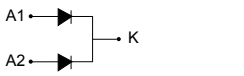
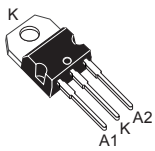
# STPS30120C

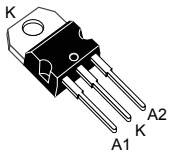
Datasheet

## 120 V power Schottky rectifier




**TO-220AB narrow leads**




**TO-220AB**

## Features

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

## Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting

## Description

Dual center tap Schottky rectifier suited for high frequency switch mode power supply.

Packaged in TO-220AB and TO-220AB narrow leads, the STPS30120C is optimized for use in notebook adaptors, LCD adaptors and desktop SMPS, providing in these applications a margin between the remaining voltages applied on the diode and the voltage capability of the diode.

| Product status link | |
|---|---|
| STPS30120C | |
| **Product summary** | |
| **Symbol** | **Value** |
| $I_{F(AV)}$ | 2 x 15 A |
| $V_{RRM}$ | 120 V |
| $T_j$ (max.) | 175 °C |
| $V_F$ (typ.) | 0.70 V |

# 1 Characteristics

**Table 1. Absolute ratings (limiting values at 25 °C, per diode, 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 | $T_c$ = 145 °C | Per diode | 15 | A |
| | | $T_c$ = 140 °C | Per device | 30 | |
| $I_{FSM}$ | 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 | 480 | 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 | 2.2 | °C/W |
| | | Total | 1.3 | |
| $R_{th(c)}$ | Coupling | | 0.3 | |

When the diodes 1 and 2 are used simultaneously:
$T_j$(diode 1) = P(diode 1) x $R_{th(j-c)}$(per diode) + P(diode 2) x $R_{th(c)}$

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

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$(1) | Reverse leakage current | $T_j$ = 25 °C | $V_R = V_{RRM}$ | - | | 15 | µA |
| | | $T_j$ = 125 °C | | - | 2.5 | 7.5 | mA |
| $V_F$(2) | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 5 A | - | | 0.74 | V |
| | | $T_j$ = 125 °C | | - | 0.57 | 0.61 | |
| | | $T_j$ = 25 °C | $I_F$ = 15 A | - | | 0.92 | |
| | | $T_j$ = 125 °C | | - | 0.70 | 0.74 | |
| | | $T_j$ = 25 °C | $I_F$ = 30 A | - | | 1.02 | |
| | | $T_j$ = 125 °C | | - | 0.83 | 0.89 | |

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:
$P = 0.59 \times I_{F(AV)} + 0.01 \times I_F{}^2{}_{(RMS)}$
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)**

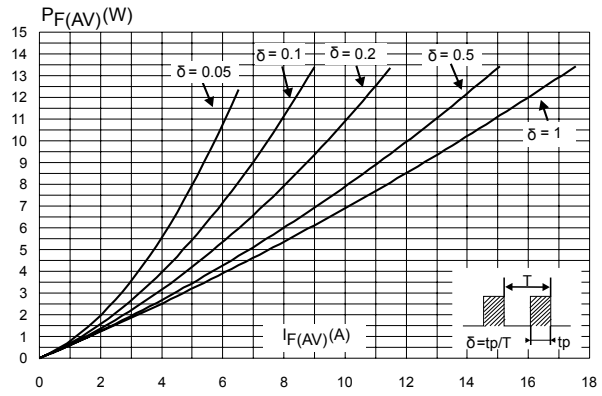



**Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)**

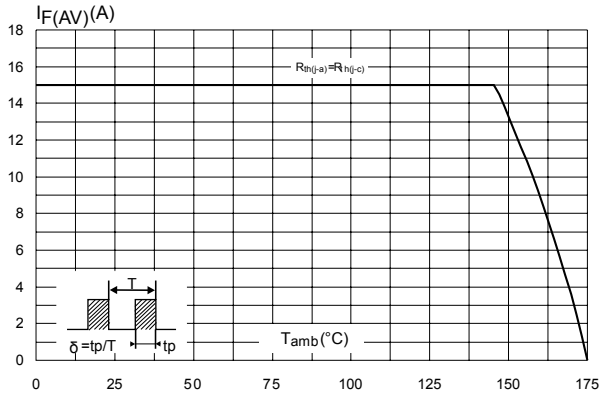



**Figure 3. Normalized avalanche power derating versus pulse duration ($T_j$ = 125 °C)**

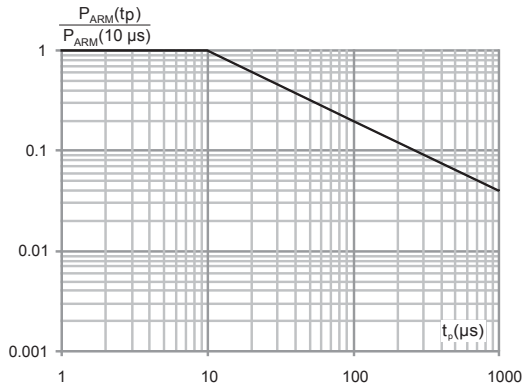



**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**

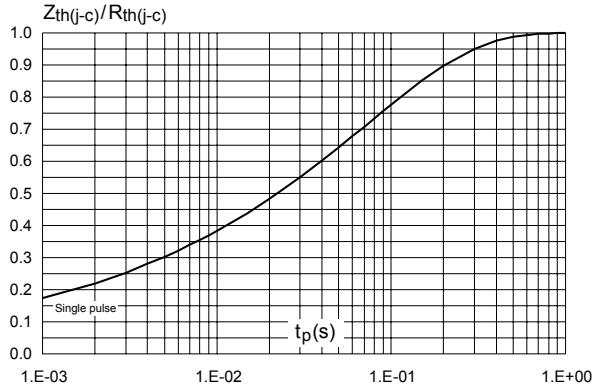


**Figure 5.** Reverse leakage current versus reverse voltage applied (typical values, per diode)

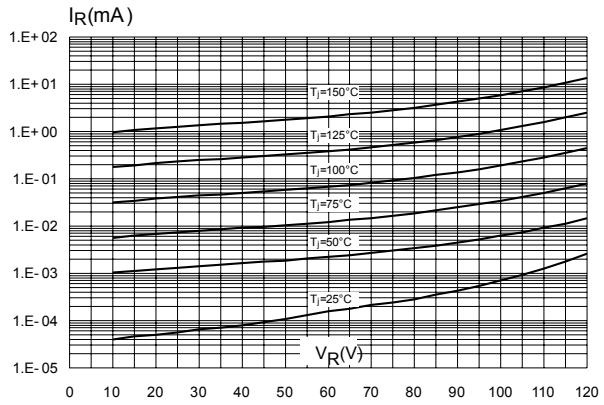



**Figure 6.** Junction capacitance versus reverse voltage applied (typical values, per diode)

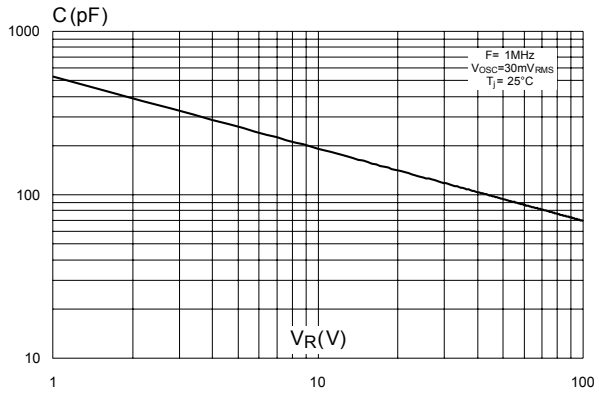
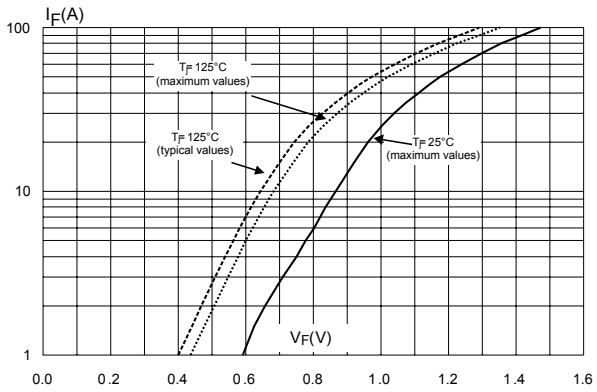



**Figure 7.** Forward voltage drop versus forward current (per diode)



# 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 TO-220AB 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**

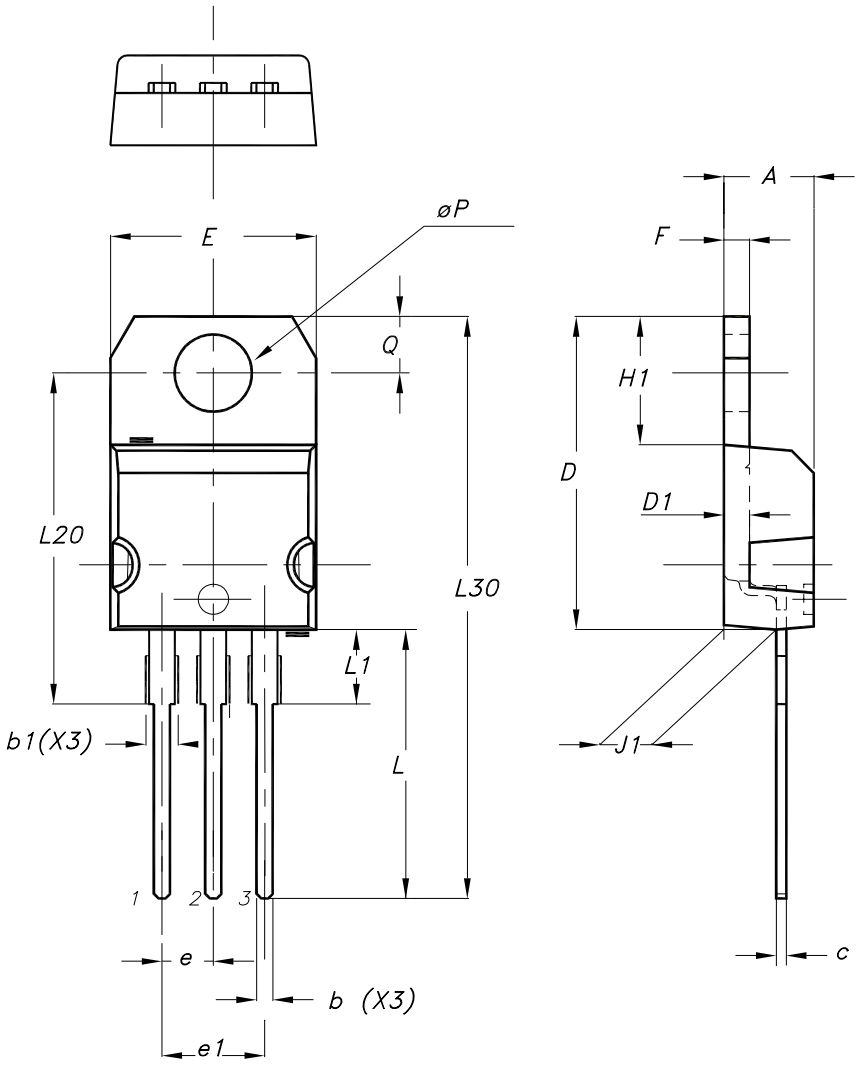


**Table 4. TO-220AB package mechanical data**

| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | 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 |

## 2.2 TO-220AB narrow leads package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.70 N·m

**Figure 9. TO-220AB narrow leads package outline**

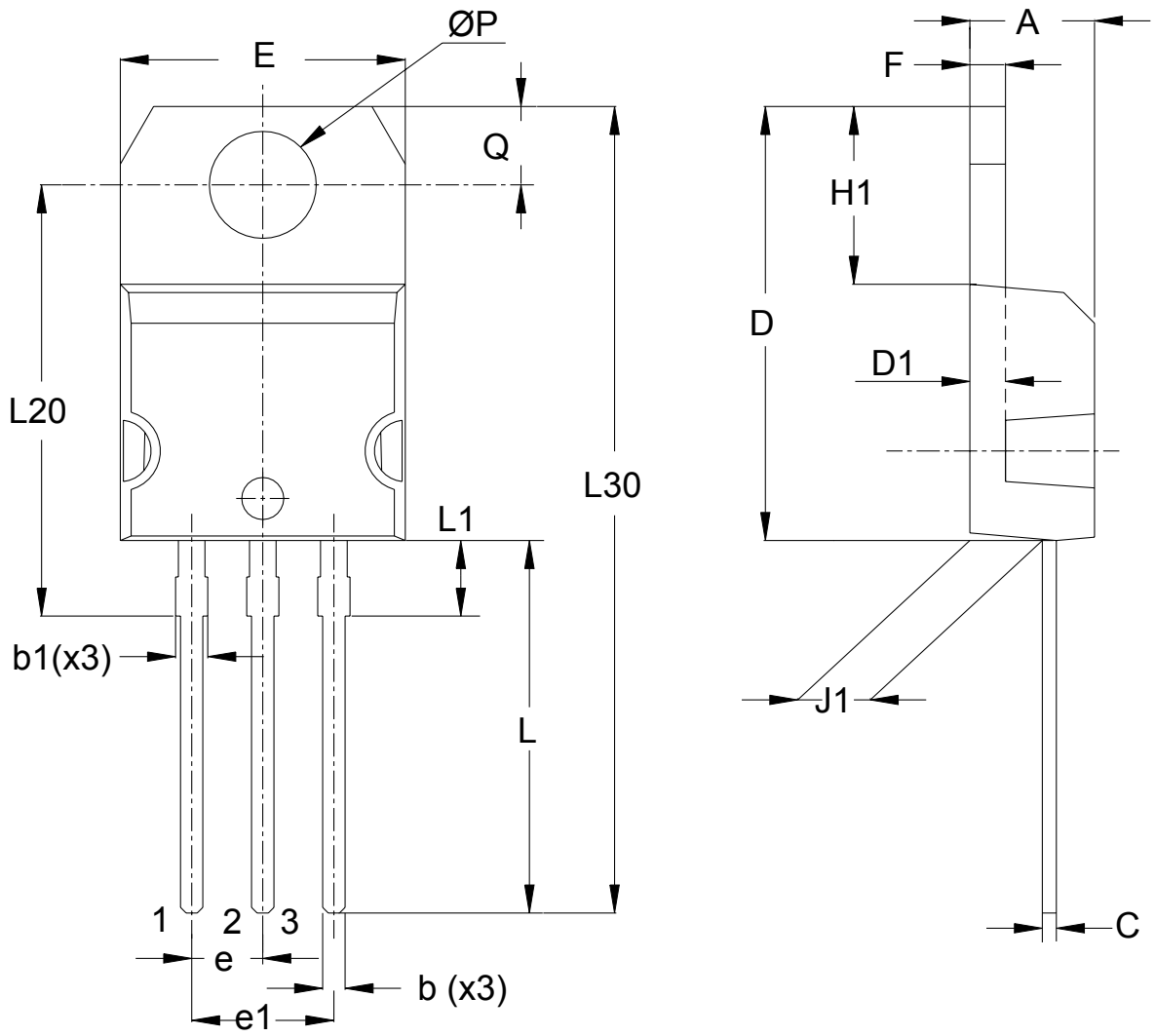



**Table 5. TO-220AB package mechanical data**

| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| b | 0.61 | 0.88 | 0.240 | 0.035 |
| b1 | 0.95 | 1.20 | 0.037 | 0.047 |

| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| 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 | 2.60 | 2.90 | 0.138 | 0.155 |
| L20 | 15.40 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 6. Ordering information**

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|---|---|---|---|---|---|
| STPS30120CT | STPS30120CT | TO-220AB | 1.95 g | 50 | Tube |
| STPS30120CTN | STPS30120CTN | TO-220AB narrow leads | 1.90 g | 50 | Tube |

## Revision history

Table 7. **Document revision history**

| Date | Version | Changes |
|---|---|---|
| 18-Feb-2005 | 1 | First issue |
| 23-Nov-2006 | 2 | Reformatted to current standards. Added I²PAK package. |
| 17-Feb-2010 | 3 | Updated Table 2. Added Figure 1 and Figure 10. |
| 13-Jan-2012 | 4 | Added TO-220AB narrow leads package. |
| 01-Jun-2018 | 5 | Removed I²PAK package.<br>Updated Table 1. Absolute ratings (limiting values at 25 °C, per diode, unless otherwise specified).<br>Removed figure 1, figure 5 and figure 10.<br>Updated Section 1.1 Characteristics (curves) and Table 4. TO-220AB package mechanical data.<br>Minor text changes to improve readability. |

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