

**650V/4A Silicon Carbide Power Schottky Barrier Diode**

**Features**

- Rated to 650V at 4 Amps
- Zero reverse recovery current
- Zero forward recovery voltage
- Temperature independent switching behavior
- High temperature operation
- High frequency operation

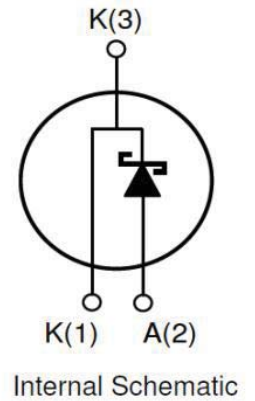
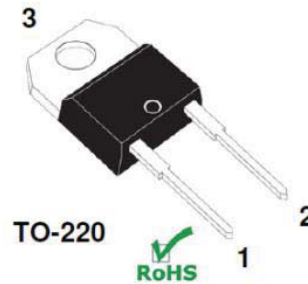
Key Characteristics		
$V_{RRM}$	<b>650</b>	<b>V</b>
$I_F, T_c \leq 135^\circ\text{C}$	<b>5</b>	<b>A</b>
$Q_c$	<b>11</b>	<b>nC</b>

**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



Part No.	Package Type	Marking
SC3S06504A	TO-220-2 pin	06504

## Maximum Ratings

Parameter	Symbol	Test Condition	Value	Unit
Repetitive Peak Reverse Voltage	$V_{RRM}$		650	V
Surge Peak Reverse Voltage	$V_{RSM}$		650	
DC Blocking Voltage	$V_{DC}$		650	
Continuous Forward Current	$I_F$	$T_C=25^{\circ}C$ $T_C=135^{\circ}C$ $T_C=150^{\circ}C$	11 5 4	A
Repetitive Peak Forward Surge Current	$I_{FRM}$	$T_C=25^{\circ}C$ , $tp=10ms$ , Half Sine Wave, $D=0.3$	15	A
Non-repetitive Peak Forward Surge Current	$I_{FSM}$	$T_C=25^{\circ}C$ , $tp=10ms$ , Half Sine Wave	30	A
Power Dissipation	$P_{TOT}$	$T_C=25^{\circ}C$	53.2	W
		$T_C=110^{\circ}C$	23	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	1	Nm
		6-32 Screw	8.8	lbf-in

## Thermal Characteristics

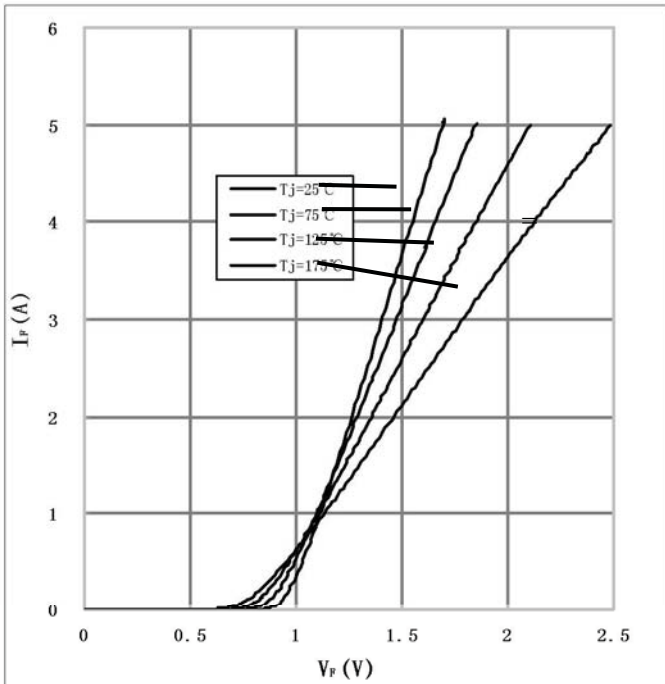
Parameter	Symbol	Test Condition	Value	Unit
			Typ.	
Thermal resistance from junction to case	$R_{thJC}$		2.82	$^{\circ}C/W$

## Electrical Characteristics

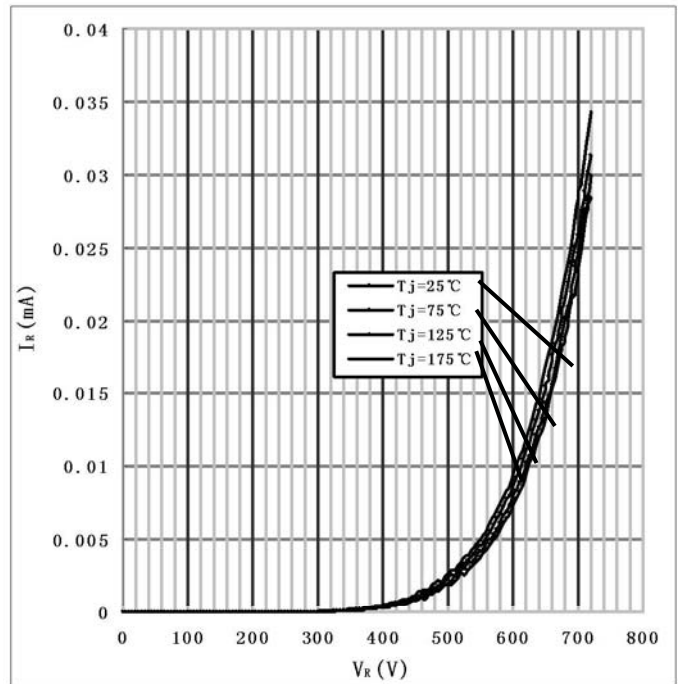
Parameter	Symbol	Test Conditions	Numerical		Unit
			Typ.	Max.	
Forward Voltage	$V_F$	$I_F=4A$ , $T_j=25^{\circ}C$	1.55	1.7	V
		$I_F=4A$ , $T_j=175^{\circ}C$	2.2	2.5	
Reverse Current	$I_R$	$V_R=650V$ , $T_j=25^{\circ}C$	10	100	$\mu A$
		$V_R=650V$ , $T_j=175^{\circ}C$	20	200	
Total Capacitive Charge	$Q_C$	$V_R=400V$ , $T_j=150^{\circ}C$ $Q_C = \int_0^{V_R} C(V)dV$	11	-	nC
Total Capacitance	C	$V_R=0V$ , $T_j=25^{\circ}C$ , $f=1MHz$	181	220	pF
		$V_R=200V$ , $T_j=25^{\circ}C$ , $f=1MHz$	22.5	25	
		$V_R=400V$ , $T_j=25^{\circ}C$ , $f=1MHz$	20.5	21	

## RATING AND CHARACTERISTICS CURVES (SC3S06504A)

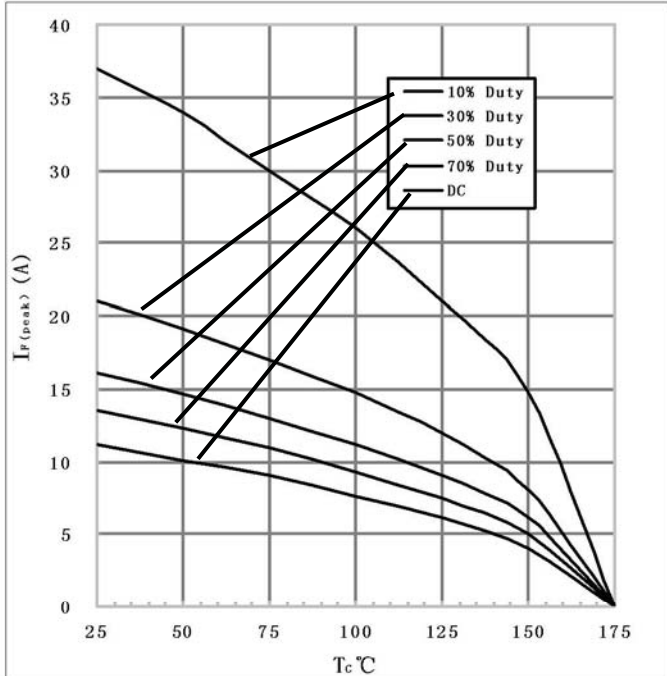
1) Forward IV characteristics as a function of  $T_j$  :



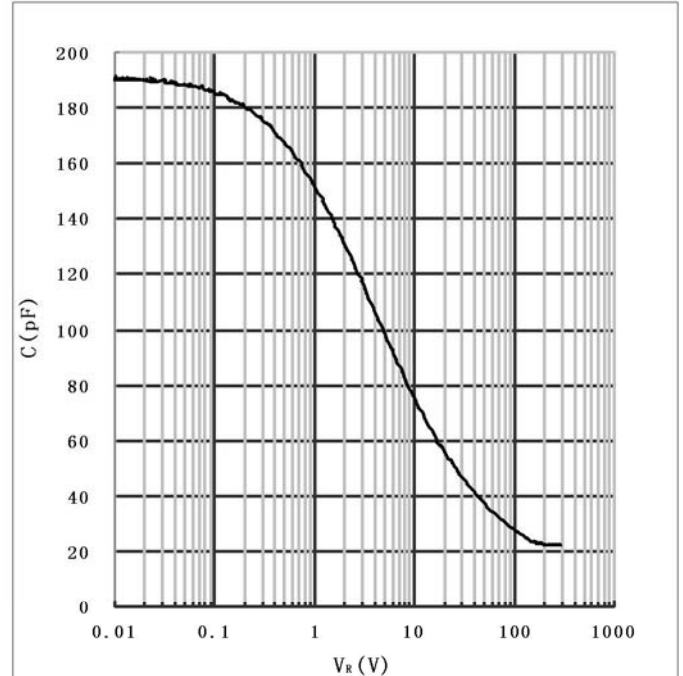
2) Reverse IV characteristics as a function of  $T_j$  :



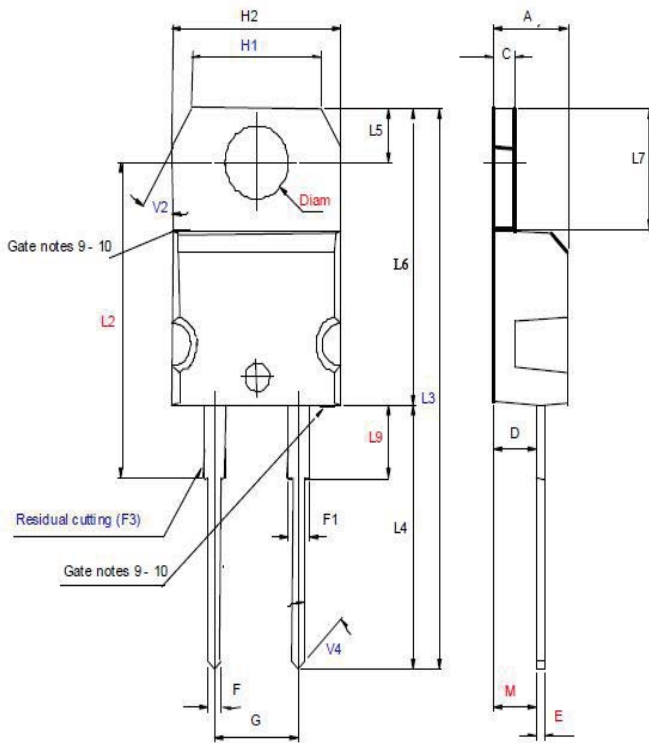
3) Current Derating



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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