



# STPS20L40C

Low drop power Schottky rectifier

## Main product characteristics

I <sub>F(AV)</sub>	2 x 10 A
V <sub>RRM</sub>	40 V
T <sub>j</sub> (max)	150° C
V <sub>F(max)</sub>	0.5 V

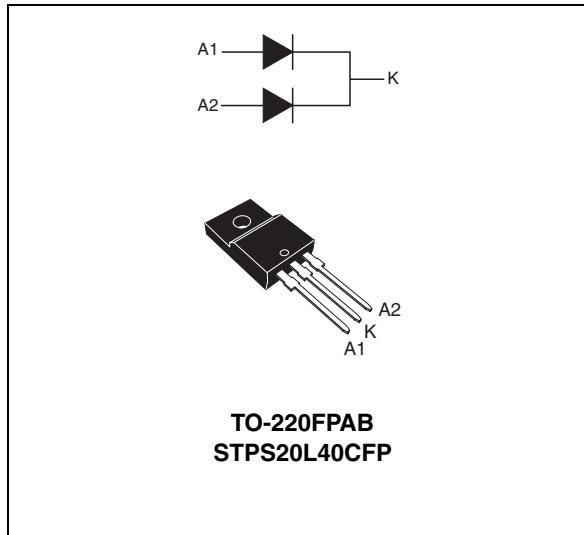
## Features and benefits

- Low forward voltage drop meaning very small conduction losses
- Low dynamic losses as a result of the schottky barrier
- Insulated package: TO-220FPAB insulating voltage = 200 V DC capacitance = 12 pF
- Avalanche capability specified

## 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.



# 1 Characteristics

**Table 1. Absolute Ratings (limiting values)**

Symbol	Parameter			Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage			40	V
$I_{F(RMS)}$	RMS forward voltage			30	A
$I_{F(AV)}$	Average forward current	$T_c = 115^\circ C$ $\delta = 0.5$	Per diode Per device	10 20	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10 \text{ ms}$ Sinusoidal		180	A
$I_{RRM}$	Peak repetitive reverse current	$t_p = 2 \mu\text{s}$ square F = 1 kHz		1	A
$I_{RSM}$	Non repetitive peak reverse current	$t_p = 100 \mu\text{s}$ square		2	A
$P_{ARM}$	Repetitive peak avalanche power	$t_p = 1 \mu\text{s}$ $T_j = 25^\circ C$		4000	W
$T_{stg}$	Storage temperature range			-65 to + 150	°C
$T_j$	Maximum operating junction temperature <sup>(1)</sup>			150	°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 2. Thermal resistances**

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode Total Coupling	4.5 3.5 2.5	°C/W

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 3. Static electrical characteristics (per diode)**

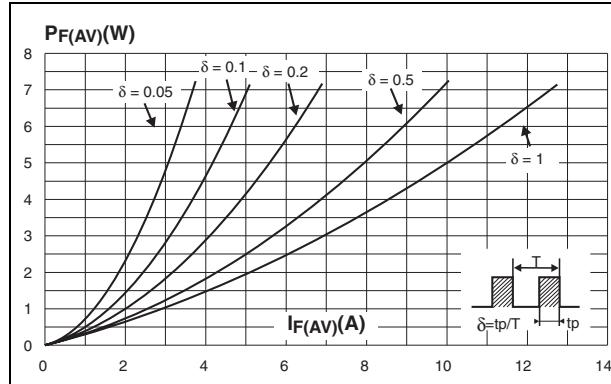
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ C$	$V_R = V_{RRM}$			0.7	mA
		$T_j = 100^\circ C$			15	35	mA
$V_F^{(1)}$	Forward voltage drop	$T_j = 25^\circ C$	$I_F = 10 A$			0.55	V
		$T_j = 125^\circ C$	$I_F = 10 A$		0.44	0.5	
		$T_j = 25^\circ C$	$I_F = 20 A$			0.73	
		$T_j = 125^\circ C$	$I_F = 20 A$		0.62	0.72	

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

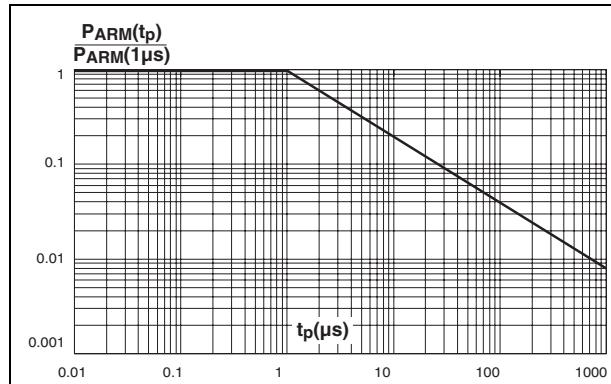
To evaluate the conduction losses use the following equation:

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

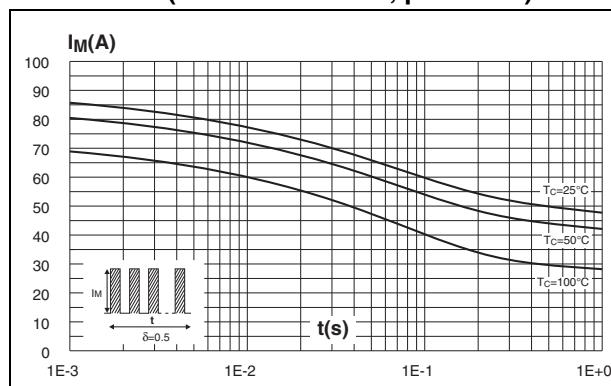
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



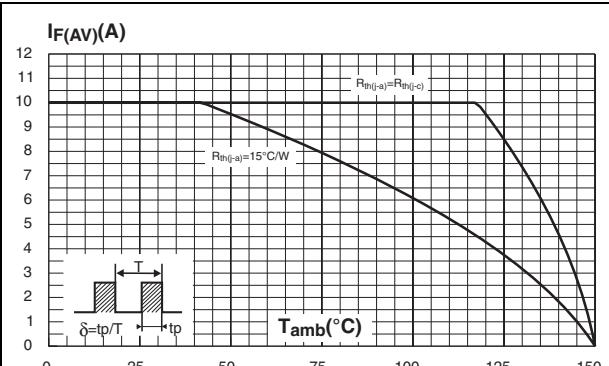
**Figure 3. Normalized avalanche power derating versus pulse duration**



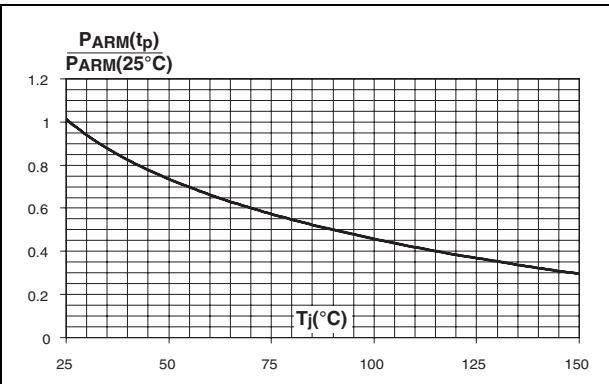
**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)**



**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



**Figure 4. Normalized avalanche power derating versus junction temperature**



**Figure 6. Relative variation of thermal impedance junction to case versus pulse duration**

