SILICON CARBIDE SCHOTTKY DIODE

Reverse Voltage - 1200 Volts

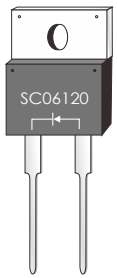
Forward Current - 6Amperes

Description

SiC Schottky Diode has no switching loss, provides improved system efficiency against Si diodes by utilizing new semiconductor material-Silicon Carbide, enables higher operating frequency, and helps increasing power density and reduction of system size /cost. Its high reliability ensures robust operation during surge or over_voltage conditions.

TO-220AC

KWSC06120



ITO-220AC

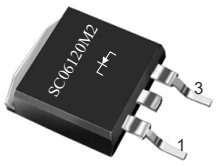
KWSC06120F

Features

- Max Junction Temperature 175° C
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery/No Forward Recovery

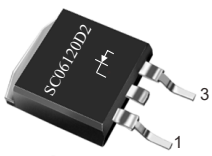
TO-252

KWSC06120M2



TO-263

KWSC06120D2



Mechanical Data

- Case: JEDEC TO-220AC/ITO-220AC/TO-263/TO-252
- Molding compound meets UL94V-0 flammability rating
- Terminals: Lead solderable per J-STD-002 and JESD22-B102
- Polarity: As marked
- Mounting Torque: 10 in-lbs maximum

Typical Applications

- General Purpose
- SMPS, Solar inverter, UPS
- Power Switching Circuits

Key Performance And Package Parameters

Type	V_{DC}	I_F	Qc	T_j,max	Package
KWSC06120	1200V	6A	19nC	175℃	TO-220AC
KWSC06120F	1200V	6A	19nC	175℃	ITO-220AC
KWSC06120D2	1200V	6A	19nC	175℃	TO-263
KWSC06120M2	1200V	6A	19nC	175℃	TO-252

Maximum Ratings

(Ratings at 25° C ambient temperature unless otherwise specified)

Parameter	Symbol	Value	Unit
Maximum repetitive peak reverse voltage	V_{RRM}	1200	V
Continuous Forward Current for $Rth_{(j-c)}$	I_F	20 (Tc≤25℃ TO -220/TO-263) 14 (Tc≤25℃ TO-252/ITO-220) 6 (Tc≤156℃ TO-220/TO-263) 6 (Tc≤135℃ TO-252/ITO-220)	A
Non-Repetitive Forward Surge Current （Half-Sine Pulse,tp=8.3mS)	I_{FSM}	60（25℃） 52（150℃）	A
I^2t value	$\int i^2t$	15（25℃） 11.2（150℃）	A^2S
Diode dv/dt ruggedness(VR=0...650V)	dv/dt	80	V/nS
Power dissipation for $R_{th(j-c,max)}$ （Tc=25℃）	P_{tot}	125(TO-220/TO-263) 60(TO-252/ITO-220)	W
Operating junction temperature range	Tj	-55. ..175	℃
Storage temperature range	Tstg	-55...175	℃

Thermal Characteristcs

Paramerter	Symbol	ITO-220AC	TO-220AC	TO-263	TO-252	Unit
Diode thermal resistance junction-case	$R_{th(j-c)}$	2.5	1.2	1.2	2.5	K/W

Electrical Characteristcs （ T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
DC blocking voltage	V_{DC}	Tj=25...175℃	1200			V
Diode forward voltage	V_F	IF=6A Tj=25℃ IF=6A Tj=125℃ IF=6A Tj=175℃		1.5 1.7 2.0	1.8 2.0 2.3	V
Reverse current	I_R	VR=1200V Tj=25℃ VR=1200V Tj=125℃ VR=1200V Tj=175℃			20 100 200	uA

Dynamic Characteristcs （Tj=25℃,unless otherwise specified)

Parameter	Symbol	conditions	Value			Unit
			min	typ	max	
Total capacitive charge	Qc	VR=1200V,IF=6A di/dt=200A/uS Tj=25℃		19		nC
Total capacitance	C	V_R=0V,f=1MHz V_R=400V,f=1MHz V_R=800V,f=1MHz Tj=25℃		385 28 22		pF

FIG.1-FORWARD CURRENT DERATING CURVE

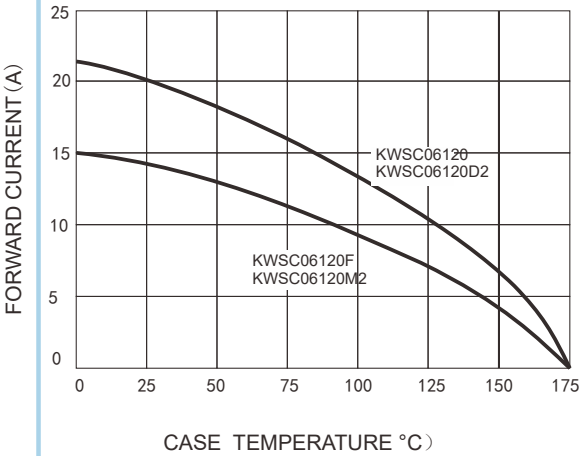


FIG.2-TYPICAL JUNCTION CAPACITANCE

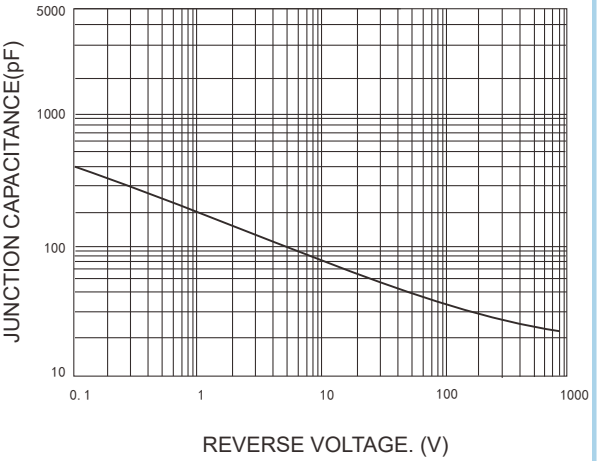


FIG.3-FORWARD CHARACTERISTICS

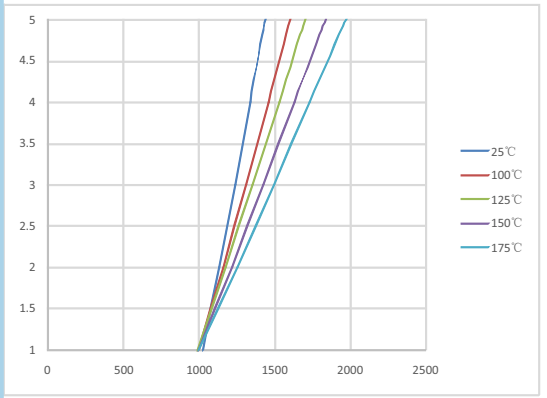


FIG.4-REVERSE CHARACTERISTICS

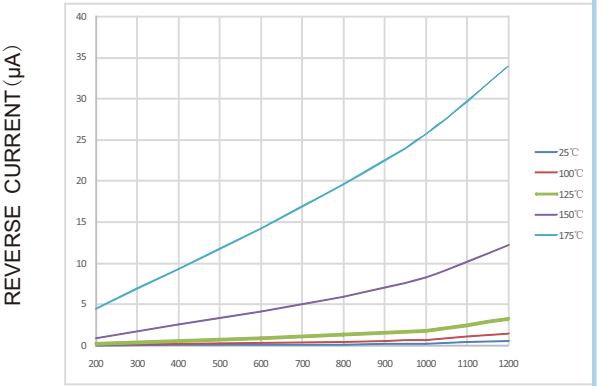
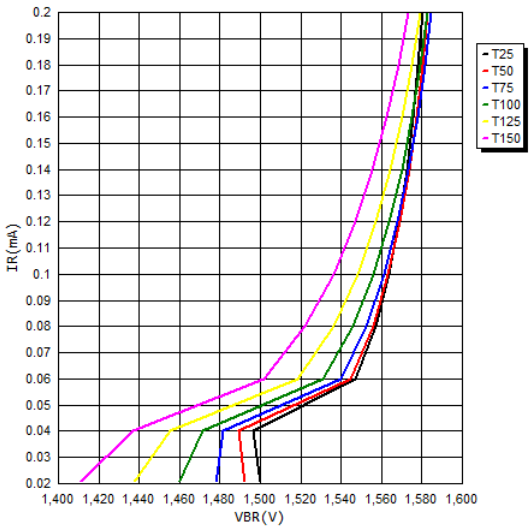
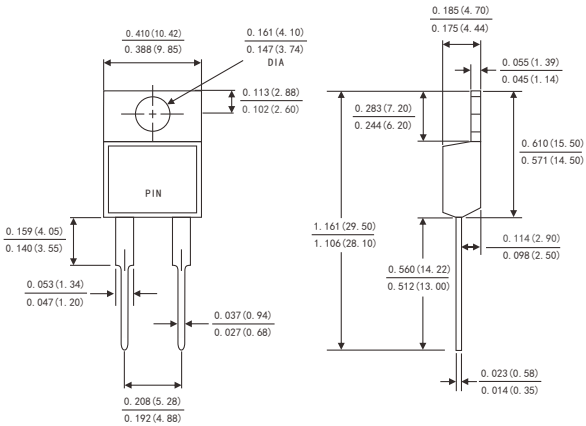


FIG.5-REVERSE CHARACTERISTICS (IR:0.02-0.2mA)

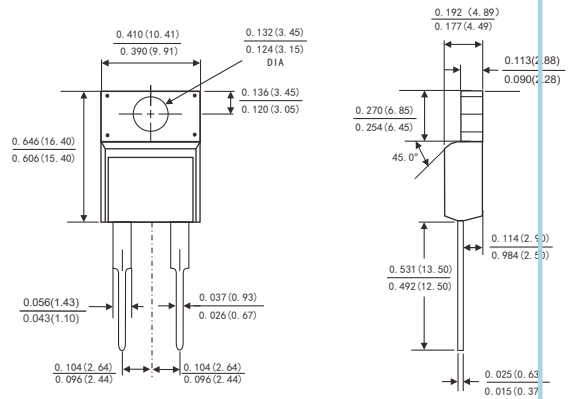


TO-220AC



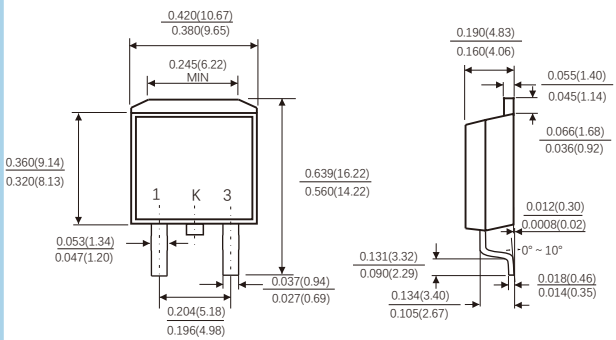
Dimensions in inches and (millimeters)

ITO-220AC



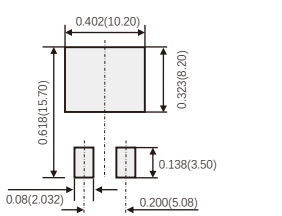
Dimensions in inches and (millimeters)

TO-263



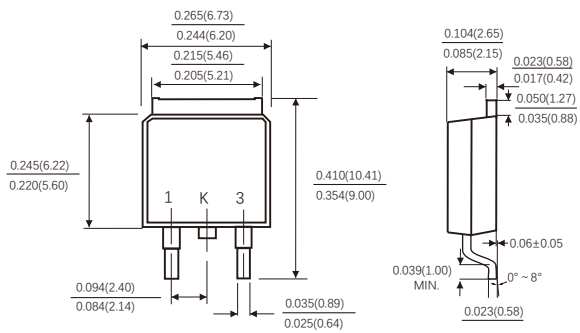
Suggested Pad Layout

(TO-263)



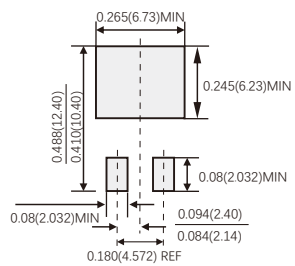
(Designers can refer to the recommended values according to the manufacturing process requirements to determine the appropriate pad size)

TO-252



Suggested Pad Layout

(TO-252)

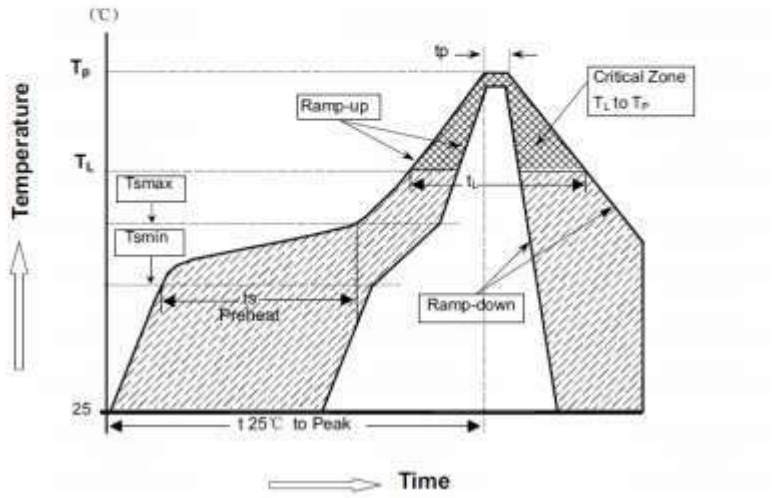


(Designers can refer to the recommended values according to the manufacturing process requirements to determine the appropriate pad size)

Recommended of soldering condition.

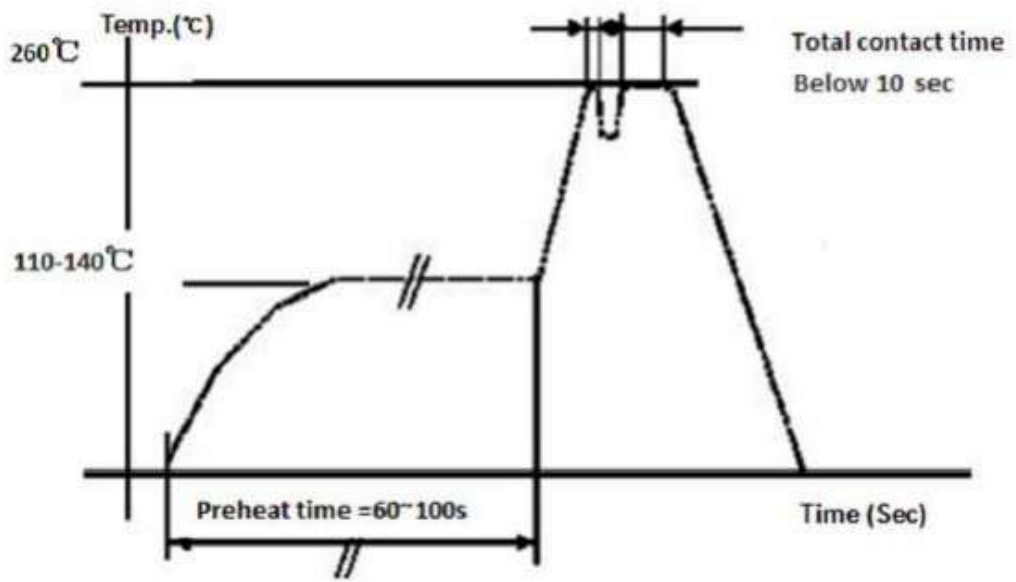
1 Reflow soldering condition.

Profile Feature	Pb-Free Assembly
Average ramp-up rate (Ts_{max} to T_P)	3℃/second max.
Preheat Temperature Min (Tsmin) Temperature Max (Tsmax) Time (min to max) (ts)	 150℃ 200℃ 60-180 seconds
Time maintained above: Temperature (T_L) Time (t_L)	 217℃ 60-150 seconds
Peak Temperature (Tp)	260+0℃
Time within 5℃ of actual Peak Temperature (tp)	20-40 seconds
Ramp-down Rate	6℃/second max.
Time 25℃ to Peak Temperature	8 minutes max.



Recommended of soldering condition.

2 Wave soldering condition.



3 Hand soldering condition.

Temperature:370℃ max

Time:3 sec. max