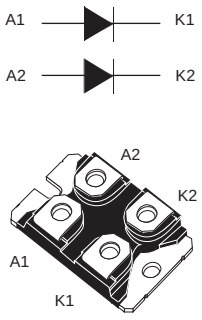
STPS200170TV1

High voltage power Schottky rectifier

Datasheet - production data



ISOTOP

Features

- 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_{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

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

1 Characteristics

Table 2: Absolute ratings (limiting values, per diode at T_{amb} = 25 °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, δ = 0.5	T_C = 105 °C	Per diode	100	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		700	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs T_j = 125 °C		7400	W
T_{stg}	Storage temperature range			-55 to +150	°C
T_j	Maximum operating junction temperature(1)			150	°C

Notes:

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

Table 3: Thermal parameters

Symbol	Parameter		Maximum values	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 1 and 2 are used simultaneously:

ΔT_j (diode1) = $P_{(diode1)}$ x $R_{th(j-c)\ (per\ diode)}$ + $P_{(diode2)}$ x $R_{th(c)}$

Table 4: Static electrical characteristics

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

Notes:

(1)Pulse test: t_p = 5 ms, δ < 2%

(2)Pulse test: t_p = 380 µs, δ < 2%

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

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

1.1 Characteristics (curves)

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

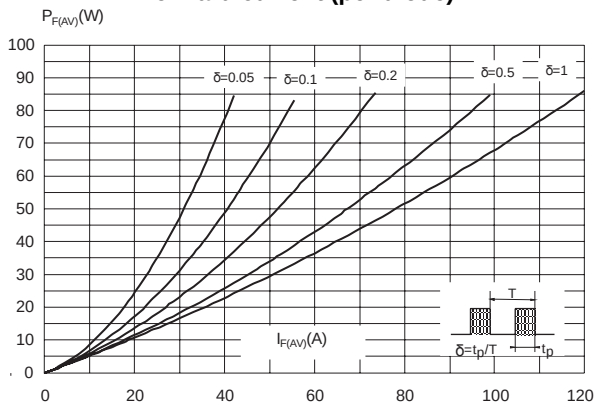


Figure 2: Average forward current versus ambient temperature (δ = 0.5, per diode)

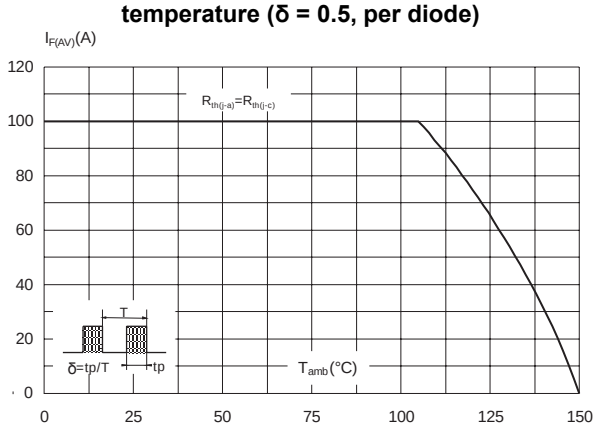


Figure 3: Relative variation of thermal impedance (junction to case) versus pulse duration

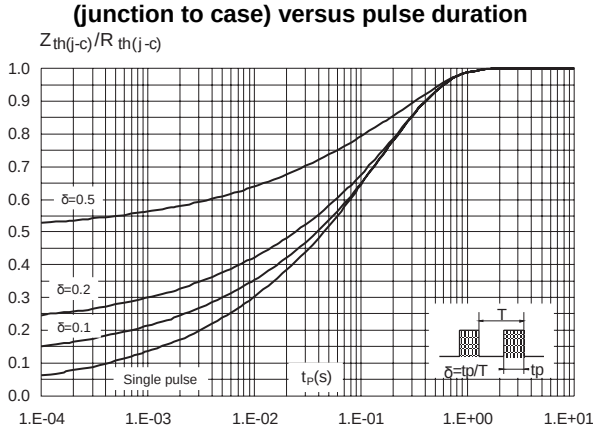


Figure 4: Reverse leakage current versus reverse voltage applied (typical values, per diode)

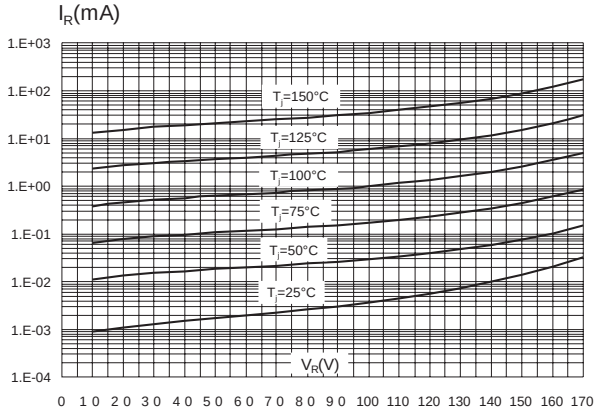


Figure 5: Junction capacitance versus reverse voltage applied (typical values, per diode)

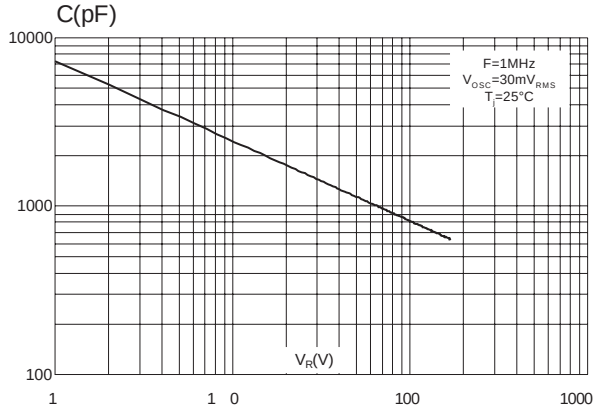


Figure 6: Forward voltage drop versus forward current (per diode, low level)

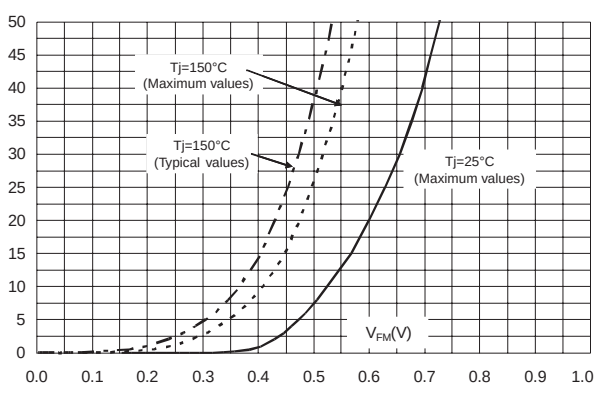


Figure 7: Forward voltage drop versus forward current (per diode, high level)

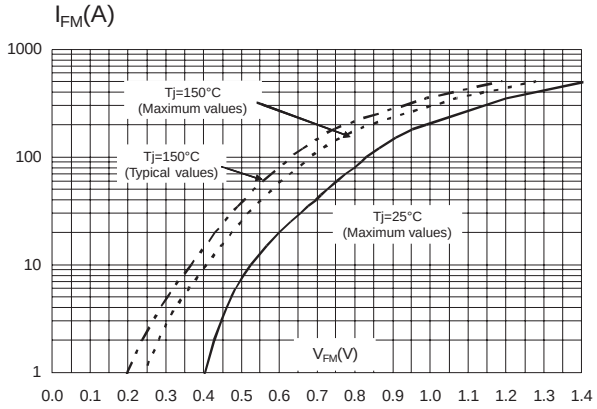
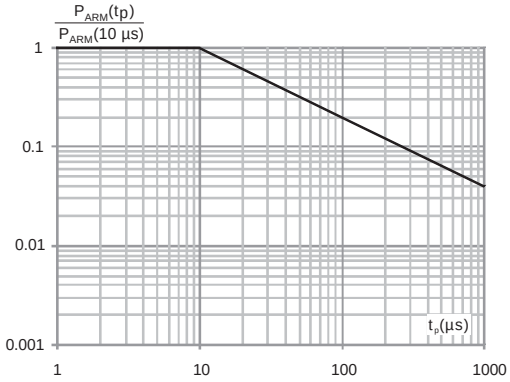


Figure 8: Normalized avalanche power derating versus pulse duration



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.

- 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 recommends 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.

2.1 ISOTOP package information

Figure 9: ISOTOP package outline

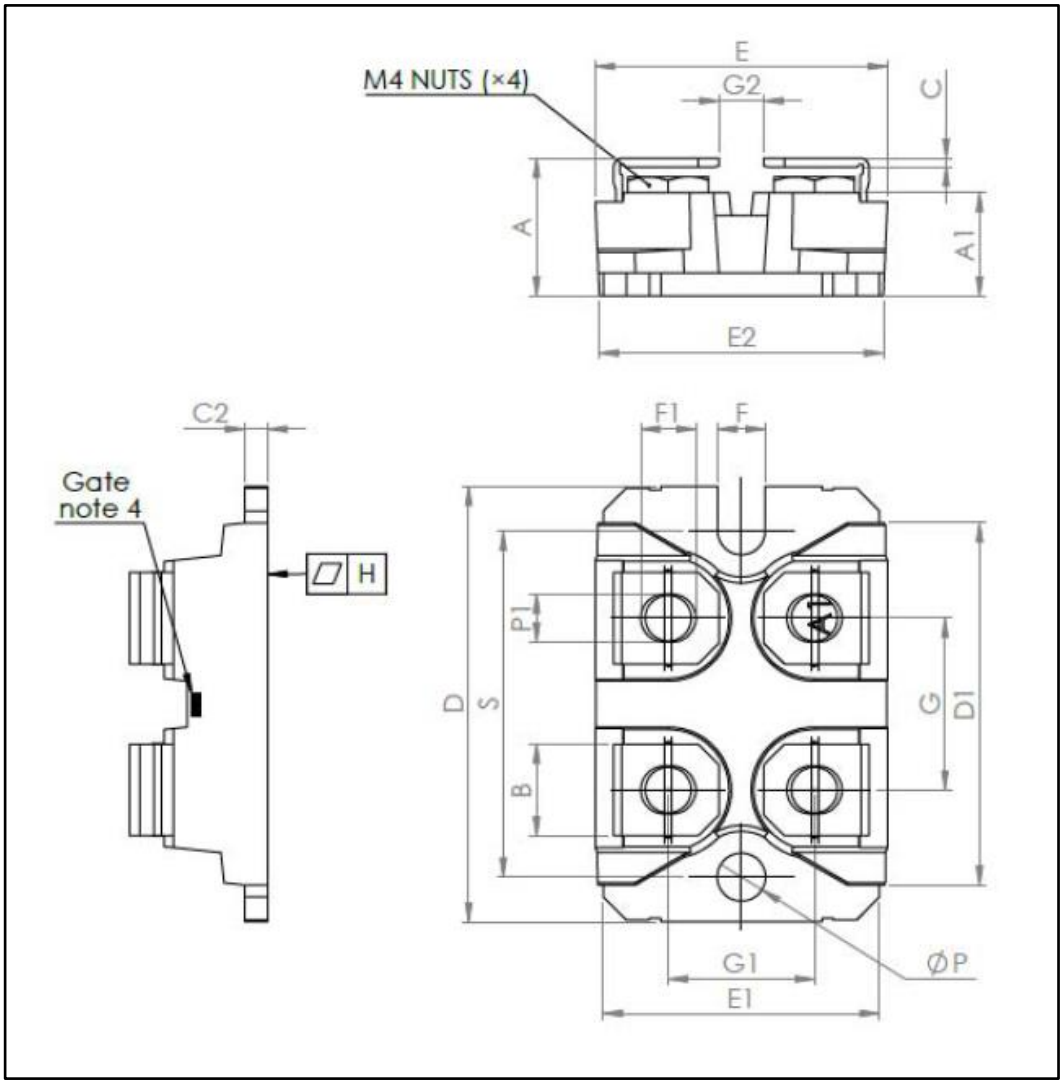


Table 5: ISOTOP package mechanical data

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	7.80	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 6: Ordering information

Order code	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 °C and I_F = 100 A to 0.85 V.
12-Feb-2018	3	Updated *Table 2: "Absolute ratings (limiting values, per diode at Tamb = 25 °C, unless otherwise specified)"* and the new PARM curve at 10 µs.

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