

Automotive power Schottky rectifier

Features

- Negligible switching losses
- Low forward voltage drop
- Low capacitance
- High reverse avalanche surge capability
- Avalanche specification
- AEC-Q101 qualified

Description

High voltage Schottky rectifier suited for switch mode power supplies and other power converters.

Packaged in DPAK, this device is intended for use in high frequency circuits where low switching losses are required.



Table 1. Device summary

$I_{F(AV)}$	10 A
V_{RRM}	45 V
T_j	175 °C
$V_F(\text{max})$	0.57 V

1 Characteristics

Table 2. Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		45	V
$I_{F(RMS)/pin}$	Forward rms current		7	A
$I_{F(AV)}$	Average forward current		10	A
I_{FSM}	Surge non repetitive forward current		75	A
I_{RRM}	Repetitive peak reverse current		1	A
P_{ARM}	Repetitive peak avalanche power		4000	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature range ⁽¹⁾		-40 to +175	°C
dV/dt	Critical rate of rise of reverse voltage		10000	V/μs

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	3	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$	-	-	100	μA
		$T_j = 125^\circ\text{C}$		-	7	15	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 10 \text{ A}$	-	-	0.63	V
		$T_j = 125^\circ\text{C}$		-	0.50	0.57	
		$T_j = 25^\circ\text{C}$	$I_F = 20 \text{ A}$	-	-	0.84	
		$T_j = 125^\circ\text{C}$		-	0.65	0.72	

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

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

To evaluate the conduction losses use the following equation:

$$P = 0.42 \times I_{F(AV)} + 0.015 I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

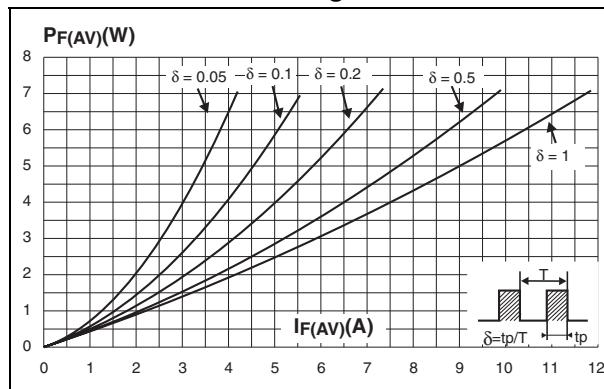


Figure 3. Normalized avalanche power derating versus pulse duration

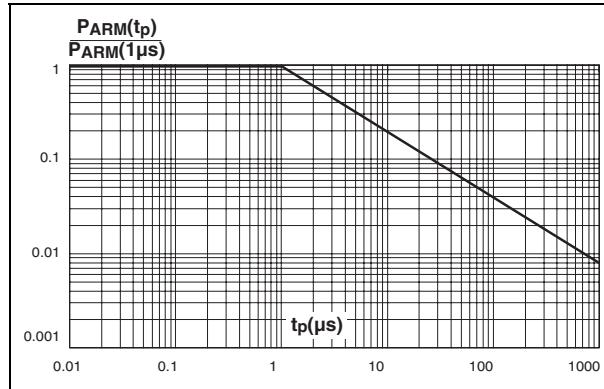


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

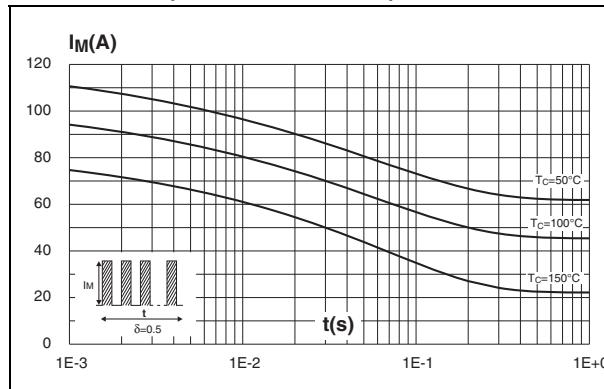


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

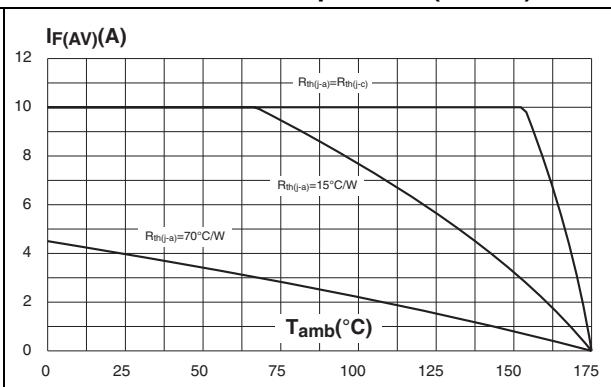


Figure 4. Normalized avalanche power derating versus junction temperature

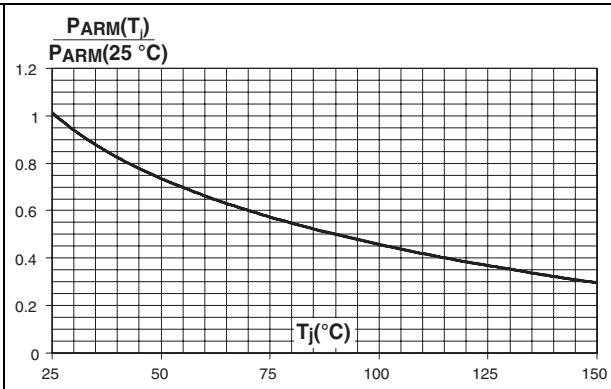


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

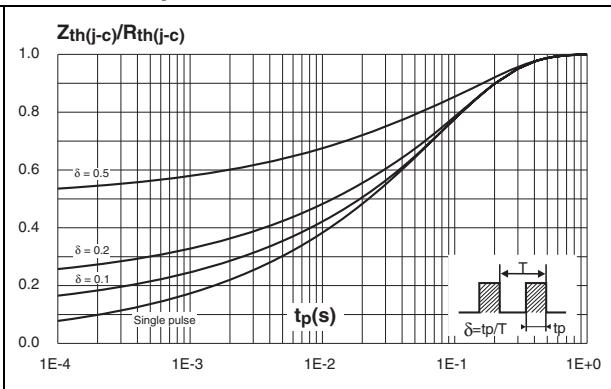


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

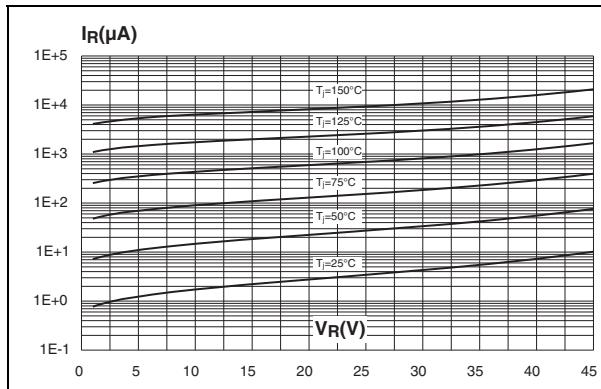


Figure 9. Forward voltage drop versus forward current

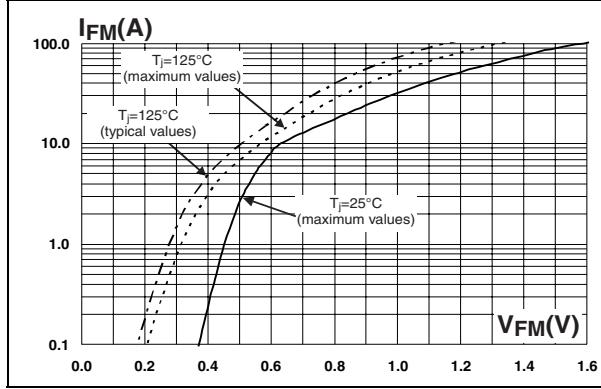


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

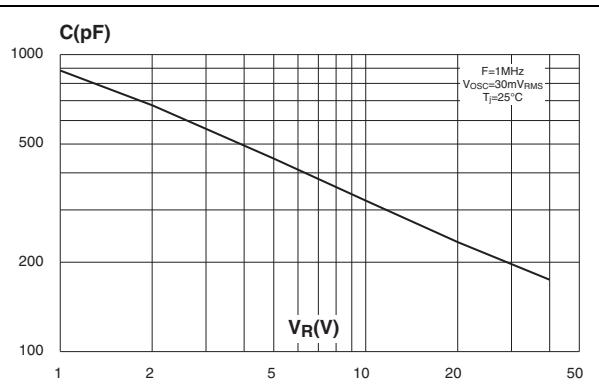
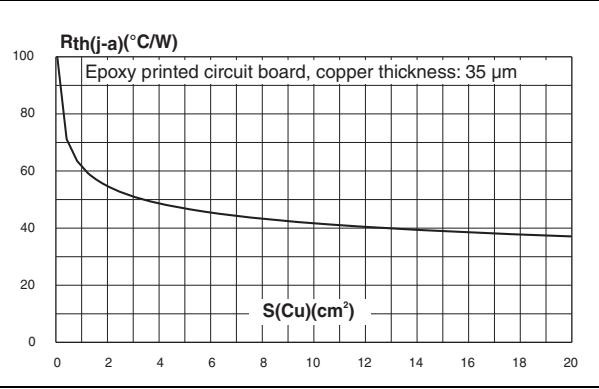


Figure 10. Thermal resistance junction to ambient versus copper surface under tab



2 Package information

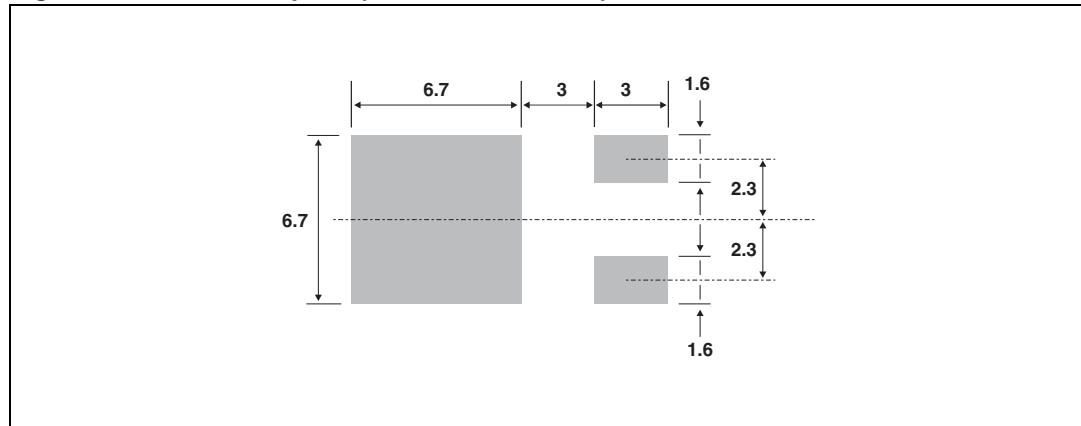
- Epoxy meets UL94, V0
- Lead-free package

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. DPAK dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max	Min.	Max.
A	2.20	2.40	0.086	0.094
A1	0.90	1.10	0.035	0.043
A2	0.03	0.23	0.001	0.009
B	0.64	0.90	0.025	0.035
B2	5.20	5.40	0.204	0.212
C	0.45	0.60	0.017	0.023
C2	0.48	0.60	0.018	0.023
D	6.00	6.20	0.236	0.244
E	6.40	6.60	0.251	0.259
G	4.40	4.60	0.173	0.181
H	9.35	10.10	0.368	0.397
L2	0.80 typ.		0.031 typ.	
L4	0.60	1.00	0.023	0.039
V2	0°	8°	0°	8°

Figure 11. DPAK footprint (dimensions in mm)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS1045BY-TR	S1045Y	DPAK	0.30 g	2500	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
23-May-2011	1	Initial release.

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