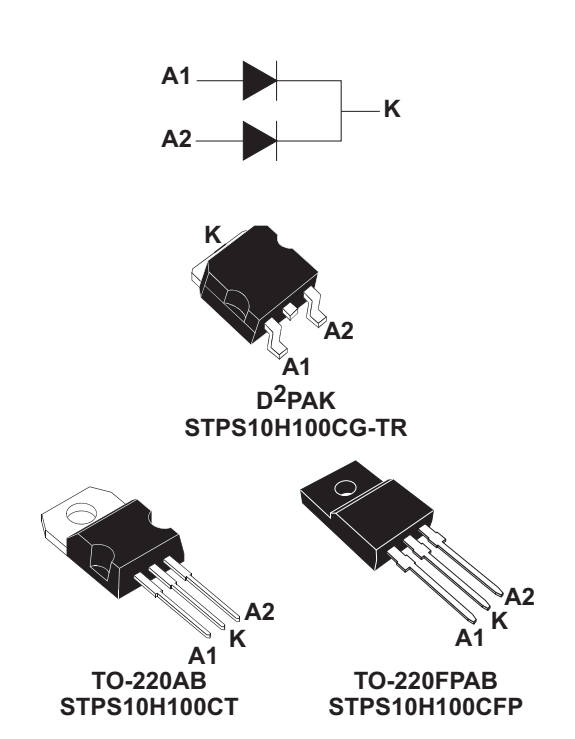
STPS10H100C

High voltage power Schottky rectifier

Datasheet - production data



Description

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

The product is packaged in TO-220AB, TO-220FPAB, and D^2PAK.

Table 1. Device summary

$I_{F(AV)}$	2 x 5 A
V_{RRM}	100 V
T_j (max)	175 °C
V_F(max)	0.61 V

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 capability specified

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage				100	V
$I_{F(RMS)}$	Forward rms current				10	A
$I_{F(AV)}$	Average forward current δ = 0.5	TO-220AB, D^2PAK	T_c = 165 °C	Per diode	5	A
		TO-220FPAB	T_c = 160 °C	Per device	10	
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal		180	A
I_{RRM}	Repetitive peak reverse current		t_p = 2 µs square F= 1 kHz		1	A
P_{ARM}	Repetitive peak avalanche power		t_p = 10 µs T_j = 125 °C		515	W
T_{stg}	Storage temperature range				-65 to + 175	°C
T_j	Maximum operating junction temperature (1)				175	°C
dV/dt	Critical rate of rise of reverse voltage				10000	V/µs

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB, D^2PAK	Per diode	2.2	°C/W
			Total	1.3	
$R_{th(c)}$	Coupling			0.3	
$R_{th(j-c)}$	Junction to case	TO-220FPAB	Per diode	4.5	°C/W
			Total	3.5	
$R_{th(c)}$	Coupling			2.5	

When 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 4. 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
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 5 A			0.73	V
		T_j = 125 °C	I_F = 5 A		0.57	0.61	
		T_j = 25 °C	I_F = 10 A			0.85	
		T_j = 125 °C	I_F = 10 A		0.66	0.71	

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:

$P = 0.51 \times I_{F(AV)} + 0.02\ I_{F}^{2}{}_{(RMS)}$

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

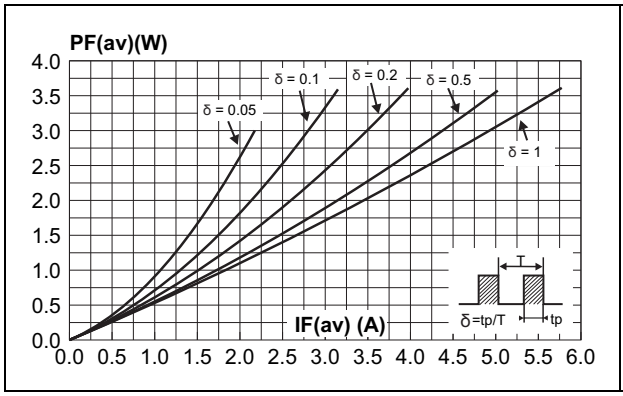


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

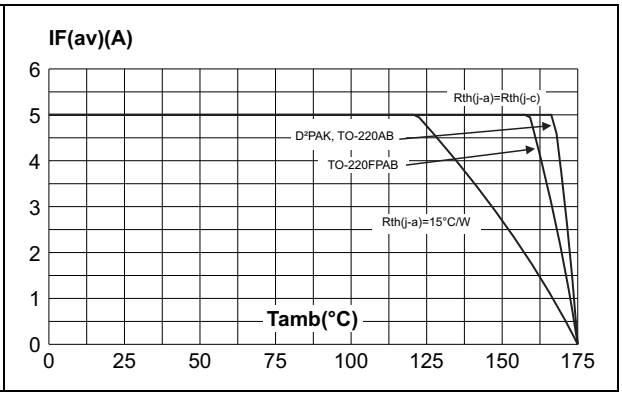


Figure 3. Normalized avalanche power derating versus pulse duration

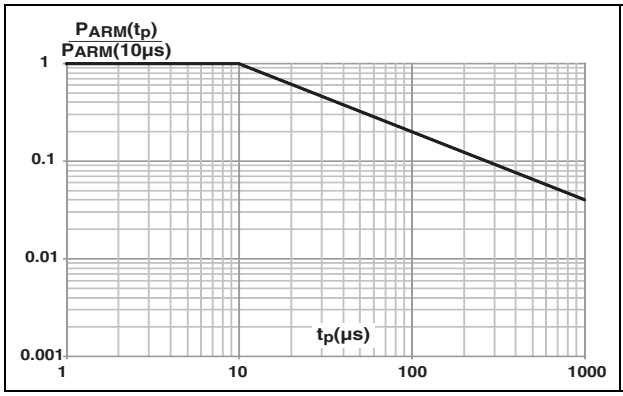


Figure 4. Non repetitive surge peak forward current versus overload duration

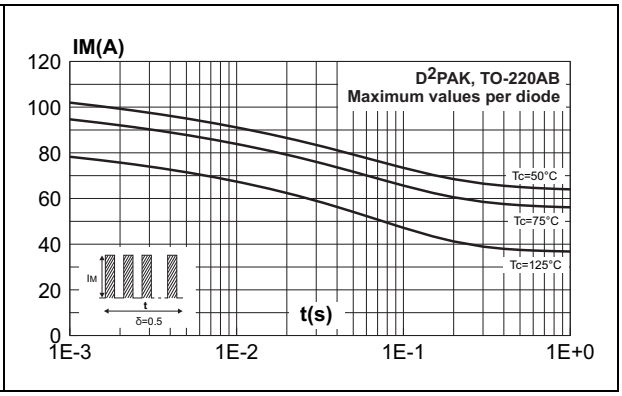


Figure 5. Non repetitive surge peak forward current versus overload duration (TO-220FPAB)

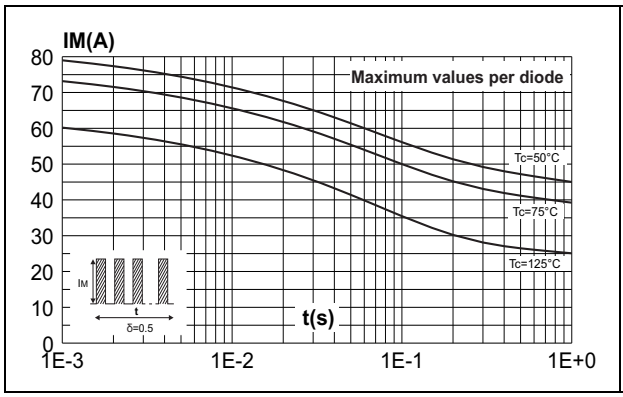


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration