

High voltage ultrafast rectifier

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.

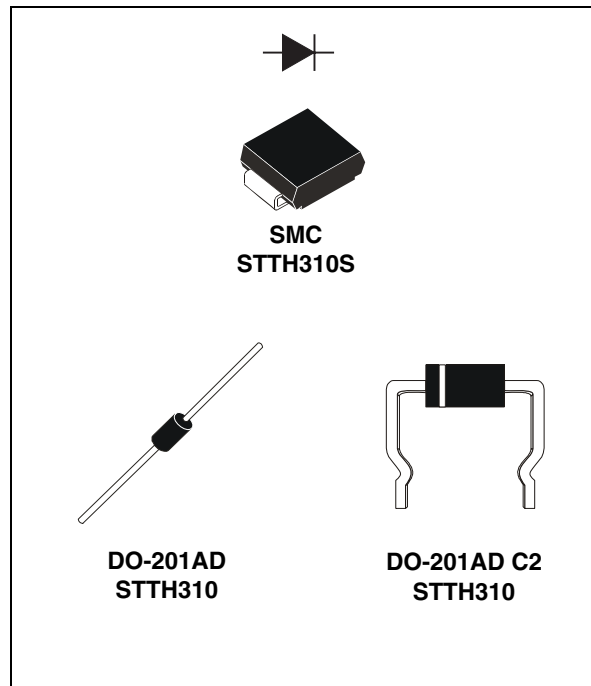


Table 1. Device summary

$I_{F(AV)}$	3 A
V_{RRM}	1000 V
T_j	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		- 50 to + 175	$^\circ\text{C}$	
T_j	Maximum operating junction temperature		+ 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

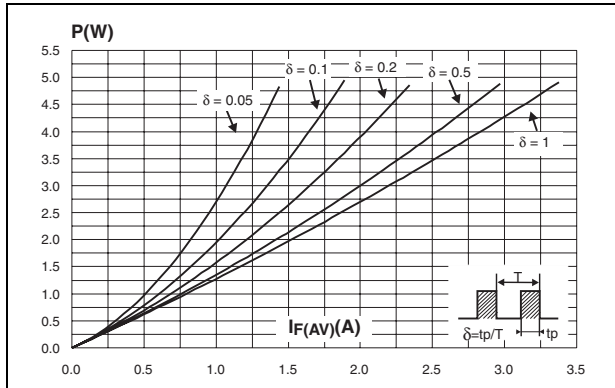


Figure 2. Forward voltage drop versus forward current

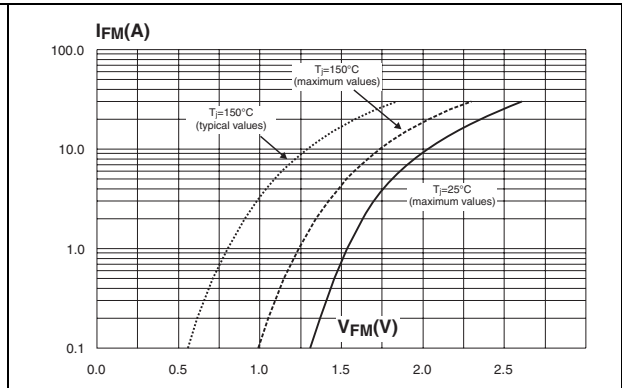


Figure 3. Relative variation of thermal impedance junction ambient versus pulse duration (DO-201AD)

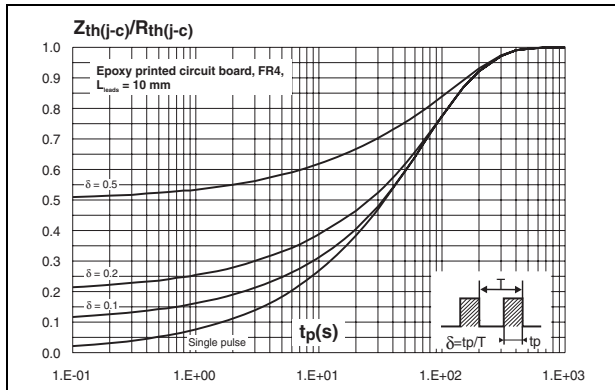


Figure 4. Relative variation of thermal impedance junction ambient versus pulse duration (SMC)

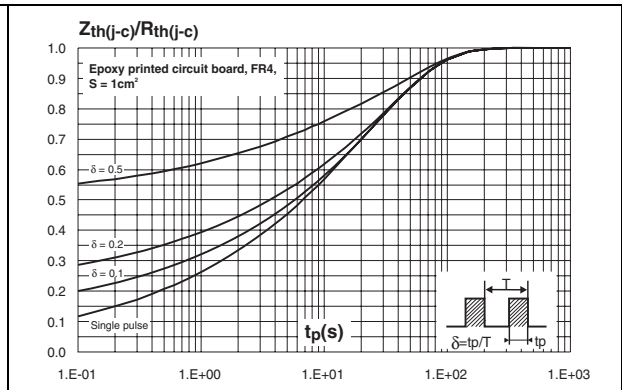
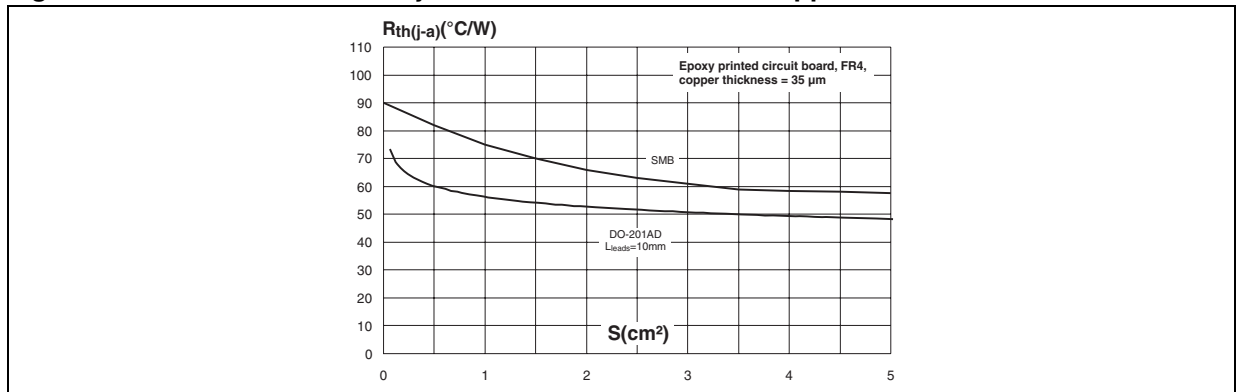


Figure 5. Thermal resistance junction to ambient versus copper surface under each lead



2 Package information

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

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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)

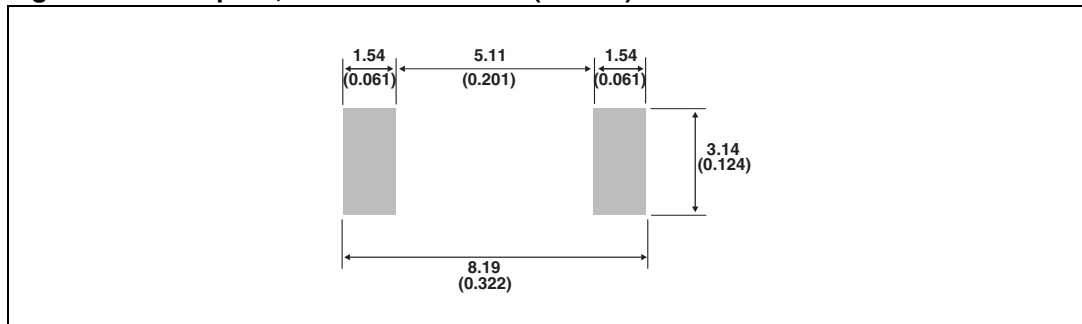


Table 7. DO-201AD dimensions

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)			

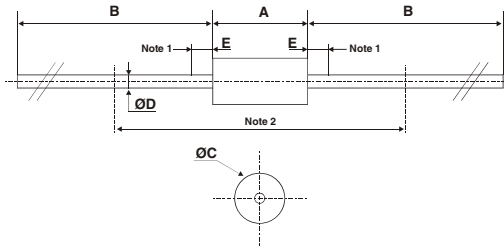
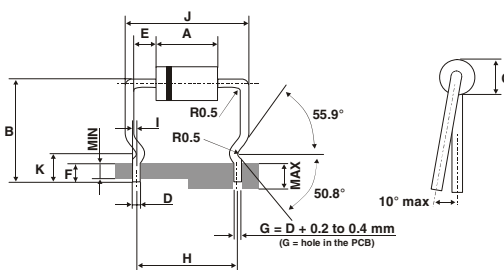


Table 8. DO-201AD C2 dimensions

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.

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