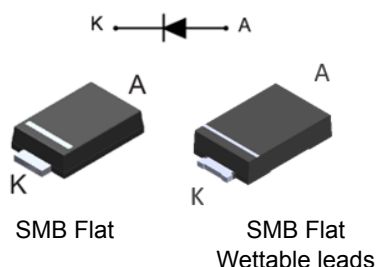


Automotive 3 A - 1000 V ultrafast rectifier



Features

- AEC-Q101 qualified 
- Very low conduction losses
- Negligible switching losses
- Low forward and reverse recovery times
- High junction temperature
- [ECOPACK2](#) or [ECOPACK3](#) compliant component on demand

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 K functions.



Product status link

[STTH310-Y](#)

Product summary

$I_{F(AV)}$	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 1. Absolute ratings (limiting values at $T_j = 25\text{ °C}$, unless otherwise specified)

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

1. $(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.

Table 2. Thermal resistance

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

Table 3. Static electrical characteristic

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

1. Pulsetest: $t_p = 5\text{ ms}$, $\delta < 2\%$

2. Pulsetest: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

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	$T_j = 25\text{ °C}$	$I_F = 0.5\text{ A}$; $I_{rr} = 0.25\text{ A}$; $I_R = 1\text{ A}$	-	52	75	ns
t_{fr}	Forward recovery time	$T_j = 25\text{ °C}$	$I_F = 3\text{ A}$; $dI_F/dt = 50\text{ A}/\mu\text{s}$; $V_{FR} = 4\text{ V}$	-		300	
V_{FP}	Forward recovery voltage			-	8	12	V

1.1 Electrical characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

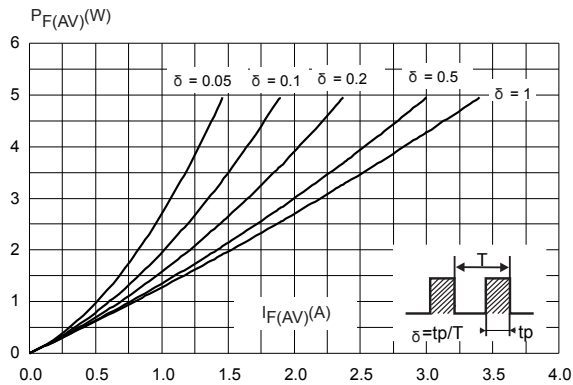


Figure 2. Forward voltage drop versus forward current (typical values)

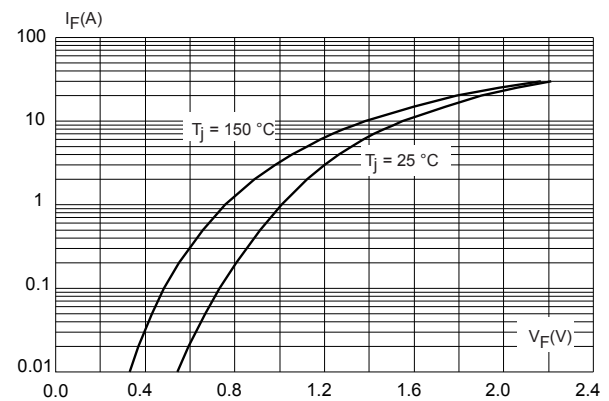


Figure 3. Forward voltage drop versus forward current (maximum values)

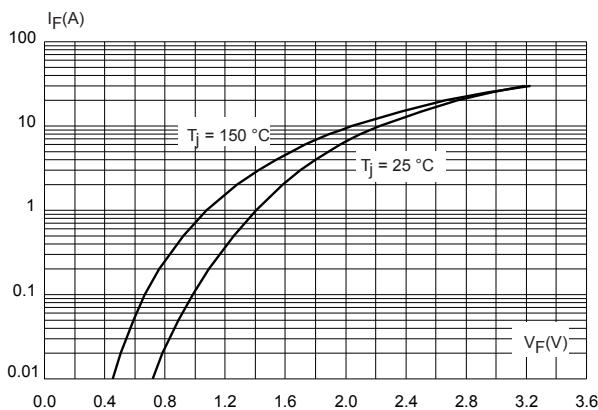


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration

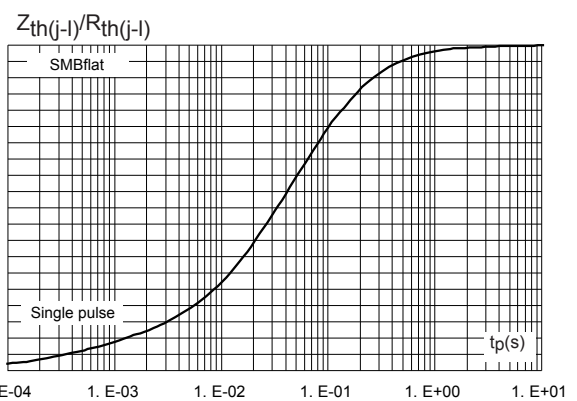


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

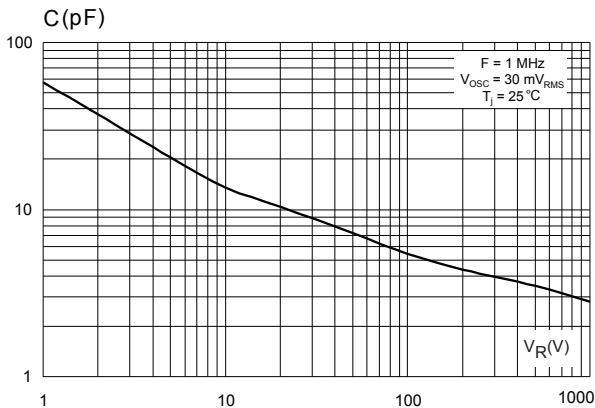
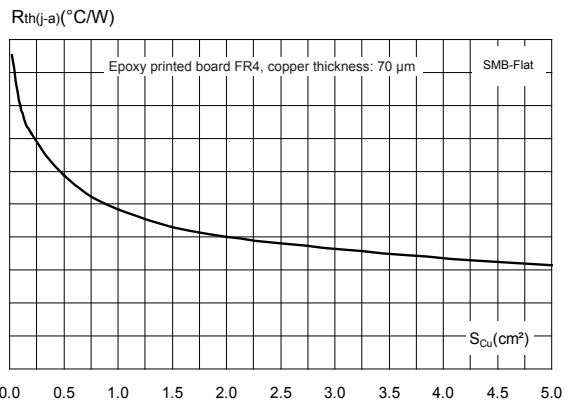


Figure 6. Thermal resistance junction to ambient versus copper surface under each lead



2 Package information

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.

2.1 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 7. SMB Flat package outline

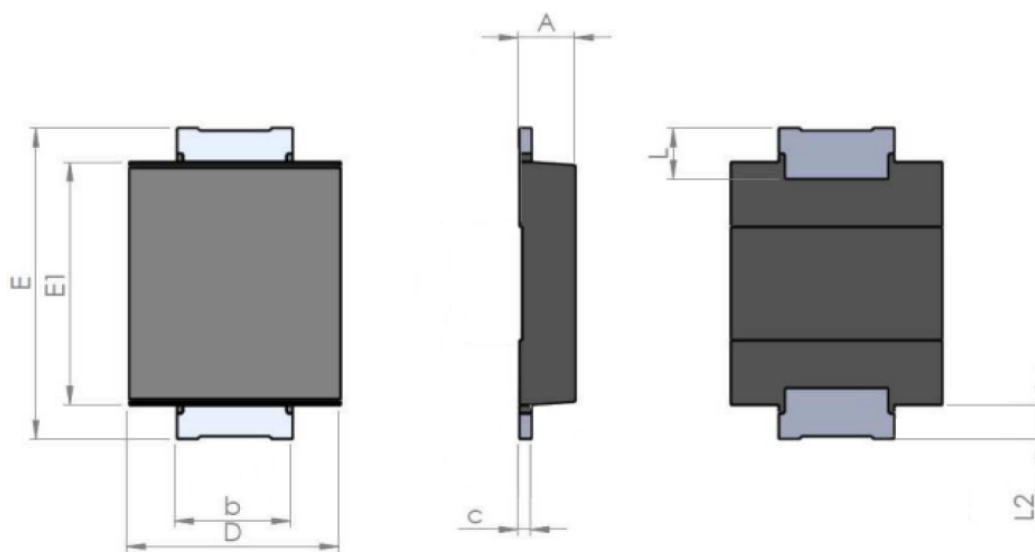
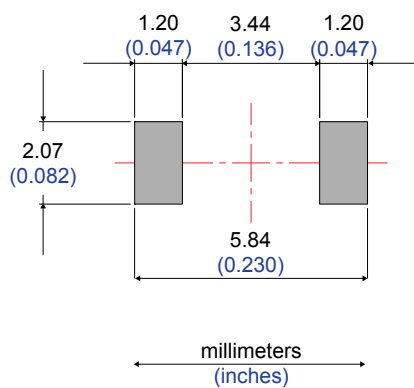


Table 5. SMB Flat mechanical data

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		0.156
E	5.10		5.60	0.200		0.220
E1	4.05		4.60	0.159		0.181
L	0.75		1.50	0.030		0.060
L2		0.60			0.024	

Figure 8. Footprint recommendations, dimensions in mm (inches)



3 Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH310UFY	F310Y	SMBflat	50 mg	5000	Tape and reel

Revision history

Table 6. Document revision history

Date	Version	Changes
05-Feb-2014	1	Initial release.
18-Mar-2022	2	Updated Section 2.1 SMB Flat package information.

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