CVFD20065A

Silicon Carbide Schottky Diode

Z-Rec® RECTIFIER

V_{RRM} = 650 V
I_F (T_C=135˚C) = 26 A
Q_c = 62 nC

Features

- 650-Volt Schottky Rectifier
- Reduced V_F for Improved Efficiency
- High Humidity Resistance
- Zero Forward and Reverse Recovery Voltage
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on V_F

Benefits

- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

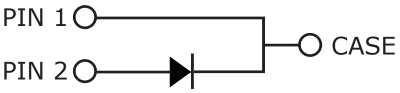
- Power Inverters
- Motor Drives
- EV Chargers
- Power Factor Correction
- Server Power Supplies

Package

TO-220-2

Halogen-Free

RoHS



Part Number	Package	Marking
CVFD20065A	TO-220-2	CVFD20065

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 Peak Blocking Voltage	650	V		
I_F	Continuous Forward Current	57 26 20	A	T_C=25˚C T_C=135˚C T_C=149˚C	Fig. 3
I_{FRM}	Repetitive Peak Forward Surge Current	91 61.5	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 Forward Surge Current	206 180	A	T_C=25˚C, t_P=10 ms, Half Sine Pulse T_C=110˚C, t_P=10 ms, Half Sine Pulse	Fig. 8
$I_{F,Max}$	Non-Repetitive Peak Forward Current	1400 1100	A	T_C=25˚C, t_P=10 µs, Pulse T_C=110˚C, t_P=10 µs, Pulse	Fig. 8
P_{tot}	Power Dissipation	187.5 81	W	T_C=25˚C T_C=110˚C	Fig. 4
$\int i^2dt$	i^2t value (Per Leg)	212 162	A^2s	T_C=25˚C, t_P=10 ms T_C=110˚C, t_P=10 ms	
T_J , T_{stg}	Operating Junction and Storage Temperature	-55 to +175	˚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	1.35 1.65	1.45 1.80	V	I_F = 20 A T_J=25°C I_F = 20 A T_J=175°C	Fig. 1
I_R	Reverse Current	8 2	80	μA	V_R = 650 V , T_J=25°C V_R = 400 V , T_J=25°C	Fig. 2
		30 5	300	μA	V_R = 650 V , T_J=175°C V_R = 400 V , T_J=175°C	Fig. 2
Q_C	Total Capacitive Charge	62		nC	V_R = 400 V d*i*/dt = 500 A/μs T_J = 25°C	Fig. 5
C	Total Capacitance	1100 113 108		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	Fig. 6
E_C	Capacitance Stored Energy	9.5		μJ	V_R = 400 V	Fig. 7

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

Thermal Characteristics

Symbol	Parameter	Typ.	Unit
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.8	°C/W

Typical Performance

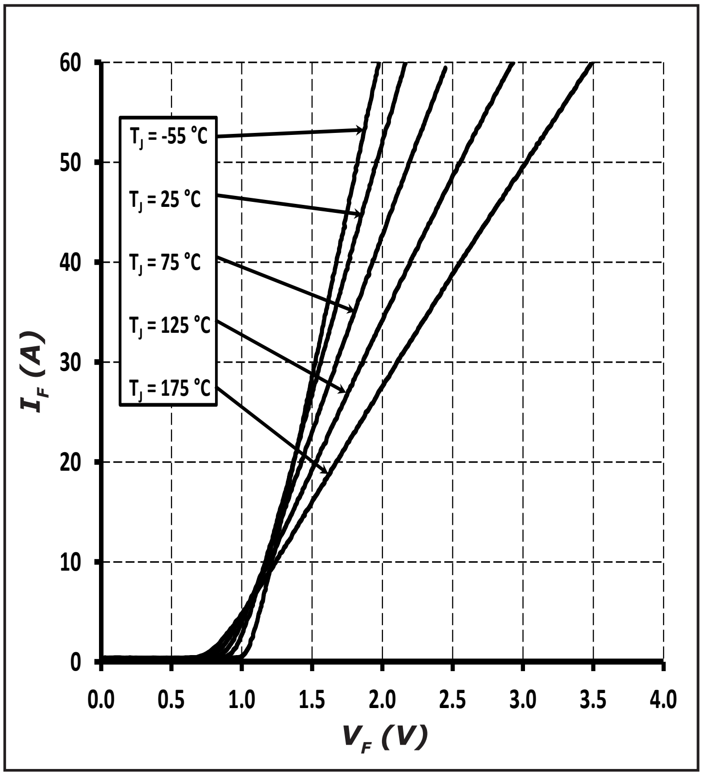


Figure 1. Forward Characteristics

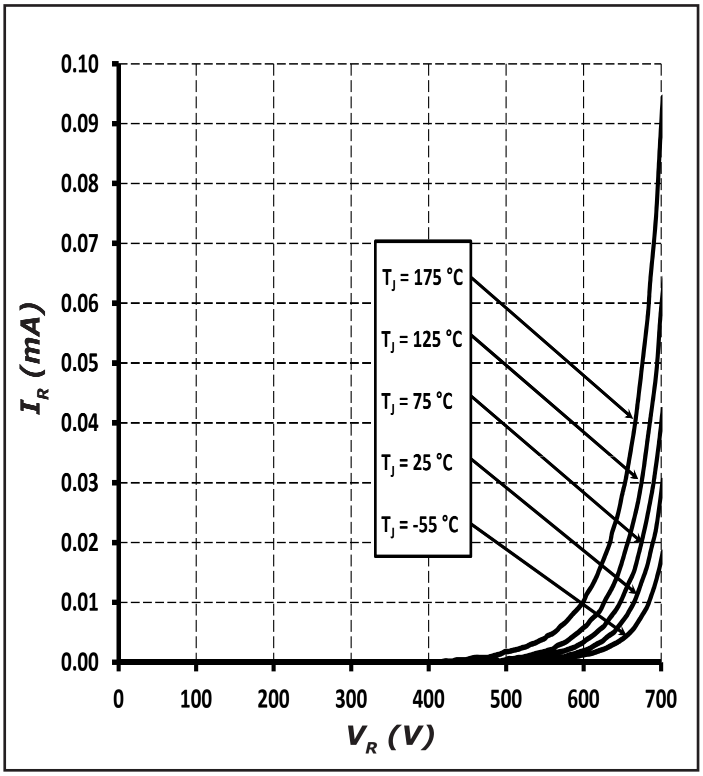


Figure 2. Reverse Characteristics

Typical Performance

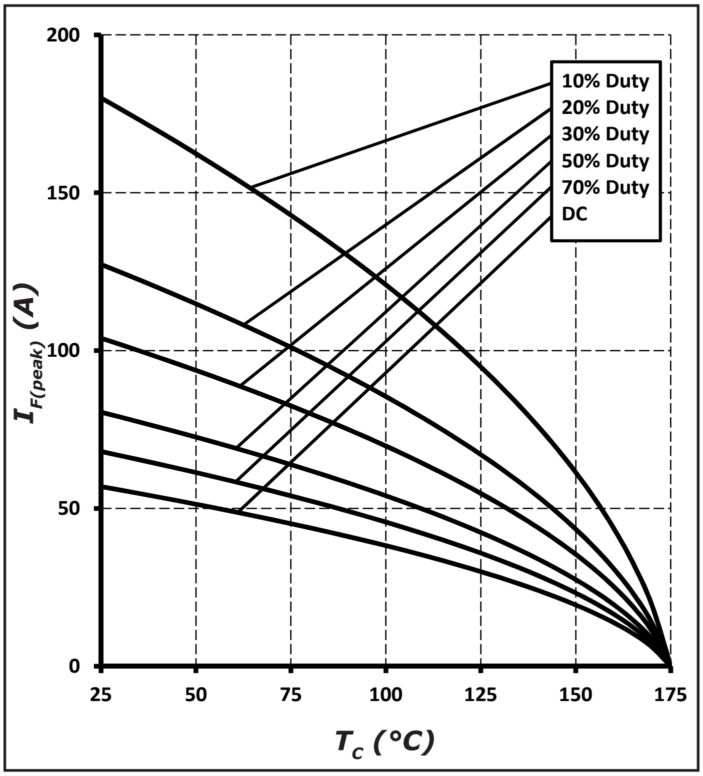


Figure 3. Current Derating

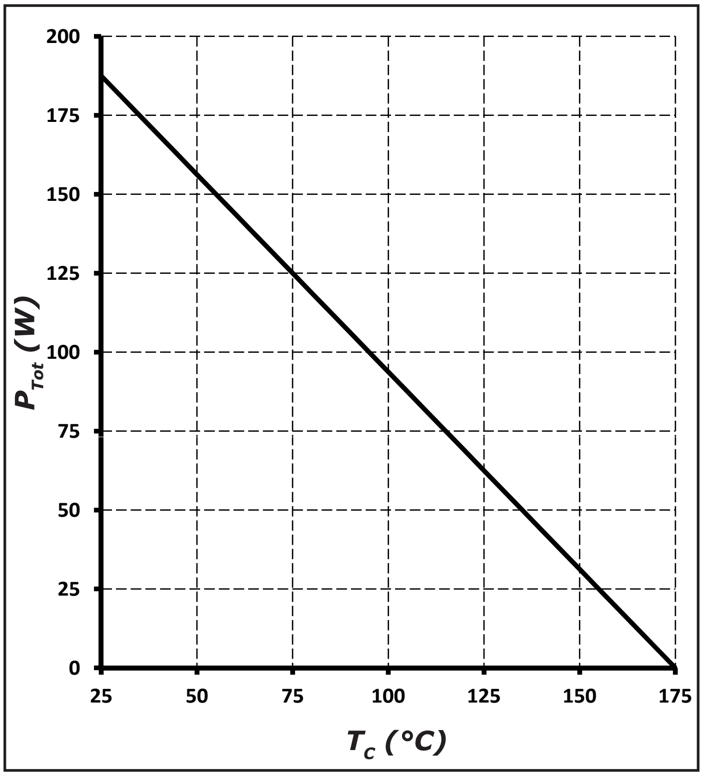


Figure 4. Power Derating

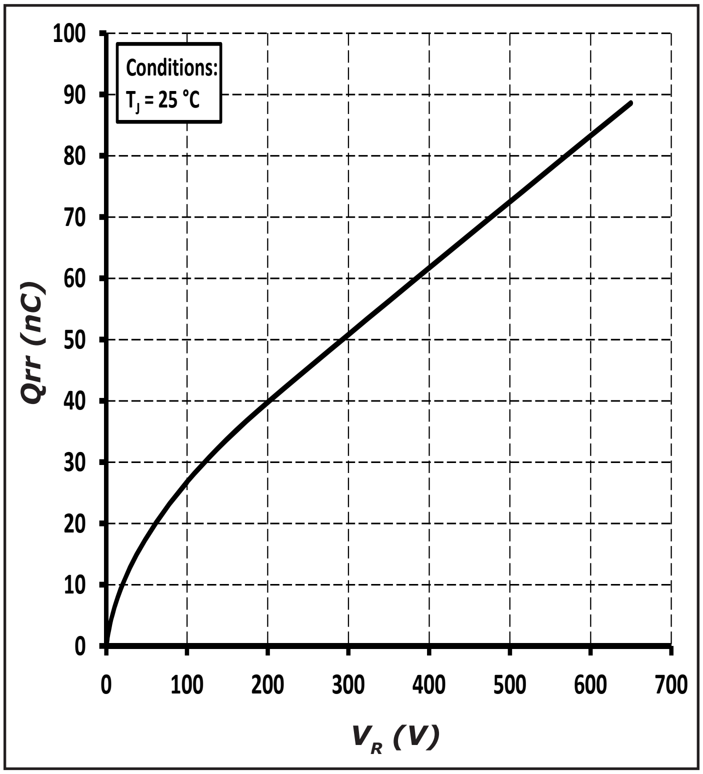


Figure 5. Recovery Charge vs. Reverse Voltage

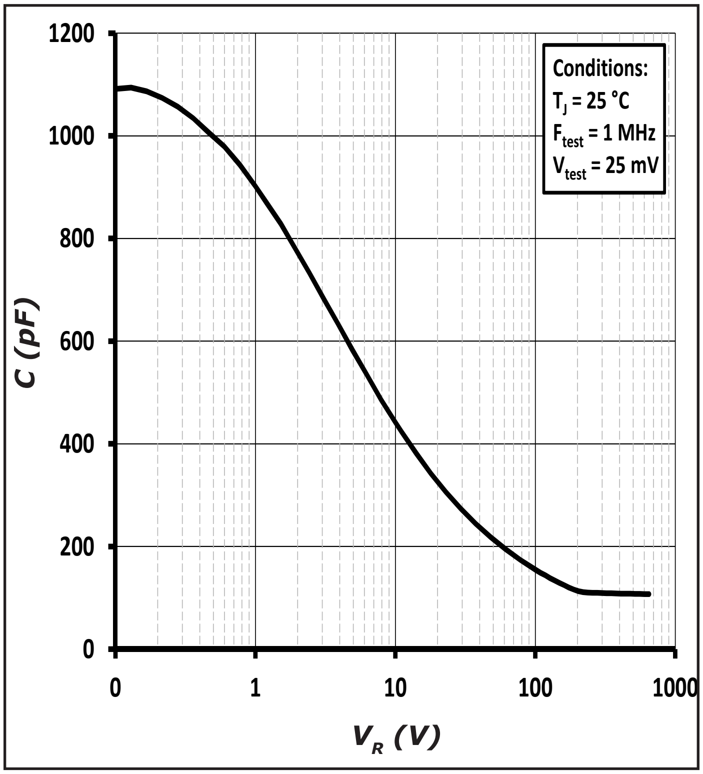


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

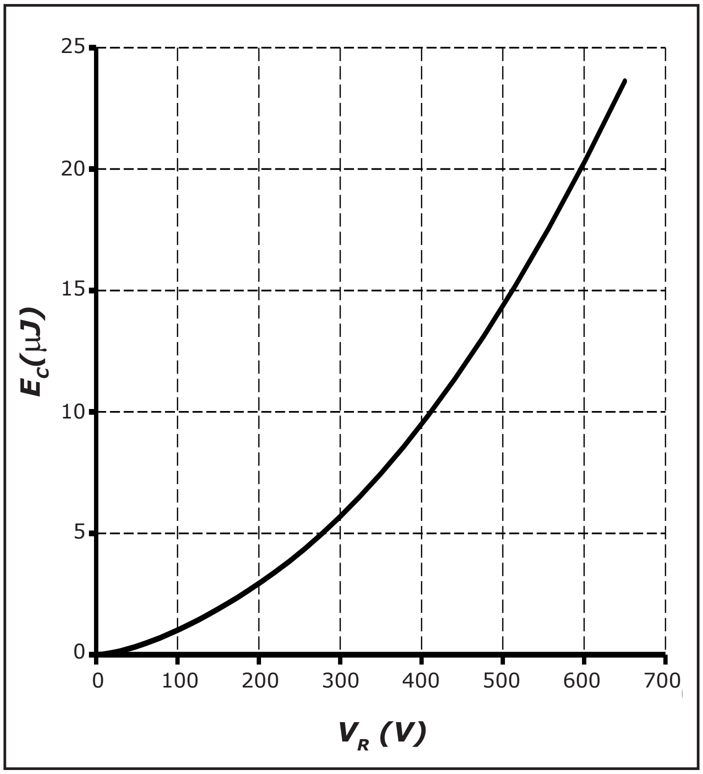


Figure 7. Typical Capacitance Stored Energy

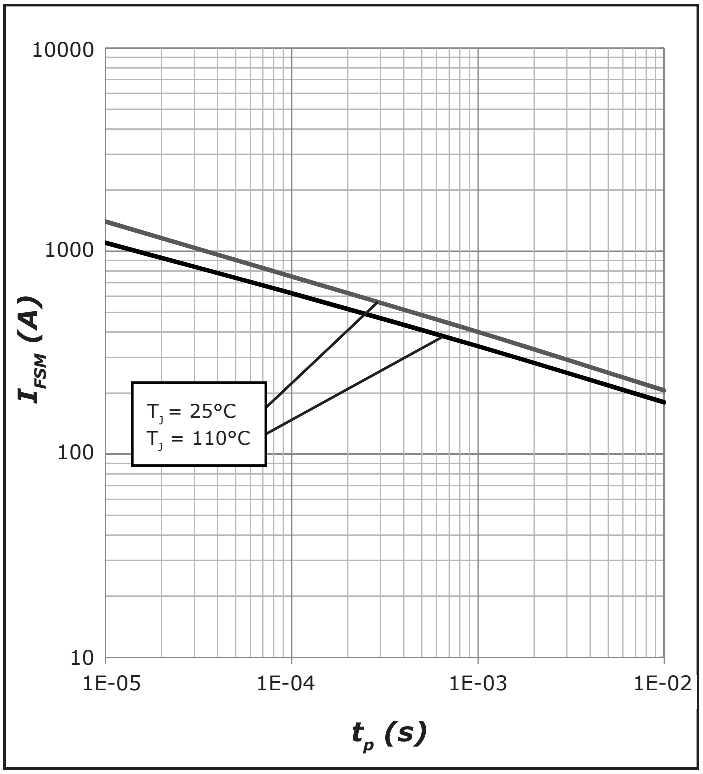


Figure 8. Non-Repetitive Peak Forward Surge Current versus Pulse Duration (sinusoidal waveform)

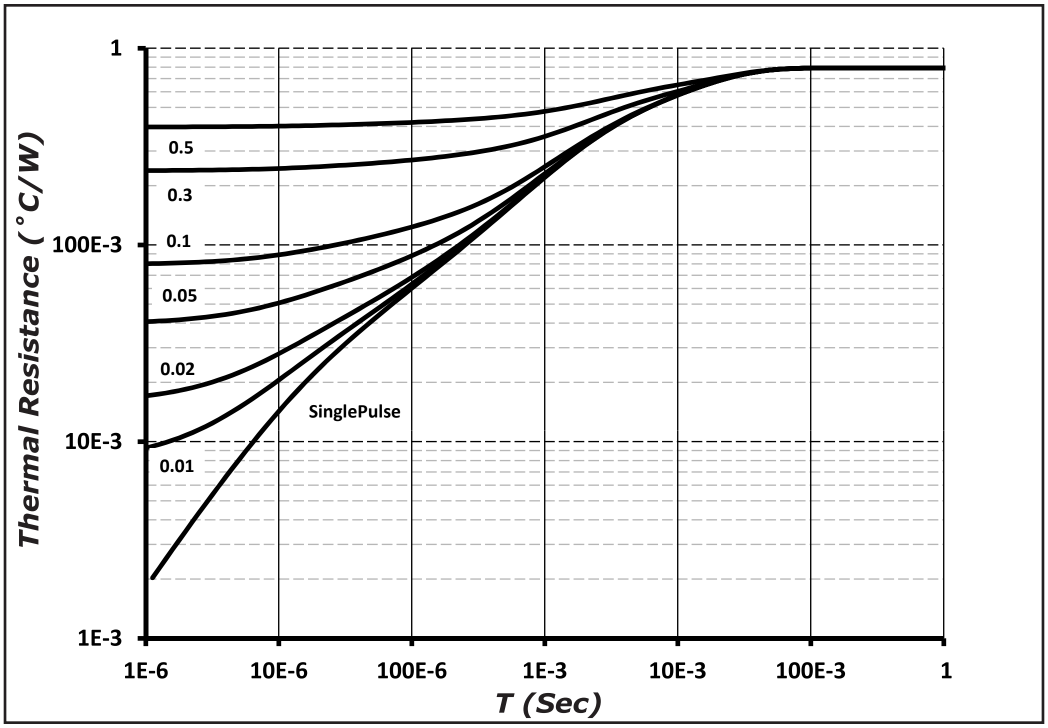
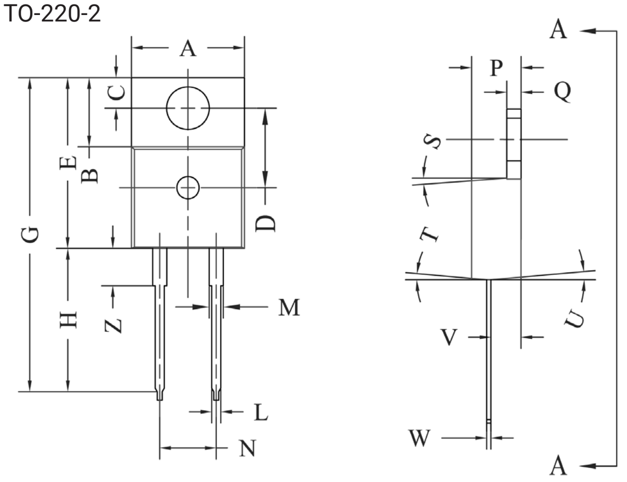
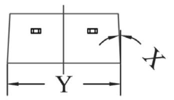


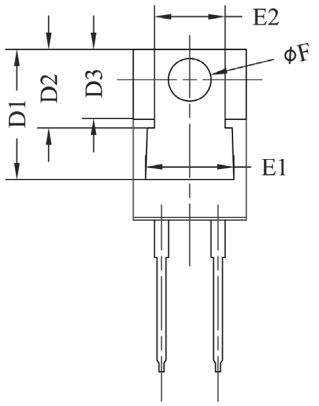
Figure 9. Transient Thermal Impedance

Package Dimensions

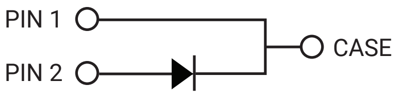
Package TO-220-2







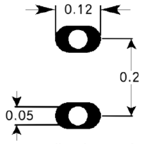
View A-A



POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.381	.410	9.677	10.414
B	.235	.255	5.969	6.477
C	.100	.120	2.540	3.048
D	.223	.337	5.664	8.560
D1	.457-.490		11.60-12.45 typ	
D2	.277-.303 typ		7.04-7.70 typ	
D3	.244-.252 typ		6.22-6.4 typ	
E	.590	.615	14.986	15.621
E1	.302	.326	7.68	8.28
E2	.227	251	5.77	6.37
F	.143	.153	3.632	3.886
G	1.105	1.147	28.067	29.134
H	.500	.550	12.700	13.970
L	.025	.036	.635	.914
M	.045	.055	1.143	1.550
N	.195	.205	4.953	5.207
P	.165	.185	4.191	4.699
Q	.048	.054	1.219	1.372
S	3°	6°	3°	6°
T	3°	6°	3°	6°
U	3°	6°	3°	6°
V	.094	.110	2.388	2.794
W	.014	.025	.356	.635
X	3°	5.5°	3°	5.5°
Y	.385	.410	9.779	10.414
z	.130	.150	3.302	3.810

NOTE:
1. Dimension L, M, W apply for Solder Dip Finish

Recommended Solder Pad Layout



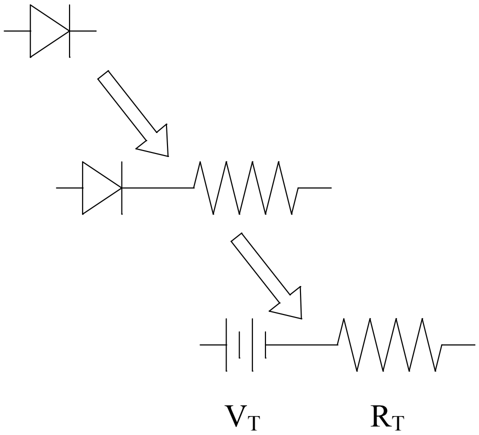
all units are in inches

TO-220-2

Part Number	Package	Marking
CVFD20065A	TO-220-2	CVFD20065A

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

Diode Model



$$V_{fT} = V_T + If * R_T$$

$$V_T = 1.0081 + (T_J * -1.6*10^{-3})$$
$$R_T = 0.0146 + (T_J * 1.7*10^{-4})$$

Note: T_j = Diode Junction Temperature In Degrees Celsius, valid from 25°C to 175°C

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 Wolfpseed representative or from the Product Ecology section of our website at http://www.wolfspeed.com/Power/Tools-and-Support/Product-Ecology.

- **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, or air traffic control systems.

Related Links

- Cree SiC Schottky diode portfolio: http://www.wolfspeed.com/Power/Products#SiCSchottkyDiodes
- Schottky diode Spice models: http://www.wolfspeed.com/power/tools-and-support/DIODE-model-request2
- SiC MOSFET and diode reference designs: http://go.pardot.com/l/101562/2015-07-31/349i