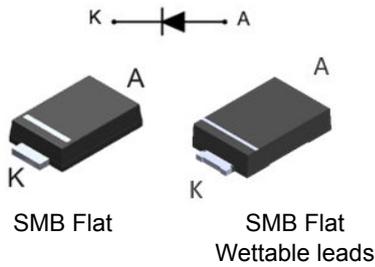


## Automotive 1 A - 1200 V ultrafast rectifier



### 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 STTH112-Y, which is using ST's new 1200 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

[STTH112-Y](#)

#### Product summary

$I_{F(AV)}$	1 A
$V_{RRM}$	1200 V
$T_j$ (max.)	175 °C
$V_F$ (typ.)	1.1 V
$T_{rr}$ (typ.)	53 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, $T_j = -40\text{ °C}$ to $+175\text{ °C}$	1200	V
$I_{F(AV)}$	Average forward current	$T_L = 135\text{ °C}$ $\delta = 0.5$	A
$I_{FSM}$	Forward surge current	$t_p = 8.3\text{ ms}$	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	20	°C/W

For more information, you can refer to the following application note related to the thermal management:

- [AN5088](#): Rectifiers thermal management, handling and mounting recommendations

**Table 3. Static electrical characteristic**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-	5	$\mu\text{A}$
		$T_j = 125\text{ °C}$		1	50	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 1\text{ A}$	-	1.9	V
		$T_j = 150\text{ °C}$		1.10	1.55	

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:

$$P = 1.25 \times I_{F(AV)} + 0.330 I_{F^2(RMS)}$$

For more information, you can refer to the following application notes related to the power losses:

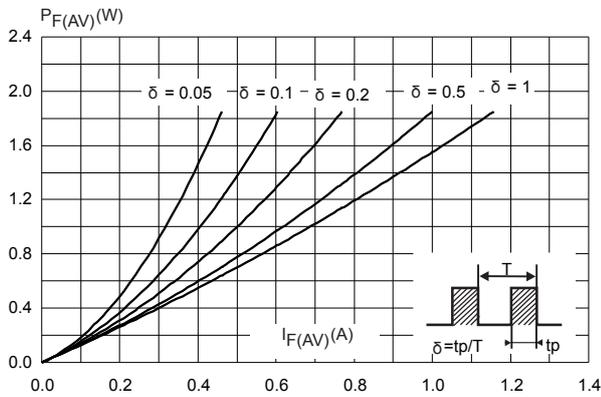
- [AN604](#): Calculation of conduction losses in a power rectifier
- [AN4021](#): Calculation of reverse losses on a power diode

**Table 4. Dynamic electrical characteristics**

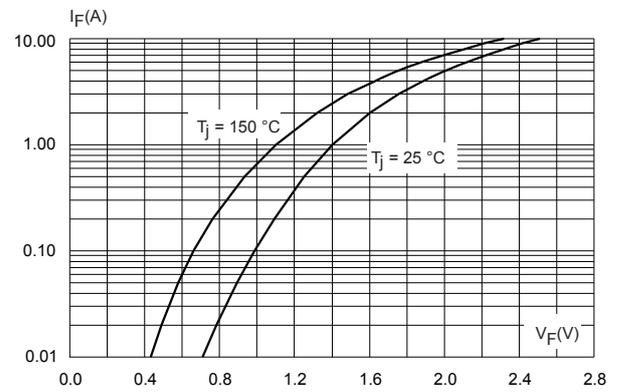
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ °C}$ $I_F = 0.5\text{ A};$ $I_{rr} = 0.25\text{ A};$ $I_R = 1\text{ A}$	-	53	75	ns
$t_{fr}$	Forward recovery time	$T_j = 25\text{ °C}$ $I_F = 1\text{ A};$	-		500	
$V_{FP}$	Forward recovery voltage	$T_j = 25\text{ °C}$ $dI_F/dt = 50\text{ A}/\mu\text{s};$ $V_{FR} = 4.50\text{ V}$	-	20	30	V

## 1.1 Electrical characteristics (curves)

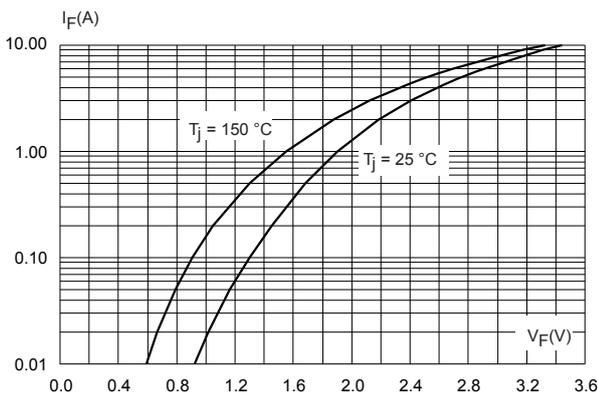
**Figure 1. Average forward power dissipation versus average forward current**



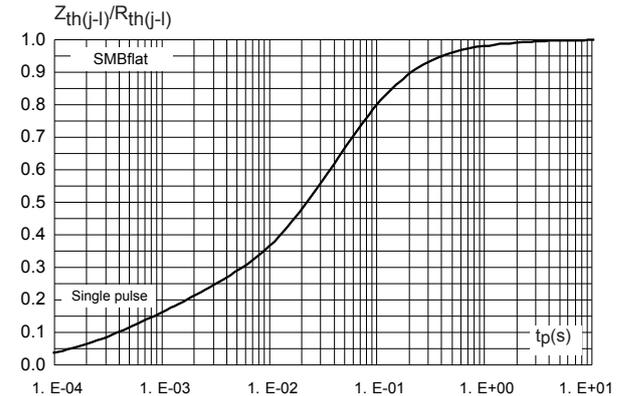
**Figure 2. Forward voltage drop versus forward current (typical values)**



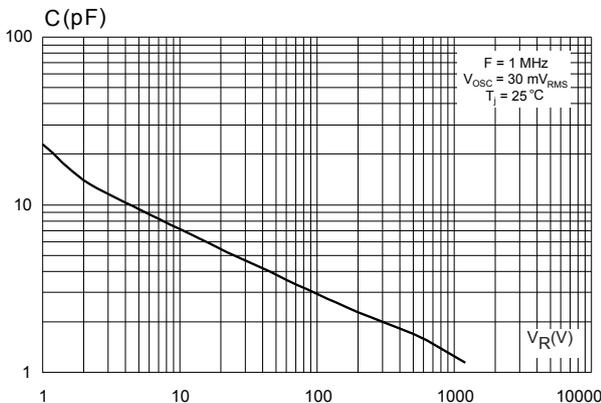
**Figure 3. Forward voltage drop versus forward current (maximum values)**



**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**

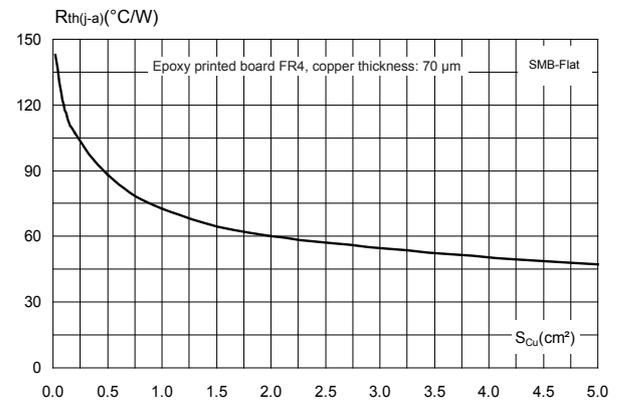
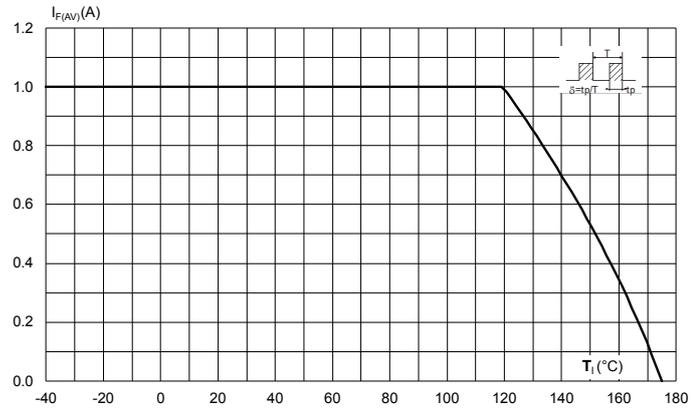


Figure 7. Average forward current versus lead temperature



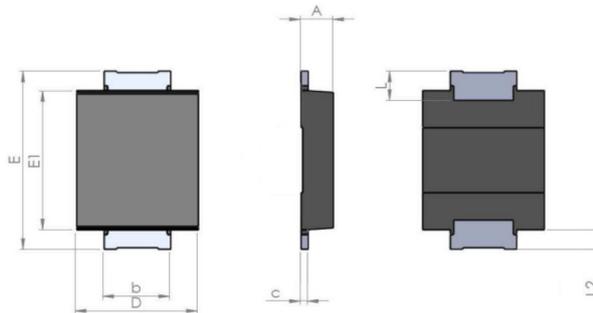
## 2 Package information

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](http://www.st.com). ECOPACK is an ST trademark.

### 2.1 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 8. SMB Flat package outline

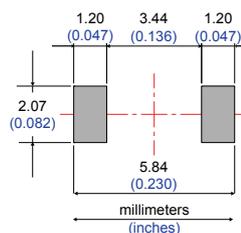


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

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 9. Footprint recommendations, dimensions in mm (inches)





### 3 Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH112UFY	F112Y	SMBflat	50 mg	5000	Tape and reel

## Revision history

**Table 6. Document revision history**

Date	Version	Changes
04-Feb-2014	1	Initial release.
18-Mar-2022	2	Updated <i>Section 2.1 SMB Flat package information</i> .
27-May-2025	3	Updated <a href="#">Table 1</a> , and added <a href="#">Figure 7</a> .

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