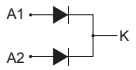
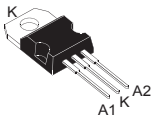
STPS20S100C

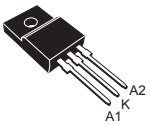
Datasheet

100 V power Schottky rectifier





TO-220AB



TO-220FPAB

Features

- 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
- ECOPACK®2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting
- Desktop power supply

Description

Schottky barrier rectifier designed for high frequency miniature switched mode power supplies such as adaptors and on board DC/DC converters.

The STPS20S100C is housed in TO-220AB and TO-220FPAB packages.

Product status link	
STPS20S100C	
Product summary	
Symbol	**Value**
$I_{F(AV)}$	2 x 10 A
V_{RRM}	100 V
T_j	175 °C
V_F (typ.)	0.66 V

1 Characteristics

Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified, per diode)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage				100	V
$I_{F(RMS)}$	Forward rms current				30	A
$I_{F(AV)}$	Average forward current	TO-220AB	T_c = 155 °C, δ = 0.5	Per diode	10	A
			T_c = 150 °C, δ = 0.5	Per device	20	
		TO-220FPAB	T_c = 135 °C, δ = 0.5	Per diode	10	
			T_c = 115 °C, δ = 0.5	Per device	20	
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal		180	A
P_{ARM}	Repetitive peak avalanche power		t_p = 10 µs, T_j = 125 °C		518	W
T_{stg}	Storage temperature range				-65 to +175	°C
T_j	Maximum operating junction temperature[1]				175	°C

1. *$(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.*

Table 2. Thermal resistance parameters

Symbol	Parameter			Max. value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB	Per diode	2.2	°C/W
			Total	1.3	
		TO-220FPAB	Per diode	4.5	
			Total	3.5	
$R_{th(c)}$	Coupling	TO-220AB		0.3	
		TO-220FPAB		2.5	

When the diodes 1 and 2 are used simultaneously :

ΔT_j(diode 1) = P(diode1) x $R_{th(j-c)}$(per diode) + P(diode 2) x $R_{th(c)}$

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R[1]	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		3.5	µA
		T_j = 125 °C		-	1.3	4.5	mA

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_F[2]	Forward voltage drop	T_j = 25 °C	I_F = 5 A	-		0.73	V
		T_j = 125 °C		-	0.57	0.61	
		T_j = 25 °C	I_F = 10 A	-		0.85	
		T_j = 125 °C		-	0.66	0.71	
		T_j = 25 °C	I_F = 20 A	-		0.94	
		T_j = 125 °C		-	0.74	0.80	

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

To evaluate the conduction losses, use the following equation:

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

For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

1.1 Characteristics (curves)

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

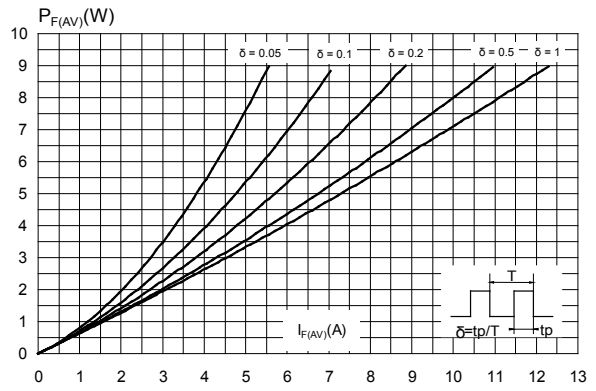


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

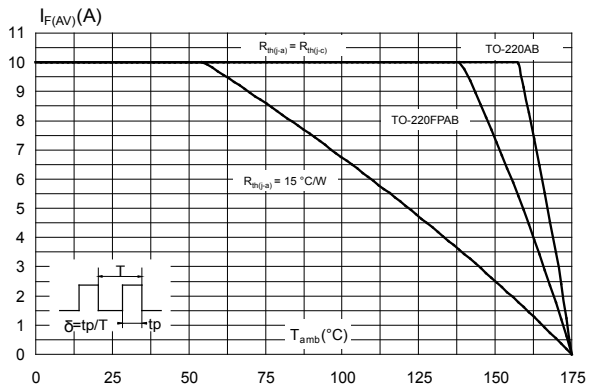


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

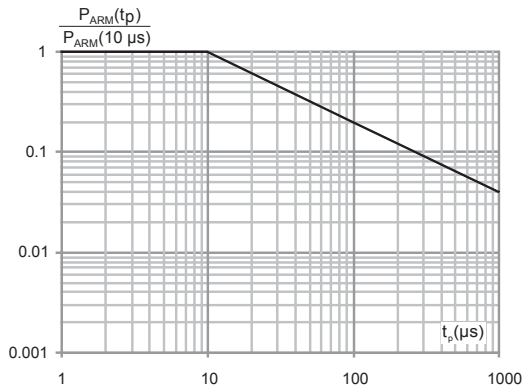


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB)