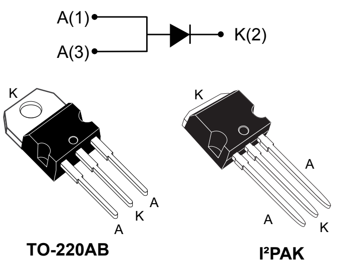
STPS20SM100S

Datasheet

100 V power Schottky rectifier



Features

- High current capability
- Avalanche rated
- Low forward voltage drop
- High frequency operation
- ECOPACK®2 compliant

Applications

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

Description

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

Packaged in TO-220AB and I²PAK, the STPS20SM100S is intended to be used in notebook, game station and desktop adaptors, providing in these applications a good efficiency at both low and high load.

Product status link
STPS20SM100S

Product summary	
$I_{F(AV)}$	20 A
V_{RRM}	100 V
T_j (max.)	150 °C
V_F (typ.)	0.63 V

1 Characteristics

Table 1. Absolute ratings (limiting values, with terminals 1 and 3 short circuited, at 25 °C, unless otherwise specified)

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 δ = 0.5, square wave	T_C = 125 °C	20	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	350	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C	1080	W
T_{stg}	Storage temperature range		-65 to +150	°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	Max. value	Unit
$R_{th(j-c)}$	Junction to case	1.3	°C/W

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

- AN5088: Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics (with terminals 1 and 3 short circuited)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	10	30	µA
		T_j = 125 °C		-	10	30	mA
		T_j = 25 °C	V_R = 70 V	-	5		µA
		T_j = 125 °C		-	5		mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 5 A	-	565		mV
		T_j = 125 °C		-	480		
		T_j = 25 °C	I_F = 10 A	-	685		
		T_j = 125 °C		-	560	620	
		T_j = 25 °C	I_F = 20 A	-	800	900	
		T_j = 125 °C		-	630	700	

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:

$P = 0.6 \times I_{F(AV)} + 0.005 \times I_F{}^2{}_{(RMS)}$

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 (terminals 1 and 3 short circuited)

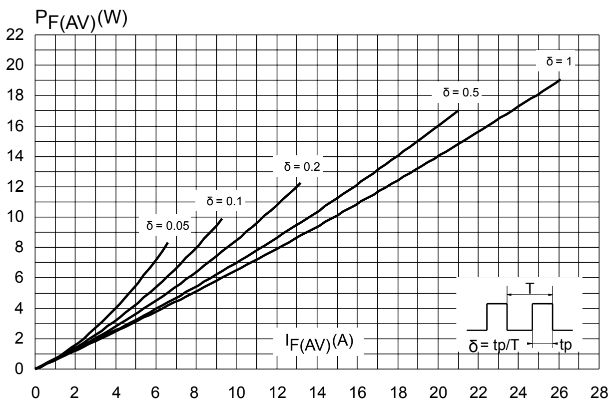


Figure 2. Average forward current versus ambient temperature (δ = 0.5, terminals 1 and 3 short circuited)

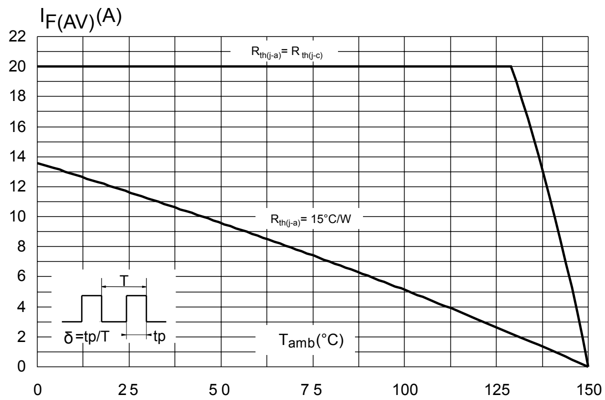


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

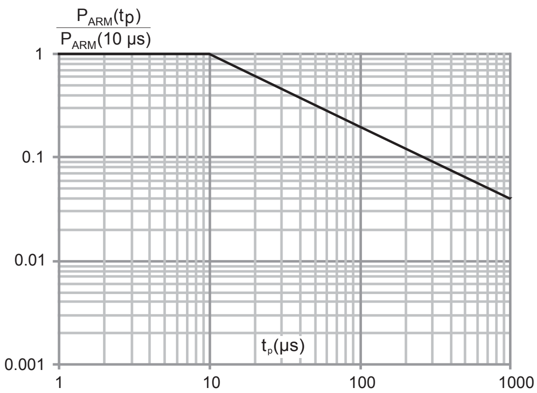


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration