

C4D40120D-Silicon Carbide Schottky Diode

Z-RECTM RECTIFIER

 $V_{RRM} = 1200 \text{ V}$ $I_{F;} T_{c} < 135^{\circ}C = 54 \text{ A}$ $Q_{c} = 260 \text{ nC}$

Features

- 1.2kV Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- Extremely Fast Swtitching

Benefits

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

Applications

- Switch Mode Power Supplies
- Power Factor Correction
- Motor Drives

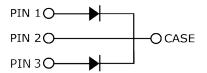
Package







TO-247-3



Part Number	Package	Marking	
C4D40120D	TO-247-3	C4D40120	

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

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V		
V _{RSM}	Surge Peak Reverse Voltage	1300	V		
V _R	DC Peak Reverse Voltage	1200	V		
I _F	Continuous DC Current (Per Leg/Device)	27/54	А	T _c <135°C, no AC component	
$I_{\sf FRM}$	Repetitive Peak Forward Surge Current	91* 61*	А	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	130* 110*	А	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 (Per Leg/Device)	266/532 114/228	W	T _c =25°C T _c =110°C	
T _c	Maximum Case Temperature	135	°C		
T,	Operating Junction Range	-55 to +175	°C		
T _{stg}	Storage Temperature Range	-55 to +135	°C		
	TO-247 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw	

^{**} Per Device, * Per Leg



Electrical Characteristics (Per Leg)

Symbol	Parameter	Тур.	Max.	Unit	Test Conditions	Note
V _F	Forward Voltage	1.5 2.2	1.8 3	V	I _F = 20 A T _J =25°C I _F = 20 A T _J =175°C	
I_R	Reverse Current	35 65	200 400	μΑ	$V_R = 1200 \text{ V } T_J = 25^{\circ}\text{C}$ $V_R = 1200 \text{ V } T_J = 175^{\circ}\text{C}$	
Q _c	Total Capacitive Charge	130		nC	$V_R = 1200 \text{ V, } I_F = 20\text{A}$ $di/dt = 200 \text{ A/}\mu\text{s}$ $T_J = 25^{\circ}\text{C}$	
С	Total Capacitance	1500 93 67		pF	$V_R = 0 \text{ V, } T_J = 25^{\circ}\text{C, } f = 1 \text{ MHz}$ $V_R = 400 \text{ V, } T_J = 25^{\circ}\text{C, } f = 1 \text{ MHz}$ $V_R = 800 \text{ V, } T_J = 25^{\circ}\text{C, } f = 1 \text{ MHz}$	

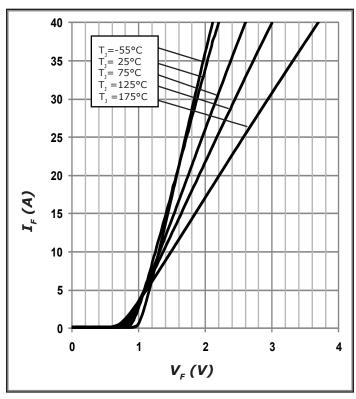
Note:

Thermal Characteristics

Symbol	Parameter	Тур.	Max.	Unit	Test Conditions	Note
$R_{_{ heta JC}}$	Thermal Resistance from Junction to Case	0.29** 0.57*		°C/W		

^{**} Per Device, * Per Leg

Typical Performance (Per Leg)





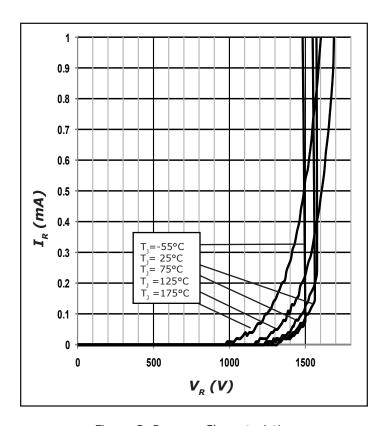
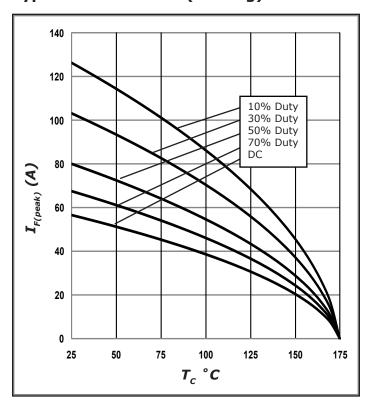


Figure 2. Reverse Characteristics

^{1.} This is a majority carrier diode, so there is no reverse recovery charge.



Typical Performance (Per Leg)



300.0 250.0 200.0 150.0 50.0 25 50 75 100 125 150 175 T_C °C

Figure 3. Current Derating

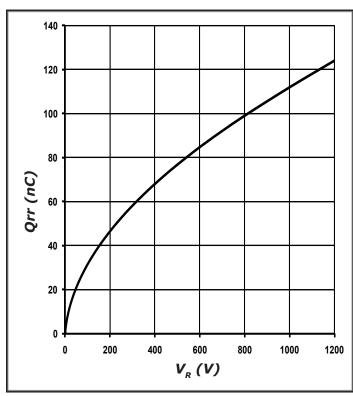


Figure 5. Recovery Charge vs. Reverse Voltage

Figure 4. Power Derating

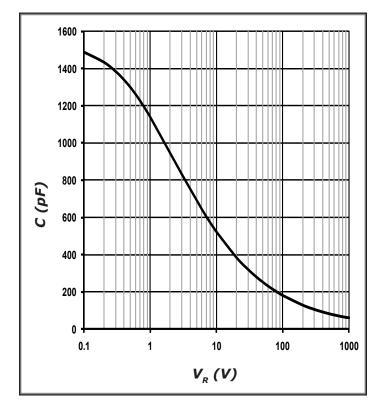


Figure 6. Capacitance vs. Reverse Voltage



Typical Performance (Per Leg)

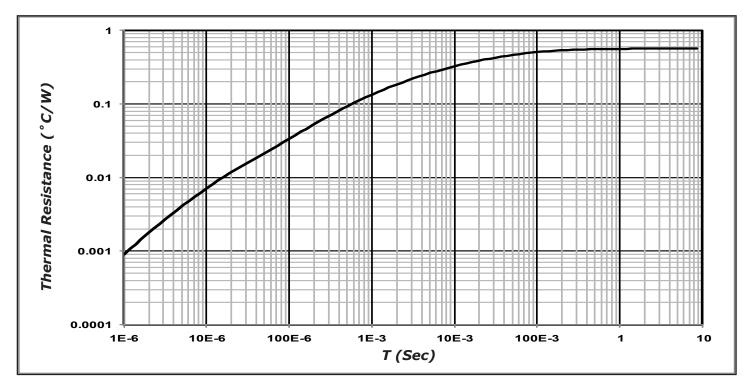


Figure 7. Transient Thermal Impedance

Diode Model

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

$$V_T = 0.97 + (T_J^* -1.40^*10^{-3})$$

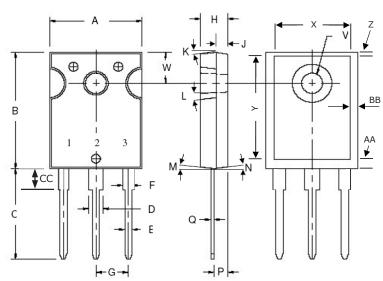
$$R_T = 0.023 + (T_J^* 2.71^*10^{-4})$$

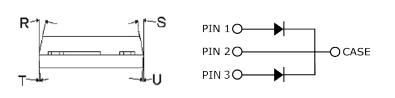
Note: T_i = Diode Junction Temperature In Degrees Celcius



Package Dimensions

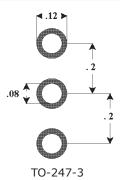
Package TO-247-3





- DOG	Inc	hes	Millimeters		
POS	Min	Max	Min	Max	
А	.605	.635	15.367	16.130	
В	.800	.831	20.320	21.10	
С	.780	.800	19.810	20.320	
D	.095	.133	2.413	3.380	
Е	.046	.052	1.168	1.321	
F	.060	.095	1.524	2.410	
G	.215	TYP	5.460	TYP	
Н	.175	.205	4.450	5.210	
J	.075	.085	1.910	2.160	
К	6°	21°	6°	21°	
L	4°	6°	4°	6°	
М	2°	4°	2°	4°	
N	2°	4°	2°	4°	
Р	.090	.100	2.286	2.540	
Q	.020	.030	.508	.762	
R	9°	11°	9°	11°	
S	9°	11°	9°	11°	
Т	2°	8°	2°	8°	
U	2°	8°	2°	8°	
V	.137	.144	3.487	3.658	
W	.210	.248	5.334	6.300	
Х	.502	.557	12.751	14.150	
Y	.637	.695	16.180	17.653	
Z	.038	.052	0.964	1.321	
AA	.110	.140	2.794	3.556	
BB	.030	.046	0.766	1.168	
CC	.161	.176	4.100	4.472	

Recommended Solder Pad Layout



Part Number	Package	Marking
C4D40120D	TO-247-3	C4D40120

"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."

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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