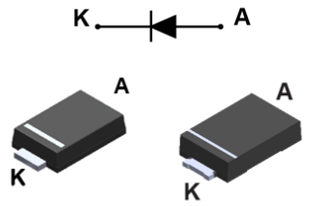
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STPS1170

Datasheet

170 V, 1 A power Schottky rectifier



SMA Flat SMA Flat Notch

Features

- Negligible switching losses
- High junction temperature capability
- Very small conduction losses
- Low leakage current
- Avalanche rated
- ECOPACK2 component

Applications

- LED lighting
- Battery charger
- DC / DC converter
- Notebook adapter
- Switching diode

Description

The STPS1170 is a 170 V Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in SMA Flat and SMA Flat Notch, the STPS1170 is ideal for use in low voltage, high frequency inverters, freewheeling and polarity protection. Also ideal for all LED lighting applications where efficiency and space constraint are required.

Product status
STPS1170

Product summary	
Symbol	Value
$I_{F(AV)}$	1 A
V_{RRM}	170 V
$T_{j(max.)}$	175 °C
$V_{F(typ.)}$	0.62 V

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1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			170	V
V_{RRM}	Repetitive peak reverse voltage, T_j = -40 °C			160	V
$I_{F(RMS)}$	Forward rms current			15	A
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	SMA Flat, SMA Flat Notch	T_L = 160 °C	1	A
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal	45	A
P_{ARM}	Repetitive peak avalanche power		t_p = 10 µs, T_j = 125 °C	110	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature1			+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 Flat, SMA Flat Notch	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	$V_R = V_{RRM}$	-		1.5	µA
		T_j = 125 °C		-	0.25	1.5	mA
V_F (1)	Forward voltage drop	T_j = 25 °C	I_F = 1 A	-		0.82	V
		T_j = 125 °C		-	0.62	0.67	
		T_j = 25 °C	I_F = 2 A	-		0.89	
		T_j = 125 °C		-	0.69	0.75	

1. *Pulse test: t_p = 380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation:

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

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

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1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

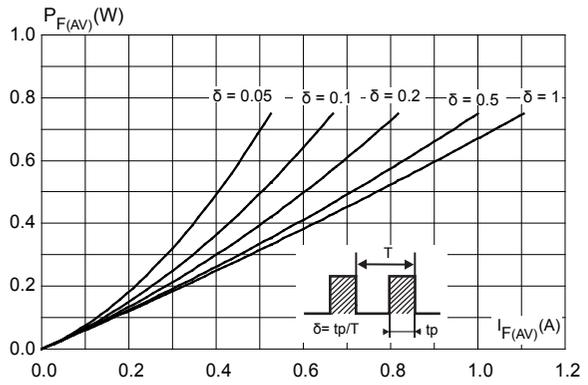


Figure 2. Average forward current versus ambient temperature (δ = 0.5, SMA Flat, SMA Flat Notch)

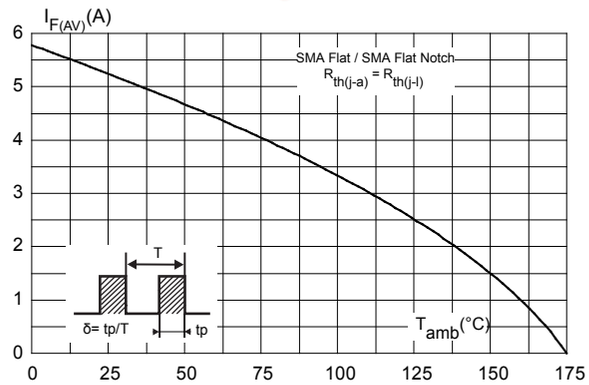


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

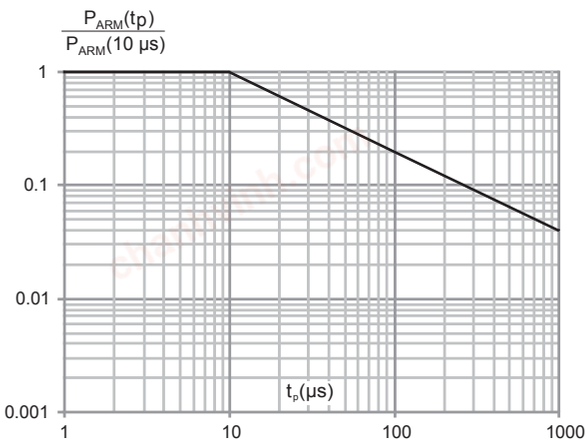


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration

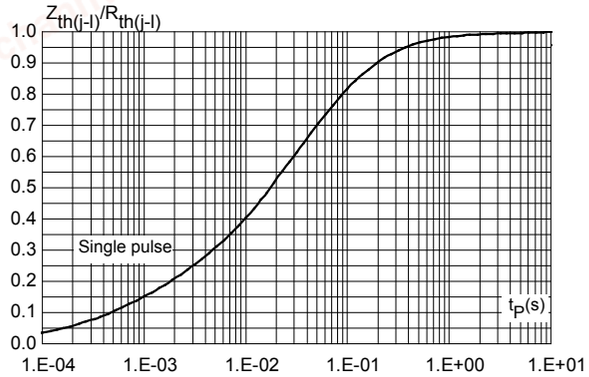


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

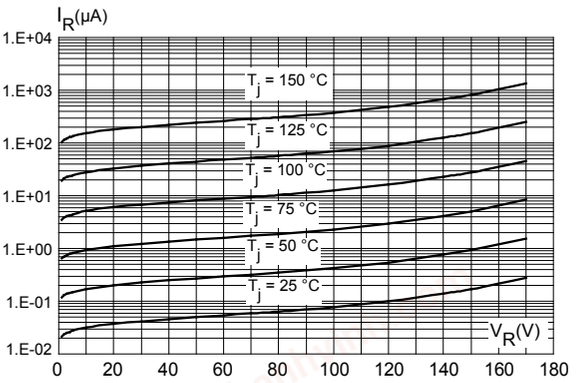
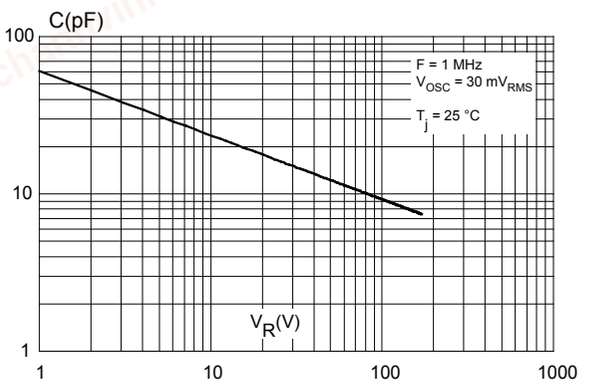


Figure 6. Junction capacitance versus reverse voltage applied (typical values)



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

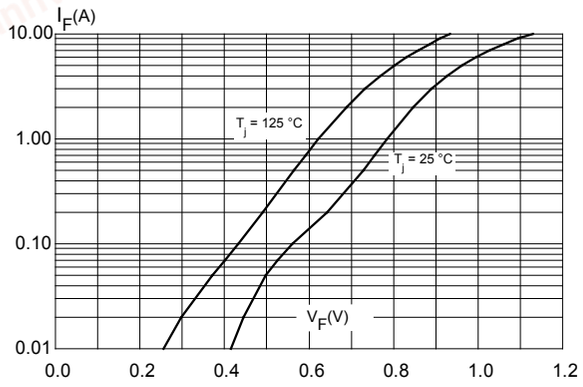


Figure 8. Forward voltage drop versus forward current (maximum values)

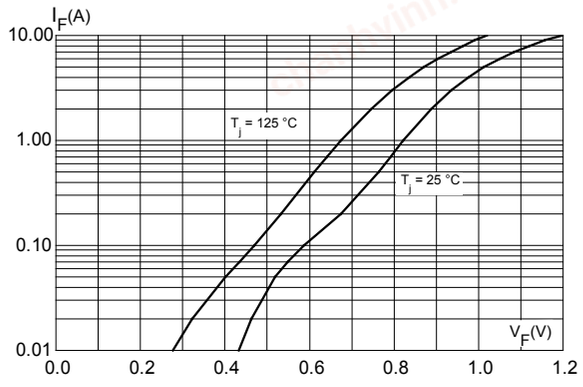
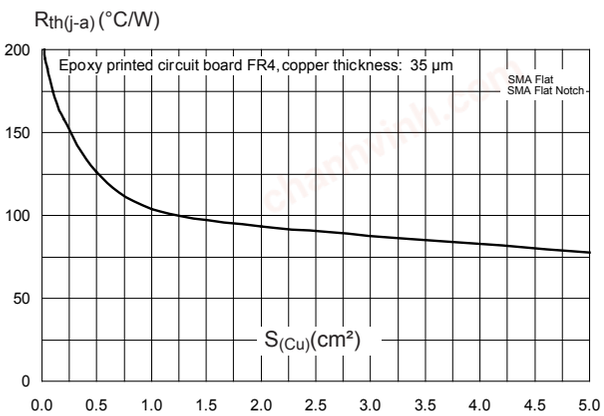


Figure 9. Thermal resistance junction to ambient versus copper surface under each lead (SMA Flat, SMA Flat Notch)



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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.

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2.1 SMA Flat package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 10. SMA Flat package outline

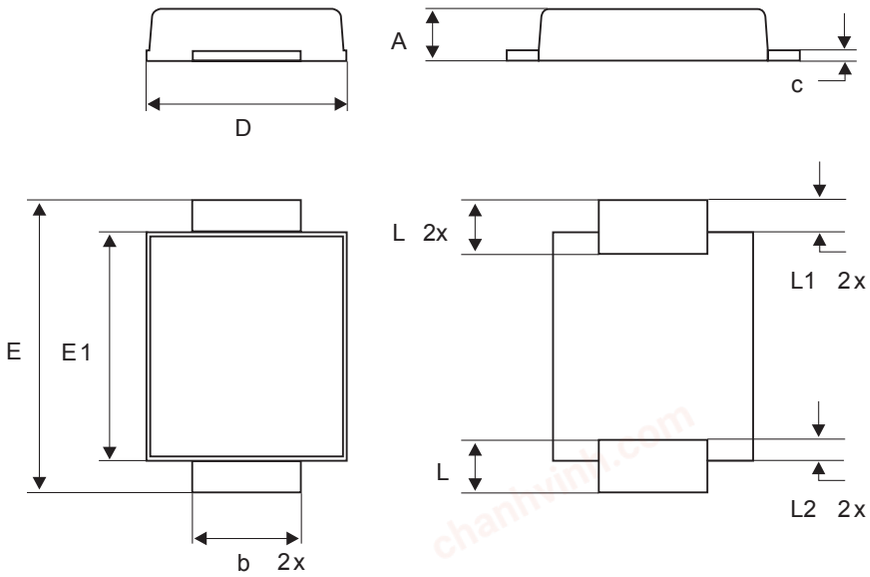
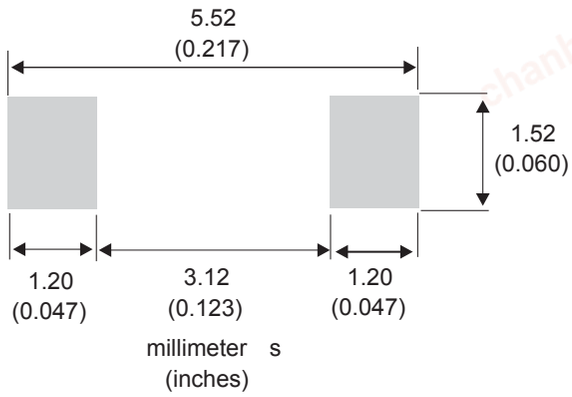


Table 4. SMA Flat package mechanical data

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.044
b	1.25		1.65	0.049		0.065
c	0.15		0.40	0.005		0.016
D	2.25		2.95	0.088		0.117
E	4.80		5.60	0.188		0.221
E1	3.95		4.60	0.155		0.182
L	0.75		1.50	0.029		0.060
L1		0.50			0.020	
L2		0.50			0.020	

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Figure 11. **SMA Flat recommended footprint in mm (inches)**



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2.2 SMA Flat Notch package information

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

Figure 12. SMA Flat Notch package outline

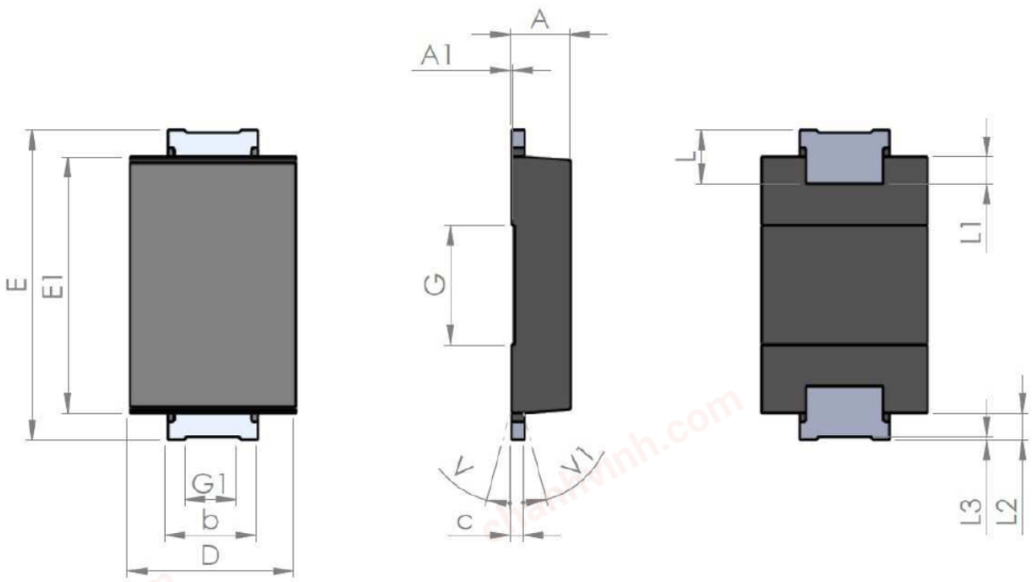
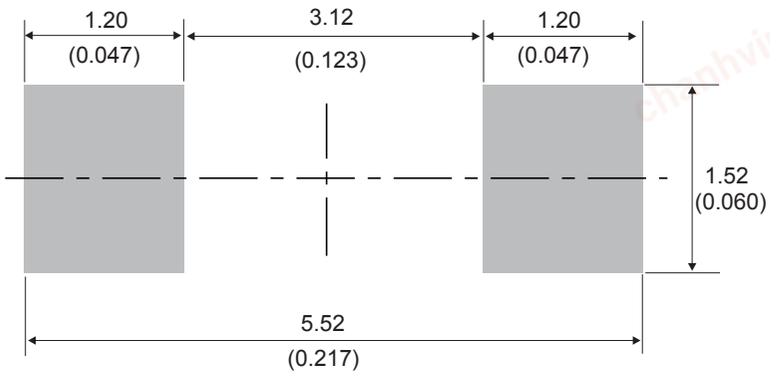


Table 5. SMA Flat Notch package mechanical data

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A1	0.90		1.10	0.035		0.044
A1		0.05			0.002	
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	5.00		5.35	0.196		0.211
E1	3.95		4.60	0.155		0.182
G		2.00			0.079	
G1		0.85			0.033	
L	0.75		1.20	0.029		
L1		0.45			0.018	
L2		0.45			0.018	
L3		0.05			0.002	
V			8°			8°
V1			8°			8°

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



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3 Ordering information

Table 6. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS1170AF	F1170	SMA Flat	0.035 g	10 000	Tape and reel
STPS1170AFN	A1170	SMA Flat Notch	0.039 g	10 000	Tape and reel

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Revision history

Table 7. **Document revision history**

Date	Version	Changes
14-Oct-2014	1	First release.
08-Oct-2019	2	Added Section 2.2 SMA Flat Notch package information.

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