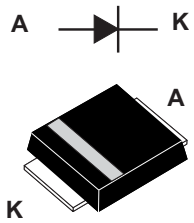
STTH310-Y

Automotive high voltage ultrafast rectifier

Datasheet - production data



SMBflat
STTH310UFY

Features

- Very low conduction losses
- Negligible switching losses
- Low forward and reverse recovery times
- High junction temperature
- AEC-Q101 qualified
- ECOPACK®2 compliant component

Description

The STTH310-Y, which is using ST's new 1000 V planar technology, is especially suited for switching mode base drive and transistor circuits.

The device is also intended for use as a free wheeling diode in power supplies and other power switching applications in automotive functions.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	3 A
V_{RRM}	1000 V
$T_{j\ (max)}$	175 °C
$V_{F\ (typ)}$	0.98 V
$T_{rr\ (typ)}$	52 ns

1 Characteristics

Table 2. Absolute ratings (limiting values at T_j = 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		1000	V
$I_{F(AV)}$	Average forward current	T_L = 95 °C δ = 0.5	3	A
I_{FSM}	Forward Surge current	t_p = 8.3 ms	30	A
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j(1)	Operating temperature range		-40 to + 175	°C

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction to lead	16	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			10	µA
		T_j = 125 °C			1	50	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 3A			1.7	V
		T_j = 150 °C			0.98	1.42	

1. Pulse test: tp = 5 ms, δ < 2%
2. Pulse test: tp = 380 µs, δ < 2%

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	Tests conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 0.5 A I_{rr} = 0.25 A I_R = 1 A		52	75	ns
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 3 A dI_F/dt = 50 A/µs V_{FR} = 4 V			300	
V_{FP}	Forward recovery voltage				8	12	V

Figure 1. Average forward power dissipation versus average forward current

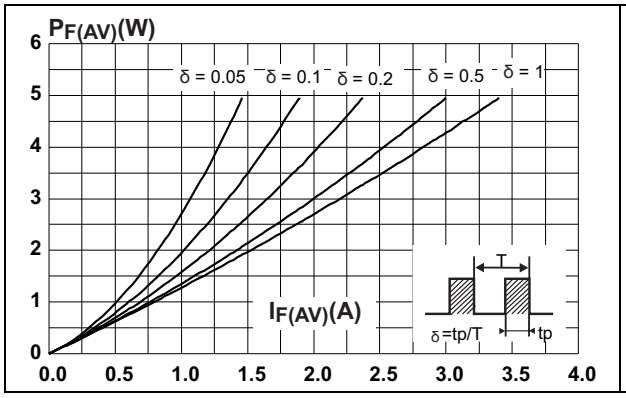


Figure 2. Forward voltage drop versus forward current (typical values)

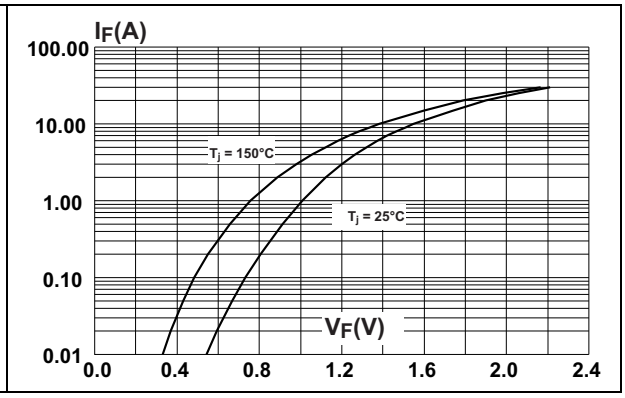


Figure 3. Forward voltage drop versus forward current (maximum values)

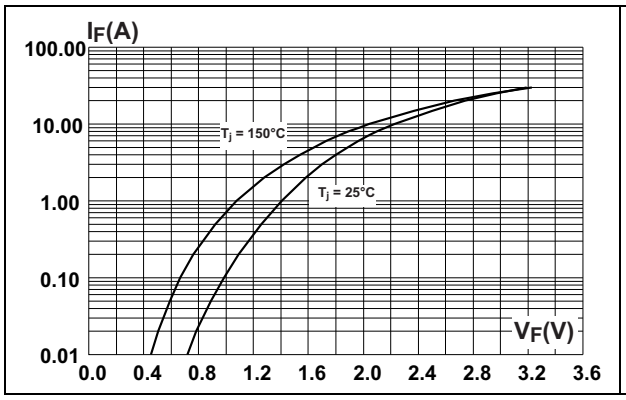


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration

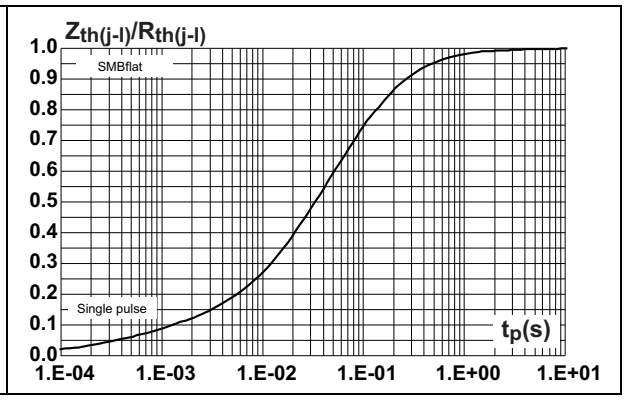


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

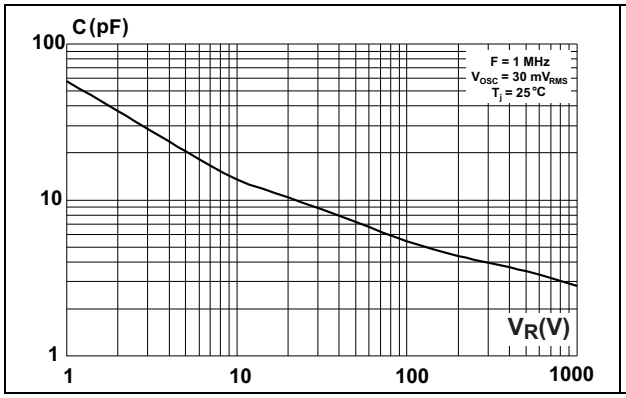
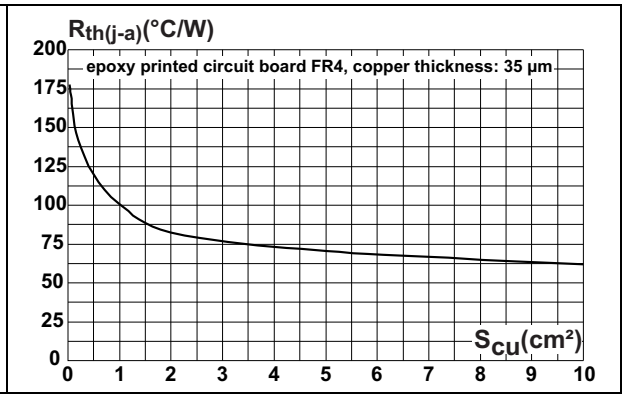


Figure 6. Thermal resistance junction to ambient versus copper surface under each lead



2 Package information

- Epoxy meets UL94,V0
- Lead-free package
- Band indicates cathode

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.

Figure 7. SMBflat dimensions definitions

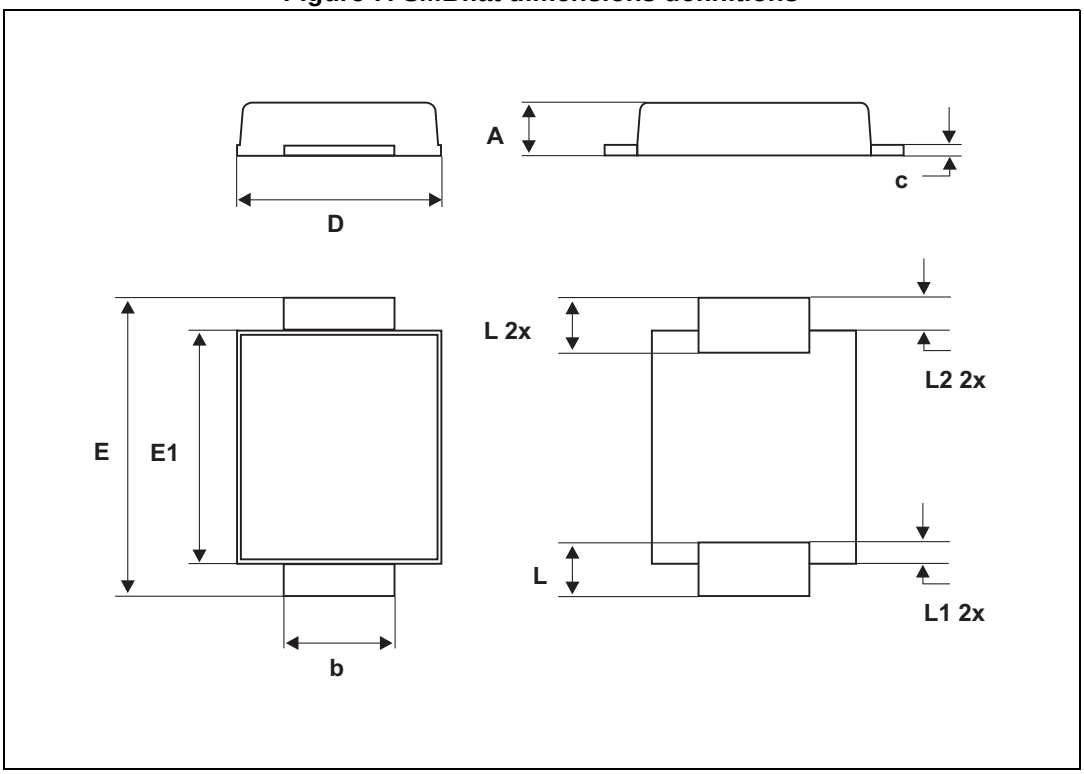
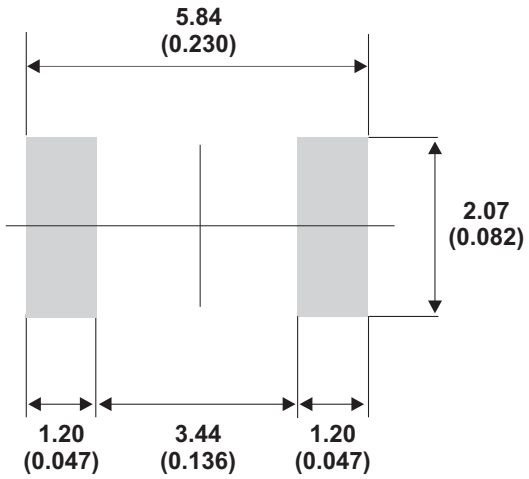


Table 6. SMBflat dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b	1.95		2.20	0.077		0.087
c	0.15		0.40	0.006		0.016
D	3.30		3.95	0.130		0.155
E	5.10		5.60	0.200		0.220
E1	4.05		4.60	0.159		0.181
L	0.75		1.50	0.029		0.059
L1		0.40			0.016	
L2		0.60			0.024	

Figure 8. SMBflat footprint, dimensions in mm (inches)



3 Ordering information

Table 7. Ordering information

Order codes	Marking	Package	Weight	Base qty	Delivery mode
STTH310UFY	F310Y	SMBflat	55 mg	5000	Tape and reel

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
05-Feb-2014	1	Initial release.

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