

## High voltage ultrafast rectifier

### Main product characteristics

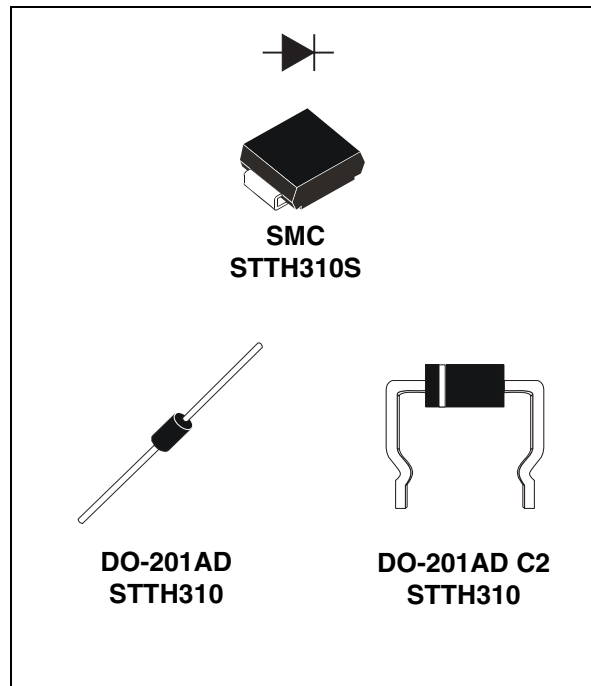
$I_{F(AV)}$	3 A
$V_{RRM}$	1000 V
$T_j$	175° C
$V_F$ (max)	1.42 V
$t_{rr}$ (max)	75 ns

### Features and benefits

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

### Description

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



### Order codes

Part Number	Marking
STTH310	STTH310B
STTH310RL	STTH310
STTH310S	S10
STTH310-C2	STTH 310

# 1 Characteristics

**Table 1. Absolute ratings (limiting values)**

Symbol	Parameter			Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage			1000	V
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	$T_L = 75^\circ\text{C}$ $\delta = 0.5$	DO-201AD	3	A
		$T_L = 75^\circ\text{C}$ $\delta = 0.5$	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			- 50 to + 175	$^\circ\text{C}$
$T_j$	Maximum operating junction temperature			+ 175	$^\circ\text{C}$

**Table 2. 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 3. Static electrical characteristics**

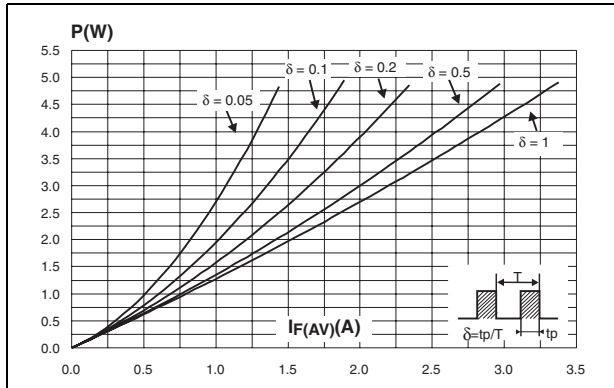
Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			10	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$				50	
$V_F$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 3\text{ A}$			1.7	V
		$T_j = 150^\circ\text{C}$			0.98	1.42	

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

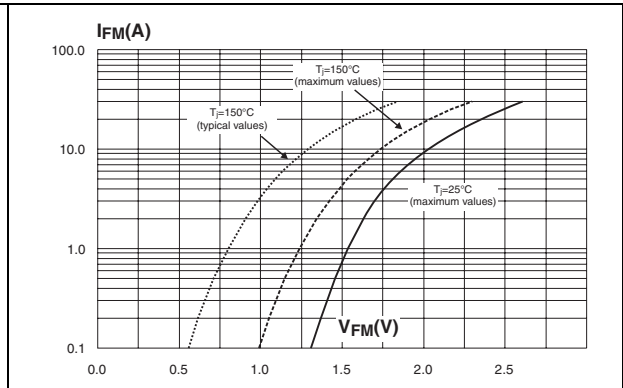
**Table 4. Dynamic electrical characteristics**

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

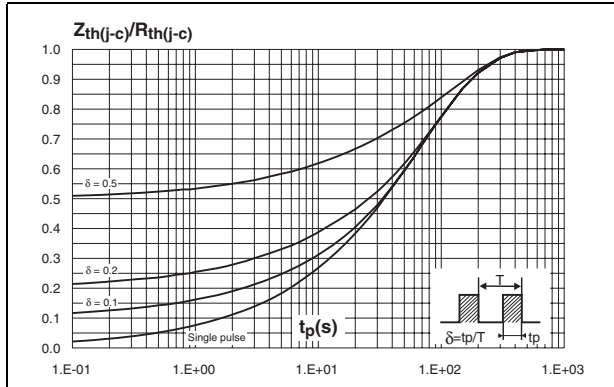
**Figure 1. Conduction losses versus average current**



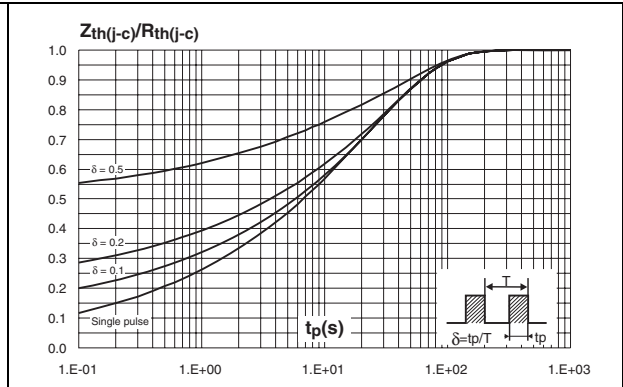
**Figure 2. Forward voltage drop versus forward current**



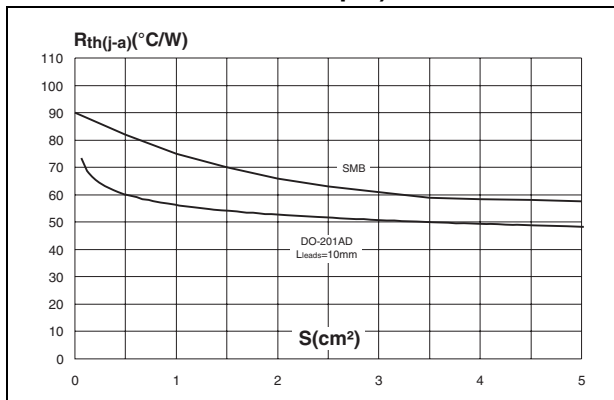
**Figure 3. Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, Lleads = 10 mm) (DO-201AD)**



**Figure 4. Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, S = 1cm²) (SMC)**



**Figure 5. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed circuit board FR4, copper thickness: 35 µm)**



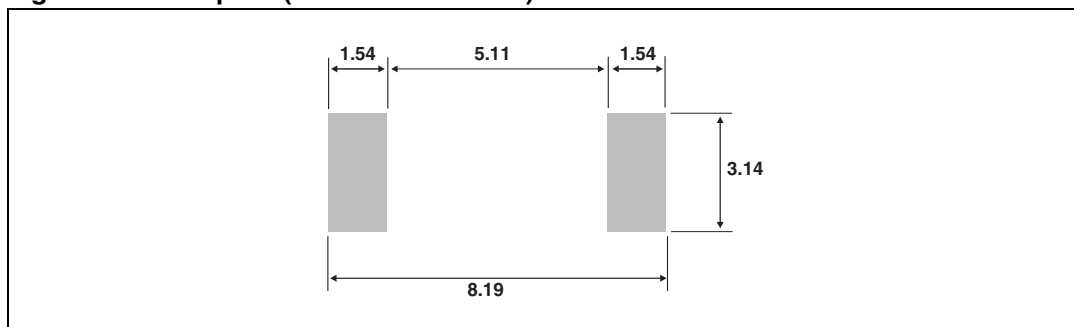
## 2 Package mechanical data

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

Table 5. SMC Dimensions

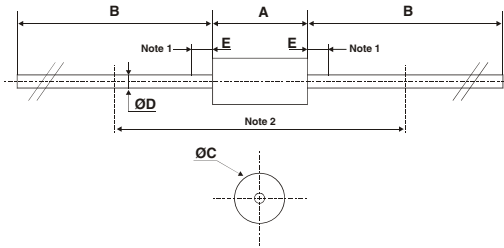
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.40	0.006	0.016
D	5.55	6.25	0.218	0.246
E	7.75	8.15	0.305	0.321
E1	6.60	7.15	0.260	0.281
E2	4.40	4.70	0.173	0.185
L	0.75	1.50	0.030	0.059

Figure 6. Footprint (dimensions in mm)



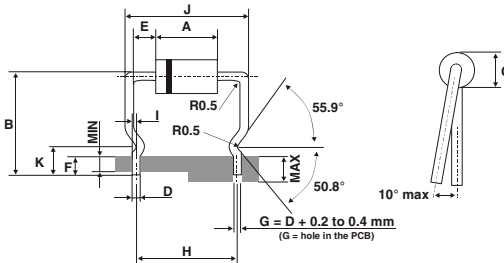
**Table 6. DO-201AD dimensions**

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
<b>Notes</b>	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 7. 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
<b>Note</b>	The difference between E dimensions on both sides of resinous body (which express the bending centering) mustn't be larger than 0.7 millimeter.					



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### 3 Ordering information

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

### 4 Revision history

Date	Revision	Description of Changes
Jan-2003	1	First release.
03-Apr-2007	2	DO-201AD C2 package added. SMC Package information updated.

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