

HCD5G40120D Silicon Carbide Schottky Diode

$$V_{RRM} = 1200V$$

$$I_F(T_C=153^\circ C) = 40 A$$

$$Q_C = 252 nC$$

Features

- 1200 V Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- Extremely Fast Switching

Benefits

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

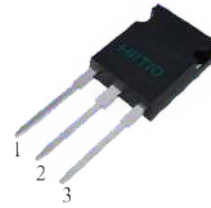
Applications

- Switching Mode Power Supply
- Boost Diodes in PFC
- DC/DC Converters
- AC/DC Converters
- Free Wheeling Diodes in Inverter

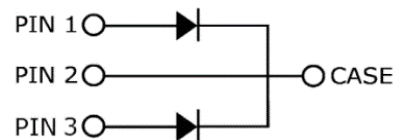
Maximum Ratings ($T_C = 25^\circ C$ unless otherwise specified)

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 Forward Current	60/120 28/56 20/40	A	$T_C=25^\circ C$ $T_C=135^\circ C$ $T_C=151^\circ C$	Fig. 3
I_{FSM}	Non- Repetitive Forward Surge Current	160	A	$T_C=25^\circ C$, $t_p=10$ ms, Half Sine Pulse	
P_{tot}	Power Dissipation	263 114	W	$T_C=25^\circ C$ $T_C=110^\circ C$	Fig. 4
T_J	Operating Junction Range	-55 to +175	$^\circ C$		
T_{stg}	Storage Temperature Range	-55 to +175	$^\circ C$		

Package



TO-247-3



Part Number	Package	Marking
HCD5G40120D	TO-247-3	HCD5G40120D

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.45 2	1.7 2.6	V	$I_F = 20A, T_J = 25^\circ C$ $I_F = 20A, T_J = 175^\circ C$	Fig. 1
I_R	Reverse Current	15 50	200 500	μA	$V_R = 1200V, T_J = 25^\circ C$ $V_R = 1200V, T_J = 175^\circ C$	Fig. 2
Q_C	Total Capacitive Charge	126		nC	$V_R = 800V, I_F = 20A,$ $T_J = 25^\circ C$	Fig. 6
C	Total Capacitance	1702 120 95		pF	$V_R = 0V, T_J = 25^\circ C, f = 1MHz$ $V_R = 400V, T_J = 25^\circ C, f = 1MHz$ $V_R = 800V, T_J = 25^\circ C, f = 1MHz$	Fig. 5
E_C	Capacitance Stored Energy	32.5		μJ	$V_R = 800V$	Fig. 7

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

Thermal Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case		0.57 0.29		$^\circ C/W$	Fig.8

Typical Performance (Per Leg)

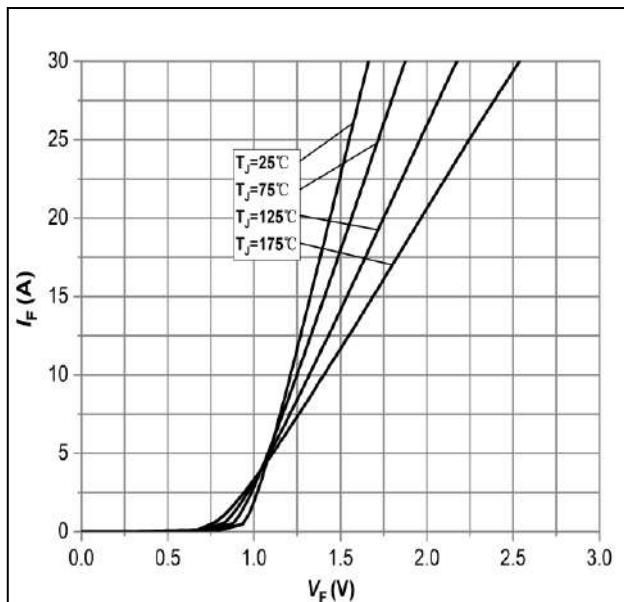


Figure 1: Forward Characteristics

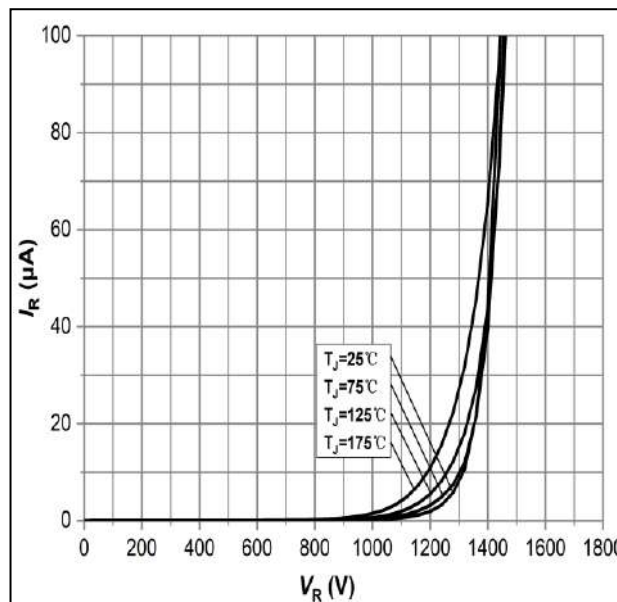


Figure 2: Reverse Characteristics

Typical Performance (Per Leg)

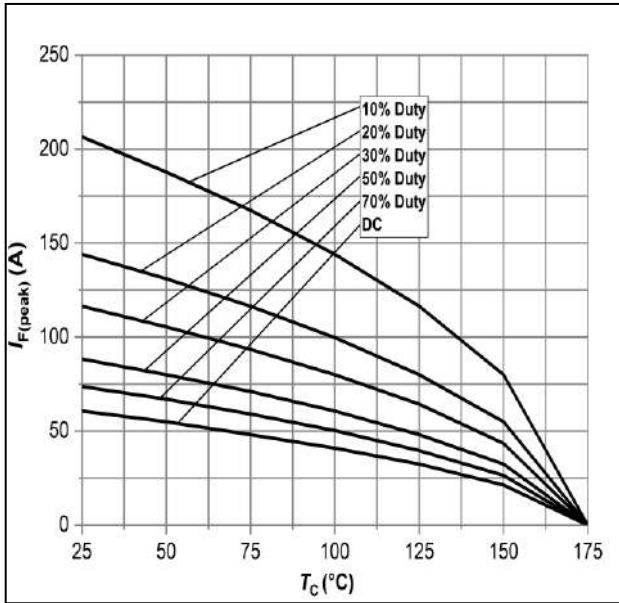


Figure 3: Current Derating

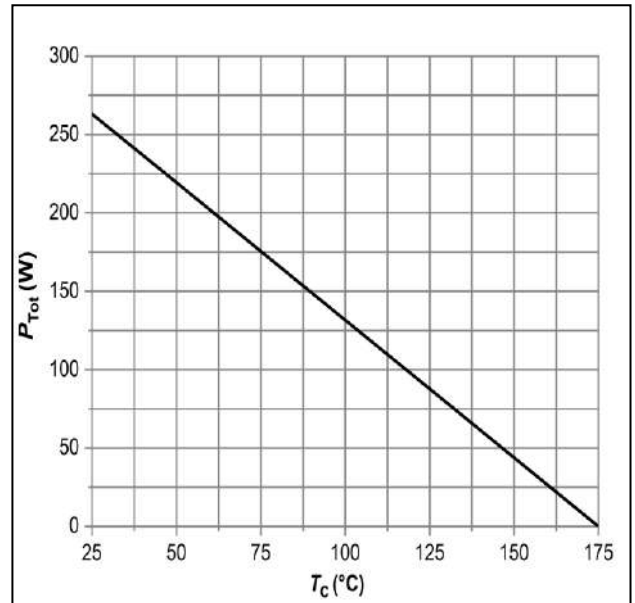


Figure 4: Power Derating

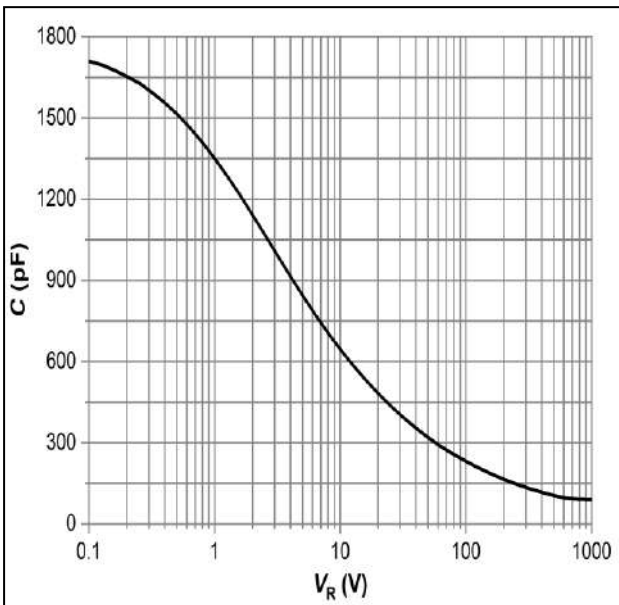


Figure 5: Capacitance vs. Reverse Voltage

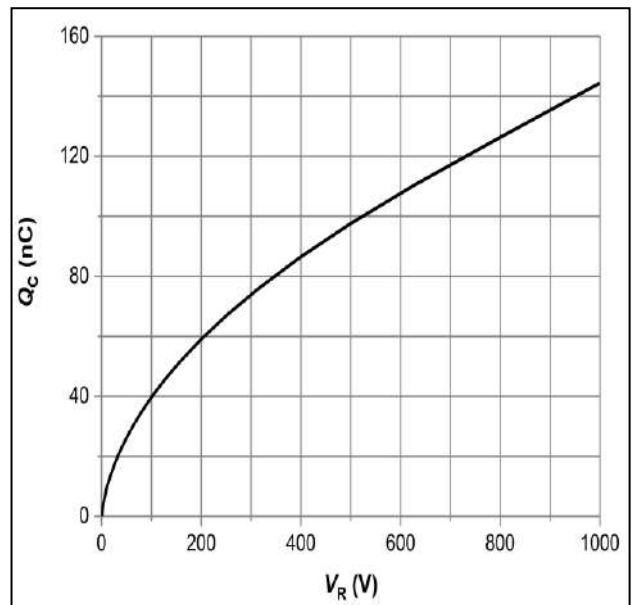


Figure 6: Total Capacitance Charge vs. Reverse Voltage

Typical Performance (Per Leg)

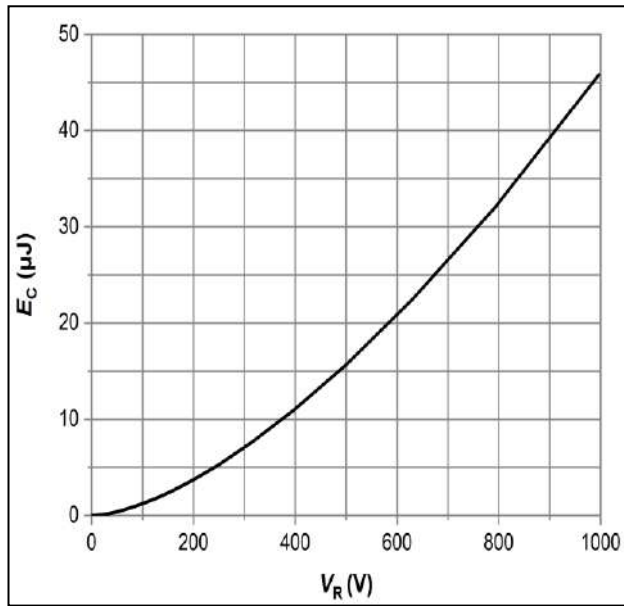


Figure 7: Typical Capacitance Stored Energy

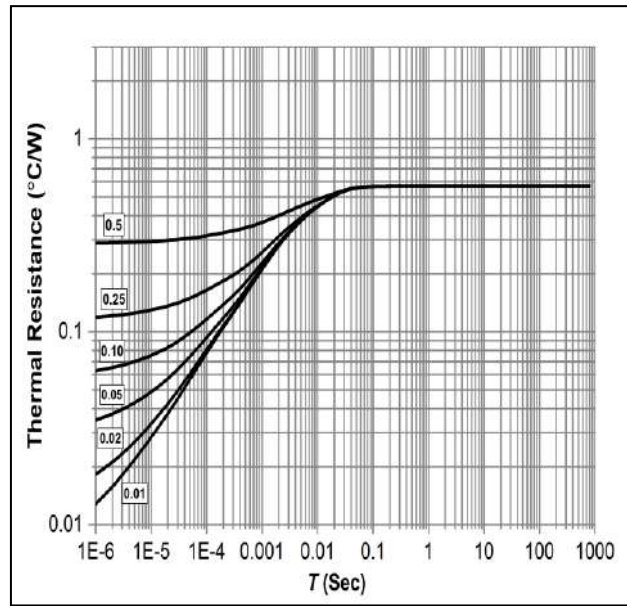
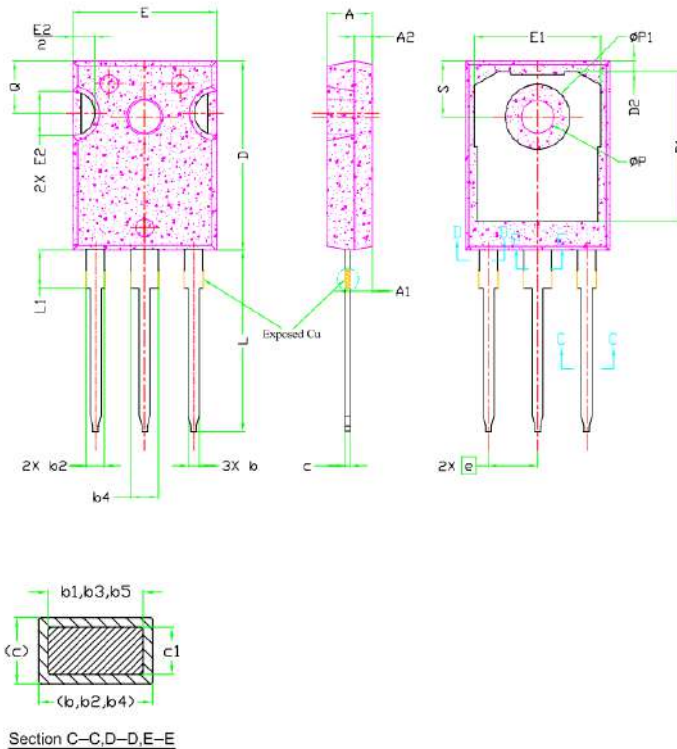


Figure 8: Transient Thermal Impedance

Package Dimensions

TO-247-3



SYMBOL	DIMENSIONS			NOTES
	Min.	NOM	Max.	
A	4.83	5.02	5.21	
A1	2.29	2.41	2.55	
A2	1.50	2.00	2.49	
b	1.12	1.20	1.33	
b1	1.12	1.20	1.28	
b2	1.91	2.00	2.39	6
b3	1.91	2.00	2.34	
b4	2.87	3.00	3.22	6,8
b5	2.87	3.00	3.18	
C	0.55	0.60	0.65	6
c1	0.55	0.60	0.65	
D	20.88	20.95	21.10	4
D1	16.25	16.55	17.65	5
D2	0.51	1.19	1.35	
E	15.75	15.94	16.13	4
E1	13.46	14.02	14.16	5
E2	4.32	4.91	5.49	3
e	5.44BSC			
L	19.81	20.07	20.32	
L1	4.10	4.19	4.40	6
ØP	3.56	3.61	3.65	7
ØPI	7.19REF.			
Q	5.39	5.79	6.20	
S	6.04	6.17	6.30	

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

Revision History

Document Version	Description of Changes
RevX.0.1	Released

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