



# STPS200170TV1

## High voltage power Schottky rectifier

### Main product characteristics

|             |           |
|-------------|-----------|
| $I_{F(AV)}$ | 2 x 100 A |
| $V_{RRM}$   | 170 V     |
| $T_j$       | 150 °C    |
| $V_F$ (typ) | 0.63 V    |

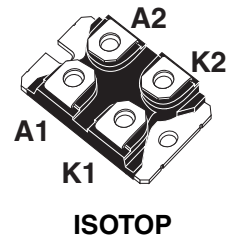
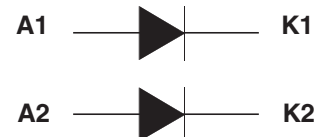
### Features and benefits

- Negligible switching losses
- Avalanche rated
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Insulated package
  - ISOTOP
    - Electrical insulation = 2500 V<sub>RMS</sub>
    - Capacitance = 45 pF

### Description

High voltage Schottky rectifier suited for high frequency switch mode power supply.

Packaged in ISOTOP, this device is intended for use in the secondary rectification of the applications.



### Order codes

| Part Number   | Marking       |
|---------------|---------------|
| STPS200170TV1 | STPS200170TV1 |

# 1 Characteristics

**Table 1. Absolute ratings - limiting values per diode at  $T_{amb} = 25\text{ °C}$ , unless otherwise specified**

| Symbol       | Parameter                                             |                                                     | Value        | Unit |
|--------------|-------------------------------------------------------|-----------------------------------------------------|--------------|------|
| $V_{RRM}$    | Repetitive peak reverse voltage                       |                                                     | 170          | V    |
| $I_{F(RMS)}$ | RMS forward current                                   |                                                     | 200          | A    |
| $I_{F(AV)}$  | Average forward current, $\delta = 0.5$               | $T_c = 105\text{ °C}$ per diode                     | 100          | A    |
| $I_{FSM}$    | Surge non repetitive forward current                  | $t_p = 10\text{ ms}$ Sinusoidal                     | 700          | A    |
| $P_{ARM}$    | Repetitive peak avalanche power                       | $t_p = 1\text{ }\mu\text{s}$ , $T_j = 25\text{ °C}$ | 100000       | W    |
| $T_{stg}$    | Storage temperature range                             |                                                     | -55 to + 150 | °C   |
| $T_j$        | Maximum operating junction temperature <sup>(1)</sup> |                                                     | 150          | °C   |

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

**Table 2. Thermal parameters**

| Symbol        | Parameter                   |           | Value | Unit |
|---------------|-----------------------------|-----------|-------|------|
| $R_{th(j-c)}$ | Junction to case            | Per diode | 0.52  | °C/W |
|               |                             | Total     | 0.31  |      |
| $R_{th(c)}$   | Coupling thermal resistance |           | 0.1   |      |

When the diodes are used simultaneously:

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

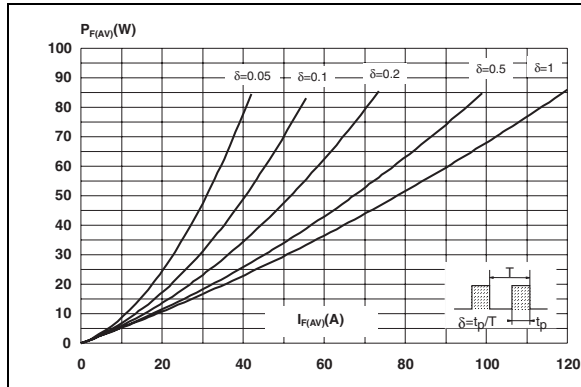
**Table 3. Static electrical characteristics**

| Symbol      | Parameter               | Test conditions       |                      | Min. | Typ  | Max.  | Unit          |
|-------------|-------------------------|-----------------------|----------------------|------|------|-------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ °C}$  | $V_R = V_{RRM}$      |      |      | 200   | $\mu\text{A}$ |
|             |                         | $T_j = 125\text{ °C}$ |                      |      | 30   | 100   | mA            |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25\text{ °C}$  | $I_F = 100\text{ A}$ |      |      | 0.83  | V             |
|             |                         | $T_j = 150\text{ °C}$ |                      |      | 0.63 | 0.68  |               |
|             |                         | $T_j = 25\text{ °C}$  | $I_F = 200\text{ A}$ |      |      | 0.975 |               |
|             |                         | $T_j = 150\text{ °C}$ |                      |      | 0.78 | 0.86  |               |

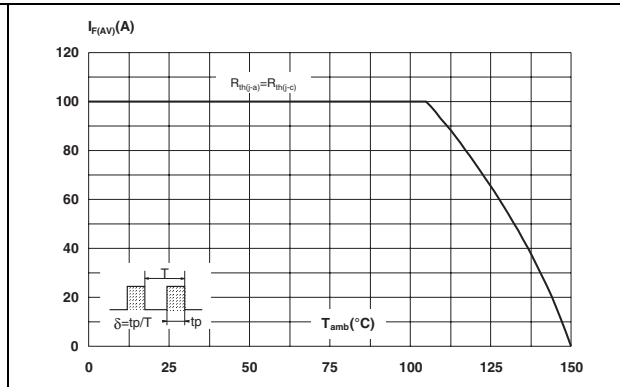
1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$   
 2. Pulse test:  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:  $P = 0.5 \times I_{F(AV)} + 0.0018 I_{F(RMS)}^2$

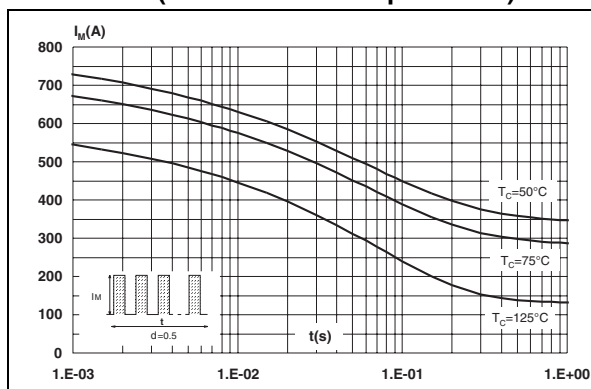
**Figure 1. Conduction losses versus average current (per diode)**



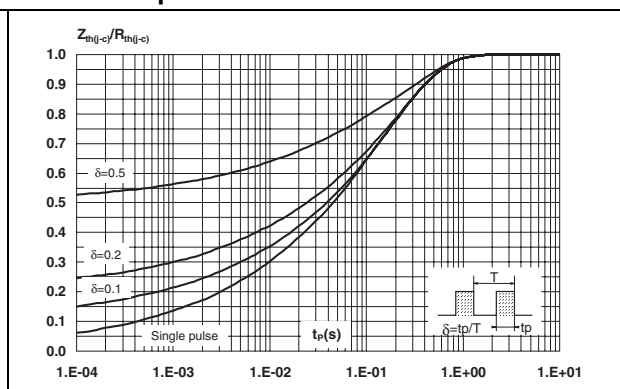
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



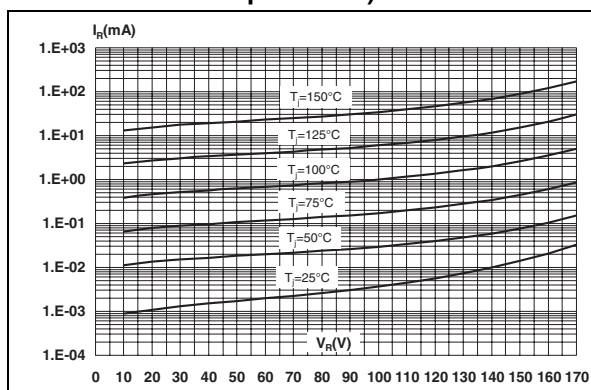
**Figure 3. Non-repetitive surge peak forward current versus overload duration (maximum values per diode)**



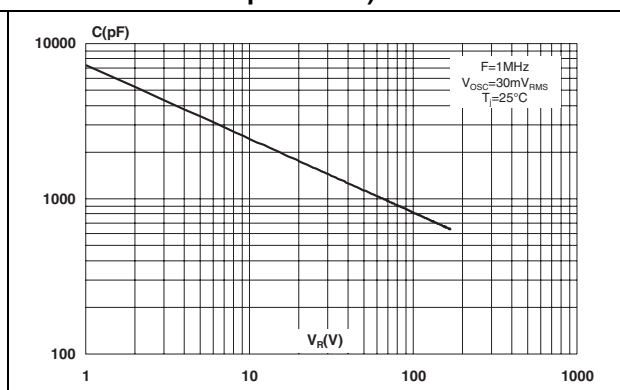
**Figure 4. Relative variation of thermal impedance (junction to case) versus pulse duration**



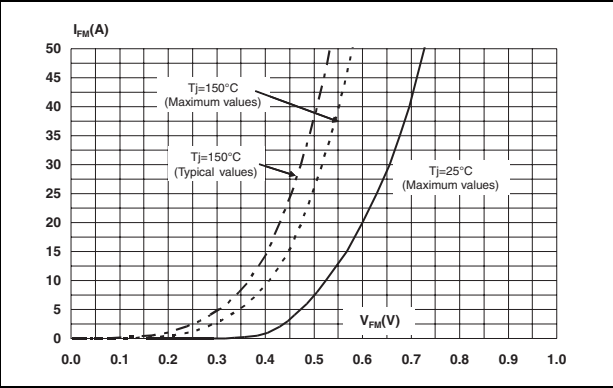
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values per diode)**



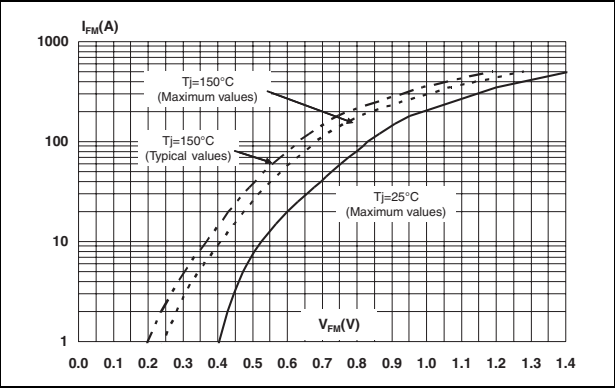
**Figure 6. Junction capacitances versus reverse voltage applied (typical values per diode)**



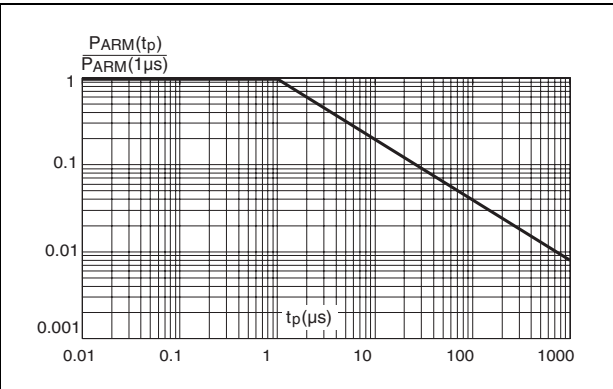
**Figure 7. Forward voltage drop versus forward current (per diode, low level)**



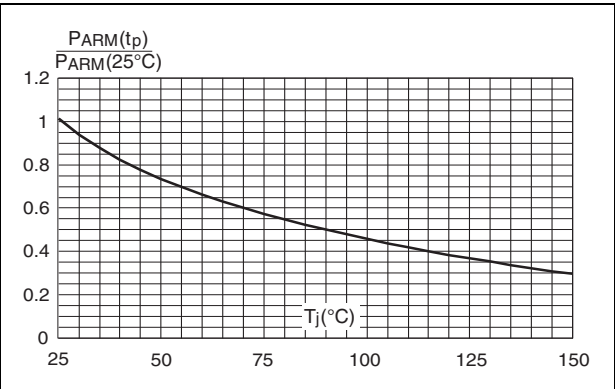
**Figure 8. Forward voltage drop versus forward current (per diode, high level)**



**Figure 9. Normalized avalanche power derating versus pulse duration**



**Figure 10. Normalized avalanche power derating versus junction temperature**



## 2 Package mechanical data

Epoxy meets UL94, V0

Cooling method: by conduction (C)

**Table 4. ISOTOP dimensions**

| REF. | DIMENSIONS  |       |            |       |
|------|-------------|-------|------------|-------|
|      | Millimeters |       | Inches     |       |
|      | Min.        | Max   | Min.       | Max.  |
| A    | 11.80       | 12.20 | 0.465      | 0.480 |
| A1   | 8.90        | 9.10  | 0.350      | 0.358 |
| B    | 7.8         | 8.20  | 0.307      | 0.323 |
| C    | 0.75        | 0.85  | 0.030      | 0.033 |
| C2   | 1.95        | 2.05  | 0.077      | 0.081 |
| D    | 37.80       | 38.20 | 1.488      | 1.504 |
| D1   | 31.50       | 31.70 | 1.240      | 1.248 |
| E    | 25.15       | 25.50 | 0.990      | 1.004 |
| E1   | 23.85       | 24.15 | 0.939      | 0.951 |
| E2   | 24.80 typ.  |       | 0.976 typ. |       |
| G    | 14.90       | 15.10 | 0.587      | 0.594 |
| G1   | 12.60       | 12.80 | 0.496      | 0.504 |
| G2   | 3.50        | 4.30  | 0.138      | 0.169 |
| F    | 4.10        | 4.30  | 0.161      | 0.169 |
| F1   | 4.60        | 5.00  | 0.181      | 0.197 |
| P    | 4.00        | 4.30  | 0.157      | 0.69  |
| P1   | 4.00        | 4.40  | 0.157      | 0.173 |
| S    | 30.10       | 30.30 | 1.185      | 1.193 |

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

### 3 Ordering information

| Part Number   | Marking       | Package | Weight                 | Base qty          | Delivery mode |
|---------------|---------------|---------|------------------------|-------------------|---------------|
| STPS200170TV1 | STPS200170TV1 | ISOTOP  | 27 g<br>without screws | 10<br>with screws | Tube          |

### 4 Revision history

| Date        | Revision | Description of Changes |
|-------------|----------|------------------------|
| 14-Nov-2005 | 1        | First issue.           |

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