C3D1P7060Q

Silicon Carbide Schottky Diode

Z-Rec™ Rectifier

V_{RRM}	=	600 V
$I_{F;}$ T_c<150˚C=		1.7 A
Q_c	=	5.6 nC

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

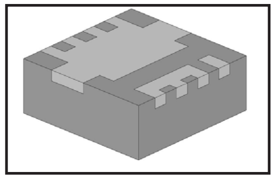
Benefits

- Small compact surface mount package
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

- Switch Mode Power Supplies
- LED Lighting

Package



PowerQFN 3.3x3.3

Part Number	Package	Marking
C3D1P7060Q	QFN 3.3	C3D1P7060

Maximum Ratings

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	600	V		
V_{RSM}	Surge Peak Reverse Voltage	600	V		
V_{DC}	DC Blocking Voltage	600	V		
I_F	Continuous Forward Current	1.7 3	A A	T_C<150˚C, No AC Component T_C<135˚C, No AC Component	See Fig 3
I_{FRM}	Repetitive Peak Forward Surge Current	7 4.4	A	T_C=25˚C, t_P=10 ms, Half Sine pulse T_C=110˚C, t_P=10 ms, Half Sine pulse	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	15 12	A	T_C=25˚C, t_P=10 ms, Half Sine pulse T_C=110˚C, t_P=10 ms, Half Sine pulse	
P_{tot}	Power Dissipation	39 17	W	T_C=25˚C T_C=110˚C	
T_J , T_{stg}	Operating Junction and Storage Temperature	-55 to +175	˚C		
T_c	Maximum Case Temperature	150	˚C		

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.5 1.8	1.7 2.4	V	I_F = 1.7 A T_J=25°C I_F = 1.7 A T_J=175°C	
I_R	Reverse Current	10 20	50 100	μA	V_R = 600 V T_J=25°C V_R = 600 V T_J=175°C	
Q_C	Total Capacitive Charge	5.6		nC	V_R = 600 V, I_F = 1.7A di/dt = 500 A/μs T_J = 25°C	
C	Total Capacitance	100 7 6		pF	V_R = 0 V, T_J = 25°C, f = 1 MHz V_R = 200 V, T_J = 25°C, f = 1 MHz V_R = 400 V, T_J = 25°C, f = 1 MHz	

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

Thermal Characteristics

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

Typical Performance

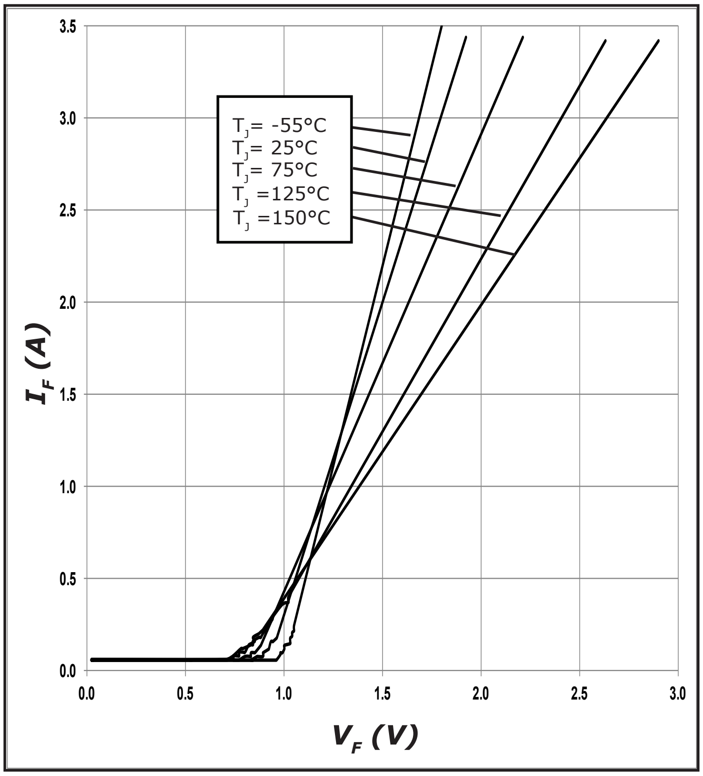


Figure 1. Forward Characteristics

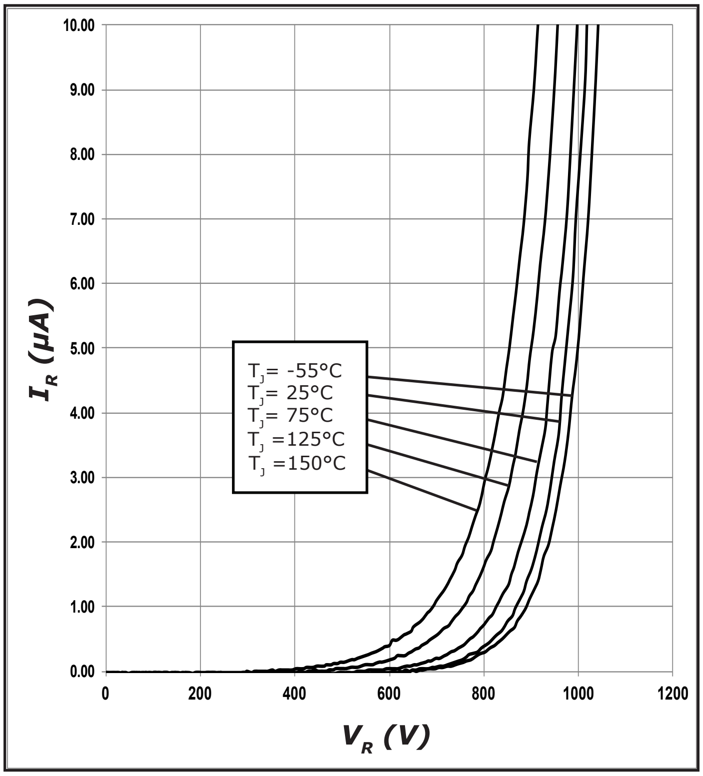


Figure 2. Reverse Characteristics

Typical Performance

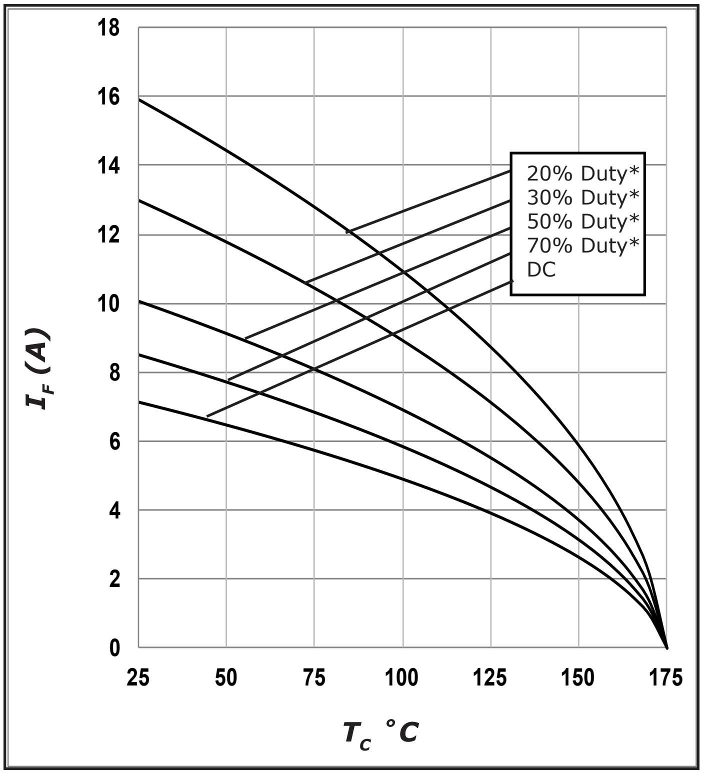


Figure 3. Current Derating

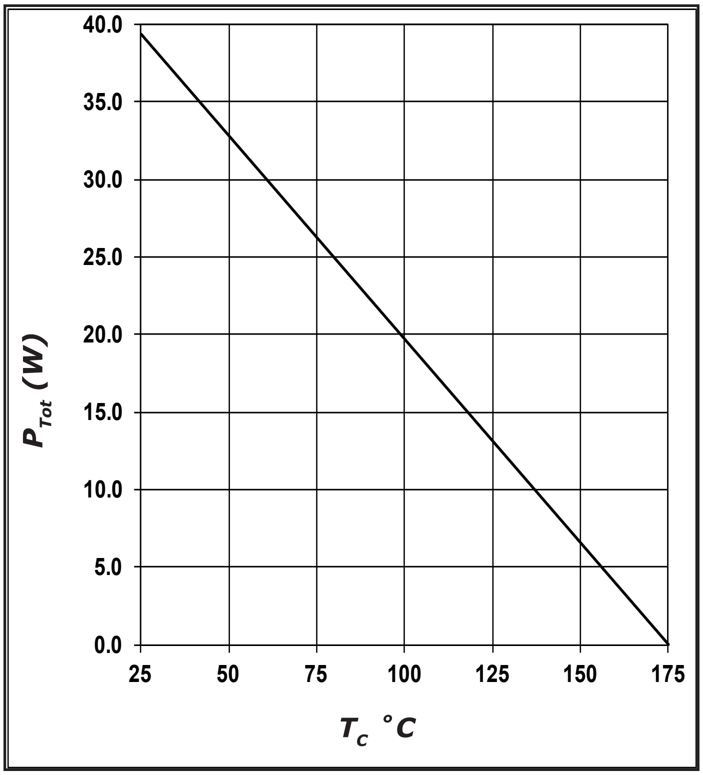


Figure 4. Power Derating

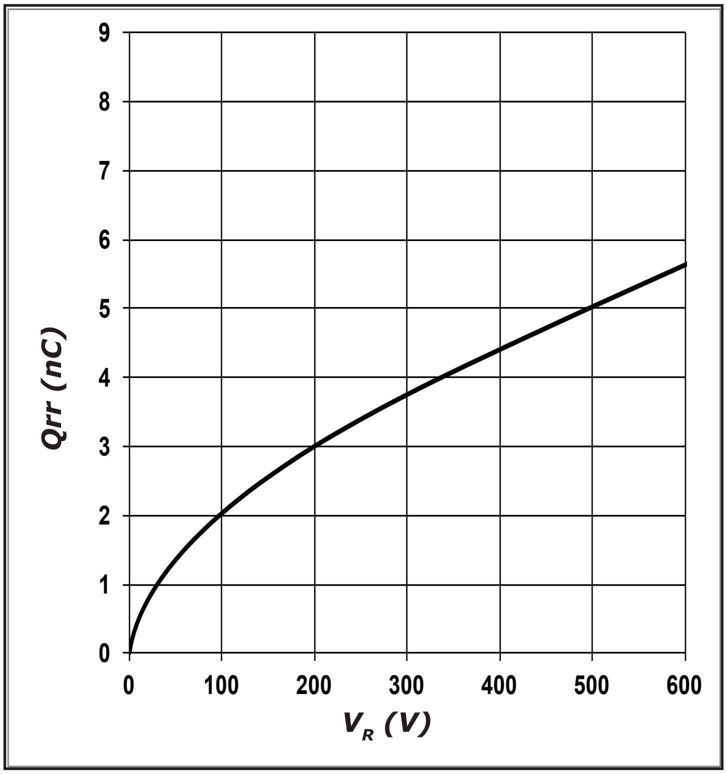


Figure 5. Recovery Charge vs. Reverse Voltage

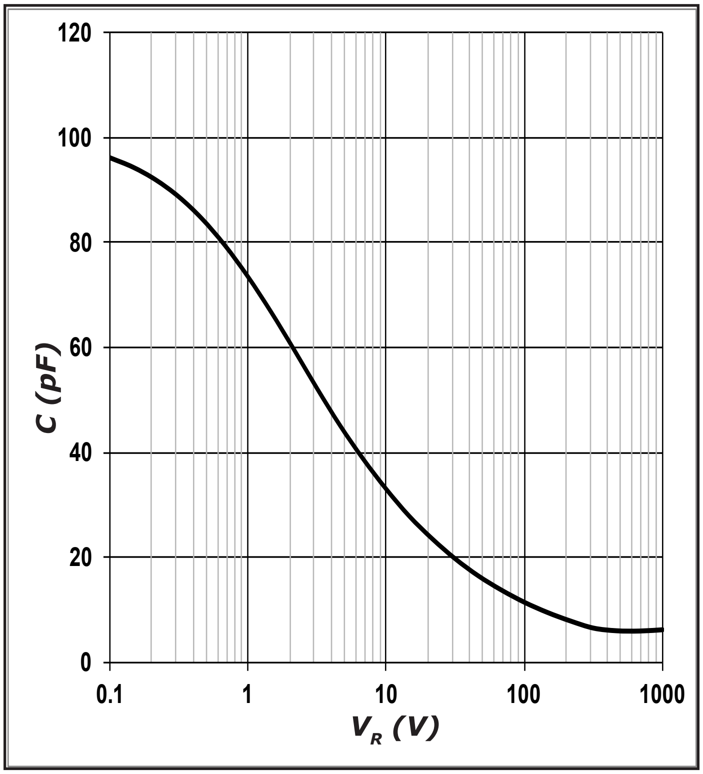


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

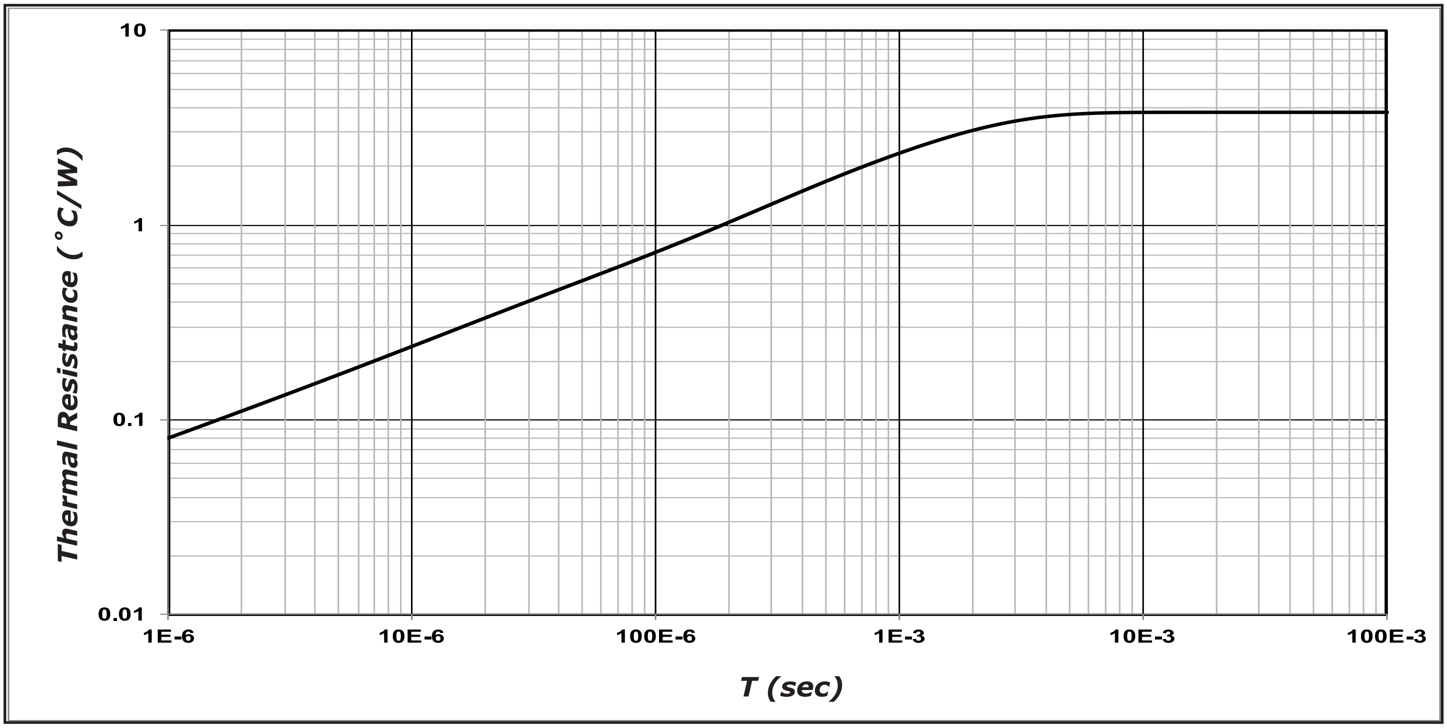
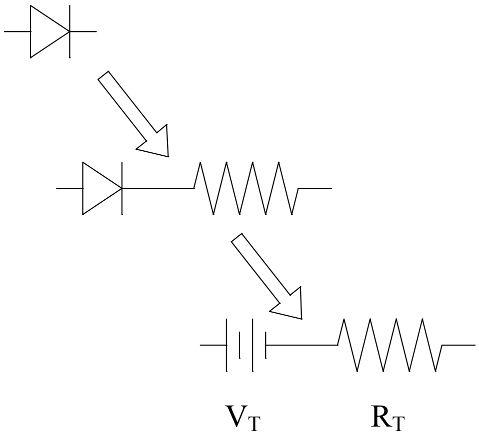


Figure 7. Transient Thermal Impedance

Diode Model



$$Vf_T = V_T + If * R_T$$

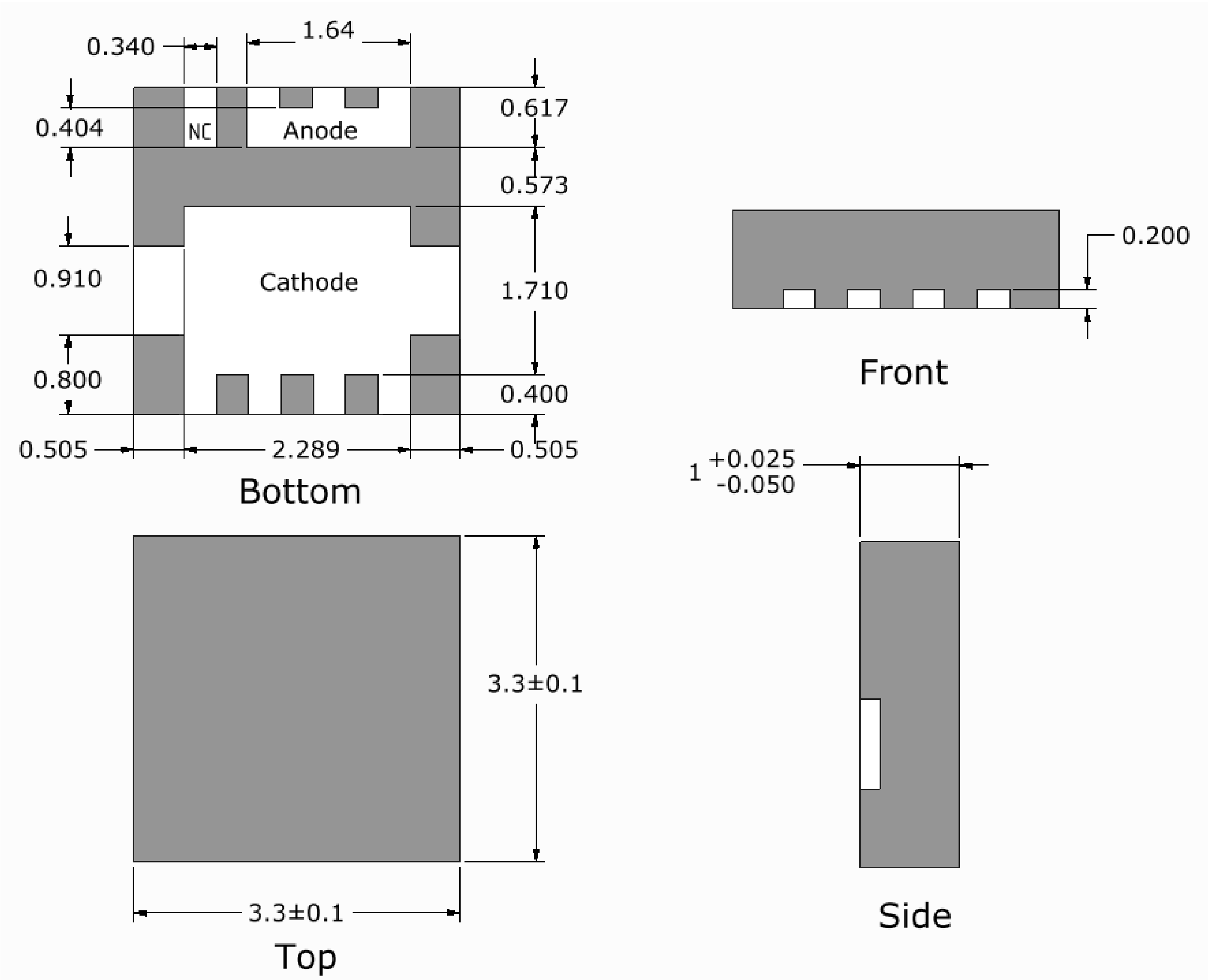
$$V_T = 0.99 + (T_J * -1.5*10^{-3})$$

$$R_T = 0.22 + (T_J * 2.6*10^{-3})$$

Note: T_j = Diode Junction Temperature In Degrees Celsius

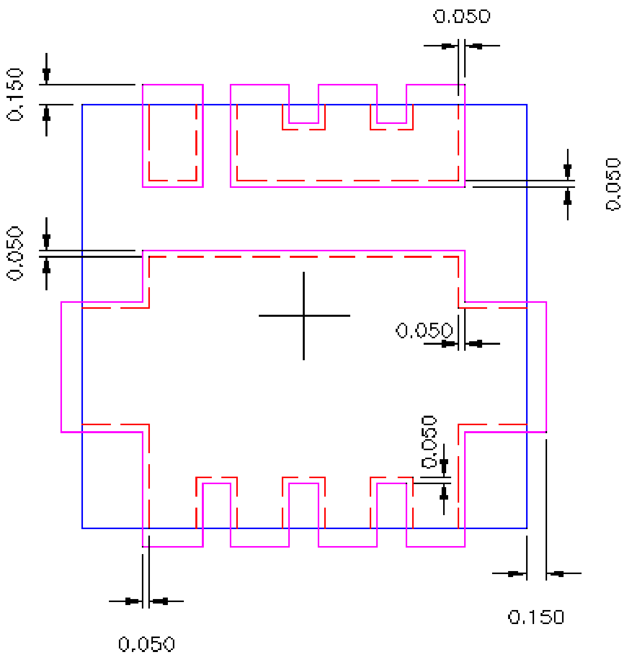
Package Dimensions

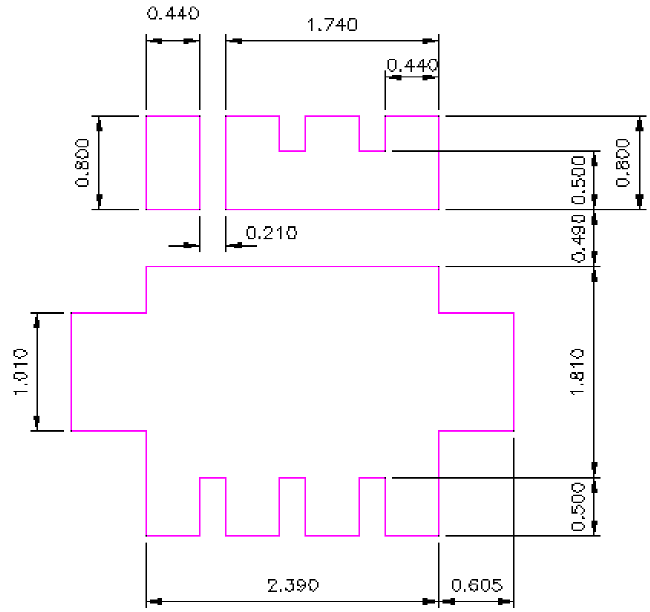
Package QFN 3.3



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

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.

"The levels of environmentally sensitive, persistent biologically toxic (PBT), persistent organic pollutants (POP), or otherwise restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), as amended through April 21, 2006."

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
Fax: +1.919.313.5451
www.cree.com/power