

C3D10065I

Silicon Carbide Schottky Diode

Z-REC™ RECTIFIER

V_{RRM}	=	650 V
$I_F, T_C < 125^\circ\text{C}$	=	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

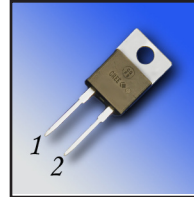
Benefits

- 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

Package



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

Maximum Ratings

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	10 6.5	A A	$T_C < 125^\circ\text{C}$, No AC Component $T_C < 150^\circ\text{C}$, No AC Component	See Fig 3
I_{FRM}	Repetitive Peak Forward Surge Current	28.6 17.7	A	$T_C = 25^\circ\text{C}$, $t_p = 10$ ms, Half Sine pulse $T_C = 110^\circ\text{C}$, $t_p = 10$ ms, Half Sine pulse	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	80 70	A	$T_C = 25^\circ\text{C}$, $t_p = 10$ ms, Half Sine pulse $T_C = 110^\circ\text{C}$, $t_p = 10$ ms, Half Sine pulse	
P_{tot}	Power Dissipation	60 26	W	$T_C = 25^\circ\text{C}$ $T_C = 110^\circ\text{C}$	
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$		
T_C	Maximum Case Temperature	150	$^\circ\text{C}$		

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.5 2.0	1.8 2.4	V	$I_F = 10\text{ A}$ $T_J = 25^\circ\text{C}$ $I_F = 10\text{ A}$ $T_J = 175^\circ\text{C}$	
I_R	Reverse Current	10 20	50 200	μA	$V_R = 650\text{ V}$ $T_J = 25^\circ\text{C}$ $V_R = 650\text{ V}$ $T_J = 175^\circ\text{C}$	
Q_C	Total Capacitive Charge	25		nC	$V_R = 400\text{ V}$, $I_F = 10\text{ A}$ $di/dt = 500\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$	
C	Total Capacitance	480 50 42		pF	$V_R = 0\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$ $V_R = 200\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$ $V_R = 400\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$	

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	$^\circ\text{C}/\text{W}$

Typical Performance

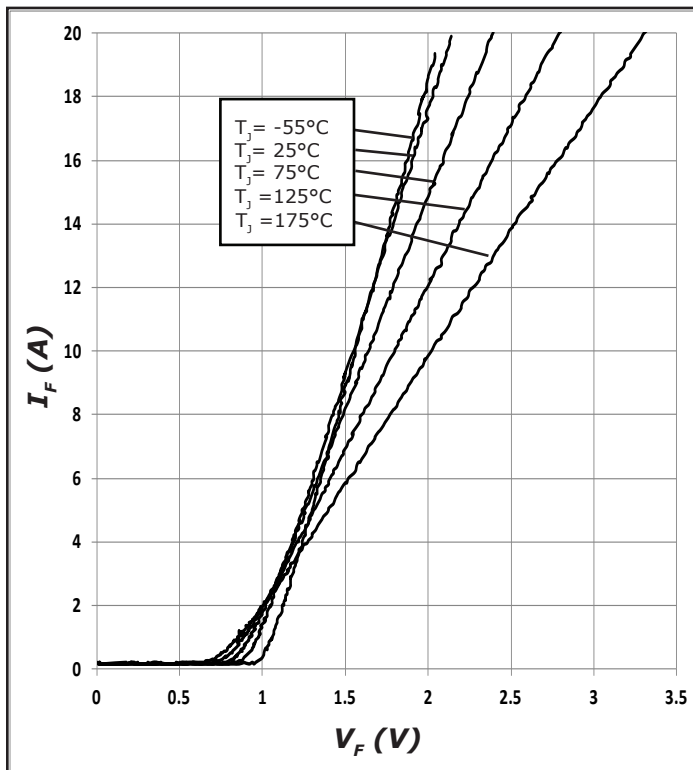


Figure 1. Forward Characteristics

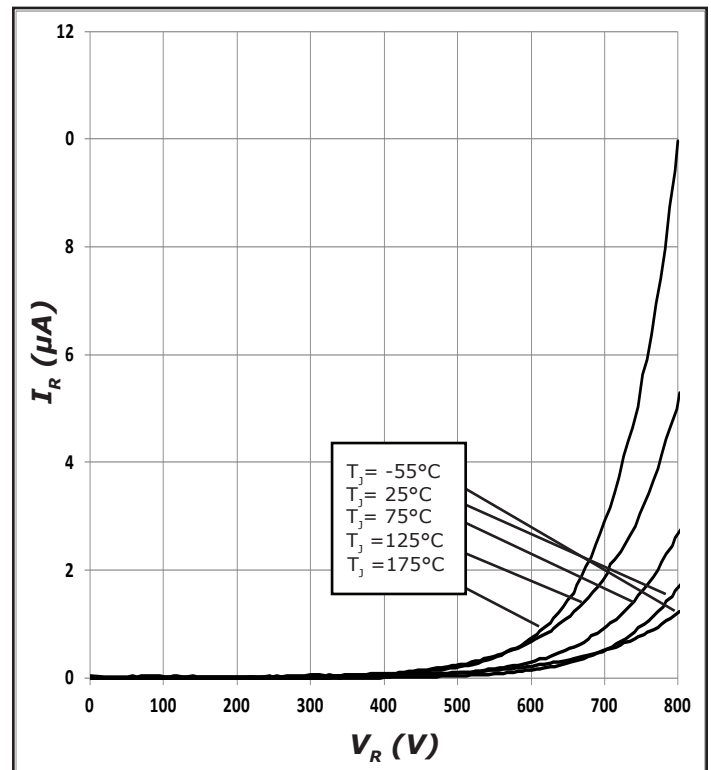


Figure 2. Reverse Characteristics

Typical Performance

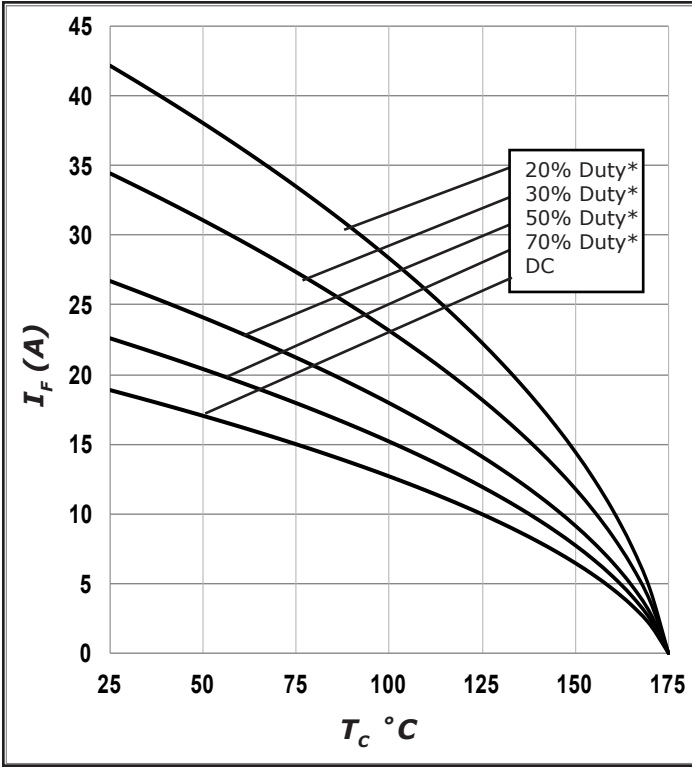


Figure 3. Current Derating

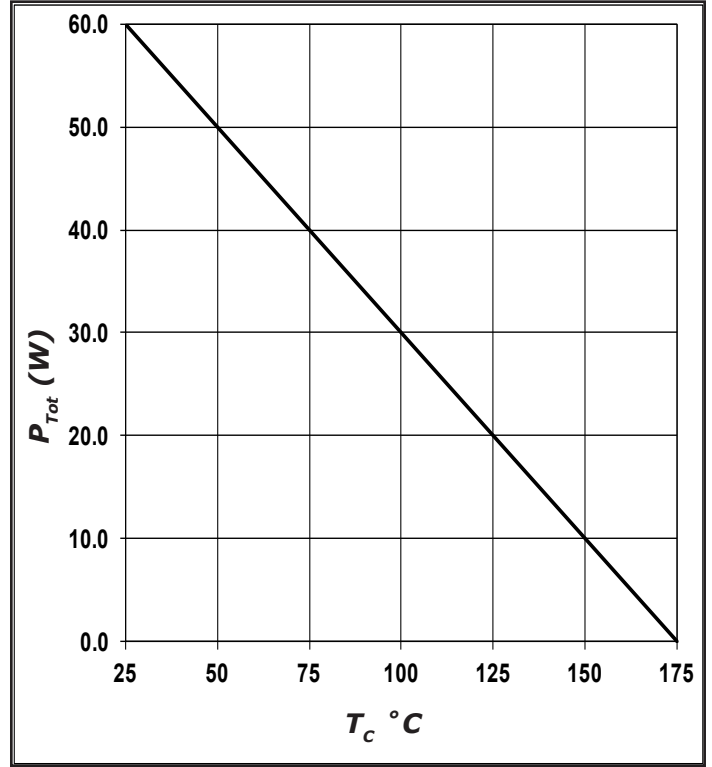


Figure 4. Power Derating

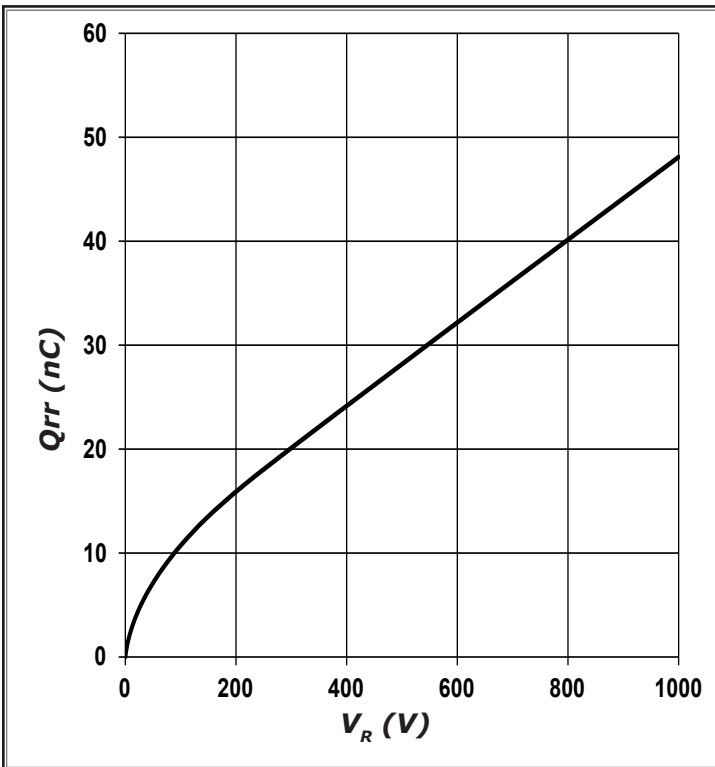


Figure 5. Recovery Charge vs. Reverse Voltage

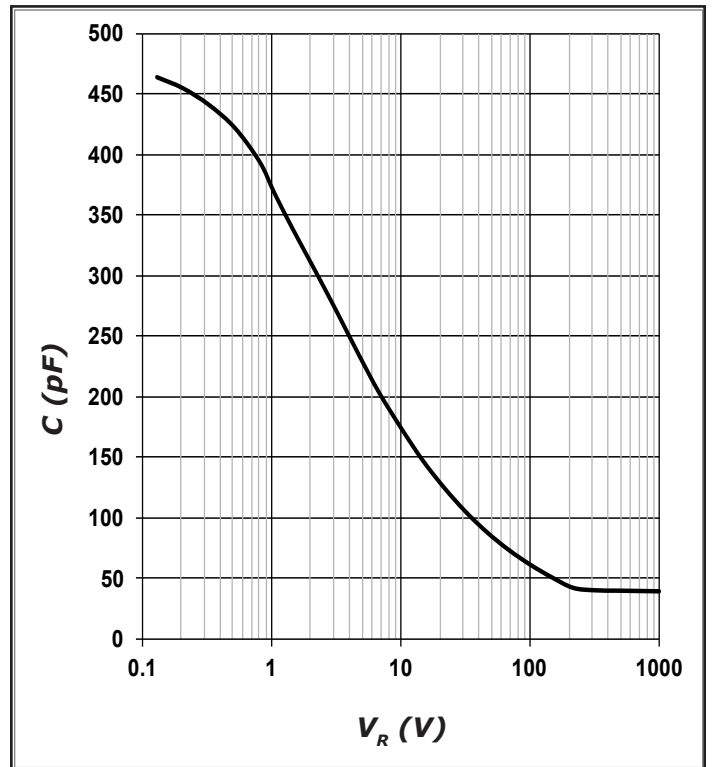


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

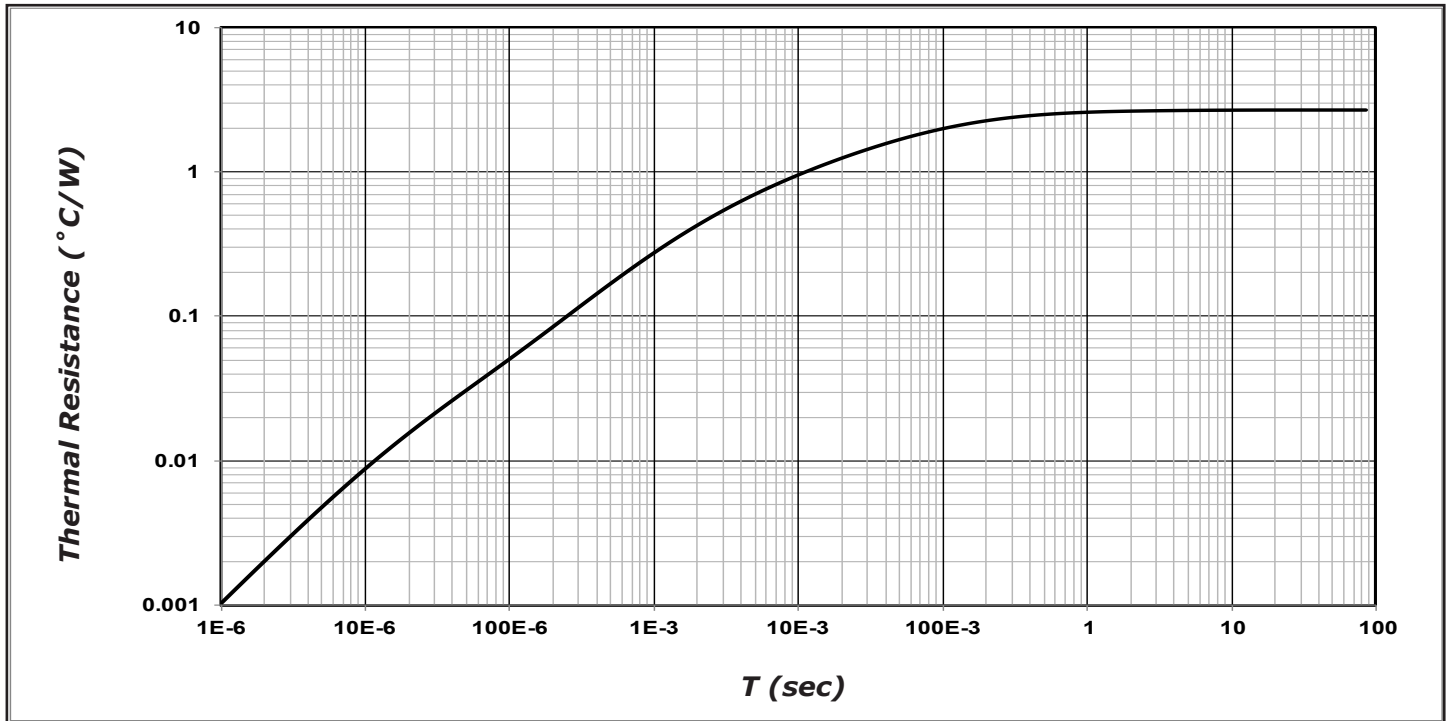
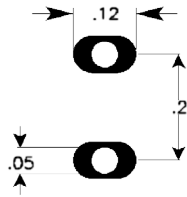


Figure 7. Transient Thermal Impedance

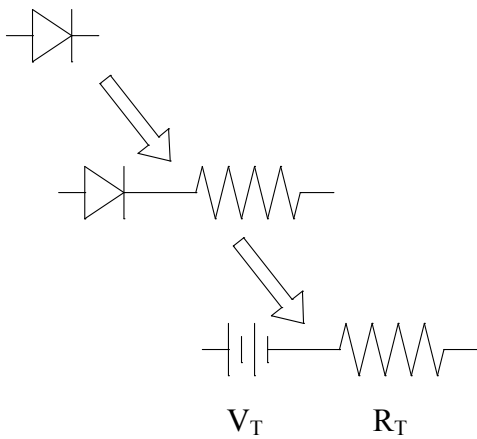
Recommended Solder Pad Layout



Measurements shown in inches

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

Diode Model



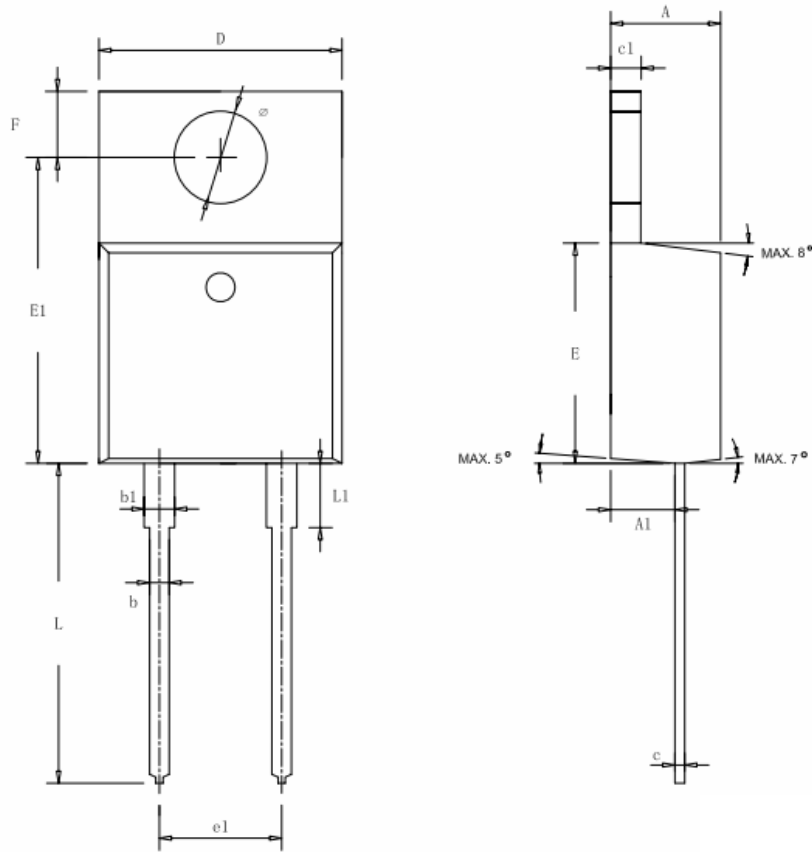
$$V_{f_T} = V_T + I_f * R_T$$

$$V_T = 0.98 + (T_j * -1.6 * 10^{-3})$$

$$R_T = 0.04 + (T_j * 0.522 * 10^{-3})$$

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

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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