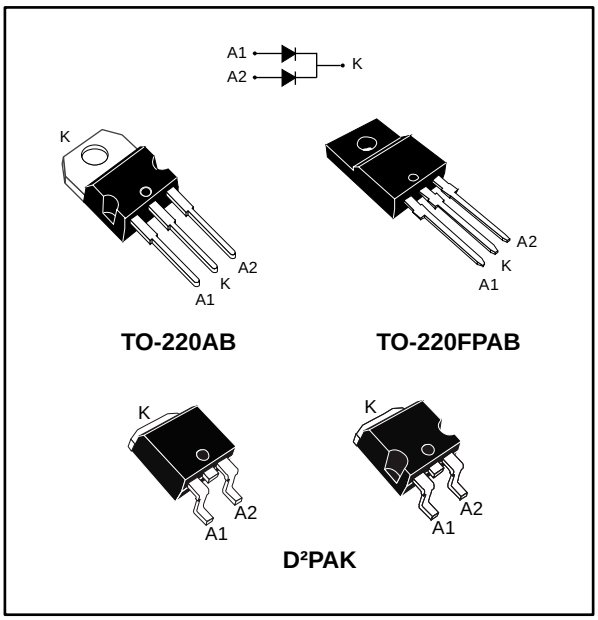
STPS20170C

High voltage power Schottky rectifier

Datasheet - production data



Description

Dual center tap Schottky rectifier diode suited for high frequency switched mode power supplies.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 x 10 A
V_{RRM}	170 V
T_j (max.)	175 °C
V_F (typ.)	0.69 V

Features

- High reverse voltage
- High junction temperature capability
- Avalanche specification with derating curves
- Insulated package TO-220FPAB
  - Insulating voltage: 2000 V_{RMS} sine
- ECOPACK®2 compliant component for D²PAK on demand

Benefits

- Can challenge bipolar ultrafast diodes with better dynamic characteristics

1 Characteristics

Table 2: Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage				170	V
$I_{F(RMS)}$	Forward rms current				30	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	TO-220AB / D²PAK	T_C = 155 °C	Per diode	10	A
			T_C = 150 °C	Total	20	
		TO-220FPAB	T_C = 135 °C	Per diode	10	
			T_C = 115 °C	Total	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	480	W
T_{stg}	Storage temperature range				-65 to +175	°C
T_j	Maximum operating junction temperature [(1)]				175	

Notes:

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

Table 3: Thermal parameters

Symbol	Parameter			Max. value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB / D²PAK	Per diode	2.2	°C/W
			Total	1.3	
		TO-220FPAB	Per diode	4.5	
			Total	3.5	
$R_{th(c)}$	Coupling	TO-220AB / D²PAK		0.3	
		TO-220FPAB		2.5	

When the diodes 1 and 2 are used simultaneously:

$\Delta T_{j\ (diode1)} = P_{(diode1)} \times R_{th(j-c)}$ (per diode) $+ P_{(diode2)} \times R_{th(c)}$

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	$V_R = V_{RRM}$	-		15	µA
		T_j = 125 °C		-		15	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 10 A	-		0.90	V
		T_j = 125 °C		-	0.69	0.75	
		T_j = 25 °C	I_F = 20 A	-		0.99	
		T_j = 125 °C		-	0.79	0.86	

Notes:

(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:

$P = 0.64 \times I_{F(AV)} + 0.011 \times I_{F}^{2}{}_{(RMS)}$

1.1 Characteristics (curves)

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

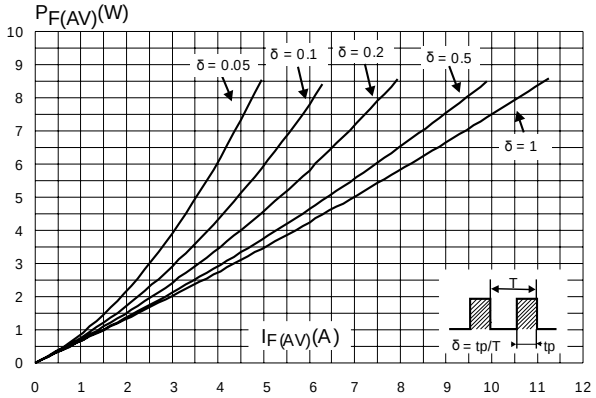


Figure 2: Average forward current versus ambient temperature (δ = 0.5, per diode)

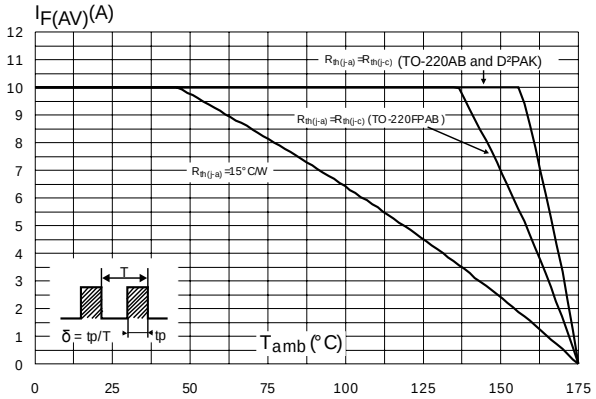


Figure 3: Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

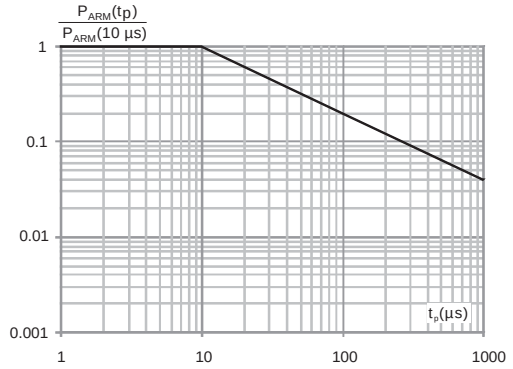


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

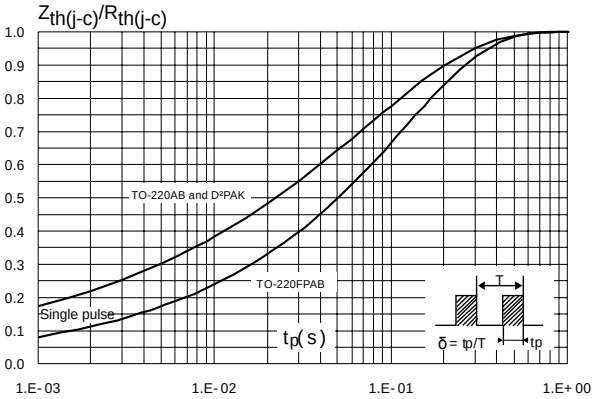


Figure 5: Reverse leakage current versus reverse voltage applied (typical values, per diode)

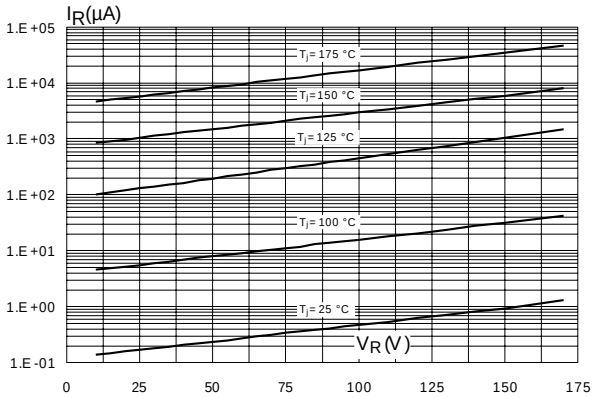


Figure 6: Junction capacitance versus reverse voltage applied (typical values, per diode)