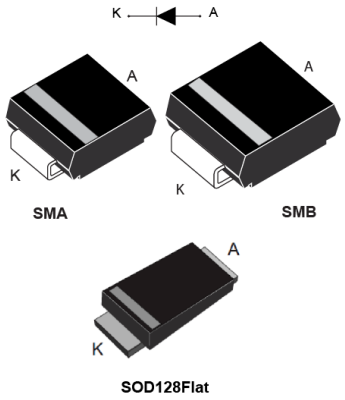
STPS2H100-Y

Datasheet

Automotive 100 V - 2 A power Schottky diode



Features

- AEC-Q101 qualified
- PPAP capable
- V_{RRM} guaranteed from -40°C to 175°C
- Low leakage current
- Avalanche capability specified
- ECOPACK2 compliant

Applications

- DC/DC converter
- Auxiliary power supply
- Freewheeling function
- Reverse battery polarity protection

Description

This high quality Schottky barrier rectifier device is designed for high frequency miniature switched mode power supplies such as adaptors or on-board DC/DC converters for automotive applications.

Packaged in SMB, SMA and SOD128Flat, the STPS2H100-Y provides a high level of performance in compact and flat packages which can withstand high operating junction temperature.

Product status link
STPS2H100-Y

Product summary	
$I_{F(AV)}$	2 A
V_{RRM}	100 V
T_j (max.)	175 °C
V_F (typ.)	0.60 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)			100	V
$I_{F(AV)}$	Average forward current, δ = 0.5 square wave	T_L = 135 °C	SMB	2	A
		T_L = 130 °C	SMA		
		T_L = 150 °C	SOD128Flat		
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	SMA, SMB	75	A
			SOD128Flat	55	
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, Tj = 125°C		173	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 parameter

Symbol	Parameter		Max. value	Unit
$R_{th(j-l)}$	Junction to lead	SMA	30	°C/W
		SMB	25	
		SOD128Flat	16	

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	$V_R = V_{RRM}$	-		1	µA
		T_j = 125 °C		-	0.4	1	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 2 A	-		0.79	V
		T_j = 125 °C		-	0.60	0.65	
		T_j = 25 °C	I_F = 4 A	-		0.88	
		T_j = 125 °C		-	0.69	0.74	

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:

$P = 0.56 \times I_{F(AV)} + 0.045 \times I_F{}^2{}_{(RMS)}$

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 current versus lead temperature (δ = 0.5)

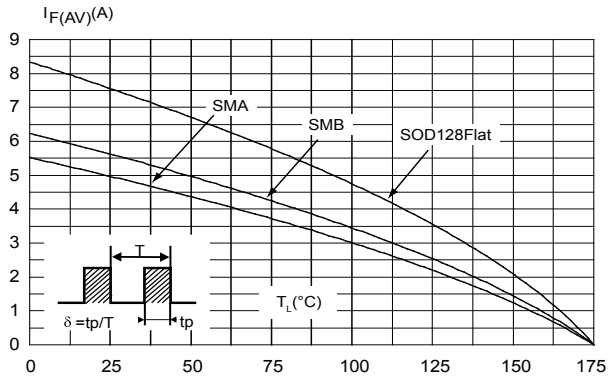


Figure 2. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)

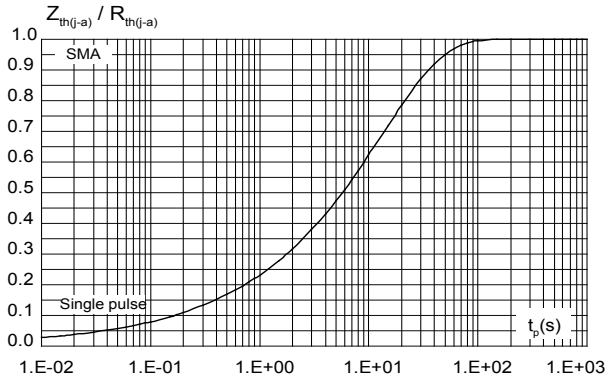


Figure 3. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

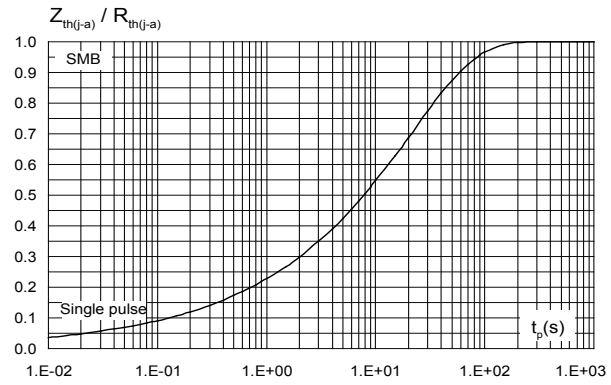


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration (SOD128Flat)

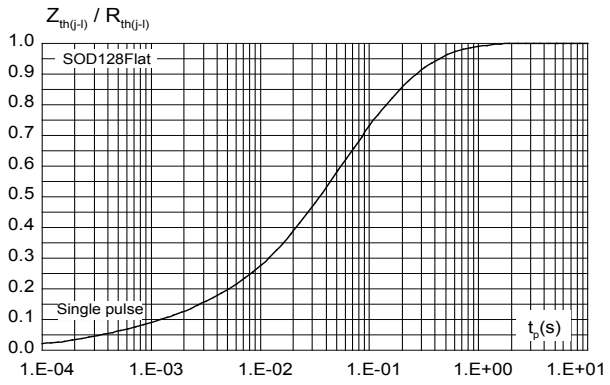


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

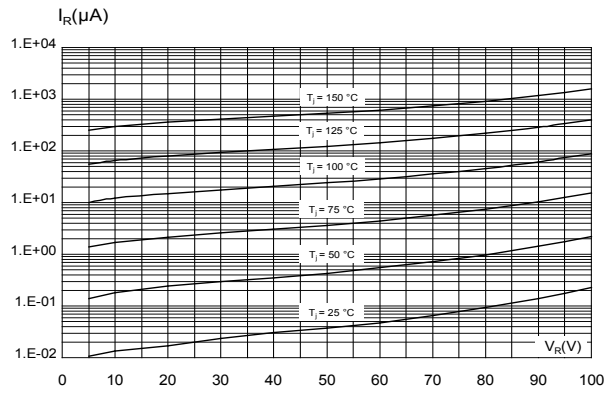


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

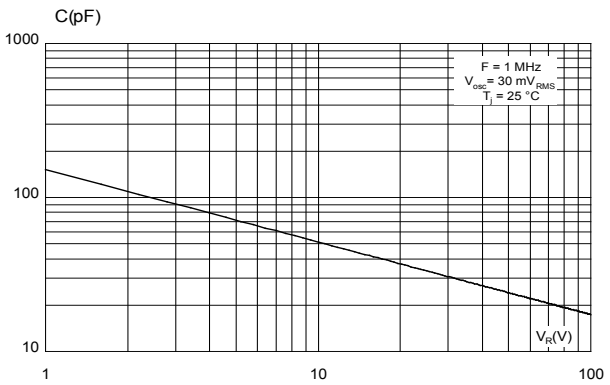


Figure 7. Forward voltage drop versus forward current (typical values)

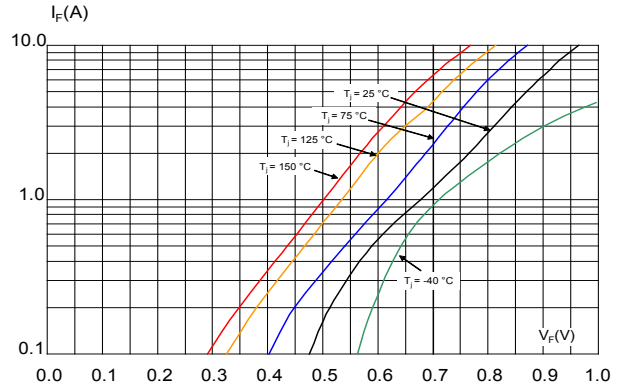


Figure 8. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

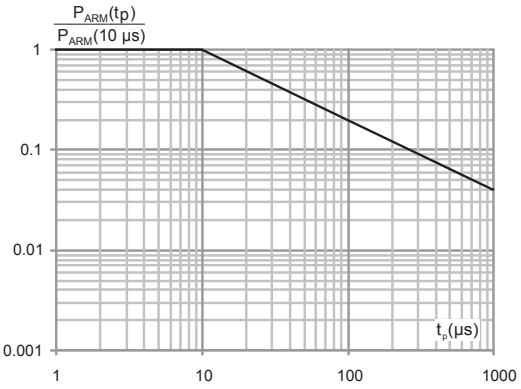


Figure 9. Thermal resistance junction to ambient versus copper surface under each lead (SMA, typical values)

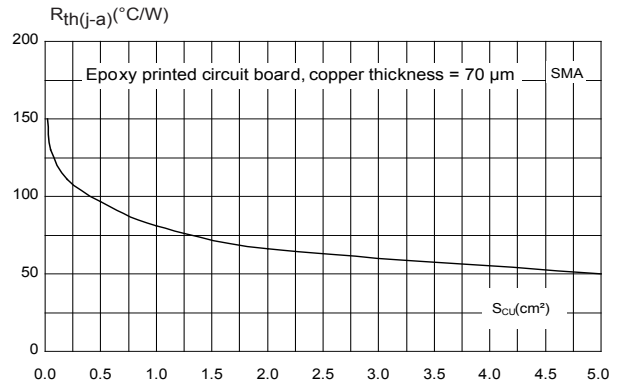


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (SMB, typical values)

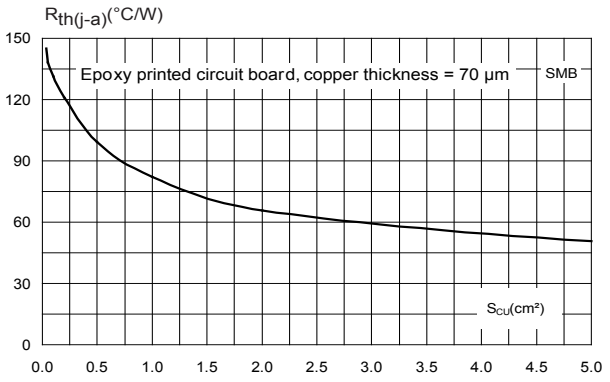
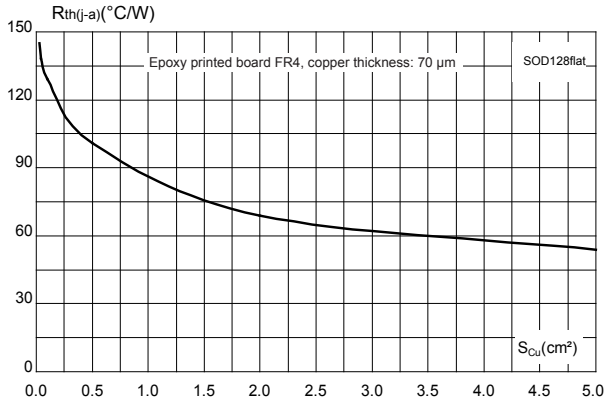


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (SOD128Flat, typical values)



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 SMA package information

- Epoxy meets UL94, V0
- Cooling method : by conduction (C)

Figure 12. SMA package outline

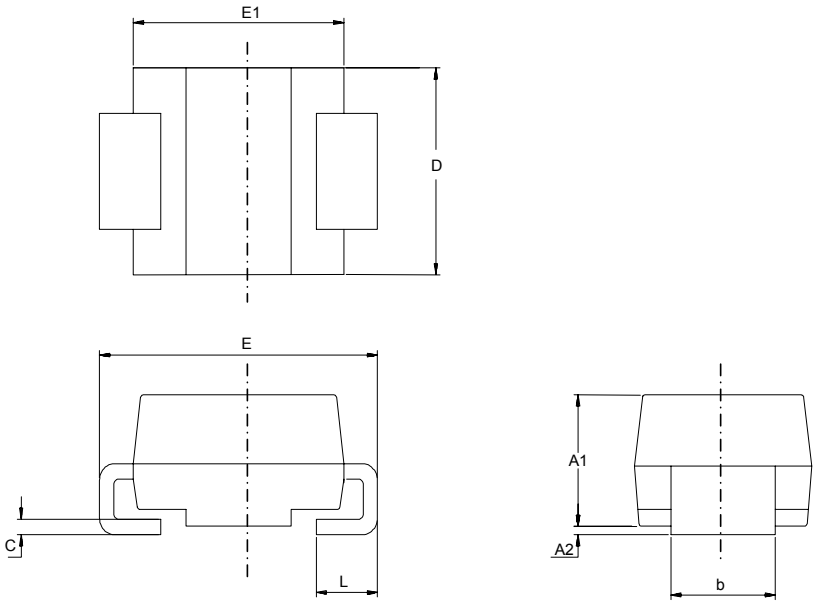
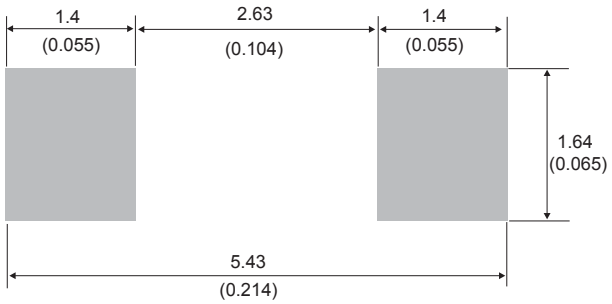


Table 4. SMA package mechanical data

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	1.25	1.65	0.049	0.065
c	0.15	0.40	0.005	0.016
D	2.25	2.90	0.088	0.115
E	4.80	5.35	0.188	0.211
E1	3.95	4.60	0.155	0.182
L	0.75	1.50	0.029	0.060

Figure 13. **SMA recommended footprint in mm (inches)**



2.2 SMB package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 14. SMB package outline

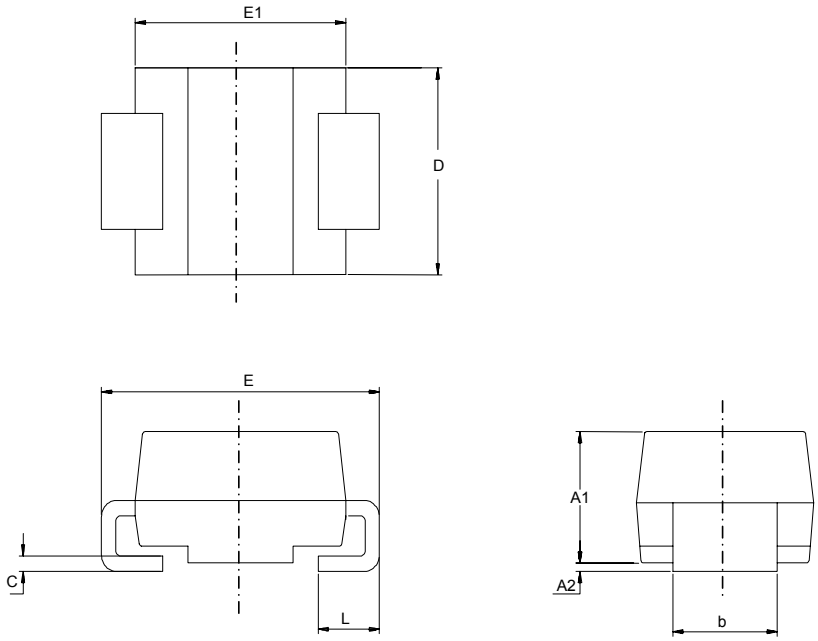
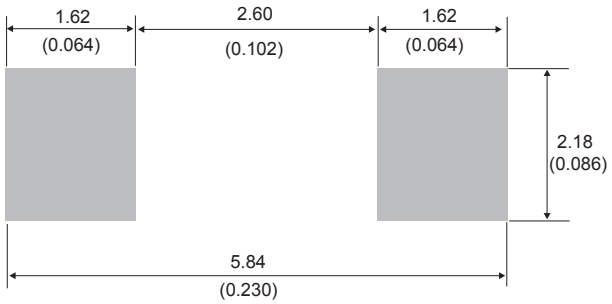


Table 5. SMB package mechanical data

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 15. **SMB recommended footprint**



2.3 SOD128Flat package information

- Lead-free package

Figure 16. **SOD128Flat package outline**

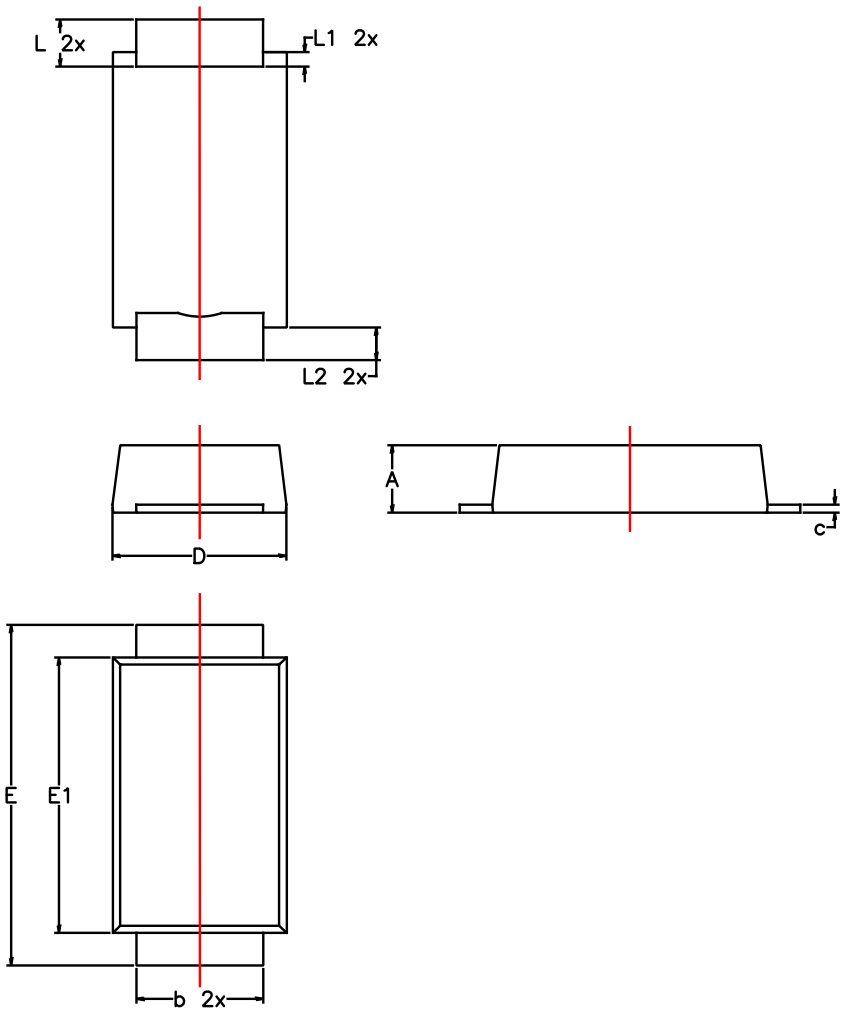
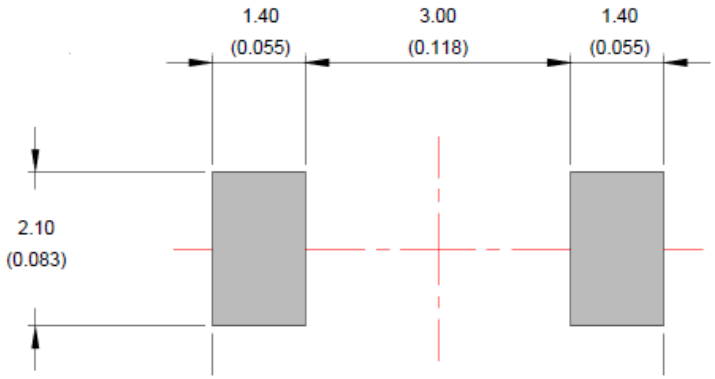


Table 6. **SOD128Flat package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.93	1.03	0.037	0.041
b	1.69	1.81	0.067	0.071
c	0.10	0.22	0.004	0.009
D	2.30	2.50	0.091	0.098
E	4.60	4.80	0.181	0.189
E1	3.70	3.90	0.146	0.154
L	0.55	0.85	0.026	0.033
L1	0.30 typ.		0.012 typ.	
L2	0.45 typ.		0.018 typ.	

Figure 17. **SOD128Flat footprint in mm (inches)**



Note: For package and tape orientation, reel and inner box dimensions and tape outline please check TN1173

3 Ordering information

Table 7. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS2H100AY	S21Y	SMA	68 mg	5000	Tape and reel
STPS2H100UY	G21Y	SMB	107 mg	2500	Tape and reel
STPS2H100AFY	2H100Y	SOD128Flat	26.4 mg	3000	Tape and reel

Revision history

Table 8. **Document revision history**

Date	Version	Changes
10-Dec-2010	1	Initial release.
11-Feb-2021	2	Added SOD128Flat package information. Minor text changes.