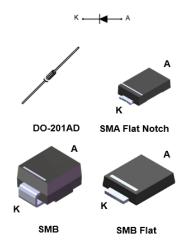


150 V, 3 A power Schottky rectifier



Features

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

Applications

- LED Lighting
- · Battery charger
- DC / DC converter
- Notebook adapter
- Switching diode

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, SMA Flat Notch and SMB Flat, the STPS3150 is ideal for use in consumer and computer applications like TV, STB, PC and DVD where low drop forward voltage is required to reduce power dissipation.

Product status
STPS3150

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	Parame	eter		Value	Unit
V _{RRM}	Repetitive peak reverse voltage			150	V
		SMA Flat Notch	T _L = 130 °C		
	Average feminand assessed \$ = 0.5 ansatz views	SMB	T _L = 130 °C		
I _{F(AV)}	Average forward current, δ = 0.5, square wave	δ = 0.5, square wave SMB Flat T_L = 150 °C		3	Α
		DO-201AD	T _L = 140 °C		
		SMA Flat Notch		75	A
I _{FSM}	Surge non repetitive forward current	SMB	t _n = 10 ms sinusoidal	80	
IFSM		SMB Flat	t _p = 10 ms sinusoidai	80	
		DO-201AD		100	
P _{ARM}	Repetitive peak avalanche power		t_p = 10 μ s, T_j = 125 °C	210	W
T _{stg}	Storage temperature range				°C
T _j	Maximum operating junction temperature ⁽¹⁾	+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	
		SMA Flat Notch	20	
D	Junction to lead	SMB	20	°C/W
R _{th(j-l)}		SMB Flat	10	C/VV
	Junction to lead, lead length = 10 mm	DO-201AD	15	

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.	Тур.	Max.	Unit
I _R ⁽¹⁾	L (1)		V _R = V _{RM}	-	0.4	2.0	μA
'R\'	Reverse leakage current	T _j = 125 °C	5 °C	-	0.6	2.0	mA
		T _j = 25 °C	I _F = 3 A	-	0.78	0.82	
V _F ⁽²⁾	(2) English to the second section	T _j = 125 °C	IF - 3 A	-	0.63	0.67	V
VF.	Forward voltage drop	T _j = 25 °C	I _F = 6 A	-	0.85	0.89	V
			1F - 0 V	-	0.70	0.75	

^{1.} Pulse test: $t_p = 5$ ms, $\delta < 2\%$

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^{2.} Pulse test: t_p = 380 μ s, δ < 2%



To evaluate the conduction losses, use the following equation:

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

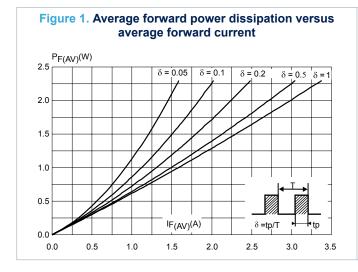
For more information, please refer to the following application notes related to the power losses:

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

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1.1 **Characteristics (curves)**



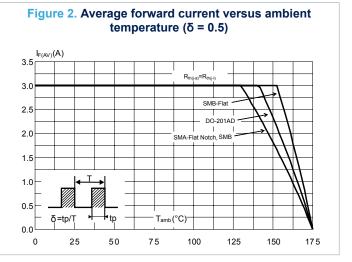


Figure 3. Normalized avalanche power derating versus pulse duration (T_i = 125 °C)

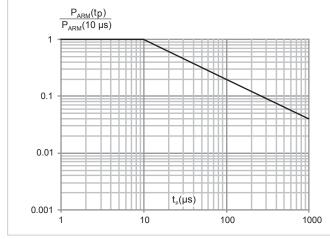


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

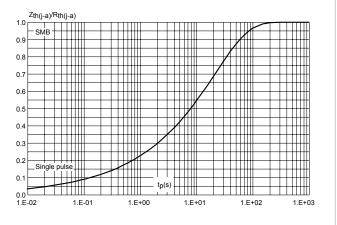
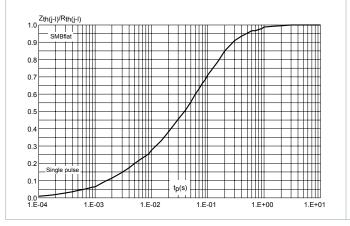
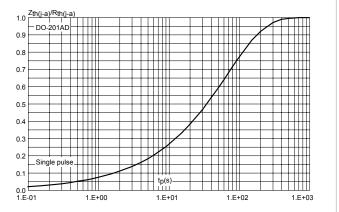


Figure 5. Relative variation of thermal impedance junction | Figure 6. Relative variation of thermal impedance junction to lead versus pulse duration (SMB flat)



to ambient versus pulse duration (DO-201AD)



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

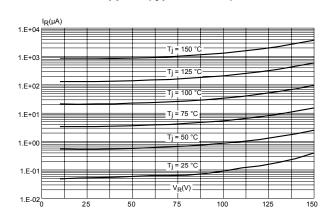


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

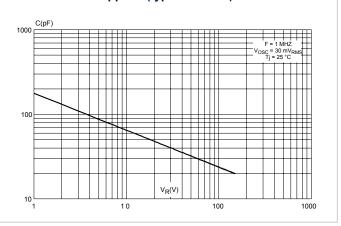


Figure 9. Forward voltage drop versus forward current

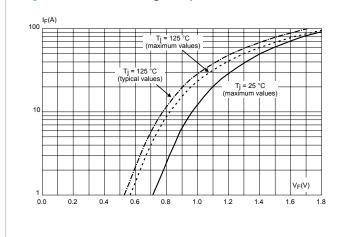


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (SMA Flat Notch)

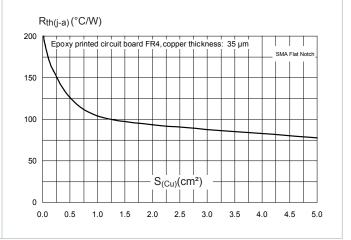


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (SMB)

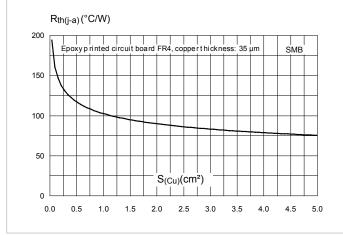
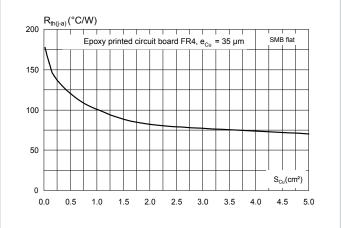
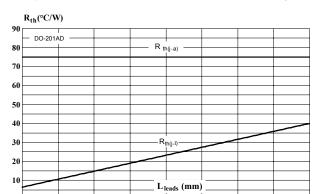


Figure 12. Thermal resistance junction to ambient versus copper surface under each lead (SMB flat)



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20

Figure 13. Thermal resistance versus lead length



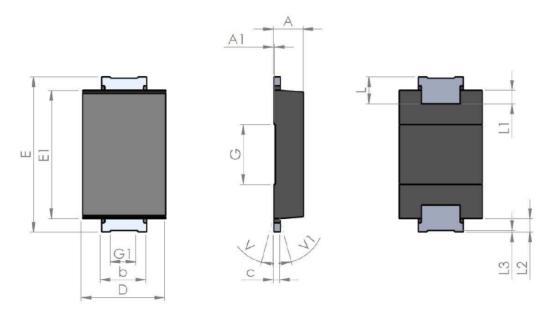
2 Package information

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 Flat Notch package information

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

Figure 14. SMA Flat Notch package outline



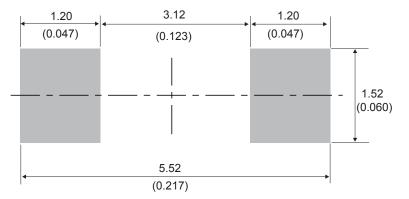
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Table 4. SMA Flat Notch package mechanical data

			Dimer	nsions		
Ref.		Millimeters		Inches (for reference only)		
	Min.	Тур.	Max.	Min.	Тур.	Max.
A1	0.90		1.10	0.035		0.044
A1		0.05			0.002	
b	1.25		1.65	0.049		0.065
С	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°

Figure 15. SMA Flat Notch recommended footprint in mm (inches)



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2.2 SMB package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 16. SMB package outline

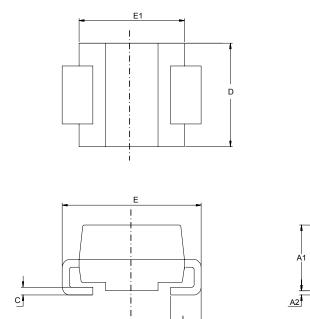


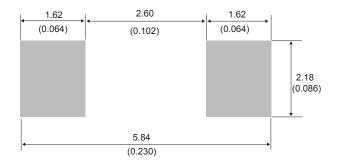
Table 5. SMB package mechanical data

	Dimensions					
Ref.	Millin	neters	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		
С	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		

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Figure 17. SMB recommended footprint



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2.3 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 18. SMB Flat package outline

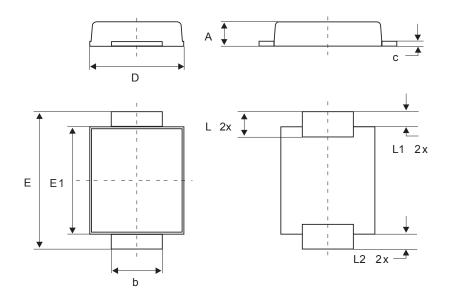


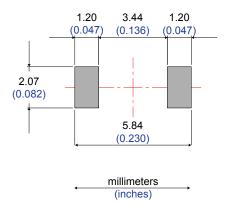
Table 6. SMB Flat mechanical data

	Dimensions					
Ref.	Millimeters					
	Min.	Тур.	Max.	Min.	Тур.	Max.
Α	0.90		1.10	0.035		0.044
b	1.95		2.20	0.076		0.087
С	0.15		0.40	0.005		0.016
D	3.30		3.95	0.129		0.156
Е	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
L1		0.40			0.016	
L2		0.60			0.024	

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Figure 19. Footprint recommendations, dimensions in mm (inches)



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2.4 DO-201AD package information

Epoxy meets UL 94, V0

Figure 20. DO-201AD package outline

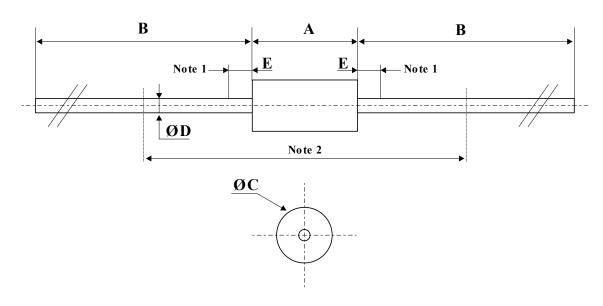


Table 7. DO-201AD package mechanical data

			Dime	nsions		
Ref.		Millimeters			es (for reference	only)
	Min.	Тур.	Max.	Min.	Тур.	Max.
А		-	9.50		-	0.374
В	25.40	-		1.000	-	
С		-	5.30		-	0.209
D ⁽¹⁾		-	1.30		-	0.051
Е		-	1.25			0.049
Note 2 ⁽²⁾	15.00			0.590		

- 1. The lead diameter D is not controlled over zone E
- 2. The minimum length, which must stay straight between the right angles after bending, is 15 mm (0.59")

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3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS3150U	G315	SMB	0.107 g	2500	Tape and reel
STPS3150UF	FG315	SMB Flat	0.050 g	5000	Tape and reel
STPS3150	STPS3150	DO-201AD	1.120 g	600	Ammopack
STPS3150RL	STPS3150	DO-201AD	1.120 g	1900	Tape and reel
STPS3150AFN	A3150	SMA Flat Notch	0.039 g	10 000	Tape and reel



Revision history

Table 9. Document revision history

Date	Version	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.
8-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.
08-Oct-2019	7	Added Section 2.1 SMA Flat Notch package information.



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