

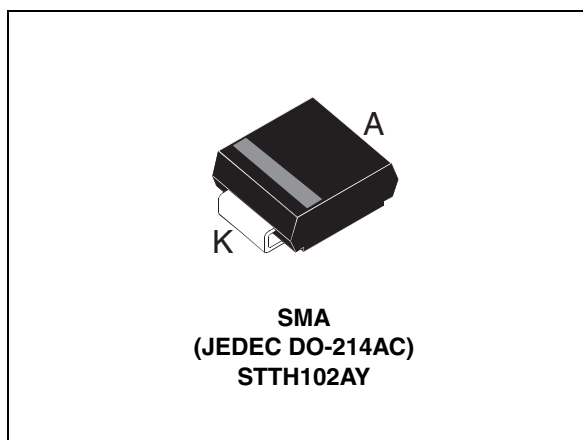
## Automotive high efficiency ultrafast diode

### Features

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

### Description

The STTH102-Y, which is using ST's new 200 V planar technology, is specially 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 for automotive.



**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	1 A
$V_{RRM}$	200 V
$T_j (max)$	175 °C
$V_F(max)$	0.78 V
$t_{rr} (max)$	20 ns

# 1 Characteristics

**Table 2. Absolute rating (limiting values)**

Symbol	Parameter	Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage	200	V
$I_{F(AV)}$	Average forward current	$T_L = 148\text{ °C } \delta = 0.5$	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	A
$T_{stg}$	Storage temperature range	-65 to + 175	°C
$T_j$	Operating junction temperature range	-40 to +175	°C
$dV/dt$	Critical rate of rise of reverse voltage	10000	V/ $\mu$ s

**Table 3. Thermal resistance**

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction to lead	30	°C/W

**Table 4. Static Electrical Characteristics**

Symbol	Parameter	Tests conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$		1	$\mu$ A
		$T_j = 125\text{ °C}$		1	25	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 700\text{ mA}$		0.90	V
			$I_F = 1\text{ A}$		0.97	
		$T_j = 125\text{ °C}$	$I_F = 1\text{ A}$	0.68	0.78	

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

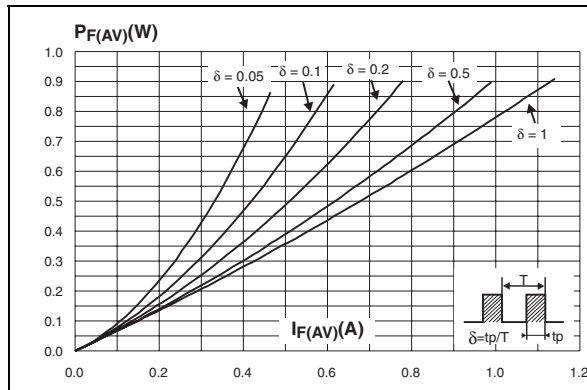
2. Pulse test:  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:  $P = 0.65 \times I_{F(AV)} + 0.130 I_F^2(RMS)$

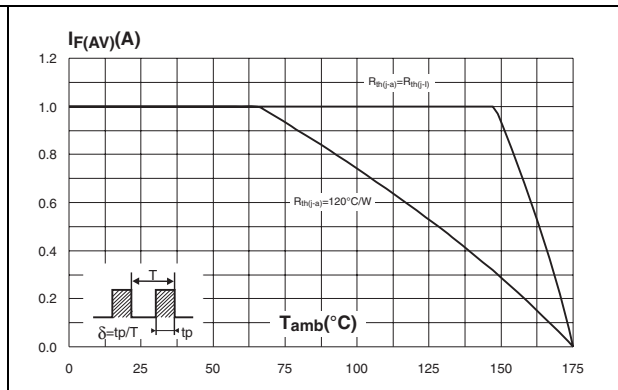
**Table 5. Dynamic electrical characteristics**

Symbol	Parameter	Tests conditions	Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ °C}$ $I_F = 0.5\text{ A } I_{rr} = 0.25\text{ A}$ $I_R = 1\text{ A}$		12	20	ns
$t_{fr}$	Forward recovery time	$T_j = 25\text{ °C}$ $I_F = 1\text{ A } dI_F/dt = 50\text{ A/ms}$ $V_{FR} = 1.1 \times V_{Fmax}$		50		ns
$V_{FP}$	Forward recovery voltage	$T_j = 25\text{ °C}$ $I_F = 1\text{ A } dI_F/dt = 50\text{ A/ms}$		1.8		V

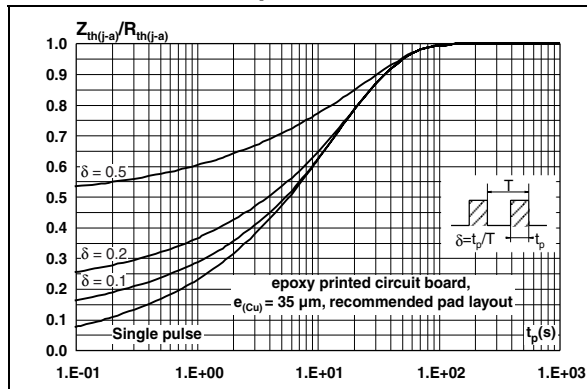
**Figure 1. Average forward power dissipation versus average forward current**



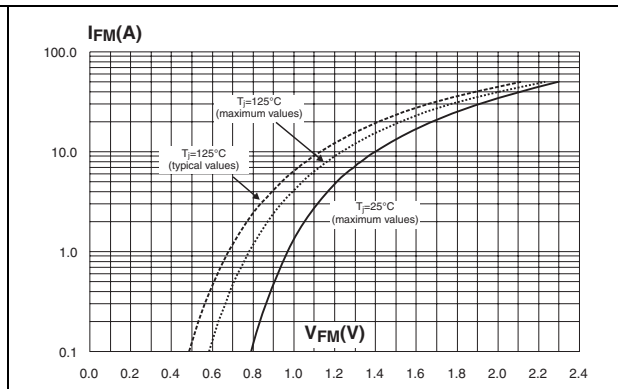
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



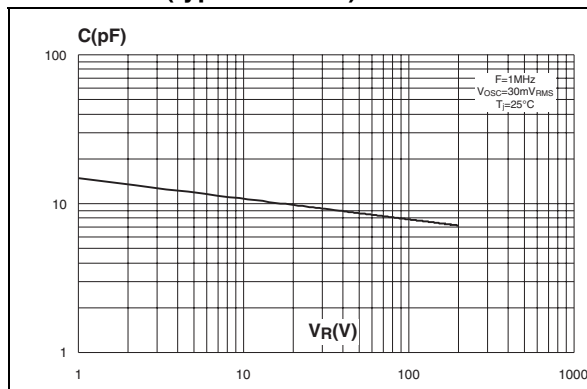
**Figure 3. Relative variation of thermal impedance junction to ambient versus pulse duration**



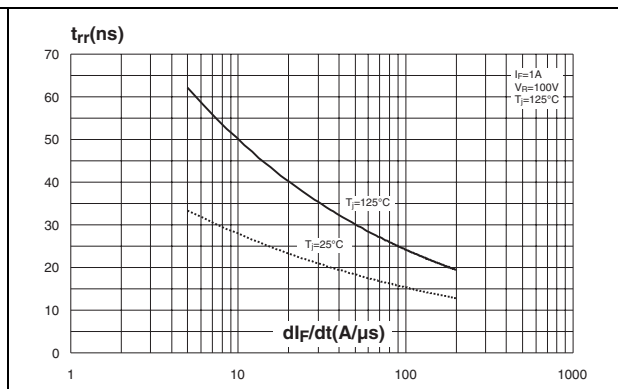
**Figure 4. Forward voltage drop versus forward current**



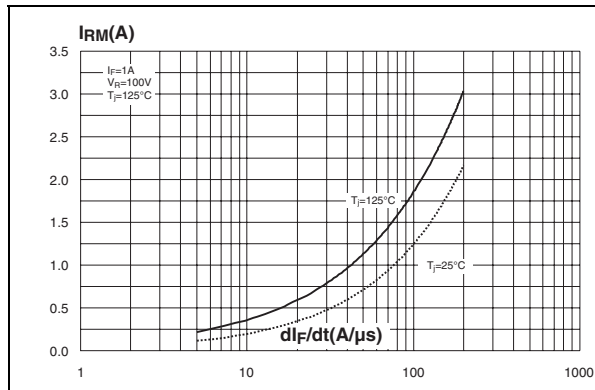
**Figure 5. Junction capacitance versus reverse voltage applied (typical values)**



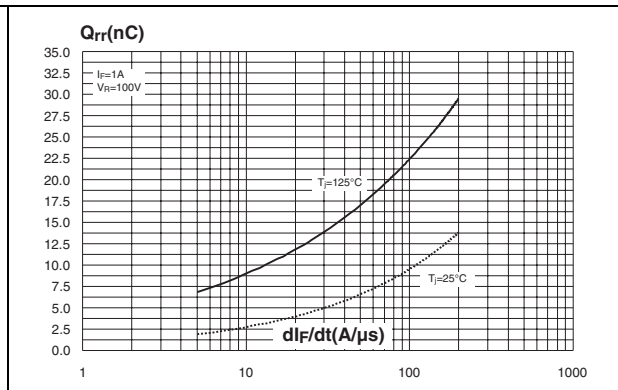
**Figure 6. Reverse recovery time versus  $dI_F/dt$  (90% confidence)**



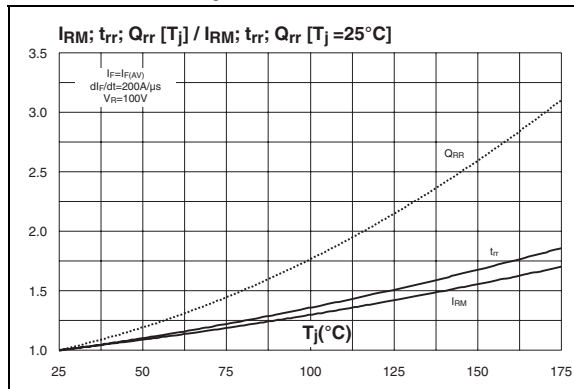
**Figure 7. Peak recovery current versus  $dl_F/dt$  (90% confidence)**



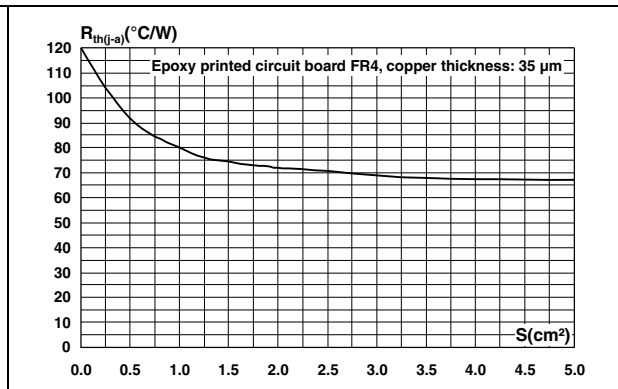
**Figure 8. Reverse recovery charges versus  $dl_F/dt$  (90% confidence)**



**Figure 9. Relative variations of dynamic parameters versus junction temperature**



**Figure 10. Thermal resistance junction to ambient versus copper surface under each lead**



## 2 Package information

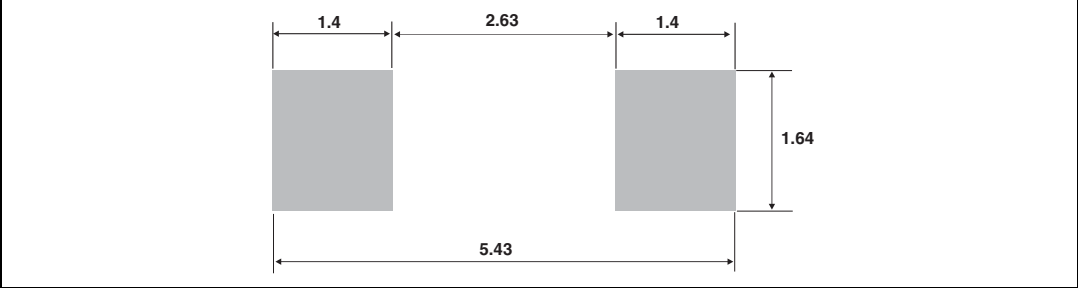
- Epoxy meets UL94 V0
- Lead-free packages

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Table 6. SMA dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.094
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.40	0.006	0.016
D	2.25	2.90	0.089	0.114
E	4.80	5.35	0.189	0.211
E1	3.95	4.60	0.156	0.181
L	0.75	1.50	0.030	0.059

Figure 11. Footprint (dimensions in mm)



### 3 Ordering information

**Table 7. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH102AY	U12Y	SMA	0.068 g	5000	Tape and reel

### 4 Revision history

**Table 8. Revision history**

Date	Revision	Changes
07-Nov-2011	1	Initial release.

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