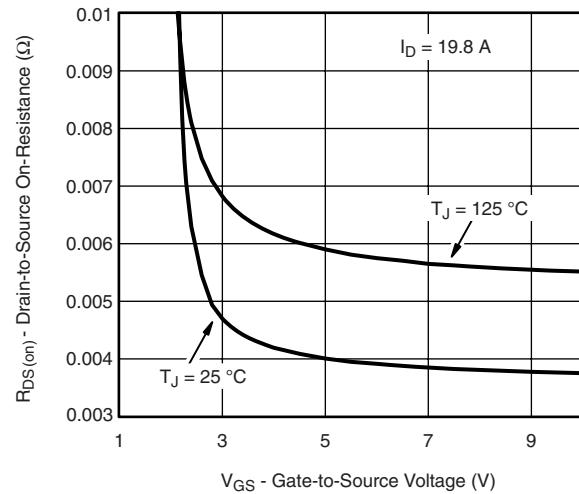
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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


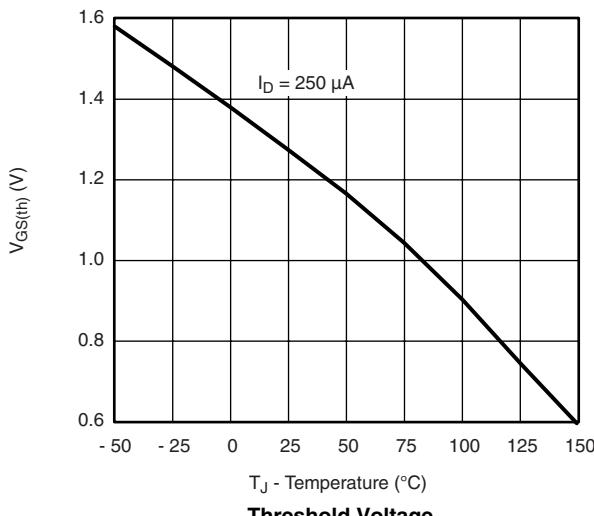
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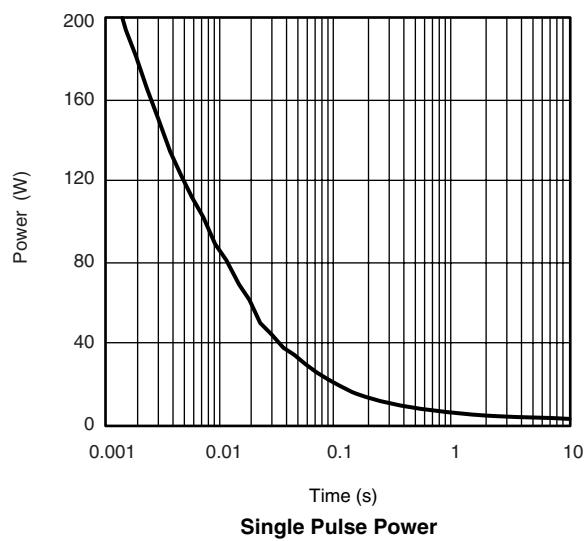
Source-Drain Diode Forward Voltage



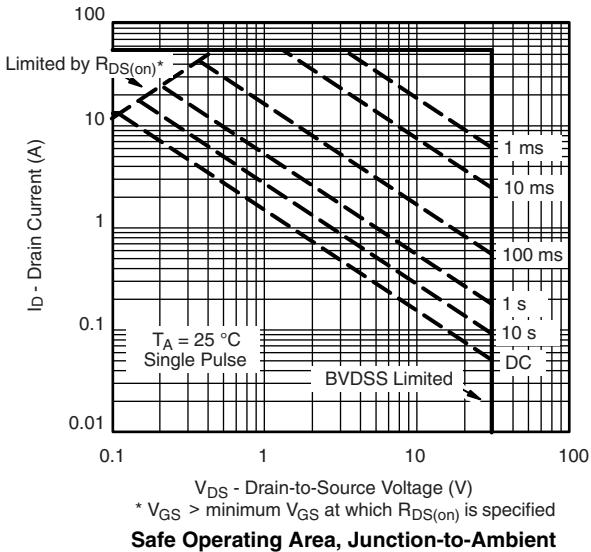
On-Resistance vs. Gate-to-Source Voltage



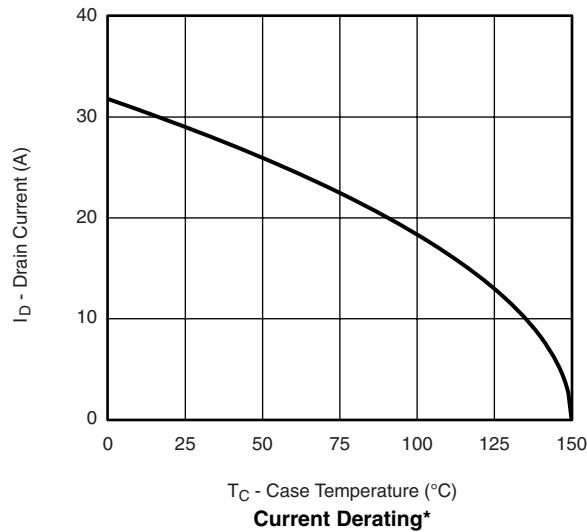
Threshold Voltage



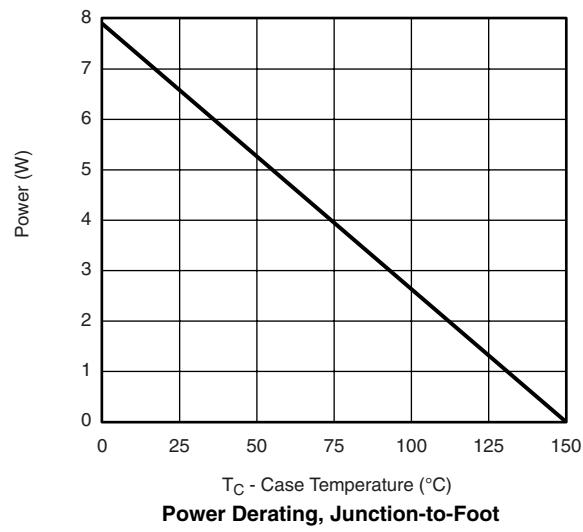
Single Pulse Power



Safe Operating Area, Junction-to-Ambient

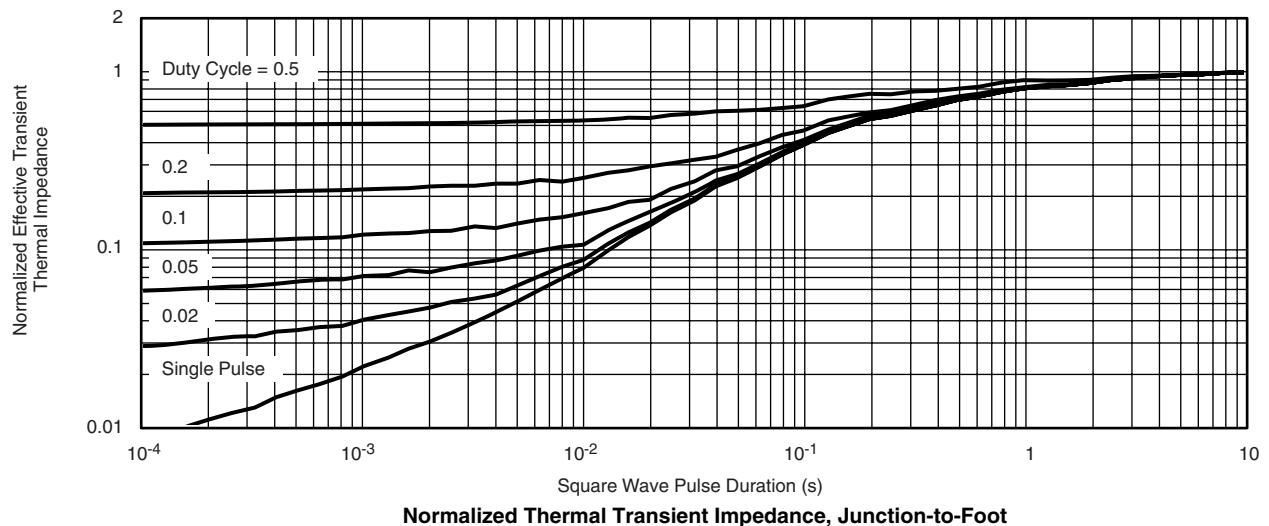
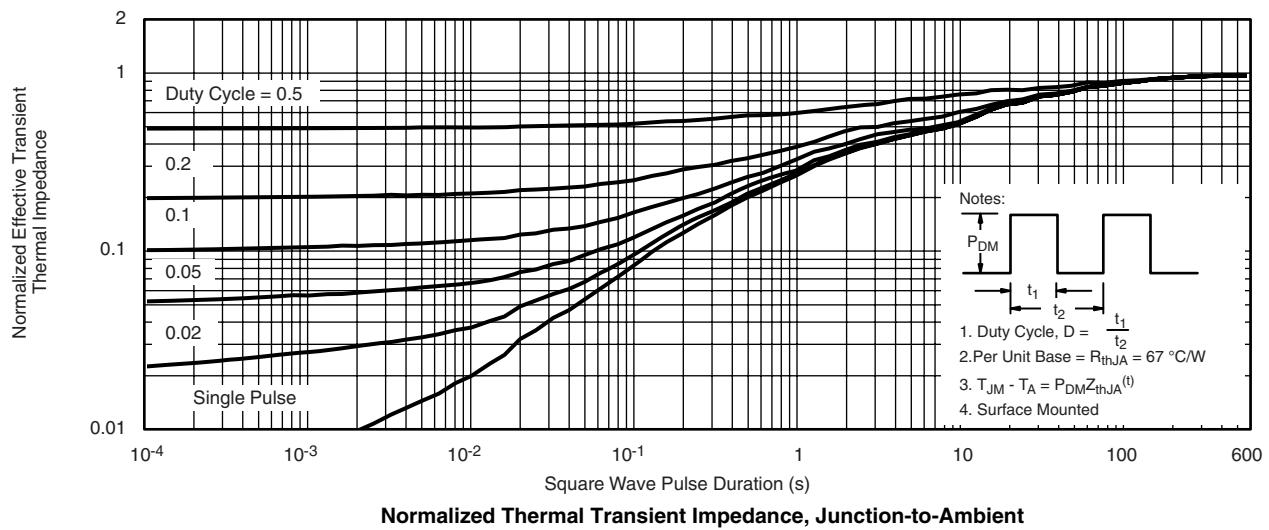
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T<sub>C</sub> - Case Temperature (°C)  
**Current Derating\***



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

\* 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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