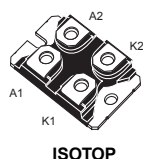
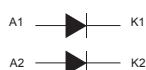


## Automotive high voltage power Schottky rectifier



### Features

- AEC-Q101 qualified
- Negligible switching losses
- Avalanche rated
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Insulated package ISOTOP:
  - Insulated voltage: 2500 V<sub>RMS</sub> sine
- ECOPACK®2 compliant component
- PPAP capable

### Description

This high voltage Schottky rectifier is suitable for high frequency switch mode power supplies.

Packaged in ISOTOP, the [STPS200170TV1Y](#) is intended for use in secondary rectification applications and more precisely in DC/DC converters in hybrid and electrical vehicles.

| Product status link            |           |
|--------------------------------|-----------|
| <a href="#">STPS200170TV1Y</a> |           |
| Product summary                |           |
| Symbol                         | Value     |
| $I_{F(AV)}$                    | 2 x 100 A |
| $V_{RRM}$                      | 170 V     |
| $T_j$ (max.)                   | 150 °C    |
| $V_F$ (typ.)                   | 0.63 V    |

# 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, $T_j = -40\text{ °C}$ to $+175\text{ °C}$ |                                                       | 170         | V    |
| $I_{F(RMS)}$ | Forward rms current                                                        |                                                       | 200         | A    |
| $I_{F(AV)}$  | Average forward current, $\delta = 0.5$ , square wave                      | $T_C = 105\text{ °C}$ , 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                                            | $t_p = 10\text{ }\mu\text{s}$ , $T_j = 125\text{ °C}$ | 7200        | W    |
| $T_{stg}$    | Storage temperature range                                                  |                                                       | -55 to +150 | °C   |
| $T_j$        | Maximum operating junction temperature <sup>(1)</sup>                      |                                                       | 150         | °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 | 0.52       | °C/W |
|               |                  | Total     | 0.31       |      |
| $R_{th(c)}$   | Coupling         |           | 0.1        |      |

When the diodes 1 and 2 are used simultaneously:

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

**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    | $T_j = 25\text{ °C}$  | $I_F = 100\text{ A}$ | -    |      | 0.85 | V             |
|             |                         | $T_j = 150\text{ °C}$ |                      | -    | 0.63 | 0.68 |               |
|             |                         | $T_j = 25\text{ °C}$  | $I_F = 200\text{ A}$ | -    |      | 1.01 |               |
|             |                         | $T_j = 150\text{ °C}$ |                      | -    | 0.78 | 0.86 |               |

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

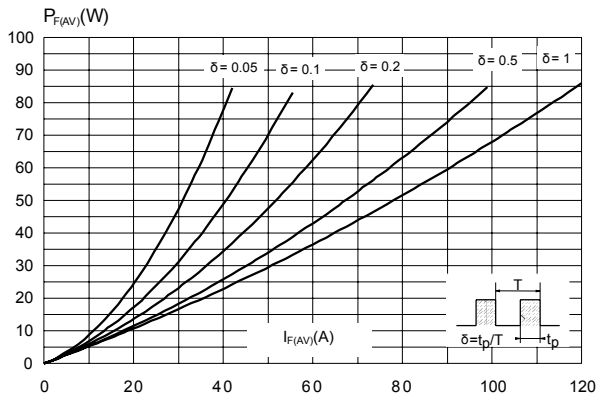
2. Pulse test:  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the maximum conduction losses, use the following equation:

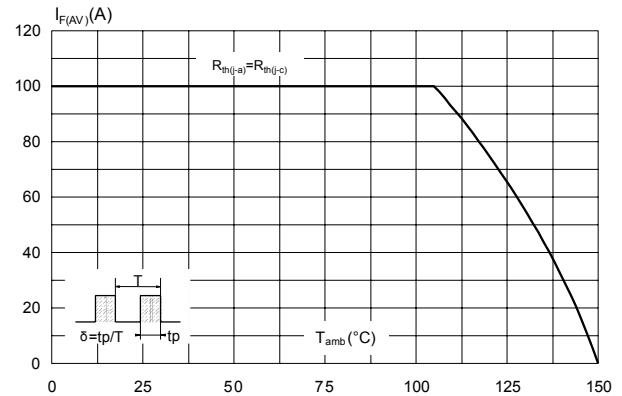
$$P = 0.5 \times I_{F(AV)} + 0.0018 \times I_F^2 (\text{RMS})$$

## 1.1 Characteristics (curves)

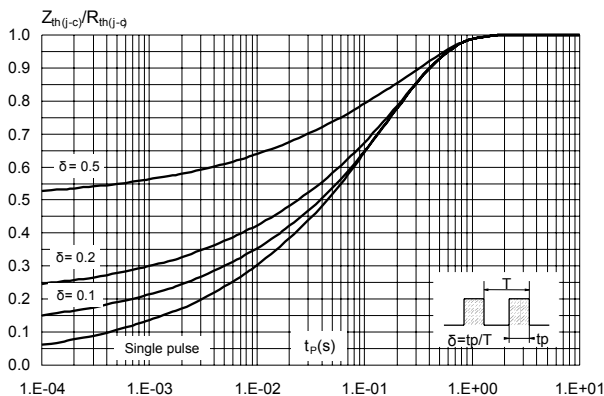
**Figure 1. Conduction losses versus average forward current (per diode)**



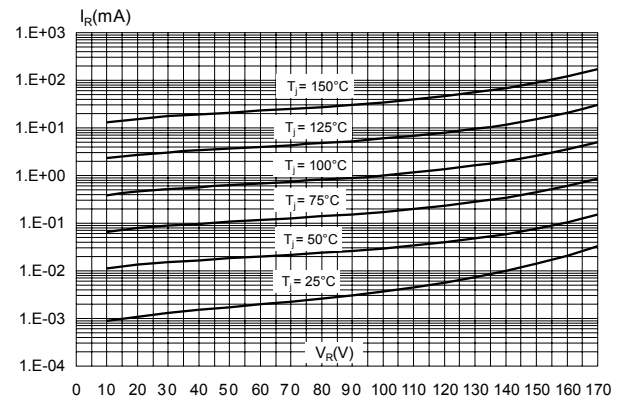
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



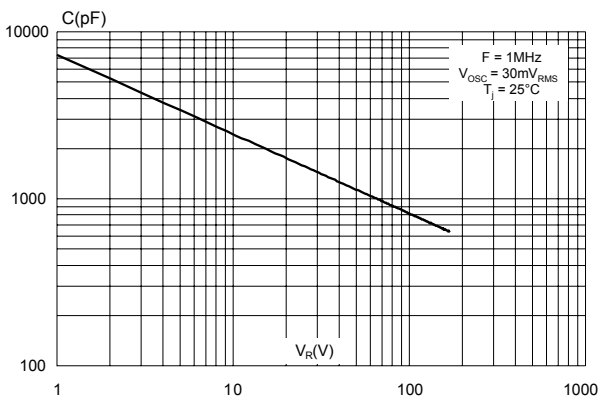
**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**



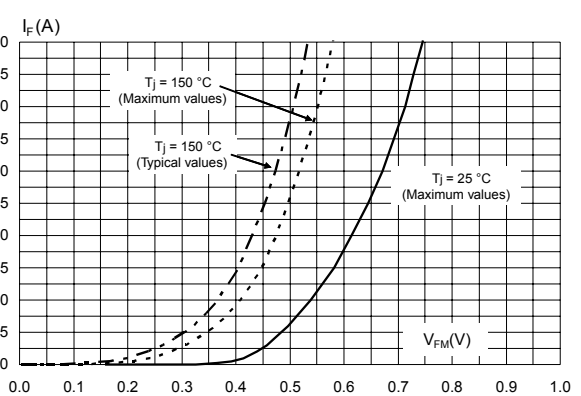
**Figure 4. Reverse leakage current versus reverse voltage applied (typical values per diode)**



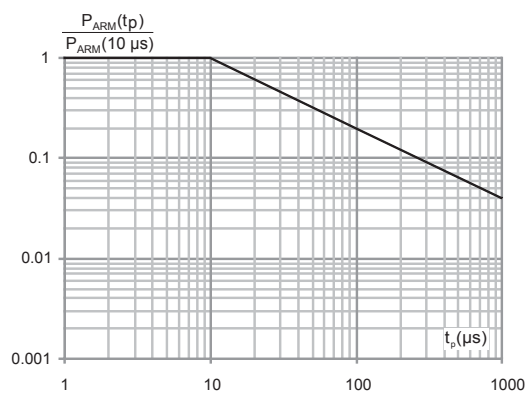
**Figure 5. Junction capacitances versus reverse voltage applied (typical values per diode)**



**Figure 6. Forward voltage drop versus forward current (per diode, low level)**



**Figure 7. Normalized avalanche power derating versus pulse duration ( $T_j = 125\text{ °C}$ )**



## 2 Package information

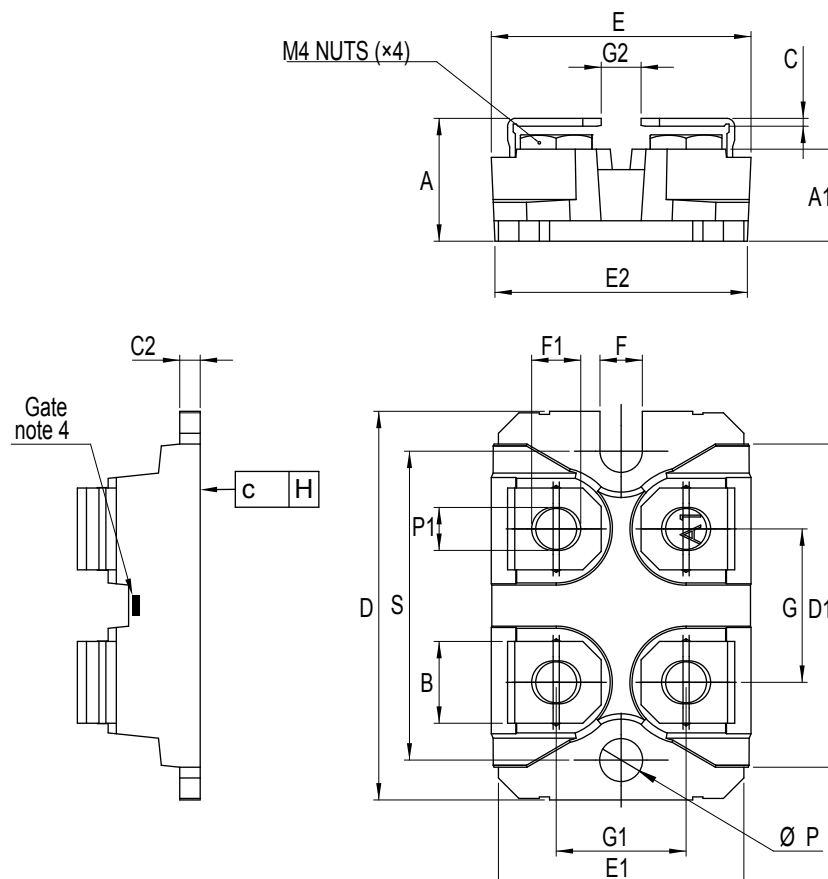
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

### 2.1 Isotop package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 1.3 N·m
- Maximum torque value: 1.5 N·m

STMicroelectronics strongly recommend the use of the screws delivered with this product.  
The use of any other screws is entirely at the user's own risk and will invalidate the warranty.

**Figure 8. ISOTOP package outline**



**Table 4. ISOTOP package mechanical data**

| Ref.   | Dimensions  |       |        |       |
|--------|-------------|-------|--------|-------|
|        | Millimeters |       | Inches |       |
|        | Min.        | Max.  | Min.   | Max.  |
| A      | 11.80       | 12.20 | 0.460  | 0.480 |
| A1     | 8.90        | 9.10  | 0.350  | 0.358 |
| B      | 7.80        | 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       |       | 0.976  |       |
| 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     | 0.181  | 0.197 |
| H      | -0.05       | 0.1   | -0.002 | 0.004 |
| Diam P | 4           | 4.30  | 0.157  | 0.169 |
| P1     | 4           | 4.40  | 0.157  | 0.173 |
| S      | 30.10       | 30.30 | 1.185  | 1.193 |

### 3 Ordering Information

**Table 5. Ordering information**

| Order code     | Marking         | Package | Weight              | Base qty.      | Delivery mode |
|----------------|-----------------|---------|---------------------|----------------|---------------|
| STPS200170TV1Y | STPS 200170TV1Y | ISOTOP  | 27 g without screws | 10 with screws | Tube          |

## Revision history

**Table 6. Document revision history**

| Date        | Version | Changes                                                                                                                                                                                                                                              |
|-------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 02-Mar-2010 | 1       | First issue.                                                                                                                                                                                                                                         |
| 07-Oct-2011 | 2       | Added torque values in Section 2.                                                                                                                                                                                                                    |
| 12-Nov-2015 | 3       | Updated features in cover page.<br>Text added in Section 2.                                                                                                                                                                                          |
| 16-Apr-2018 | 4       | Removed figures 3 and 10.<br>Updated <a href="#">Section • Features</a> , <a href="#">Section • Description</a> and <a href="#">Table 1. Absolute ratings</a> (limiting values, per diode at $T_{amb} = 25\text{ °C}$ , unless otherwise specified). |

**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2018 STMicroelectronics – All rights reserved

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[STMicroelectronics:](#)

[STPS200170TV1Y](#)