C3D10065I

Silicon Carbide Schottky Diode

Z-Rec™ Rectifier

V_{RRM}	=	650 V
I_F (T_C=125°C)	=	10 A
Q_c	=	25 nC

Features

- 650-Volt Schottky Rectifier
- Ceramic Package provides 2.5kV isolation
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Positive Temperature Coefficient on V_F

Package

Halogen-Free

RoHS

Benefits

- Electrically Isolated Package
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

- HVAC
- Switch Mode Power Supplies

Part Number	Package	Marking
C3D10065I	Isolated TO-220-2	C3D10065I

Maximum Ratings (T_C = 25 °C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	650	V		
V_{RSM}	Surge Peak Reverse Voltage	650	V		
V_{DC}	DC Blocking Voltage	650	V		
I_F	Continuous Forward Current	19 10 8.5	A	T_C=25°C T_C=125°C T_C=135°C	
I_{FRM}	Repetitive Peak Forward Surge Current	28.6 17.7	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	80 70	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	60 26	W	T_C=25°C T_C=110°C	
T_J	Operating Junction Range	-55 to +175	°C		
T_{stg}, T_c	Storage Temperature and Case Temperature	-55 to +150	°C		
	TO-220 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw	

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.5 2.0	1.8 2.4	V	I_F = 10 A T_J=25°C I_F = 10 A T_J=175°C	
I_R	Reverse Current	12 24	60 220	μA	V_R = 650 V T_J=25°C V_R = 650 V T_J=175°C	
Q_C	Total Capacitive Charge	25		nC	V_R = 650 V, I_F = 10 A di/dt = 500 A/μs T_J = 25°C	
C	Total Capacitance	480 50 42		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	2.6	°C/W

Typical Performance

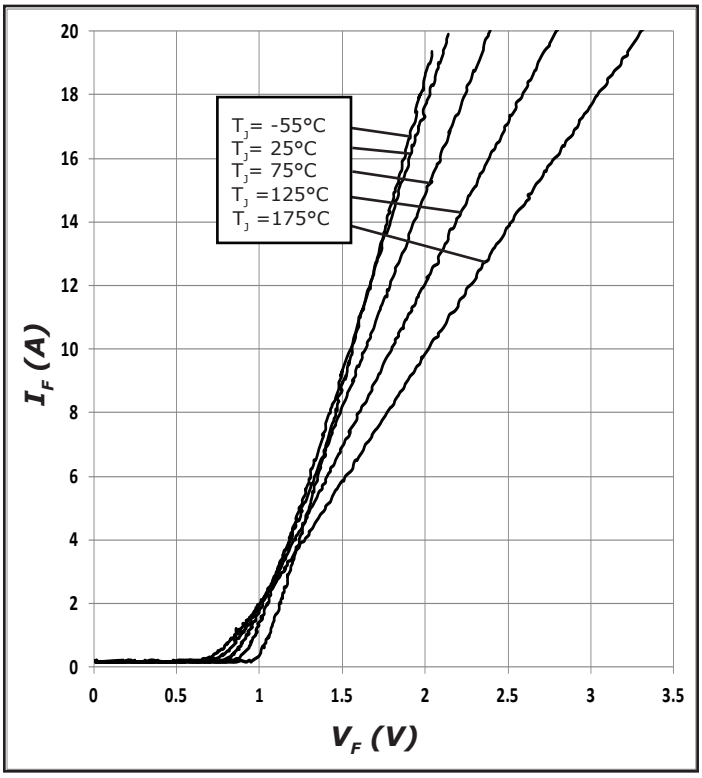


Figure 1. Forward Characteristics

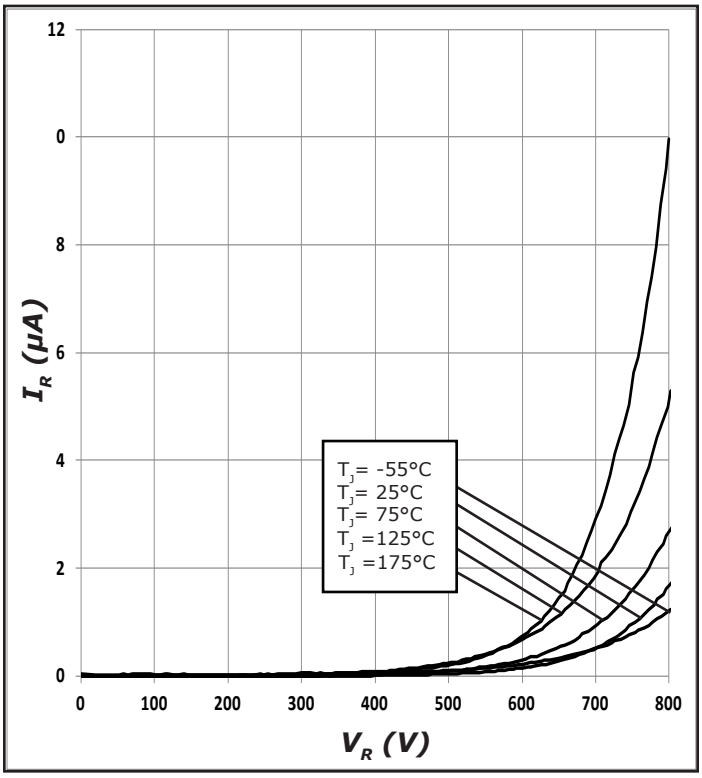


Figure 2. Reverse Characteristics

Typical Performance

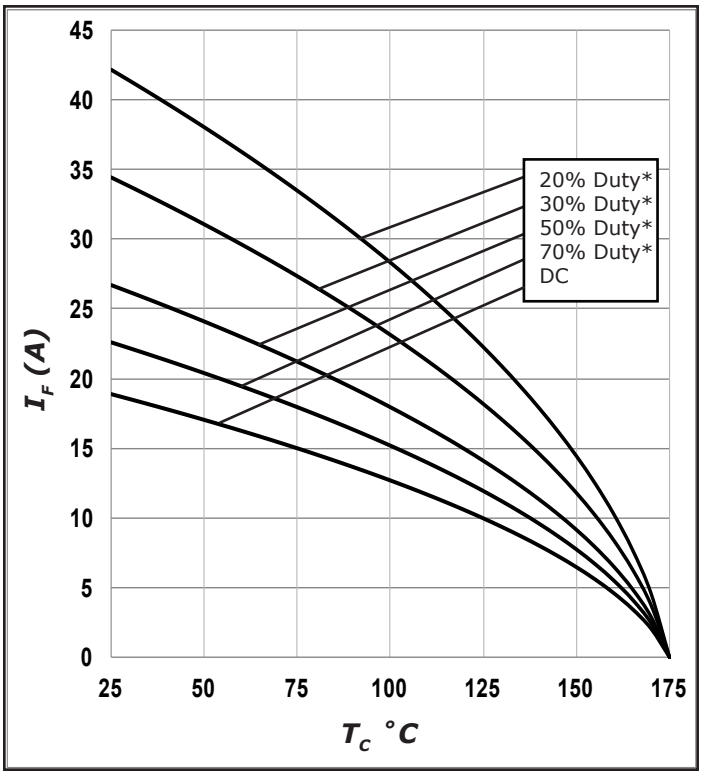


Figure 3. Current Derating

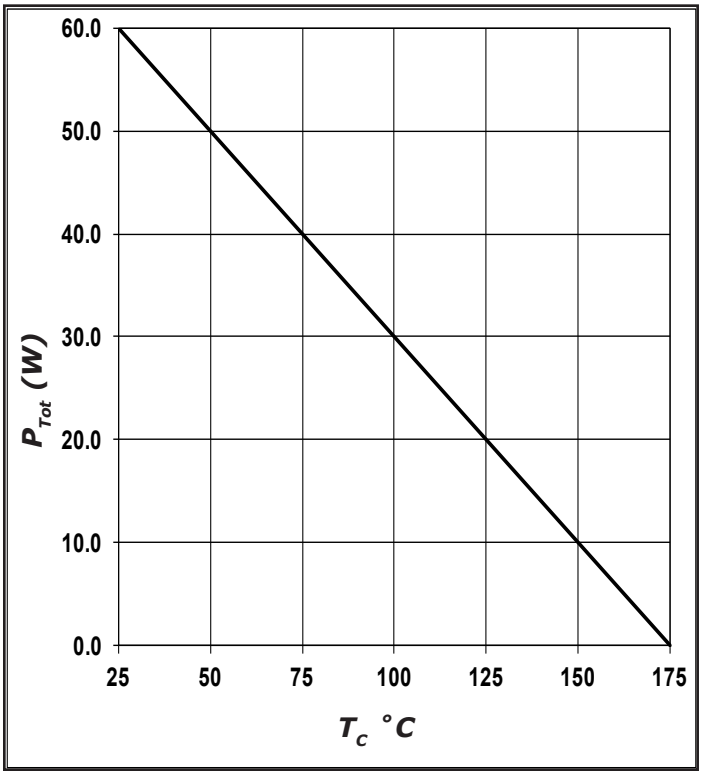


Figure 4. Power Derating

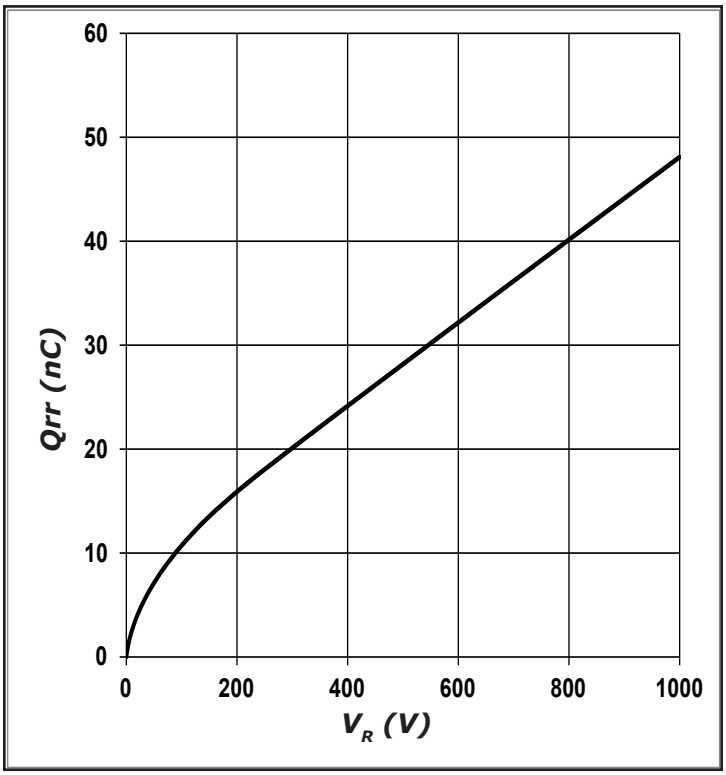


Figure 5. Recovery Charge vs. Reverse Voltage

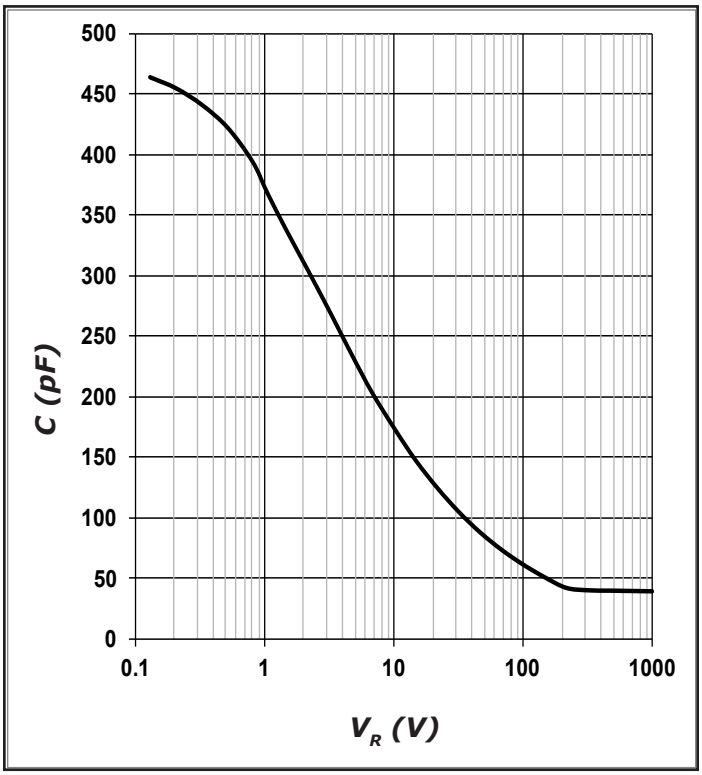


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

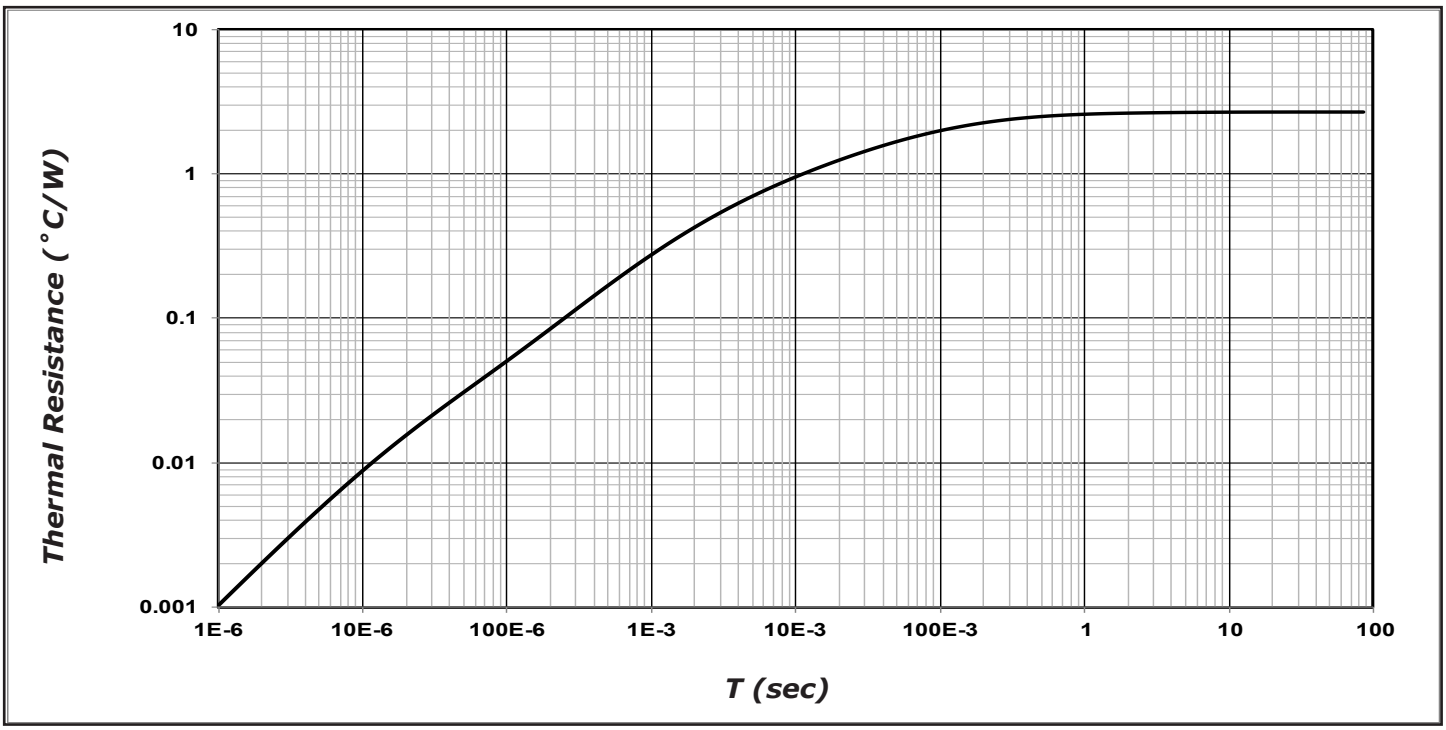
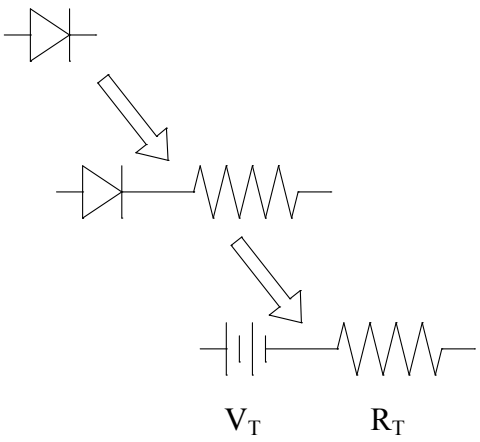


Figure 7. Transient Thermal Impedance

Diode Model

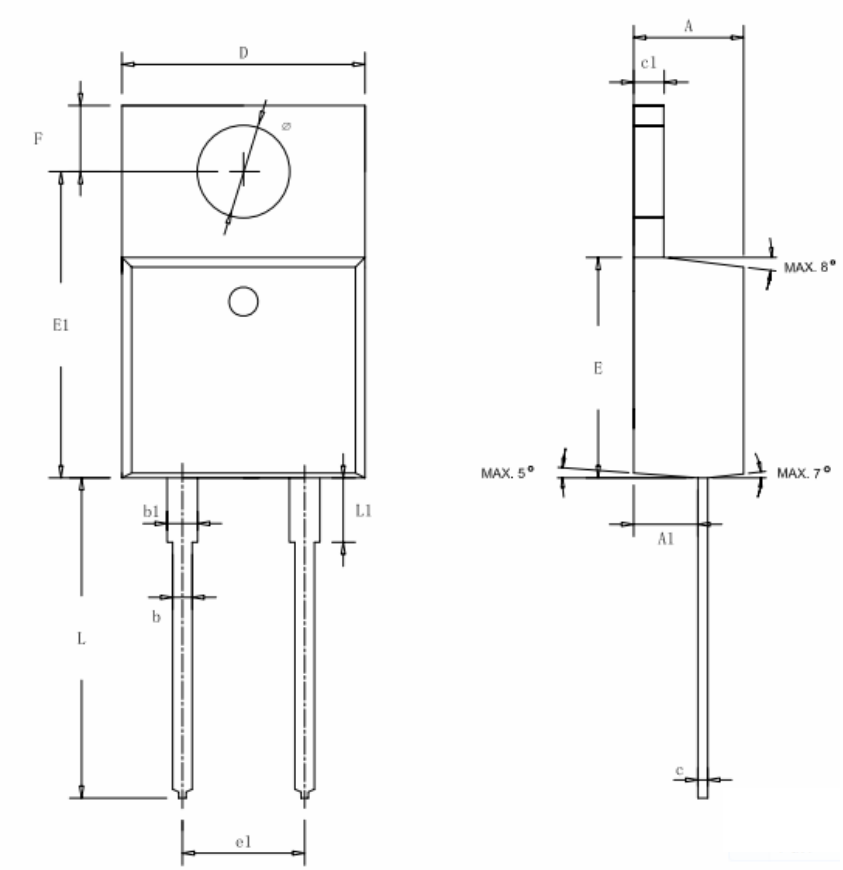


$$Vf_T = V_T + If * R_T$$

$$V_T = 0.98 + (T_J * -1.6 * 10^{-3})$$
$$R_T = 0.04 + (T_J * 0.522 * 10^{-3})$$

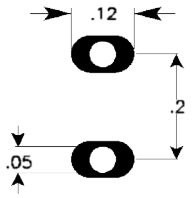
Note: T_j = Diode Junction Temperature In Degrees Celsius

Package Dimensions



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	4.420	4.720	1.174	0.186
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.360	0.460	0.014	0.018
c1	1.170	1.370	0.046	0.054
D	9.950	10.250	0.392	0.404
E	8.930	9.290	0.352	0.366
E1	12.550	12.850	0.494	0.506
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
L	13.080	13.480	0.515	0.531
L1	2.470	2.870	0.097	0.113
ϕ	3.790	3.890	0.149	0.153

Recommended Solder Pad Layout



Measurements shown in inches

TO-220-2

Part Number	Package	Marking
C3D10065I	Isolated TO-220-2	C3D10065I

Note: Recommended soldering profiles can be found in the applications note here:
http://www.cree.com/power_app_notes/soldering

Notes

- **RoHS Compliance**
  The levels of RoHS 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 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Cree representative or from the Product Documentation sections of www.cree.com.

- **REACh Compliance**
  REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future,please contact a Cree representative to insure you get the most up-to-date REACh SVHC Declaration. REACh banned substance information (REACh Article 67) is also available upon request.

- This product has not been designed or tested for use in, and is not intended for use in, applications implanted into the human body nor in applications in which failure of the product could lead to death, personal injury or property damage, including but not limited to equipment used in the operation of nuclear facilities, life-support machines, cardiac defibrillators or similar emergency medical equipment, aircraft navigation or communication or control systems, air traffic control systems, or weapons systems.

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