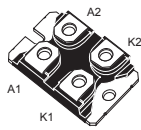
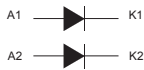


Automotive high voltage power Schottky rectifier



ISOTOP



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_{RMS} 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

[STPS200170TV1Y](#)

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	$^{\circ}\text{C}$
T_j	Maximum operating junction temperature ⁽¹⁾		150	$^{\circ}\text{C}$

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	$^{\circ}\text{C/W}$
		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	μA
		$T_j = 125\text{ °C}$		-	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:

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

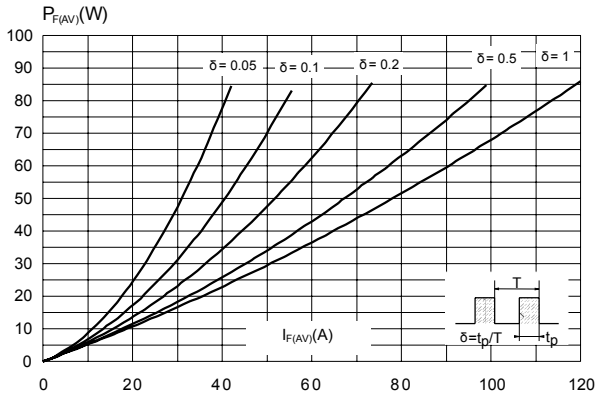
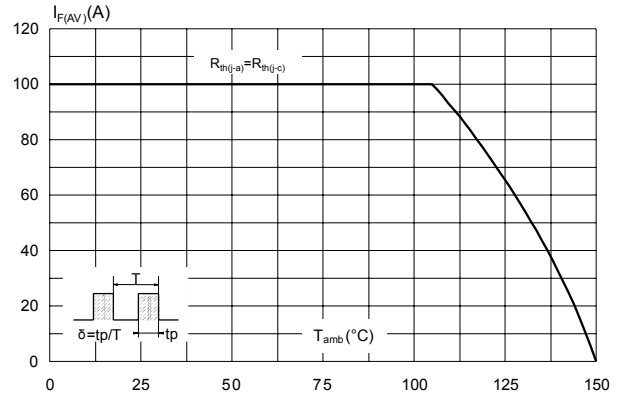
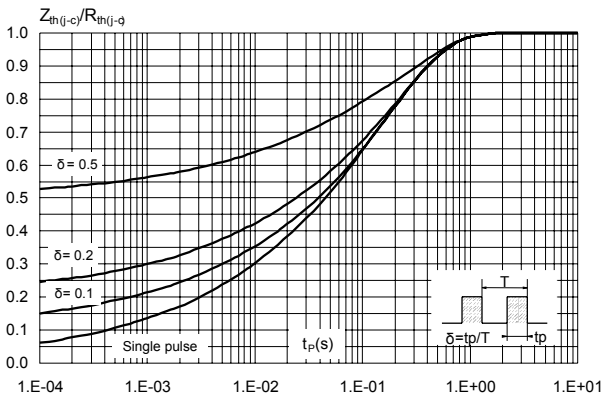
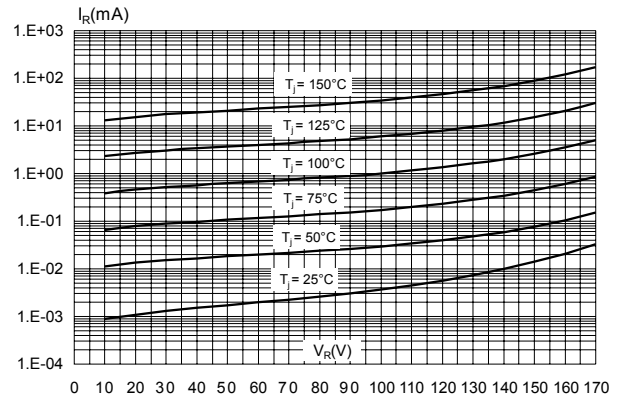
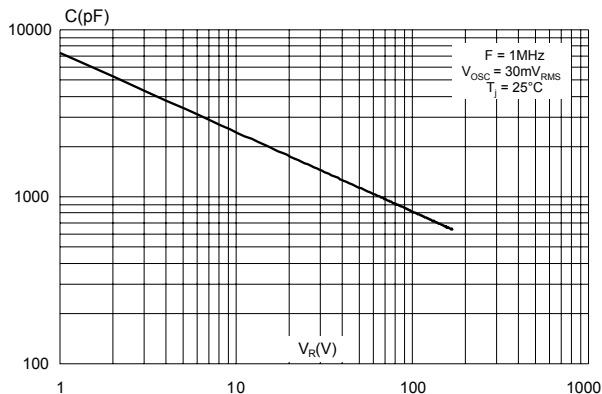
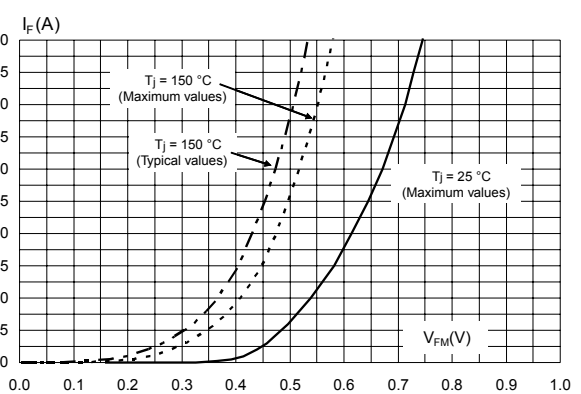
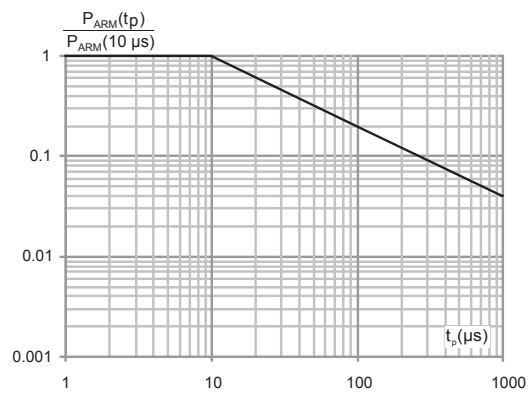
1.1 Characteristics (curves)
Figure 1. Conduction losses versus average forward current (per diode)

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 ($T_j = 125\text{ }^\circ\text{C}$)


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. 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

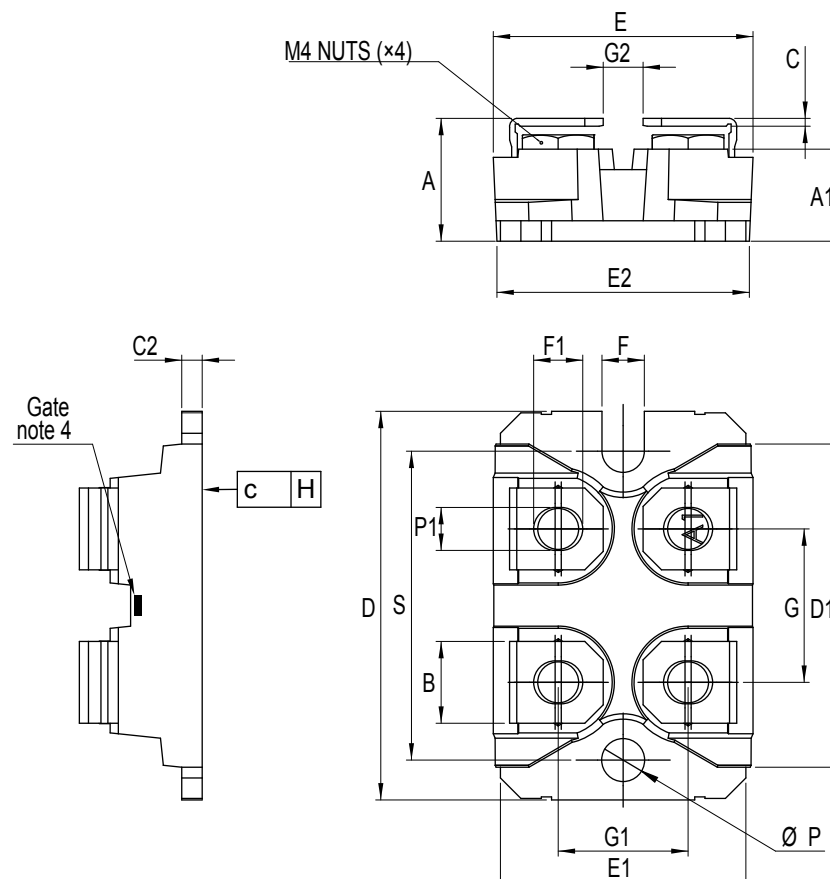


Table 4. ISOTOP package mechanical data

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. Text added in Section 2.
16-Apr-2018	4	Removed figures 3 and 10. Updated Section • Features , Section • Description and Table 1. Absolute ratings (limiting values, per diode at $T_{amb} = 25\text{ °C}$, unless otherwise specified).

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