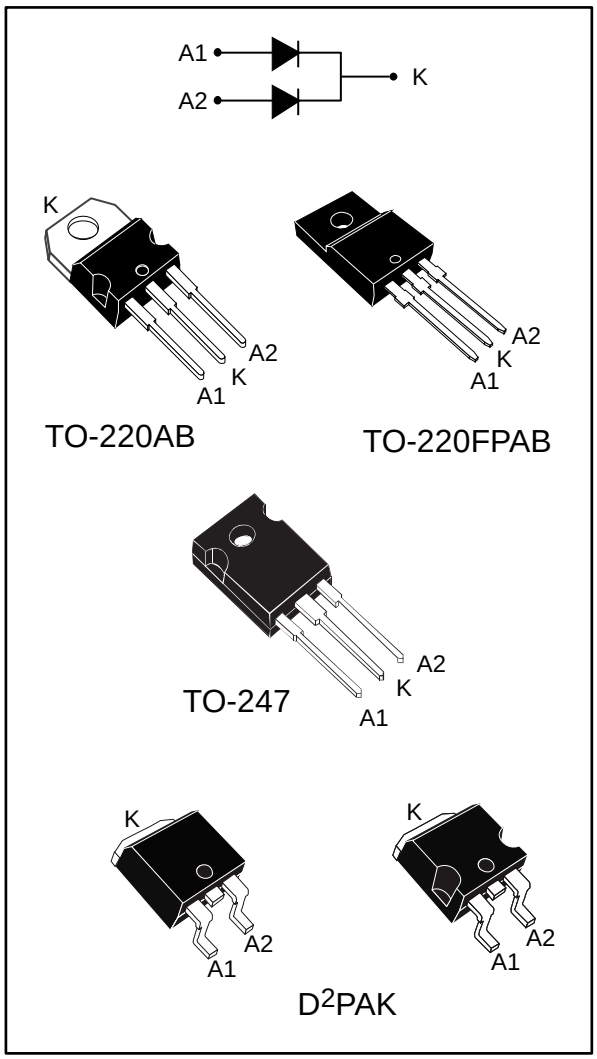
STPS30150C

High voltage power Schottky rectifier

Datasheet - production data



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 = 2000 V_{RMS} sine
- ECOPACK®2 compliant component for D²PAK on demand

Description

Dual center tap Schottky rectifier designed for high frequency switch mode power supply.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 x 15 A
V_{RRM}	150 V
T_j (max)	175 °C
V_F (typ)	0.69 V

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				150	V
$I_{F(RMS)}$	Forward rms current				30	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	TO-220FPAB	T_C = 120 °C	Per diode	15	A
			T_C = 90 °C	Per device	30	
		TO-220AB, D^2PAK, TO-247	T_C = 155 °C	Per diode	15	
			T_C = 150 °C	Per device	30	
I_{FSM}	Surge non repetitive forward current	tp = 10 ms sinusoidal			220	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C			750	W
T_{stg}	Storage temperature range				-65 to +175	°C
T_j	Maximum operating junction temperature (1)				+175	°C

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 parameter

Symbol	Parameter			Max. value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB, D^2PAK	Per diode	1.6	°C/W
		TO-220FPAB		4	
		TO-247		1.5	
		TO-220AB, D^2PAK	Total	0.85	
		TO-220FPAB		3.3	
		TO-247		0.8	
$R_{th(c)}$	Coupling	TO-220AB, D^2PAK, TO-247	-	0.1	°C/W
		TO-220FPAB		2.6	

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	$V_R = V_{RRM}$	-		6.5	µA
		T_j = 125 °C		-		8.0	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 15 A	-		0.92	V
		T_j = 125 °C		-	0.69	0.75	
		T_j = 25 °C	I_F = 30 A	-		1	
		T_j = 125 °C		-	0.8	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:

$P = 0.64 \times I_{F(AV)} + 0.0073\ I_F^2{}_{(RMS)}$

1.1 Characteristics (curves)

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

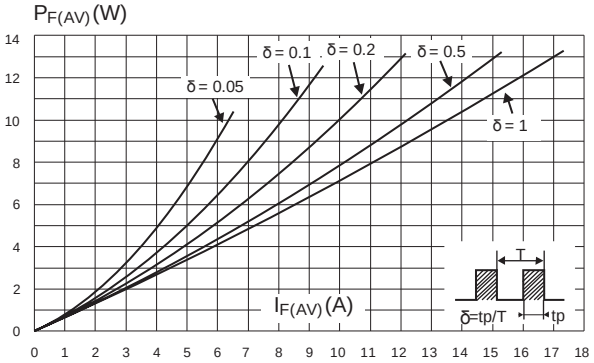


Figure 2: Average forward current versus ambient temperature (δ = 0.5, per diode)

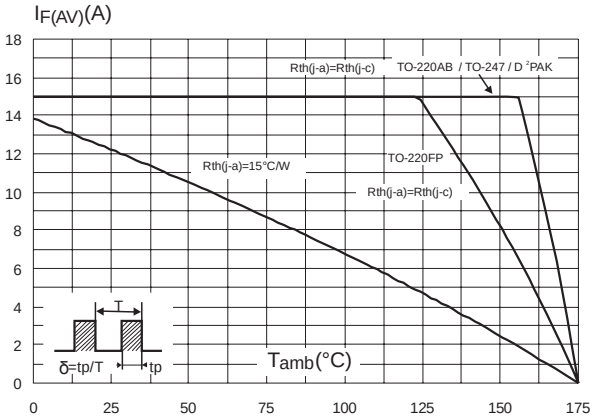


Figure 3: Normalized avalanche power derating versus pulse duration (Tj = 125 °C)

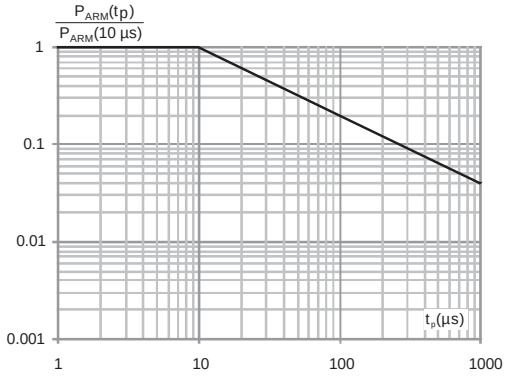


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D²PAK, TO-247)

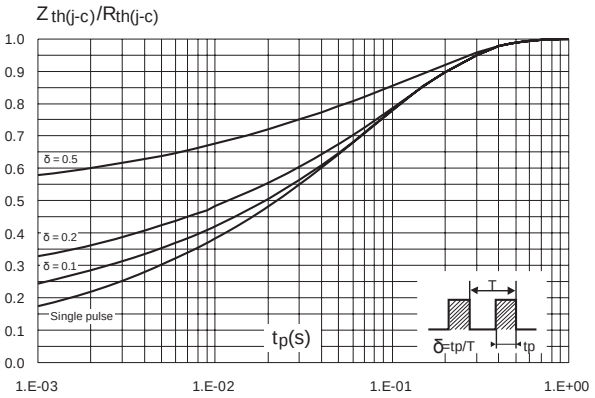


Figure 5: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)

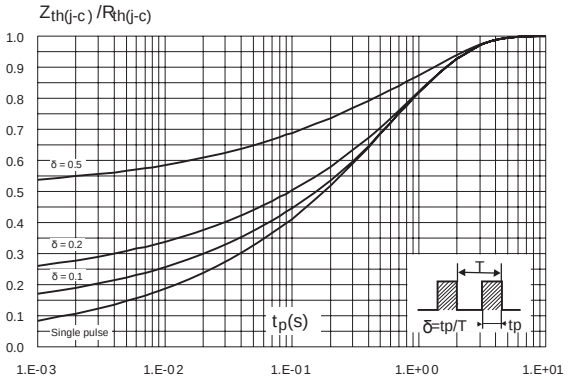


Figure 6: Reverse leakage current versus reverse voltage applied (typical values, per diode)