

SC3D50065H Silicon Carbide Schottky Barrier Diode

$V_{RRM}=650V$
 $I_F(T_C=135^{\circ}C)=50A$
 $Q_C=116nC$

Features

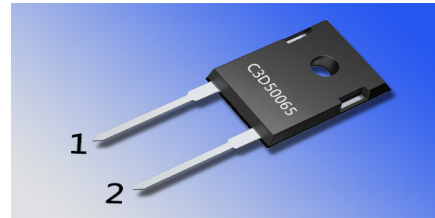
- 650-Volt Schottky Rectifier
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on V_F

Benefits

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

Applications

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

Package

Part Number	Package	Marking
SC3D50065H	TO-247-2	C3D50065

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_{DC}	DC Blocking Voltage	650	V		
I_F	Continuous Forward Current	120 50 46	A	$T_C=25^{\circ}C$ $T_C=135^{\circ}C$ $T_C=150^{\circ}C$	Fig.3
I_{FRM}	Repetitive Peak Forward Surge Current	158 82	A	$T_C=25^{\circ}C, t_p=10ms, \text{Half Sine Wave}$ $T_C=110^{\circ}C, t_p=10ms, \text{Half Sine Wave}$	
P_{tot}	Power Dissipation	300 130	W	$T_C=25^{\circ}C$ $T_C=110^{\circ}C$	Fig.4
dV/dt	Diode dV/dt ruggedness	200	V/ns	$VR=0-650V$	
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +175	$^{\circ}C$		

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Condition	Note
V_F	Forward Voltage	1.5 2.0	1.8 2.4	V	$I_F=50A, T_J=25^{\circ}C$ $I_F=50A, T_J=175^{\circ}C$	Fig.1
I_R	Reverse Current	20 200	500 1000	μA	$V_R=650V, T_J=25^{\circ}C$ $V_R=650V, T_J=175^{\circ}C$	Fig.2
Q_C	Total Capacitive Charge	116		nC	$V_R=400V, I_F=50A, di/dt=500A/\mu s, T_J=25^{\circ}C$	Fig.5
C	Total Capacitance	2900 215 150		pF	$V_R=0V, T_J=25^{\circ}C, f=1MHz$ $V_R=200V, T_J=25^{\circ}C, f=1MHz$ $V_R=400V, T_J=25^{\circ}C, f=1MHz$	Fig.6

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.34	$^{\circ}\text{C}/\text{W}$	Fig.7

Typical Performance

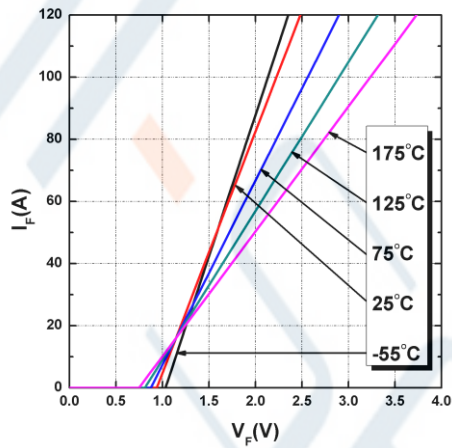


Figure 1. Forward Characteristics

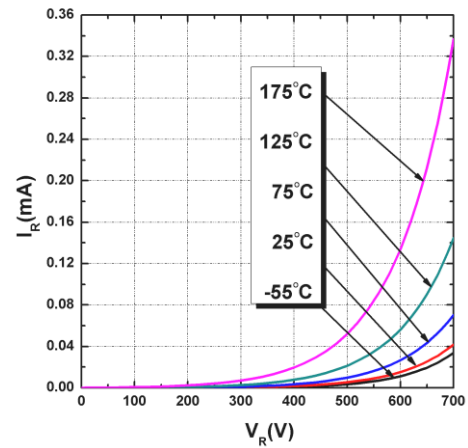


Figure 2. Reverse Characteristics

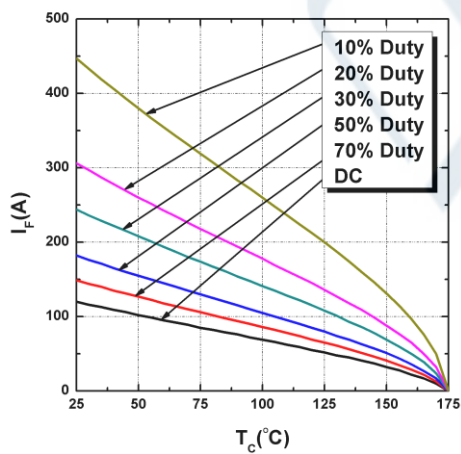


Figure 3. Current Derating

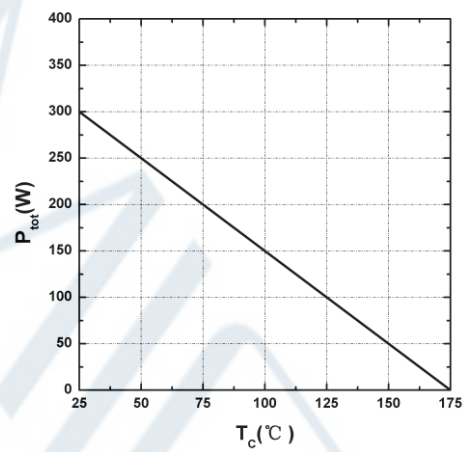


Figure 4. Power Derating

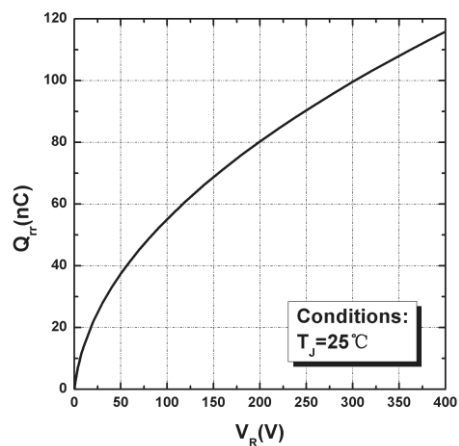


Figure 5. Total Capacitance Charge vs. Reverse Voltage

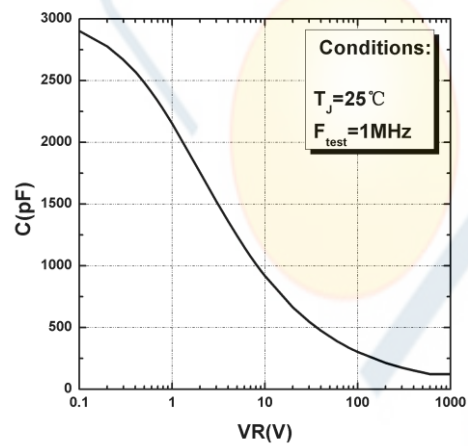


Figure 6. Capacitance vs. Reverse Voltage

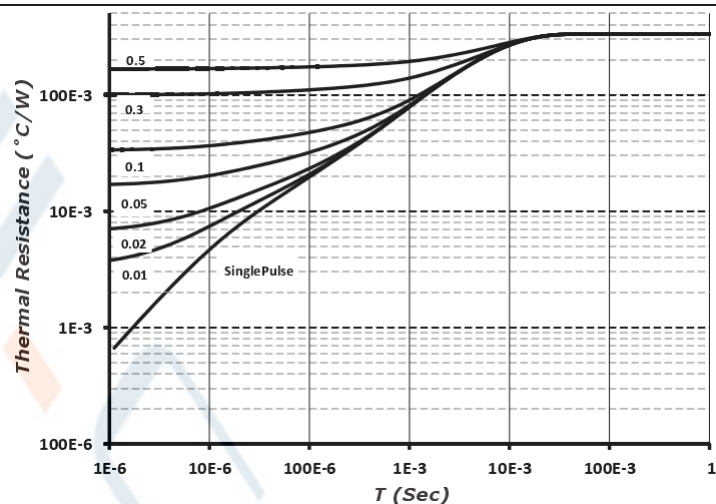
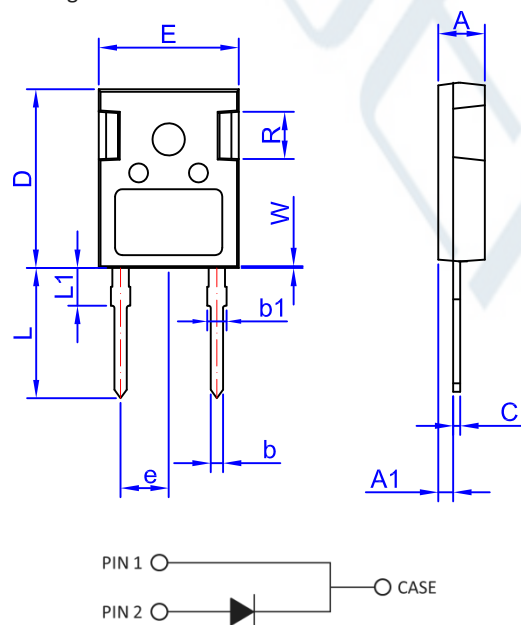


Figure 7. Transient Thermal Impedance

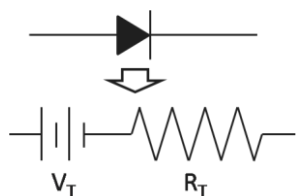
Package Dimensions

Package TO-247-2



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.7		5.31	0.185		0.209
A1	2.21		2.59	0.087		0.102
b	1.02		1.40	0.040		0.055
b1	1.65		2.23	0.065		0.088
C	0.41		0.79	0.016		0.031
D	20.80		21.46	0.819		0.845
E	15.49		16.26	0.61		0.640
e	5.46		5.46	0.215		0.215
L	19.81		20.32	0.78		0.80
L1	4.17		4.47	0.164		0.176
R	3.43		3.99	0.135		0.157
W	0.00		0.15	0.00		0.006

Diode Model



$$V_{FT} = V_T + I_F \times R_T$$

$$V_T = 0.945 - 1.27 \times 10^{-3} \times T_J$$

$$R_T = 0.013 + 2.77 \times 10^{-5} \times T_J + 2.62 \times 10^{-7} \times T_J^2$$

Note: T_J = Diode Junction Temperature In DegreeCelsius, valid from -55°C to 175°C.

Notes

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact hi-semicon electronics co., Ltd.