STTH102-Y

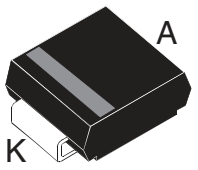
Automotive high efficiency ultrafast diode

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.



SMA
(JEDEC DO-214AC)
STTH102AY

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 °C δ = 0.5	1	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	40	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/µs

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 °C	$V_R = V_{RRM}$			1	µA
		T_j = 125 °C			1	25	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 700 mA			0.90	V
			I_F = 1 A			0.97	
		T_j = 125 °C	I_F = 1 A		0.68	0.78	

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

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

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		12	20	ns
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 1 A dI_F/dt = 50 A/ms V_{FR} = 1.1 x $V_F$max		50		ns
V_{FP}	Forward recovery voltage	T_j = 25 °C	I_F = 1 A dI_F/dt = 50 A/ms		1.8		V

Figure 1. Average forward power dissipation versus average forward current

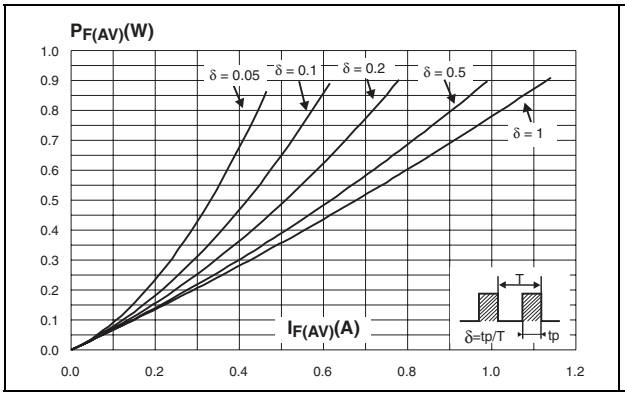


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

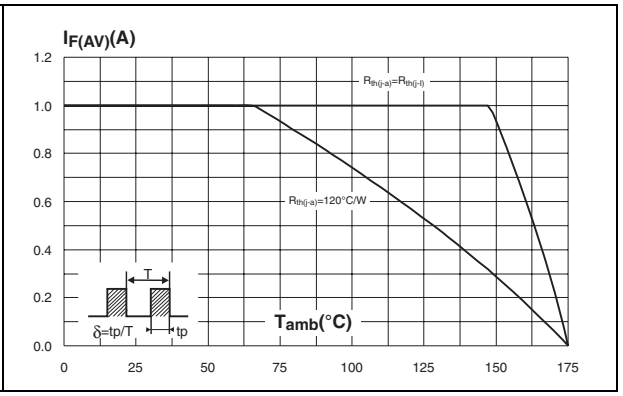


Figure 3. Relative variation of thermal impedance junction to ambient versus pulse duration

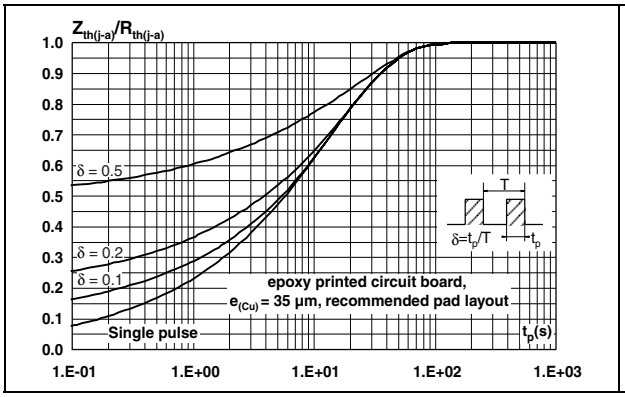


Figure 4. Forward voltage drop versus forward current

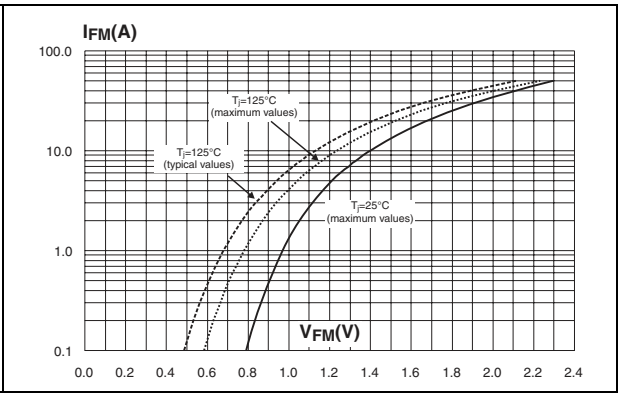


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

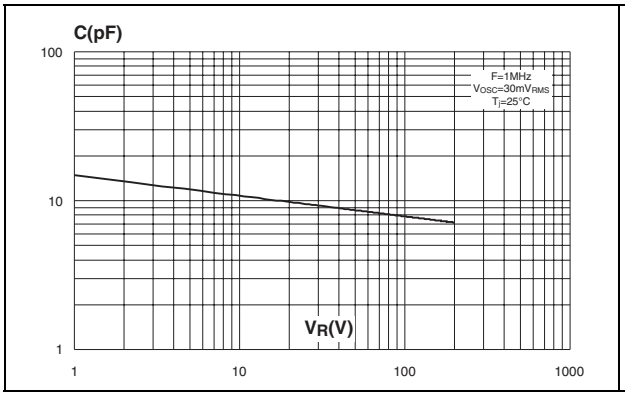


Figure 6. Reverse recovery time versus dI_F/dt (90% confidence)

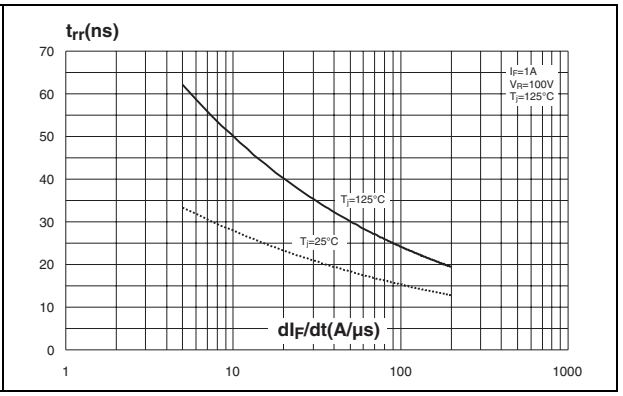


Figure 7. Peak recovery current versus dI_F/dt (90% confidence)

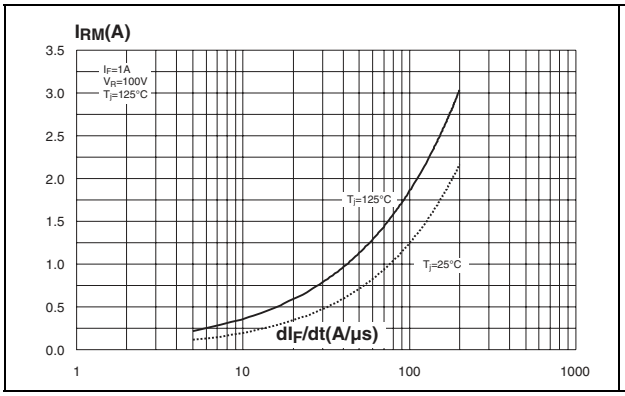


Figure 8. Reverse recovery charges versus dI_F/dt (90% confidence)

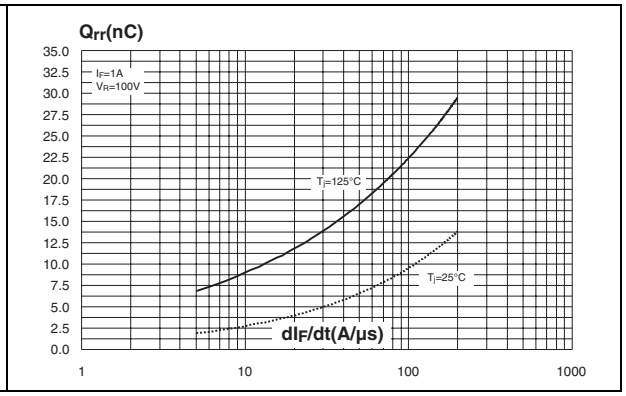


Figure 9. Relative variations of dynamic parameters versus junction temperature

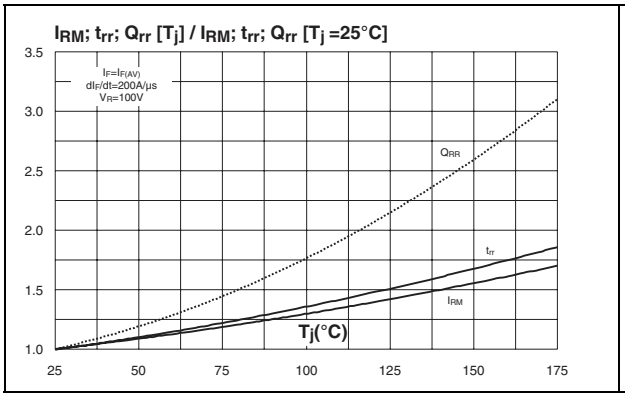
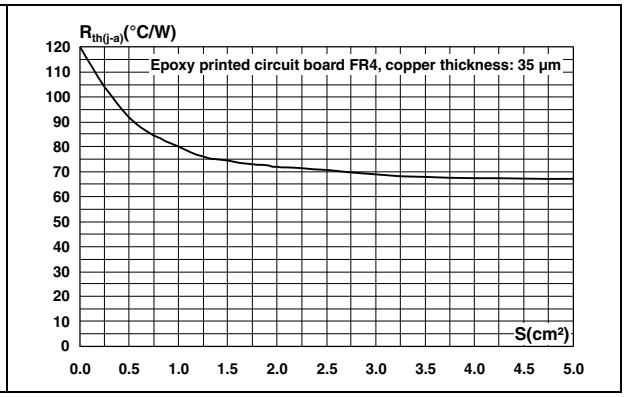


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead

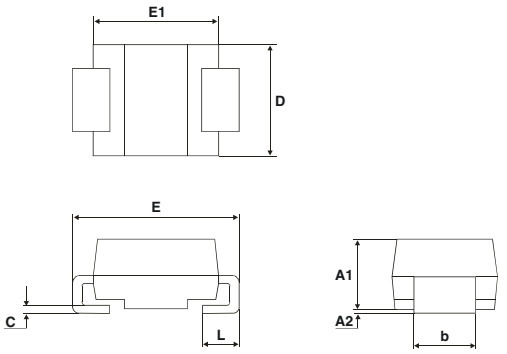


2 Package information

- Epoxy meets UL94 V0
- Lead-free packages

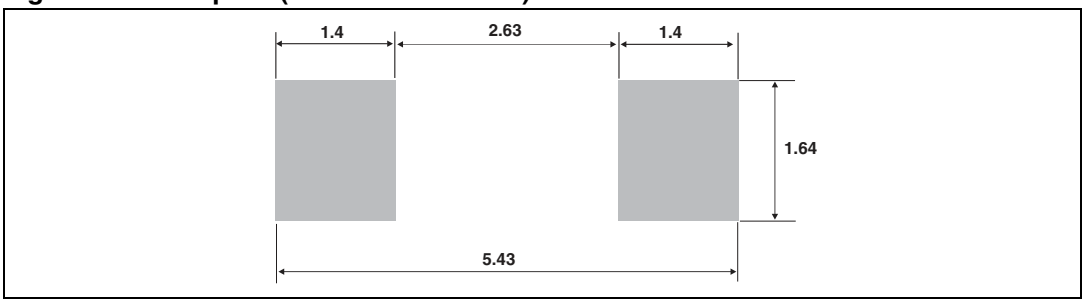
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

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.