



# STPS20S100C

## POWER SCHOTTKY RECTIFIER

**Table 1: Main Product Characteristics**

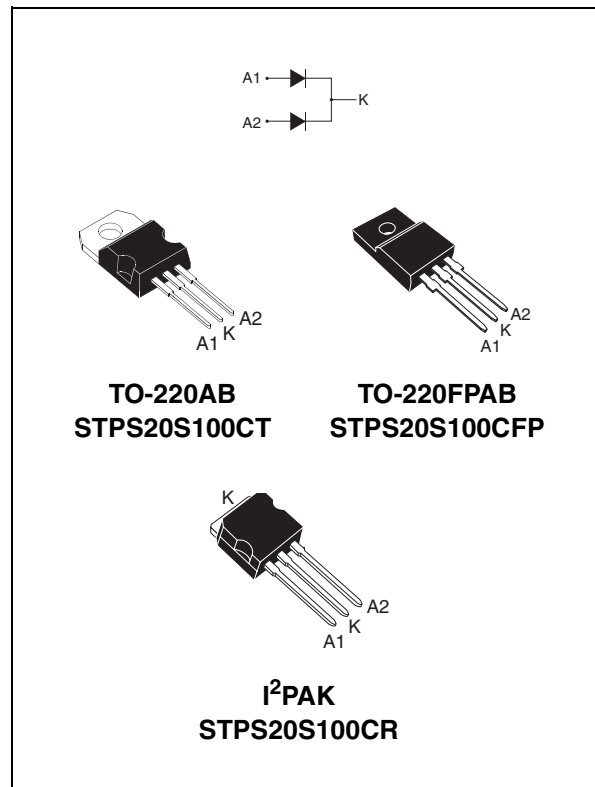
$I_{F(AV)}$	<b>2 x 10 A</b>
$V_{RRM}$	<b>100 V</b>
$T_j$	<b>175°C</b>
$V_F(max)$	<b>0.71 V</b>

### FEATURES AND BENEFITS

- High junction temperature capability for converters located in confined environment
- Low leakage current at high temperature
- Low static and dynamic losses as a result of the Schottky barrier
- Avalanche specification

### DESCRIPTION

Schottky barrier rectifier designed for high frequency miniature Switched Mode Power Supplies such as adaptators and on board DC/DC converters. Packaged in TO-220AB, I<sup>2</sup>PAK and TO-220FPAB.



**Table 2: Order Codes**

Part Numbers	Marking
STPS20S100CT	STPS20S100CT
STPS20S100CFP	STPS20S100CFP
STPS20S100CR	STPS20S100CR

## STPS20S100C

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

Symbol	Parameter				Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage				100	V
$I_{F(RMS)}$	RMS forward current				30	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AB / I <sup>2</sup> PAK	$T_c = 150^\circ\text{C}$	Per diode	10	A
				Per device	20	
		TO-220FPAC	$T_c = 140^\circ\text{C}$	Per diode	10	A
				Per device	20	
$I_{FSM}$	Surge non repetitive forward current		$t_p = 10\text{ms}$ sinusoidal		180	A
$P_{ARM}$	Repetitive peak avalanche power		$t_p = 1\mu\text{s}$ $T_j = 25^\circ\text{C}$		7200	W
$T_{stg}$	Storage temperature range				-65 to + 175	$^\circ\text{C}$
$T_j$	Maximum operating junction temperature *				175	$^\circ\text{C}$
dV/dt	Critical rate of rise of reverse voltage				10000	V/ $\mu\text{s}$

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

**Table 4: Thermal Resistance**

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB / I <sup>2</sup> PAK	Per diode	2.2	$^\circ\text{C/W}$
			Total	1.3	
$R_{th(c)}$			Coupling	0.3	
$R_{th(j-c)}$	Junction to case	TO-220FPAB	Per diode	4.5	$^\circ\text{C/W}$
			Total	3.5	
$R_{th(c)}$			Coupling	2.5	

When the diodes 1 and 2 are used simultaneously:

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

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

Symbol	Parameter	Tests conditions		Min.	Typ	Max.	Unit
$I_R$ *	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			3.5	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$			1.3	4.5	mA
$V_F$ **	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 5\text{A}$			0.73	V
		$T_j = 125^\circ\text{C}$			0.57	0.61	
		$T_j = 25^\circ\text{C}$	$I_F = 10\text{A}$			0.85	
		$T_j = 125^\circ\text{C}$			0.66	0.71	
		$T_j = 25^\circ\text{C}$	$I_F = 20\text{A}$			0.94	
		$T_j = 125^\circ\text{C}$			0.74	0.80	

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:  $P = 0.62 \times I_{F(AV)} + 0.009 I_{F(RMS)}^2$

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

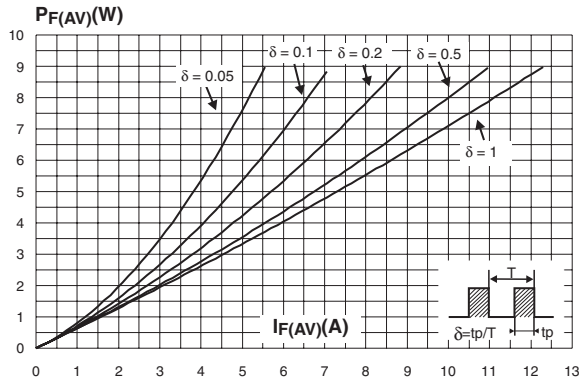


Figure 2: Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)

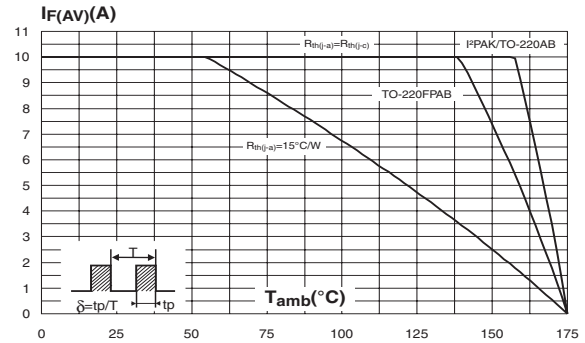


Figure 3: Normalized avalanche power derating versus pulse duration

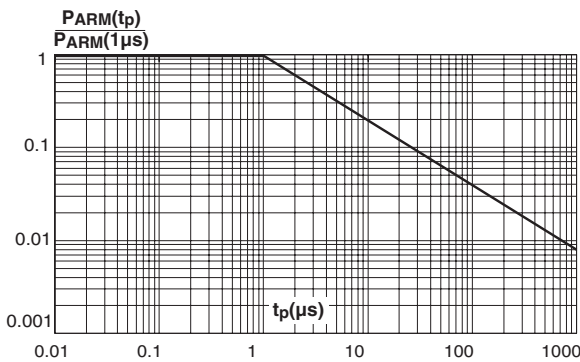


Figure 4: Normalized avalanche power derating versus junction temperature

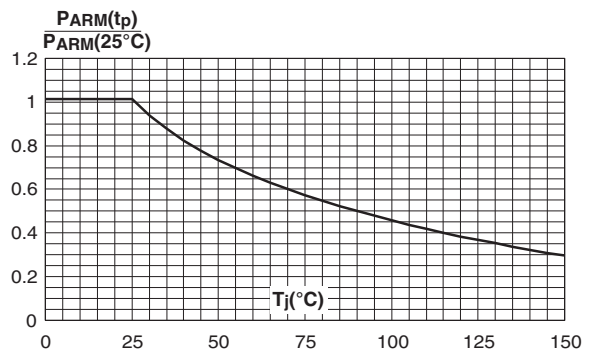


Figure 5: Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

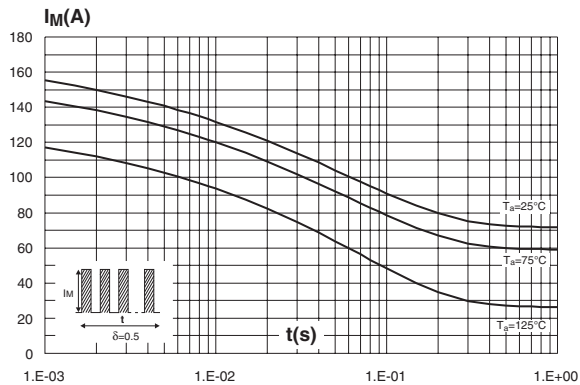
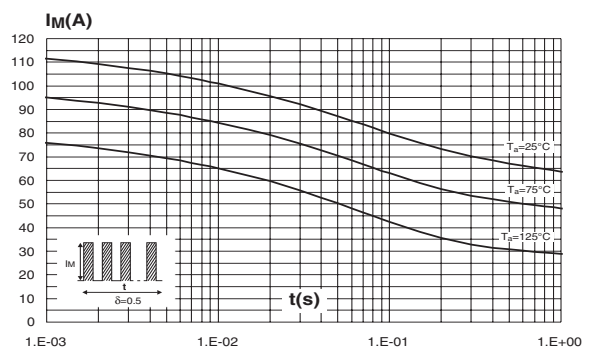
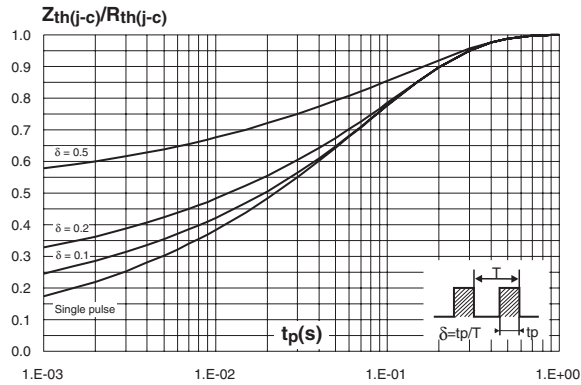


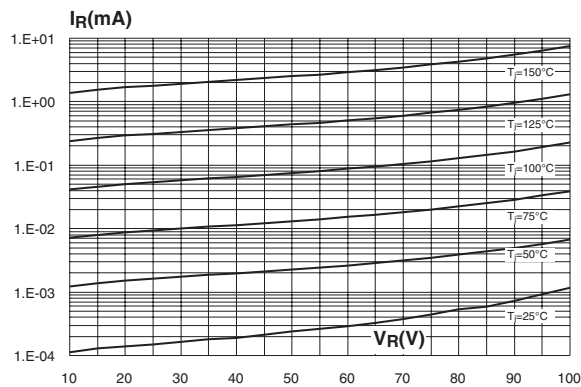
Figure 6: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220FPAB)



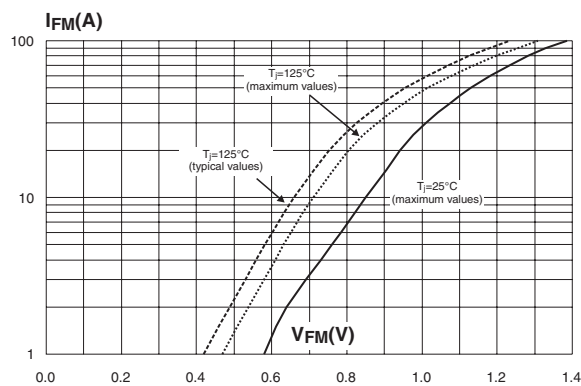
**Figure 7: Relative variation of thermal impedance junction to case versus pulse duration (per diode)**



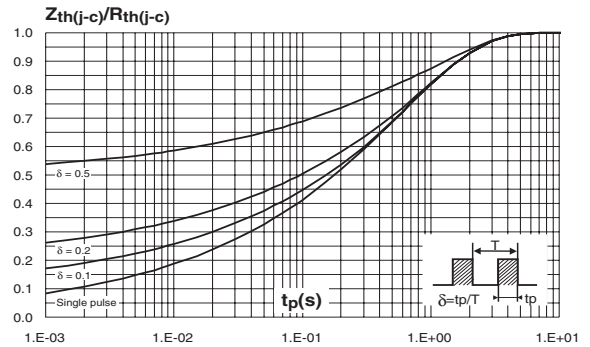
**Figure 7: Reverse leakage current versus reverse voltage applied (typical values, per diode)**



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



**Figure 8: Relative variation of thermal impedance junction to case versus pulse duration (per diode) (TO-220FPAB)**



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

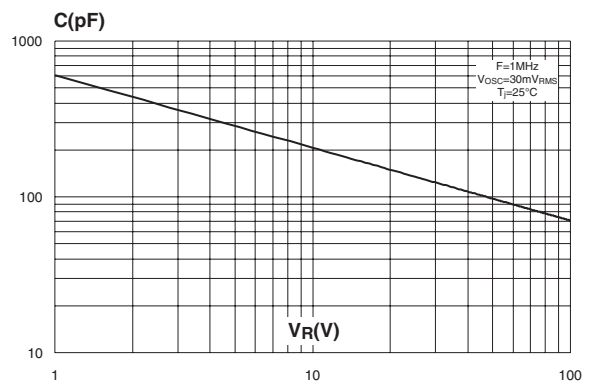


Figure 10: TO-220FPAB Package Mechanical Data

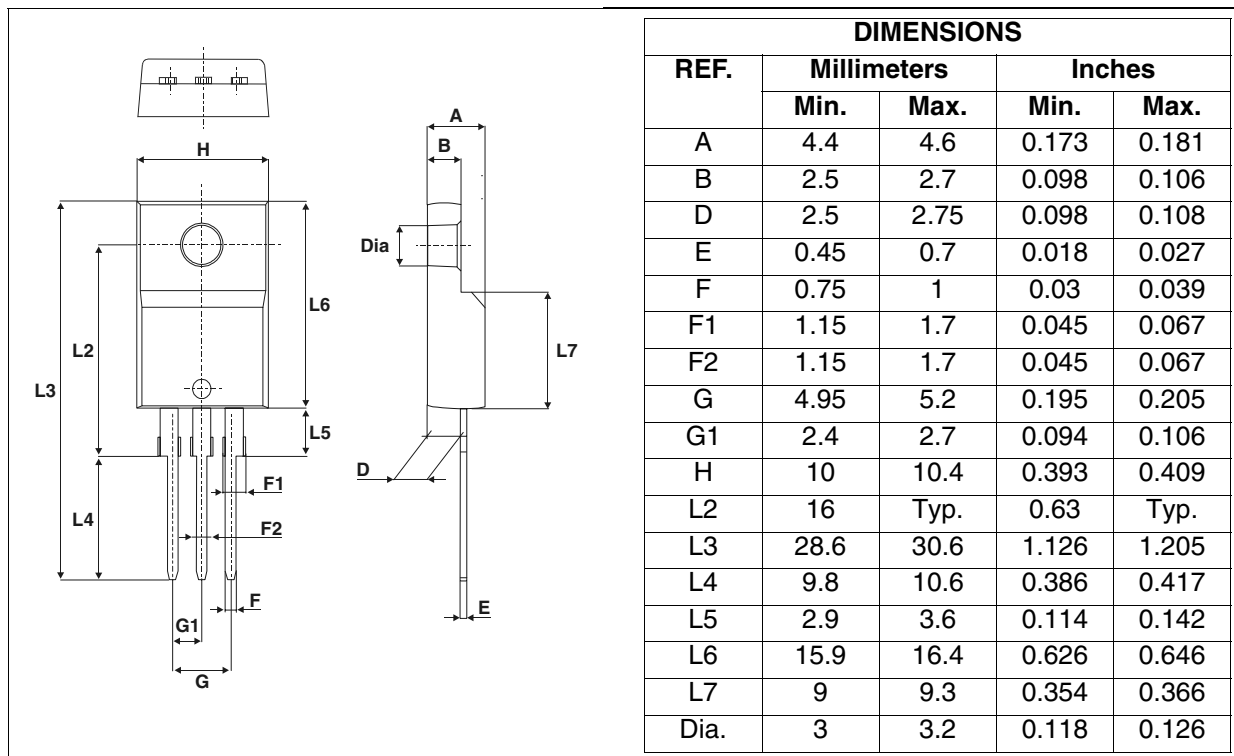
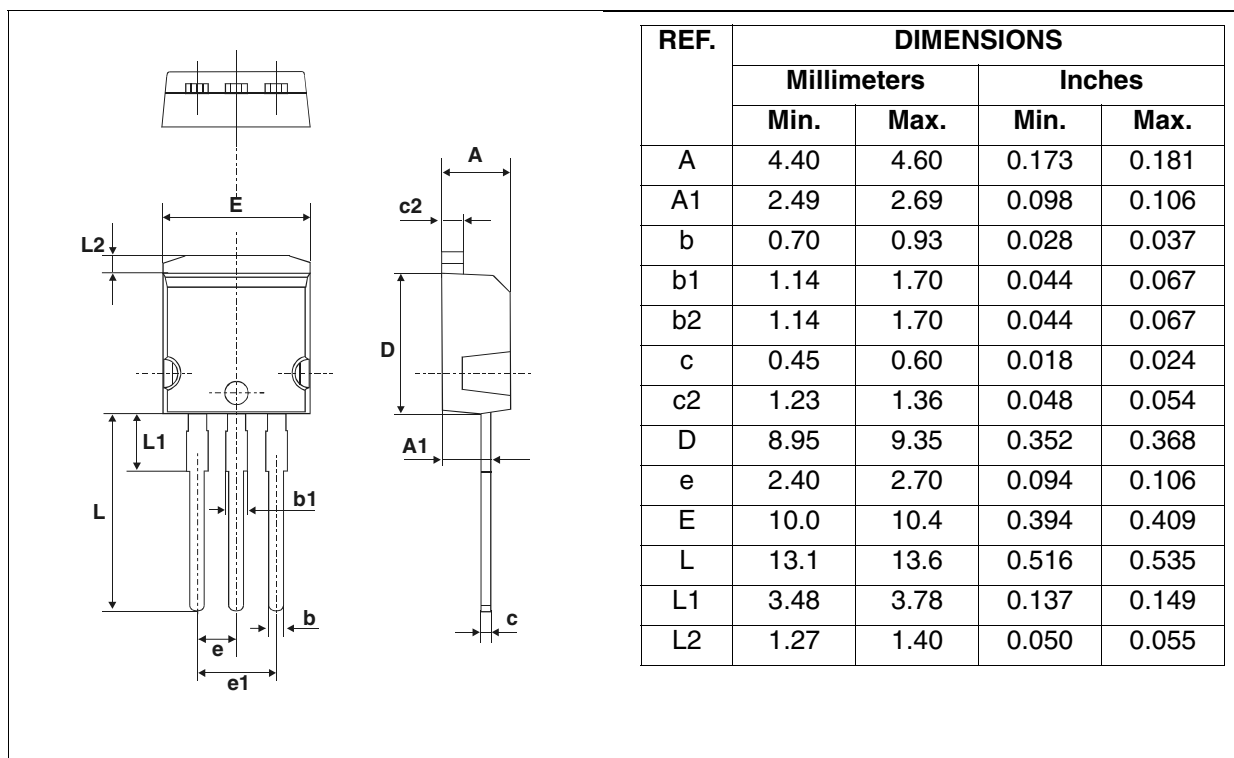


Figure 11: I<sup>2</sup>PAK Package Mechanical Data



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Figure 12: TO-220AB Package Mechanical Data

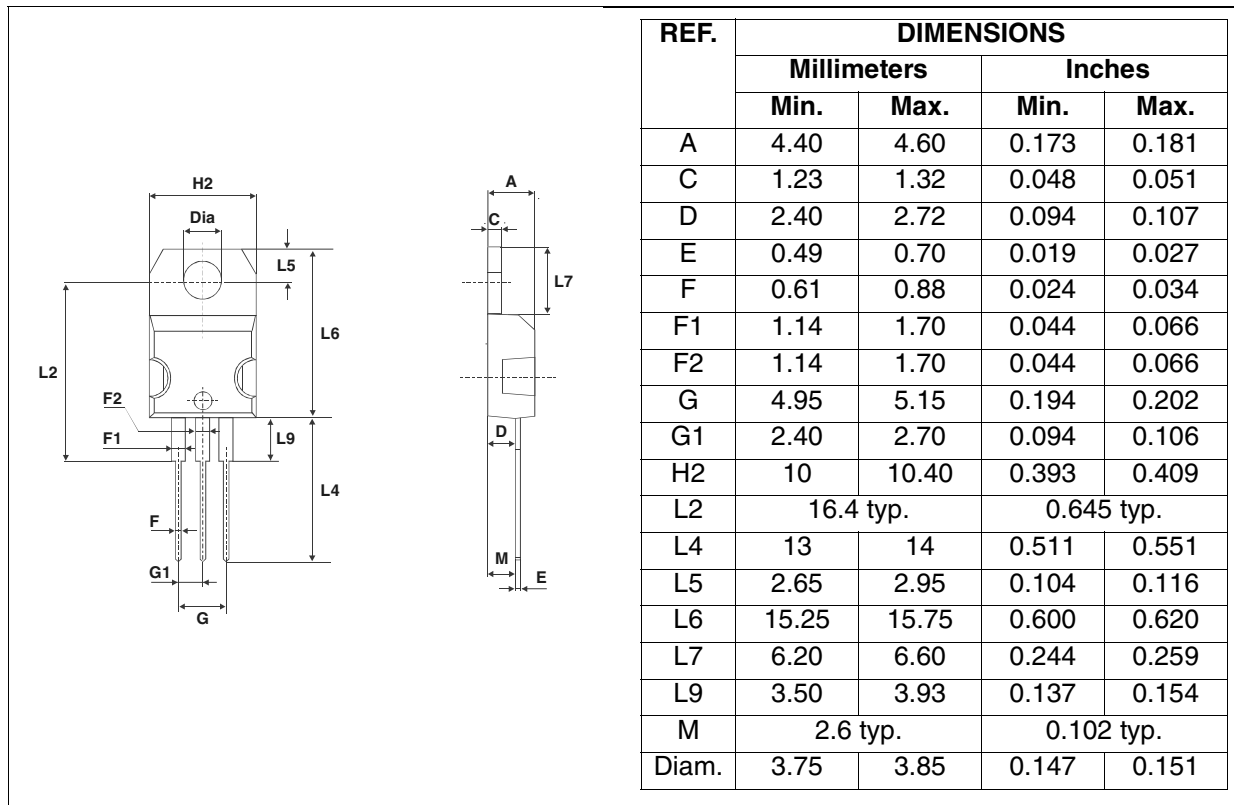


Table 6: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS20S100CT	STPS20S100CT	TO-220AB	2.20 g	50	Tube
STPS20S100CFP	STPS20S100CFP	TO-220FPAB	2 g	50	Tube
STPS20S100CR	STPS20S100CR	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
16-Mar-2005	1	First issue.

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