STPS1150-Y

Datasheet

Automotive power Schottky rectifier





SMA



Features

- AEC-Q101 qualified
- Negligible switching losses
- Low forward voltage drop for higher efficiency and extended battery life
- Low thermal resistance
- Surface mount miniature package
- Avalanche capability specified
- ECOPACK®2 compliant component
- PPAP capable

Description

This 150 V power Schottky rectifier is ideal for switch mode power supplies on up to 24 V rails and high frequency converters.

Packaged in SMA, the STPS1150-Y is intended for use in ECU (Engine Control Unit) and fly-back converters in automotive applications where low drop forward voltage is required to reduce power dissipation.

Product status	
STPS1150-Y	
Product summary	
Symbol	**Values**
$I_{F(AV)}$	1 A
V_{RRM}	150 V
$T_{j\ (max)}$	175 °C
$V_{F(max)}$	0.67 V

1 Characteristics

Table 1. Absolute ratings (limiting values, at 25 °C unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage, T_j = -40 °C to +175 °C		150	V
$I_{F(RMS)}$	Forward rms current		15	A
$I_{F(AV)}$	Average forward current	T_L = 150 °C, δ = 0.5 square wave	1	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	50	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C	108	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature range(1)		-40 to +175	°C

1. *$(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.*

Table 2. Thermal resistance parameters

Symbol	Parameter	Max. value	Unit
$R_{th(j-l)}$	Junction to lead	30	°C/W

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	0.2	1.0	µA
		T_j = 125 °C		-	0.2	1.0	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 1 A	-	0.78	0.82	V
		T_j = 125 °C		-	0.62	0.67	
		T_j = 25 °C	I_F = 2 A	-	0.85	0.89	
		T_j = 125 °C		-	0.69	0.75	

1. *t_p = 5 ms, δ < 2%*
2. *t_p = 380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation:

$P = 0.59 \times I_{F(AV)} + 0.08 \times I_F{}^2{}_{(RMS)}$

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

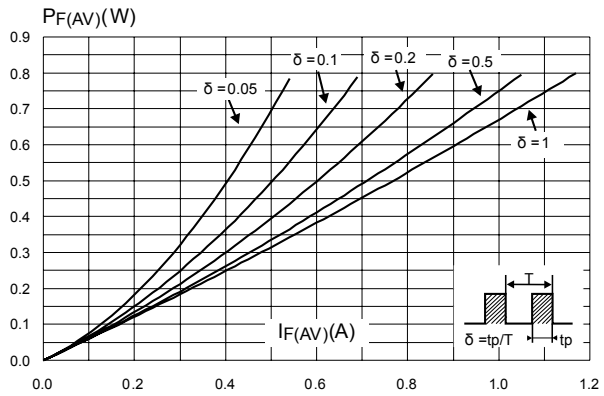


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

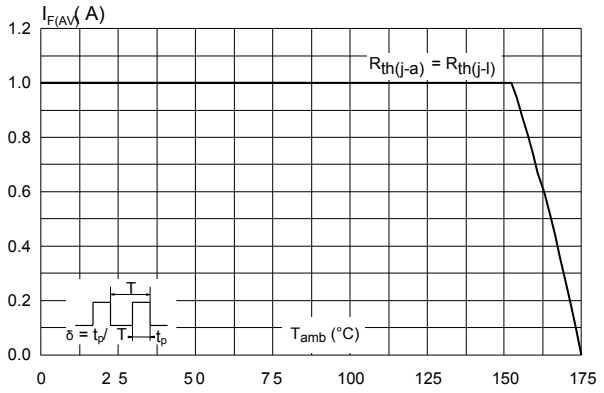


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

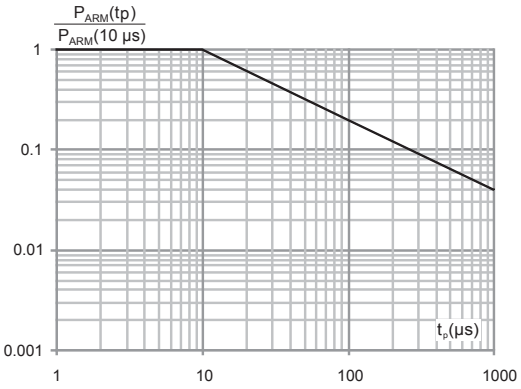


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration

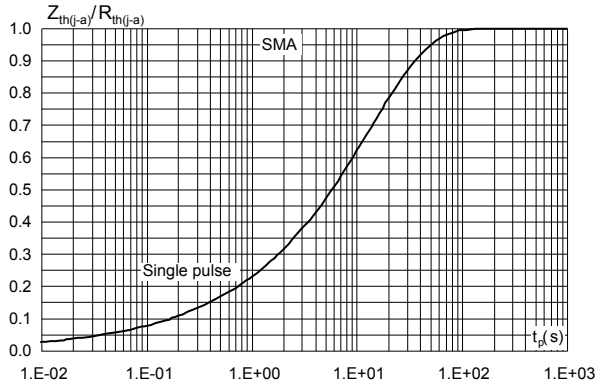


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

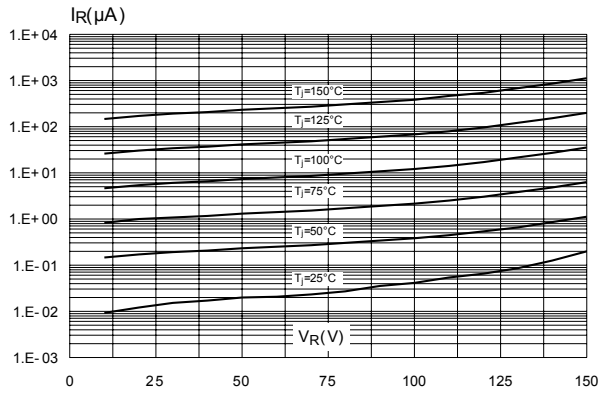


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

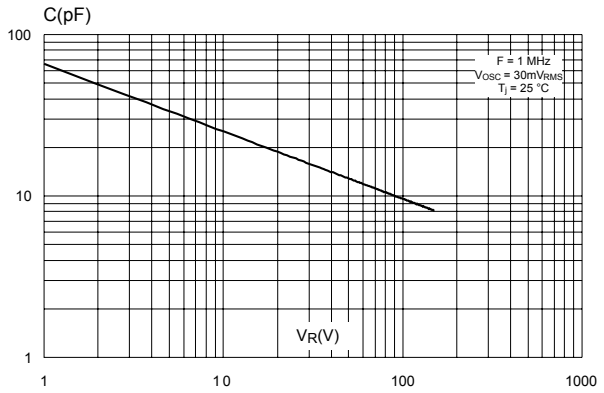


Figure 7. Forward voltage drop versus forward current

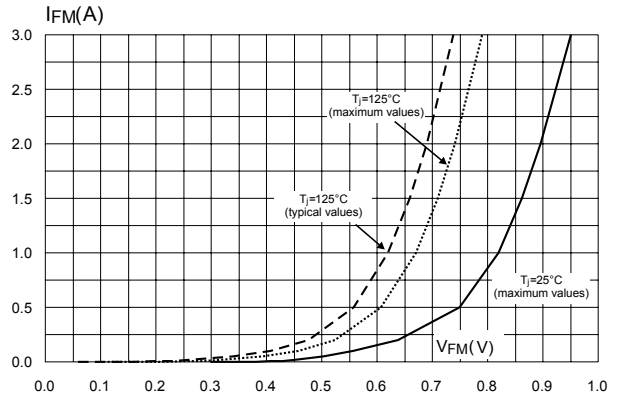
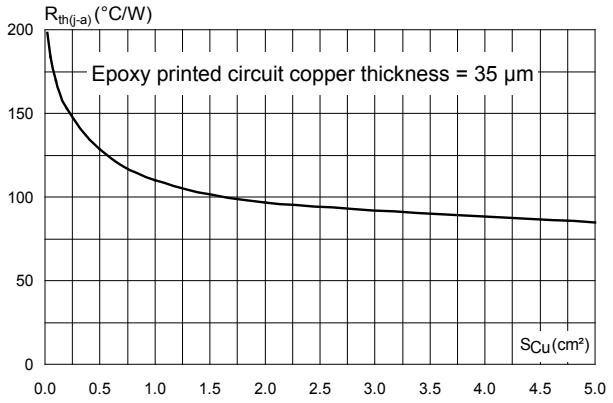


Figure 8. Thermal resistance junction to ambient versus copper surface under each lead (SMA)



2 Package information

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 SMA package information

- Band shows cathode
- Epoxy meets UL94, V0

Figure 9. SMA package outline

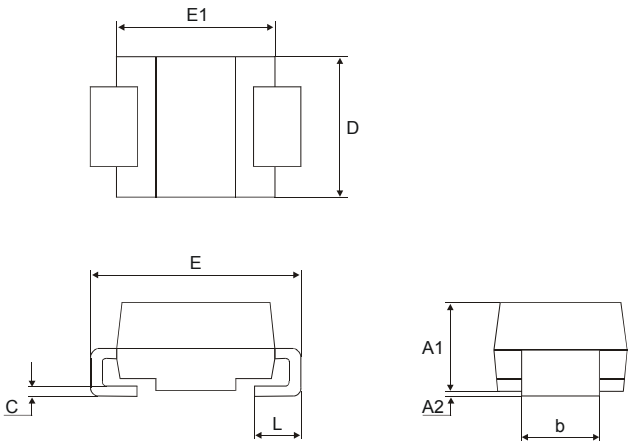
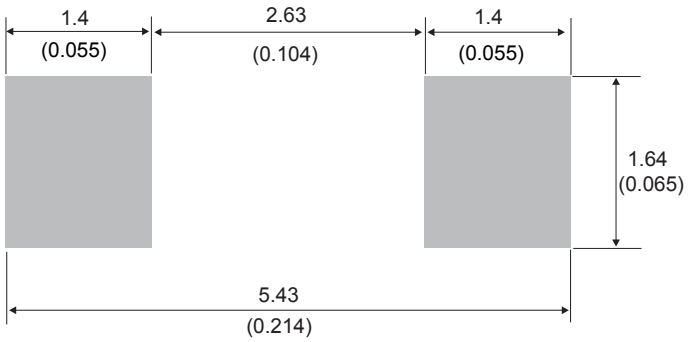


Table 4. SMA package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.097
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.40	0.006	0.016
D	2.25	2.90	0.089	0.114
E	4.80	5.35	0.189	0.211
E1	3.95	4.60	0.156	0.181
L	0.75	1.50	0.030	0.059

Figure 10. **SMA recommended footprint in mm (inches)**



3 Ordering Information

Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS1150AY	1150Y	SMA	0.068 g	5000	Tape and reel

Revision history

Table 6. Document revision history

Date	Version	Changes
02-Nov-2011	1	Initial release.
02-May-2012	2	Updated Table 3.
16-Apr-2018	3	Updated Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C), Table 2. Thermal resistance parameters and Table 1. Absolute ratings (limiting values, at 25 °C unless otherwise specified). Removed figure 4 and figure 5.

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