STPS30120C

Power Schottky rectifier

Feature

- High junction temperature capability
- Avalanche rated
- Low leakage current
- Good trade-off between leakage current and forward voltage drop

Description

Dual center tap Schottky rectifier suited for high frequency switch mode power supply.

Packaged in TO-220AB and I^2PAK, this device is intended to be used in notebook and LCD adaptors, desktop SMPS, providing in these applications a margin between the remaining voltages applied on the diode and the voltage capability of the diode.

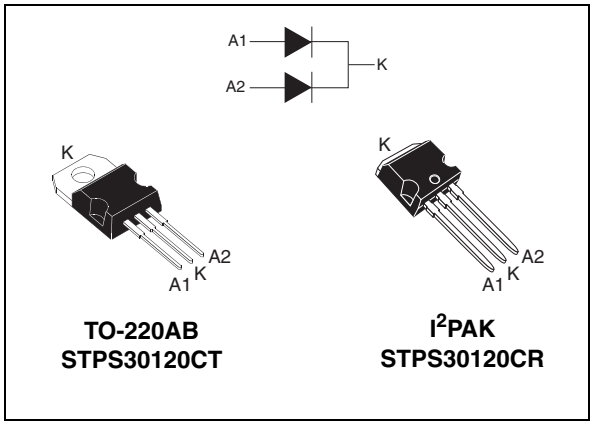


Figure 1. Electrical characteristics [(a)]

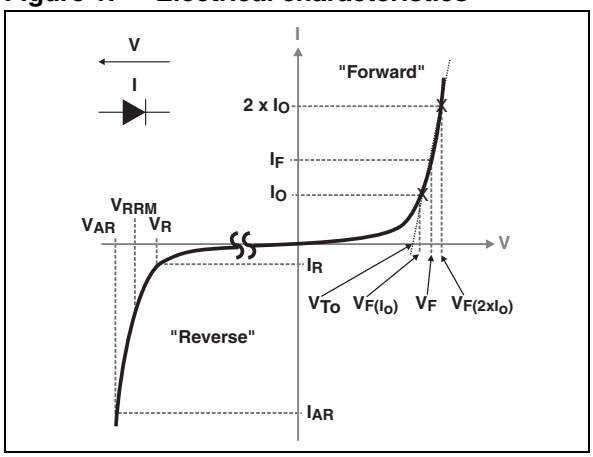


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 15 A
V_{RRM}	120 V
$T_{j(max)}$	175 °C
$V_{F(typ)}$	0.57 V

a. V_{ARM} and I_{ARM} must respect the reverse safe operating area defined in *Figure 11*. V_{AR} and I_{AR} are pulse measurements (t_p < 1 µs). V_R, I_R, V_{RRM} and V_F, are static characteristics.

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			120	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current	$\delta = 0.5$ $T_c = 145$ °C	Per diode Per device	15 30	A
I_{FSM}	Surge non repetitive forward current		$t_p = 10$ ms sinusoidal	180	A
P_{ARM}	Repetitive peak avalanche power		$t_p = 1$ µs $T_j = 25$ °C	6700	W
V_{ARM}(1)	Maximum repetitive peak avalanche voltage	$t_p = 1$ µs, $T_j < 150$ °C, $I_{AR} < 13.4$ A		150	V
V_{ASM}(1)	Maximum single pulse peak avalanche voltage	$t_p = 1$ µs, $T_j < 150$ °C, $I_{AR} < 13.4$ A		150	V
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature(2)			175	°C

1. Refer to
2. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode Total	2.2 1.3	°C/W
$R_{th(c)}$	Coupling	Total	0.3	°C/W

When the diodes 1 and 2 are used simultaneously :
T_j(diode 1) = P(diode 1) x $R_{th(j-c)}$(per diode) + P(diode 2) x $R_{th(c)}$

Table 4. Static electrical characteristics (per diode)

Symbol	Test conditions			Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			15	µA
		T_j = 125 °C			2.5	7.5	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 5 A			0.74	V
		T_j = 125 °C			0.57	0.61	
		T_j = 25 °C	I_F = 15 A			0.92	
		T_j = 125 °C			0.7	0.74	
		T_j = 25 °C	I_F = 30 A			1.02	
		T_j = 125 °C			0.83	0.89	

1. Pulse test : tp = 5 ms, δ < 2%
2. Pulse test : tp = 380 µs, δ < 2%

To evaluate the maximum conduction losses use the following equation :
$P = 0.59 \times I_{F(AV)} + 0.01\ I_F^2{}_{(RMS)}$

Figure 2. Average forward power dissipation versus average forward current (per diode)

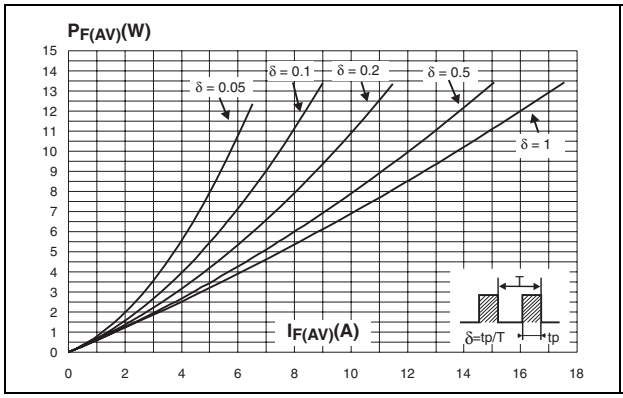


Figure 3. Average forward current versus ambient temperature (δ = 0.5, per diode)

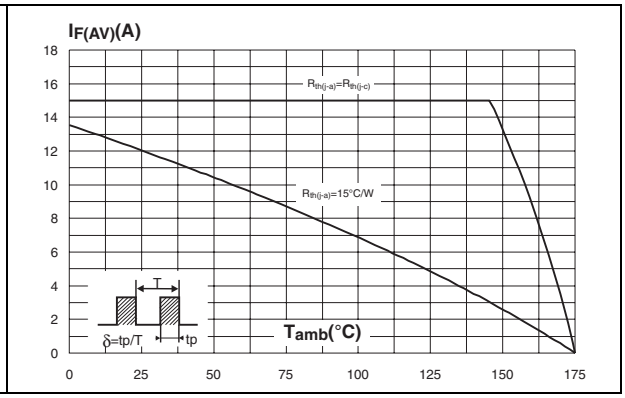


Figure 4. Normalized avalanche power derating versus pulse duration

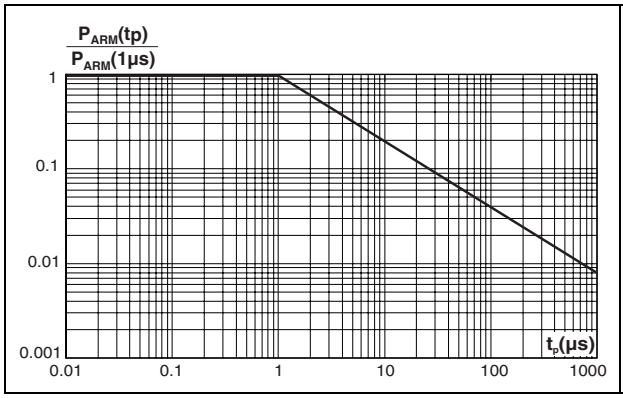
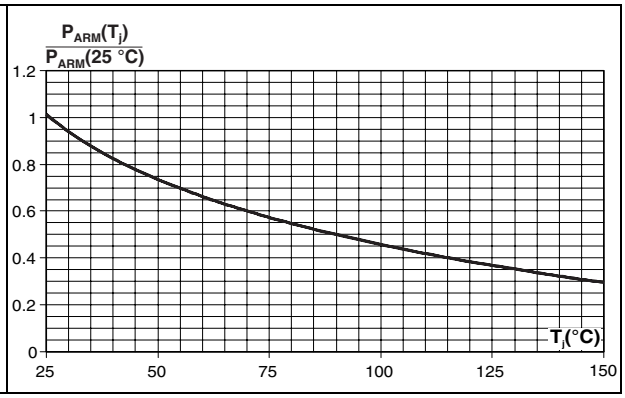


Figure 5. Normalized avalanche power derating versus junction temperature



3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS30120CT	STPS30120CT	TO-220AB	2.23 g	50	Tube
STPS30120CR	STPS30120CR	I^2PAK	1.49 g	50	Tube