

C4D10120E

Silicon Carbide Schottky Diode

Z-REC[®] RECTIFIER

V_{RRM}	=	1200 V
$I_F (T_c=135^\circ\text{C})$	=	16 A
Q_c	=	52 nC

Features

- 1.2kV Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on V_F

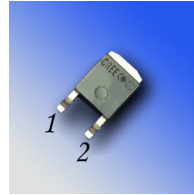
Benefits

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

Applications

- Solar Inverters
- Switch Mode Power Supplies (SMPS)
- Boost diodes in PFC or DC/DC stages
- Free Wheeling Diodes in Inverter stages
- AC/DC converters

Package



TO-252-2



Part Number	Package	Marking
C4D10120E	TO-252-2	C4D10120

Maximum Ratings ($T_c=25^\circ\text{C}$ 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_{DC}	DC Blocking Voltage	1200	V		
I_F	Continuous Forward Current	33 16 10	A	$T_c=25^\circ\text{C}$ $T_c=135^\circ\text{C}$ $T_c=156^\circ\text{C}$	Fig. 3
I_{FRM}	Repetitive Peak Forward Surge Current	47 31.5	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	71 59	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	Fig. 8
$I_{F,Max}$	Non-Repetitive Peak Forward Current	750 620	A	$T_c=25^\circ\text{C}$, $t_p=10$ μs , Pulse $T_c=110^\circ\text{C}$, $t_p=10$ μs , Pulse	Fig. 8
P_{tot}	Power Dissipation	166.5 72	W	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	Fig. 4
dV/dt	Diode dV/dt ruggedness	200	V/ns	$V_R=0-960\text{V}$	
$\int i^2 dt$	i^2t value	25 17.5	A ² s	$T_c=25^\circ\text{C}$, $t_p=10$ ms $T_c=110^\circ\text{C}$, $t_p=10$ ms	
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$		

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.5 2.2	1.8 3	V	$I_F = 10\text{ A}$ $T_J = 25^\circ\text{C}$ $I_F = 10\text{ A}$ $T_J = 175^\circ\text{C}$	Fig. 1
I_R	Reverse Current	30 55	250 350	μA	$V_R = 1200\text{ V}$ $T_J = 25^\circ\text{C}$ $V_R = 1200\text{ V}$ $T_J = 175^\circ\text{C}$	Fig. 2
Q_C	Total Capacitive Charge	52		nC	$V_R = 800\text{ V}$, $I_F = 10\text{ A}$ $di/dt = 200\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$	Fig. 5
C	Total Capacitance	754 45 38		pF	$V_R = 0\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$ $V_R = 400\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$ $V_R = 800\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$	Fig. 6
E_C	Capacitance Stored Energy	14.5		μJ	$V_R = 800\text{ V}$	Fig. 7

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

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.9	$^\circ\text{C}/\text{W}$	Fig.9

Typical Performance

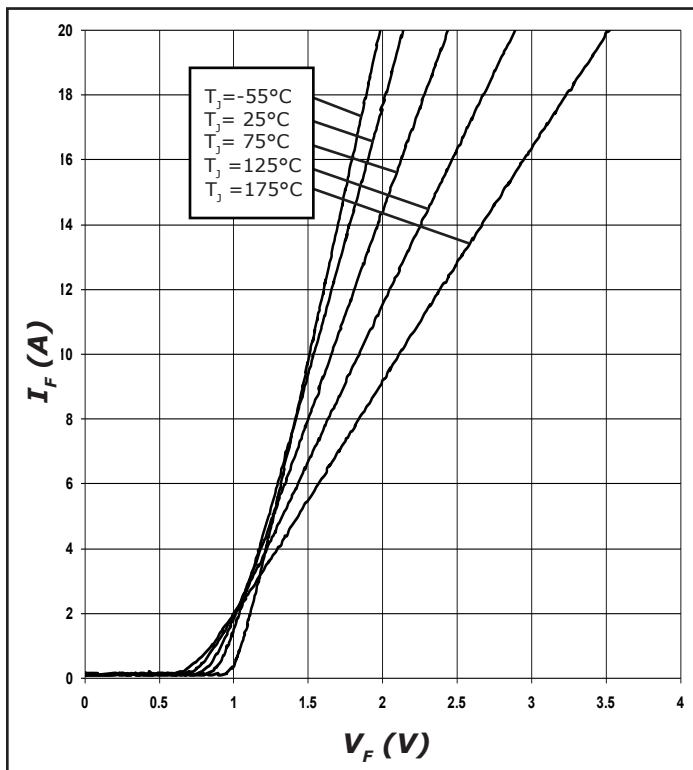


Figure 1. Forward Characteristics

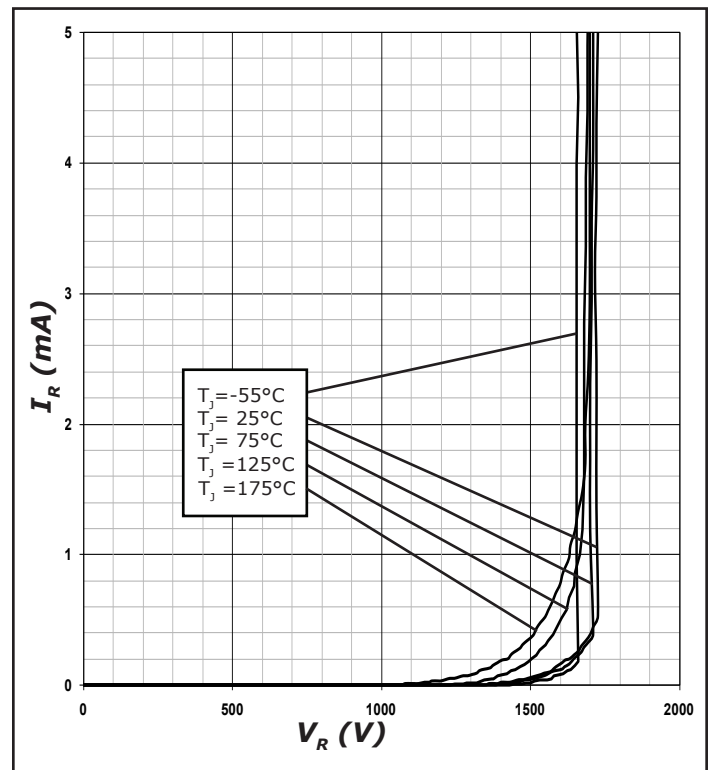


Figure 2. Reverse Characteristics

Typical Performance

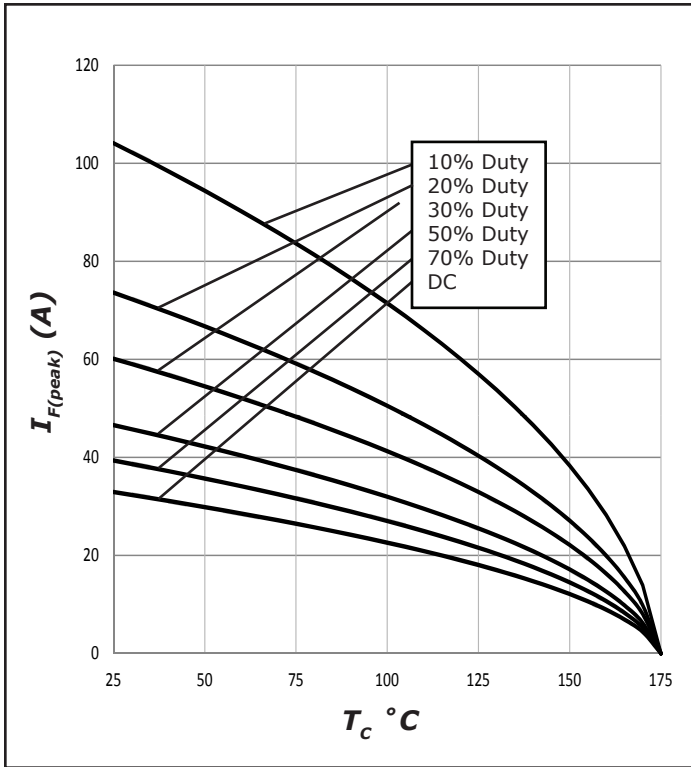


Figure 3. Current Derating

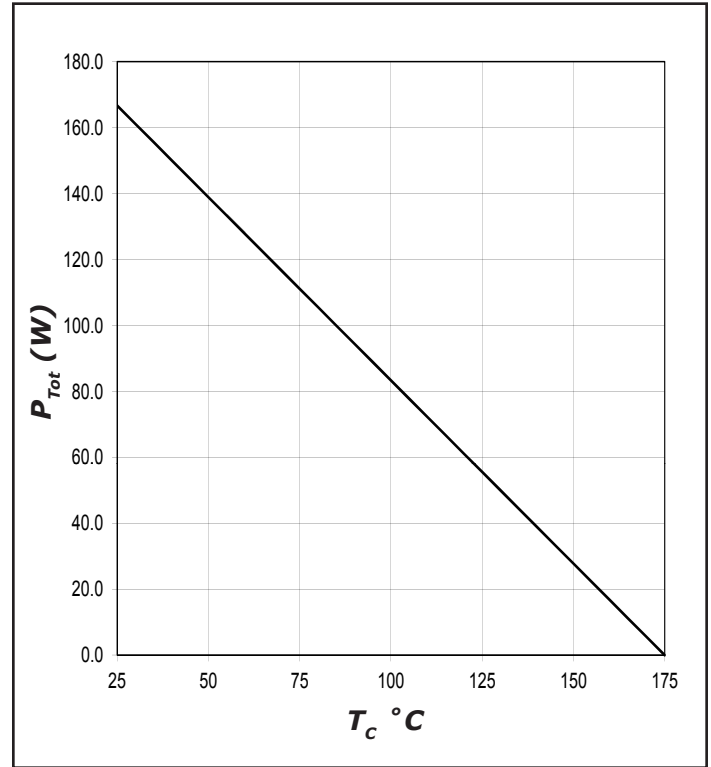


Figure 4. Power Derating

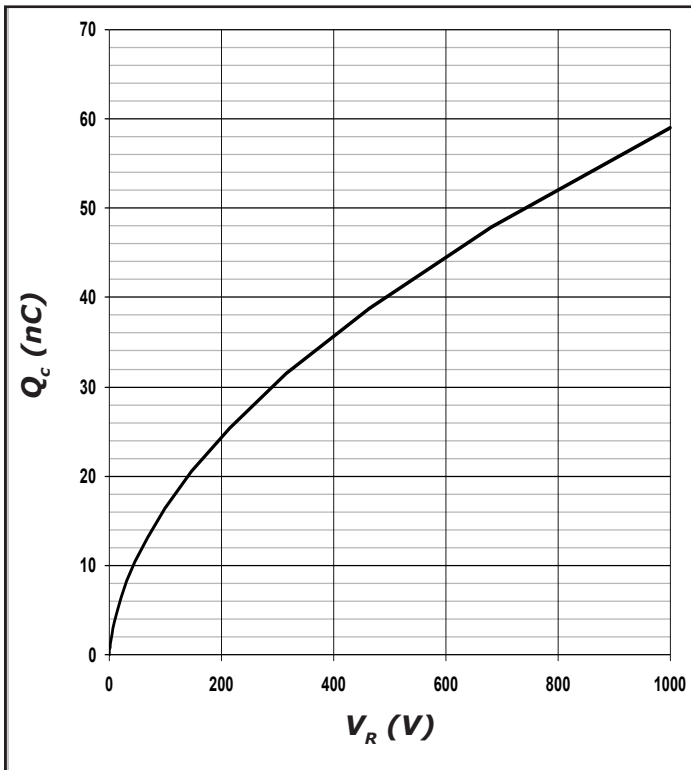


Figure 5. Recovery Charge vs. Reverse Voltage

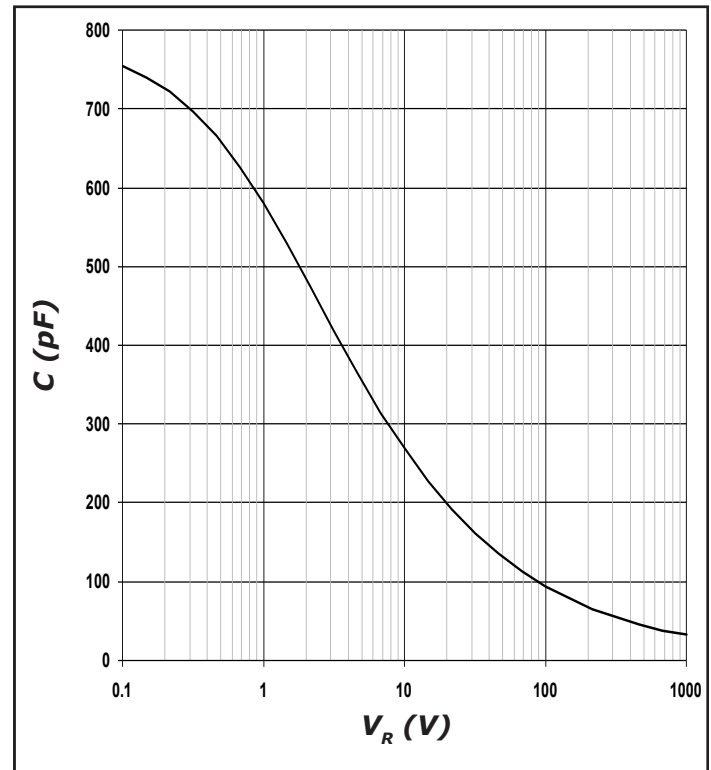


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

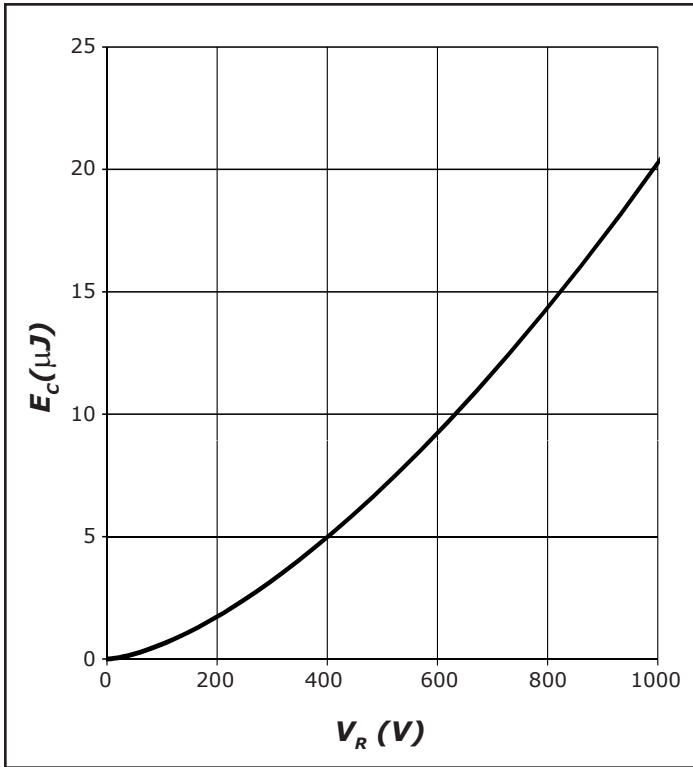


Figure 7. Typical Capacitance Stored Energy

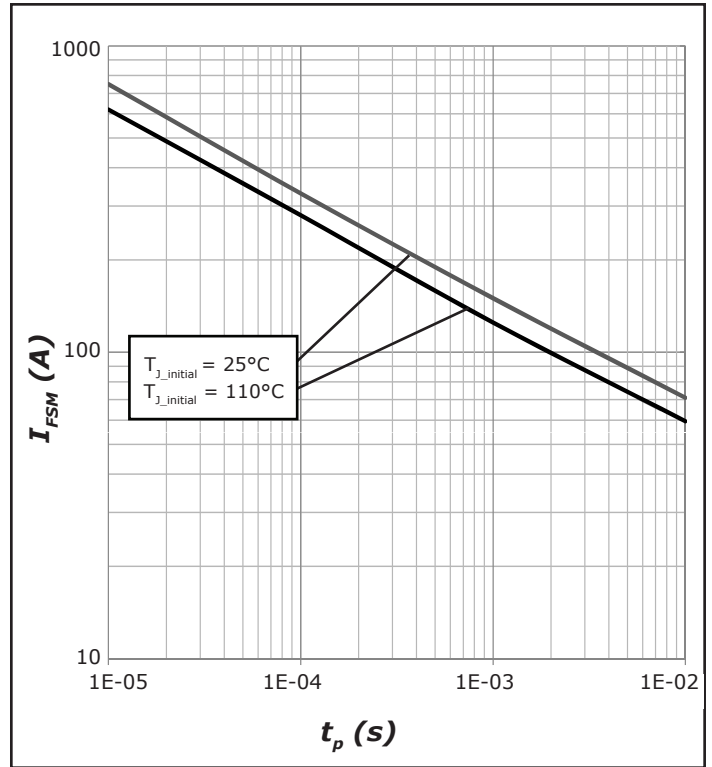


Figure 8. Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

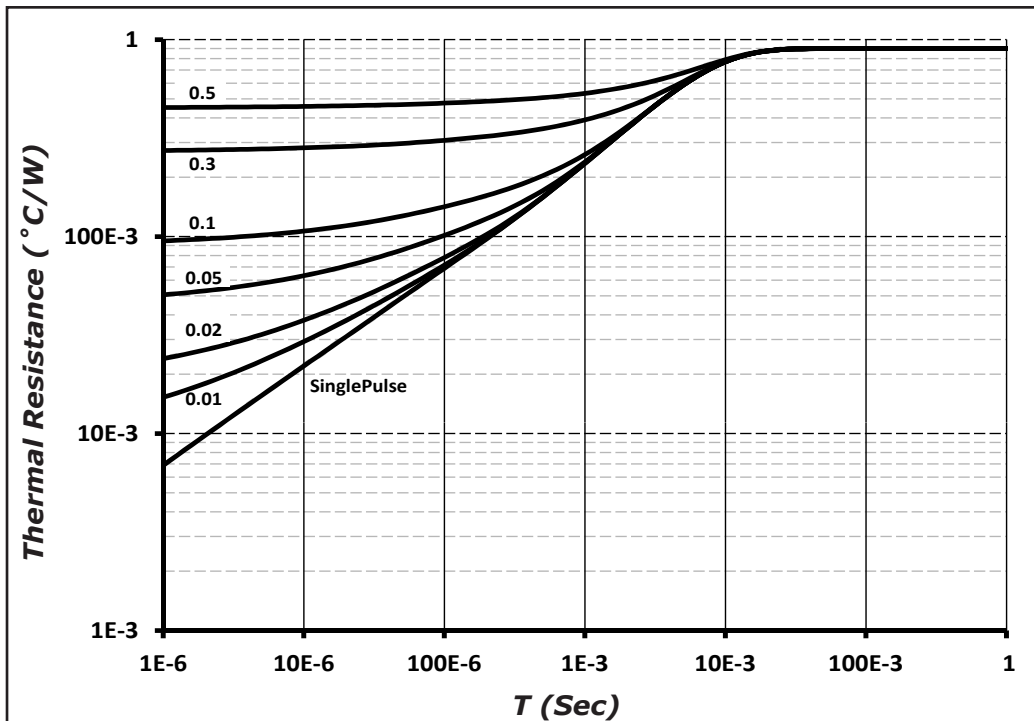
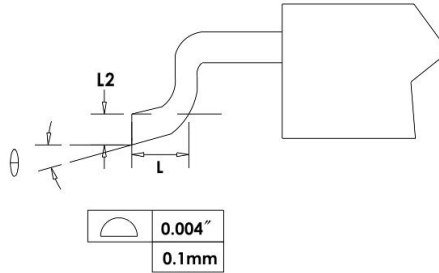
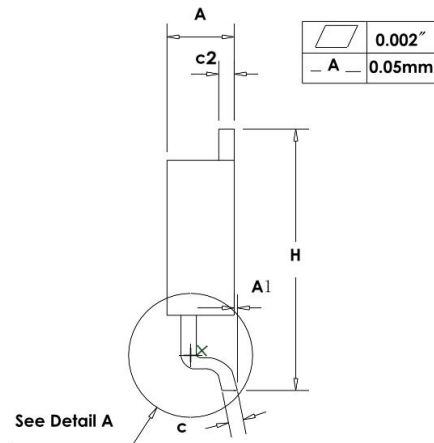
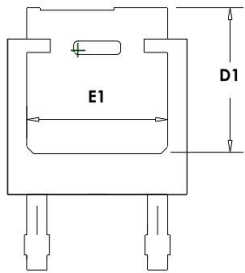
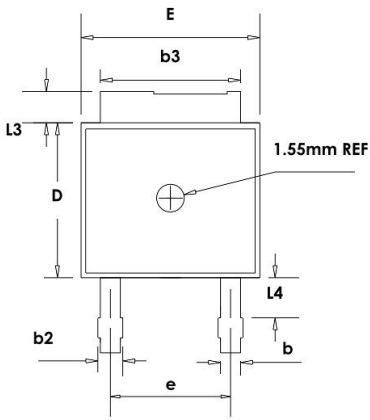


Figure 9. Transient Thermal Impedance

Package Dimensions

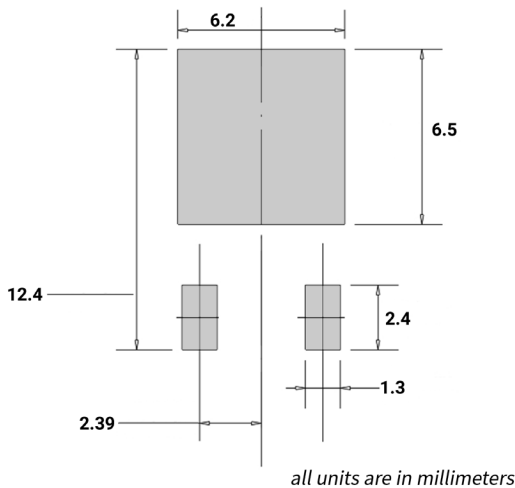
Package TO-252-2



SYMBOL	MILLIMETERS	
	MIN	MAX
A	2.159	2.413
A1	0	0.13
b	0.64	0.89
b2	0.653	1.143
b3	5.004	5.6
c	0.457	0.61
c2	0.457	0.864
D	5.867	6.248
D1	5.21	-
E	6.35	7.341
E1	4.32	-
e	4.58 BSC	
H	9.65	10.414
L	1.106	1.78
L2	0.51 BSC	
L3	0.889	1.27
L4	0.64	1.01
θ	0°	8°



Recommended Solder Pad Layout



TO-252-2

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

