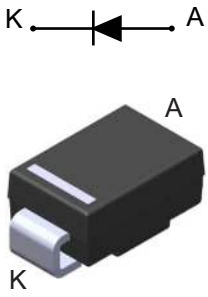
STPS3150-Y

Datasheet

Automotive 150 V, 3 A power Schottky rectifier



SMB

Features

- AEC-Q101 qualified
- Negligible switching losses
- Low forward voltage drop for higher efficiency and extended battery life
- Surface mount miniature package
- Low thermal resistance
- ECOPACK2 component

Applications

- DC / DC converter
- Reverse polarity protection
- Freewheeling diodes
- Switching diode

Description

Packaged in SMB, this device is intended for use in automotive applications where low drop forward voltage is required to reduce power dissipation.

Product status
STPS3150-Y

Product summary	
Symbol	**Value**
$I_{F(AV)}$	3 A
V_{RRM}	150 V
$T_{j(max.)}$	175 °C
$V_{F(typ.)}$	0.63 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
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	T_L = 130 °C	3	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	80	A
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 parameter

Symbol	Parameter	Max. value	Unit
$R_{th(j-l)}$	Junction to lead	20	°C/W

For more information, please refer to the following application note :

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	0.4	2.0	µA
		T_j = 125 °C		-	0.6	2.0	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 3 A	-	0.78	0.82	V
		T_j = 125 °C		-	0.63	0.67	
		T_j = 25 °C	I_F = 6 A	-	0.85	0.89	
		T_j = 125 °C		-	0.70	0.75	

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

To evaluate the conduction losses, use the following equation:

$P = 0.59 \times I_{F(AV)} + 0.027 \times I_F{}^2{}_{(RMS)}$

For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

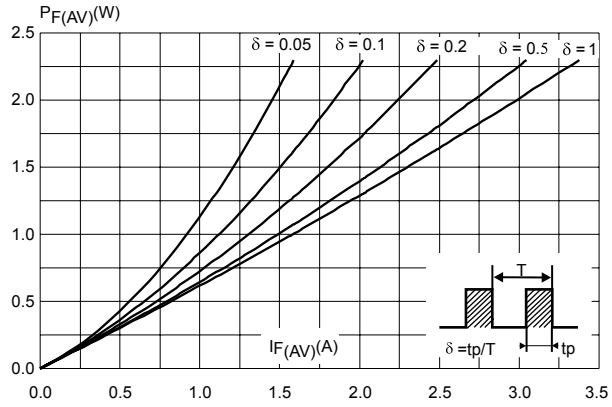


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

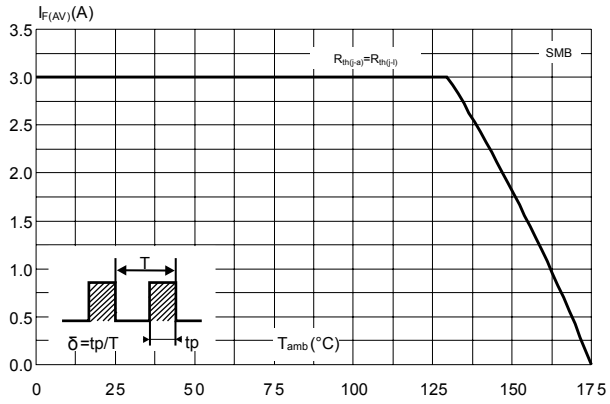


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

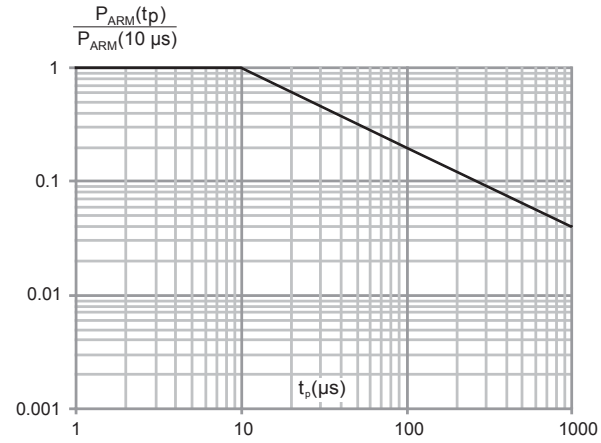


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

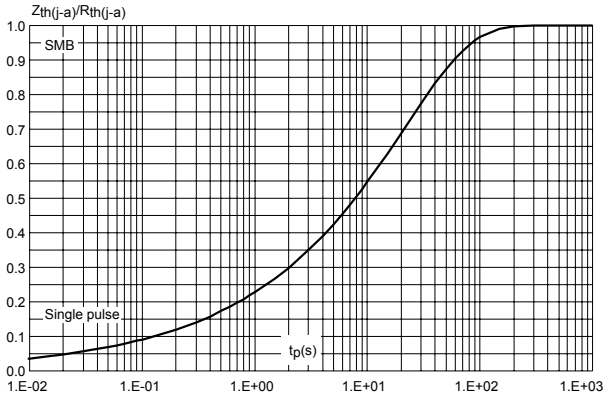


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

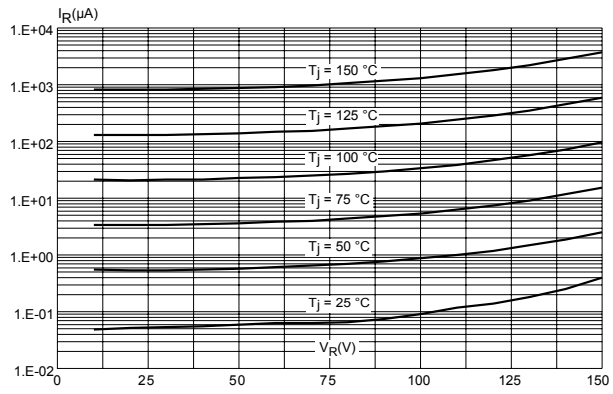


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

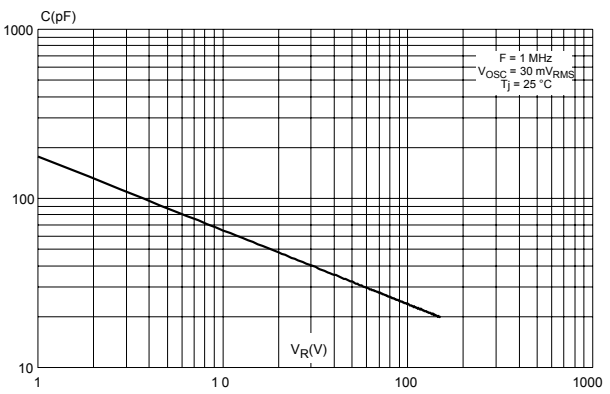


Figure 7. Forward voltage drop versus forward current

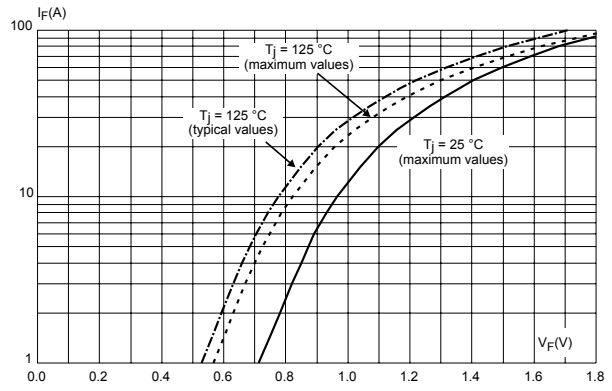
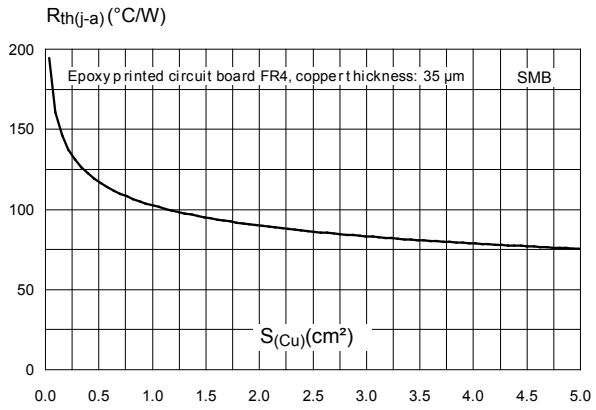


Figure 8. Thermal resistance junction to ambient versus copper surface under each lead (SMB)(typical values)



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 SMB package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 9. SMB package outline

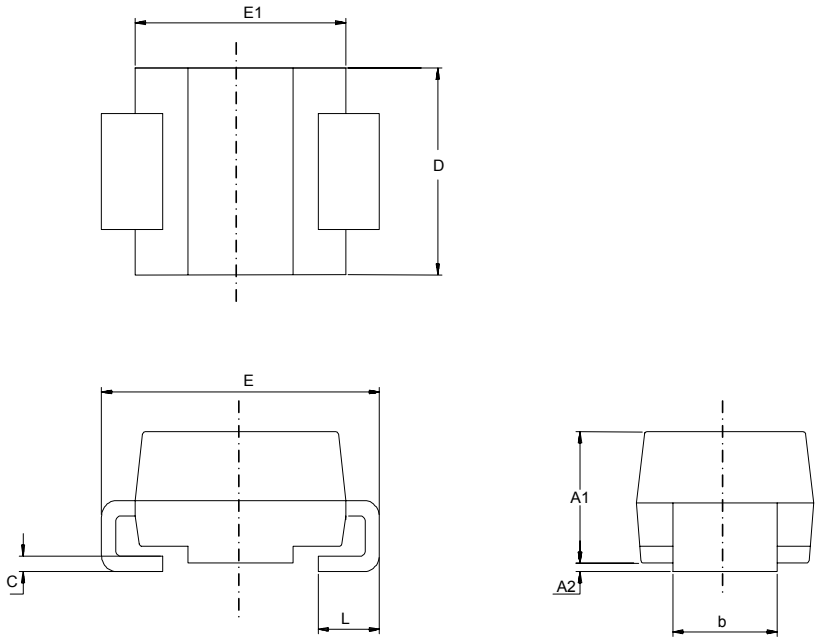
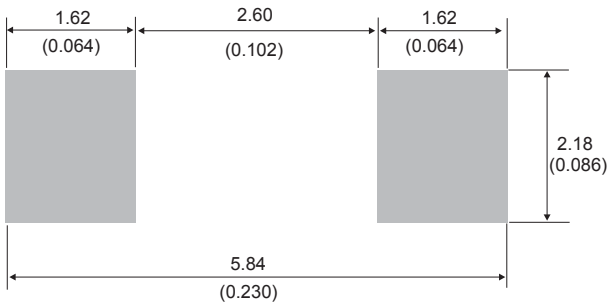


Table 4. SMB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.074	0.097
A2	0.05	0.20	0.001	0.008
b	1.95	2.20	0.076	0.087
c	0.15	0.40	0.005	0.016
D	3.30	3.95	0.129	0.156
E	5.10	5.60	0.200	0.221
E1	4.05	4.60	0.159	0.182
L	0.75	1.50	0.029	0.060

Figure 10. SMB recommended footprint



3 Ordering information

Table 5. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS3150UY	G315Y	SMB	0.107 g	2500	Tape and reel

Revision history

Table 6. **Document revision history**

Date	Version	Changes
03-Nov-2011	1	Initial release.
16-Jan-2020	2	Updated Figure 1, Figure 2 and Figure 8.