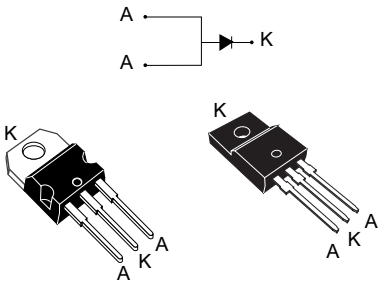
STPS20SM120S

Datasheet

120 V power Schottky rectifier



TO-220AB TO-220FPAB

Features

- High current capability
- Avalanche rated
- Low forward voltage drop
- High frequency operation
- Insulated package TO220FPAB:
  - Insulated voltage: 2000 V_{RMS} sine
- ECOPACK®2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting
- Notebook adapter

Description

This Schottky diode is suited for high frequency switch mode power supply.

Packed in TO-220AB and TO-220FPAB, the STPS20SM120S is optimized for use in notebook, game station and desktop adapters, providing in these applications a good efficiency at both low and high load.

Product status
STPS20SM120S

Product summary	
$I_{F(AV)}$	20 A
V_{RRM}	120 V
T_j (max)	150 °C
V_F (typ)	0.65 V

1 Characteristics

Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified, anode terminals short circuited)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		120	V
$I_{F(RMS)}$	Forward rms current		50	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave		20	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	220	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C	900	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature (1)		+150	°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 parameter

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB	1.55	°C/W
		TO-220FPAB	4	

For more information, please refer to the following application note :

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics (anode terminals short circuited)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	40	210	µA
		T_j = 125 °C		-	15	40	mA
V_F (2)	Forward voltage drop	T_j = 125 °C	I_F = 5 A	-	0.49	0.54	V
		T_j = 25 °C	I_F = 10 A	-		0.75	
		T_j = 125 °C		-	0.57	0.62	
		T_j = 25 °C	I_F = 20 A	-		0.89	
		T_j = 125 °C		-	0.65	0.72	

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:

$P = 0.56 \times I_{F(AV)} + 0.008\ I_F{}^2{}_{(RMS)}$

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

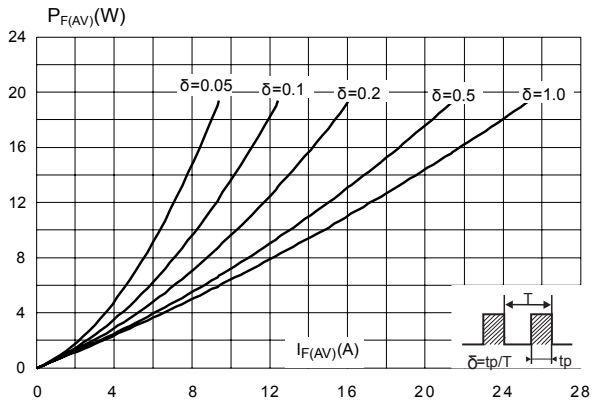


Figure 2. Average forward current versus ambient temperature (δ = 0.5, TO-220AB)

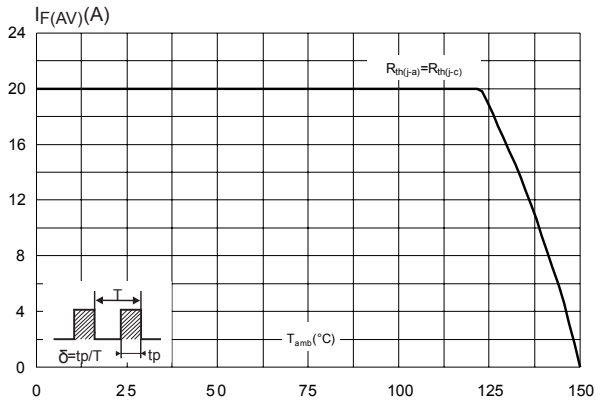


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

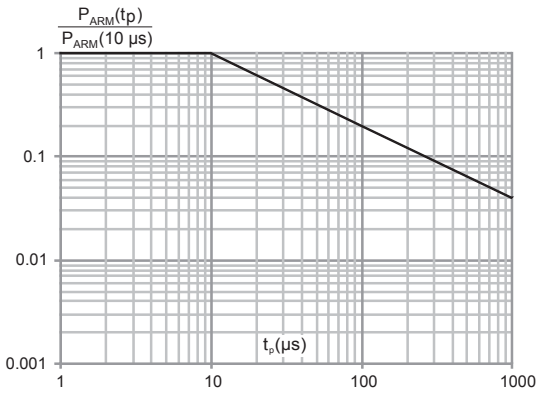


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB)