

Low drop power Schottky rectifier

Features

- low forward voltage drop meaning very small conduction losses
- low switching losses allowing high frequency operation
- low thermal resistance
- avalanche rated
- insulated package TO-220FPAB:
 - insulating voltage = 2000 V DC
 - capacitance = 45 pF
- avalanche capability specified

Description

Dual center tap Schottky rectifier suited for switched mode power supplies and high frequency DC to DC converters.

Packaged in TO-247, TO-220AB, TO-220FPAB, D²PAK and I²PAK this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

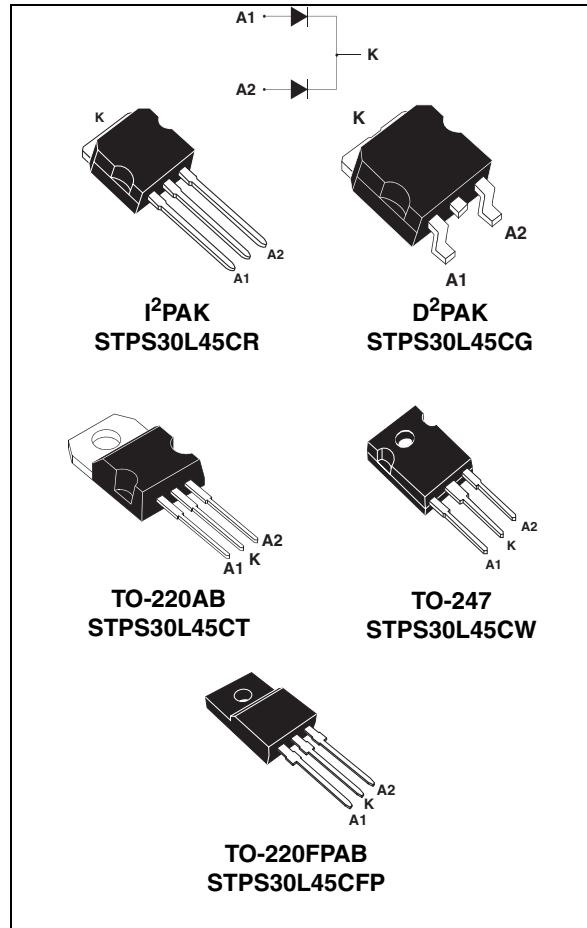


Table 1. Device summary

I _{F(AV)}	2 x 15 A
V _{RRM}	45 V
T _j (max)	150 °C
V _{F(max)}	0.5 V

1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			45	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current	TO-220FPAB	$T_c = 110^\circ\text{C}, \delta = 0.5$	Per diode Per device	A
		TO-220AB, TO-247, $I^2\text{PAK}$, $D_2\text{PAK}$	$T_c = 135^\circ\text{C}, \delta = 0.5$		
I_{FSM}	Surge non repetitive forward current			220	A
I_{RRM}	Repetitive peak reverse current			1	A
I_{RSM}	Non repetitive peak reverse current			3	A
P_{ARM}	Repetitive peak avalanche power			6000	W
T_{stg}	Storage temperature range			-65 to + 150	$^\circ\text{C}$
T_j	Maximum operating junction temperature ⁽¹⁾			150	$^\circ\text{C}$
dV/dt	Critical rate of rise of reverse voltage			10000	V/ μs

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

Table 3. Thermal resistances

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220FPAB	Per diode	4	$^\circ\text{C/W}$
			Total	3.2	
	TO-220AB, TO-247, $I^2\text{PAK}$, $D^2\text{PAK}$	Per diode	1.60		
		Total	0.85		
$R_{th(c)}$	Coupling	TO-220FPAB		2.5	$^\circ\text{C/W}$
		TO-220AB, TO-247, $I^2\text{PAK}$, $D^2\text{PAK}$		0.10	

When the diodes 1 and 2 are used simultaneously:

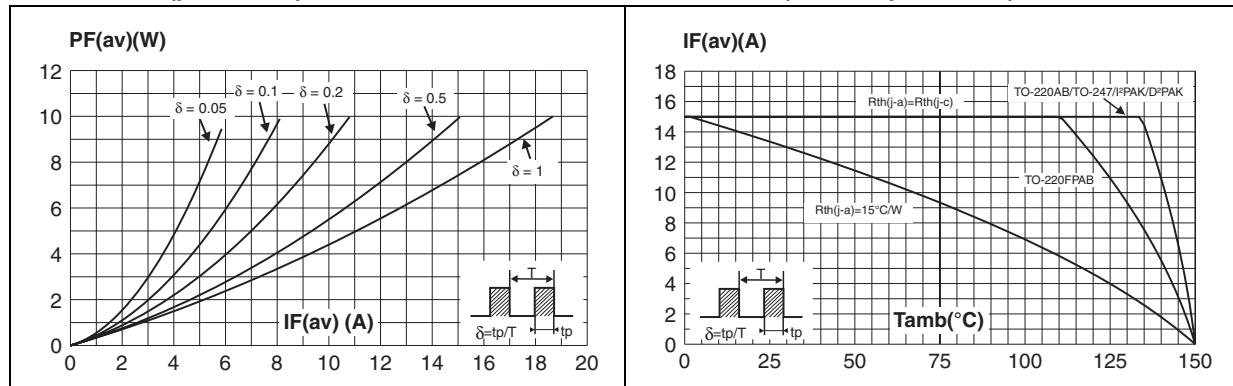
$$\Delta T_j(\text{diode 1}) = P(\text{diode 1}) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			0.4	mA
		$T_j = 125^\circ\text{C}$			100	200	mA
$V_F^{(1)}$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 15\text{ A}$			0.55	V
		$T_j = 125^\circ\text{C}$	$I_F = 15\text{ A}$		0.42	0.50	
		$T_j = 25^\circ\text{C}$	$I_F = 30\text{ A}$			0.74	
		$T_j = 125^\circ\text{C}$	$I_F = 30\text{ A}$		0.59	0.67	

1. Pulse test: $t_p = 380\ \mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation: $P = 0.330 \times I_{F(\text{AV})} + 0.011 I_{F(\text{RMS})}^2$

Figure 1. Average forward power dissipation versus average forward current (per diode)**Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$, per diode)****Figure 3. Normalized avalanche power derating versus pulse duration****Figure 4. Normalized avalanche power derating versus junction temperature**