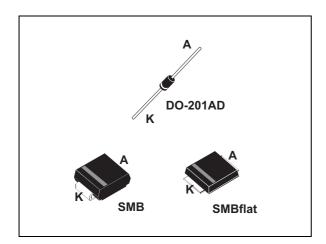


## Power Schottky rectifier

Datasheet - production data



#### **Features**

- Negligible switching losses
- Low forward voltage drop for higher efficiency and extended battery life
- · Low thermal resistance
- ECOPACK®2 compliant component

### **Description**

150 V Power Schottky rectifier are suited for switch mode power supplies on up to 24 V rails and high frequency converters.

Packaged in Axial, SMB, and low-profile SMB, this device is intended for use in consumer and computer applications like TV, STB, PC and DVD where low drop forward voltage is required to reduce power dissipation.

**Table 1. Device summary** 

Symbol	Value
I <sub>F(AV)</sub>	3 A
$V_{RRM}$	150 V
T <sub>j</sub> (max)	175 °C
V <sub>F</sub> (typ)	0.63 V

Characteristics **STPS3150** 

### **Characteristics**

Table 2. Absolute Ratings (limiting values at 25 °C unless otherwise specified)

Symbol	Parameter			Value	Unit
$V_{RRM}$	Repetitive peak reverse volt	Repetitive peak reverse voltage			V
		SMB	T <sub>L</sub> = 130 °C	3	
I <sub>F(AV)</sub>	Average forward current, $\delta = 0.5$ square wave	DO-201AD	T <sub>L</sub> = 140 °C		Α
		SMB flat	T <sub>L</sub> = 150 °C		
		SMB		80	
I <sub>FSM</sub>	Surge non repetitive forward current	DO-201AD	t <sub>p</sub> = 10 ms sinusoidal	100	Α
		SMB flat		80	
P <sub>ARM</sub> <sup>(1)</sup>	Repetitive peak avalanche power $T_j = 125$ °C, $t_p = 10 \mu s$			210	W
T <sub>stg</sub>	Storage temperature range			-65 to + 175	°C
Tj	Operating junction temperature <sup>(2)</sup>			175	°C

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".

Table 3. Thermal resistance

Symbol	Parameter			Value	Unit
			SMB flat	10	
R <sub>th(j-l)</sub>	Junction to lead		SMB	20	°C/W
		Lead length = 10 mm	DO-201AD	15	

Table 4. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Тур	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage	T <sub>j</sub> = 25 °C	\/- <b>-</b> \/		0.4	2.0	μΑ
'R`	current	T <sub>j</sub> = 125 °C	$V_R = V_{RRM}$		0.6	2.0	mA
	V <sub>F</sub> <sup>(2)</sup> Forward voltage drop	T <sub>j</sub> = 25 °C	- I <sub>F</sub> = 3 Α		0.78	0.82	
V (2)		T <sub>j</sub> = 125 °C			0.63	0.67	V
VF \		T <sub>j</sub> = 25 °C			0.85	0.89	V
		T <sub>j</sub> = 125 °C	I <sub>F</sub> = 6 A		0.70	0.75	

<sup>1.</sup>  $t_p = 5 \text{ ms}, \ \delta < 2\%$ 

To evaluate the conduction losses use the following equation: P = 0.59 x  $I_{F(AV)}$  + 0.027  $I_{F}^{2}_{(RMS)}$ 

$$P = 0.59 \times I_{E(A)A} + 0.027 I_{E}^{2}$$



<sup>2.</sup>  $\frac{dPtot}{dT_j} < \frac{1}{Rth(j-a)}$  condition to avoid thermal runaway for a diode on its own heatsink

<sup>2.</sup>  $t_p = 380 \ \mu s, \ \delta < 2\%$ 

STPS3150 Characteristics

Figure 1. Average forward power dissipation versus average forward current

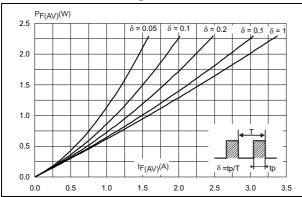


Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )

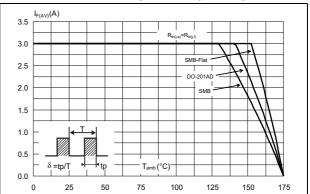
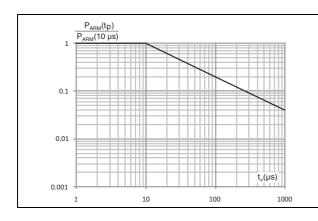


Figure 3. Normalized avalanche power derating versus pulse duration

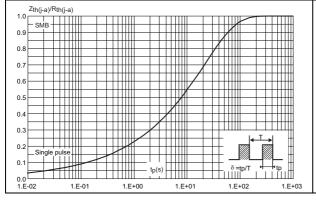
Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-201AD)

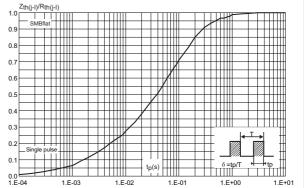


1.0 Zth(j-a)/Rth(j-a)
0.9 DO-201AD
0.7
0.6
0.5
0.4
0.3
0.2 Single pulse
0.1
0.0
1.E-01
1.E+00
1.E+01
1.E+02
1.E+03

Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

Figure 6. Relative variation of thermal impedance junction to lead versus pulse duration (SMBflat)

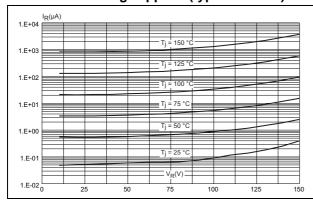




Characteristics STPS3150

Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

Figure 8. Junction capacitance versus reverse voltage applied (typical values)



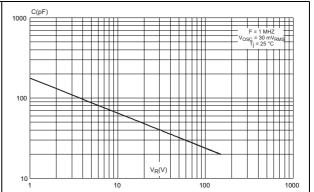
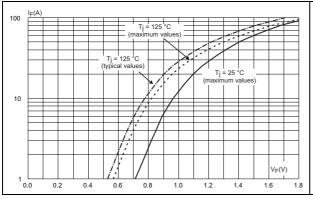


Figure 9. Forward voltage drop versus forward current

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



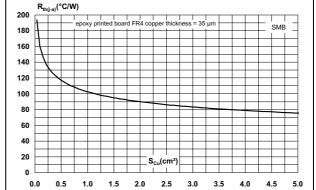
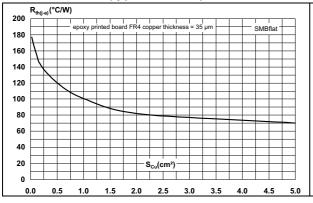
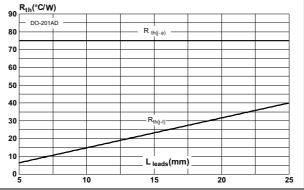


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (typical values)

Figure 12. Thermal resistance versus lead length





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## 2 Package information

- Epoxy meets UL94, V0
- Lead-free package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: <a href="www.st.com">www.st.com</a>. ECOPACK<sup>®</sup> is an ST trademark.

Figure 13. SMB dimensions (definitions)

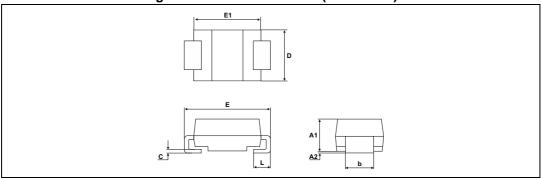
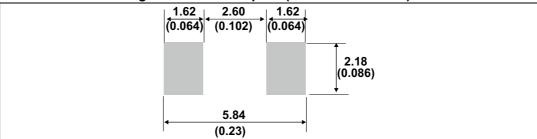


Table 5. SMB dimensions (values)

	rable of one americans (values)					
	Dimensions					
Ref.	Millin	neters	Inch			
	Min.	Max.	Min.	Max.		
A1	1.90	2.45	0.075	0.096		
A2	0.05	0.20	0.002	0.008		
b	1.95	2.20	0.077	0.087		
С	0.15	0.40	0.006	0.016		
E	5.10	5.60	0.201	0.220		
E1	4.05	4.60	0.159	0.181		
D	3.30	3.95	0.130	0.156		
L	0.75	1.50	0.030	0.059		

Figure 14. SMB footprint (dimensions in mm)



Package information STPS3150

A L2x L2x L12x

Figure 15. SMBflat dimensions (definitions)

Table 6. SMBflat dimensions (values)

b

	Dimensions					
Ref.	Millimeters				Inches	
	Min.	Тур.	Max.	Min.	Тур.	Max.
Α	0.90		1.10	0.035		0.043
b <sup>(1)</sup>	1.95		2.20	0.077		0.087
c <sup>(1)</sup>	0.15		0.40	0.006		0.016
D	3.30		3.95	0.130		0.156
E	5.10		5.60	0.200		0.220
E1	4.05		4.60	0.189		0.181
L	0.75		1.50	0.029		0.059
L1		0.40			0.016	
L2		0.60			0.024	

<sup>1.</sup> Applies to plated leads

5.84 (0.230) 2.07 (0.082) 1.20 3.44 1.20 (0.047) (0.136) (0.047) millimeters (inches)

Figure 16. SMB Flat footprint

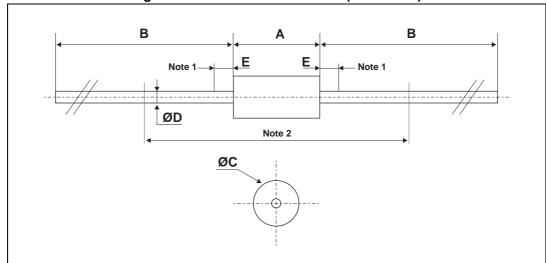


Figure 17. DO-201AD dimensions (definitions)

Table 7. DO-201AD dimensions (values)

	Dimensions			
Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
А		9.50		0.374
В	25.40		1.000	
С		5.30		0.209
D <sup>(1)</sup>		1.30		0.051
E		1.25		0.049
Note 2 <sup>(2)</sup>	15		0.59	

<sup>1.</sup> The lead diameter D is not controlled over zone E

<sup>2.</sup> The minimum length, which must stay straight between the right angles after bending, is 15 mm (0.59")

Ordering information STPS3150

# 3 Ordering information

**Table 8. Ordering information** 

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS3150U	G315	SMB	107 mg	2500	Tape and reel
STPS3150UF	FG315	SMB flat	50 mg	5000	Tape and reel
STPS3150	STPS3150	DO-201AD	1.12 g	600	Ammopack
STPS3150RL	STPS3150	DO-201AD	1.12 g	1900	Tape and reel

# 4 Revision history

Table 9. Document revision history

Date	Revision	Changes
May-2003	2A	Last update.
31-May-2006	3	Reformatted to current standard. Added ECOPACK statement. Updated SMB footprint in Figure 12. Changed nF to pF in Figure 8.
08-Feb-2007	4	Added SMB flat and SMB flat e package.
20-Jul-2011	5	Updated Table 2.
11-Aug-2016	6	Updated Table 2 and all curves.

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