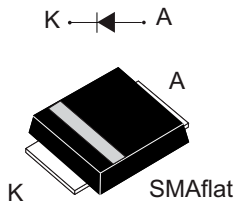
STPS1170

Power Schottky rectifier

Datasheet – production data



Features

- Negligible switching losses
- High junction temperature capability
- Very small conduction losses
- Low leakage current
- Avalanche rated
- ECOPACK® compliant component
- T_j = -40 °C minimum operating

Description

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

Packaged in SMAflat, this device is especially intended 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.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	1 A
V_{RRM}	170 V
V_F (typ)	0.62 V
T_j (max)	175 °C

1 Characteristics

Table 2. 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	SMAflat, T_L = 160 °C	1	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	45	A
P_{ARM}(1)	Repetitive peak avalanche power, square wave	t_p = 10 µs, T_j = 125 °C	110	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature(2)		-40 to +175	°C

1. For pulse time duration deratings, please refer to *Figure 3*. More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the STMicroelectronics Application notes AN1768, “Admissible avalanche power of Schottky diodes” and AN2025, “Converter improvement using Schottky rectifier avalanche specification”.
2. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal parameters

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction to lead, SMAflat	20	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			1.5	µA
		T_j = 125 °C			0.25	1.5	mA
V_F(2)	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 = 5 ms, δ < 2%
2. Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:

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

Figure 1. Average forward power dissipation versus average forward current

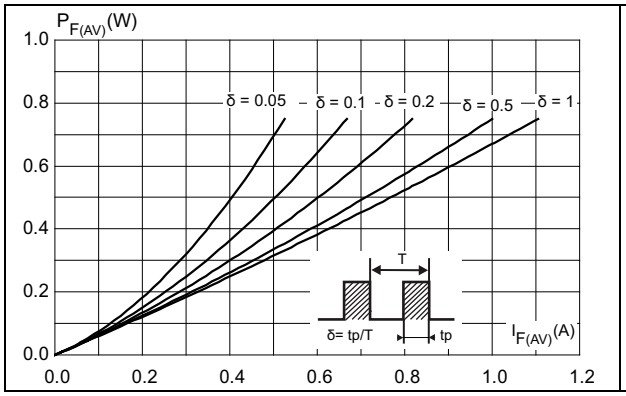


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

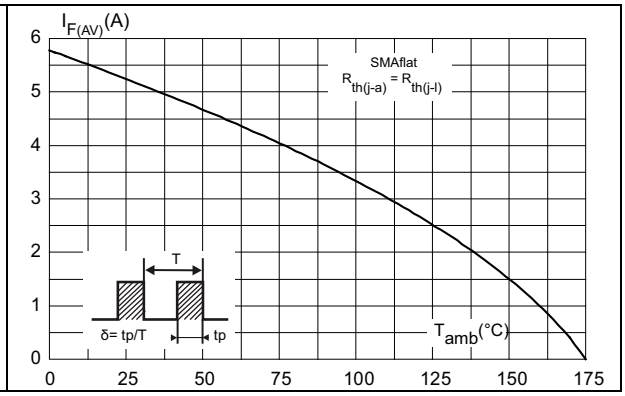


Figure 3. Normalized avalanche power derating versus pulse duration (pulse > 10 µs, T_j < 150 °C)

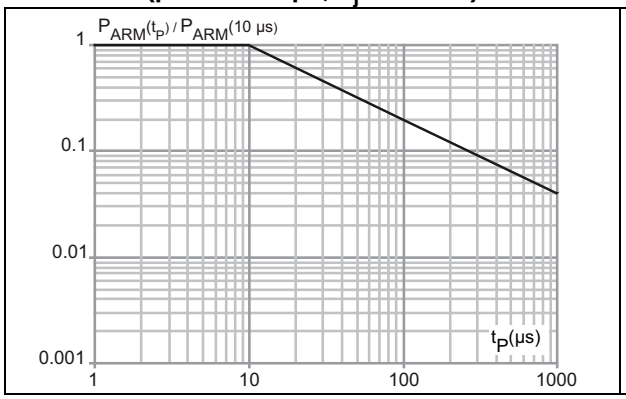


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration

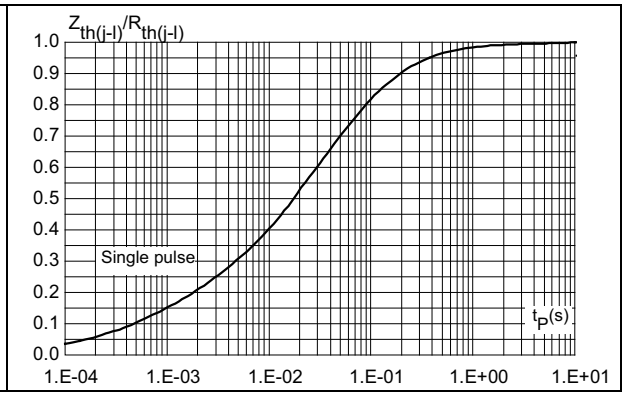


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

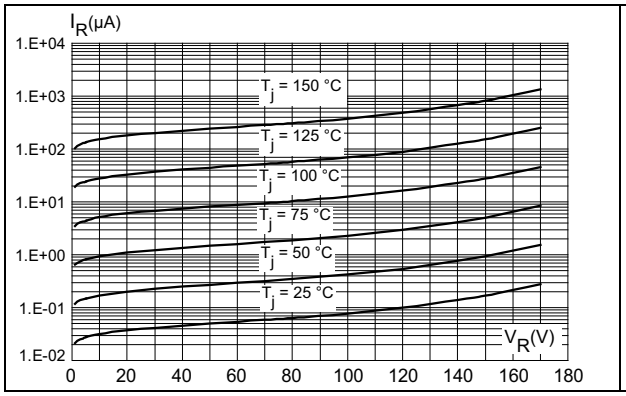


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

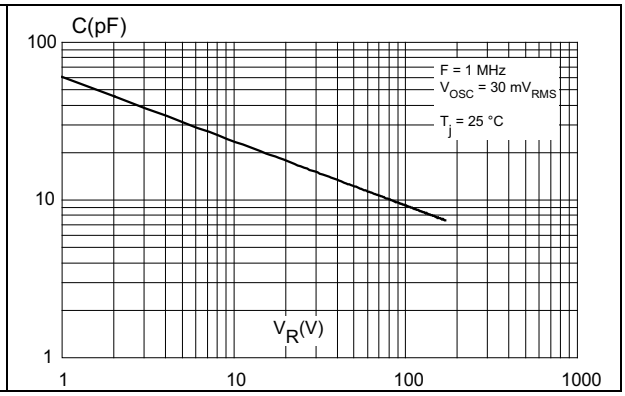


Figure 7. Forward voltage drop versus forward current (typical values)

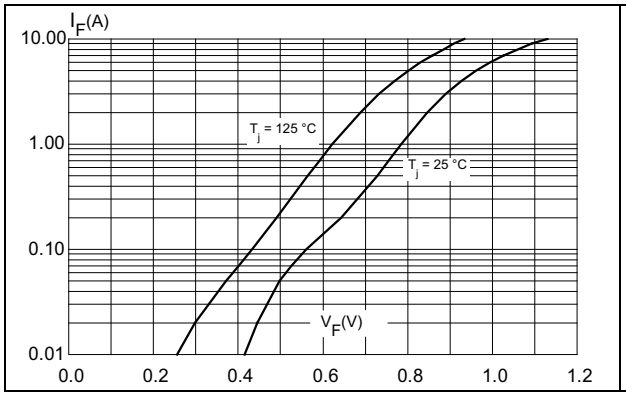


Figure 8. Forward voltage drop versus forward current (maximum values)

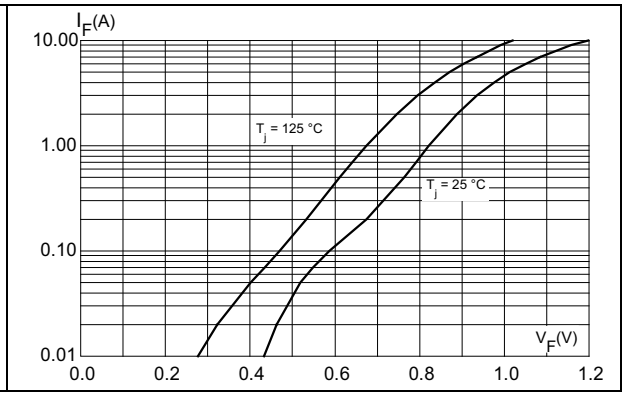
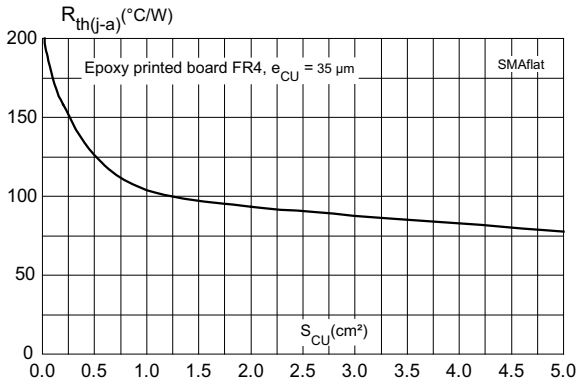


Figure 9. Thermal resistance junction to ambient versus copper surface under each lead (typical values)



2 Package information

- Epoxy meets UL94,V0
- Lead-free package
- Band indicates cathode

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.

Figure 10. SMAflat dimensions definitions

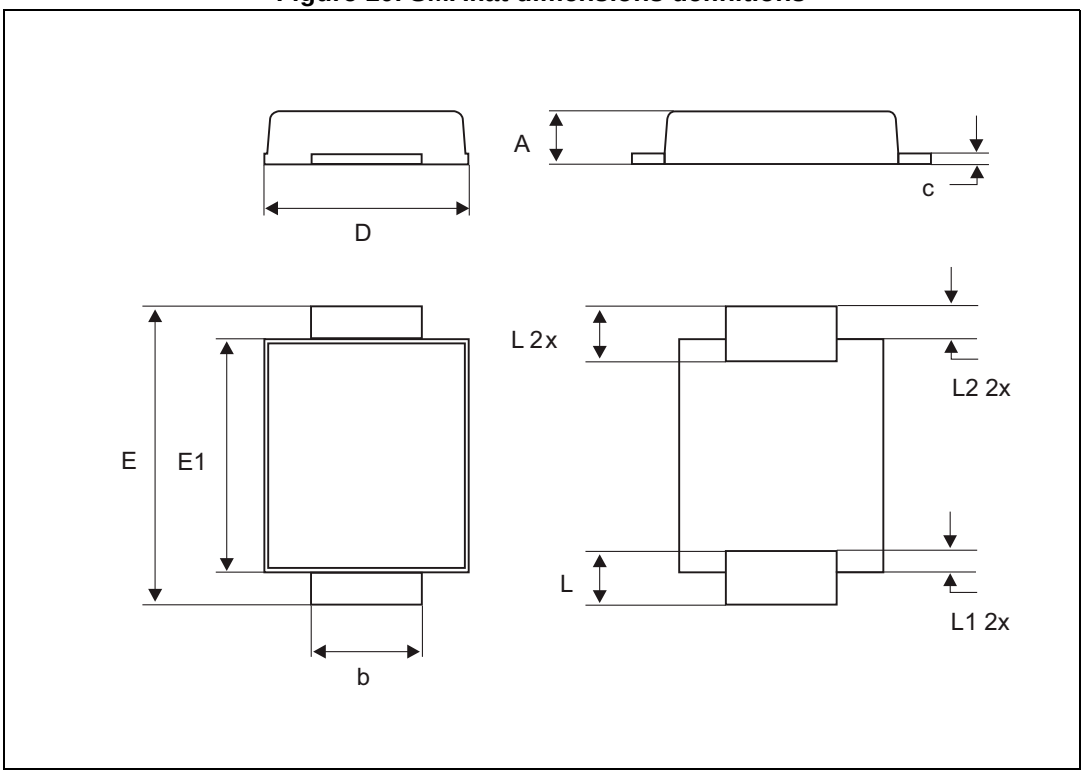


Table 5. SMAflat dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b	1.25		1.65	0.049		0.065
c	0.15		0.40	0.006		0.016
D	2.25		2.95	0.088		0.116
E	4.80		5.60	0.189		0.220
E1	3.95		4.60	0.156		0.181
L	0.75		1.50	0.030		0.059
L1		0.50			0.019	
L2		0.50			0.019	

Figure 11. SMAflat footprint, dimensions in mm (inches)

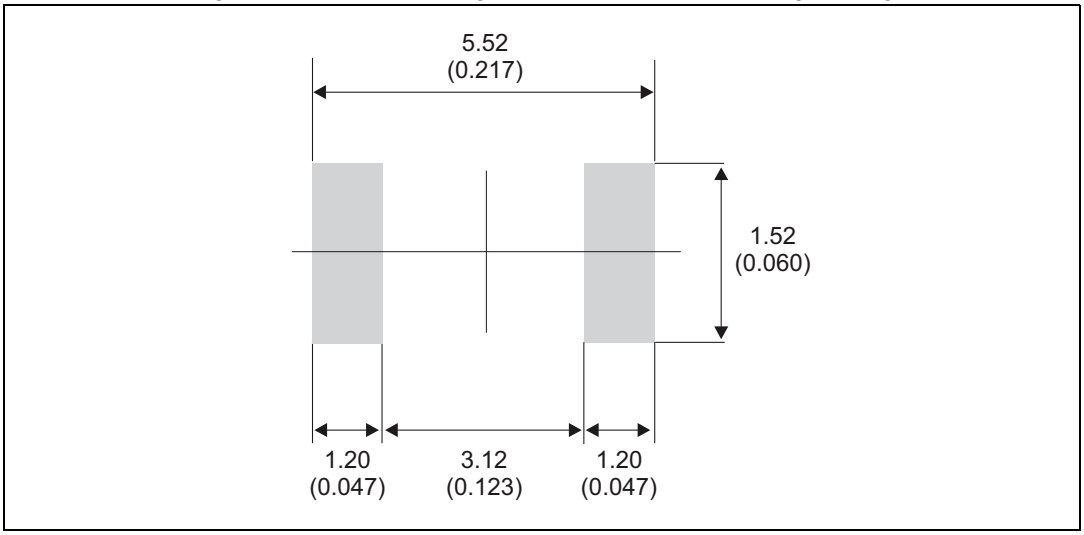
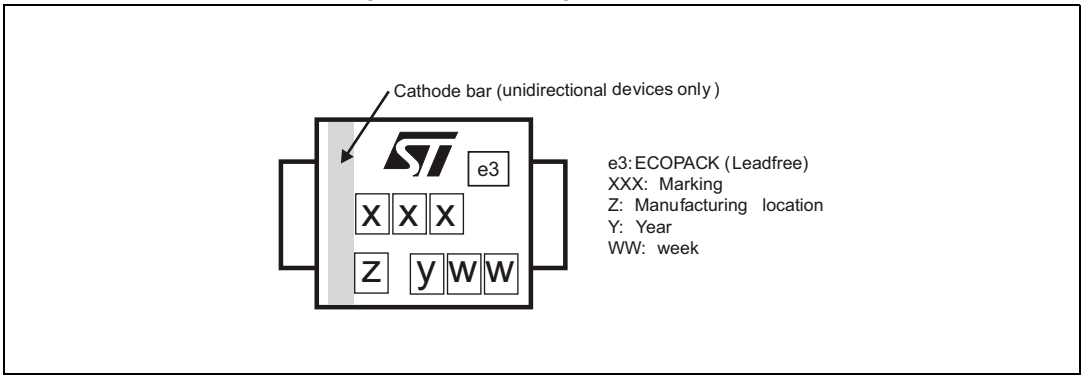


Figure 12. Marking informations



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS1170AF	F1170	SMAflat	0.035 g	10000	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
14-Oct-2014	1	First release.