

N-Channel 8-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a	Q_g (Typ)
8	0.047 at $V_{GS} = 4.5$ V	4.0 ^a	4.24 nC
	0.051 at $V_{GS} = 2.5$ V	4.0 ^a	
	0.058 at $V_{GS} = 1.8$ V	4.0 ^a	
	0.069 at $V_{GS} = 1.5$ V	4.0 ^a	

FEATURES

- TrenchFET[®] Power MOSFET: 1.5 V Rated
- 100 % R_g Tested

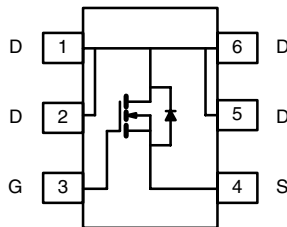


RoHS
COMPLIANT

APPLICATIONS

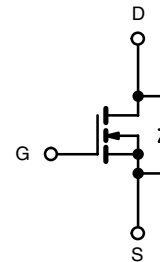
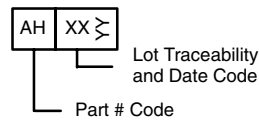
- Load Switch for Portable Applications
- Guaranteed Operation at $V_{GS} = 1.5$ V
- Critical for Optimized Design and Space Savings

SOT-363
SC-70 (6-LEADS)



Top View

Marking Code



N-Channel MOSFET

Ordering Information: Si1450DH-T1-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	8	V
Gate-Source Voltage	V_{GS}	± 5	
Continuous Drain Current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	A
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
Pulsed Drain Current	I_{DM}	15	A
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C	
		$T_A = 25$ °C	
Maximum Power Dissipation	P_D	$T_C = 25$ °C	W
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature) ^{d, e}		260	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, f}	R_{thJA}	60	80	°C/W
Maximum Junction-to-Foot (Drain)	R_{thJF}	34	45	

Notes:

a. Package limited.

b. Surface Mounted on 1" x 1" FR4 Board.

c. $t = 5$ sec.

d. Maximum under Steady State conditions is 125 °C/W.

SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	8			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		8.32		mV/ $^{\circ}\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 2.7		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	0.3		1	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 5\text{ V}$			± 100	ns
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 8\text{ V}$, $V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 8\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^{\circ}\text{C}$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq 5\text{ V}$, $V_{GS} = 4.5\text{ V}$	15			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 4.5\text{ V}$, $I_D = 4.0\text{ A}$		0.039	0.047	Ω
		$V_{GS} = 2.5\text{ V}$, $I_D = 4.0\text{ A}$		0.042	0.051	
		$V_{GS} = 1.8\text{ V}$, $I_D = 4.0\text{ A}$		0.048	0.058	
		$V_{GS} = 1.5\text{ V}$, $I_D = 1.28\text{ A}$		0.053	0.069	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 4\text{ V}$, $I_D = 4.0\text{ A}$		15.5		S
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{DS} = 4\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$		535		pF
Output Capacitance	C_{oss}			120		
Reverse Transfer Capacitance	C_{rss}			61		
Total Gate Charge	Q_g	$V_{DS} = 4\text{ V}$, $V_{GS} = 5\text{ V}$, $I_D = 4.0\text{ A}$		4.7	7.05	nC
Gate-Source Charge	Q_{gs}	$V_{DS} = 4\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 4.0\text{ A}$		4.24	6.4	
Gate-Drain Charge	Q_{gd}			1.2		
				0.810		
Gate Resistance	R_g	$f = 1\text{ MHz}$		7.3	11	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 4\text{ V}$, $R_L = 1.11\text{ }\Omega$ $I_D \equiv 3.6\text{ A}$, $V_{GEN} = 4.5\text{ V}$, $R_g = 1\text{ }\Omega$		8	12	ns
Rise Time	t_r			73	110	
Turn-Off Delay Time	$t_{d(off)}$			18	27	
Fall Time	t_f			5	7.5	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^{\circ}\text{C}$			2.6	A
Pulse Diode Forward Current	I_{SM}				15	
Body Diode Voltage	V_{SD}	$I_S = 2.6\text{ A}$, $V_{GS} = 0\text{ V}$		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 2.6\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^{\circ}\text{C}$		14.3	21.45	ns
Body Diode Reverse Recovery Charge	Q_{rr}			3.6	5.4	nC
Reverse Recovery Fall Time	t_a			6.8		ns
Reverse Recovery Rise Time	t_b			7.5		

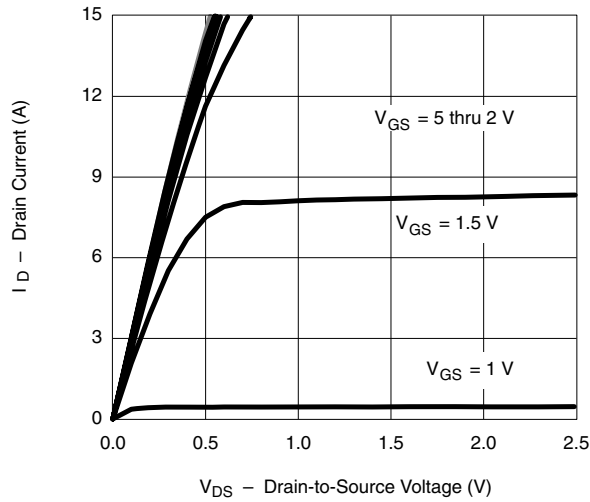
Notes:

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

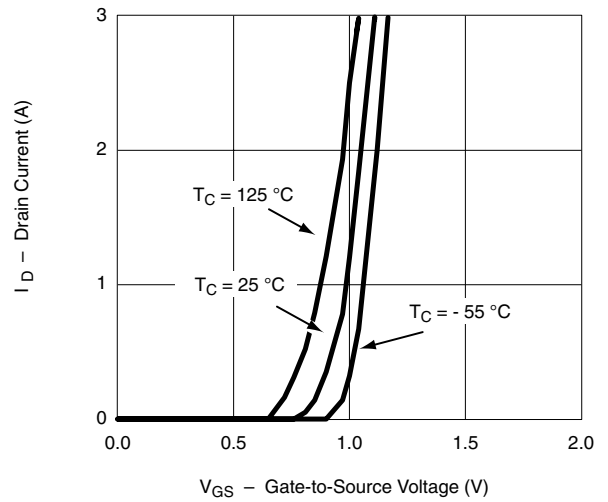
b. Guaranteed by design, not subject to production testing.

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.

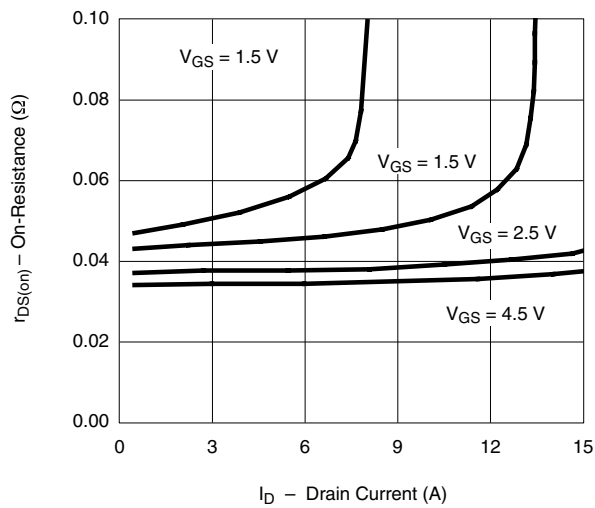
TYPICAL CHARACTERISTICS 25 °C, unless noted



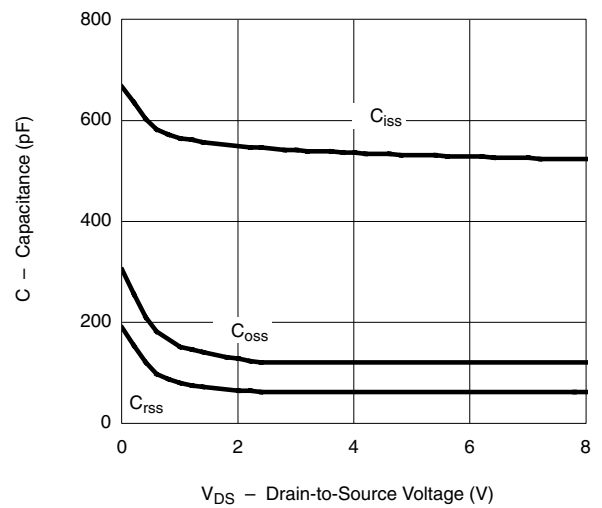
Output Characteristics



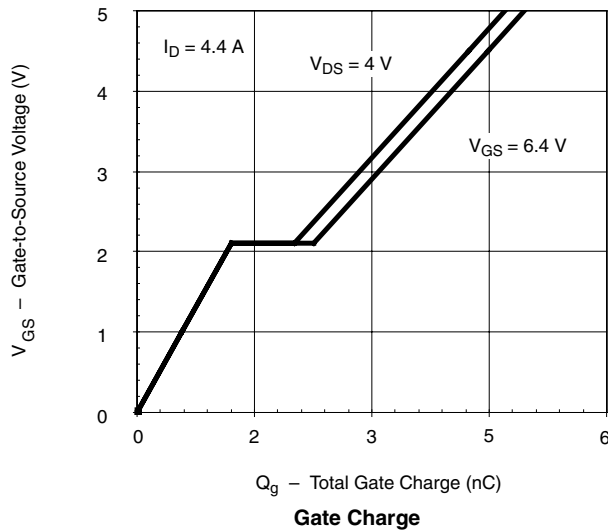
Transfer Characteristics



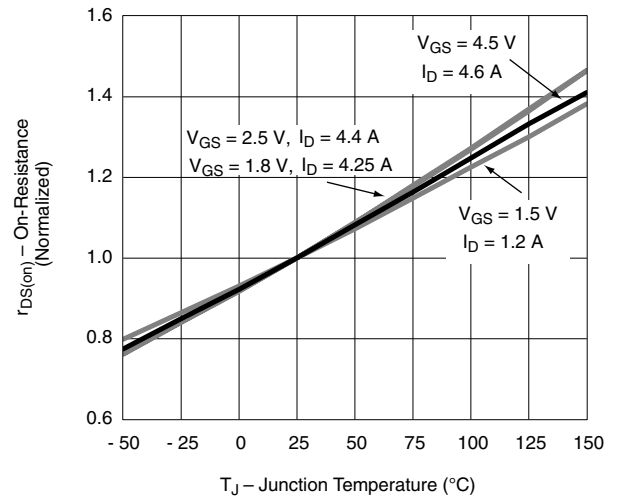
$r_{DS(on)}$ vs. Drain Current



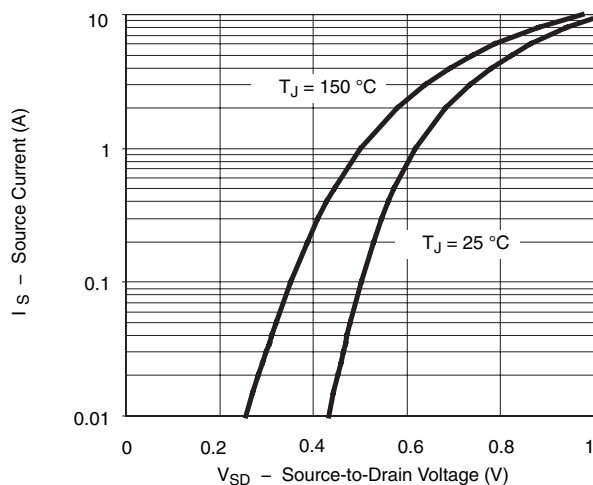
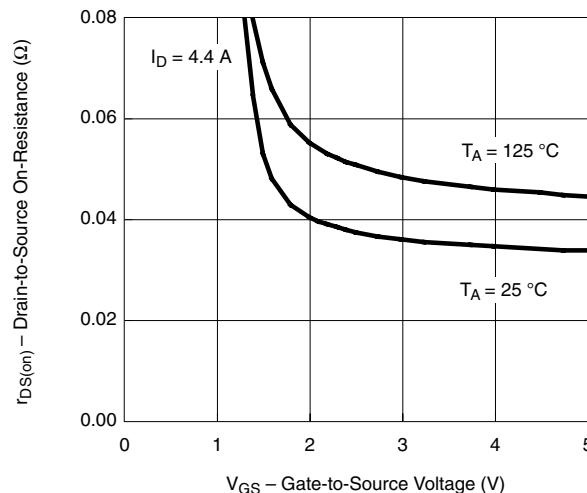
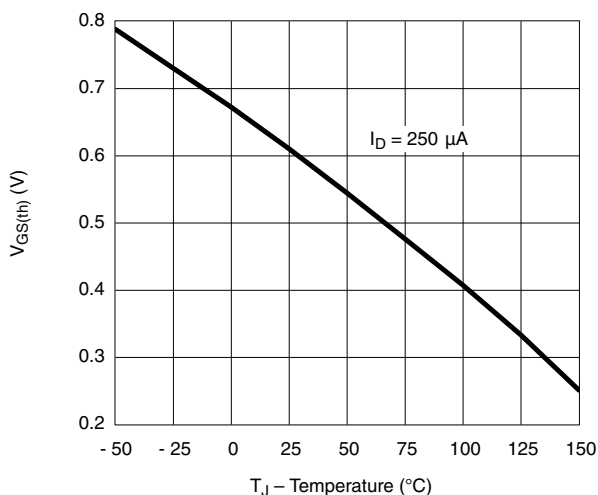
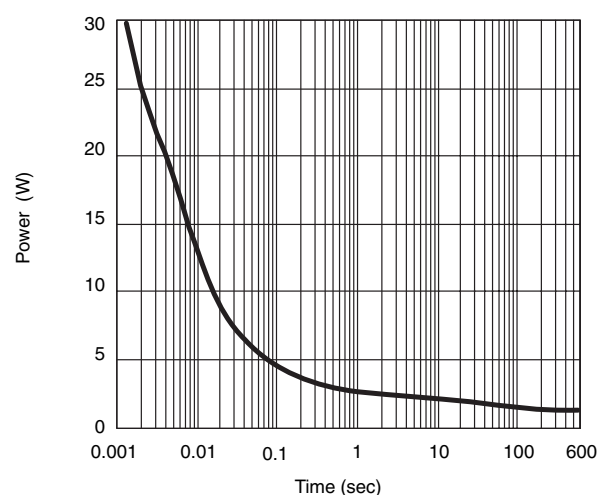
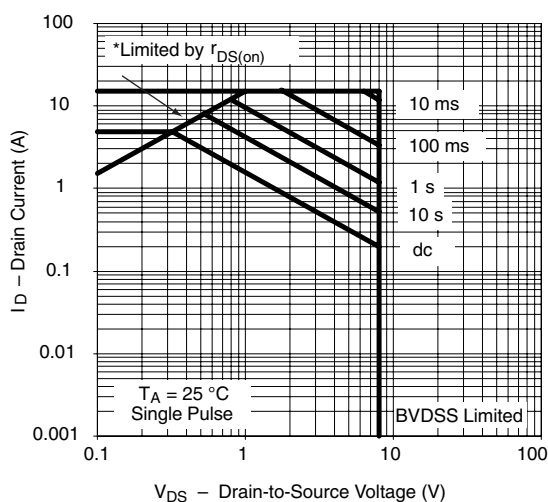
Capacitance



Gate Charge



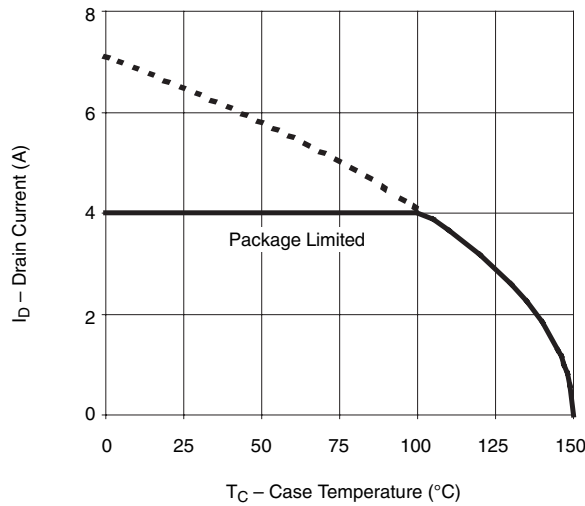
On-Resistance vs. Junction Temperature

TYPICAL CHARACTERISTICS 25 °C, unless noted**Forward Diode Voltage vs. Temp** **$r_{DS(on)}$ vs. V_{GS} vs. Temperature****Threshold Voltage****Single Pulse Power**

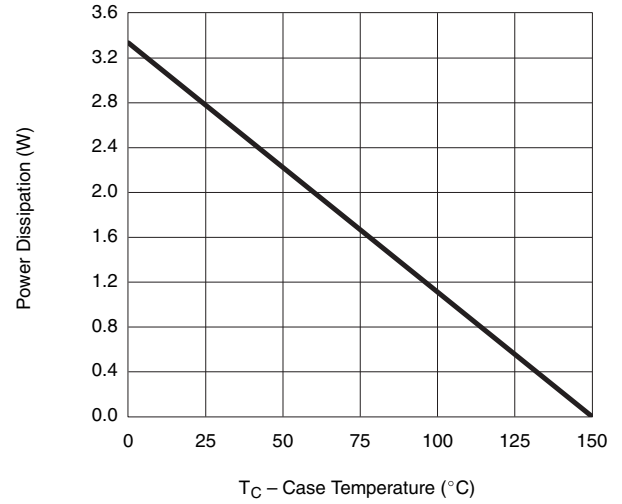
$V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case

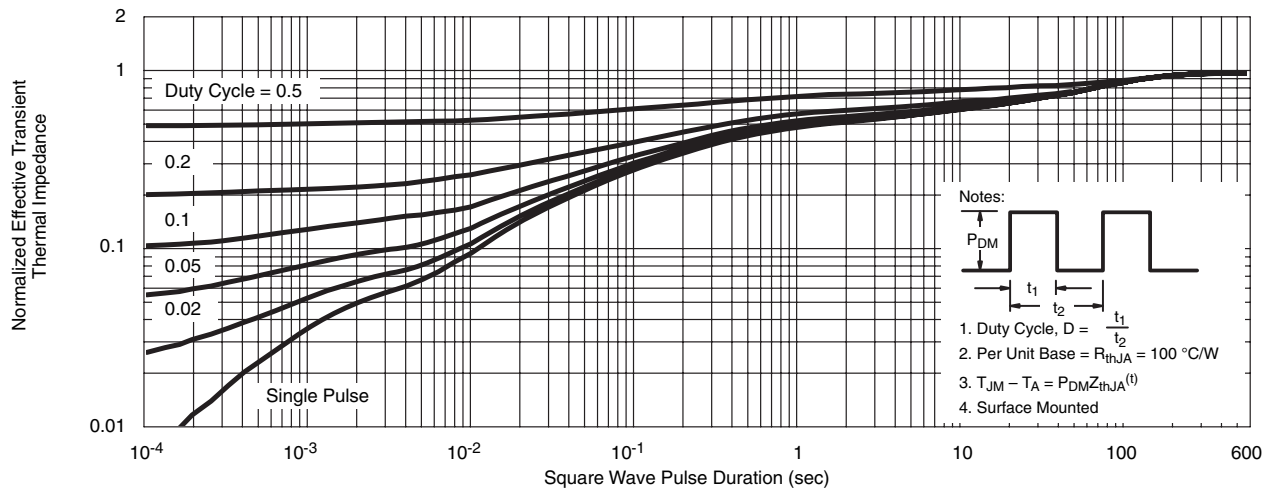
TYPICAL CHARACTERISTICS 25 °C, unless noted



Current Derating*

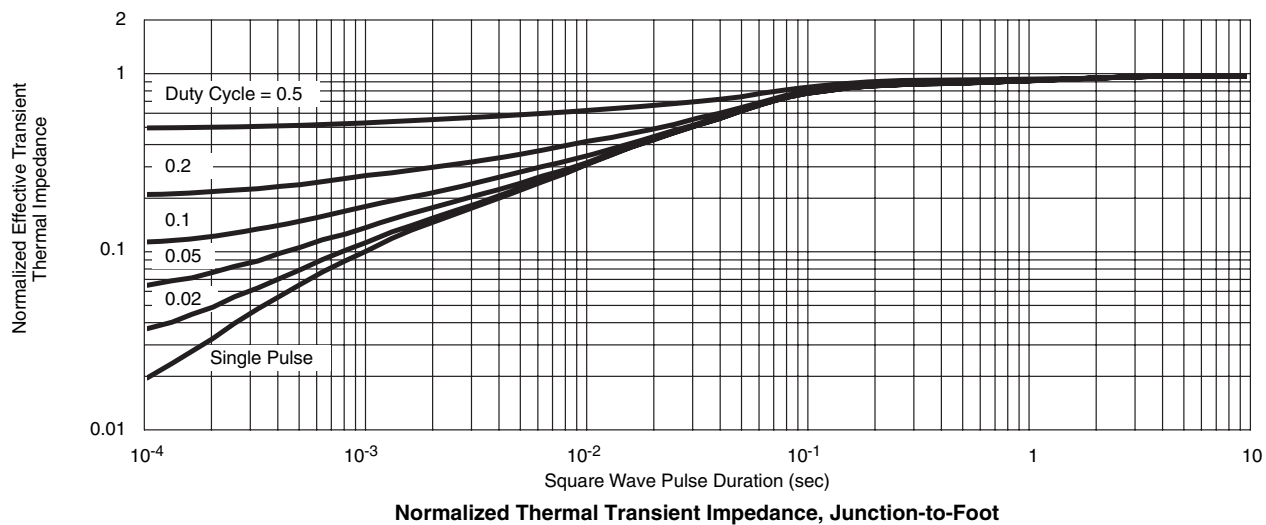


Power Derating



Normalized Thermal Transient Impedance, Junction-to-Ambient

*The power dissipation P_D is based on $T_{J(max)} = 150\text{ }^{\circ}\text{C}$, 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 noted

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