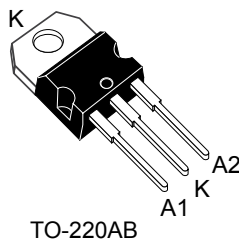
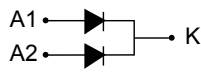


## 120 V power Schottky rectifier



### Features

- High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Avalanche capability
- ECOPACK<sup>®</sup>2 compliant

### Applications

- Switching diode
- SMPS
- DC/DC converter
- Telecom power
- LED lighting
- Notebook adapter

### Description

This dual diode common cathode Schottky rectifier is suited for high frequency switched mode power supplies.

Packaged in TO-220AB, the **STPS10120C** is optimized for use to enhance the reliability of the application.

Product status	
STPS10120C	
Product summary	
$I_{F(AV)}$	2 x 5 A
$V_{RRM}$	120 V
$T_{j(max.)}$	175 °C
$V_{F(typ.)}$	0.64 V

# 1 Characteristics

**Table 1. Absolute ratings (limiting values per diode at 25 °C, unless otherwise specified)**

Symbol	Parameter	Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage	120	V	
I <sub>F(RMS)</sub>	Forward rms current	30	A	
I <sub>F(AV)</sub>	Average forward current, $\delta = 0.5$ , square wave	T <sub>c</sub> = 160 °C Per diode	5	A
		T <sub>c</sub> = 155 °C Per device	10	
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal	120	A
P <sub>ARM</sub>	Repetitive peak avalanche power	t <sub>p</sub> = 10 $\mu$ s, T <sub>j</sub> = 125 °C	215	W
T <sub>stg</sub>	Storage temperature range	-65 to +175	°C	
T <sub>j</sub>	Maximum operating junction temperature <sup>(1)</sup>	+175	°C	

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

**Table 2. Thermal resistance parameters**

Symbol	Parameter	Max. value	Unit	
R <sub>th(j-c)</sub>	Junction to case	Per diode	3.8	°C/W
		Total	2.3	
R <sub>th(c)</sub>	Coupling	0.7	°C/W	

When the diodes 1 and 2 are used simultaneously:  $\Delta T_j(\text{diode1}) = P_{(\text{diode1})} \times R_{th(j-c)}$  (per diode) +  $P_{(\text{diode2})} \times R_{th(c)}$

For more information, please refer to the following application note :

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

**Table 3. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-		6	$\mu$ A
		T <sub>j</sub> = 125 °C		-	1	3	mA
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 5 A	-		0.85	V
		T <sub>j</sub> = 125 °C		-	0.64	0.70	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 10 A	-		0.96	
		T <sub>j</sub> = 125 °C		-	0.73	0.80	

1. Pulse test: t<sub>p</sub> = 5 ms,  $\delta < 2\%$

2. Pulse test: t<sub>p</sub> = 380  $\mu$ s,  $\delta < 2\%$

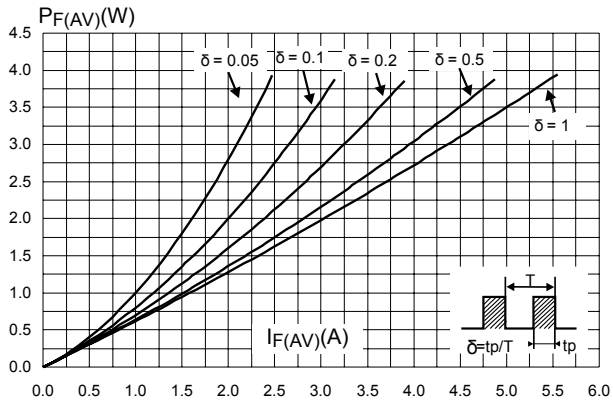
To evaluate the conduction losses, use the following equation:  $P = 0.60 \times I_{F(AV)} + 0.02 \times I_F^2$  (RMS)

For more information, please refer to the following application notes related to the power losses :

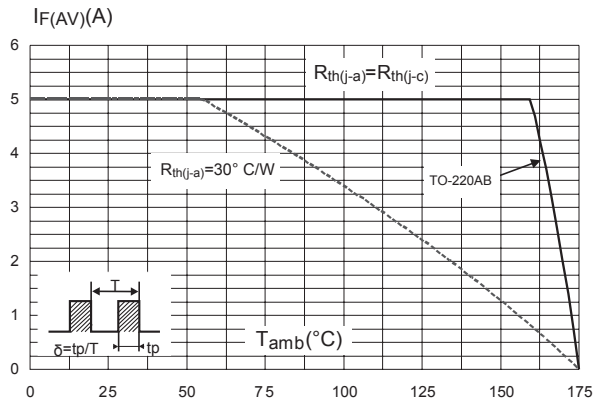
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

### 1.1 Characteristics (curves)

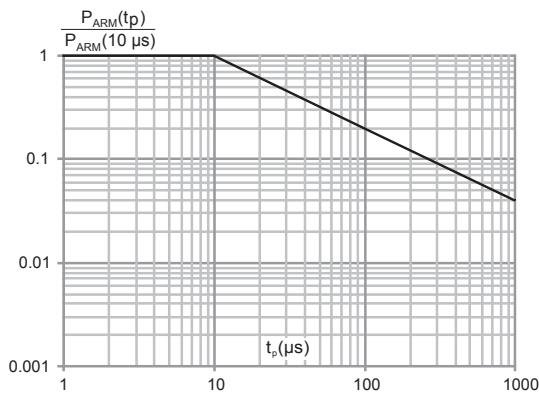
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



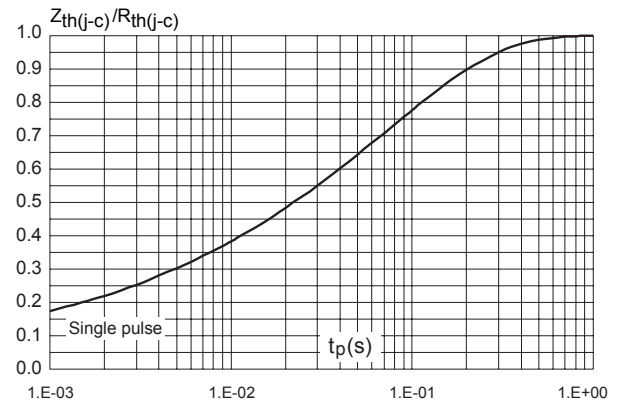
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



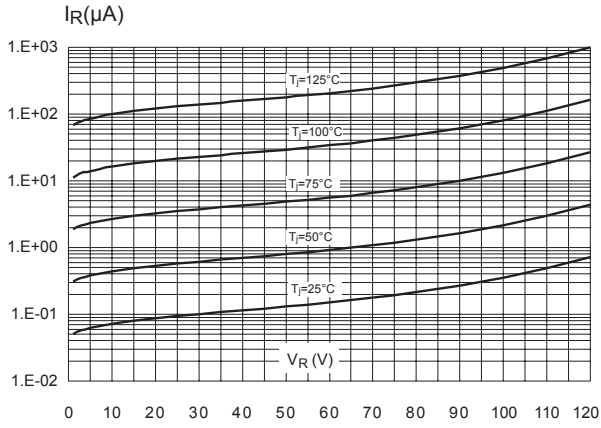
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125^{\circ}C$ )**



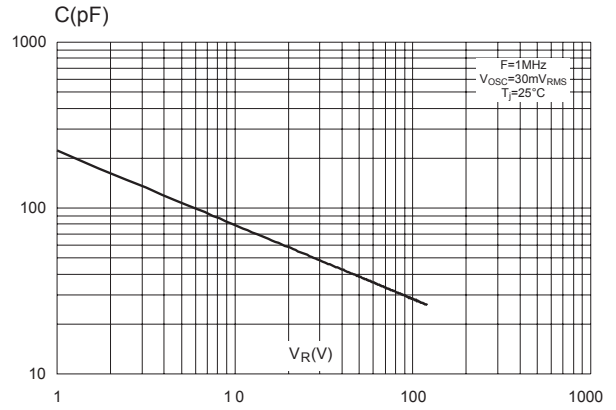
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



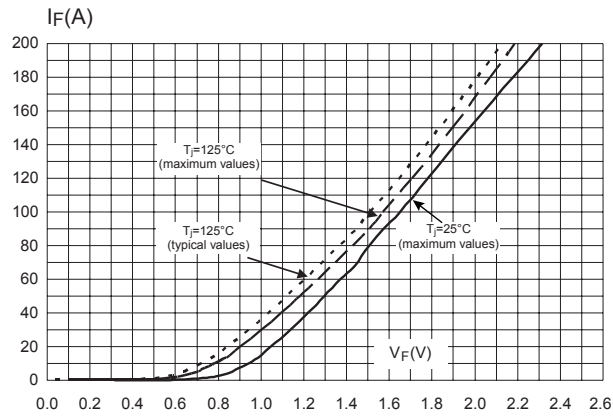
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)**



**Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)**



**Figure 7. Forward voltage drop versus forward current (per diode)**



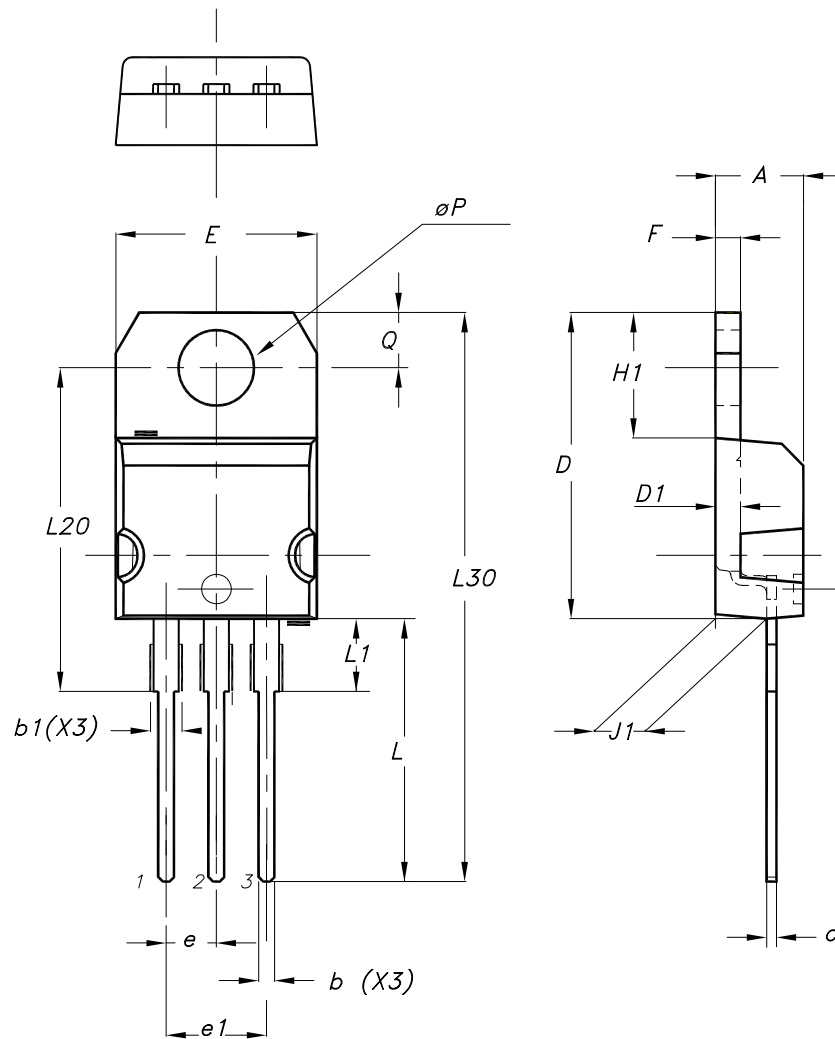
## 2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

### 2.1 Package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.70 N·m

**Figure 8. TO-220AB package outline**



**Table 4. TO-220AB package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
b	0.61	0.88	0.240	0.035
b1	1.14	1.55	0.045	0.061
c	0.48	0.70	0.019	0.028
D	15.25	15.75	0.600	0.620
D1	1.27 typ.		0.050 typ.	
E	10.00	10.40	0.394	0.409
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
F	1.23	1.32	0.048	0.052
H1	6.20	6.60	0.244	0.260
J1	2.40	2.72	0.094	0.107
L	13.00	14.00	0.512	0.551
L1	3.50	3.93	0.138	0.155
L20	16.40 typ.		0.646 typ.	
L30	28.90 typ.		1.138 typ.	
θP	3.75	3.85	0.148	0.152
Q	2.65	2.95	0.104	0.116

### 3 Ordering information

**Table 5. Order code**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS10120CT	STPS10120CT	TO-220AB	1.95 g	50	Tube

## Revision history

**Table 6. Document revision history**

Date	Revision	Changes
11-Jul-2007	1	First issue.
09-Aug-2018	2	Updated Table 1. Absolute ratings (limiting values per diode at 25 °C, unless otherwise specified) and Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125\text{ °C}$ ). Removed TO-220FP package.



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