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STPS140Z-Y

Automotive power Schottky rectifier

Datasheet – production data

Features

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

Description

This single Schottky rectifier is suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in SOD-123, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection for automotive applications.

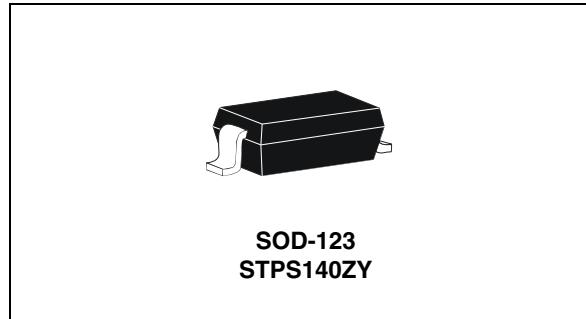


Table 1. Device summary

I_F	1 A
V_{RRM}	40 V
T_j (max)	150 °C
V_F (max)	0.49 V

Characteristics

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1 Characteristics

Table 2. Absolute Ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		40	V
I_F	Continuous forward current	$T_{amb} = 60^\circ C$	1	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10 \text{ ms sinusoidal}$	5.5	A
I_{RRM}	Repetitive peak reverse current	$t_p = 2 \mu\text{s } F = 1 \text{ kHz square}$	0.5	A
I_{RSM}	Non repetitive peak reverse current	$t_p = 100 \mu\text{s square}$	1	A
T_{stg}	Storage temperature range		- 65 to + 150	°C
T_j	Operating junction temperature ⁽¹⁾		- 40 to + 150	°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 resistance

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

1. Mounted on epoxy board.

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ C$	$V_R = 5 \text{ V}$			10	μA
		$T_j = 25^\circ C$	$V_R = 40 \text{ V}$			40	
		$T_j = 100^\circ C$			1.5	5	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25^\circ C$	$I_F = 1 \text{ A}$			0.55	V
		$T_j = 100^\circ C$			0.45	0.51	

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

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

To evaluate the maximum conduction losses use the following equation:

$$P = 0.2 \times I_{F(AV)} + 0.3 \times I_F^2 \text{ (RMS) at } T_j = 150^\circ C$$

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Figure 1. Average forward power dissipation versus average forward current

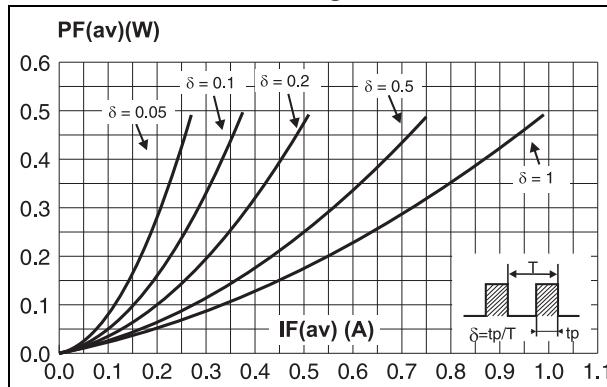


Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)

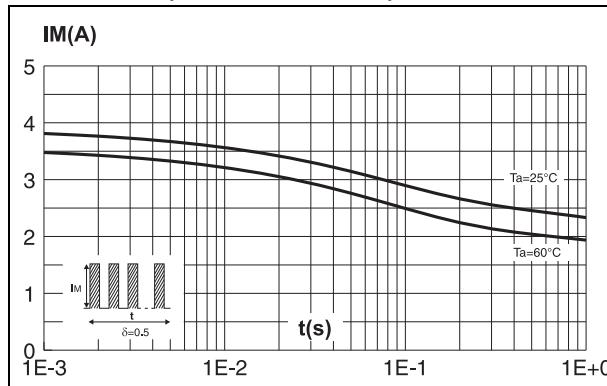


Figure 5. Reverse leakage current versus reverse voltage applied (typical value)

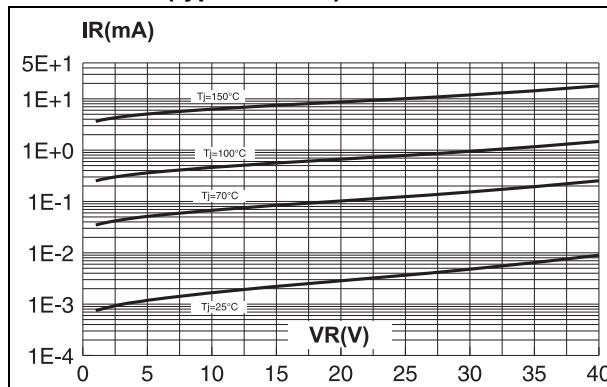


Figure 2. Average forward current versus ambient temperature ($\delta = 1$)

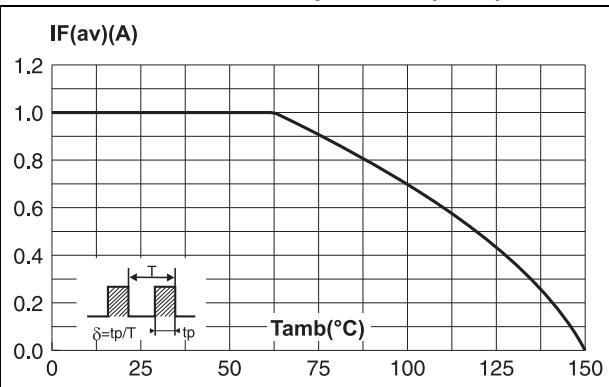


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration

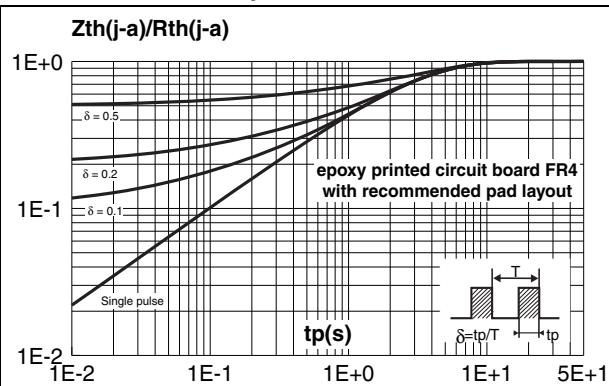
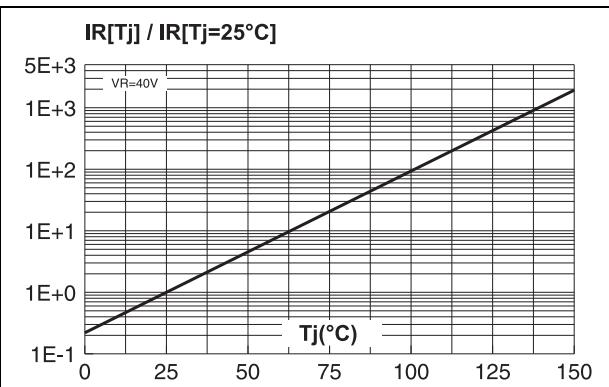


Figure 6. Reverse leakage current versus junction temperature (typical value)



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

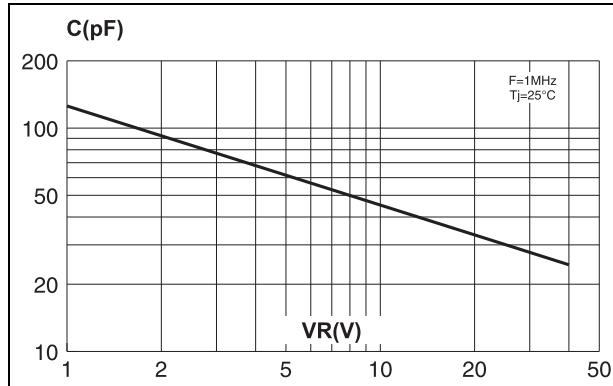


Figure 8. Forward voltage drop versus forward current (high level, maximum values)

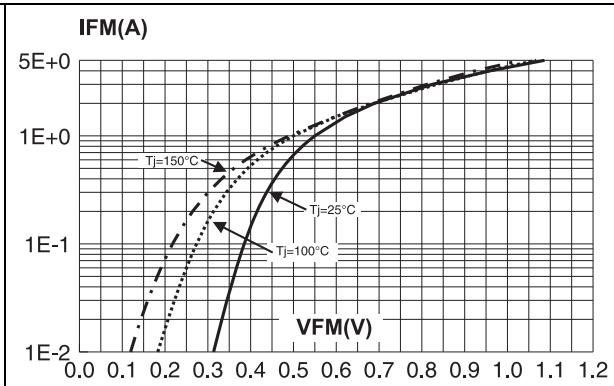
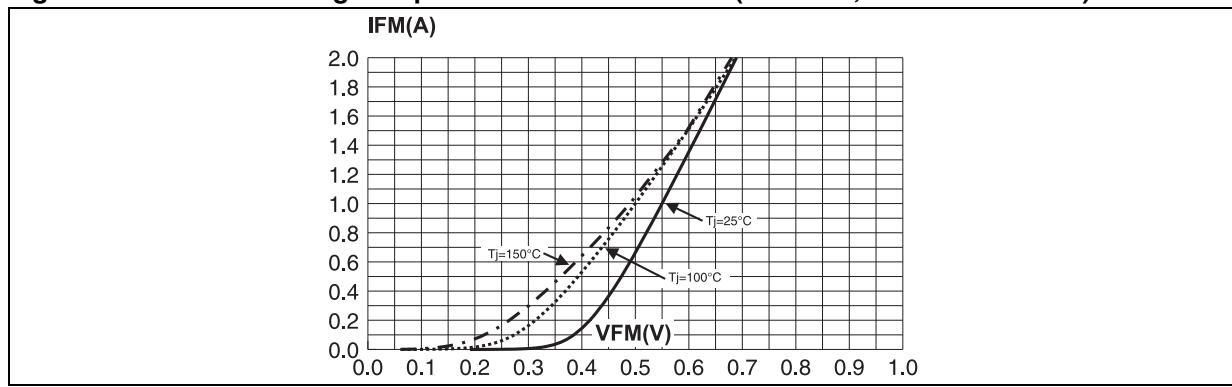


Figure 9. Forward voltage drop versus forward current (low level, maximum values)



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Package information

2 Package information

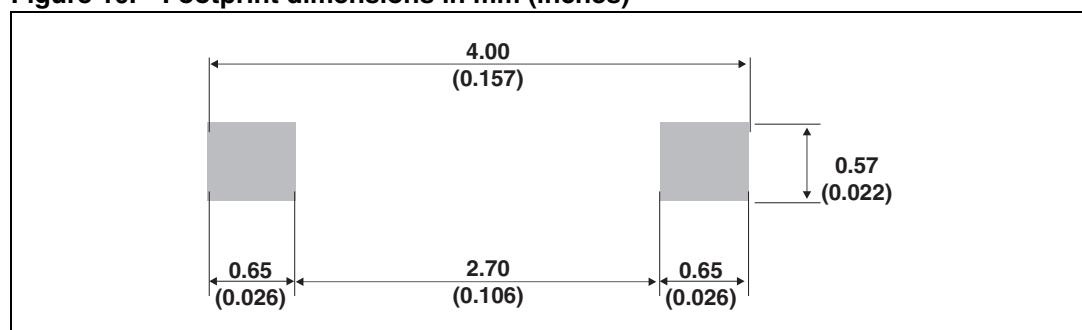
- Epoxy meets UL94, V0
- Lead-free packages

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 10. Footprint dimensions in mm (inches)



Ordering information**STPS140Z-Y****3 Ordering information****Table 6. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS140ZY	Z1Y	SOD-123	0.01 g	3000	Tape and reel

4 Revision history**Table 7. Document revision history**

Date	Revision	Changes
24-Oct-2012	1	First issue.

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