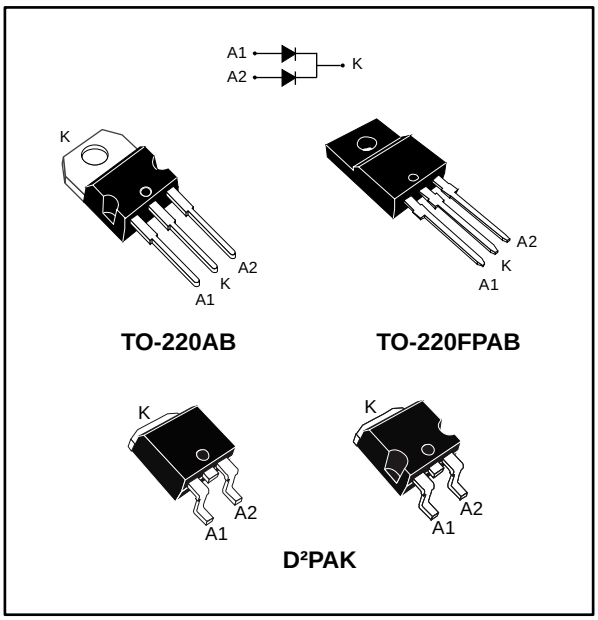
STPS20L45C

Low drop power Schottky rectifier

Datasheet - production data



Description

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

These devices are intended for use in low voltage, high frequency inverters, free-wheeling and polarity protection applications.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 x 10 A
V_{RRM}	45 V
V_F (typ.)	0.44 V
T_j (max.)	150 °C

Features

- Low forward voltage drop meaning very small conduction losses
- Low switching losses allowing high frequency operation
- Insulated package: TO-220FPAB
  - Insulating voltage = 2000 V_{RMS} sine
- Avalanche capability specified
- ECOPACK®2 compliant component for D²PAK on demand

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				45	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 = 135 °C	Per diode	10	A
			T_C = 130 °C	Per device	20	
		TO-220FPAB	T_C = 115 °C	Per diode	10	
			T_C = 100 °C	Per device	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	285	W
T_{stg}	Storage temperature range				-65 to +150	°C
T_j	Maximum operating junction temperature [(1)]				150	

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-220FPAB	Per diode	4.5	°C/W
			Total	3.5	
		TO-220AB D²PAK	Per diode	2.2	
			Total	1.3	
$R_{th(c)}$	Coupling	TO-220FPAB		2.5	
		TO-220AB D²PAK		0.3	

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	$V_R = V_{RRM}$	-		0.2	mA
		T_j = 125 °C		-	65	130	
V_F[(1)]	Forward voltage drop	T_j = 25 °C	I_F = 10 A	-		0.55	V
		T_j = 125 °C			0.44	0.5	
		T_j = 25 °C	I_F = 20 A	-		0.73	
		T_j = 125 °C		-	0.62	0.72	

Notes:

(1)Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses, use the following equation:

$P = 0.28 \times I_{F(AV)} + 0.022 \times I_{F}^{2}{}_{(RMS)}$

1.1 Characteristics (curves)

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

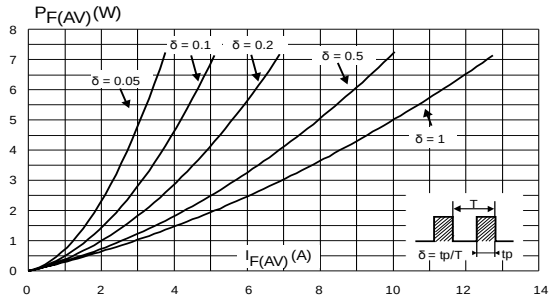


Figure 2: Average forward current versus ambient temperature (δ = 0.5, per diode)

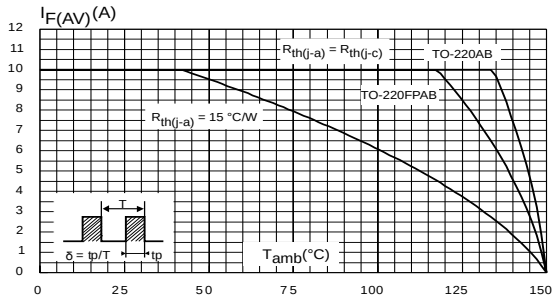


Figure 3: Normalized avalanche power deratings versus pulse duration (T_j = 125 °C)

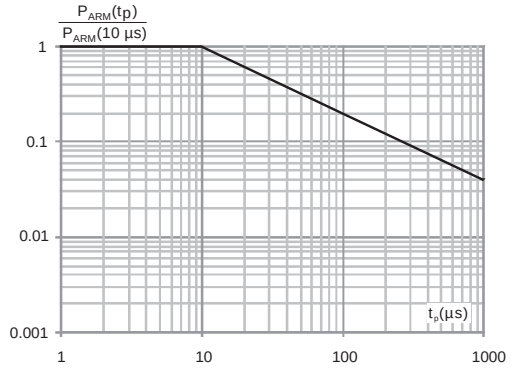


Figure 4: Reverse leakage current versus reverse voltage applied (typical values, per diode)

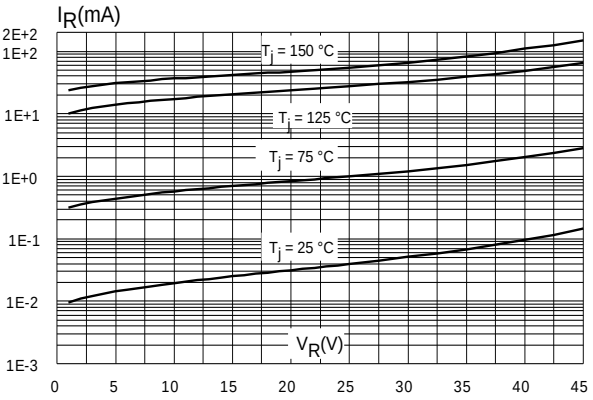


Figure 5: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D²PAK)

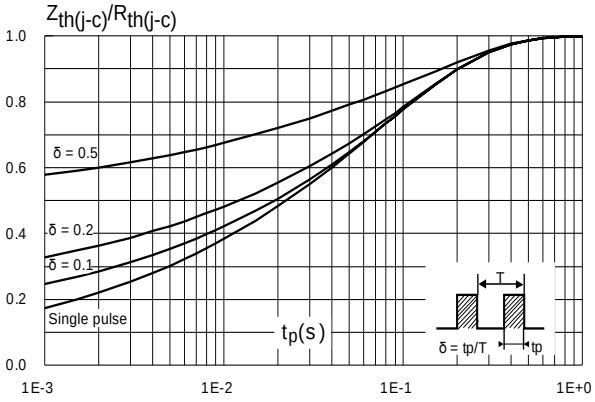


Figure 6: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)