

## High voltage power Schottky rectifier

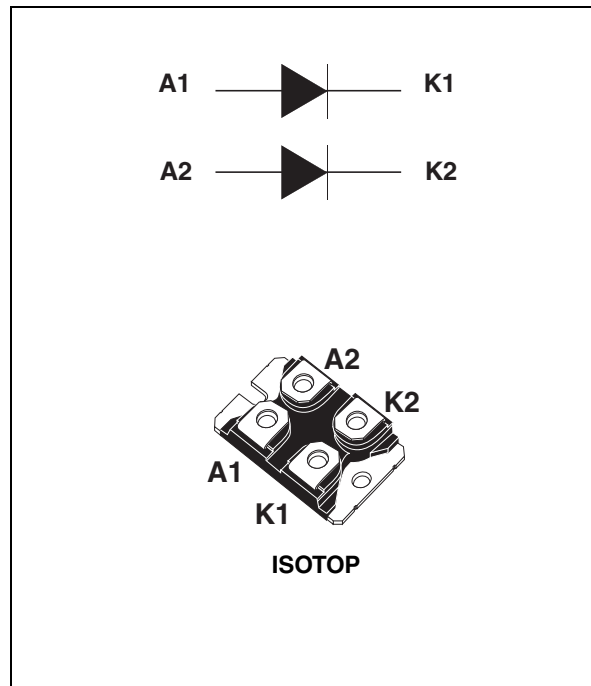
### Features

- 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

# 1 Characteristics

**Table 2. 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
$I_{F(RMS)}$	Forward rms current	200	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	$T_c = 105\text{ °C}$ per diode	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal	A
$P_{ARM}$	Repetitive peak avalanche power	$t_p = 1\text{ }\mu\text{s}$ , $T_j = 25\text{ °C}$	W
$T_{stg}$	Storage temperature range	-55 to + 150	°C
$T_j$	Maximum operating junction temperature <sup>(1)</sup>	150	°C

1.  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  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
		Total	0.31
$R_{th(c)}$	Coupling thermal resistance	0.1	°C/W

When the diodes are used simultaneously:

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

**Table 4. Static electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-	-	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	
		$T_j = 25\text{ °C}$	$I_F = 200\text{ A}$	-	-	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)

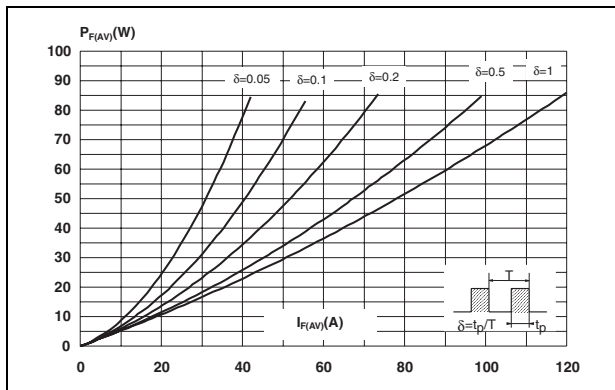


Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)

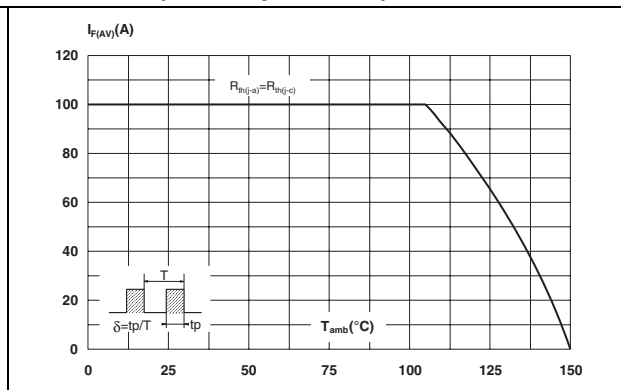


Figure 3. Non-repetitive surge peak forward current versus overload duration (maximum values per diode)

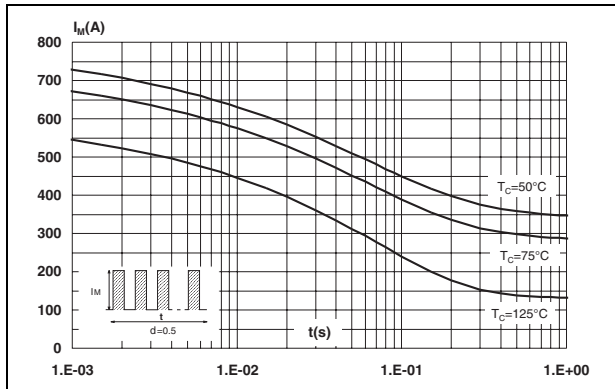


Figure 4. Relative variation of thermal impedance (junction to case) versus pulse duration

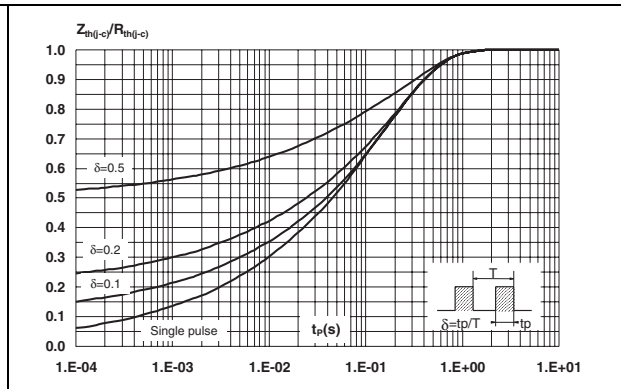


Figure 5. Reverse leakage current versus reverse voltage applied (typical values per diode)

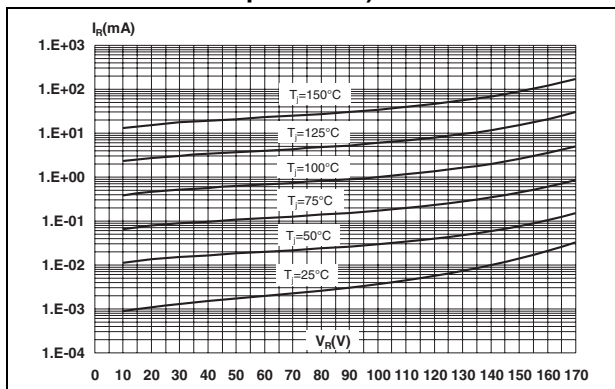
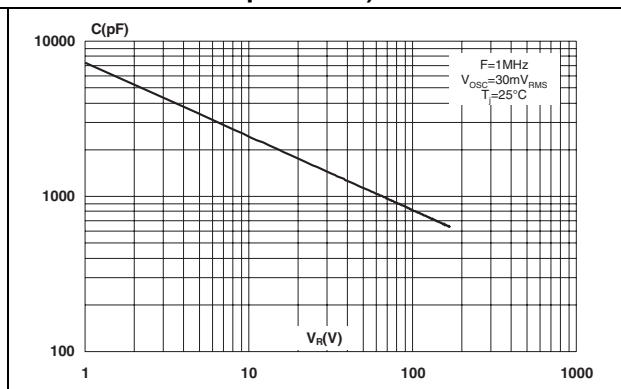
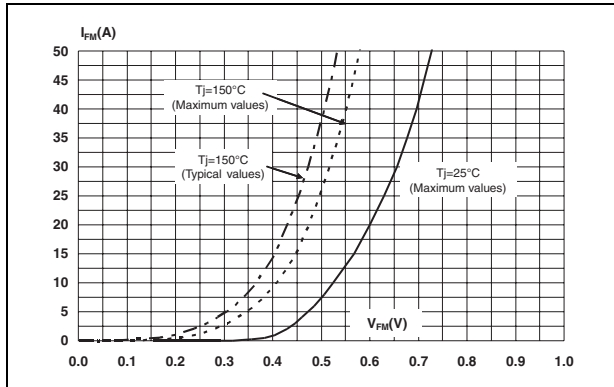


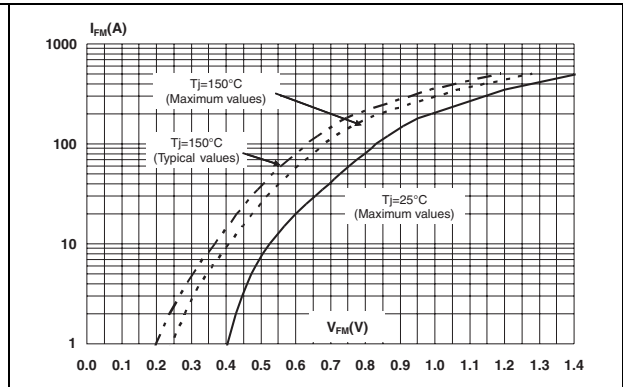
Figure 6. Junction capacitances versus reverse voltage applied (typical values per diode)



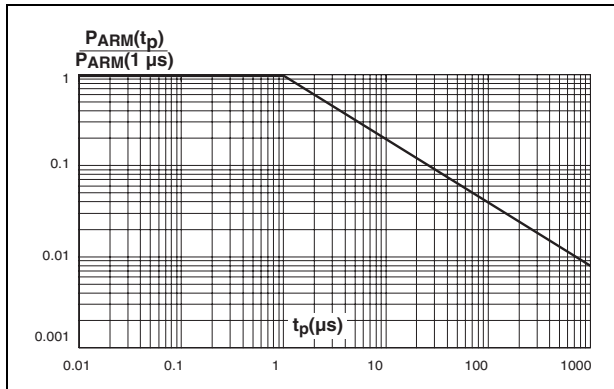
**Figure 7. Forward voltage drop versus forward current (per diode, low level)**



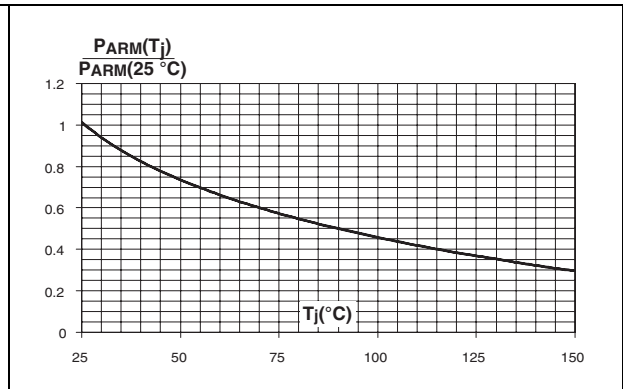
**Figure 8. Forward voltage drop versus forward current (per diode, high level)**



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



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



## 2 Package information

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

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**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 $T_j = 25 \text{ }^\circ\text{C}$ and $I_F = 100 \text{ A}$ to 0.85 V.

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