

STPSC1206

600 V power Schottky silicon carbide diode

Features

- No reverse recovery
- Switching behavior independent of temperature
- Dedicated to PFC boost diode

Description

These diodes are manufactured using silicon carbide substrate. This wide bandgap material supports the manufacture of a Schottky diode structure with a high voltage rating. Such diodes exhibit no or negligible recovery characteristics. The recovery characteristics are independent of the temperature.

Using these diodes will significantly reduce the switching power losses of the associated MOS-FET, and thus increase the efficiency of the overall application. These diodes will then outperform the power factor correction circuit operating in hard switching conditions.



Table 1. Device summary

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I _{F(AV)}	12 A
V _{RRM}	600 V
T _{j (max)}	175 °C
Q _{C (typ)}	12 nC

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1 Characteristics

Table 2. Absolute ratings (limiting values at 25 °C unless otherwise specified)

Symbol	Para	Value	Unit	
V_{RRM}	Repetitive peak reverse voltage		600	V
I _{F(RMS)}	Forward rms current		30	Α
I _{F(AV)}	Average forward current	$T_c = 110 ^{\circ}\text{C}, \delta = 0.5$	12	Α
		$t_p = 10 \text{ ms sinusoidal}, T_c = 25 ^{\circ}\text{C}$	50	
I _{FSM}	Surge non repetitive forward current	$t_p = 10$ ms sinusoidal, $T_c = 125$ °C	40	Α
		$t_p = 10 \mu s \text{ square}, T_c = 25 ^{\circ}\text{C}$	200	
I _{FRM}	Repetitive peak forward current $T_c = 105 ^{\circ}\text{C}, T_j = 150 ^{\circ}\text{C}, \delta = 0.1$		50	Α
T _{stg}	Storage temperature range		-55 to +175	°C
Tj	Operating junction temperature		-40 to +175	°C

Table 3. Thermal resistance

Symbol	Parameter	Maximum value	Unit
R _{th(j-c)}	Junction to case	1.75	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Tests co	onditions	Min.	Тур.	Max.	Unit
I _B ⁽¹⁾	Reverse leakage current		V - V	-	30	150	
'R`'	IR Preverse leakage current	T _j = 150 °C	$V_R = V_{RRM}$	-	200	1500	μA
V _E ⁽²⁾	V (2) Farward valtage drap	T _j = 25 °C	Ι _ 10 Λ	-	1.4	1.7	V
V _F · / Forward voilage	Forward voltage drop	T _i = 150 °C	l _F = 12 A	-	1.6	2.1	V

^{1.} $t_p = 10 \text{ ms}, \delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 1.2 \times I_{F(AV)} + 0.075 \times I_{F^{2}(RMS)}$$

Table 5. Other parameters

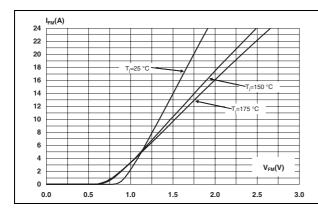
Symbol	Parameter	Test conditions	Тур.	Unit
Q _c	Total capacitive charge	$V_r = 400 \text{ V}, I_F = 12 \text{ A}$ $dI_F/dt = -200 \text{ A}/\mu\text{s}, T_j = 150 \text{ °C}$	12	nC
С	Total capacitance	V _r = 0 V, T _c = 25 °C, F = 1 Mhz	750	pF
	$V_r = 400 \text{ V}, T_c = 25 \text{ °C}, F = 1 \text{ Mhz}$	65	ρi	

^{2.} $t_p = 500 \ \mu s, \ \delta < 2\%$

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Figure 1. Forward voltage drop versus forward current (typical values)

Figure 2. Reverse leakage current versus reverse voltage applied (maximum values)



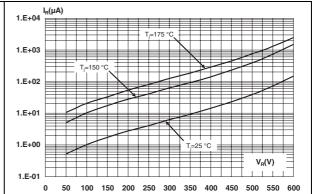
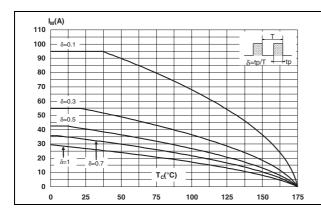
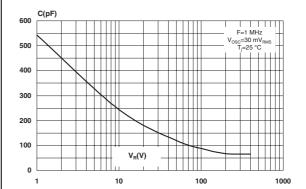


Figure 3. Peak forward current versus case temperature

Figure 4. Junction capacitance versus reverse voltage applied (typical values)

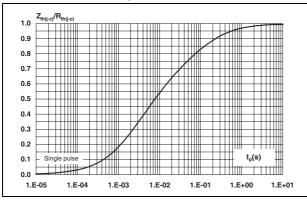




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Figure 5. Relative variation of thermal impedance junction to case versus pulse duration

Figure 6. Non-repetitive peak surge forward current versus pulse duration (sinusoidal waveform)



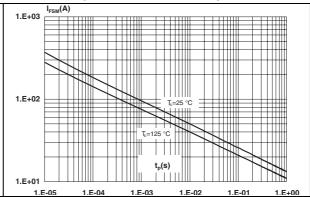
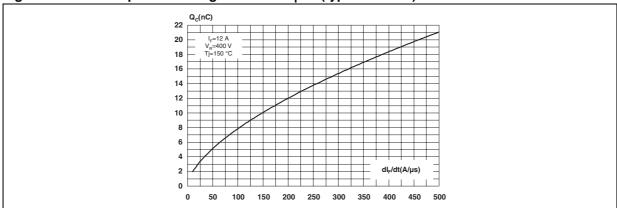


Figure 7. Total capacitive charges versus dl_F/dt (typical values)



2 Package information

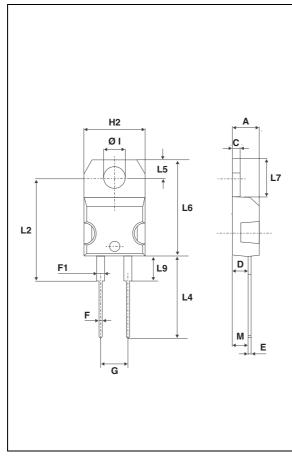
Epoxy meets UL94, V0

Colling method: convection (C)

Recommended torque: 0.4 to 0.6 N⋅m

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Table 6. TO-220AC dimensions



	Dimensions			
Ref.	Millimeters		Inc	hes
	Min.	Max.	Min.	Max.
Α	4.40	4.60	0.173	0.181
С	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
Е	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
H2	10.00	10.40	0.393	0.409
L2	16.40) typ.	0.645 typ.	
L4	13.00	14.00	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
М	2.6 typ.		0.102	2 typ.
Diam. I	3.75	3.85	0.147	0.151

Ordering information STPSC1206

3 Ordering information

 Table 7.
 Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPSC1206D	STPSC1206D	TO-220AC	1.86 g	50	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
28-Sep-2009	1	First issue.

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