

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

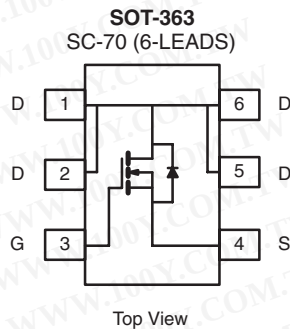
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET: 1.5 V Rated
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



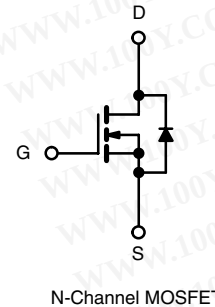
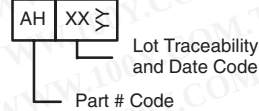
RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

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



Marking Code



Ordering Information: Si1450DH-T1-E3 (Lead (Pb)-free)
Si1450DH-T1-GE3 (Lead (Pb)-free and Halogen-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	V
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	6.04 ^a
		T _C = 70 °C	4.8 ^a
		T _A = 25 °C	4.53 ^a
		T _A = 70 °C	3.62 ^a
Pulsed Drain Current	I _{DM}	15	A
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	2.3
		T _A = 25 °C	1.3 ^c
Maximum Power Dissipation	P _D	T _C = 25 °C	2.78
		T _C = 70 °C	1.78
		T _A = 25 °C	1.56 ^{b, c}
		T _A = 70 °C	1.0 ^{b, 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:

- Package limited.
- Surface mounted on 1" x 1" FR4 board.
- t = 5 s.
- 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 V, I _D = 250 μA	8			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		8.32		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 2.7		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.3		1	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 5 V			± 100	ns
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 8 V, V _{GS} = 0 V			1	μA
		V _{DS} = 8 V, V _{GS} = 0 V, T _J = 55 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≤ 5 V, V _{GS} = 4.5 V	15			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 4.0 A		0.039	0.047	Ω
		V _{GS} = 2.5 V, I _D = 4.0 A		0.042	0.051	
		V _{GS} = 1.8 V, I _D = 4.0 A		0.048	0.058	
		V _{GS} = 1.5 V, I _D = 1.28 A		0.053	0.069	
Forward Transconductance ^a	g _{fs}	V _{DS} = 4 V, I _D = 4.0 A		15.5		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 4 V, V _{GS} = 0 V, f = 1 MHz		535		pF
Output Capacitance	C _{oss}			120		
Reverse Transfer Capacitance	C _{rss}			61		
Total Gate Charge	Q _g	V _{DS} = 4 V, V _{GS} = 5 V, I _D = 4.0 A		4.7	7.05	nC
		V _{DS} = 4 V, V _{GS} = 4.5 V, I _D = 4.0 A		4.24	6.4	
Gate-Source Charge	Q _{gs}			1.2		
Gate-Drain Charge	Q _{gd}			0.810		
Gate Resistance	R _g	f = 1 MHz		7.3	11	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 4 V, R _L = 1.11 Ω I _D ≅ 3.6 A, V _{GEN} = 4.5 V, R _g = 1 Ω		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 °C			2.6	A
Pulse Diode Forward Current	I _{SM}				15	
Body Diode Voltage	V _{SD}	I _S = 2.6 A, V _{GS} = 0 V		0.8	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 2.6 A, di/dt = 100 A/μs, T _J = 25 °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 $\leq 2\%$.

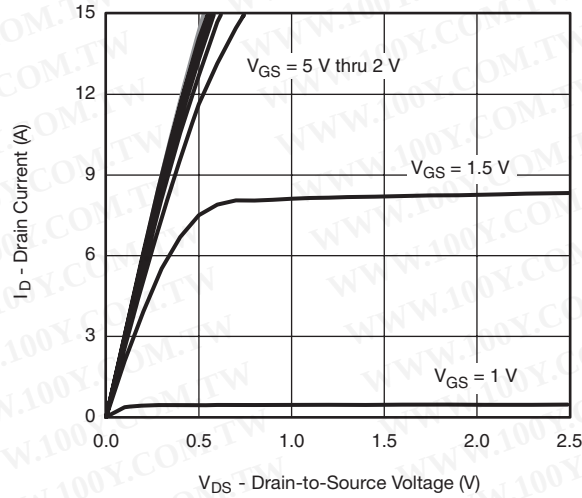
b. Guaranteed by design, not subject to production testing.

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.

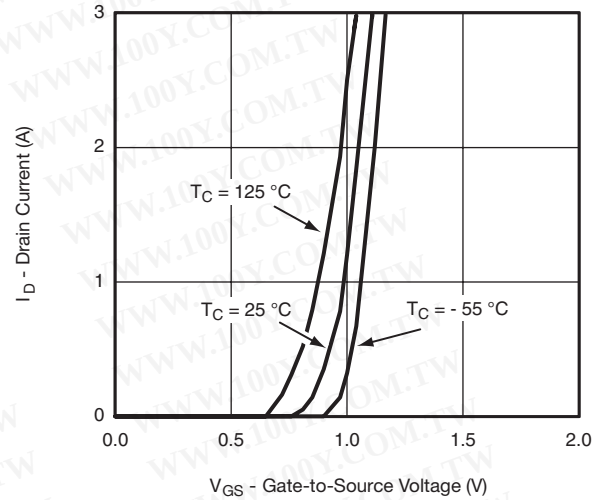
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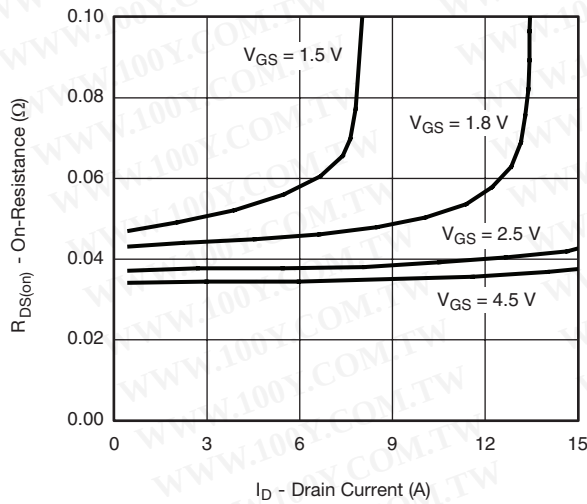
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



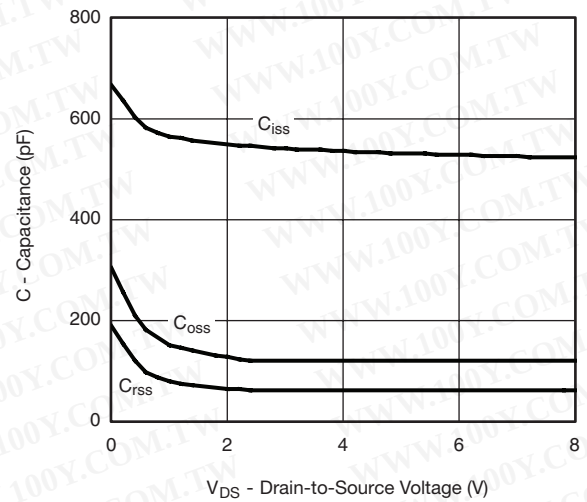
Output Characteristics



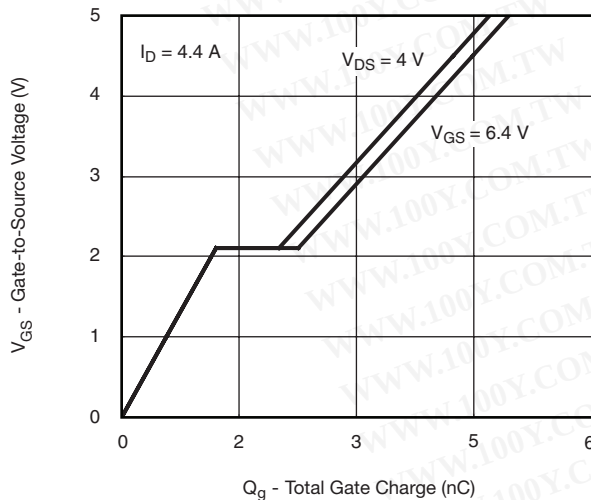
Transfer Characteristics



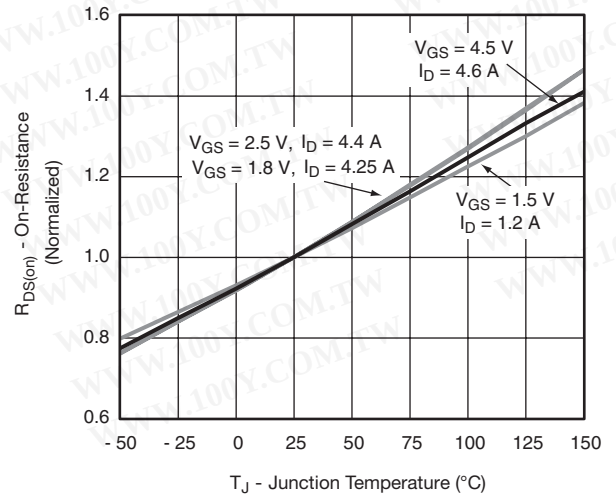
$R_{DS(on)}$ vs. Drain Current



Capacitance



Gate Charge



On-Resistance vs. Junction Temperature

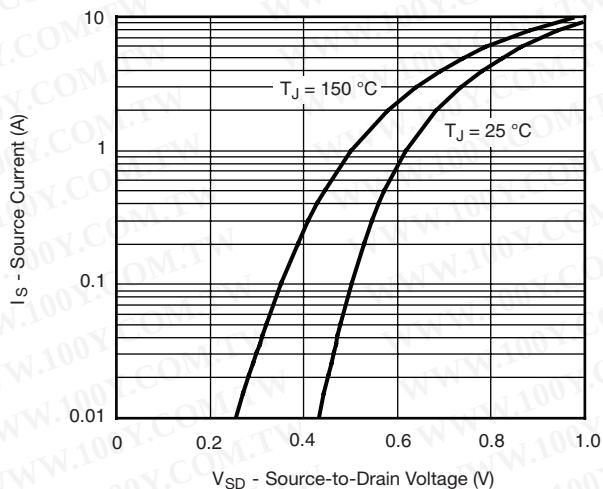
Si1450DH

Vishay Siliconix

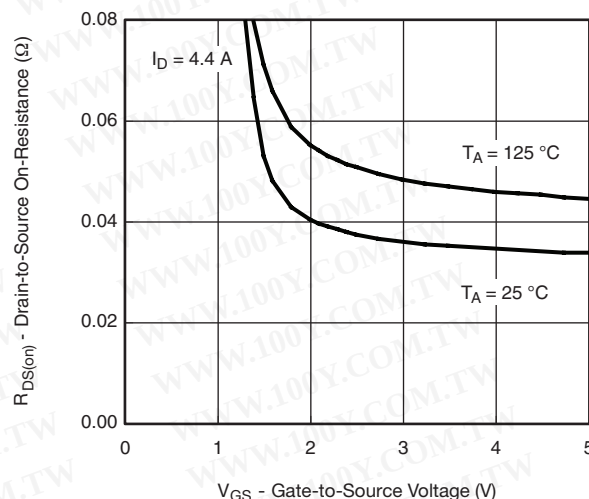
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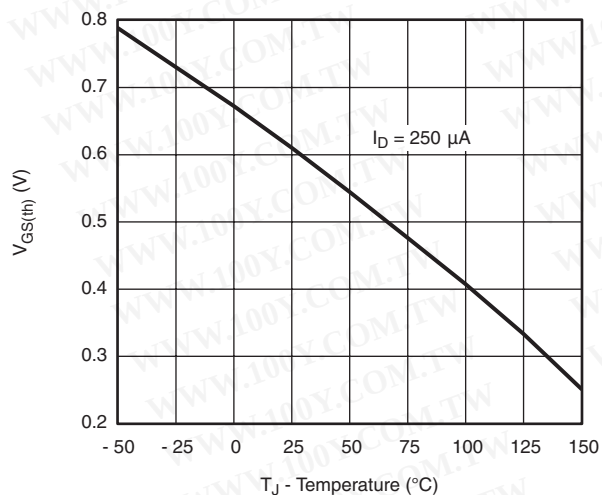
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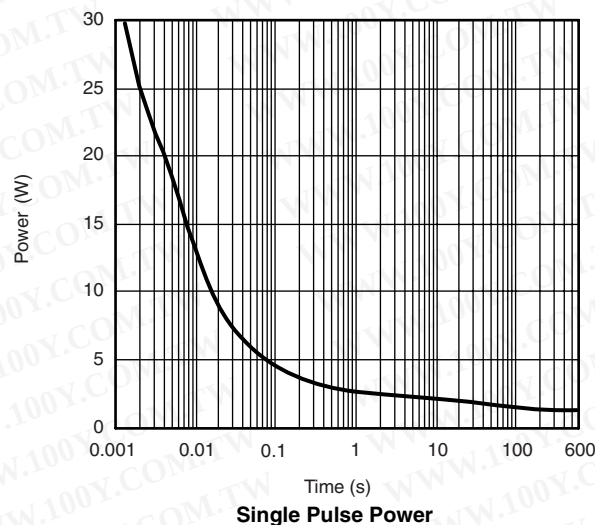
Forward Diode Voltage vs. Temperature



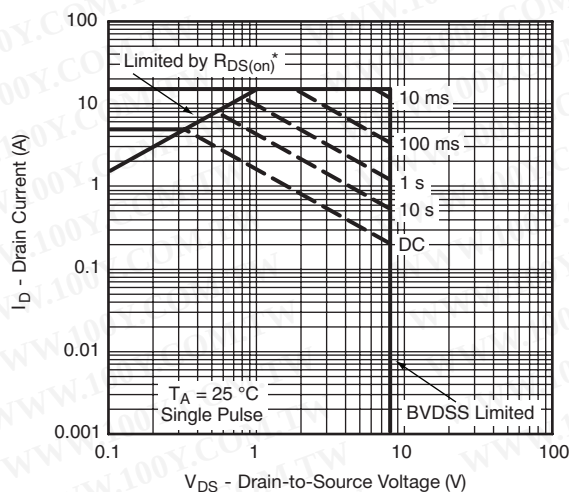
$R_{DS(on)}$ vs. V_{GS} vs. Temperature



Threshold Voltage



Single Pulse Power

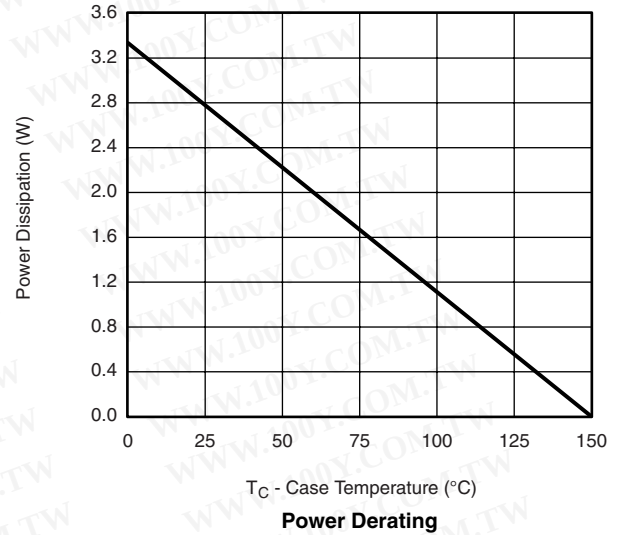
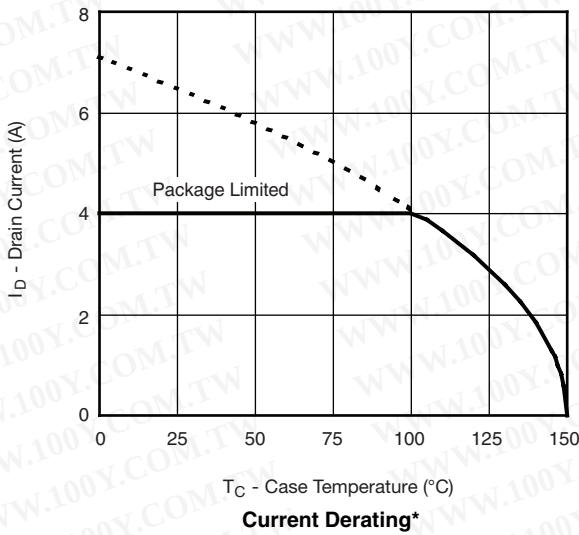


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case

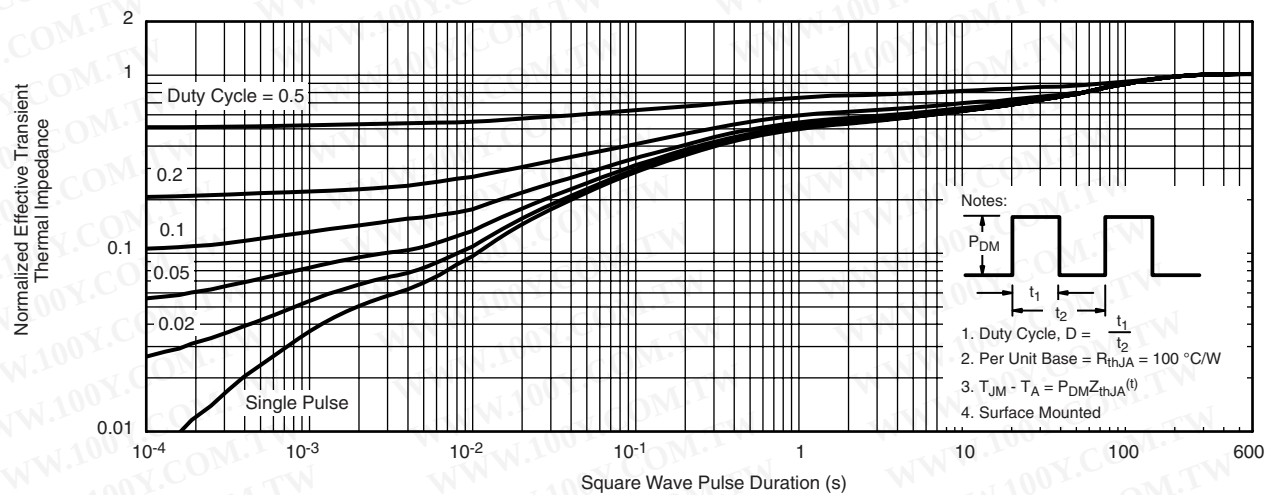
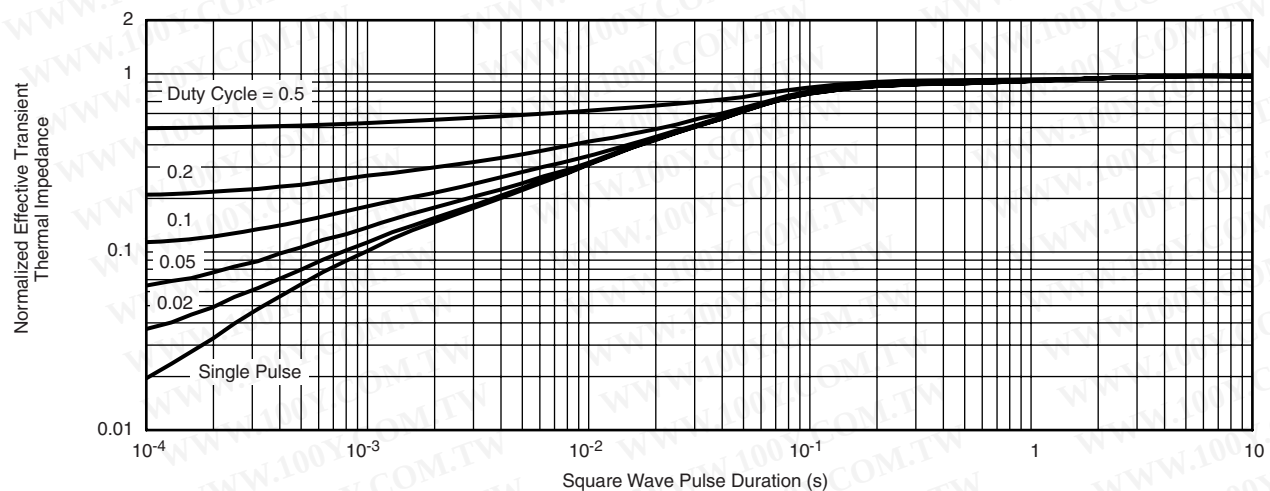


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



* 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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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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