

HCD5G04065A Silicon Carbide Schottky Diode

$V_{RRM} = 650V$
 $I_F(T_C=153^{\circ}C) = 4 A$
 $Q_C = 11 nC$

Features

- 650 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	650	V		
V_{RSM}	Surge Peak Reverse Voltage	650	V		
V_R	DC Peak Reverse Voltage	650	V		
I_F	Continuous Forward Current	13 6 4	A	$T_C=25^{\circ}C$ $T_C=135^{\circ}C$ $T_C=159^{\circ}C$	Fig. 3
I_{FSM}	Non- Repetitive Forward Surge Current	34	A	$T_C=25^{\circ}C$, $t_p=10 ms$, Half Sine Pulse	
P_{tot}	Power Dissipation	51 22	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



Part Number	Package	Marking
HCD5G04065A	TO -220- 2	HCD5G04065A

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.41 1.8	1.65 2.4	V	$I_F = 4\text{ A}$, $T_J = 25\text{ }^\circ\text{C}$ $I_F = 4\text{ A}$, $T_J = 175\text{ }^\circ\text{C}$	Fig. 1
I_R	Reverse Current	2 10	30 100	μA	$V_R = 650\text{ V}$, $T_J = 25\text{ }^\circ\text{C}$ $V_R = 650\text{ V}$, $T_J = 175\text{ }^\circ\text{C}$	Fig. 2
Q_C	Total Capacitive Charge	11		nC	$V_R = 400\text{ V}$, $I_F = 4\text{ A}$, $T_J = 25\text{ }^\circ\text{C}$	Fig. 6
C	Total Capacitance	213 22 17		pF	$V_R = 0\text{ V}$, $T_J = 25\text{ }^\circ\text{C}$, $f = 1\text{ MHz}$ $V_R = 200\text{ V}$, $T_J = 25\text{ }^\circ\text{C}$, $f = 1\text{ MHz}$ $V_R = 400\text{ V}$, $T_J = 25\text{ }^\circ\text{C}$, $f = 1\text{ MHz}$	Fig. 5
E_C	Capacitance Stored Energy	1.5		μJ	$V_R = 400\text{ V}$	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		2.9		$^\circ\text{C/W}$	Fig.8

Typical Performance

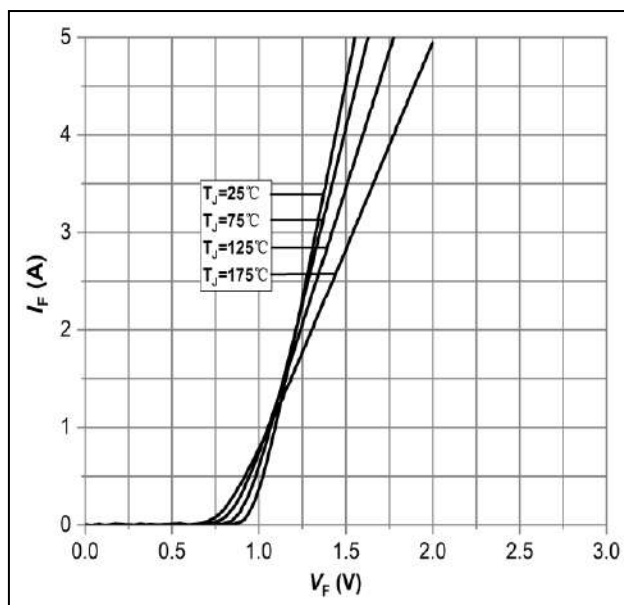


Figure 1: Forward Characteristics

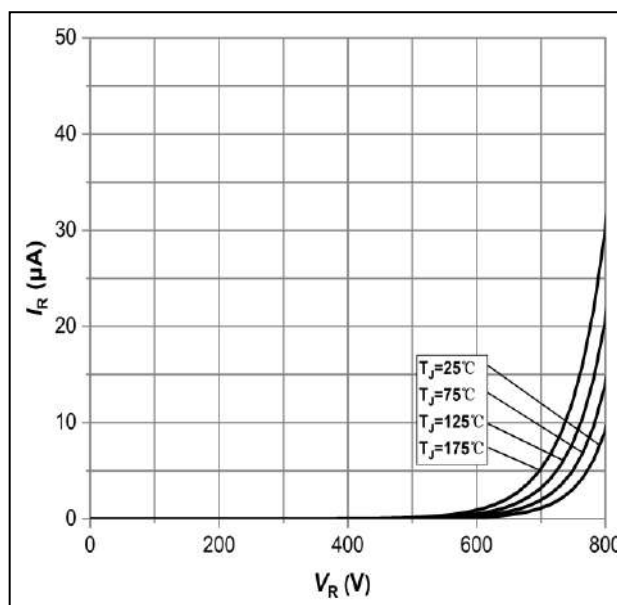


Figure 2: Reverse Characteristics

Typical Performance

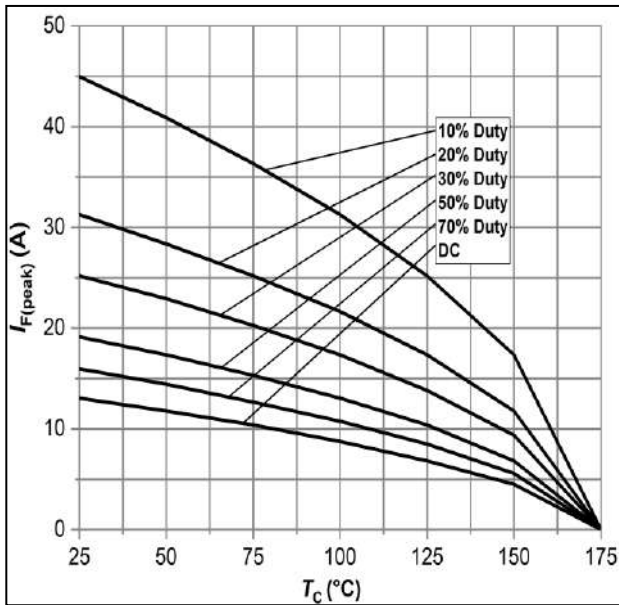


Figure 3: Current Derating

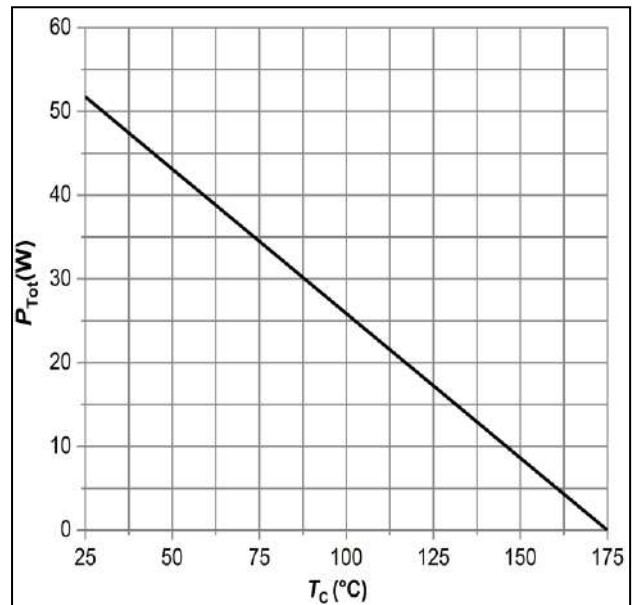


Figure 4: Power Derating

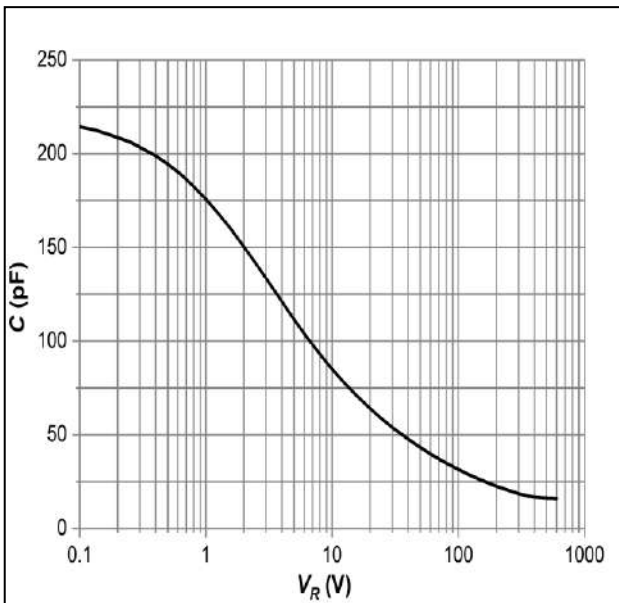


Figure 5: Capacitance vs. Reverse Voltage

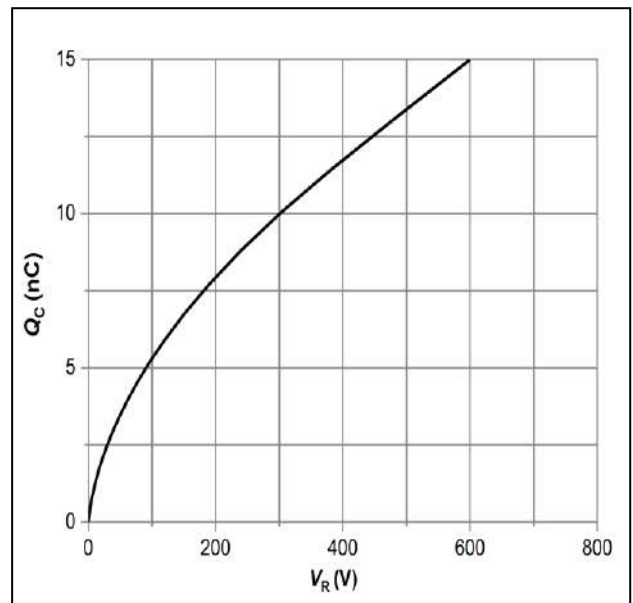


Figure 6: Total Capacitance Charge vs. Reverse Voltage

Typical Performance

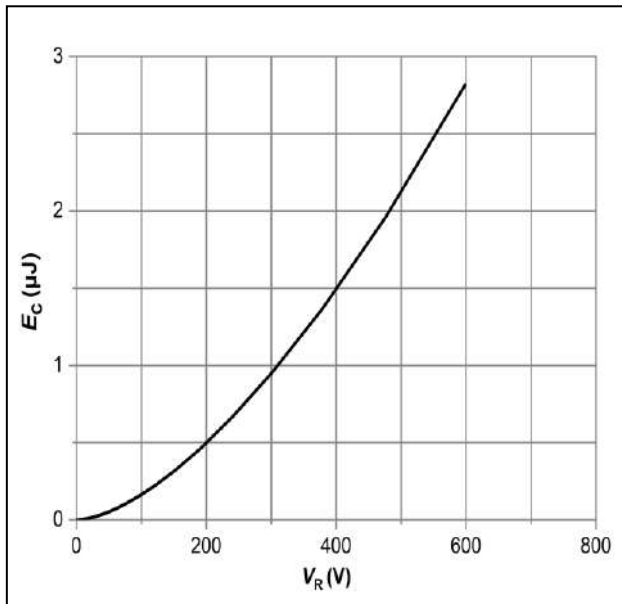


Figure 7: Typical Capacitance Stored Energy

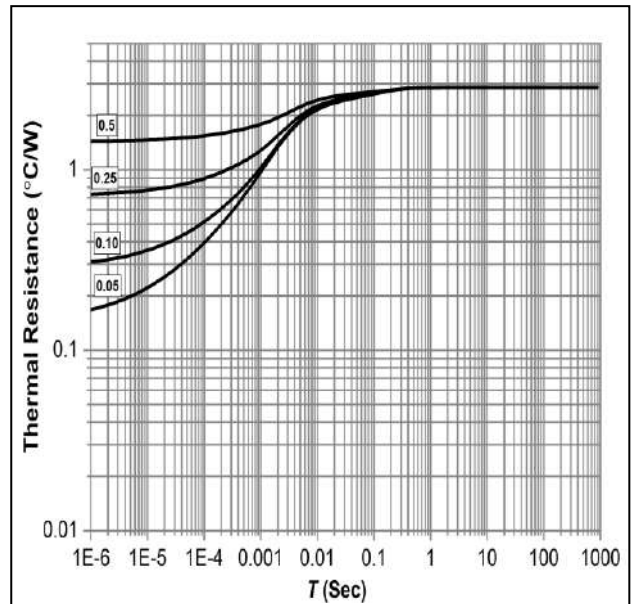
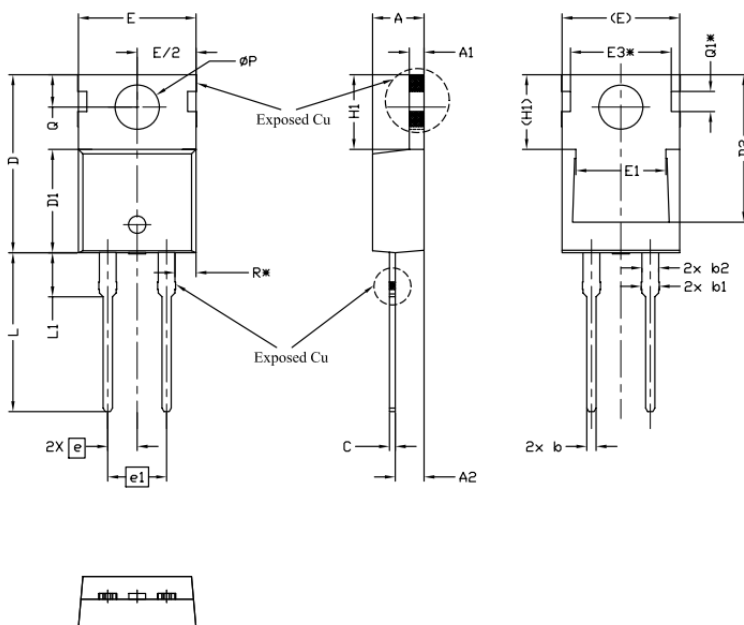


Figure 8: Transient Thermal Impedance

Package Dimensions

P TO-220-2



SYMBOL	DIMENSIONS			NOTES
	Min.	NOM	Max.	
A	4.24	4.44	4.64	
A1	1.15	1.27	1.40	
A2	2.30	2.48	2.70	
b	0.70	0.80	0.90	
b1	1.20	1.55	1.75	
b2	1.20	1.45	1.70	
c	0.40	0.50	0.60	
D	14.70	15.37	16.00	4
D1	8.82	8.92	9.02	
D2	12.43	12.73	12.83	5
E	9.96	10.16	10.36	4.5
E1	6.86	7.77	8.89	5
E3*	8.70 REF			
e	2.54 BSC			
e1	5.08 BSC			
H1	6.30	6.45	6.60	5.6
L	13.47	13.72	13.97	
L1	3.60	3.80	4.00	
ϕP	3.75	3.84	3.93	
Q	2.60	2.80	3.00	
Q1*	1.73 REF			
R*	1.82 REF			

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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