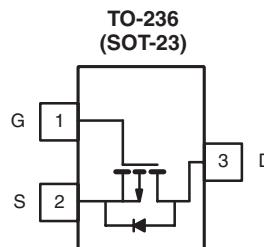


P-Channel 20-V (D-S) MOSFET

MOSFET PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a	Q_g (Typ.)
- 20	0.115 at $V_{GS} = - 4.5$ V	- 3.0	3.2 nC
	0.205 at $V_{GS} = - 2.5$ V	- 2.2	

FEATURES

- Halogen-free Option Available
- TrenchFET® Power MOSFET
- PWM Optimized
- 100 % R_g Tested


RoHS
COMPLIANT


Top View
Si2351DS (G1)*
* Marking Code

Ordering Information: Si2351DS-T1-E3 (Lead (Pb)-free)
Si2351DS-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}	- 20	V	
Gate-Source Voltage	V_{GS}	± 12		
Continuous Drain Current ($T_J = 150$ °C)	$T_C = 25$ °C	I_D	- 2.8	A
	$T_C = 70$ °C		- 2.4	
	$T_A = 25$ °C		- 2.2 ^{b, c}	
	$T_A = 70$ °C		- 1.8 ^{b, c}	
Pulsed Drain Current	I_{DM}	- 10		
Continuous Source-Drain Diode Current	$T_C = 25$ °C	I_S	- 2.0	W
	$T_A = 25$ °C		- 0.91 ^{b, c}	
Maximum Power Dissipation	$T_C = 25$ °C	P_D	2.1	
	$T_C = 70$ °C		1.5	
	$T_A = 25$ °C		1.0 ^{b, c}	
	$T_A = 70$ °C		0.7 ^{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}	90	115	°C/W
Maximum Junction-to-Foot (Drain)	R_{thJF}	60	75	

Notes:

- a. Based on $T_C = 25$ °C.
- b. Surface Mounted on 1" x 1" FR4 board.
- c. $t = 5$ s.
- d. Maximum under Steady State conditions is 130 °C/W.

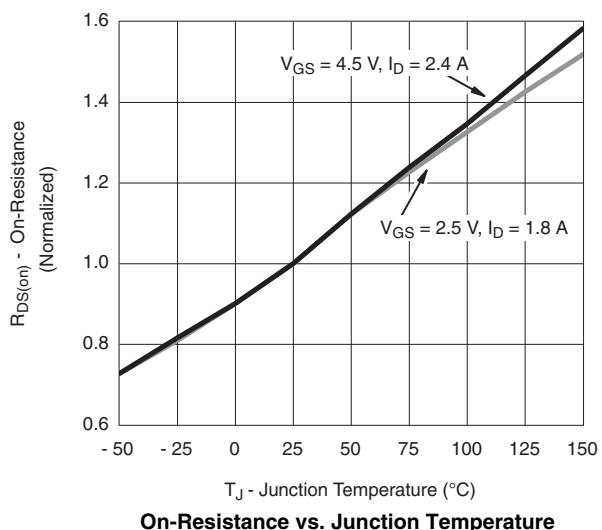
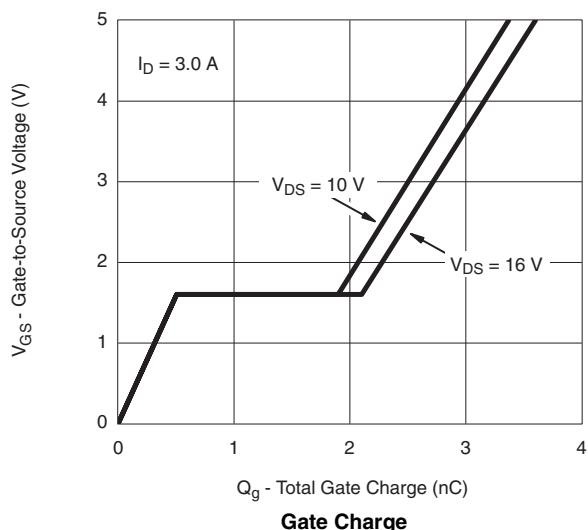
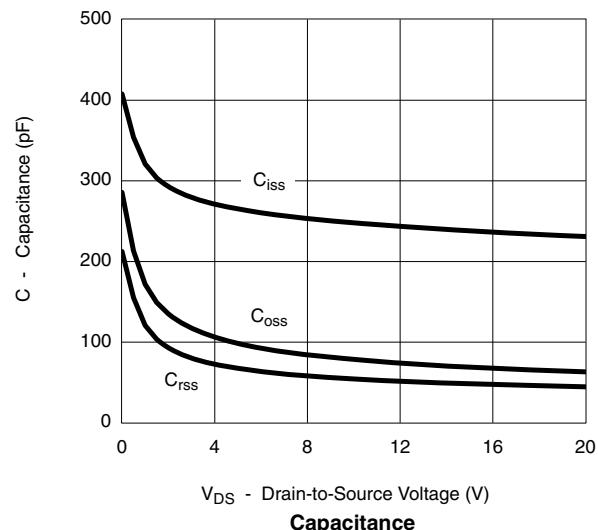
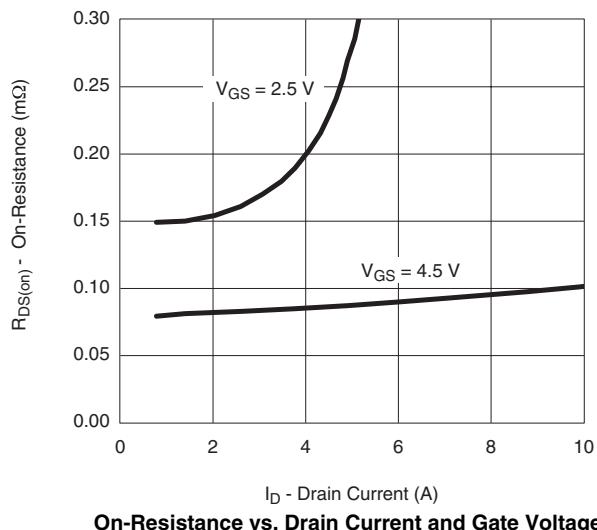
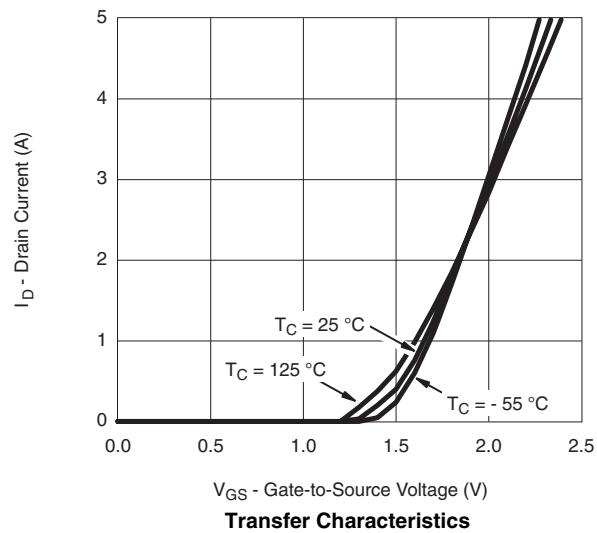
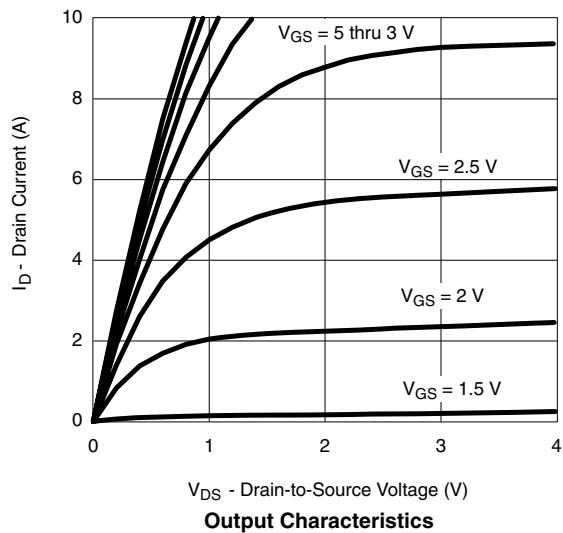
MOSFET SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

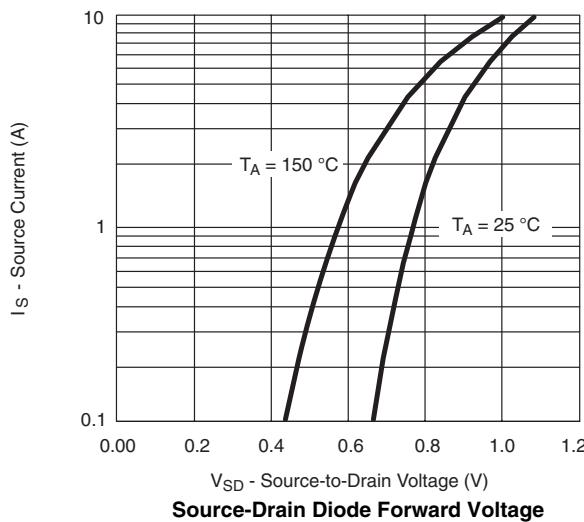
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{DS} = 0 \text{ V}, I_D = -250 \mu\text{A}$	-20			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250 \mu\text{A}$		-16.7		mV/°C
$V_{GS(\text{th})}$ Temperature Coefficient	$\Delta V_{GS(\text{th})}/T_J$			2.1		
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}, I_D = -250 \mu\text{A}$	-0.6		-1.5	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 12 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -20 \text{ V}, V_{GS} = 0 \text{ V}$			-1	μA
		$V_{DS} = -20 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq -5 \text{ V}, V_{GS} = -4.5 \text{ V}$	-10			A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = -4.5 \text{ V}, I_D = -2.4 \text{ A}$		0.092	0.115	Ω
		$V_{GS} = -2.5 \text{ V}, I_D = -1.8 \text{ A}$		0.164	0.205	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -10 \text{ V}, I_D = -2.4 \text{ A}$		5.5		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		250		pF
Output Capacitance	C_{oss}			80		
Reverse Transfer Capacitance	C_{rss}			55		
Total Gate Charge	Q_g	$V_{DS} = -10 \text{ V}, V_{GS} = -5.0 \text{ V}, I_D = -2.4 \text{ A}$		3.4	5.1	nC
Gate-Source Charge	Q_{gs}	$V_{DS} = -10 \text{ V}, V_{GS} = -4.5 \text{ V}, I_D = -2.4 \text{ A}$		3.2	5	
Gate-Drain Charge	Q_{gd}			0.5		
Gate Resistance	R_g			1.4		
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = -10 \text{ V}, R_L = 5.26 \Omega$ $I_D \approx -1.9 \text{ A}, V_{GEN} = -4.5 \text{ V}, R_G = 1 \Omega$		8.5	13	Ω
Rise Time	t_r			9	14	ns
Turn-Off Delay Time	$t_{d(\text{off})}$			30	45	
Fall Time	t_f			32	48	
				16	24	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$			-2.0	A
Pulse Diode Forward Current ^a	I_{SM}				-10	
Body Diode Voltage	V_{SD}	$I_S = -2.0 \text{ A}$		-0.8	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -2.0 \text{ A}, di/dt = 100 \text{ A}/\mu\text{s}, T_J = 25^\circ\text{C}$		17	26	ns
Body Diode Reverse Recovery Charge	Q_{rr}			5	8	nC
Reverse Recovery Fall Time	t_a			14		ns
Reverse Recovery Rise Time	t_b			3		

Notes:

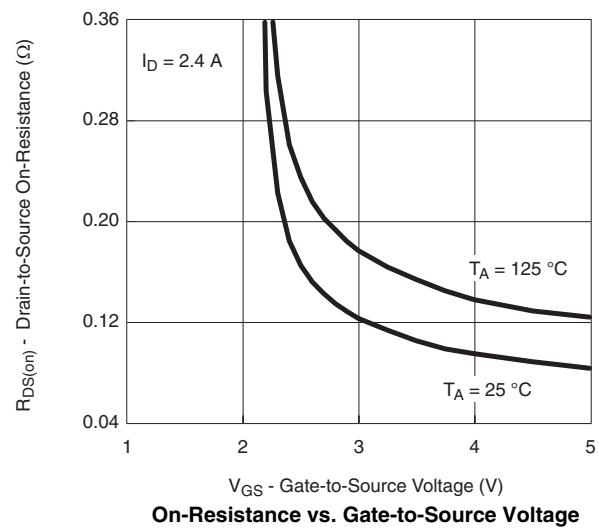
- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

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.

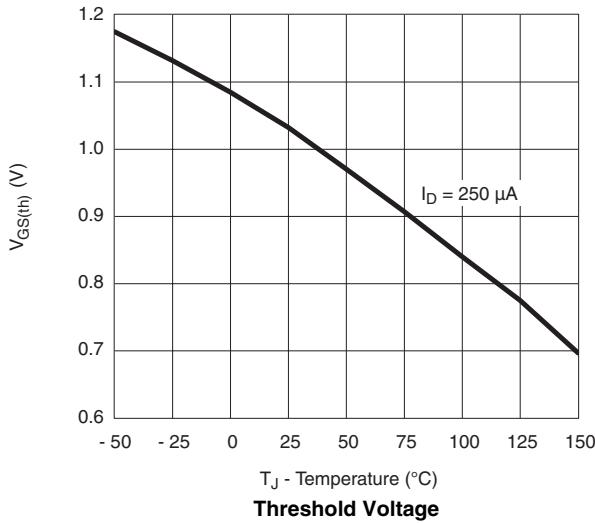
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


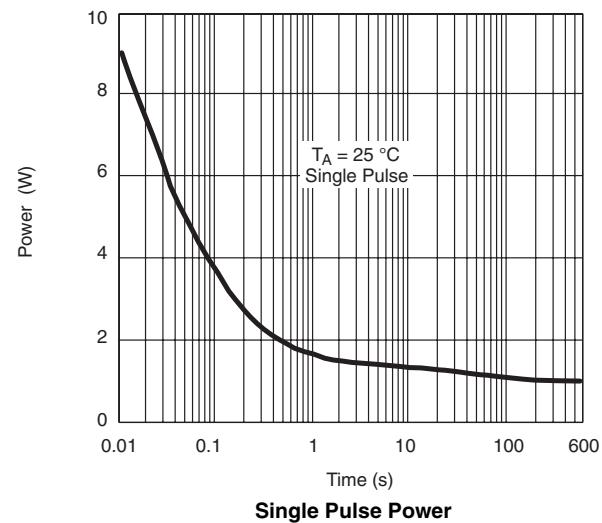
Source-Drain Diode Forward Voltage



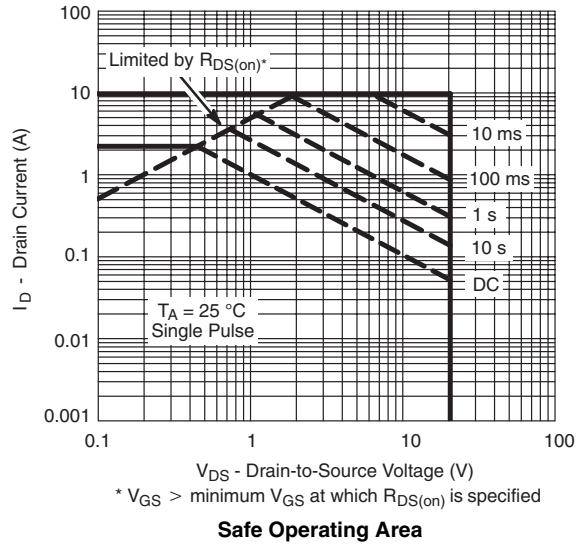
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

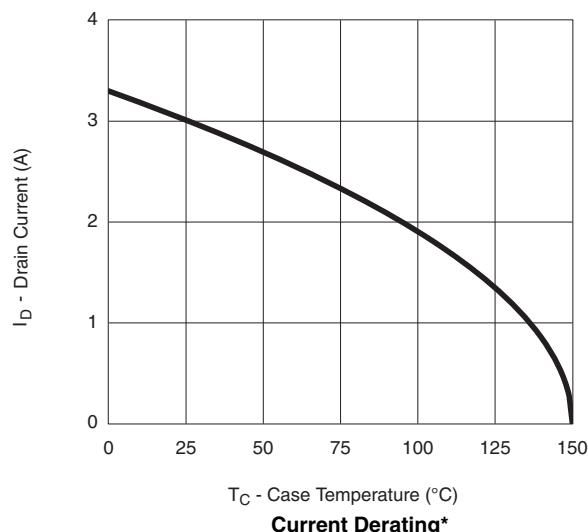


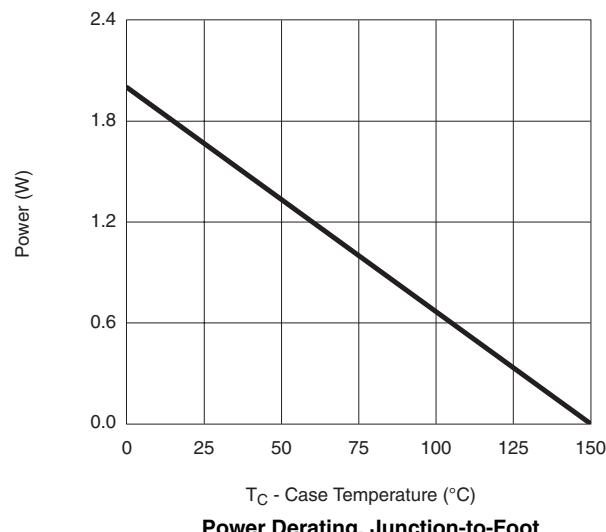
Single Pulse Power



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

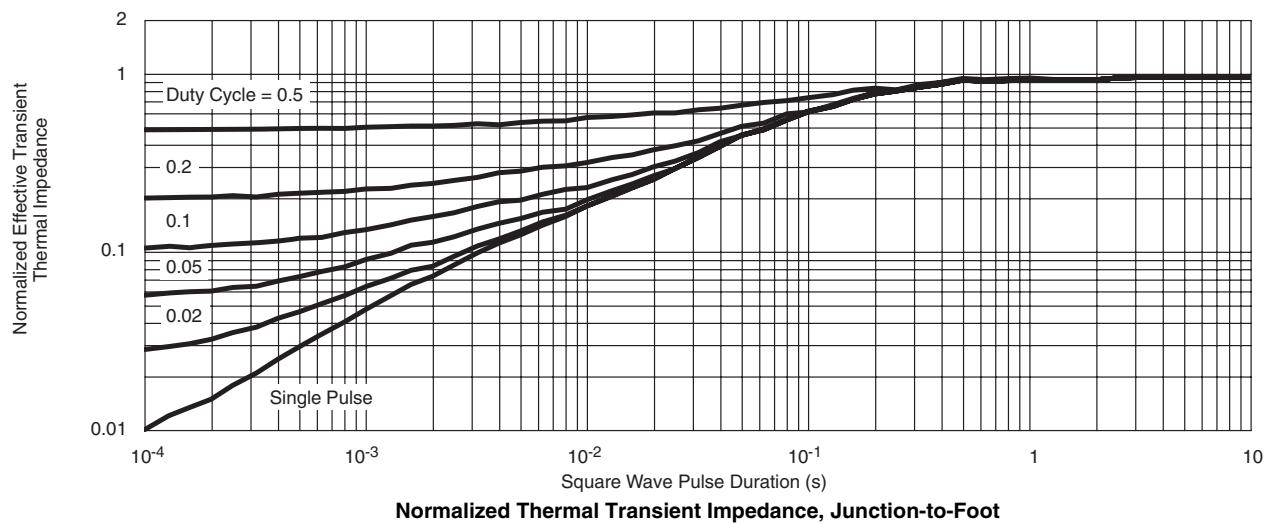
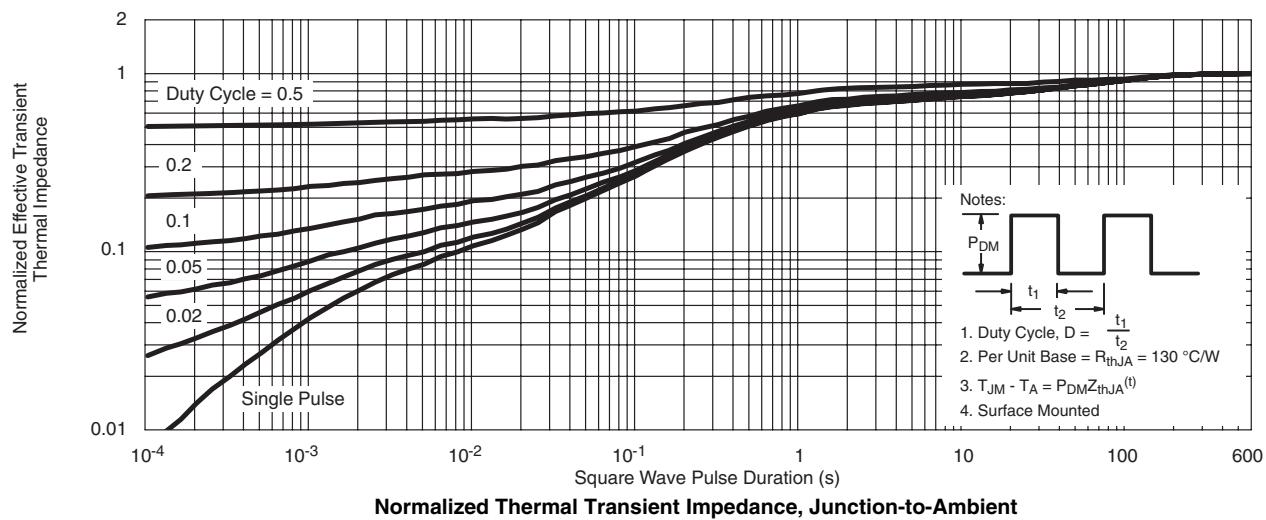
Safe Operating Area

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

T_C - Case Temperature (°C)

Current Derating*

T_C - 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.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


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