

Power Schottky rectifier

Features

- High current capability
- Avalanche rated
- Low forward voltage drop current
- High frequency operation
- Insulated package:
 - Insulation voltage 2000 V rms
 - Package capacitance = 12 pF

Description

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

Packaged in TO-220AB, TO-220FPAB, D²PAK and I²PAK, this device 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.

Table 1. Device summary

I _{F(AV)}	20 A
V _{RRM}	100 V
T _j (max)	150 °C
V _F (typ)	0.455 V

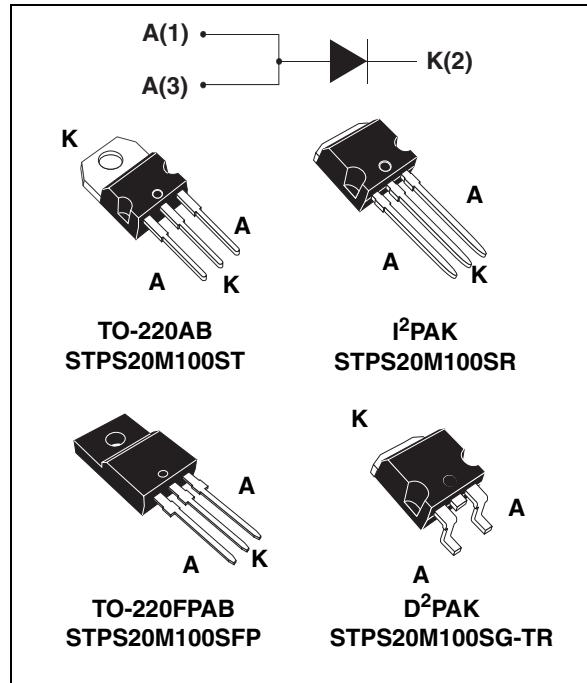
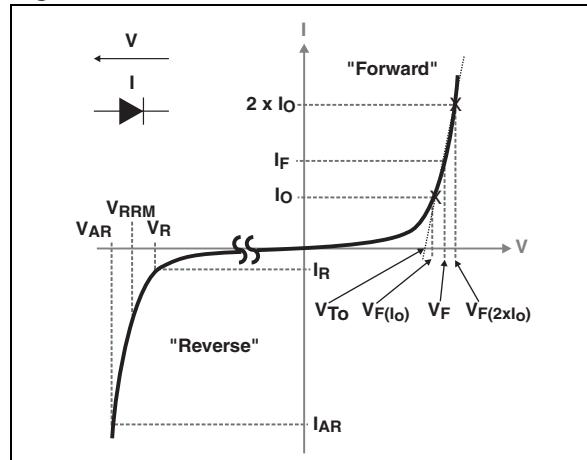


Figure 1. Electrical characteristics (a)



- a. V_{ARM} and I_{ARM} must respect the reverse safe operating area defined in [Figure 14](#). V_{AR} and I_{AR} are pulse measurements ($t_p < 1 \mu\text{s}$). V_R, I_R, V_{RRM} and V_F, are static characteristics

1 Characteristics

Table 2. Absolute ratings (limiting values with terminals 1 and 3 short circuited)

Symbol	Parameter	Value	Unit	
V _{RRM}	Repetitive peak reverse voltage	100	V	
I _{F(RMS)}	Forward current rms	30	A	
I _{F(AV)}	Average forward current $\delta = 0.5$	TO-220AB, D ² PAK, I ² PAK, T _c = 130 °C	20	
		TO-220FPAB, T _c = 85 °C		
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal, terminals 1 and 3 short circuited	530	A
P _{ARM} ⁽¹⁾	Repetitive peak avalanche power	t _p = 1 μs T _j = 25 °C	16000	W
V _{ARM} ⁽²⁾	Maximum repetitive peak avalanche voltage	t _p < 1 μs T _j < 150 °C I _{AR} < 40 A	120	V
V _{ASM} ⁽²⁾	Maximum single pulse peak avalanche voltage	t _p < 1 μs T _j < 150 °C I _{AR} < 40 A	120	V
T _{stg}	Storage temperature range	-65 to + 175	°C	
T _j	Maximum operating junction temperature ⁽³⁾	150	°C	

- For temperature or pulse time duration deratings, refer to [Figure 4.](#) and [Figure 5.](#). More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the application notes AN1768 and AN2025.
- Refer to [Figure 14](#)
- $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ 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 ² PAK, I ² PAK	1.2
		TO-220FPAB	4

Table 4. Static electrical characteristics (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 = 70 V		5		μA
		T _j = 125 °C			5		mA
		T _j = 25 °C	V _R = 100 V		10	40	μA
		T _j = 125 °C			10	40	mA
V _F ⁽²⁾	Forward voltage drop	T _j = 25 °C	I _F = 5 A		550		mV
		T _j = 125 °C			455		
		T _j = 25 °C	I _F = 10 A		660	730	
		T _j = 125 °C			530	600	
		T _j = 25 °C	I _F = 20 A		775	850	
		T _j = 125 °C			610	690	

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:

$$P = 0.425 \times I_{F(AV)} + 0.0088 \times I_{F(RMS)}^2$$

Figure 2. Average forward power dissipation versus average forward current

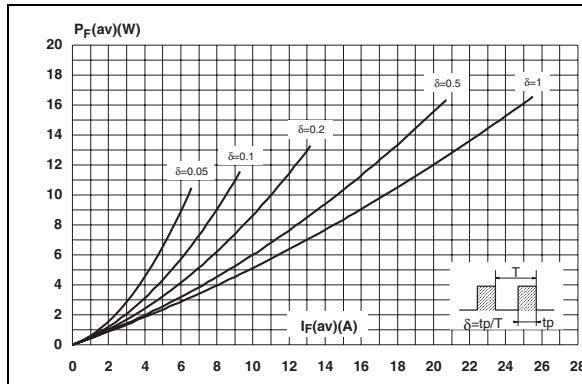


Figure 3. Average forward current versus ambient temperature ($\delta = 0.5$)

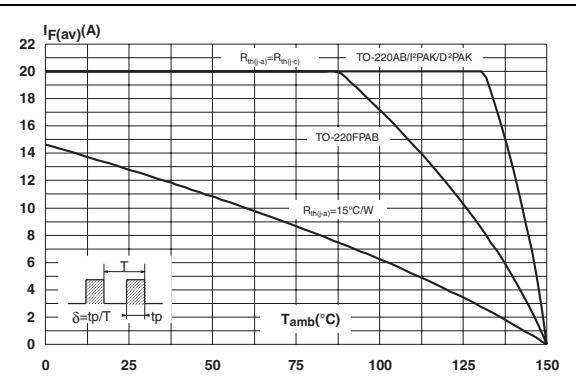


Figure 4. Normalized avalanche power derating versus pulse duration

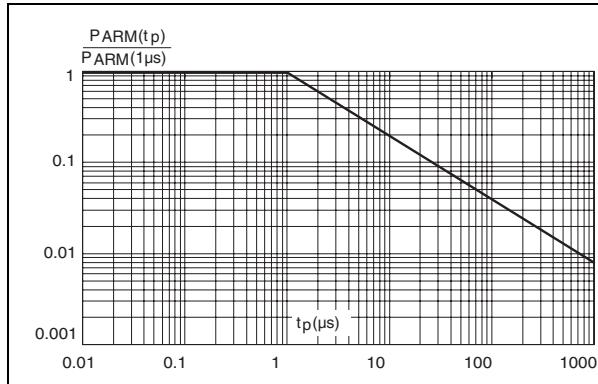


Figure 5. Normalized avalanche power derating versus junction temperature

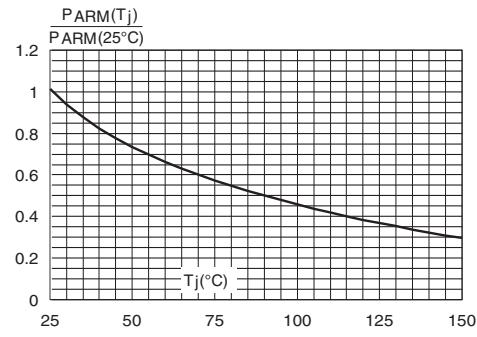


Figure 6. Non repetitive surge peak forward current versus overload duration, maximum values

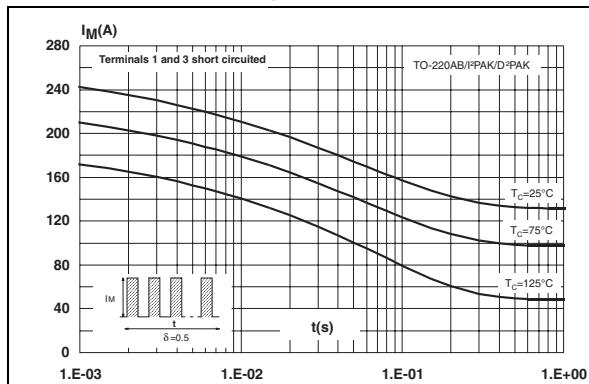
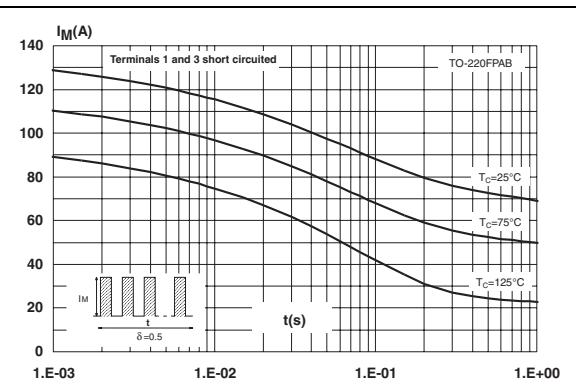


Figure 7. Non repetitive surge peak forward current versus overload duration, maximum values



3 Ordering information

Table 9. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS20M100ST	PS20M100ST	TO-220AB	2.2 g	50	Tube
STPS20M100SFP	PS20M100SFP	TO-220FPAB	1.70 g	50	Tube
STPS20M100SR	PS20M100SR	I ² PAK	1.49 g	50	Tube
STPS20M100SG-TR	PS20M100SG	D ² PAK	1.48 g	1000	Tape and reel