

## POWER SCHOTTKY RECTIFIER

**Table 1: Main Product Characteristics**

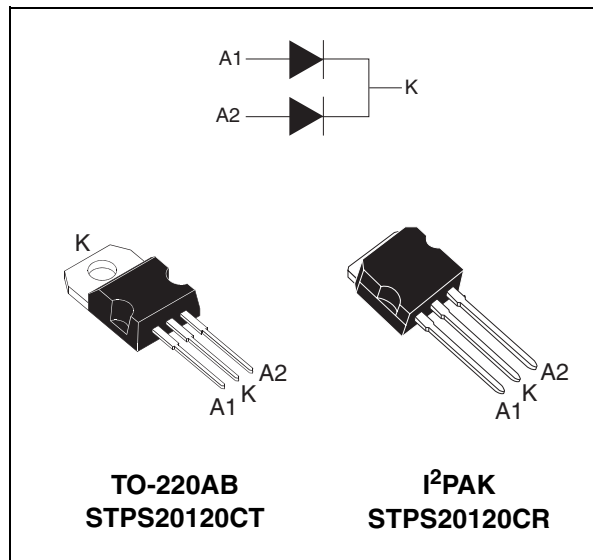
$I_{F(AV)}$	<b>2 x 10 A</b>
$V_{RRM}$	<b>120 V</b>
$T_j$ (max)	<b>175°C</b>
$V_F$ (typ)	<b>0.54 V</b>

### FEATURES AND BENEFITS

- 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 & I<sup>2</sup>PAK, this device is intended to be used in notebook & 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.



**Table 2: Order Codes**

Part Number	Marking
STPS20120CT	STPS20120CT
STPS20120CR	STPS20120CR

**Table 3: Absolute Ratings** (limiting values, per diode)

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		120	V
$I_{F(RMS)}$	RMS forward current		30	A
$I_{F(AV)}$	Average forward current	$\delta = 0.5$ $T_c = 150^\circ\text{C}$	Per diode 20 Per device	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ms}$ sinusoidal	150	A
$P_{ARM}$	Repetitive peak avalanche power	$t_p = 1\mu\text{s}$ $T_j = 25^\circ\text{C}$	4600	W
$T_{stg}$	Storage temperature range		-65 to + 175	°C
$T_j$	Maximum operating junction temperature *		175	°C

\* :  $\frac{dP_{tot}}{dT_j} > \frac{1}{R_{th(j-a)}}$  thermal runaway condition for a diode on its own heatsink

**Table 4: Thermal Parameters**

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	3	$^{\circ}\text{C/W}$
		Total	1.8	
$R_{th(c)}$	Coupling	Total	0.6	$^{\circ}\text{C/W}$

When the diodes 1 and 2 are used simultaneously:

$$T_j(\text{diode } 1) = P(\text{diode } 1) \times R_{th(j-c)}(\text{per diode}) + P(\text{diode } 2) \times R_{th(c)}$$

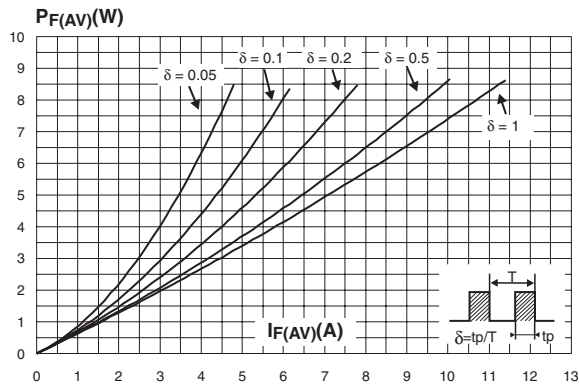
**Table 5: Static Electrical Characteristics (per diode)**

Symbol	Parameter	Tests conditions		Min.	Typ	Max.	Unit	
$I_R^*$	Reverse leakage current	$T_j = 25^{\circ}\text{C}$	$V_R = V_{RRM}$			10	$\mu\text{A}$	
		$T_j = 125^{\circ}\text{C}$			1.5	5	$\text{mA}$	
$V_F^{**}$	Forward voltage drop	$T_j = 25^{\circ}\text{C}$	$I_F = 2.5\text{A}$			0.7	V	
		$T_j = 125^{\circ}\text{C}$			0.54	0.58		
		$T_j = 25^{\circ}\text{C}$	$I_F = 10\text{A}$			0.92		
		$T_j = 125^{\circ}\text{C}$			0.7	0.74		
		$T_j = 25^{\circ}\text{C}$		$I_F = 20\text{A}$				1.02
		$T_j = 125^{\circ}\text{C}$				0.81		0.86

Pulse test: \*  $t_p = 5 \text{ ms}$ ,  $\delta < 2\%$   
 \*\*  $t_p = 380 \mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:  $P = 0.62 \times I_{F(AV)} + 0.012 I_{F(RMS)}^2$

**Figure 1: Average forward power dissipation versus average forward current (per diode)**



**Figure 2: Average forward current versus ambient temperature (delta = 0.5, per diode)**

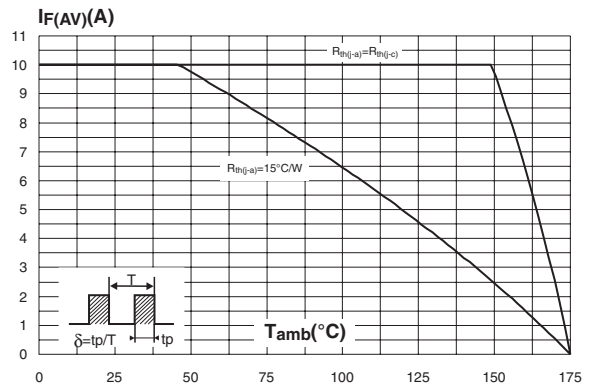


Figure 3: Normalized avalanche power derating versus pulse duration

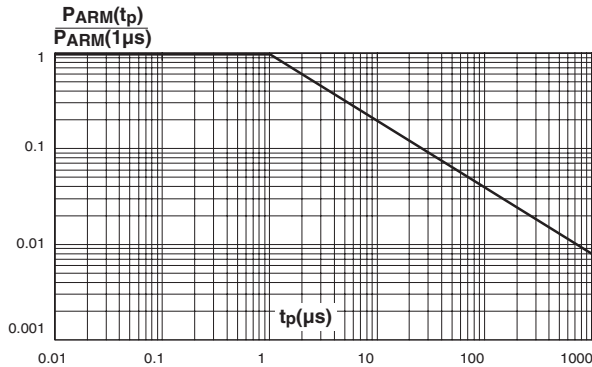


Figure 4: Normalized avalanche power derating versus junction temperature

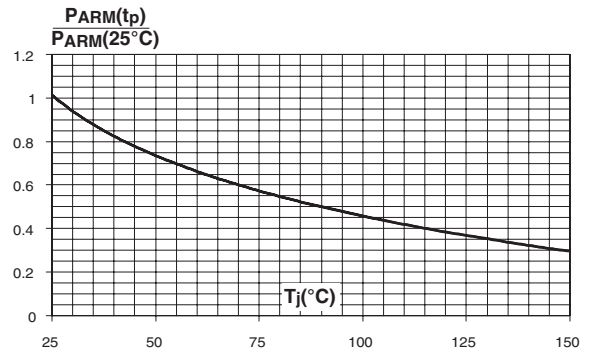


Figure 5: Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

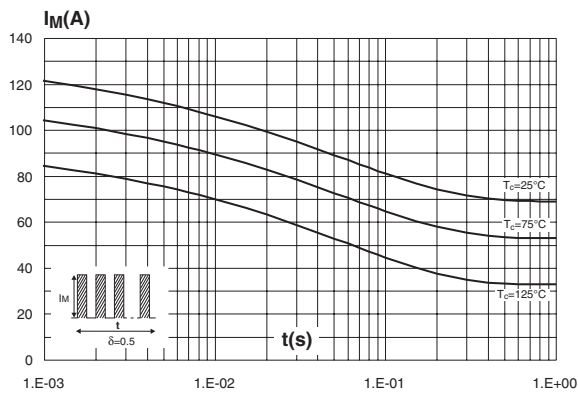


Figure 6: Relative variation of thermal impedance junction to ambient versus pulse duration

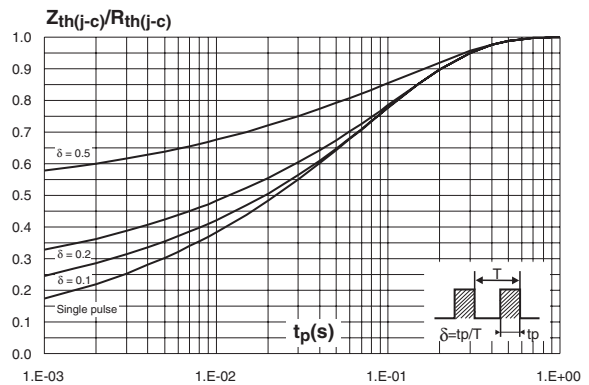


Figure 7: Reverse leakage current versus reverse voltage applied (typical values, per diode)

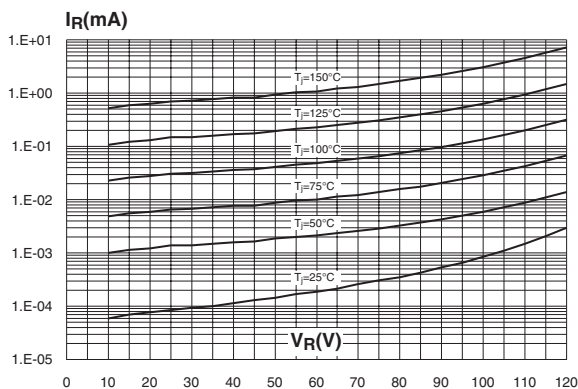


Figure 8: Junction capacitance versus reverse voltage applied (typical values, per diode)

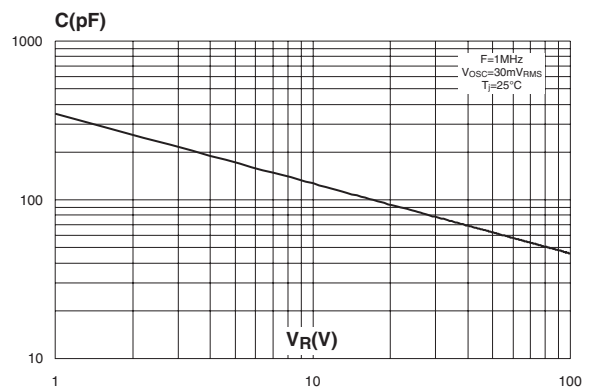


Figure 9: Forward voltage drop versus forward current (per diode)

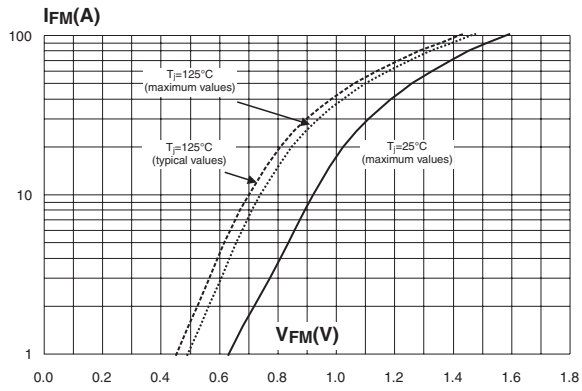


Figure 10: TO-220AB Package Mechanical Data

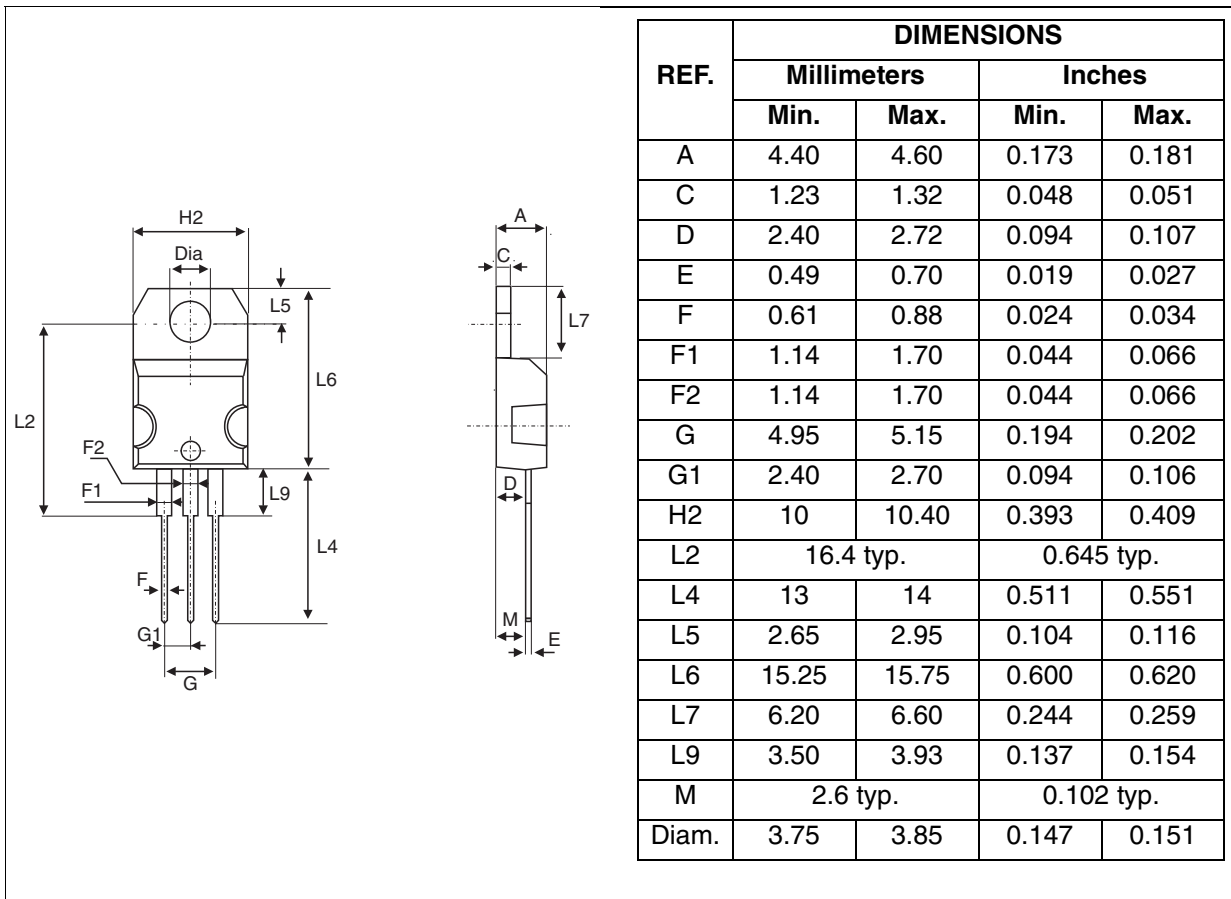


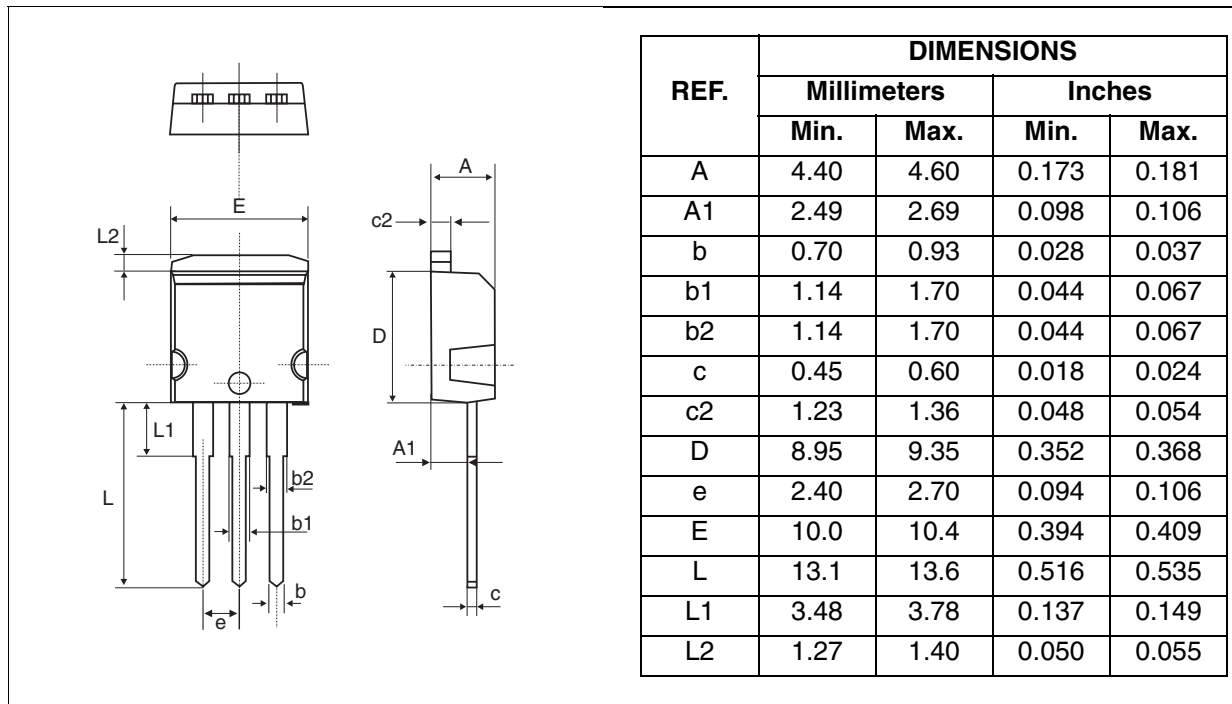
Figure 11: I<sup>2</sup>PAK Package Mechanical Data

Table 6: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS20120CT	STPS20120CT	TO-220AB	2.23 g	50	Tube
STPS20120CR	STPS20120CR	I <sup>2</sup> PAK	1.49 g	50	Tube

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 m.N.
- Maximum torque value: 1.0 m.N.

Table 7: Revision History

Date	Revision	Description of Changes
18-Feb-2005	1	First issue.

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