C3D1P7060Q

600 V, 1.7 A Silicon Carbide Schottky Diode

QFN 3.3

Features

- 600-Volt Schottky rectifier
- Optimized for PFC boost diode application
- Zero reverse recovery current
- High-frequency operation
- Temperature-independent switching behavior
- Extremely fast switching
- Positive temperature coefficient on V_F

Package Types: QFN 3X3

PN's: C3D1P7060Q

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Applications

- Switch mode power supplies
- LED lighting
- Medical imaging services

Benefits

- Small compact surface mount package
- Essentially no switching losses
- Higher efficiency
- Reduction of heat sink requirements
- Parallel devices without thermal runaway

Maximum Ratings (T_C = 25 °C Unless Otherwise Specified)

Parameter	Symbol	Value	Unit	Test Conditions	Note
Repetitive Peak Reverse Voltage	V_{RRM}	600	V		
Surge Peak Reverse Voltage	V_{RSM}	600			
DC Blocking Voltage	V_{DC}	600			
Continuous Forward Current	I_F	9.7	A	T_C = 25 °C	Fig. 3
		3.3		T_C = 135 °C	
		1.7		T_C = 150 °C	
Repetitive Peak Forward Surge Current	I_{FRM}	7		T_C = 25 °C, t_P = 10 ms, Half Sine Wave	
		4.5		T_C = 110 °C, t_P = 10 ms, Half Sine Wave	
Non-Repetitive Peak Forward Surge Current	I_{FSM}	15		T_C = 25 °C, t_P = 10 ms, Half Sine Wave	Fig. 8
		12		T_C = 110 °C, t_P = 10 ms, Half Sine Wave	
Non-Repetitive Peak Forward Surge Current	$I_{F,Max}$	50		T_C = 25 °C, t_P = 10 µs, Pulse	Fig. 8
		40		T_C = 110 °C, t_P = 10 µs, Pulse	
Power Dissipation	P_{tot}	35.5	W	T_C = 25 °C	Fig. 4
		13		T_C = 110 °C	
Operating Junction and Storage Temperature	T_J, T_{stg}	-55 to +160	°C		

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Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Note
Forward Voltage	V_F	1.5	1.7	V	I_F = 1.7 A, T_J = 25 °C	Fig. 1
		1.7	2.4		I_F = 1.7 A, T_J = 150 °C	
Reverse Current	I_R	3	15	µA	V_R = 600 V, T_J = 25 °C	Fig. 2
		6	55		V_R = 600 V, T_J = 150 °C	
Total Capacitive Charge	Q_C	4		nC	V_R = 400 V, I_F = 1.7 A di/dt = 500 A/µs T_J = 25 °C	Fig. 5
Total Capacitance	C	82.5		pF	V_R = 0 V, T_J = 25 °C, f = 1 MHz	Fig. 6
		7			V_R = 200 V, T_J = 25 °C, f = 1 MHz	
		6			V_R = 400 V, T_J = 25 °C, f = 1 MHz	
Capacitance Stored Energy	E_C	0.6		µJ	V_R = 400 V	Fig. 7

Note: This is a majority carrier diode, so there is no reverse recovery charge.

Thermal Characteristics

Parameter	Symbol	Typ.	Unit	Note
Thermal Resistance from Junction to Case	$R_{\theta JC}$	3.8	°C/W	Fig. 9

Typical Performance

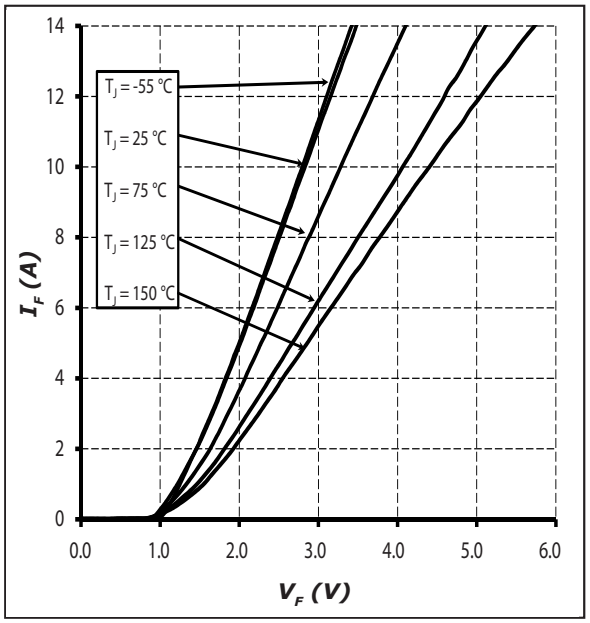


Figure 1. Forward Characteristics

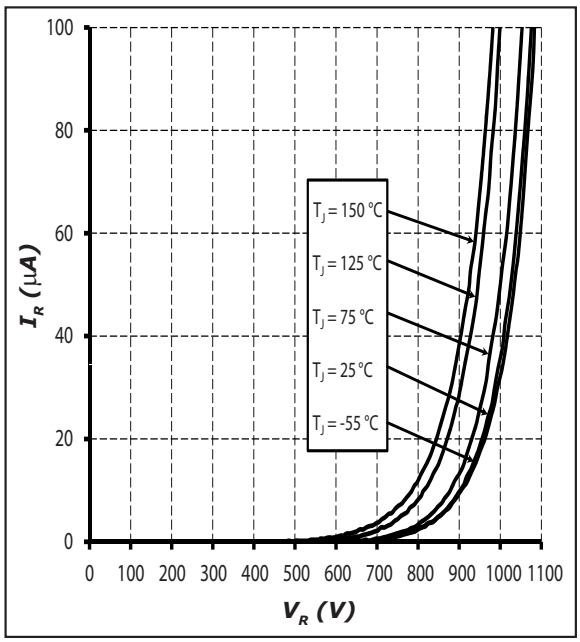


Figure 2. Reverse Characteristics

Typical Performance

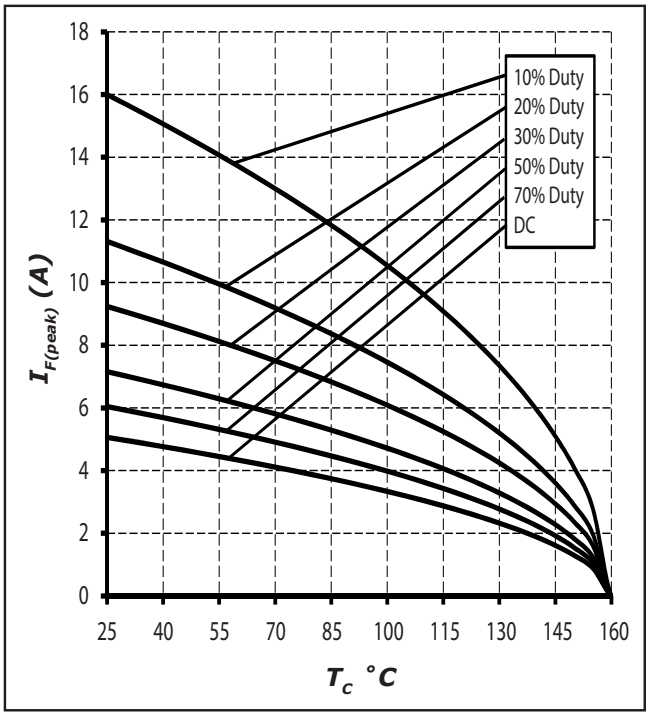


Figure 3. Current Derating

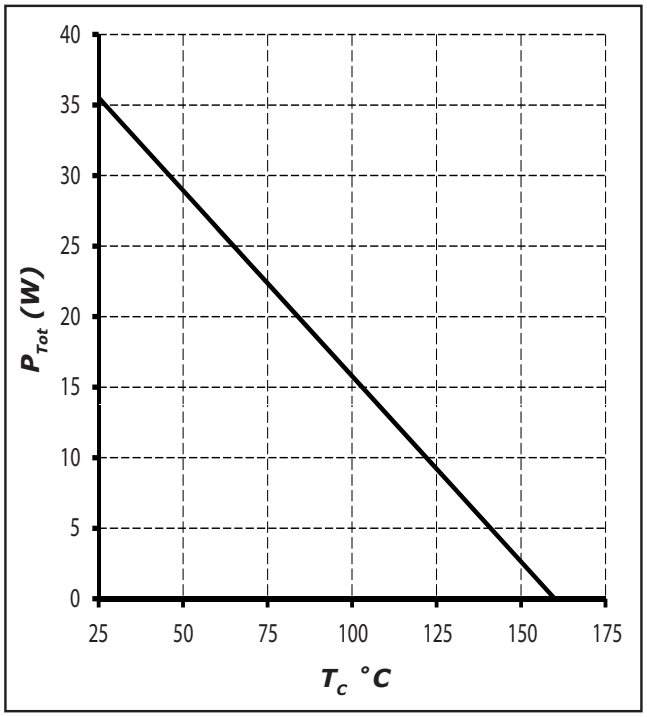


Figure 4. Power Derating

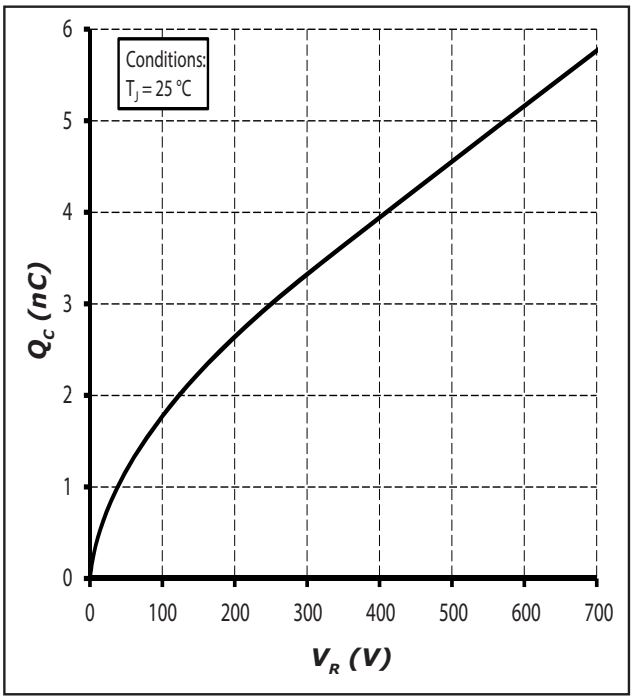


Figure 5. Total Capacitance Charge vs. Reverse Voltage

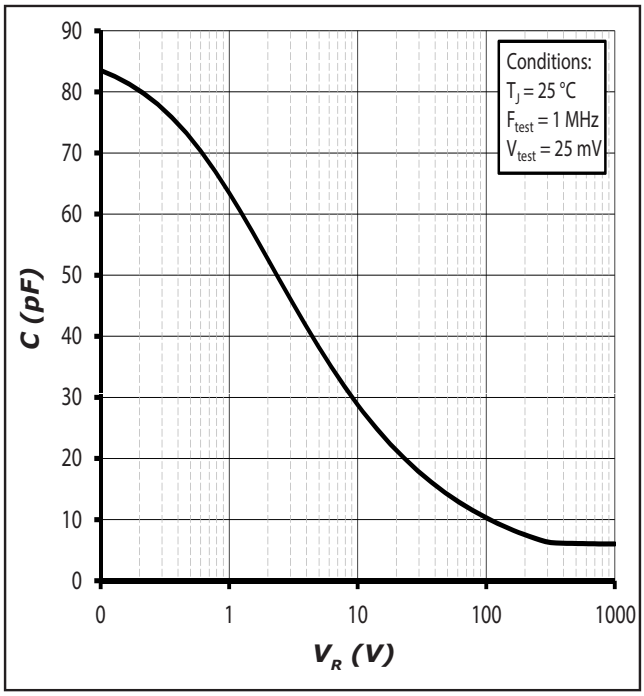


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

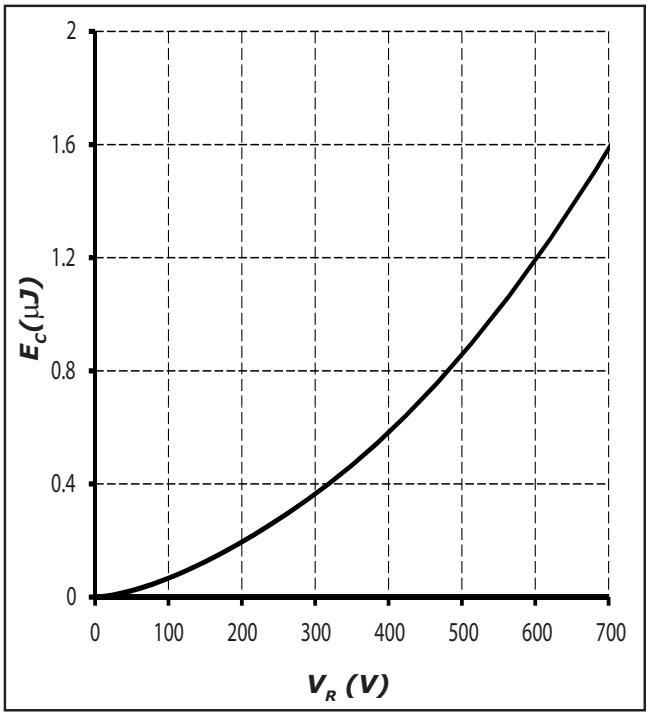


Figure 7. Capacitance Stored Energy

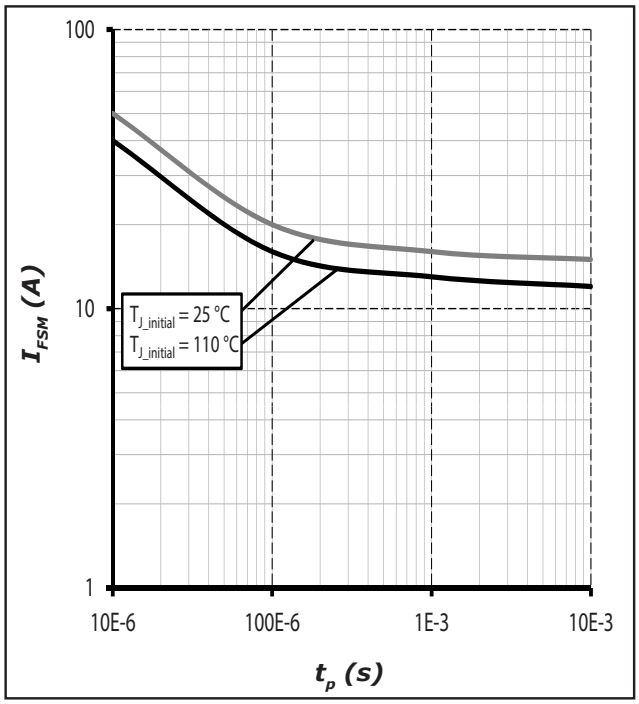


Figure 8. Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

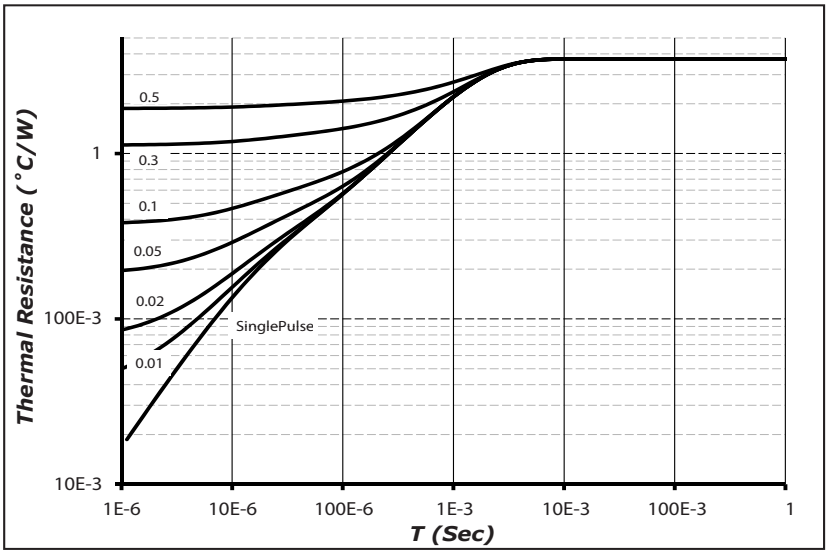
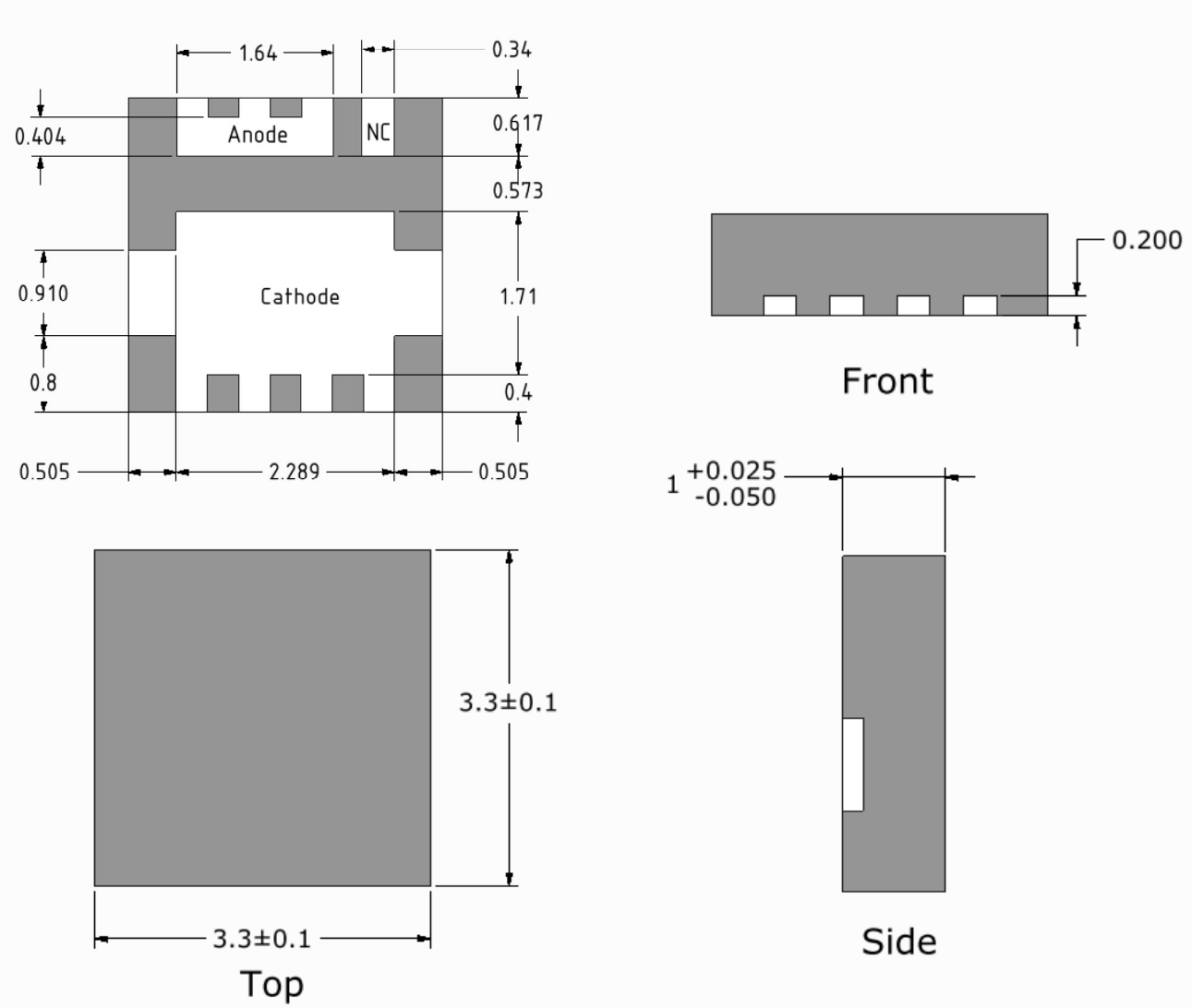


Figure 9. Transient Thermal Impedance

Package Dimensions



All Dimensions are in mm
Tolerances are 0.05 mm if not specified
NC = No Connect

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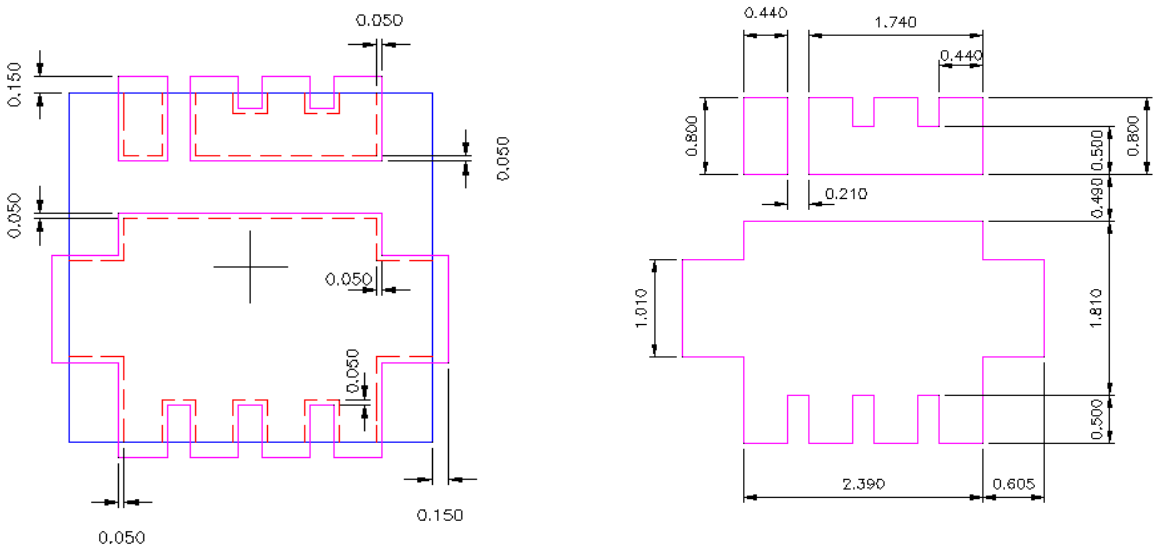
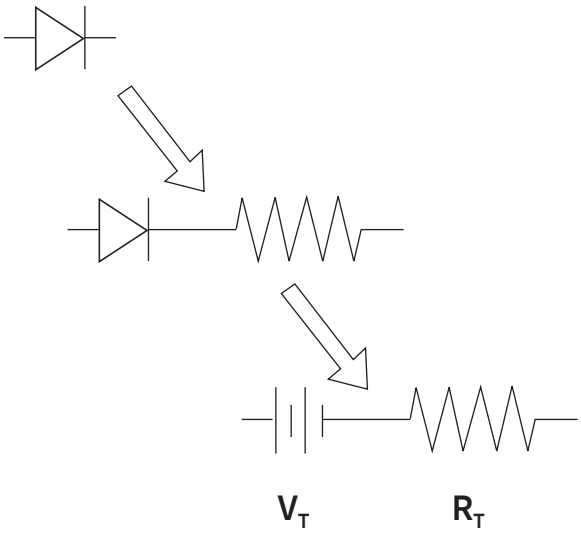
Recommended Landing Pattern (All Dimensions are in mm)



Note: The design of the land pattern and the size of the thermal pad depend mainly on the thermal characteristic and power dissipation. In general, the size of the thermal pad should be as close to the exposed pad of the package as possible, provided that there is no bridging between the thermal pad and the lead pads.

The 0.050mm extra length and width provides space to accommodate the placement tolerance of the component during pick and place process. The 0.150mm along the perimeter present areas for solder to form fillet along the side metal edges of the package.

Diode Model



$$Vf_T = V_T + If * R_T$$

$$V_T = 1.15 + (T_J * 1.1 * 10^{-3})$$

$$R_T = 0.13 + (T_J * 1.1 * 10^{-3})$$

Note: T_j = Diode Junction Temperature in Degrees Celsius,

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Revision History

Current Revision	Date of Release	Description of Changes
7	JANUARY-2024	Updated Wolfspeed branding, package drawing, and solder pad layout

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