

Dual P-Channel 1.8-V (G-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)	Q _g (Typ)
- 8	0.542 at V _{GS} = - 4.5 V	- 0.63	10.5 nC
	0.798 at V _{GS} = - 2.5 V	- 0.52	
	1.2 at V _{GS} = - 1.8 V	- 0.20	

FEATURES

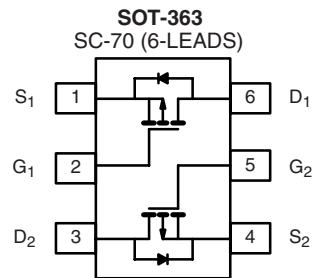
- TrenchFET[®] Power MOSFET

APPLICATIONS

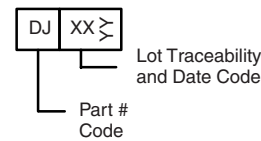
- Load Switch for Portable Devices



RoHS
COMPLIANT



Marking Code



Top View
Ordering Information: Si1905BDH-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}	± 8	
Continuous Drain Current (T _J = 150 °C) ^{a, b}	I _D	T _C = 25 °C	- 0.63
		T _C = 70 °C	- 0.50
		T _A = 25 °C	- 0.58 ^{a, b}
		T _A = 70 °C	- 0.47 ^{a, b}
Pulsed Drain Current (10 μs Pulse Width)	I _{DM}	- 1.8	A
Continuous Source-Drain Diode Current ^{a, b}	I _S	T _C = 25 °C	
		T _A = 25 °C	- 0.25 ^{a, b}
Maximum Power Dissipation ^{a, b}	P _D	T _C = 25 °C	0.357
		T _C = 70 °C	- 0.301
		T _A = 25 °C	0.301 ^{a, b}
		T _A = 70 °C	0.95 ^{a, b}
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature) ^{c, d}		260	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^{a, c}	R _{thJA}	t ≤ 5 s	360	415	°C/W
		Steady State	400	460	
Maximum Junction-to-Foot (Drain)	R _{thJF}	300	350		

Notes:

- a. Surface Mounted on 1" x 1" FR4 board.
- b. t = 5 s.
- c. Maximum under Steady State conditions is 400 °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	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		7.15		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 1.66		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 0.45		- 1.0	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = -8\text{ V}$			- 100	nA
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	$I_{D(on)}$	$V_{DS} \leq 5\text{ V}, V_{GS} = -4.5\text{ V}$	- 1.8			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -0.58\text{ A}$		0.450	0.542	Ω
		$V_{GS} = -2.5\text{ V}, I_D = -0.47\text{ A}$		0.655	0.798	
		$V_{GS} = -1.8\text{ V}, I_D = -0.2\text{ A}$		0.950	1.2	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -4\text{ V}, I_D = -0.58\text{ A}$		1.2		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -4\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		62		μF
Output Capacitance	C_{oss}			30		
Reverse Transfer Capacitance	C_{rss}			12		
Total Gate Charge	Q_g	$V_{DS} = -4\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -0.58\text{ A}$		1.0	1.5	nC
Gate-Source Charge	Q_{gs}			0.19		
Gate-Drain Charge	Q_{gd}			0.20		
Gate Resistance	R_g	$f = 1\text{ MHz}$		6.3		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -4\text{ V}, R_L = 8.7\text{ }\Omega$ $I_D \cong -0.46\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		9	14	ns
Rise Time	t_r			40	60	
Turn-Off Delay Time	$t_{d(off)}$			50	75	
Fall Time	t_f			60	90	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			- 0.30	A
Pulse Diode Forward Current	I_{SM}				- 1.8	
Body Diode Voltage	V_{SD}	$I_S = -1.4\text{ A}, V_{GS} = 0\text{ V}$		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -1.4\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		25	38	ns
Body Diode Reverse Recovery Charge	Q_{rr}			7	11	nC
Reverse Recovery Fall Time	t_a			9		ns
Reverse Recovery Rise Time	t_b			16		

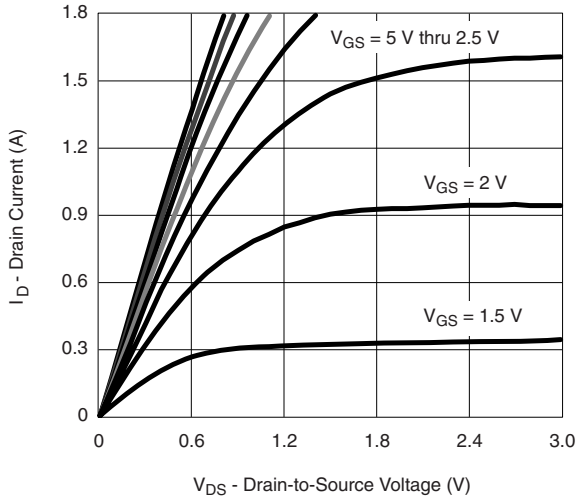
Notes:

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

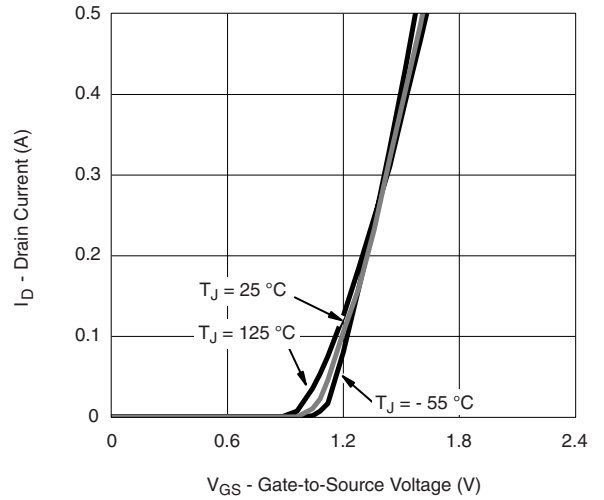
b. Guaranteed by design, not subject to production testing.

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.

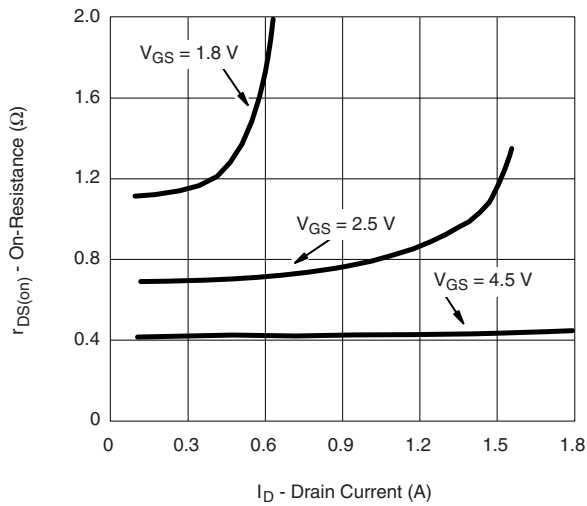
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



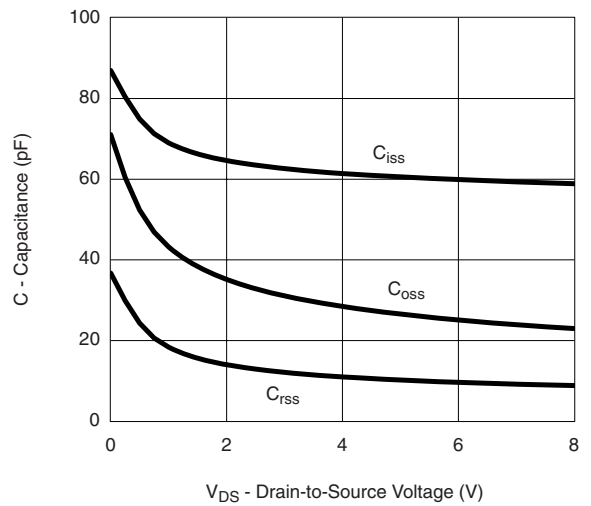
Output Characteristics



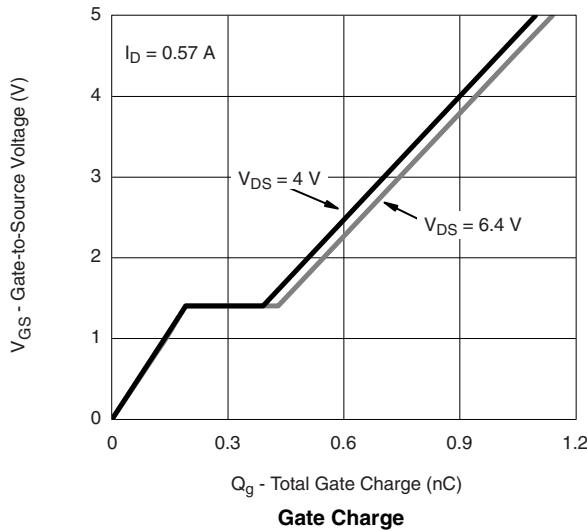
Transfer Characteristics



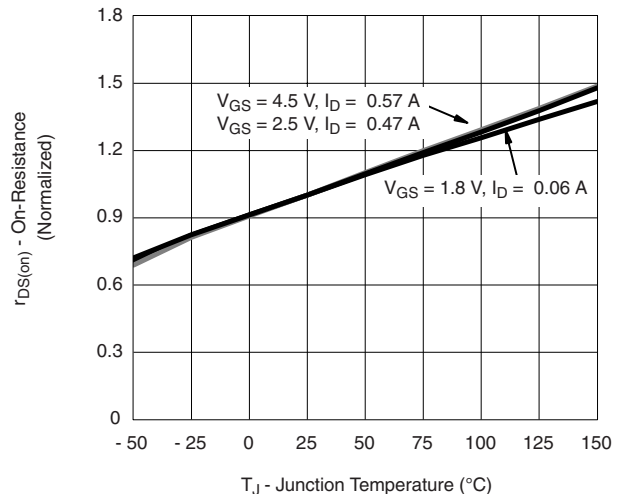
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



Gate Charge



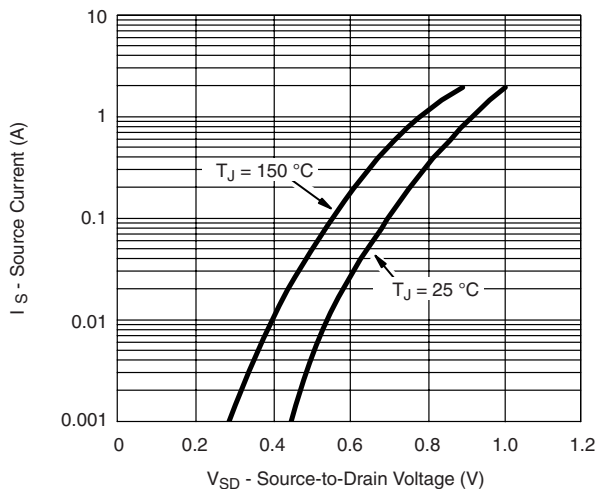
On-Resistance vs. Junction Temperature

Si1905BDH

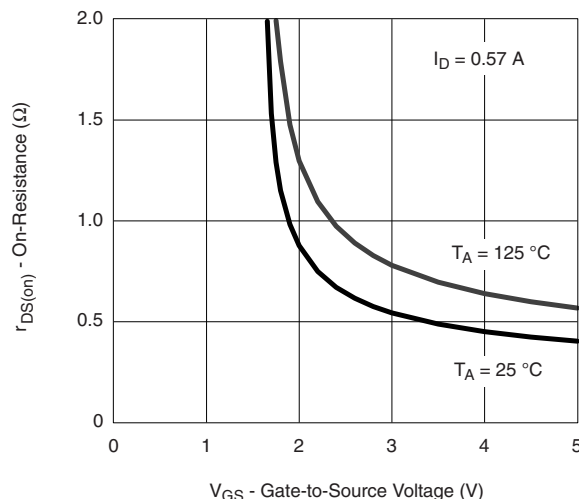
Vishay Siliconix



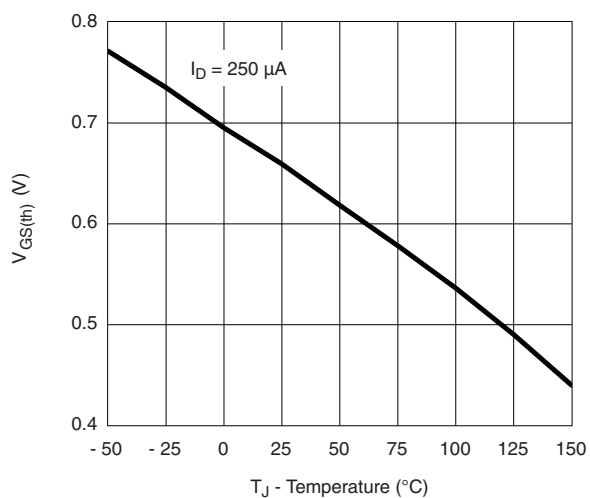
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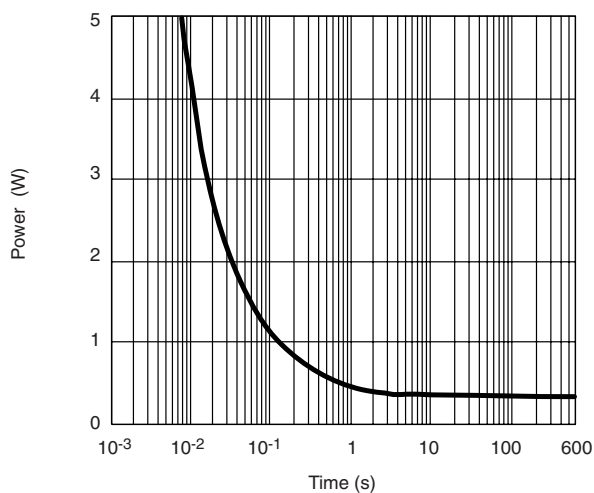
Source-Drain Diode Forward Voltage



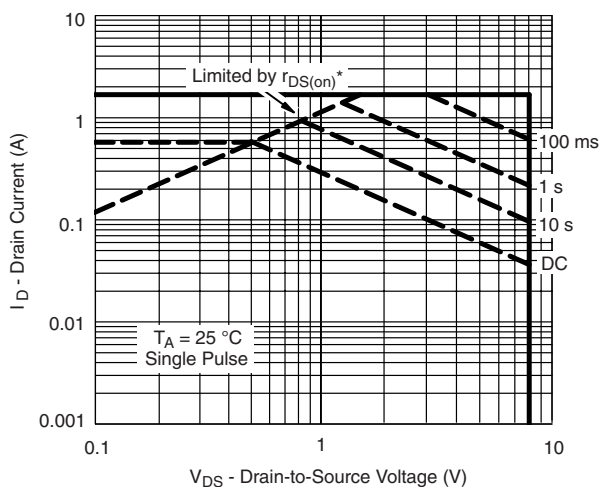
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient

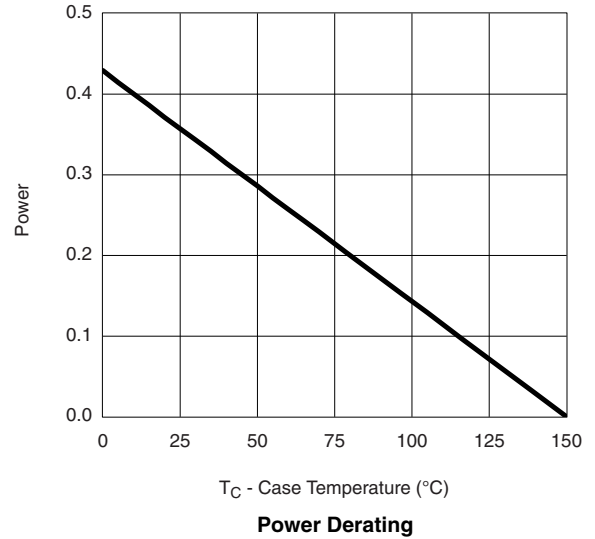
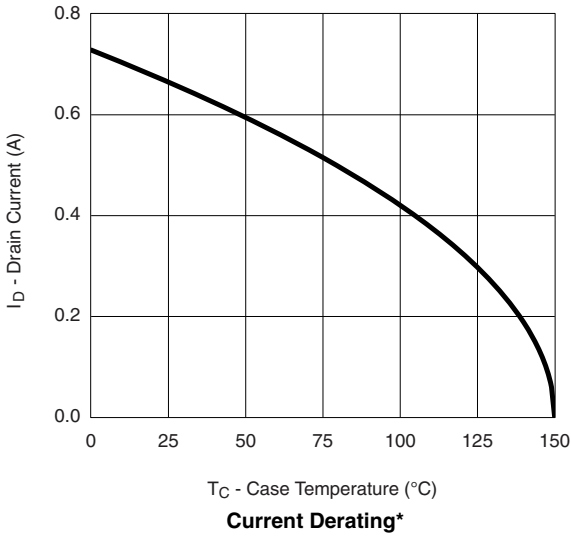


* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient



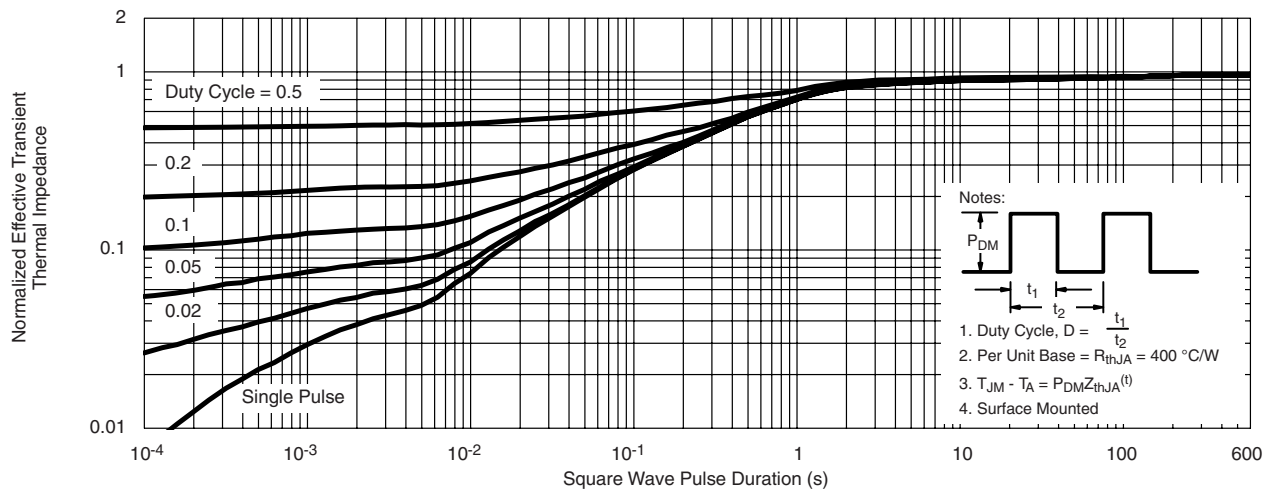
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



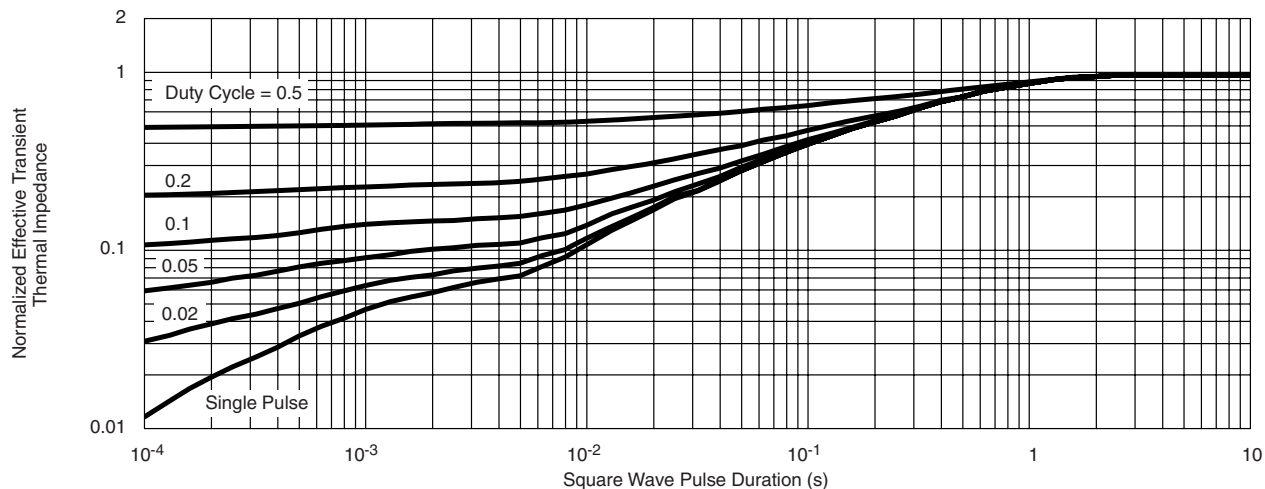
* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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