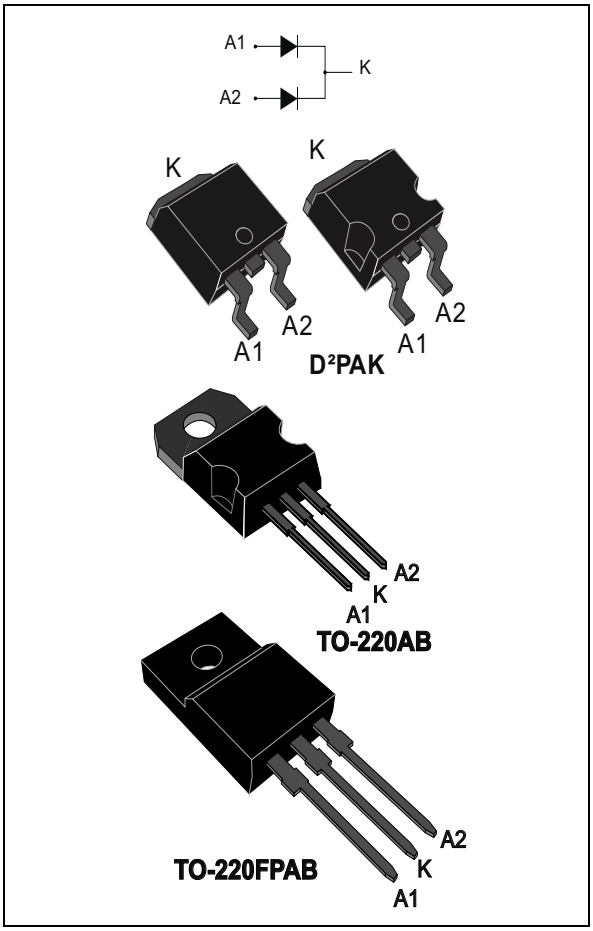
STPS10150C

High voltage power Schottky rectifier

Datasheet — production data



Description

This dual center tab Schottky rectifier is suited for high frequency switched mode power supplies.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 5A
V_{RRM}	150 V
$T_{j(max)}$	175 °C
$V_{F\ (Typ)}$	0.69 V

Features

- High junction temperature capability
- Good trade off between leakage current and forward voltage drop
- Low leakage current
- Avalanche capability specified
- Insulated package:
  - TO-220FPAB insulating voltage = $2000V_{RMS}$ sine
- ECOPACK®2 compliant component for D²PAK on demand

1 Characteristics

Table 2. Absolute ratings (limiting values per diode at T_{amb} = 25 °C unless otherwise stated)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage				150	V
$I_{F(RMS)}$	Forward rms current				10	A
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	TO-220AB, D²PAK	T_c = 155 °C	Per diode	5	A
		TO-220FPAB	T_c = 145 °C			
		TO-220AB, D²PAK	T_c = 150 °C	Per device	10	
		TO-220FPAB	T_c = 130 °C			
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal		120	A
P_{ARM}(1)	Repetitive peak avalanche power		t_p = 10 µs, T_j = 125 °C		220	W
T_{stg}	Storage temperature range				-65 to + 175	°C
T_j	Maximum operating junction temperature(2)				175	°C

1. For pulse time duration derating, please refer to *Figure 3*. More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the application notes AN1768 and AN2025.
2. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal parameters

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB, D²PAK	Per diode	4	°C/W
		TO-220FPAB		7	
		TO-220AB, D²PAK	Total	2.4	
		TO-220FPAB		5.3	
$R_{th(c)}$	Coupling	TO-220AB, D²PAK		0.7	
		TO-220FPAB		3.7	

When the diodes 1 and 2 are used simultaneously:
$\Delta Tj(diode\ 1) = P(diode1) \times R_{th(j-c)}(Per\ diode) + P(diode\ 2) \times R_{th(c)}$

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	$V_R = V_{RRM}$	-	-	2.0	µA
		T_j = 125 °C		-	0.40	2.0	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 5A	-	-	0.92	V
		T_j = 125 °C		-	0.69	0.75	
		T_j = 25 °C	I_F = 10 A	-	-	1.0	
		T_j = 125 °C		-	0.79	0.85	

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:
$P = 0.65 \times I_{F(AV)} + 0.02 \times I_F^2{}_{(RMS)}$

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

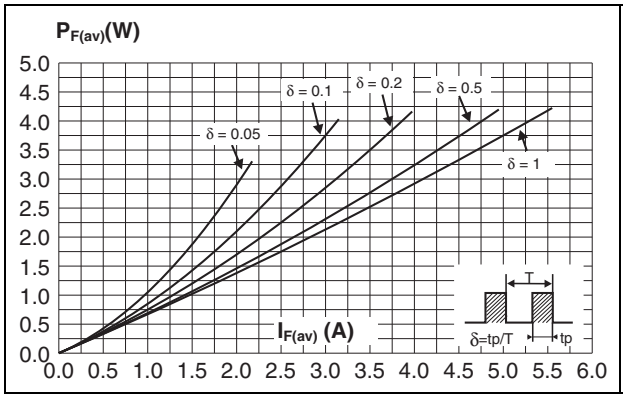


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

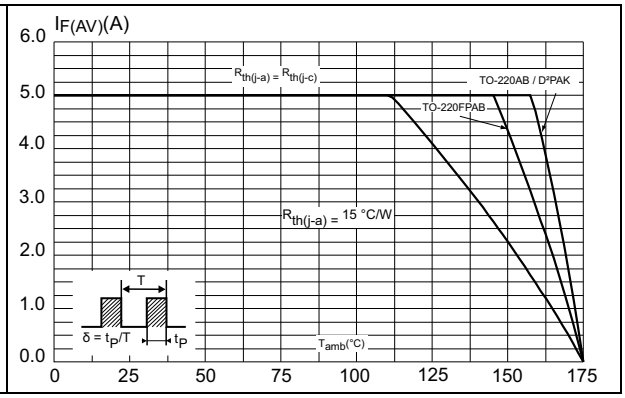


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

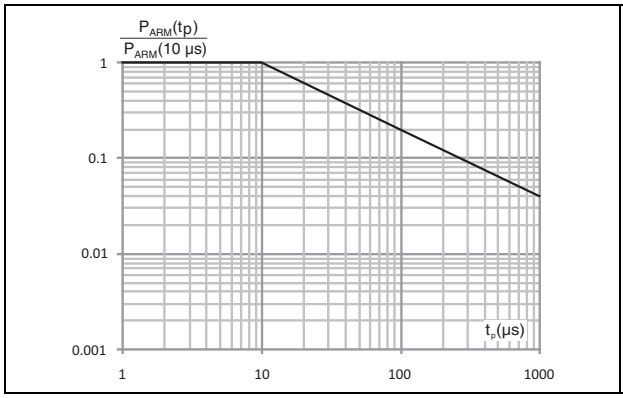


Figure 4. Reverse leakage current versus reverse voltage applied (typical values, per diode)

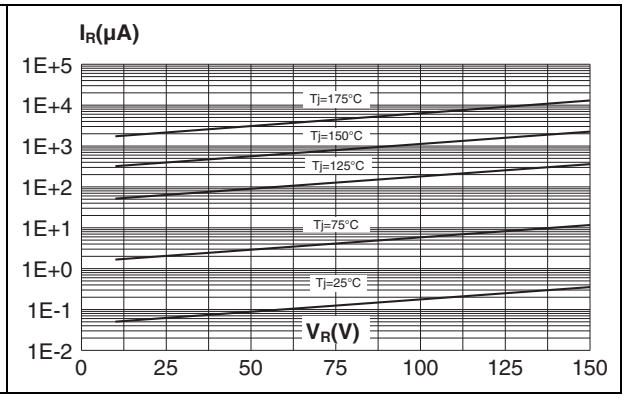


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D²PAK)

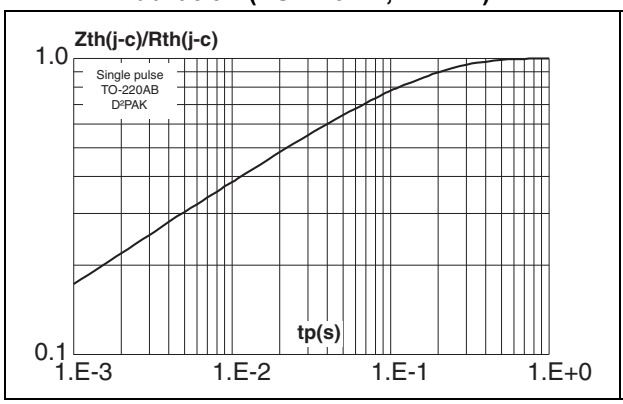


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)