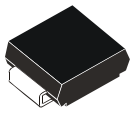
STTH310

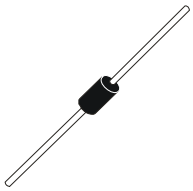
High voltage ultrafast rectifier

Main product characteristics

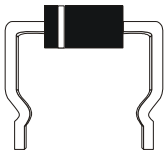
$I_{F(AV)}$	3 A
V_{RRM}	1000 V
T_j	175° C
V_F (max)	1.42 V
t_{rr} (max)	75 ns



SMC
STTH310S



DO-201AD
STTH310



DO-201AD C2
STTH310

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, snubbering, 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° C δ = 0.5	DO-201AD	3	A
		T_L = 75° C δ = 0.5	SMC	3	
I_{FSM}	Forward surge current	t_p = 8.3 ms Sinusoidal	DO-201AD	55	A
			SMC	45	
T_{stg}	Storage temperature range			- 50 to + 175	°C
T_j	Maximum operating junction temperature			+ 175	°C

Table 2. Thermal parameters

Symbol	Parameter			Value	Unit
$R_{th(j-l)}$	Junction to lead	L = 10 mm	DO-201AD	20	°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° C	$V_R = V_{RRM}$			10	µA
		T_j = 125° C				50	
V_F	Forward voltage drop	T_j = 25° C	I_F = 3 A			1.7	V
		T_j = 150° 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 A I_{rr} = 0.25 A I_R = 1 A T_j = 25° C			75	ns
t_{fr}	Forward recovery time	I_F = 3 A dI_F/dt = 50 A/µs V_{FR} = 1.1 x V_{Fmax} T_j = 25° C			300	ns
V_{FP}	Forward recovery voltage				12	V

Figure 1. Conduction losses versus average current

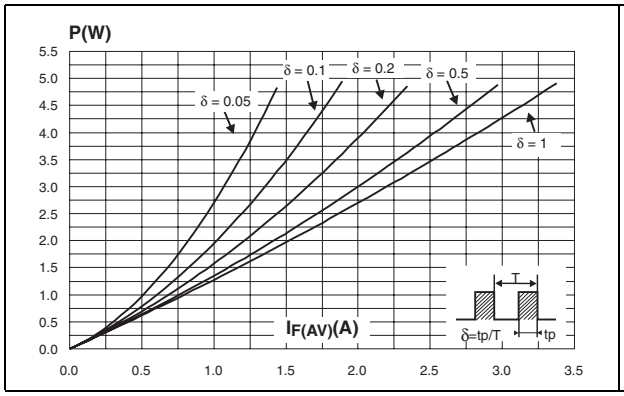


Figure 2. Forward voltage drop versus forward current

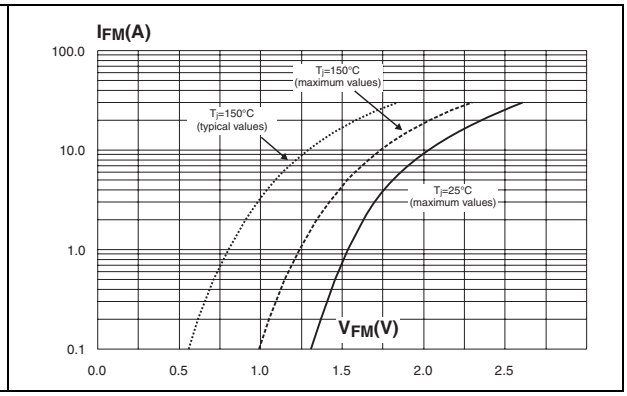


Figure 3. Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, L_{leads} = 10 mm) (DO-201AD)

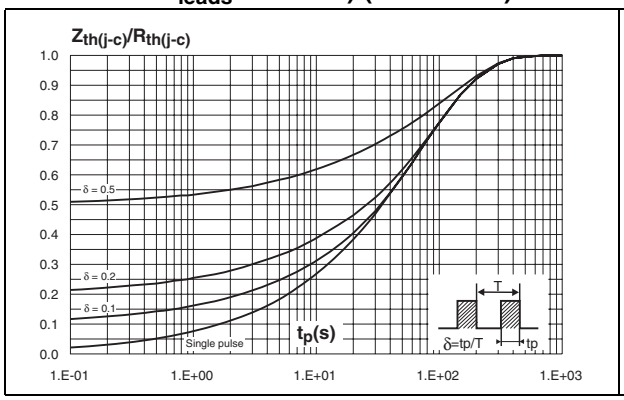


Figure 4. Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, S = 1cm²) (SMC)

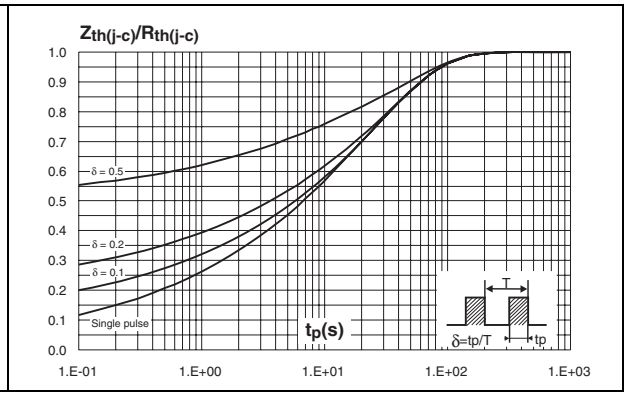
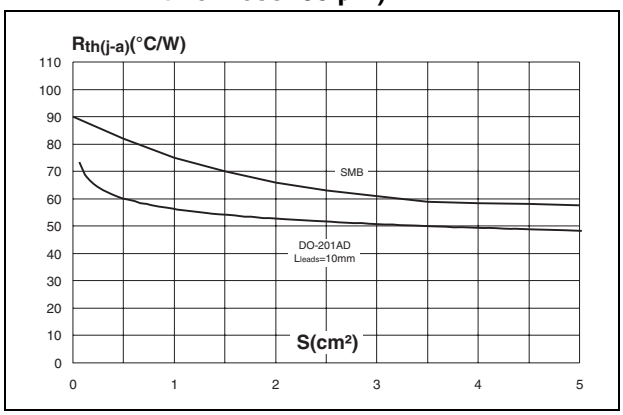


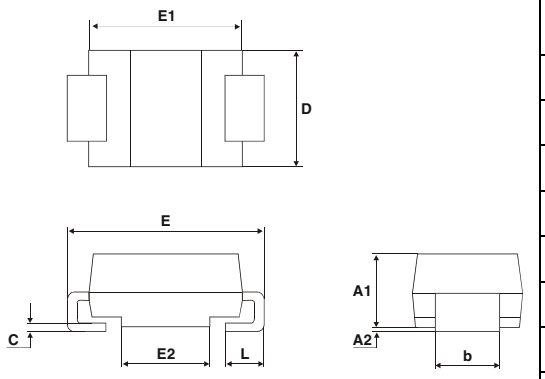
Figure 5. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed circuit board FR4, copper thickness: 35 µm)



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)

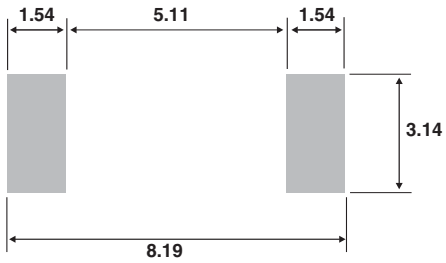
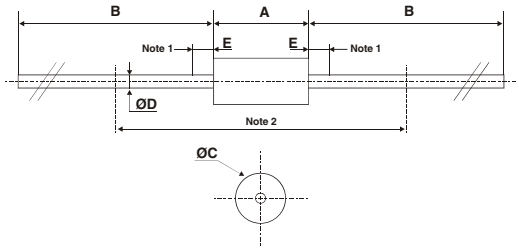
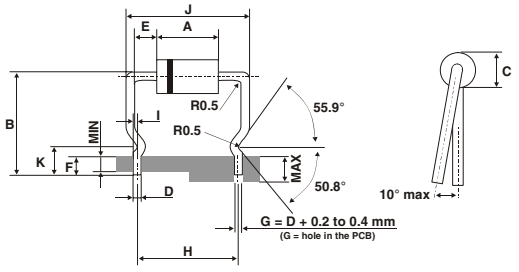


Table 6. DO-201AD dimensions



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
Notes	1 - The lead diameter ø 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
Note	The difference between E dimensions on both sides of resinous body (which express the bending centering) musn't be larger than 0.7 millimeter.					

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

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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