

650V/20A Silicon Carbide Power Schottky Barrier Diode

Features

- Rated to 650V at 20 Amps
- Zero reverse recovery current
- Zero forward recovery voltage
- Temperature independent switching behavior
- High temperature operation
- High frequency operation

Key Characteristics

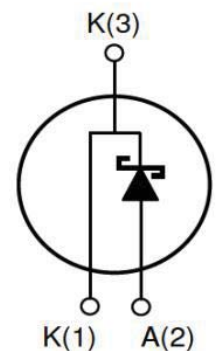
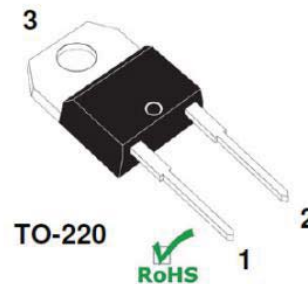
V_{RRM}	650	V
$I_F, T_c \leq 135^\circ\text{C}$	20	A
Q_c	56	nC

Benefits

- Unipolar rectifier
- Substantially reduced switching losses
- No thermal run-away with parallel devices
- Reduced heat sink requirements

Applications

- SMPS, e.g., CCM PFC;
- Motor drives, Solar application, UPS, Wind turbine, Rail traction, EV/HEV



Internal Schematic

Part No.	Package Type	Marking
SC3S06520A	TO-220-2 pin	SC06520

Maximum Ratings

Parameter	Symbol	Test Condition	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}		650	V
Surge Peak Reverse Voltage	V_{RSM}		650	V
DC Blocking Voltage	V_{DC}		650	V
Continuous Forward Current	I_F	$T_C=25^{\circ}C$ $T_C=135^{\circ}C$	45 20	A
Repetitive Peak Forward Surge Current	I_{FRM}	$T_C=25^{\circ}C$, $t_p=10ms$, Half Sine Wave, $D=0.3$	100	A
Non-repetitive Peak Forward Surge Current	I_{FSM}	$T_C=25^{\circ}C$, $t_p=10ms$, Half Sine Wave	200	A
Power Dissipation	P_{TOT}	$T_C=25^{\circ}C$	141.5	W
		$T_C=110^{\circ}C$	61.3	W
Operating Junction	T_j		$-55^{\circ}C$ to $175^{\circ}C$	$^{\circ}C$
Storage Temperature	T_{stg}		$-55^{\circ}C$ to $175^{\circ}C$	$^{\circ}C$
Mounting Torque		M3 Screw 6-32 Screw	1 8.8	Nm lbf-in

Thermal Characteristics

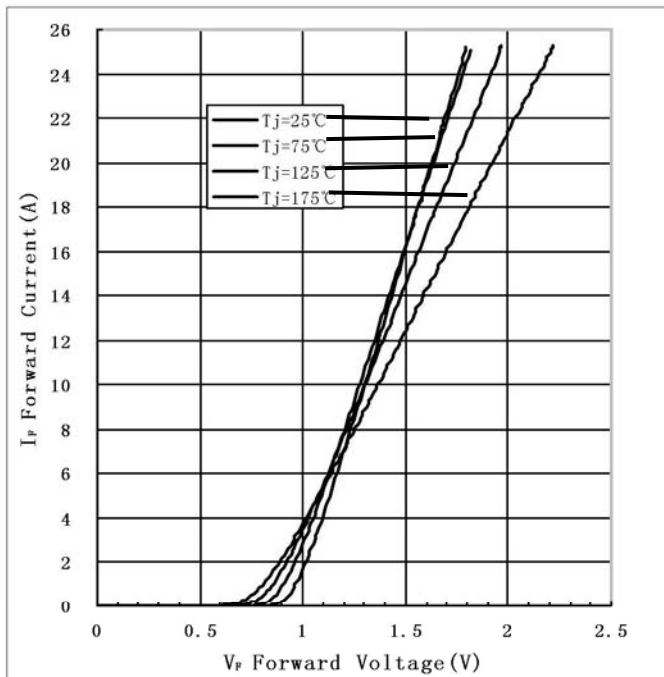
Parameter	Symbol	Test Condition	Value	Unit
			Typ.	
Thermal resistance from junction to case	R_{thJC}		1.06	$^{\circ}C/W$

Electrical Characteristics

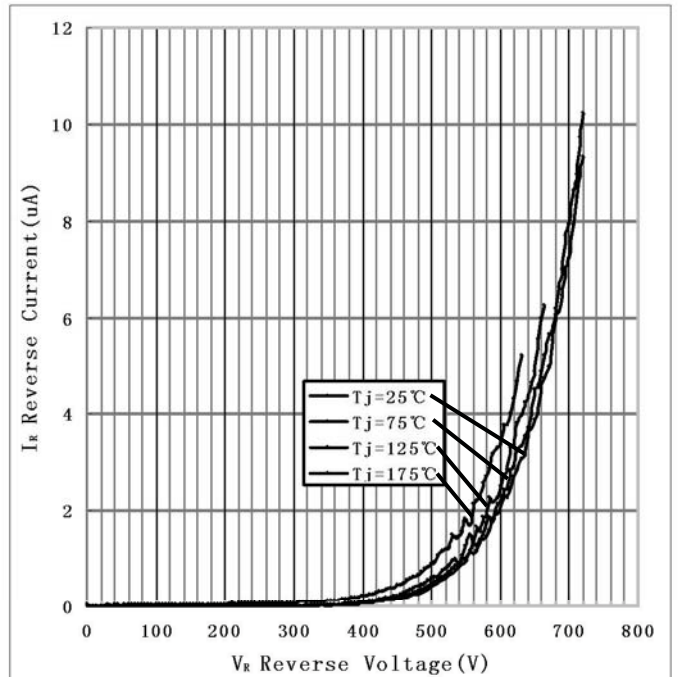
Parameter	Symbol	Test Conditions	Numerical		Unit
			Typ.	Max.	
Forward Voltage	V_F	$I_F=20A$, $T_j=25^{\circ}C$	1.7	1.8	V
		$I_F=20A$, $T_j=175^{\circ}C$	2	2.5	
Reverse Current	I_R	$V_R=650V$, $T_j=25^{\circ}C$	30	100	μA
		$V_R=650V$, $T_j=175^{\circ}C$	60	200	
Total Capacitive Charge	Q_C	$V_R=400V$, $T_j=150^{\circ}C$ $Q_C = \int_V^R C(V)dV$	56	-	nC
Total Capacitance	C	$V_R=0V$, $T_j=25^{\circ}C$, $f=1MHz$	1170	1300	pF
		$V_R=200V$, $T_j=25^{\circ}C$, $f=1MHz$	110	120	
		$V_R=400V$, $T_j=25^{\circ}C$, $f=1MHz$	100	108	

RATING AND CHARACTERISTICS CURVES(SC3S06520A)

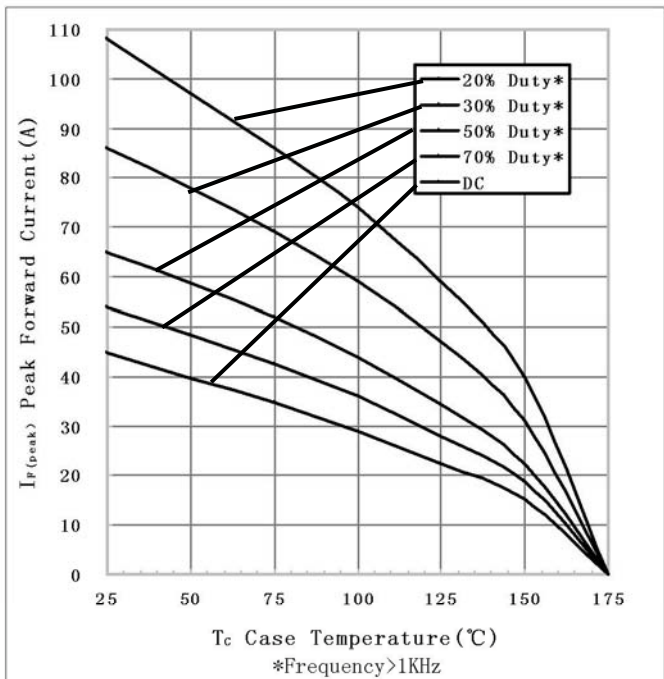
1) Forward IV characteristics as a function of T_j :



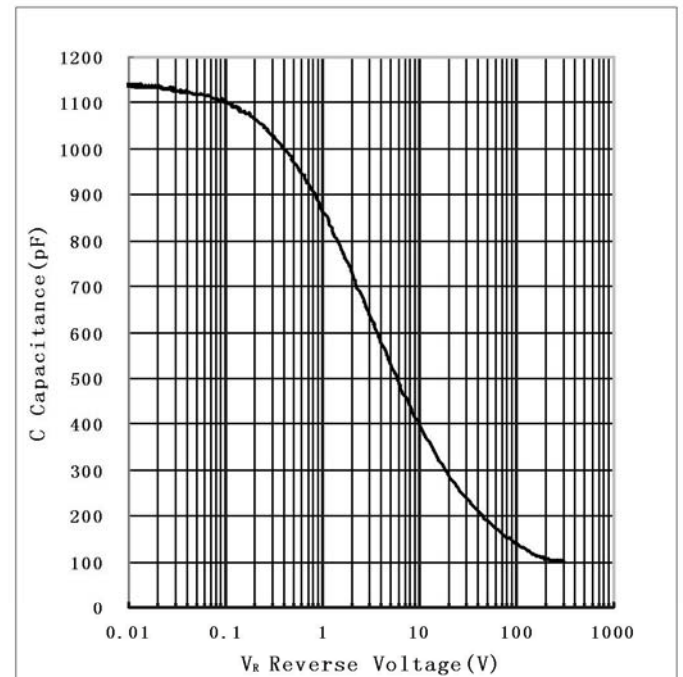
2) Reverse IV characteristics as a function of T_j :



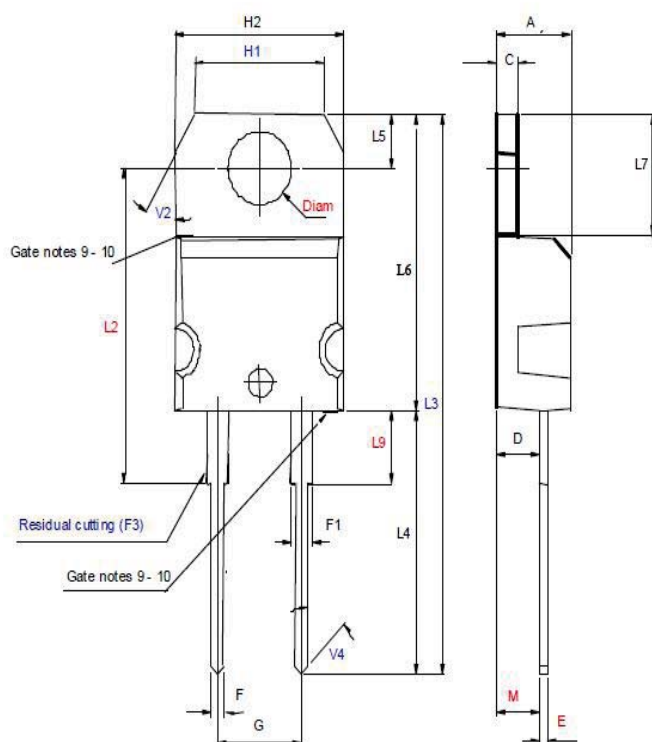
3) Current Derating



4) Capacitance vs. reverse voltage :



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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