STPS200170TV1Y

Automotive high voltage power Schottky rectifier

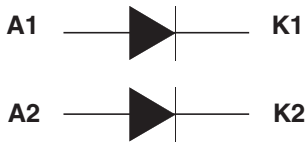
Features

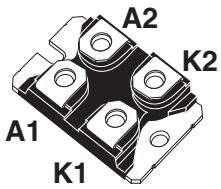
- Negligible switching losses
- Avalanche rated
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Insulated package:
  - Electrical insulation = 2500 V rms,
  - Capacitance = 45 pF
- AEC-Q101 qualified

Description

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

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





ISOTOP

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 °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 = 1 µs, T_j = 25 °C		100000	W
T_{stg}	Storage temperature range			-55 to + 150	°C
T_j	Maximum operating junction temperature(1)			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	°C/W
		Total	0.31	
$R_{th(c)}$	Coupling thermal resistance		0.1	

When the diodes are used simultaneously:
$T_{j(diode1)} = P_{(diode1)} \text{ X } R_{th(j-c)}$ (per diode) + $P_{(diode2)} \text{ X } R_{th(c)}$

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	-	-	1.01	
		T_j = 150 °C		-	0.78	0.86	

1. Pulse test: t_p = 5 ms, δ < 2 %
2. Pulse test: t_p = 380 µs, δ < 2 %

To evaluate the conduction losses use the following equation:
$P = 0.5 \text{ x } I_{F(AV)} + 0.0018 \, I_F{}^2{}_{(RMS)}$

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

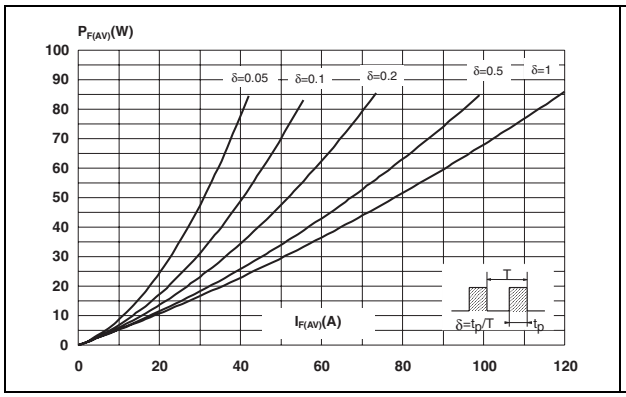


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

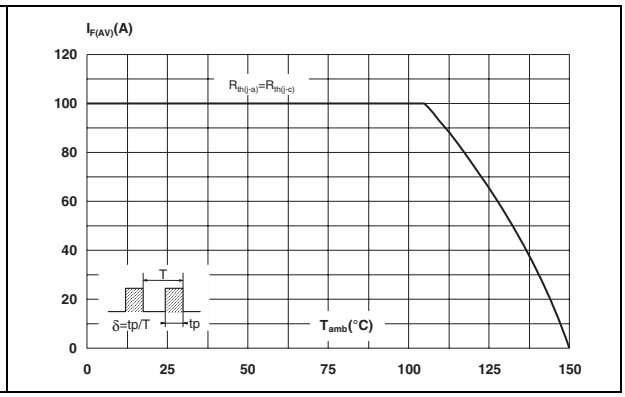


Figure 3. Non-repetitive surge peak forward current vesus overload duration (maximum values per diode)

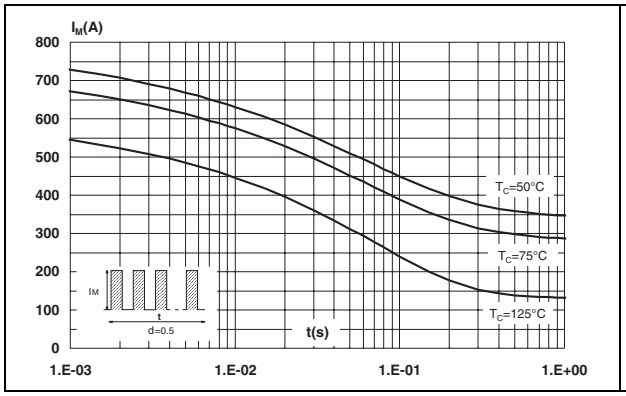


Figure 4. Relative variation of thermal impedance (junction to case) versus pulse duration

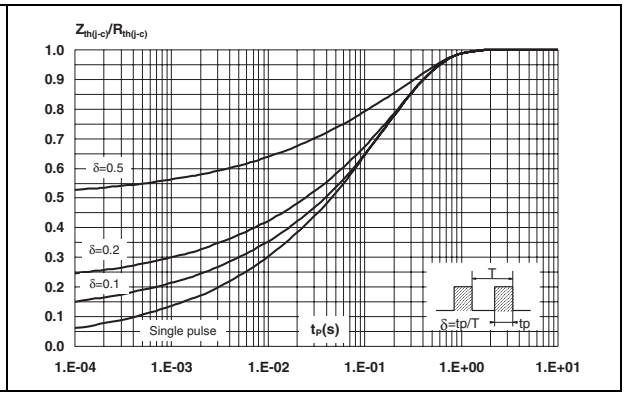


Figure 5. Reverse leakage current versus reverse voltage applied (typical values per diode)

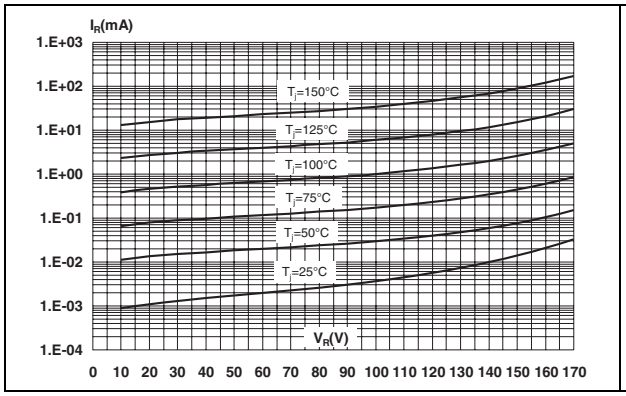


Figure 6. Junction capacitances versus reverse voltage applied (typical values per diode)

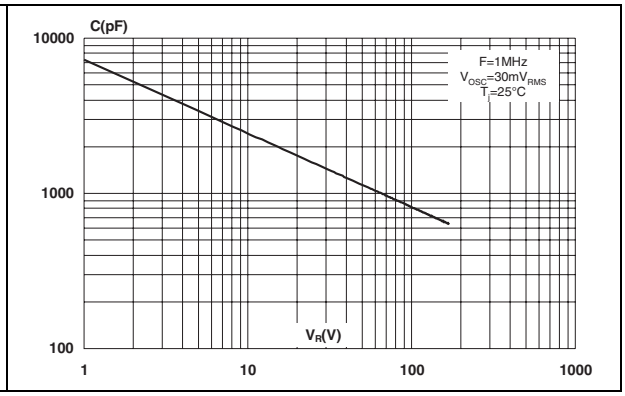


Figure 7. Forward voltage drop versus forward current (per diode, low level)

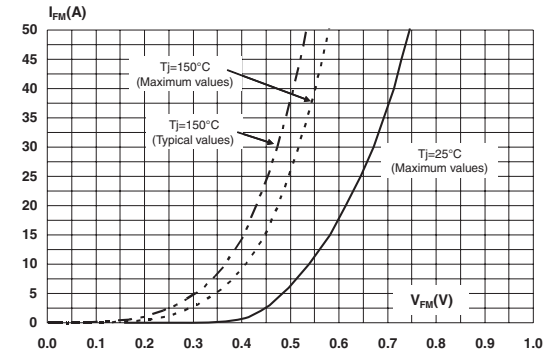


Figure 8. Forward voltage drop versus forward current (per diode, high level)

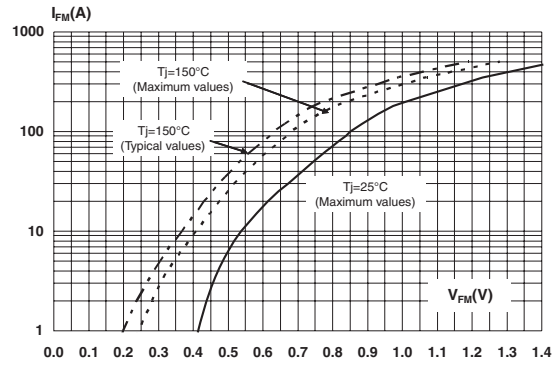


Figure 9. Normalized avalanche power derating versus pulse duration

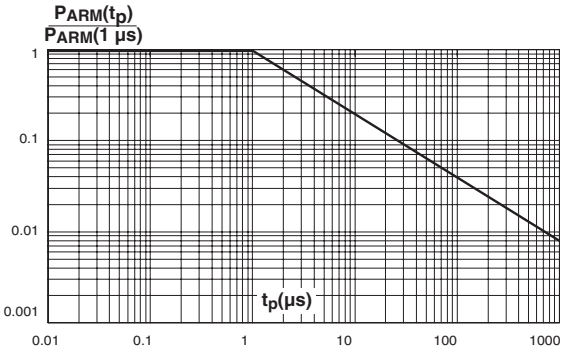
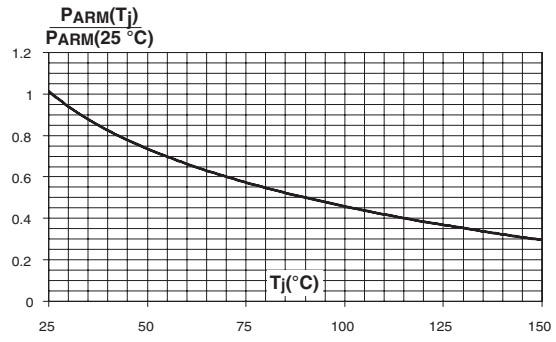


Figure 10. Normalized avalanche power derating versus junction temperature



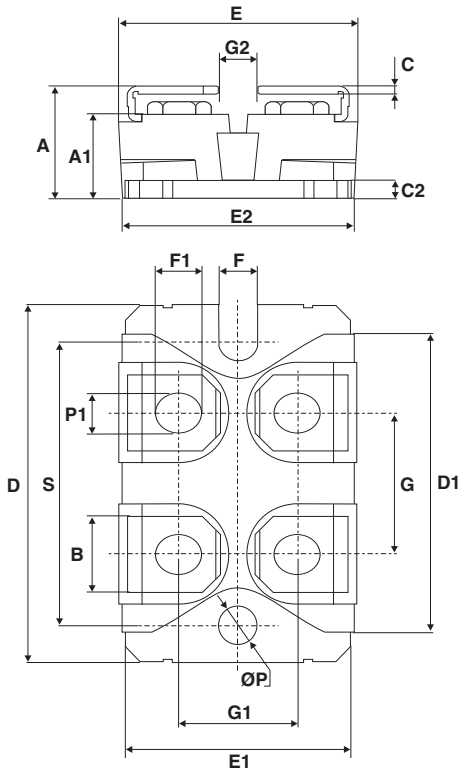
2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- 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 anyother screws is entirely at the user's own risk and will invalidate the warranty.

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.

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

Order code	Marking	Package	Weight	Base qty[1]	Delivery mode
STPS200170TV1Y	STPS200170TV1Y	ISOTOP	27 g without screws	10 with screws	Tube

1. This product is supplied with 40 terminal screws and washers for each tube. The screws and washers are supplied in a separate pack with the order.

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
02-Mar-2010	1	First issue.
07-Oct-2011	2	Added torque values in *Section 2*.

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