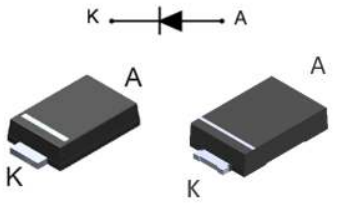
STTH110-Y

Datasheet

Automotive high voltage ultrafast rectifier



SMB Flat

SMB Flat
Wettable leads

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 STTH110-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
STTH110-Y

Product summary	
$I_{F(AV)}$	1 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 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		1000	V
$I_{F(AV)}$	Average forward current	T_L=140 °C δ = 0.5	1	A
I_{FSM}	Forward surge current	t_p= 8.3 ms	20	A
T_{stg}	Storage temperature range		-65to + 175	°C
T_j(1)	Operating temperature range		-40to + 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	20	°C/W

Table 3. Static electrical characteristic

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j= 25 °C	V_R=V_{RRM}	-		5	µA
		T_j= 125 °C		-	1	50	
V_F(2)	Forward voltage drop	T_j= 25 °C	I_F=1 A	-		1.7	V
		T_j= 150 °C		-	0.98	1.42	

1. *Pulsetest: tp = 5 ms, δ < 2%*
2. *Pulsetest: tp = 380 µs, δ < 2%*

To evaluate the conduction losses use the following equation:
$P = 1.20 \times I_{F(AV)} + 0.225\ I_{F^2(RMS)}$

Table 4. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j= 25 °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=1 A; $dI_{F/dt}$= 50 A/µs; V_{FR}=2.70 V	-		300	
V_{FP}	Forward recovery voltage			-	10	15	V

1.1 Electrical characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

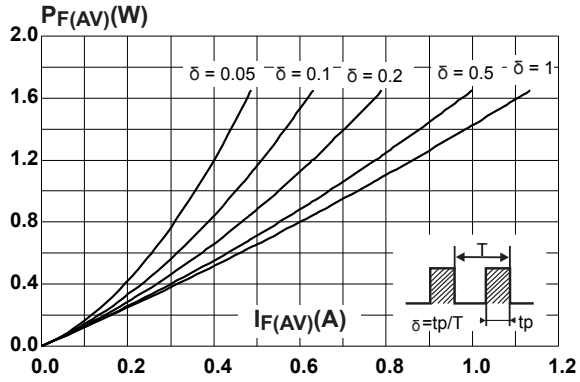


Figure 2. Forward voltage drop versus forward current (typical values)

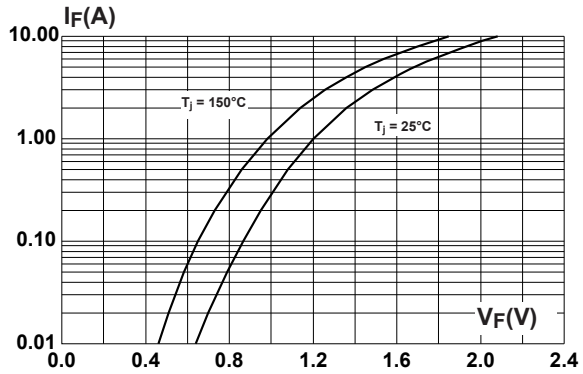


Figure 3. Forward voltage drop versus forward current (maximum values)

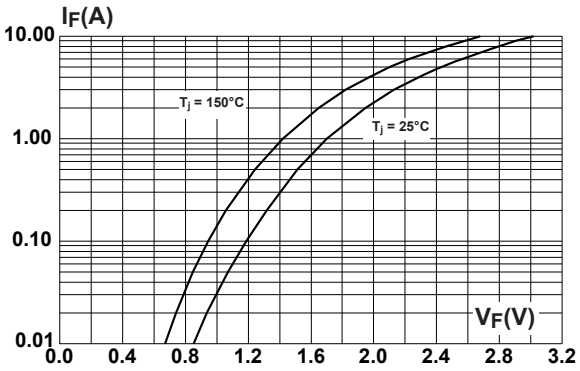


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration

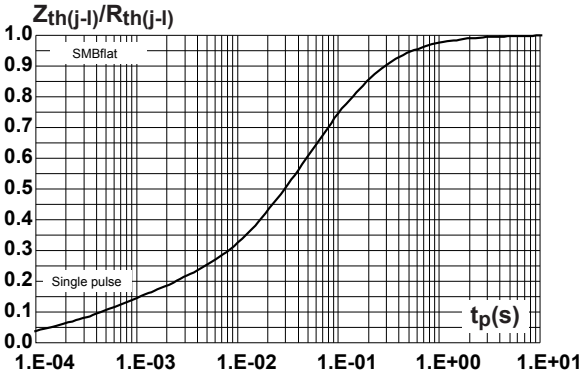


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

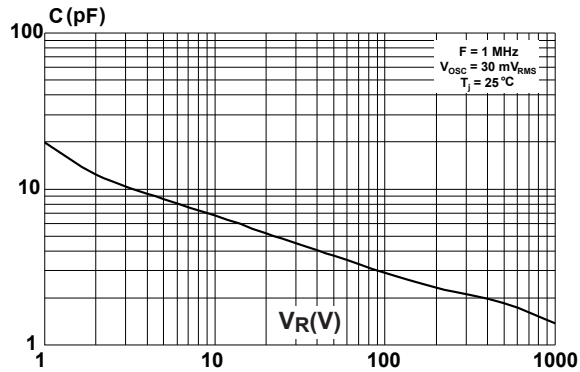
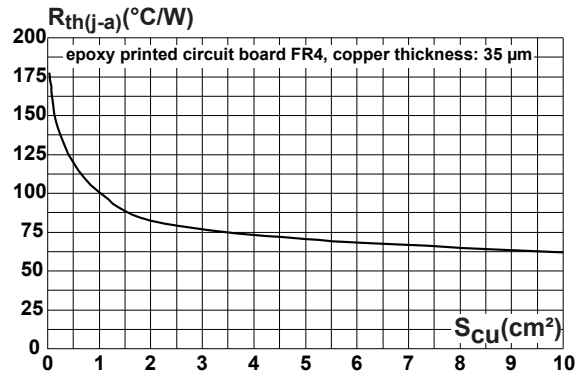


Figure 6. Thermal resistance junction to ambient versus copper surface under each lead



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

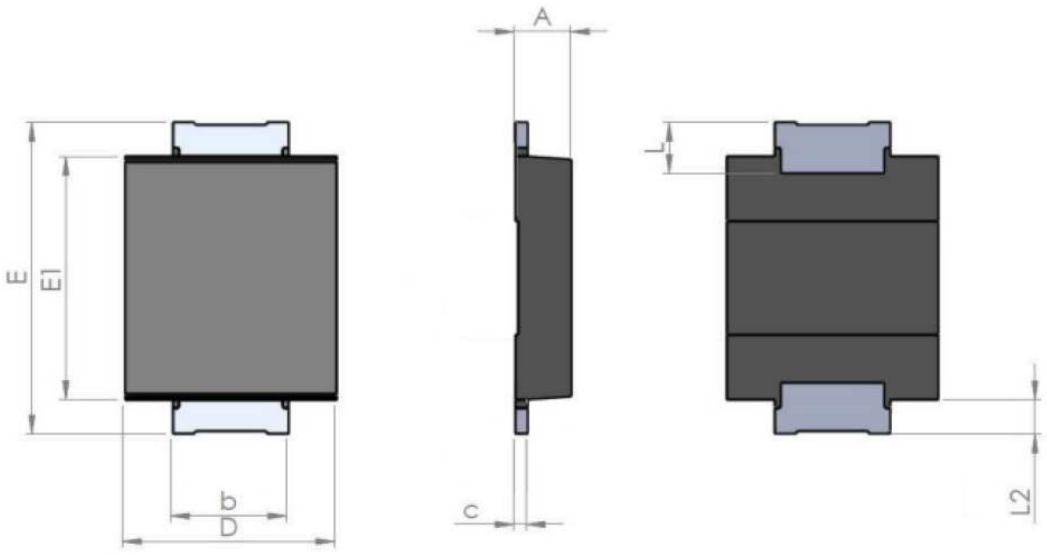
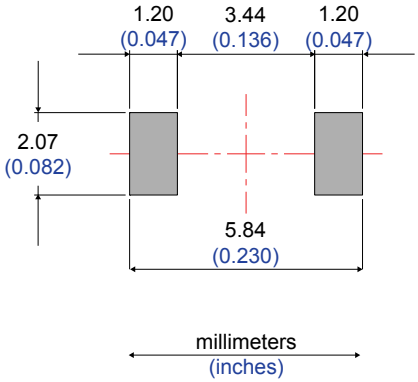


Table 5. SMB Flat mechanical data

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
STTH110UFY	F110Y	SMBflat	50mg	5000	Tape and reel

Revision history

Table 6. **Document revision history**

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