

Features

- Low forward voltage drop
- High reliability
- High surge current capability
- Soft switching for reduced EMI disturbances
- Planar technology

Description

The STTH310, which uses ST ultrafast high voltage planar technology, is specially suited for free-wheeling, clamping, snubbing, demagnetization in power supplies and other power switching applications.

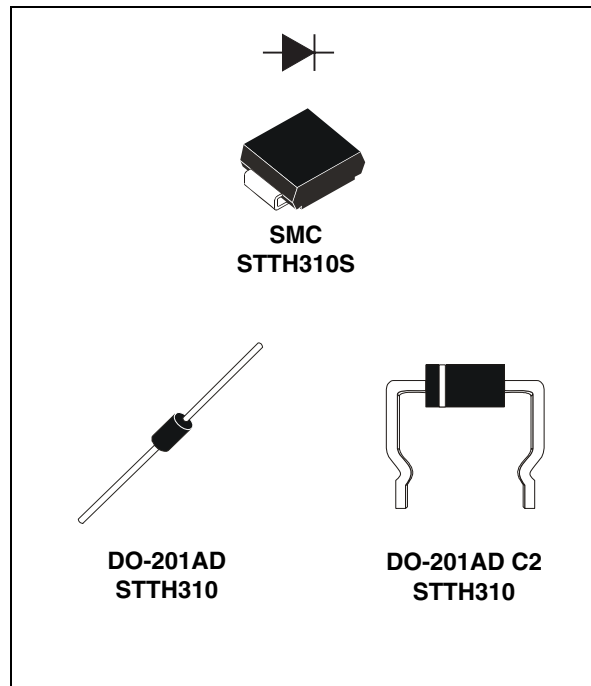


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	3 A
V_{RRM}	1000 V
$T_{j(max)}$	+175 °C
$V_F (max)$	1.42 V
$t_{rr} (max)$	75 ns

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit	
V_{RRM}	Repetitive peak reverse voltage		1000	V	
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	$T_L = 75\text{ }^\circ\text{C}$, $\delta = 0.5$	DO-201AD	3	A
		$T_L = 75\text{ }^\circ\text{C}$, $\delta = 0.5$	SMC	3	
I_{FSM}	Forward surge current	$t_p = 8.3\text{ ms}$ sinusoidal	DO-201AD	55	A
			SMC	45	
T_{stg}	Storage temperature range		- 65 to +175	$^\circ\text{C}$	
T_j	Operating junction temperature range		-40 to +175	$^\circ\text{C}$	

Table 3. Thermal parameters

Symbol	Parameter		Value	Unit	
$R_{th(j-l)}$	Junction to lead	L = 10 mm	DO-201AD	20	$^\circ\text{C/W}$
			SMC	20	
$R_{th(j-a)}$	Junction to ambient	L = 10 mm	DO-201AD	75	

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R	Reverse leakage current	$T_j = 25\text{ }^\circ\text{C}$	$V_R = V_{RRM}$	-	-	10	μA
		$T_j = 125\text{ }^\circ\text{C}$		-	-	50	
V_F	Forward voltage drop	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 3\text{ A}$	-	-	1.7	V
		$T_j = 150\text{ }^\circ\text{C}$		-	0.98	1.42	

To evaluate the conduction losses use the following equation: $P = 1.20 \times I_{F(AV)} + 0.075 I_F^2_{(RMS)}$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$I_F = 0.5\text{ A}$, $I_{rr} = 0.25\text{ A}$ $I_R = 1\text{ A}$, $T_j = 25\text{ }^\circ\text{C}$	-	-	75	ns
t_{fr}	Forward recovery time	$I_F = 3\text{ A}$, $di_F/dt = 50\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$, $T_j = 25\text{ }^\circ\text{C}$	-	-	300	ns
V_{FP}	Forward recovery voltage		-	-	12	V

Figure 1. Conduction losses versus average current

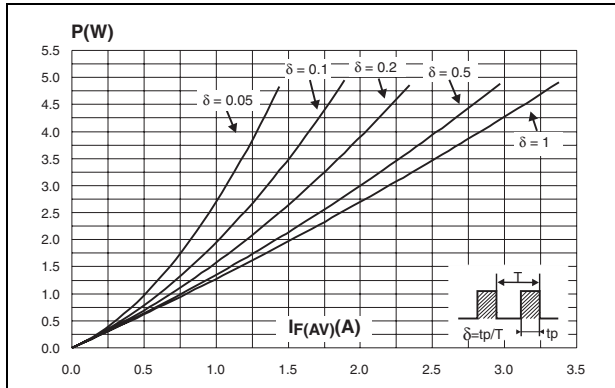


Figure 2. Forward voltage drop versus forward current

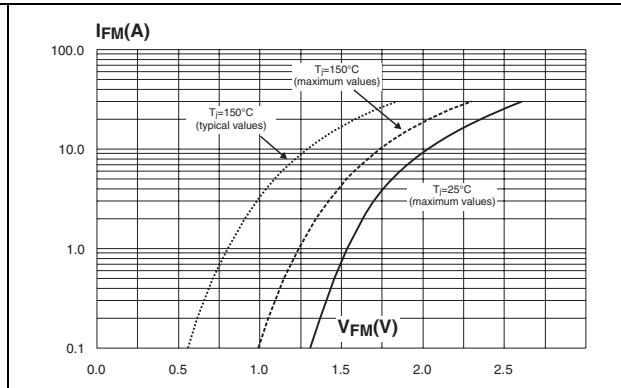


Figure 3. Relative variation of thermal impedance junction ambient versus pulse duration (DO-201AD)

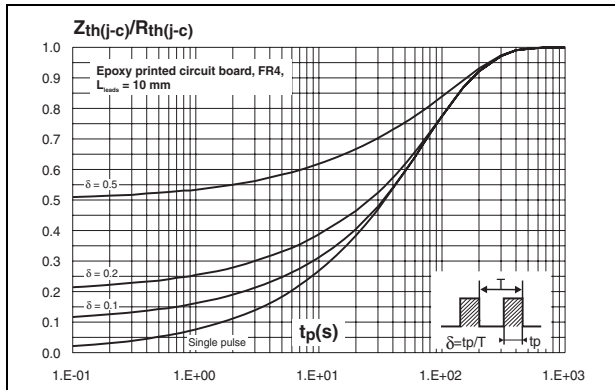


Figure 4. Relative variation of thermal impedance junction ambient versus pulse duration (SMC)

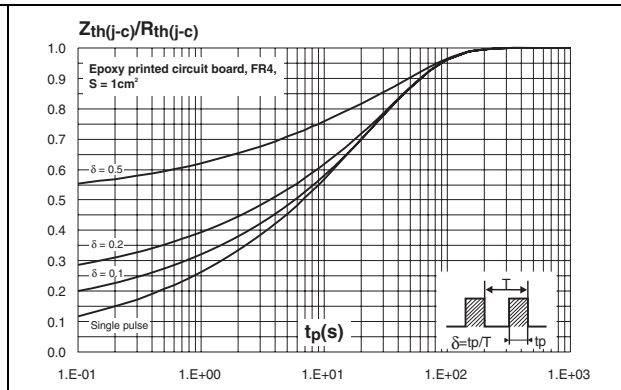
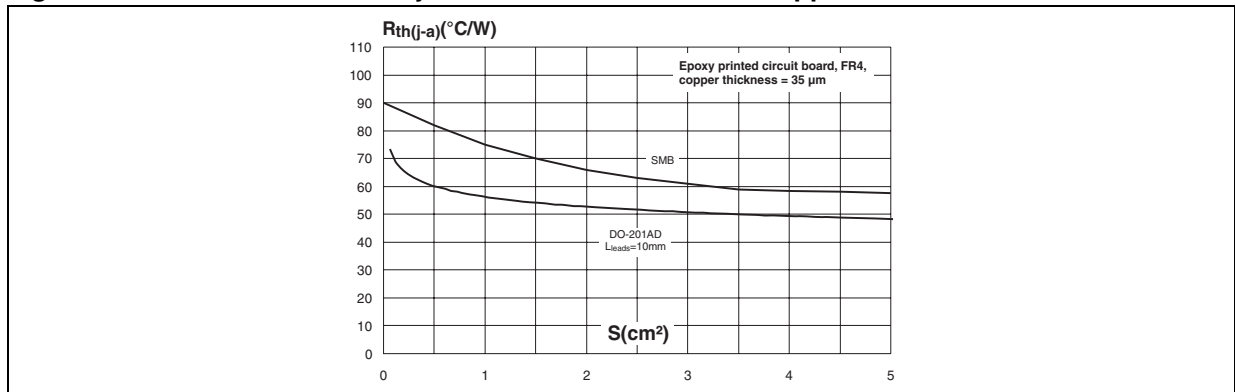


Figure 5. Thermal resistance junction to ambient versus copper surface under each lead



2 Package information

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

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.

Table 6. SMC dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b ⁽¹⁾	2.90	3.20	0.114	0.126
c ⁽¹⁾	0.15	0.40	0.006	0.016
D	5.55	6.25	0.218	0.246
E	7.75	8.15	0.305	0.321
E1	6.60	7.15	0.260	0.281
E2	4.40	4.70	0.173	0.185
L	0.75	1.50	0.030	0.059

1. Dimensions b and c apply to plated leads

Figure 6. Footprint, dimensions in mm (inches)

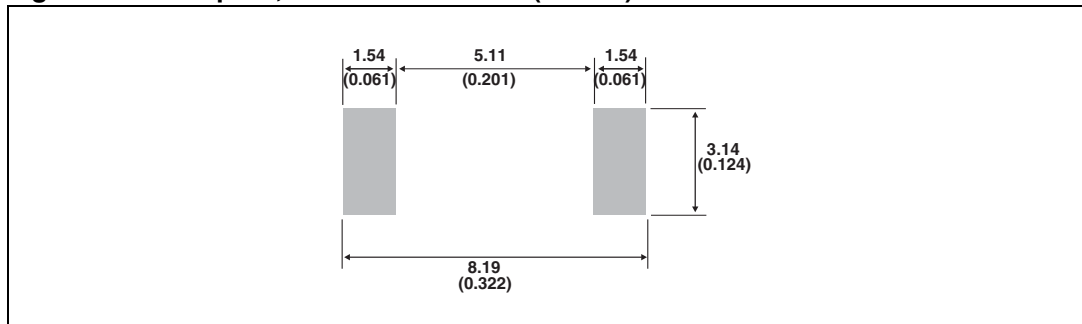


Table 7. DO-201AD dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	-	9.50	-	0.374
B	25.40	-	1.000	-
C	-	5.30	-	0.209
D	-	1.30	-	0.051
E	-	1.25	-	0.049
Notes	1 - The lead diameter $\varnothing D$ is not controlled over zone E 2 - The minimum length which must stay straight between the right angles after bending is 0.59"(15mm)			

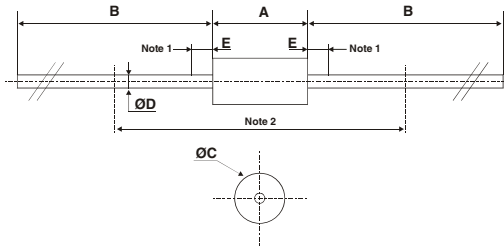
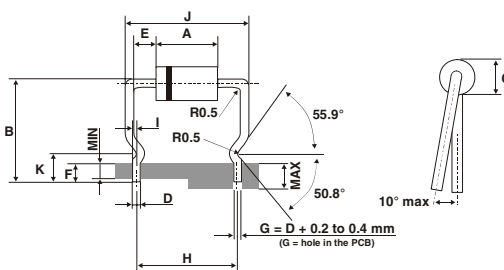


Table 8. DO-201AD C2 dimensions

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	-	9.5	-	-	0.374
B	13.75	-	17.75	0.541	-	0.699
C	-	-	5.3	-	-	0.208
D	-	-	1.3	-	-	0.051
E	3.1	3.6	4.1	0.122	0.142	0.161
F	2.4	3.15	3.9	0.094	0.124	0.153
G	-	1.6	-	-	0.063	-
H	14.9	-	15.6	0.587	-	0.614
I	0.5	0.6	0.8	0.019	0.024	0.031
J	-	18.78	-	-	0.739	-
K	3.8	-	4.8	0.150	-	0.189
Note	The difference between E dimensions on both sides of resinous body (which express the bending centering) must not be larger than 0.7 millimeter.					



3 Ordering information

Table 9. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH310S	S10	SMC	0.245 g	2500	Tape and reel
STTH310	STTH310	DO-201AD	1.16 g	600	Ammopack
STTH310RL	STTH310	DO-201AD	1.16 g	1900	Tape and reel
STTH310-C2	STTH 310	DO-201AD C2	1.12 g	500	Box

4 Revision history

Table 10. Document revision history

Date	Revision	Changes
Jan-2003	1	First release.
03-Apr-2007	2	DO-201AD C2 package added. SMC package information updated.
07-Dec-09	3	Updated Table 6 package dimensions.
21-Jun-2012	4	Updated T_j in Table 1 and Table 2 and change min. T_{stg} to -65 °C in Table 2 .

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2012 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com