STPS140Z-Y

Automotive power Schottky rectifier

Datasheet - production data

SOD123

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

Symbol	Value
$I_{F(AV)}$	1 A
V_{RRM}	40 V
T_j (max)	150 °C
$V_{F\ (max)}$	0.51 V

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 °C	1	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	5.5	A
I_{RRM}	Repetitive peak reverse current	t_p = 2 µs F = 1 kHz square	0.5	A
I_{RSM}	Non repetitive peak reverse current	t_p = 100 µs 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. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ 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 °C	V_R = 5 V			10	µA
		T_j = 25 °C	V_R = 40 V			40	
		T_j = 100 °C			1.5	5	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 1 A			0.55	V
		T_j = 100 °C			0.45	0.51	

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

To evaluate the maximum conduction losses use the following equation:
$P = 0.2 \times I_{F(AV)} + 0.3 \times I_F{}^2{}_{(RMS)}$ at T_j = 150 °C

Figure 1. Average forward power dissipation versus average forward current

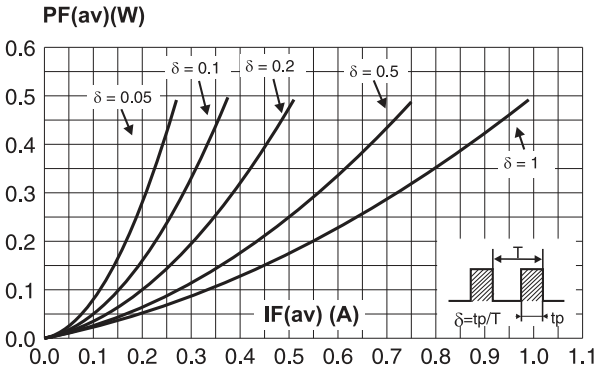


Figure 2. Average forward current versus ambient temperature (δ = 1)

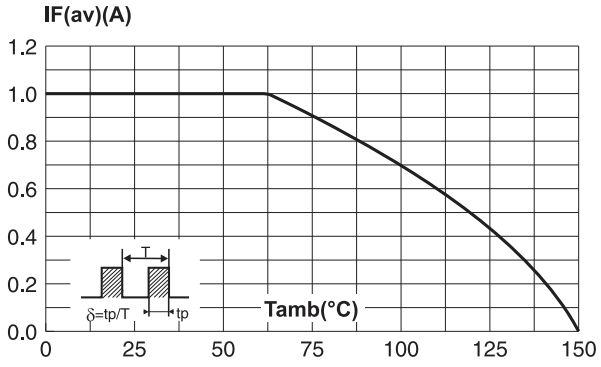


Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)

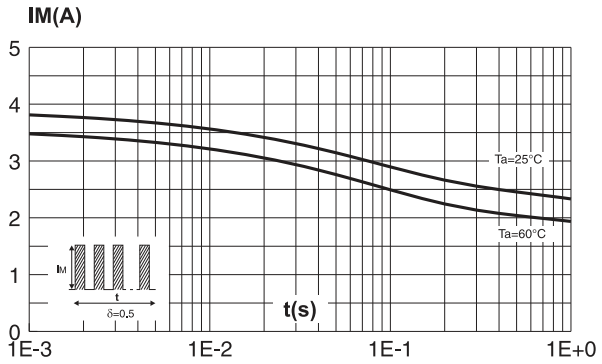


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration

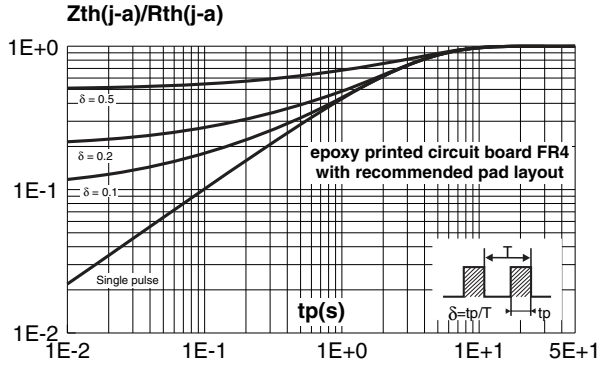


Figure 5. Reverse leakage current versus reverse voltage applied (typical value)

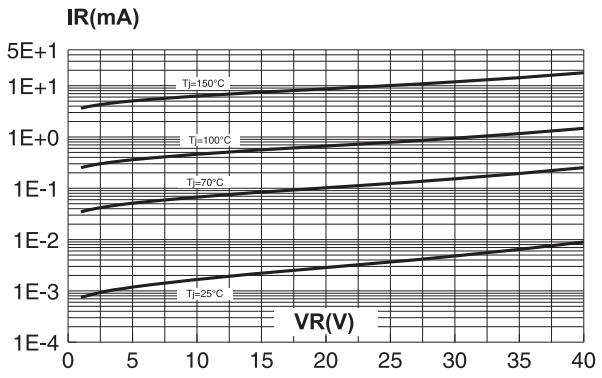


Figure 6. Reverse leakage current versus junction temperature (typical value)

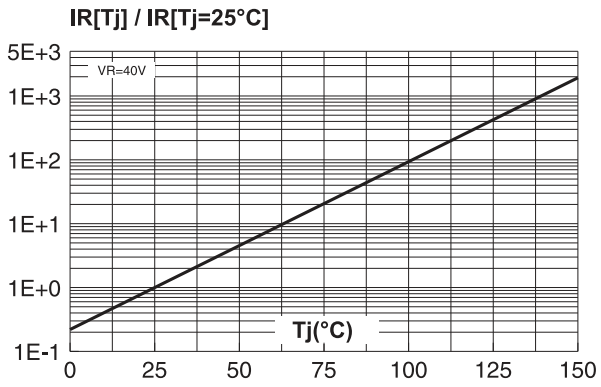


Figure 7. Junction capacitance versus reverse voltage applied (typical value)

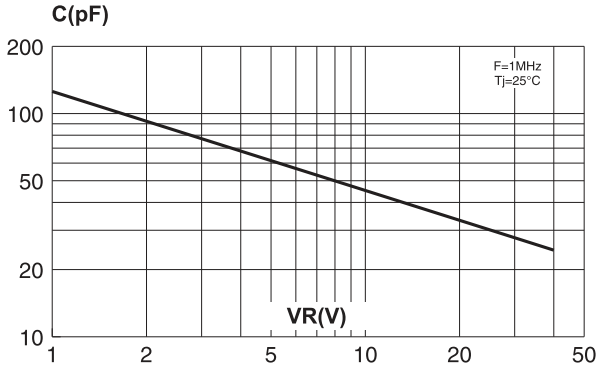


Figure 8. Forward voltage drop versus forward current (high level, maximum values)

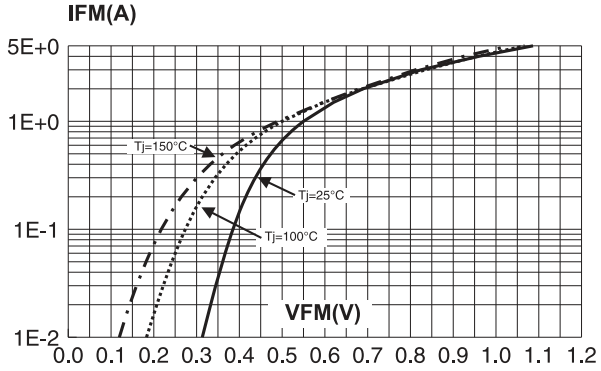
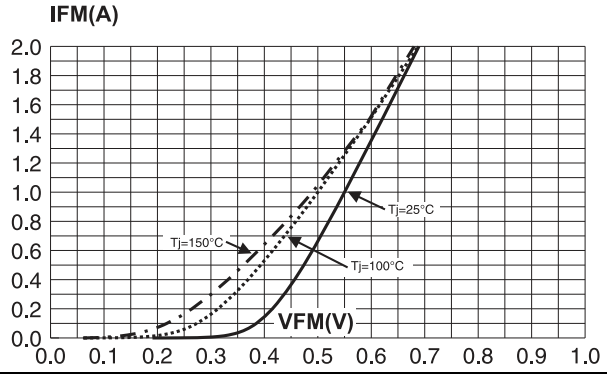


Figure 9. Forward voltage drop versus forward current (low level, maximum values)



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.

2.1 SOD-123 package information

Figure 10. SOD123 package outline

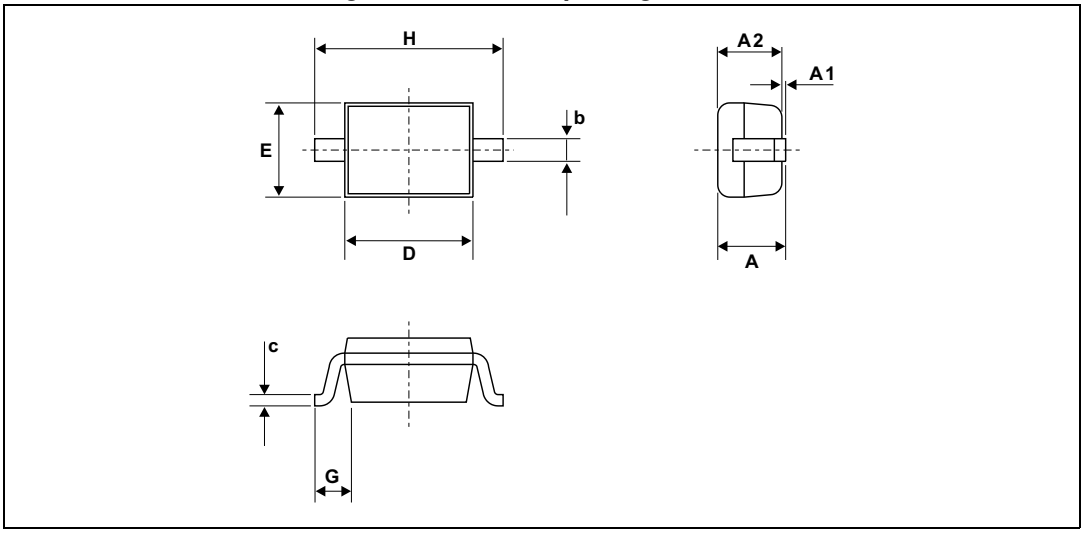
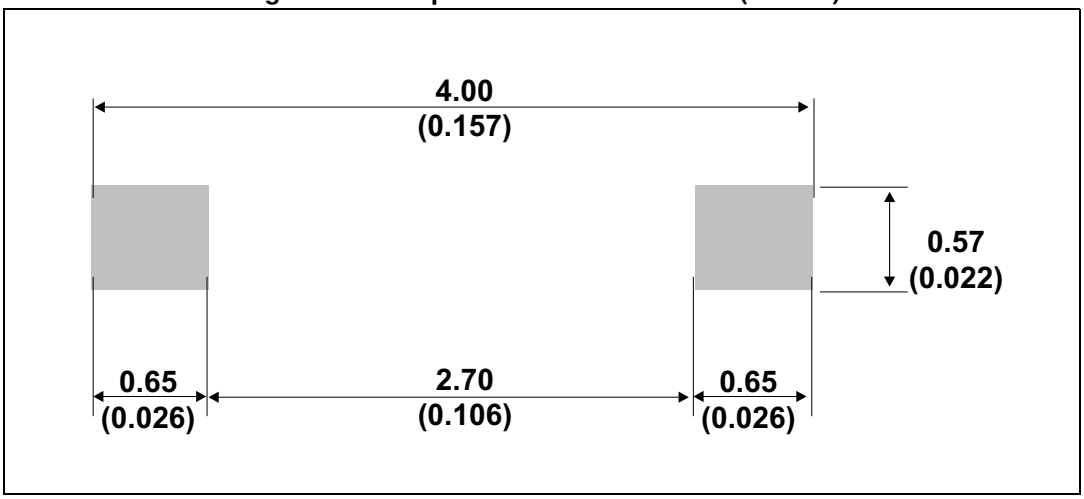


Table 5. SOD123 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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			0.022	
c		0.15			0.039	
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 11. Footprint dimensions in mm (inches)



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.
07-Jul-2015	2	Updated *Table 4* and reformatted to current standard.