RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

SC3S06503A

650V/3A Silicon Carbide Power Schottky Barrier Diode

Features

- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- Positive Temperature Coefficient on V_F
- Temperature-independent Switching
- 175°C Operating Junction Temperature

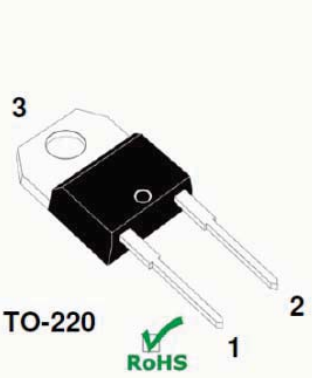
V_{RRM}	=	650	V
I_F (T_C≤135℃)	=	4	A
Q_C	=	5.4	nC

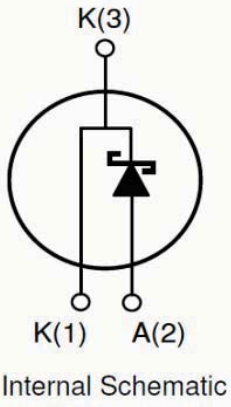
Benefits

- Replace Bipolar with Unipolar Device
- Reduction of Heat Sink Size
- Parallel Devices Without Thermal Runaway
- Essentially No Switching Losses

Applications

- Switch Mode Power Supplies
- Power Factor Correction
- Motor drive, PV Inverter, Wind Power Station





Internal Schematic

Part No.	Package Type	Marking
SC3S06503A	TO-220-2 pin	SC06503

2023-07/110
REV:B

Maximum Ratings

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	650	V	T_C = 25˚C	
V_{RSM}	Surge Peak Reverse Voltage	650	V	T_C = 25˚C	
V_R	DC Blocking Voltage	650	V	T_C = 25˚C	
I_F	Forward Current	8 4 2	A	T_C ≤ 25˚C T_C ≤ 135˚C T_C ≤ 161˚C	
I_{FSM}	Non-Repetitive Forward Surge Current	20	A	T_C = 25˚C, t_p = 8.3ms, Half Sine Wave	
P_{tot}	Power Dissipation	39	W	T_C = 25˚C	Fig.3
T_C	Maximum Case Temperature	161	˚C		
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to 175	˚C		

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.4 1.7	1.65 2.3	V	I_F = 2A, T_J = 25˚C I_F = 2A, T_J = 175˚C	Fig.1
I_R	Reverse Current	1 5	10 100	μA	V_R = 650V, T_J = 25˚C V_R = 650V, T_J = 175˚C	Fig.2
C	Total Capacitance	125 12 10	/	pF	V_R = 0V, T_J = 25˚C, f = 1MHz V_R = 200V, T_J = 25˚C, f = 1MHz V_R = 400V, T_J = 25˚C, f = 1MHz	Fig.5
Q_C	Total Capacitive Charge	5.4	/	nC	V_R = 650V, I_F = 2A di/dt = 200A/μs, T_J = 25˚C	Fig.4

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	3.8	˚C/W	Fig.6
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	80	˚C/W	
T_{sold}	Soldering Temperature	260	˚C	

RATING AND CHARACTERISTICS CURVES (SC3S06503A)

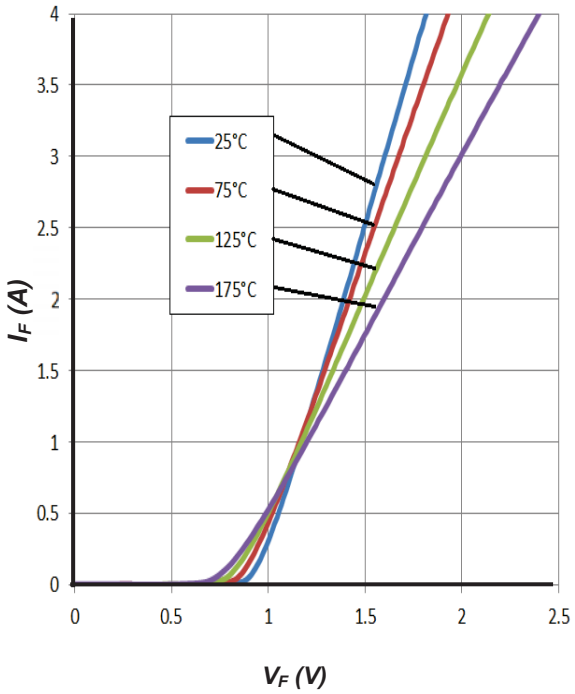


Figure 1. Forward Characteristics

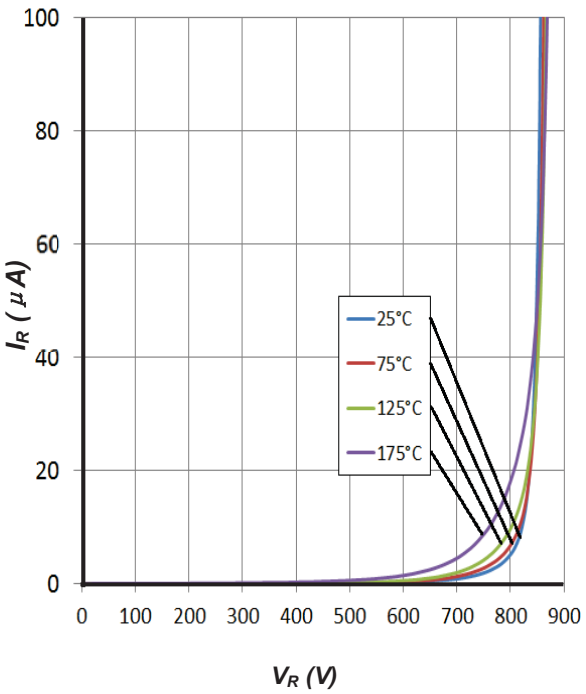


Figure 2. Reverse Characteristics

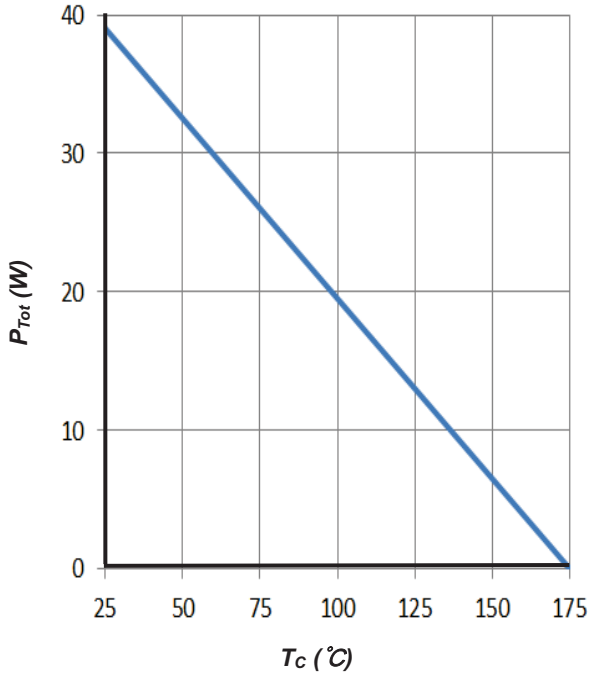


Figure 3. Power Derating

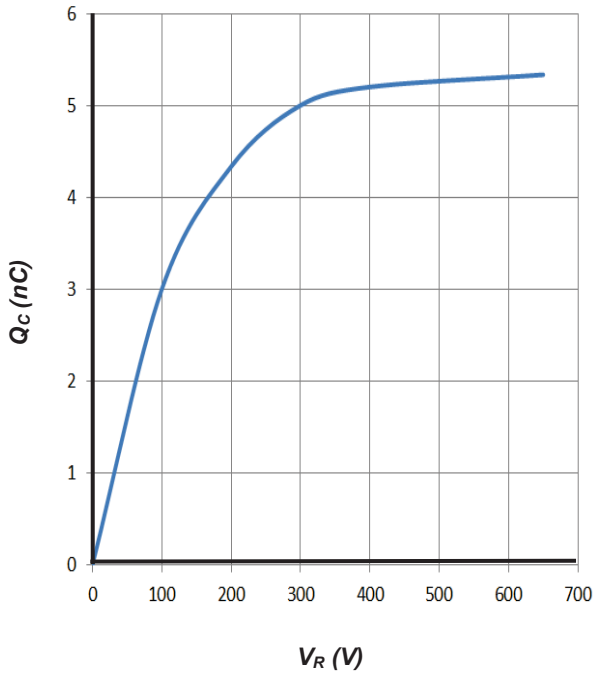


Figure 4. Total Capacitive Charge vs. Reverse Voltage

RATING AND CHARACTERISTICS CURVES (SC3S06503A)

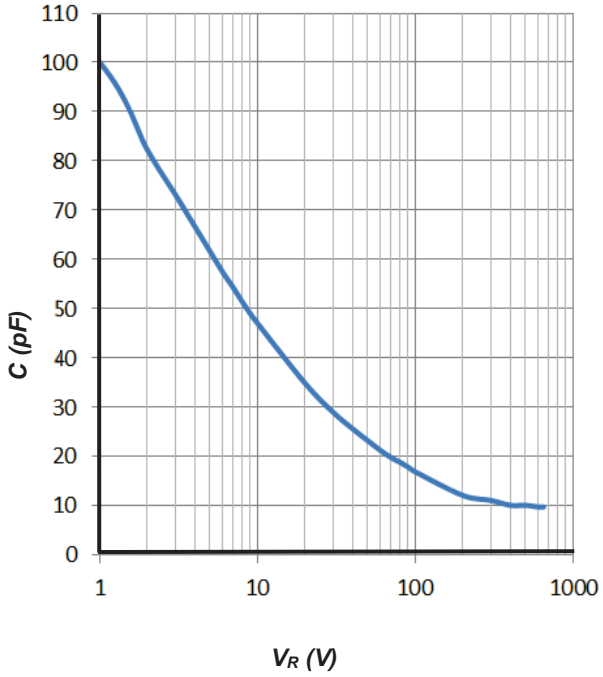


Figure 5. Total Capacitance vs. Reverse Voltage

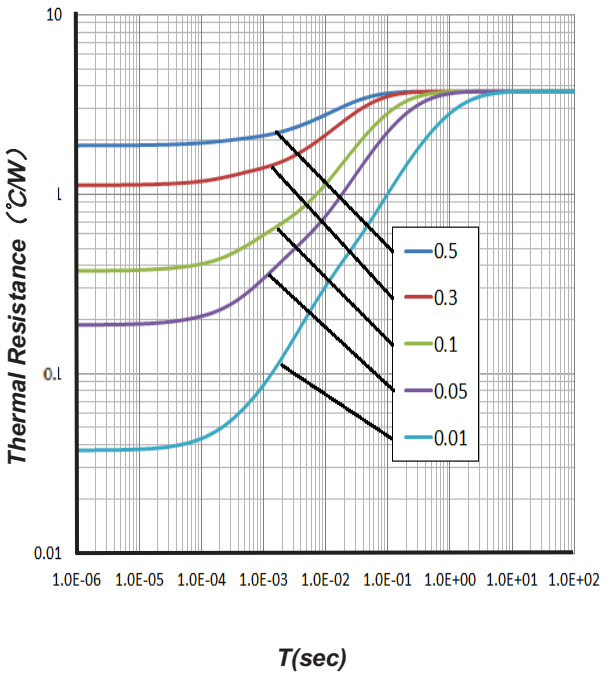
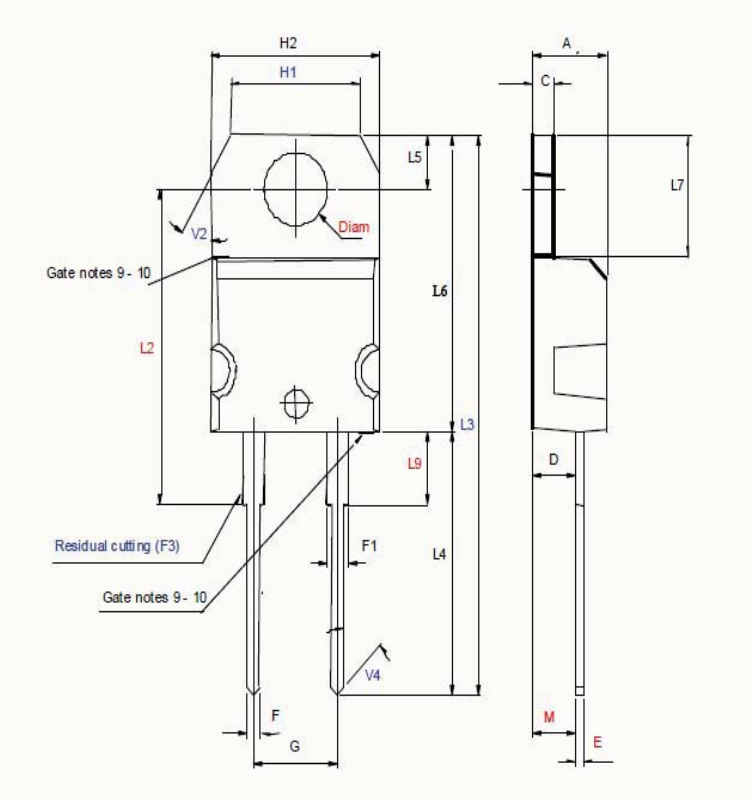


Figure 6. Transient Thermal Impedance

Package TO-220



DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
C	1.23	1.32	0.048	0.052
D	2.4	2.72	0.094	0.107
E	0.49	0.7	0.019	0.028
F	0.61	0.88	0.024	0.035
F1	1.14	1.7	0.045	0.067
F3		1		0.039
G	4.95	5.15	0.195	0.203
H1	7.7	7.9	0.303	0.311
H2	10	10.4	0.394	0.409
L2	16.4		0.646	
L3	28.9		1.138	
L4	13	14	0.512	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.2	6.6	0.244	0.260
L9	3.5	3.93	0.138	0.155
M	2.6			
V	5°			
V2	30°			
V4	45°			
diam	3.75	3.85	0.148	0.152

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