

Silicon Carbide Schottky Barrier Diode

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

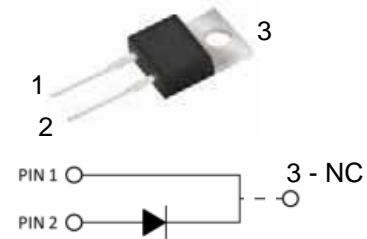
Benefits

- 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
SC3S06504II	Isolated TO-220-2	SC06504

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

Symbol	Parameter	Value	Unit	Test Conditions
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	14	A	$T_C=25^\circ\text{C}$
		5.5		$T_C=135^\circ\text{C}$
		4		$T_C=150^\circ\text{C}$
I_{FRM}	Repetitive Peak Forward Surge Current	18.5	A	$T_C=25^\circ\text{C}, t_p=10\text{ms}, \text{Half Sine Wave}$
		10		$T_C=110^\circ\text{C}, t_p=10\text{ms}, \text{Half Sine Wave}$
P_{tot}	Power Dissipation	51.5	W	$T_C=25^\circ\text{C}$
		22		$T_C=110^\circ\text{C}$
dV/dt	Diode dV/dt ruggedness	200	V/ns	VR=0-650V
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$	

Symbol	Parameter	Typ.	Unit
$R_{\theta JC}$	Thermal Resistance from Junction to Case	2.9	$^{\circ}\text{C}/\text{W}$

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Condition
V_F	Forward Voltage	1.5 2.0	1.8 2.4	V	$I_F=4\text{A}, T_J=25^{\circ}\text{C}$ $I_F=4\text{A}, T_J=175^{\circ}\text{C}$
I_R	Reverse Current	5 25	10 100	μA	$V_R=650\text{V}, T_J=25^{\circ}\text{C}$ $V_R=650\text{V}, T_J=175^{\circ}\text{C}$
Q_C	Total Capacitive Charge	10		nC	$V_R=400\text{V}, I_F=4\text{A}, di/dt=500\text{A}/\mu\text{s}, T_J=25^{\circ}\text{C}$
C	Total Capacitance	250 18.5 13		pF	$V_R=0\text{V}, T_J=25^{\circ}\text{C}, f=1\text{MHz}$ $V_R=200\text{V}, T_J=25^{\circ}\text{C}, f=1\text{MHz}$ $V_R=400\text{V}, T_J=25^{\circ}\text{C}, f=1\text{MHz}$

RATING AND CHARACTERISTICS CURVES (SC3S06504II)

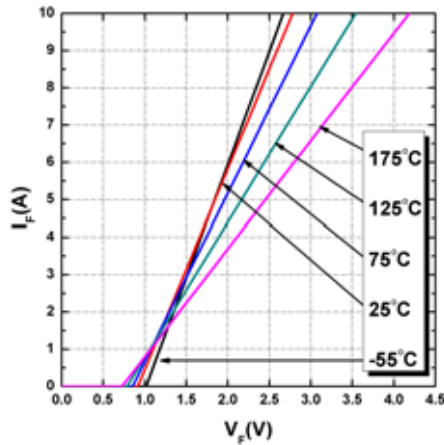


Figure 1. Forward Characteristics

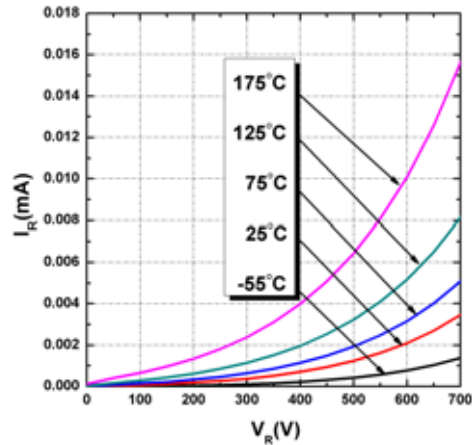


Figure 2. Reverse Characteristics

RATING AND CHARACTERISTICS CURVES (SC3S06504II)

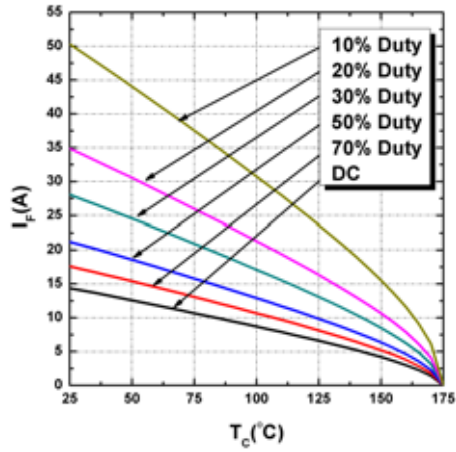


Figure 3. Current Derating

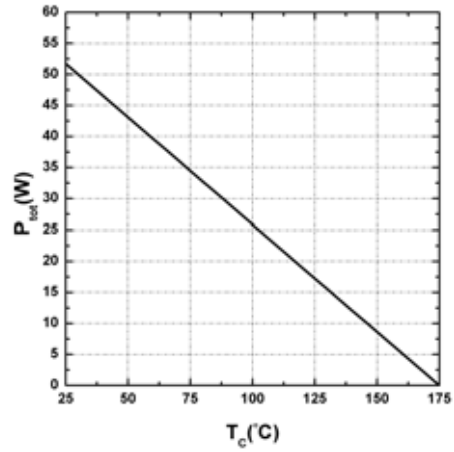


Figure 4. Power Derating

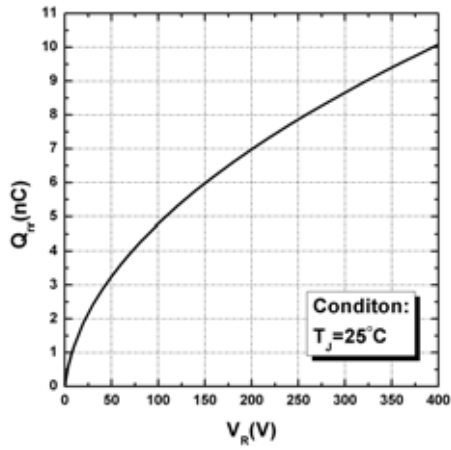


Figure 5. Total Capacitance Charge vs. Reverse Voltage

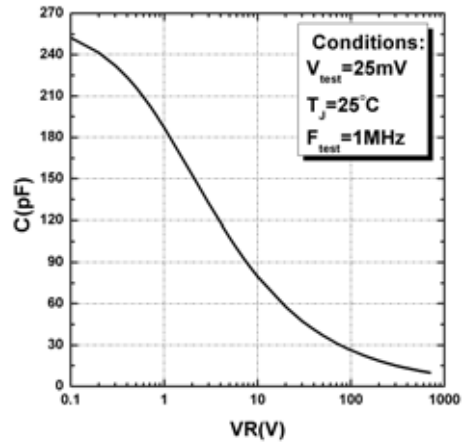


Figure 6. Capacitance vs. Reverse Voltage

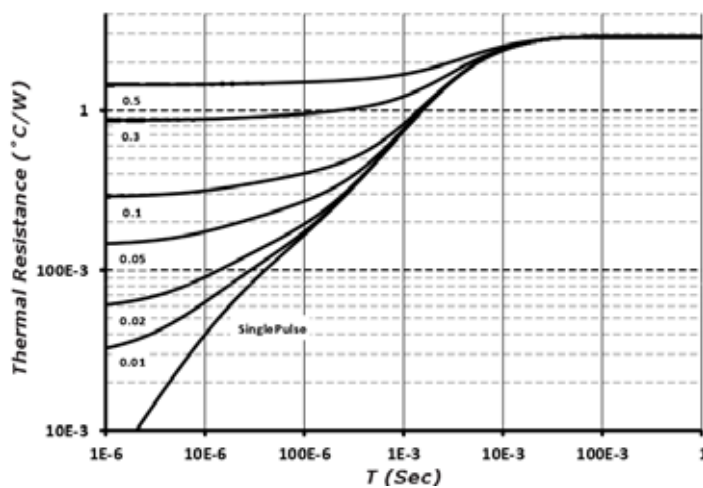
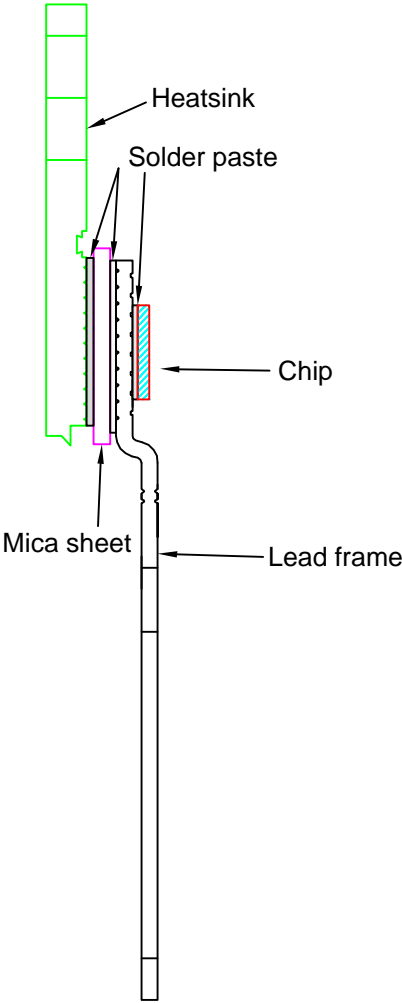


Figure 7. Transient Thermal Impedance

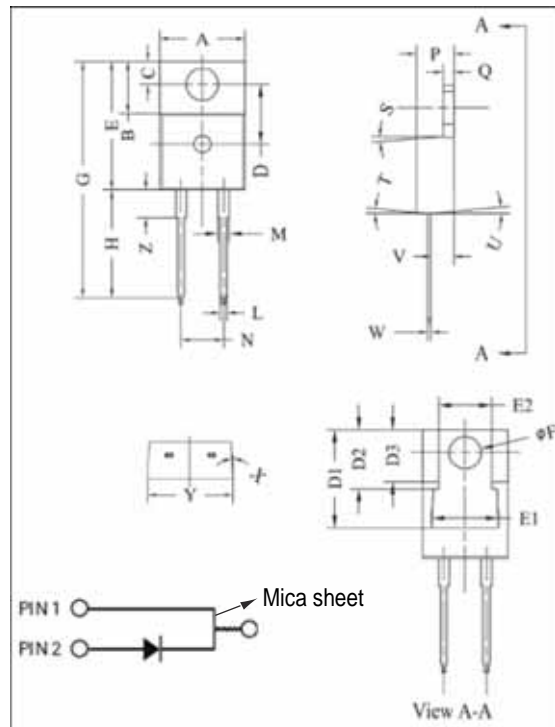
Internal Structure



Package Dimensions

POS	Inches		Millimeters	
	Min	Max	Min	Max
A	0.381	0.410	9.677	10.414
B	0.235	0.255	5.969	6.477
C	0.100	0.120	2.540	3.048
D	0.223	0.337	5.664	8.560
D1	0.457-0.490 typ.		11.60-12.45 typ.	
D2	0.277-0.303 typ.		7.04-7.70 typ.	
D3	0.244-0.252 typ.		6.22-6.4 typ.	
E	0.590	0.615	14.986	15.621
E1	0.302	0.326	7.68	8.28
E2	0.227	0.251	5.77	6.37
F	0.143	0.153	3.632	3.886
G	1.105	1.147	28.067	29.134
H	0.500	0.550	12.700	13.970
L	0.025	0.036	0.635	0.914
M	0.045	0.055	1.143	1.550
N	0.195	0.205	4.953	5.207
P	0.165	0.185	4.191	4.699
Q	0.048	0.054	1.219	1.372
S	3°	6°	3°	6°
T	3°	6°	3°	6°
U	3°	6°	3°	6°
V	0.094	0.110	2.388	2.794
W	0.014	0.025	0.356	0.635
X	3°	5.5°	3°	5.5°
Y	0.385	0.410	9.779	10.414
Z	0.130	0.150	3.302	3.810

Package TO-220-2



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