

Features

- Low forward voltage drop
- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- -40°C minimum operating T_j
- Insulated package: TO-220FPAB
 - Insulating voltage: 2000 V DC
 - Capacitance: 45 pF
- ECOPACK®2 compliant component

Description

This device is a dual center tap 200 V Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in TO-220AB, TO-220AB narrow-leads, TO-220FPAB and D²PAK, it is especially intended for use as secondary rectification in SMPS and is also ideal for all LED lighting applications.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 10 A
V_{RRM}	200 V
$T_j(\text{max})$	175 °C
$V_F(\text{typ})$	0.64 V

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode, unless otherwise stated)

Symbol	Parameter				Value	Unit			
V_{RRM}	Repetitive peak reverse voltage				200	V			
$I_{F(RMS)}$	Forward rms current				30	A			
$I_{F(AV)}$	Average forward current, $\delta = 0.5$, square wave	TO-220AB, D ² PAK, TO 220AB narrow leads	$T_c = 160$ °C	Per device	20	A			
		TO-220FPAB	$T_c = 105$ °C	Per device	20	A			
I_{FSM}	Surge non repetitive forward current	$t_p = 10$ ms sinusoidal, $T_{amb} = 25$ °C			180	A			
T_{stg}	Storage temperature range				-65 to +175	°C			
T_j	Operating junction temperature range ⁽¹⁾				-40 to +175	°C			

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 parameters

Symbol	Parameter				Value	Unit
$R_{th(j-c)}$	Junction to case	D ² PAK, TO-220AB, TO-220AB narrow leads	Per diode	1.30	°C/W	
			Per device	0.75		
	TO-220FPAB		Per diode	5.00		
			Per device	4.15		
$R_{th(c)}$	Coupling	D ² PAK, TO-220AB, TO-220AB narrow leads	0.20	°C/W		
		TO-220FPAB	3.30			

General formula to calculate T_j (diode1) and T_j (diode2):

$$T_j(\text{diode1}) = P(\text{diode1}) \times R_{th(j-c)}(\text{per diode}) + P(\text{diode2}) \times R_{th(c)} + T_{case}$$

$$T_j(\text{diode2}) = P(\text{diode2}) \times R_{th(j-c)}(\text{per diode}) + P(\text{diode1}) \times R_{th(c)} + T_{case}$$

Table 4. Static electrical characteristics (per diode)

Symbol	Test conditions			Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			15	μA
		$T_j = 125^\circ\text{C}$			1.3	7	mA
		$T_j = 125^\circ\text{C}$	$V_R = 150\text{ V}$			4.5	
$V_F^{(1)}$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 10\text{ A}$			0.86	V
		$T_j = 125^\circ\text{C}$			0.64	0.70	V

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

To evaluate the maximum conduction losses use the following equation:

$$P = 0.6 \times I_{F(\text{AV})} + 0.01 I_F^2 (\text{RMS})$$

Note: *More information is available in the application notes:*

AN604 Calculation of conduction losses in a power rectifier

AN4021 Calculation of reverse losses in a power diode

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

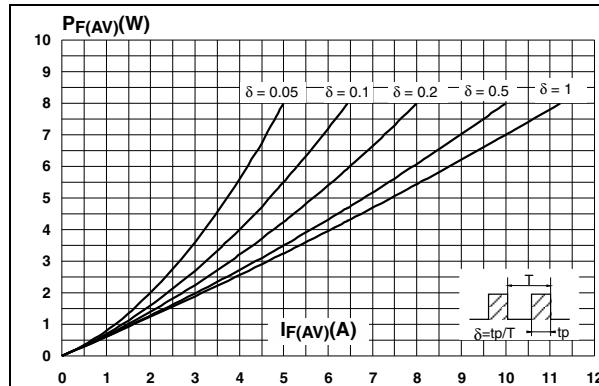


Figure 2. Forward voltage drop versus forward current (per diode)

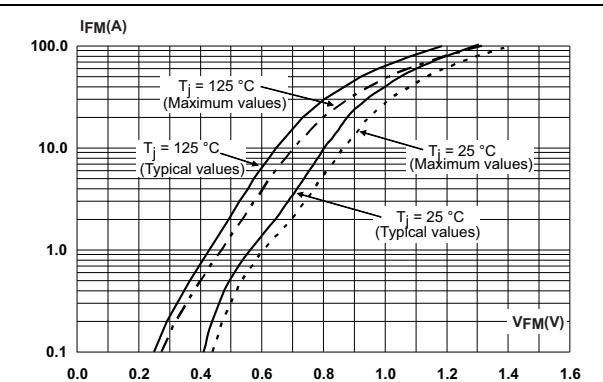


Figure 3. Reverse leakage current versus reverse voltage applied (typical values, per diode)

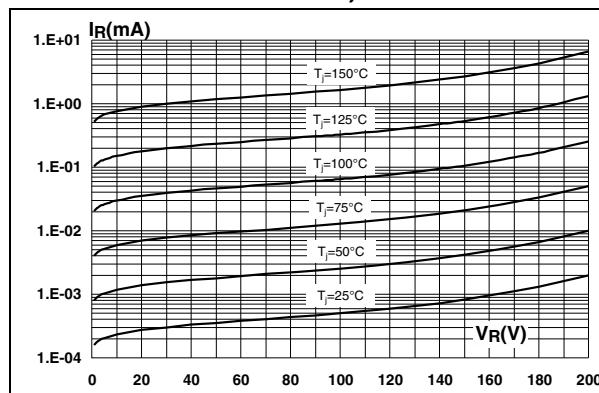


Figure 4. Junction capacitance versus reverse voltage applied (typical values, per diode)

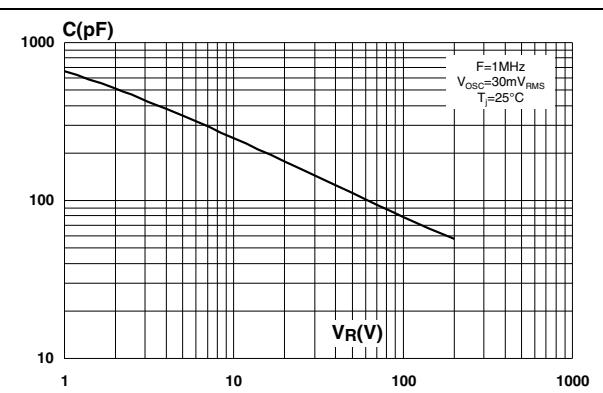


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration

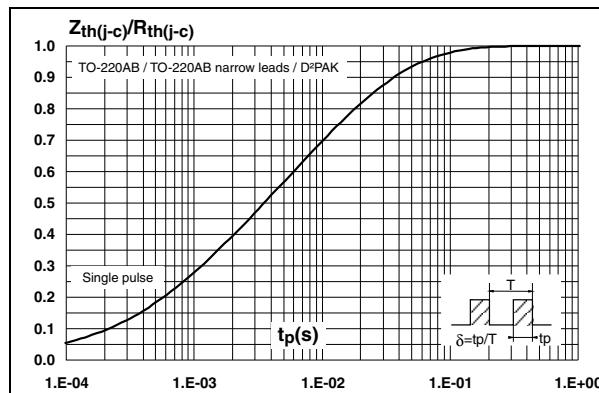
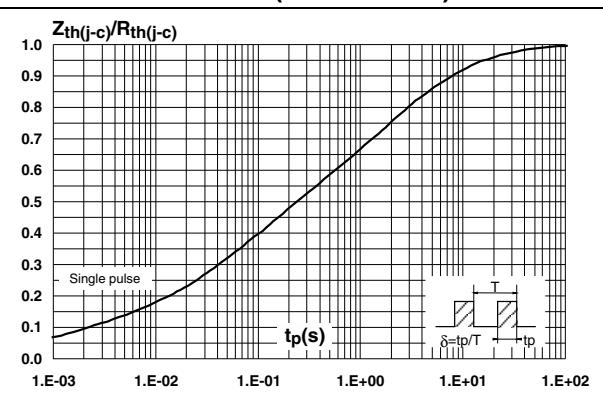


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)



3 Ordering information

Table 9. Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS20200CT	STPS20200CT	TO-220AB	2.20 g	50	Tube
STPS20200CTN	STPS20200CTN	TO-220AB narrow leads	1.90 g	50	Tube
STPS20200CFP	STPS20200CFP	TO-220FPAB	2.0 g	50	Tube
STPS20200CG-TR	STPS20200CG	D ² PAK	1.48g	1000	Tape and reel