

C4D10120E Silicon Carbide Schottky Diode

Z- Rec^{TM} Rectifier

Features

- 1200-Volt Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- 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
- Power Factor Correction

V _{RRM}	= 1200 V			
Ι_F (τ_c=135°C) = 16 Α				
Q	=	52 nC		

Package



TO-252-2



Part Number	Package	Marking		
C4D10120E	TO-252-2	C4D10120		

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

Symbol	Parameter	Value	Unit	Test Conditions	Note
V _{RRM}	Repetitive Peak Reverse Voltage	1200	V		1
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°C T _c =135°C T _c =155°C	
\mathbf{I}_{FRM}	Repetitive Peak Forward Surge Current	47 31	А	$T_c = 25^{\circ}C$, $t_p = 10$ ms, Half Sine pulse $T_c = 110^{\circ}C$, $t_p = 10$ ms, Half Sine pulse	
$\mathbf{I}_{_{FSM}}$	Non-Repetitive Peak Forward Surge Current	71 59	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	170 74	W	$T_c=25^{\circ}C$ $T_c=110^{\circ}C$	
T _c	Maximum Case Temperature	135	°C		
T,	Operating Junction Range	-55 to +175	°C		
T_{stg}	Storage Temperature Range	-55 to +135	°C		



Electrical Characteristics

Symbol	Parameter	Тур.	Max.	Unit	Test Conditions	Note
V _F	Forward Voltage	1.5 2.2	1.8 3	V	$I_{F} = 10 \text{ A} T_{J} = 25^{\circ}\text{C}$ $I_{F} = 10 \text{ A} T_{J} = 175^{\circ}\text{C}$	
I _R	Reverse Current	30 55	250 350	μA	$V_{R} = 1200 V T_{J} = 25^{\circ}C$ $V_{R} = 1200 V T_{J} = 175^{\circ}C$	
Q _c	Total Capacitive Charge	52		nC	$V_{R} = 800 \text{ V}, I_{F} = 10\text{ A}$ $di/dt = 200 \text{ A}/\mu\text{s}$ $T_{J} = 25^{\circ}\text{C}$	
С	Total Capacitance	754 45 38		pF	$ \begin{array}{l} V_{_R} = 0 \ V, \ T_{_J} = 25 \ ^{\circ}C, \ f = 1 \ MHz \\ V_{_R} = 400 \ V, \ T_{_J} = 25 \ ^{\circ}C, \ f = 1 \ MHz \\ V_{_R} = 800 \ V, \ T_{_J} = 25 \ ^{\circ}C, \ f = 1 \ MHz \end{array} $	

Note:

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

Thermal Characteristics

Symbol	Parameter		Unit
$R_{_{ ext{ hetaJC}}}$	TO-252 Package Thermal Resistance from Junction to Case	0.88	°C/W

Typical Performance

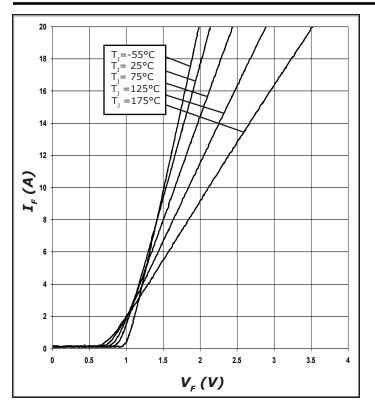
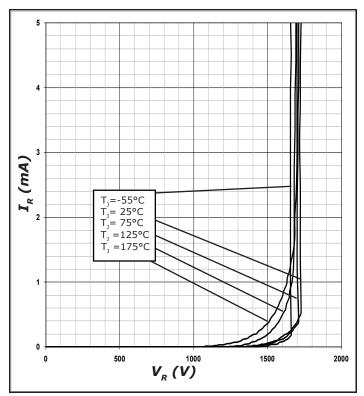
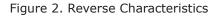


Figure 1. Forward Characteristics







Typical Performance

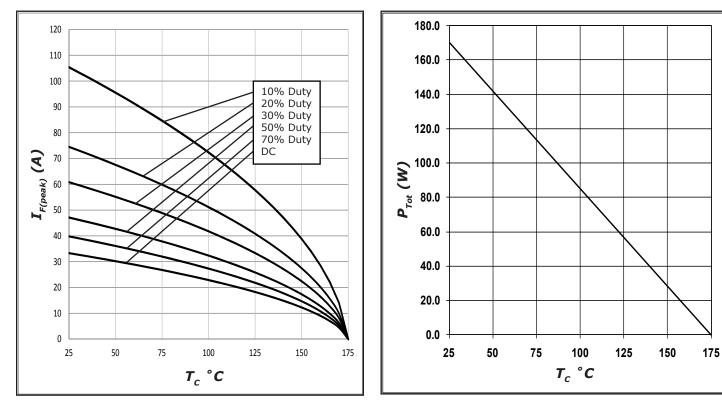
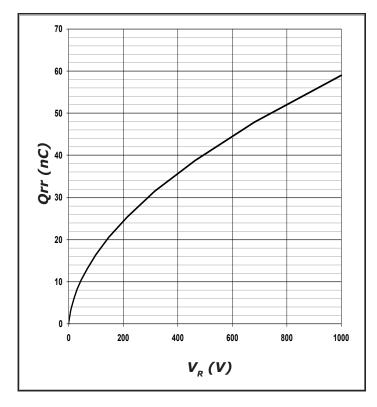
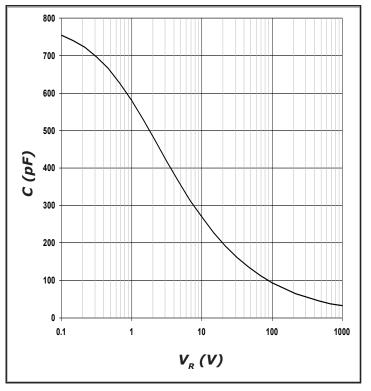


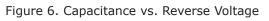
Figure 3. Current Derating













Typical Performance

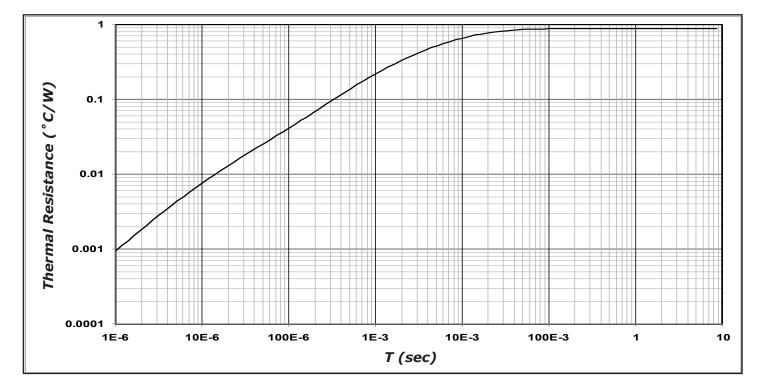
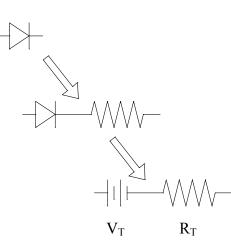


Figure 7. Transient Thermal Impedance

Diode Model



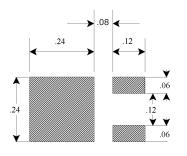
$$V_{fT} = V_T + If^*R_T$$
$$V_T = 0.98 + (T_J^* - 1.71^*10^{-3})$$
$$R_T = 0.040 + (T_J^* 5.32^*10^{-4})$$



-4)



Recommended Solder Pad Layout



Part Number	Package	Marking		
C4D10120E	C4D10120E TO-252-2			

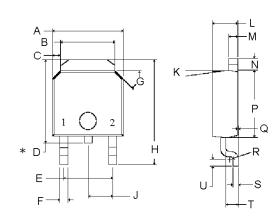
TO-252-2

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



Package Dimensions

Package TO-252-2





POS	Inc	hes	Millimeters		
PUS	Min	Max	Min	Мах	
А	.250	.289	6.350	7.341	
В	.197	.215	5.004	5.461	
С	.027	.050	.686	1.270	
D*	.270	.322	6.858	8.179	
E	.178	.182	4.521	4.623	
F	.025	.045	.635	1.143	
G	44°	46°	44°	46°	
Н	.380	.410	9.652	10.414	
J	.090	ТҮР	2.286 TYP		
К	6°	8°	6°	8°	
L	.086	.094	2.184	2.388	
М	.018	.034	.457	.864	
Ν	.035	.050	.889	1.270	
Р	.231	.246	5.867	6.248	
Q	0.00	.005	0.00	.127	
R	R0.01	R0.010 TYP		4 TYP	
S	.017	.023	.432	.584	
Т	.038	.045	.965	1.143	
U	.021	.029	.533	.737	

Note:

* Tab "D" may not be present



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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