

Automotive Schottky rectifier

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- ECOPACK®2 compliant component
- AEC-Q101 qualified

Description

Single Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packages in SOD-123, these devices is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection for automotive applications.



SOD-123
STPS0540ZY

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	0.5 A
V_{RRM}	40 V
$V_F(max)$	0.40 V

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	40	V
$I_{F(RMS)}$	Forward rms voltage	2	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	$T_a = 60\text{ }^{\circ}\text{C}$	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	A
dV/dt	Critical rate of rise of reverse voltage	10000	V/ μs
T_{stg}	Storage temperature range	-65 to + 150	$^{\circ}\text{C}$
T_j	Operating junction temperature ⁽¹⁾	-40 to + 150	$^{\circ}\text{C}$

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 resistance

Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction to ambient ⁽¹⁾	500	$^{\circ}\text{C/W}$

1. Mounted on epoxy board.

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions	typ.	max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ }^{\circ}\text{C}$	$V_R = V_{RRM}$	40	μA
		$T_j = 100\text{ }^{\circ}\text{C}$		5	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 0.5\text{ A}$	0.50	V
		$T_j = 100\text{ }^{\circ}\text{C}$		0.40	
		$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 1\text{ A}$	0.55	
		$T_j = 100\text{ }^{\circ}\text{C}$		0.51	

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:

$$P = 0.29 \times I_{F(AV)} + 0.22 \times I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

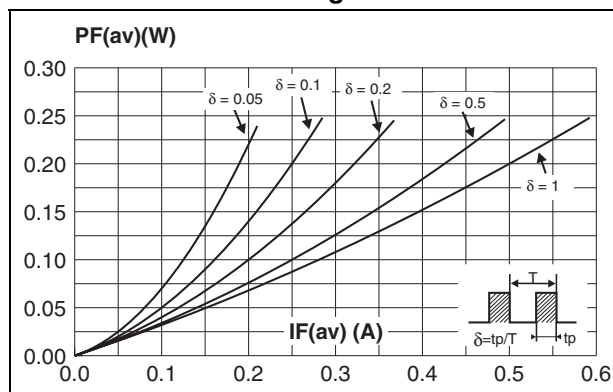


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

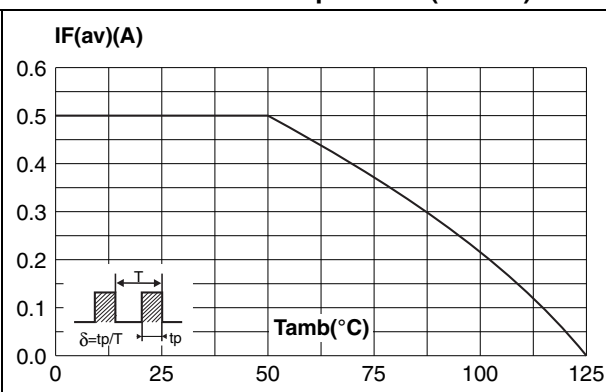


Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)

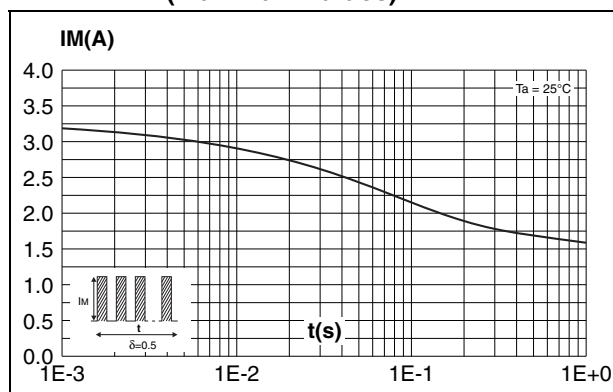


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration

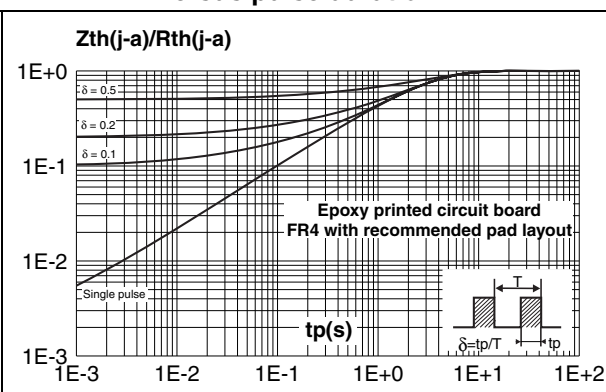


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

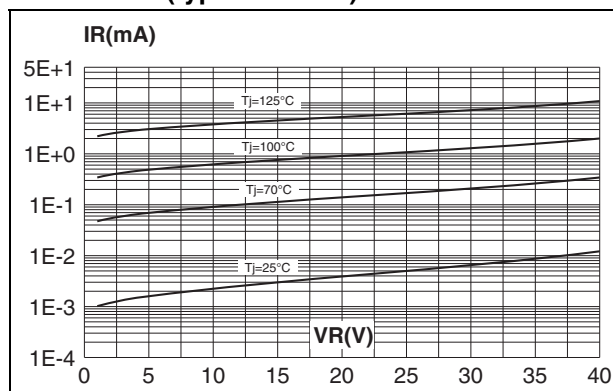


Figure 6. Reverse leakage current versus junction temperature (typical values)

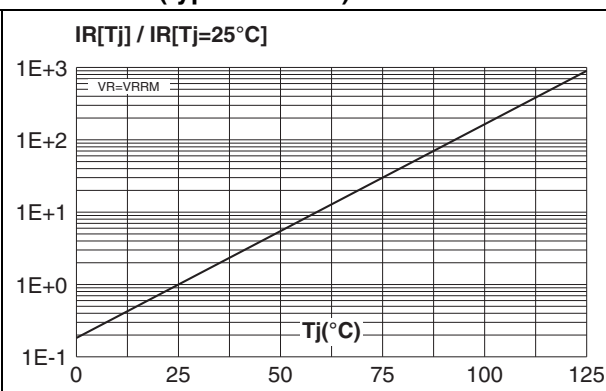


Figure 7. Junction capacitance versus reverse voltage applied (typical values)

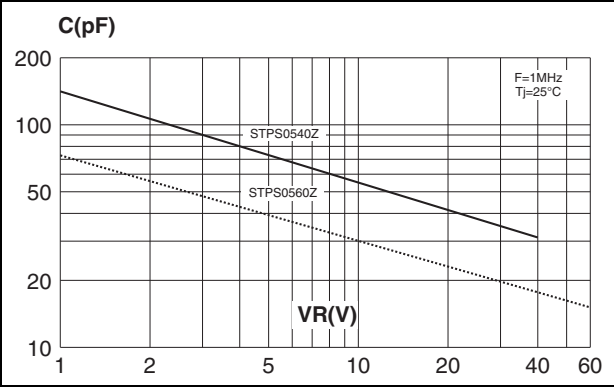
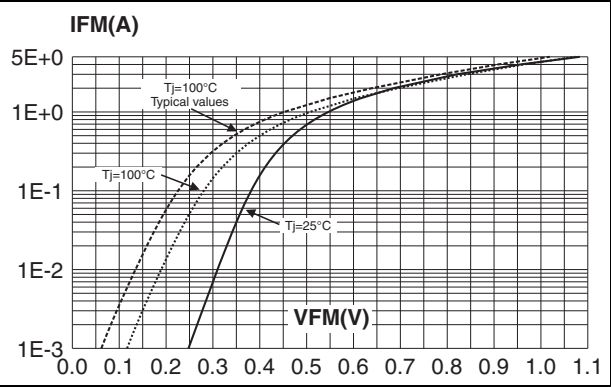


Figure 8. Forward voltage drop versus forward current (maximum values)



2 Package information

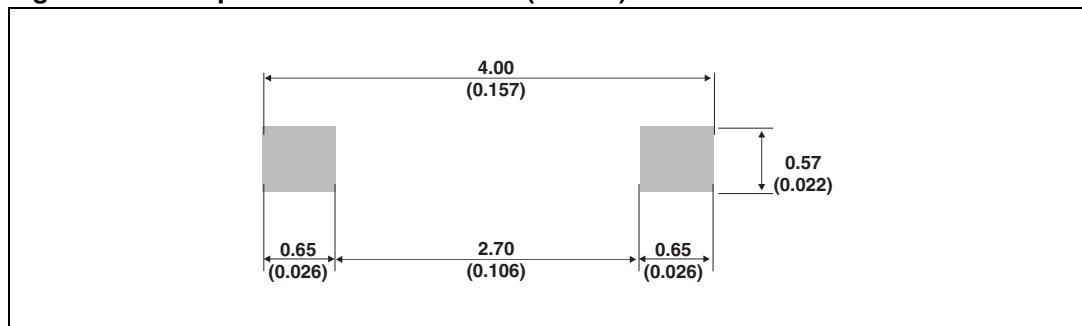
- Epoxy meets UL94, V0
- Band indicates cathode

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. SOD-123 dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		1.45		0.057
A1	0	0.1	0	0.004
A2	0.85	1.35	0.033	0.053
b	0.55 Typ.		0.022 Typ.	
c	0.15 Typ.		0.039 Typ.	
D	2.55	2.85	0.1	0.112
E	1.4	1.7	0.055	0.067
G	0.25		0.01	
H	3.55	3.75	0.14	0.148

Figure 9. Footprint dimensions in mm (inches)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS0540ZY	Z5Y	SOD-123	0.01 g	3000	Tape and reel

3.1 Revision history

Table 7. Revision history

Date	Revision	Changes
03-Nov-2011	1	Initial release.

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Contact Us :

➤ Address :

401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd
Minhang District, Shanghai , China

➤ Sales :

Direct +86 (21) 6401-6692

Email amall@ameya360.com

QQ 800077892

Skype ameyasales1 ameyasales2

➤ Customer Service :

Email service@ameya360.com

➤ Partnership :

Tel +86 (21) 64016692-8333

Email mkt@ameya360.com