

Dual N-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
60	1.4 at $V_{GS} = 10$ V	0.37	0.47
	3.0 at $V_{GS} = 4.5$ V	0.25	

FEATURES

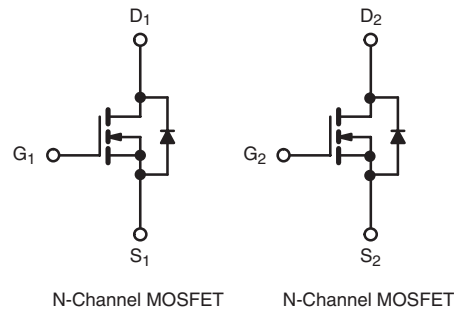
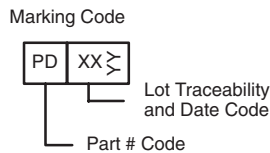
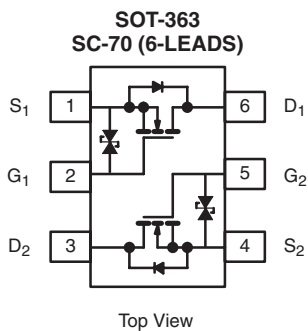
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- ESD Protected: 1800 V



RoHS
COMPLIANT

APPLICATIONS

- Low Power Load Switch



Ordering Information: Si1926DL-T1-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	0.37
		$T_C = 70$ °C	0.30
		$T_A = 25$ °C	0.34 ^{b, c}
		$T_A = 70$ °C	0.27 ^{b, c}
Pulsed Drain Current	I_{DM}	0.65	A
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C	
		$T_A = 25$ °C	0.25 ^{b, c}
Maximum Power Dissipation	P_D	$T_C = 25$ °C	0.51
		$T_C = 70$ °C	0.33
		$T_A = 25$ °C	0.30 ^{b, c}
		$T_A = 70$ °C	0.20 ^{b, c}
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 ^{b, d}	R_{thJA}	360	415	°C/W
Maximum Junction-to-Foot (Drain)	R_{thJF}	300	350	

Notes:

- Based on $T_C = 25$ °C.
- Surface mounted on 1" x 1" FR4 board.
- $t = 5$ s.
- 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}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		56.7		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			-3		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		2.5	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 10\text{ V}$			± 150	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			10	
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 85\text{ }^\circ\text{C}$			100	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 10\text{ V}, V_{GS} = 4.5\text{ V}$	0.50			A
		$V_{DS} \geq 7.5\text{ V}, V_{GS} = 10\text{ V}$	0.65			
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 0.34$			1.4	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 0.23$			3	
Forward Transconductance	g_{fs}	$V_{DS} = 30\text{ V}, I_D = 0.2\text{ A}$		159		ms
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		18.5		pF
Output Capacitance	C_{oss}			7.5		
Reverse Transfer Capacitance	C_{rss}			4.2		
Total Gate Charge	Q_g	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 0.34$		0.9	1.4	nC
				0.5	0.75	
Gate-Source Charge	Q_{gs}	$V_{DS} = 30\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 0.34$		0.2		
Gate-Drain Charge	Q_{gd}			0.15		
Gate Resistance	R_g	$f = 1\text{ MHz}$		160	240	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 100\text{ }\Omega$ $I_D \cong 0.3\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		6.5	10	ns
Rise Time	t_r			12	18	
Turn-Off Delay Time	$t_{d(off)}$			13	22	
Fall Time	t_f			14	21	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			0.43	A
Pulse Diode Forward Current ^a	I_{SM}				0.65	
Body Diode Voltage	V_{SD}	$I_S = 0.3\text{ A}$		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 0.6\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		16.5	25	nC
Body Diode Reverse Recovery Charge	Q_{rr}			13	20	ns
Reverse Recovery Fall Time	t_a			13.5		
Reverse Recovery Rise Time	t_b			3		

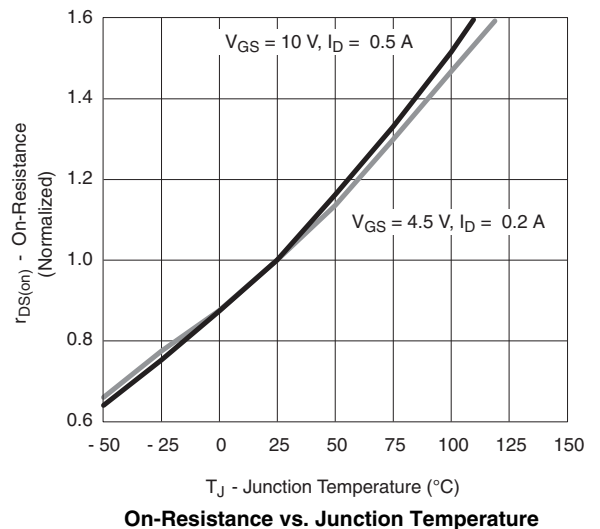
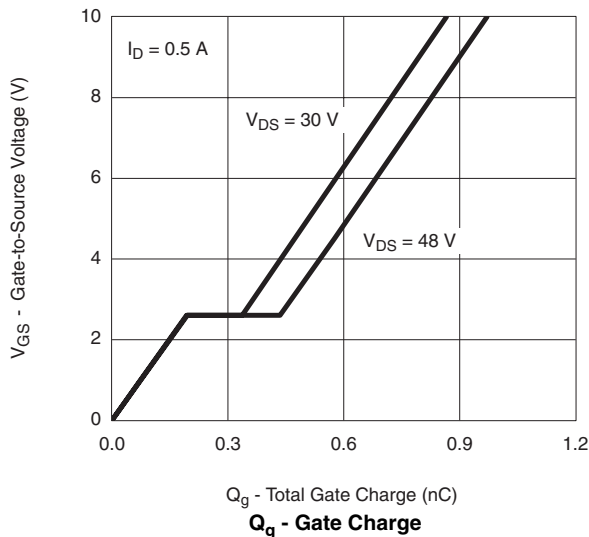
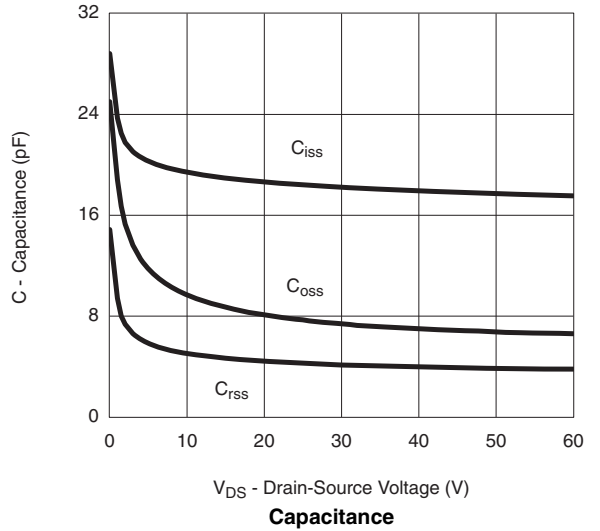
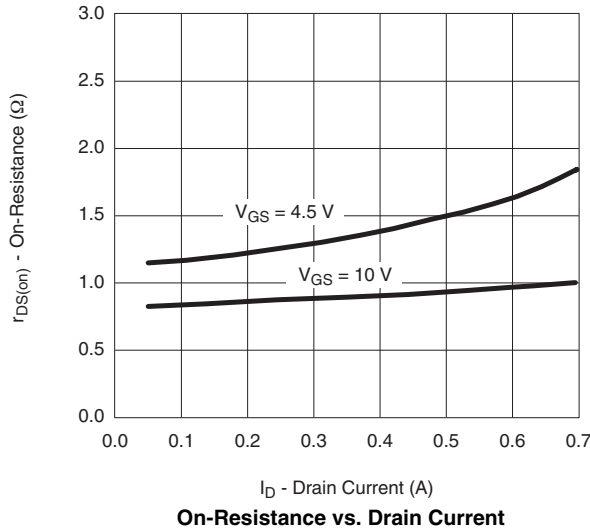
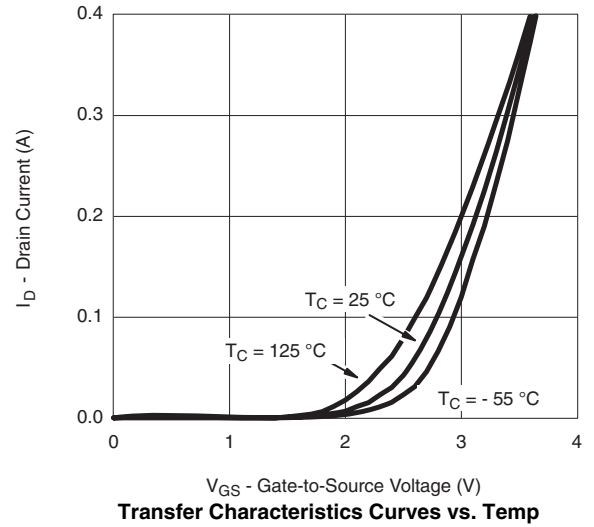
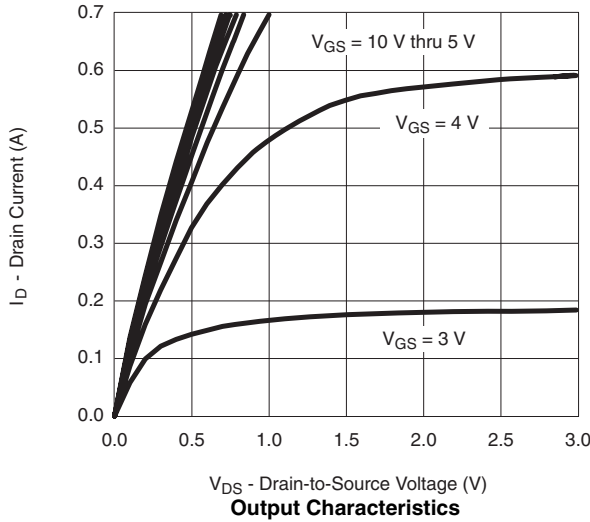
Notes:

- 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.

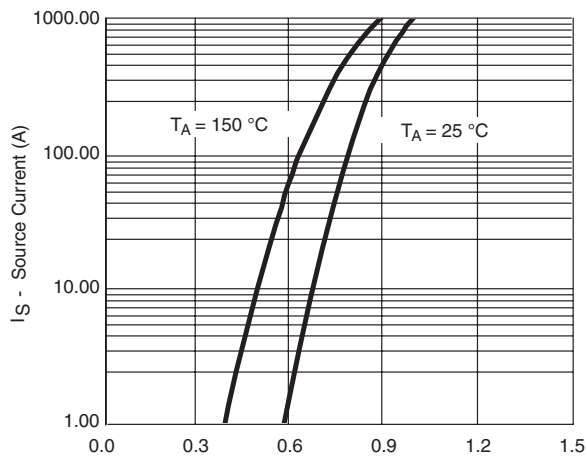


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

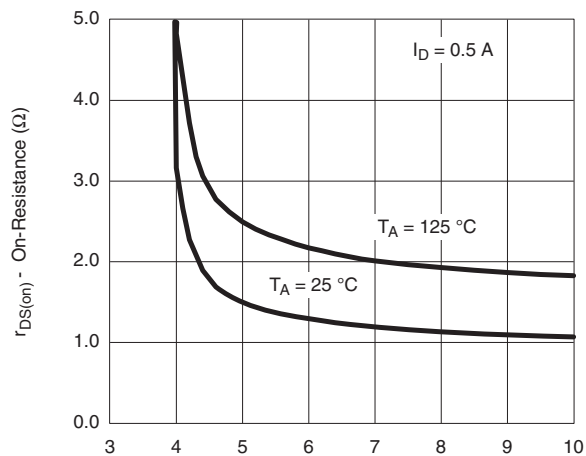




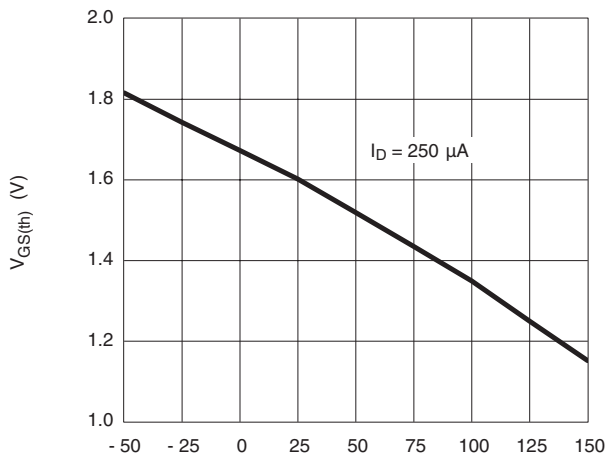
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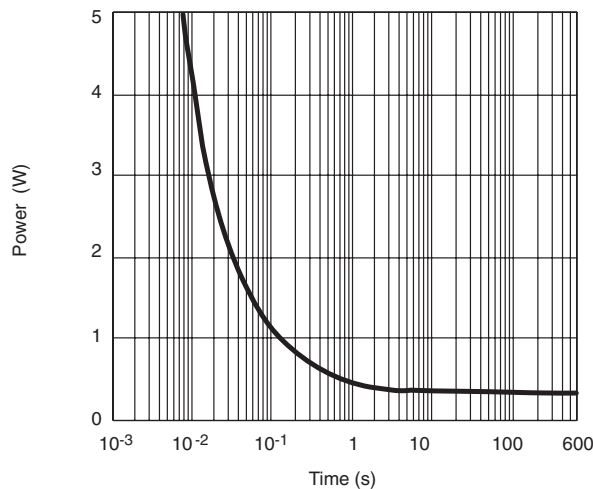
Source-Drain Diode Forward Voltage



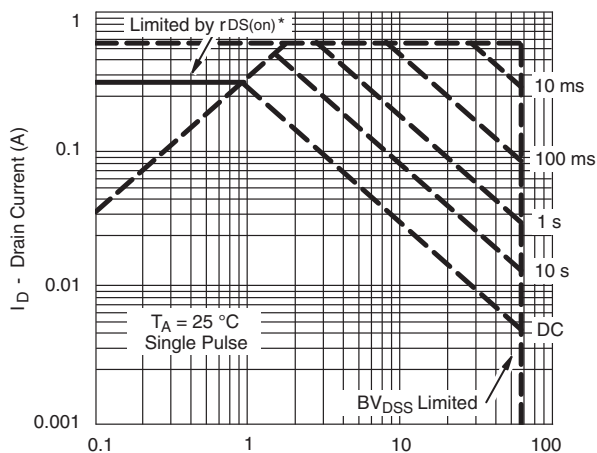
$r_{DS(on)}$ vs. V_{GS} vs. Temperature



Threshold Voltage



Single Pulse Power

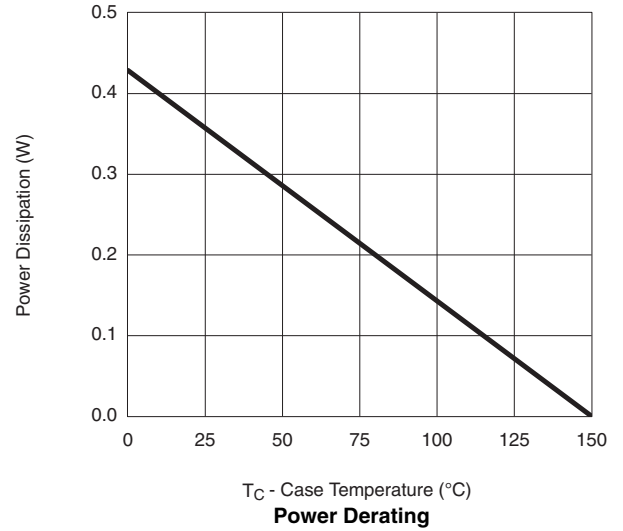
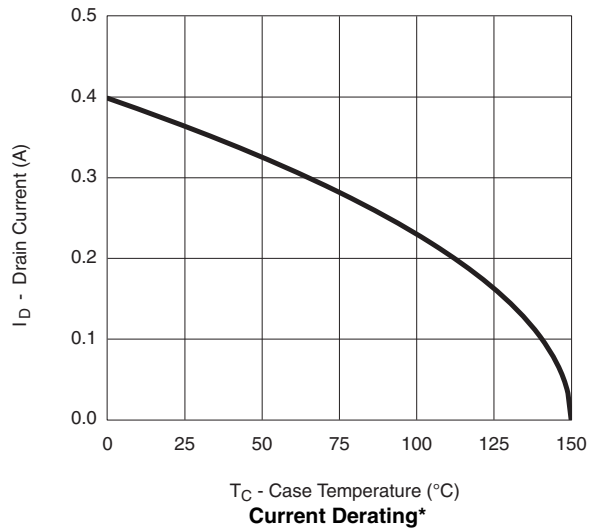


* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified

Safe Operating Area

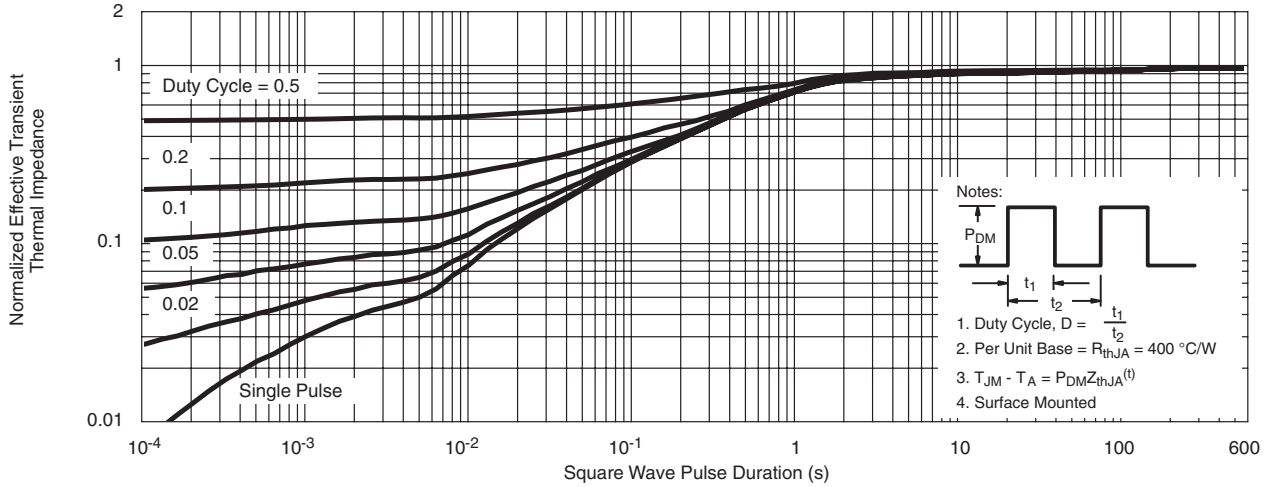


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

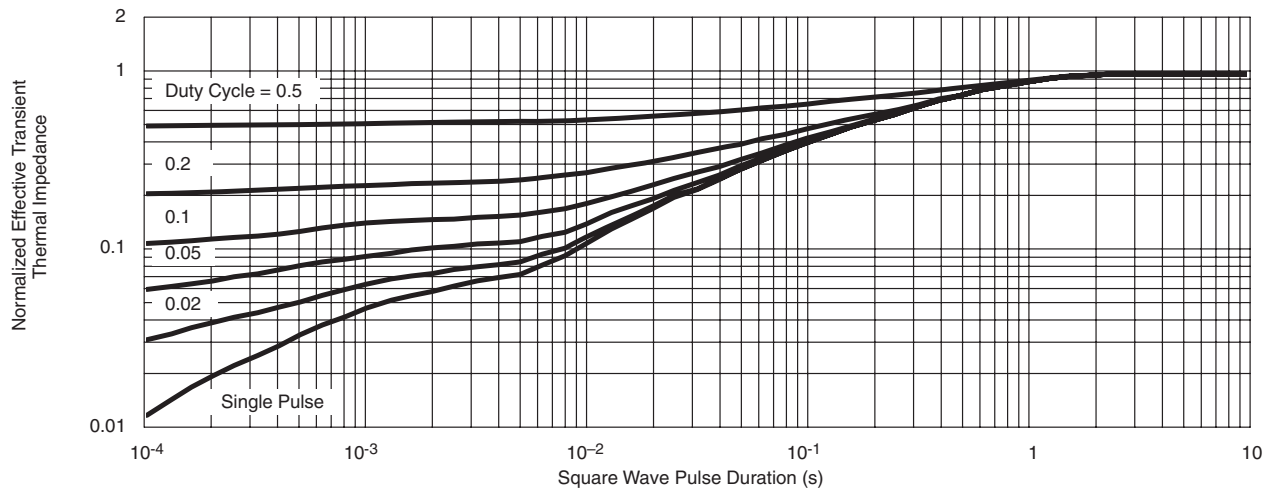


* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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