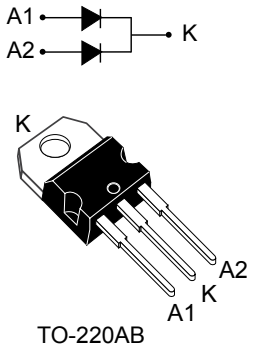
STPS10120C

Datasheet

120 V power Schottky rectifier



TO-220AB

Features

- High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Avalanche capability
- ECOPACK®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_{RRM}	Repetitive peak reverse voltage			120	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	T_c = 160 °C	Per diode	5	A
		T_c = 155 °C	Per device	10	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		120	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C		215	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature (1)			+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
$R_{th(j-c)}$	Junction to case	Per diode	3.8	°C/W
		Total	2.3	
$R_{th(c)}$	Coupling		0.7	°C/W

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

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_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		6	µA
		T_j = 125 °C		-	1	3	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 5 A	-		0.85	V
		T_j = 125 °C		-	0.64	0.70	
		T_j = 25 °C	I_F = 10 A	-		0.96	
		T_j = 125 °C		-	0.73	0.80	

1. *Pulse test: t_p = 5 ms, δ < 2%*
2. *Pulse test: t_p =380 µs, δ < 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)

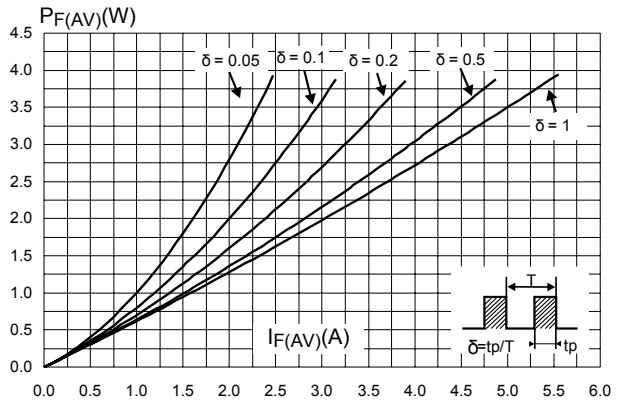


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

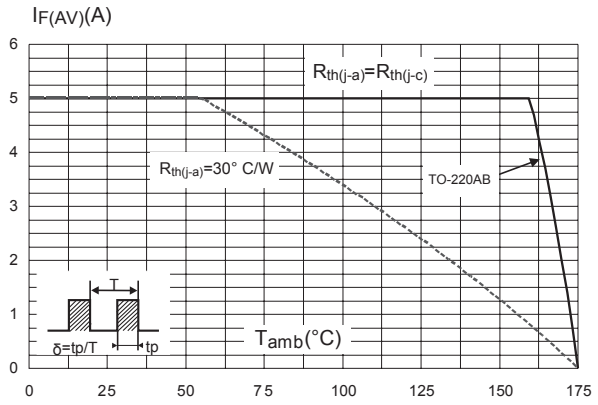


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

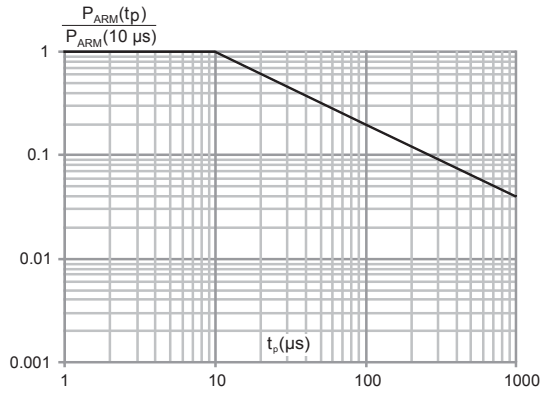


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

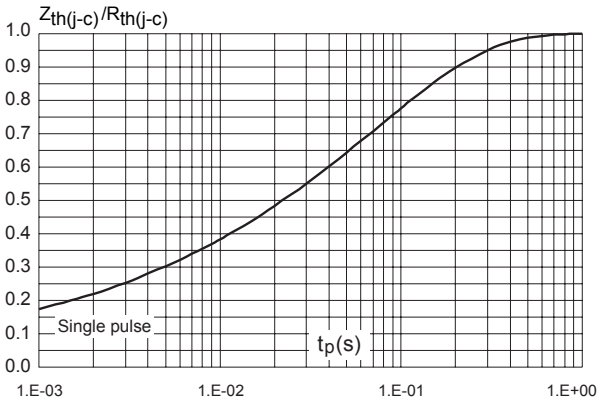


Figure 5. **Reverse leakage current versus reverse voltage applied (typical values, per diode)**

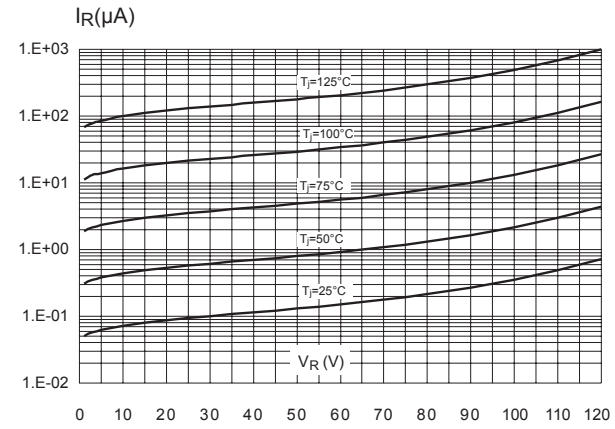


Figure 6. **Junction capacitance versus reverse voltage applied (typical values, per diode)**

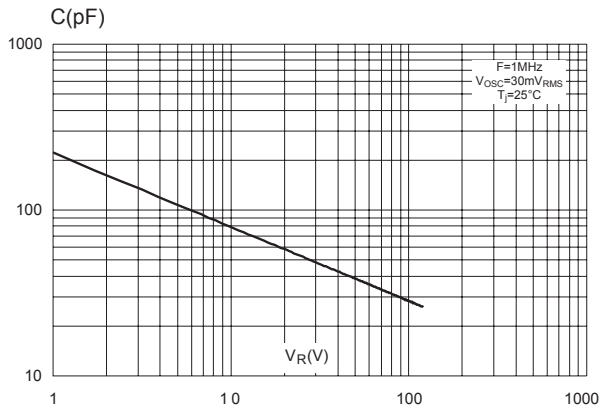
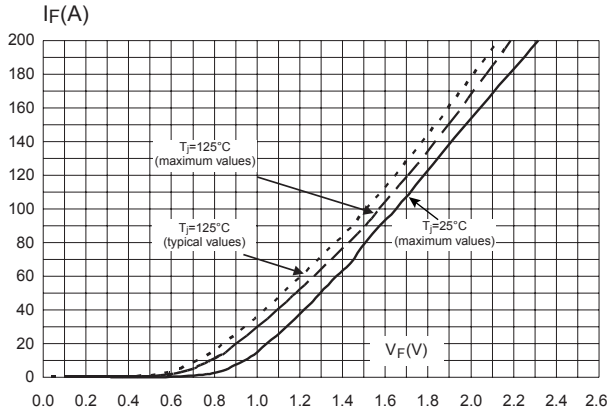


Figure 7. **Forward voltage drop versus forward current (per diode)**



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. 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

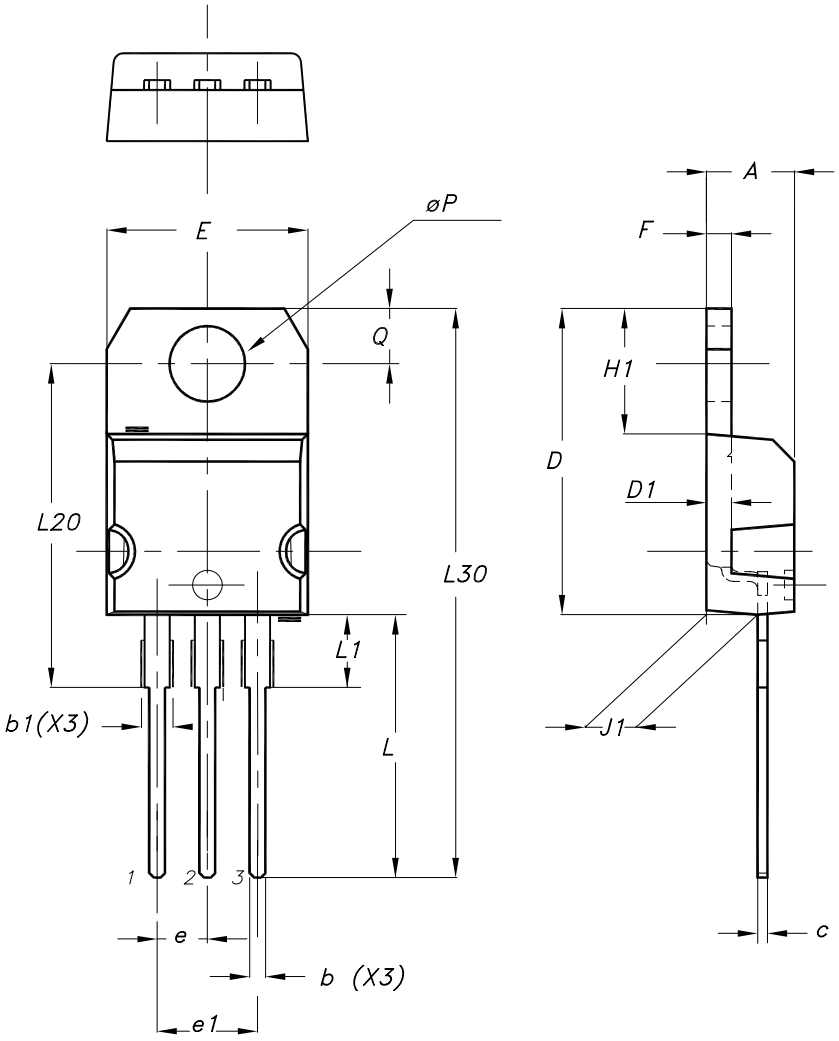


Table 4. TO-220AB package mechanical data

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 °C). Removed TO-220FP package.

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