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# STPS0540-Y

## Automotive Schottky rectifier

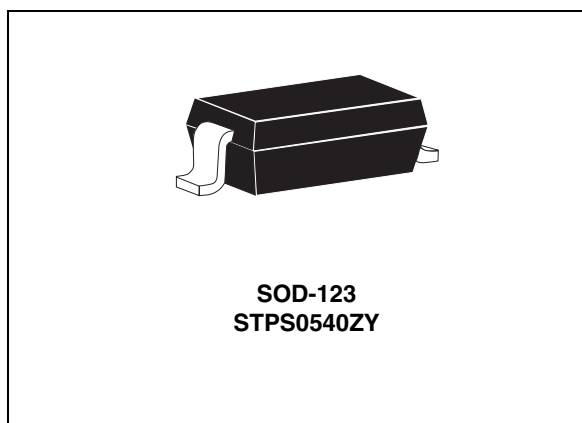
### Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- ECOPACK<sup>®</sup>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.



**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/ $\mu\text{s}$
$T_{stg}$	Storage temperature range	-65 to + 150	$^\circ\text{C}$
$T_j$	Operating junction temperature <sup>(1)</sup>	-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 <sup>(1)</sup>	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	$\mu\text{A}$
		$T_j = 100\text{ }^\circ\text{C}$		1.5	5	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 0.5\text{ A}$		0.50	V
		$T_j = 100\text{ }^\circ\text{C}$		0.35	0.40	
		$T_j = 25\text{ }^\circ\text{C}$	$I_F = 1\text{ A}$		0.55	
		$T_j = 100\text{ }^\circ\text{C}$		0.45	0.51	

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

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

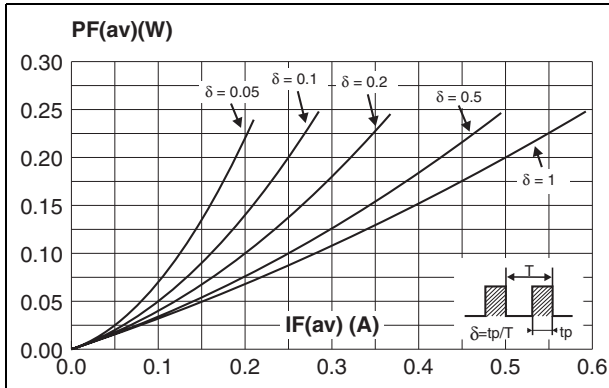
To evaluate the conduction losses use the following equation:

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

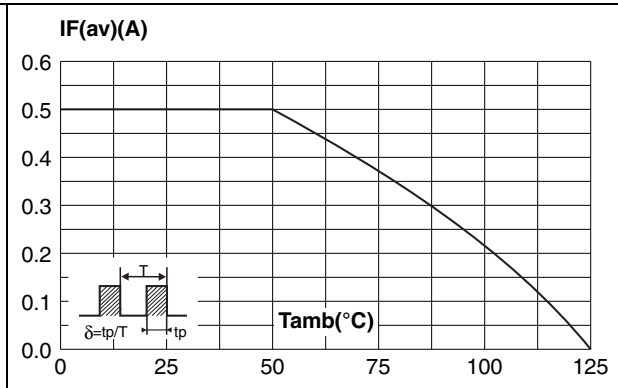
**STPS0540-Y**

**Characteristics**

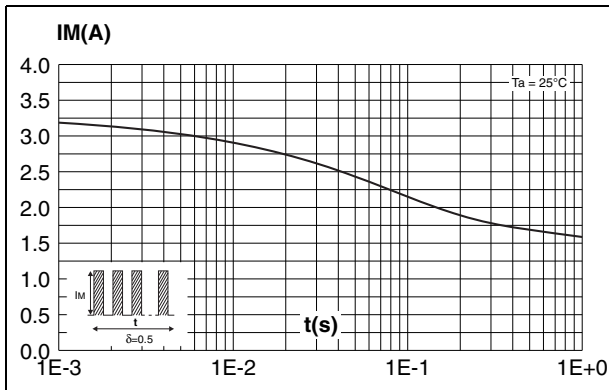
**Figure 1. Average forward power dissipation versus average forward current**



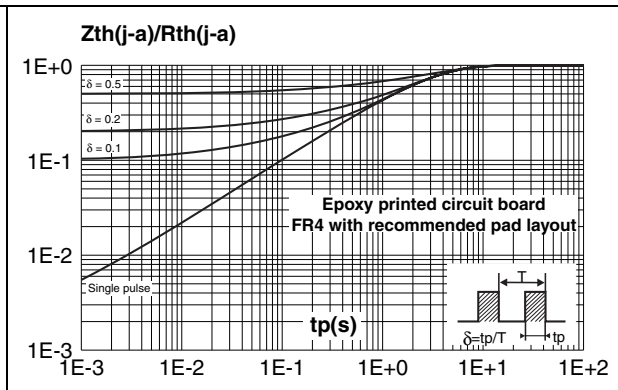
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



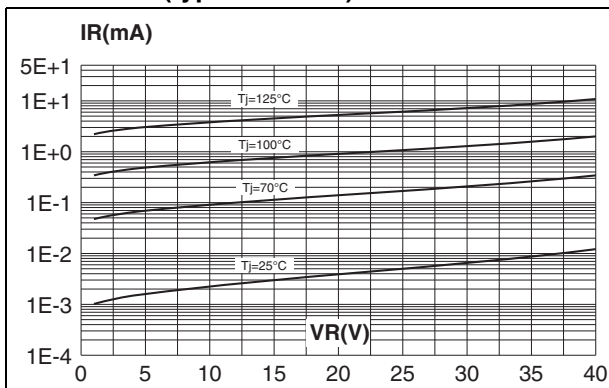
**Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)**



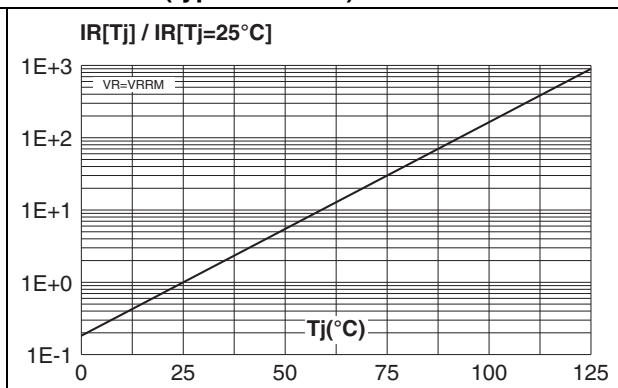
**Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration**



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



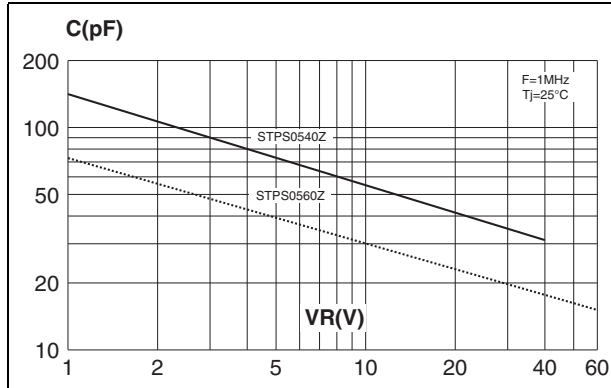
**Figure 6. Reverse leakage current versus junction temperature (typical values)**



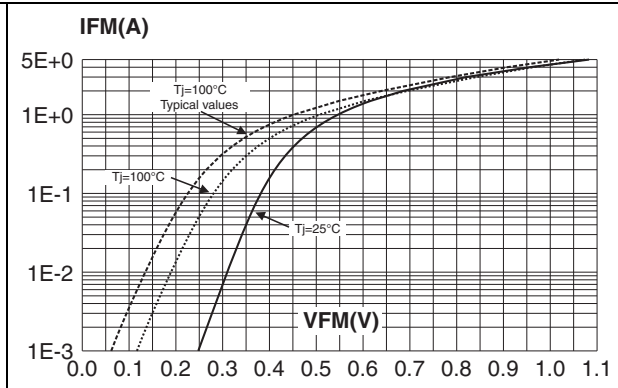
**Characteristics**

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



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



## 2 Package information

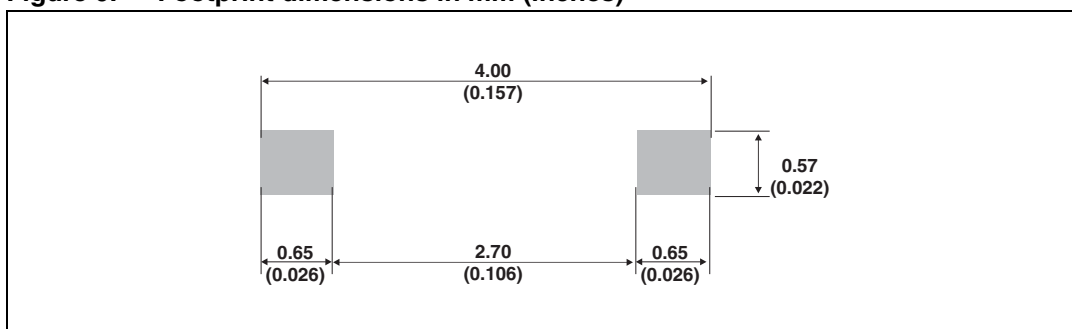
- Epoxy meets UL94, V0
- Band indicates cathode

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](http://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.

## STPS0540-Y

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