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# STPS200170TV1

## High voltage power Schottky rectifier

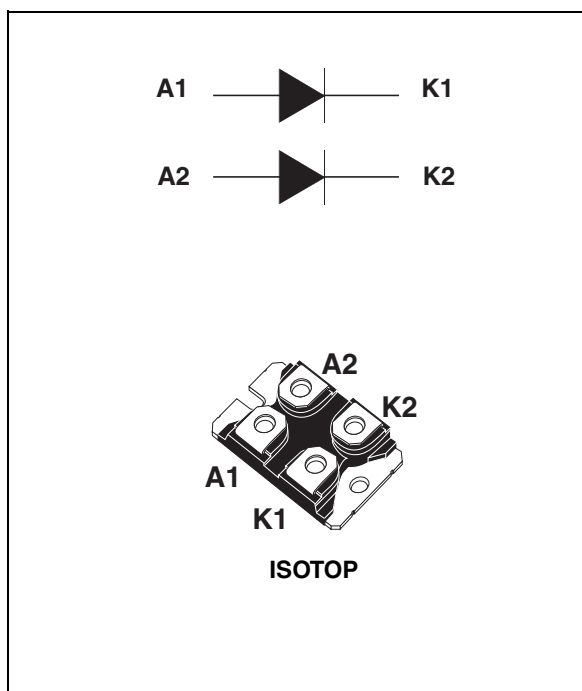
### Features

- 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 rms, capacitance = 45 pF

### Description

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

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



**Table 1. Device summary**

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

Characteristics

STPS200170TV1

# 1 Characteristics

**Table 2. Absolute ratings - limiting values per diode at  $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified**

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		170	V
$I_{F(RMS)}$	Forward rms current		200	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	$T_c = 105\text{ }^{\circ}\text{C}$ 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	$t_p = 1\text{ }\mu\text{s}$ , $T_j = 25\text{ }^{\circ}\text{C}$	100000	W
$T_{stg}$	Storage temperature range		-55 to + 150	$^{\circ}\text{C}$
$T_j$	Maximum operating junction temperature <sup>(1)</sup>		150	$^{\circ}\text{C}$

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

**Table 3. Thermal parameters**

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

When the diodes are used simultaneously:

$$T_{j(\text{diode}1)} = P_{(\text{diode}1)} \times R_{th(j-c)} \text{ (per diode)} + P_{(\text{diode}2)} \times R_{th(c)}$$

**Table 4. Static electrical characteristics**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ }^{\circ}\text{C}$	$V_R = V_{RRM}$	-	-	200	$\mu\text{A}$
		$T_j = 125\text{ }^{\circ}\text{C}$		-	30	100	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 100\text{ A}$	-	-	0.85	V
		$T_j = 150\text{ }^{\circ}\text{C}$		-	0.63	0.68	
		$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 200\text{ A}$	-	-	0.975	
		$T_j = 150\text{ }^{\circ}\text{C}$		-	0.78	0.86	

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

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

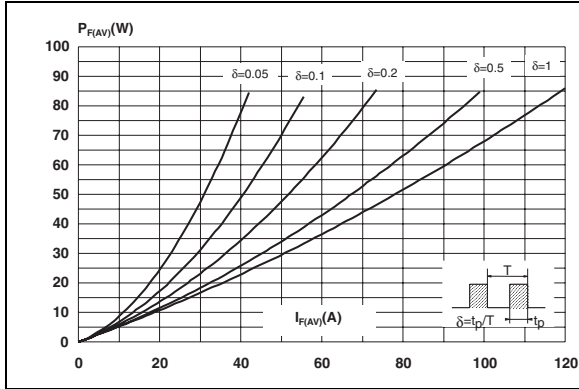
To evaluate the conduction losses use the following equation:

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

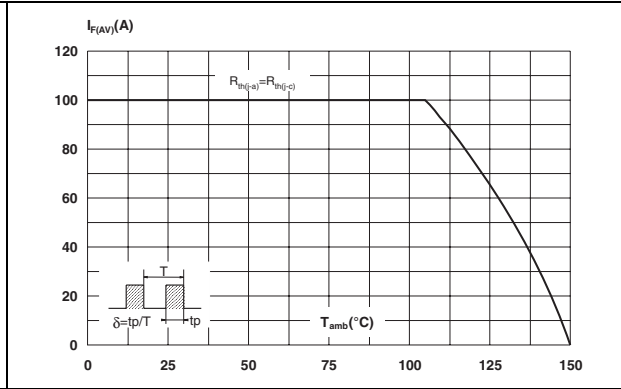
**STPS200170TV1**

**Characteristics**

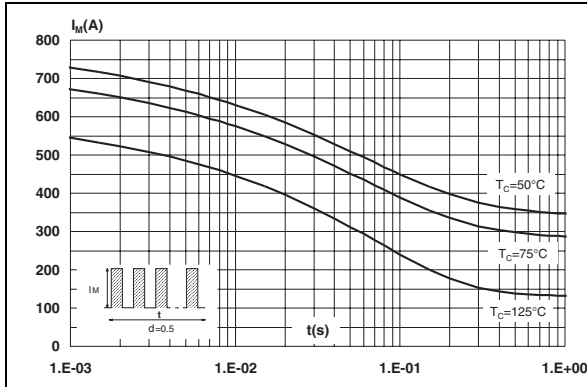
**Figure 1. Conduction losses versus average current (per diode)**



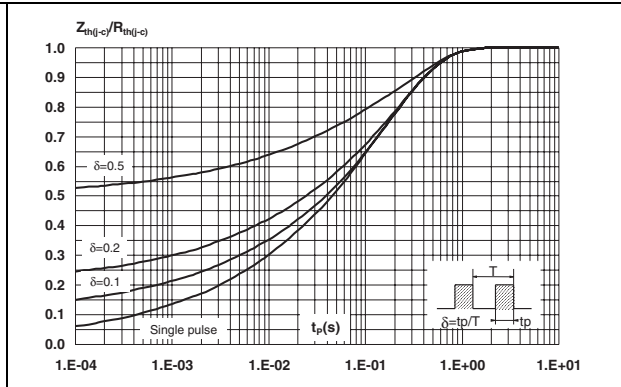
**Figure 2. Average forward current versus ambient temperature (delta = 0.5, per diode)**



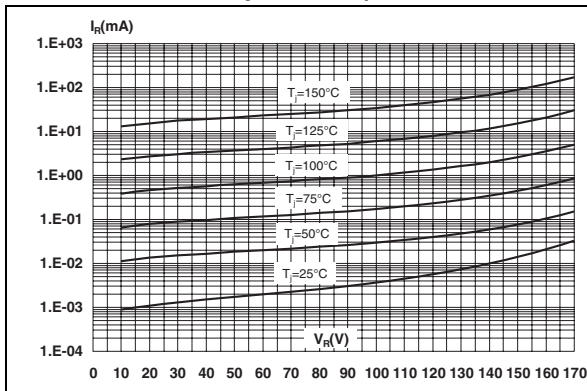
**Figure 3. Non-repetitive surge peak forward current versus overload duration (maximum values per diode)**



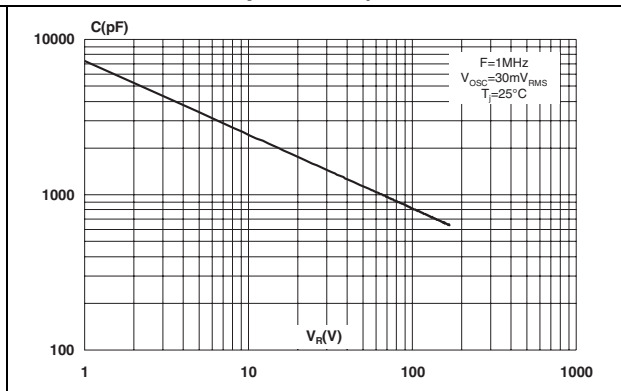
**Figure 4. Relative variation of thermal impedance (junction to case) versus pulse duration**



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



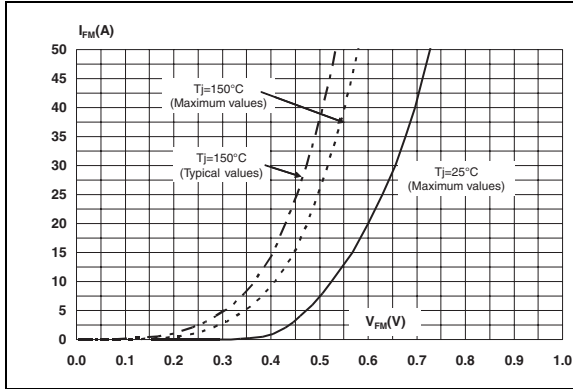
**Figure 6. Junction capacitances versus reverse voltage applied (typical values per diode)**



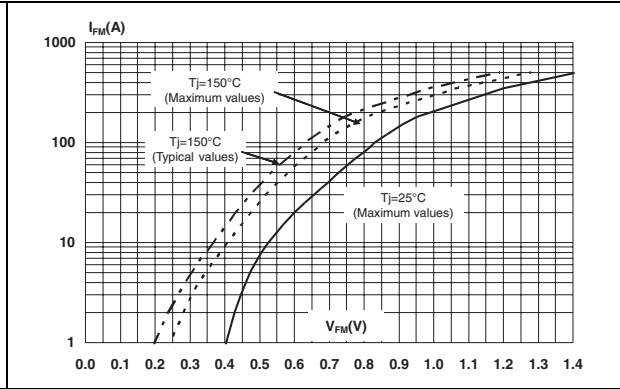
**Characteristics**

**STPS200170TV1**

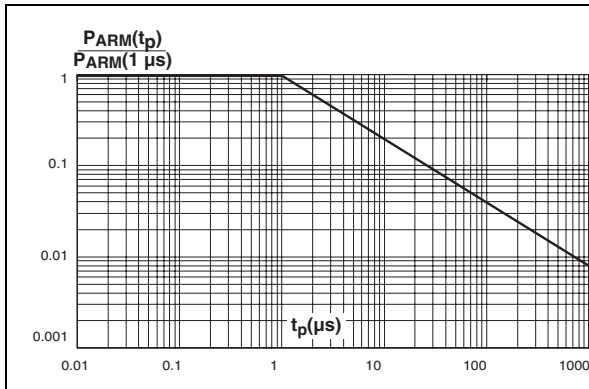
**Figure 7. Forward voltage drop versus forward current (per diode, low level)**



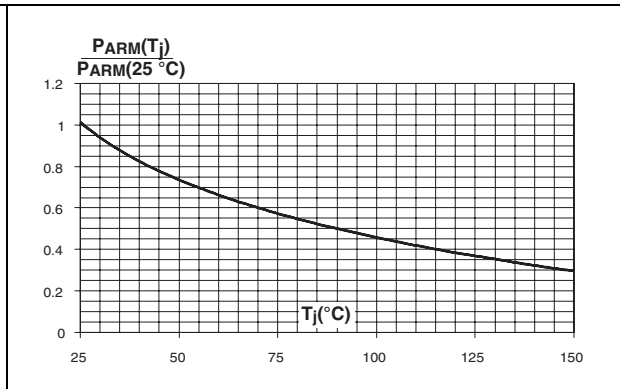
**Figure 8. Forward voltage drop versus forward current (per diode, high level)**



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



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



## 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

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.

Table 5. 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

### 3 Ordering information

Table 6. Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STPS200170TV1	STPS200170TV1	ISOTOP	27 g without screws	10 with screws	Tube

### 4 Revision history

Table 7. Document revision history

Date	Revision	Changes
14-Nov-2005	1	First issue.
09-Sep-2011	2	Updated $V_{F\ max}$ at $T_j = 25\ ^\circ\text{C}$ and $I_F = 100\ \text{A}$ to 0.85 V.

## STPS200170TV1

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