Excellent Integrated System Limited

Stocking Distributor

Click to view price, real time Inventory, Delivery & Lifecycle Information:

STMicroelectronics
STTH1003SBY-TR

For any questions, you can email us directly:
sales@integrated-circuit.com

STTH1003S-Y

Automotive high efficiency rectifier

Datasheet – production data

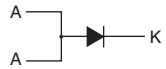
Features

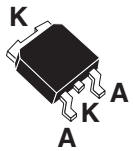
- Ultrafast recovery
- Low power losses
- High surge capability
- Low leakage current
- High junction temperature
- AEC-Q101 qualified

Description

The STTH1003S-Y is an ultrafast recovery power rectifier dedicated to energy recovery in automotive applications.

The STTH1003S-Y is especially designed for the clamping function in an energy recovery block. The compromise between forward voltage drop and recovery time offers optimized performances.





DPAK
STTH1003SBY-TR

Table 1. Device summary

$I_{F(AV)}$	10 A
V_{RRM}	300 V
t_{rr} (typ)	13 ns
T_j	175 °C
V_F (typ)	0.9 V

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		300	V
$I_{F(RMS)}$	Forward rms current		20	A
$I_{F(AV)}$	Average forward current	T_c = 150 °C δ = 0.5	10	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	100	A
I_{RSM}	Non repetitive avalanche current	t_p = 20 µs square	4	A
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Operating junction temperature range		-40 to + 175	°C

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	4	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	-	10	µA
		T_j = 125 °C		-	10	100	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 10 A	-	-	1.30	V
		T_j = 125 °C		-	0.9	1.1	

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:

$$P = 0.86 \times I_{F(AV)} + 0.024\ I_F{}^2{}_{(RMS))}$$

Table 5. Recovery 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	-	13	17	ns
			I_F = 1A, V_R = 30V dI_F/dt = -50 A/µs	-	28	35	
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 10 A, dI_F/dt = 100 A/µs V_{FR} = 1.1 x V_{Fmax}	-	-	200	ns
V_{FP}	Peak forward voltage	T_j = 25 °C	I_F = 10 A, dI_F/dt = 100 A/µs	-	2.5	3.5	V
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 10 A, V_{CC} = 200 V dI_F/dt = 200 A/µs	-	5.7	7.5	A
S_{factor}	Softness factor			-	0.3	-	

Figure 1. Forward voltage drop versus current (maximum values)

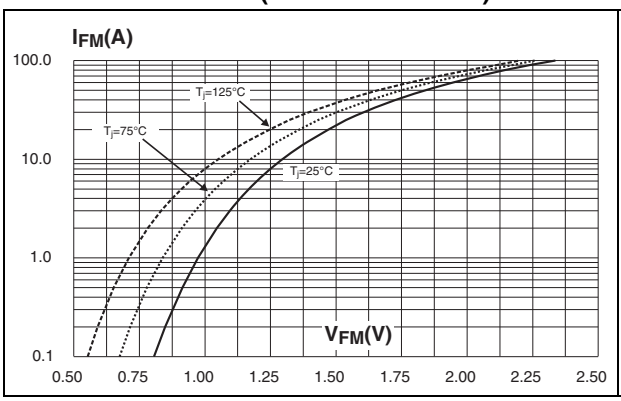


Figure 2. Peak reverse recovery current versus dI_F/dt (90% confidence)

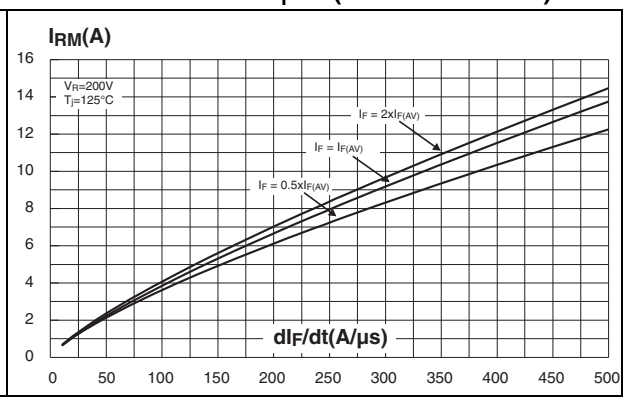


Figure 3. Reverse recovery time versus dI_F/dt (90% confidence)

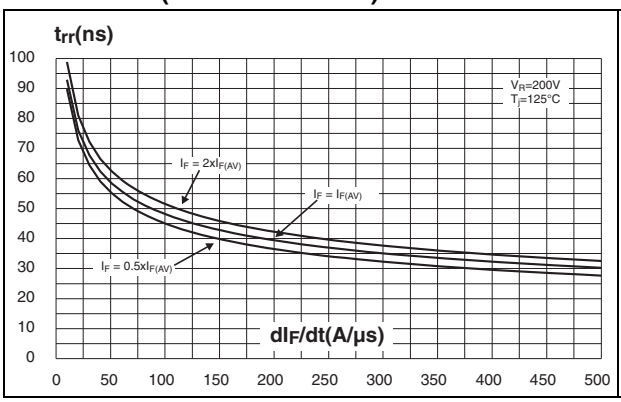


Figure 4. Softness factor versus dI_F/dt (typical values)

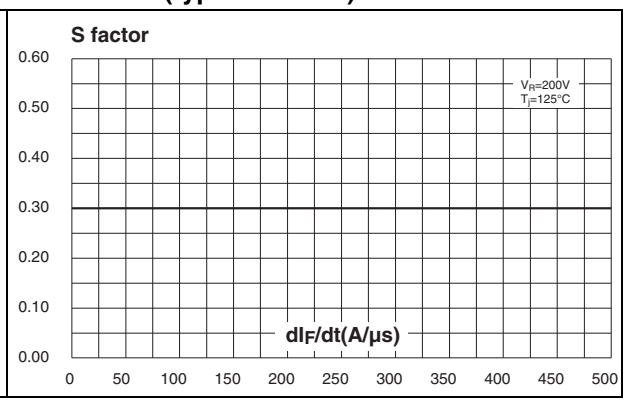


Figure 5. Relative variations of dynamic parameters versus junction temperature (reference: T_j = 125 °C)

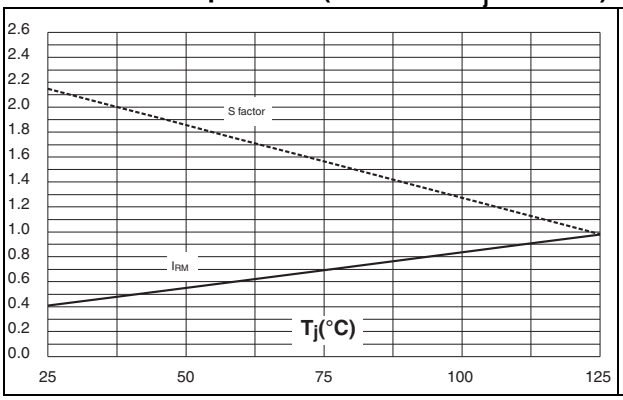


Figure 6. Transient peak forward voltage versus dI_F/dt (90% confidence)

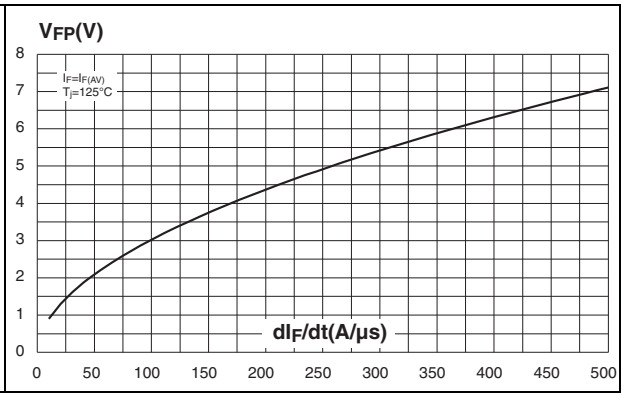
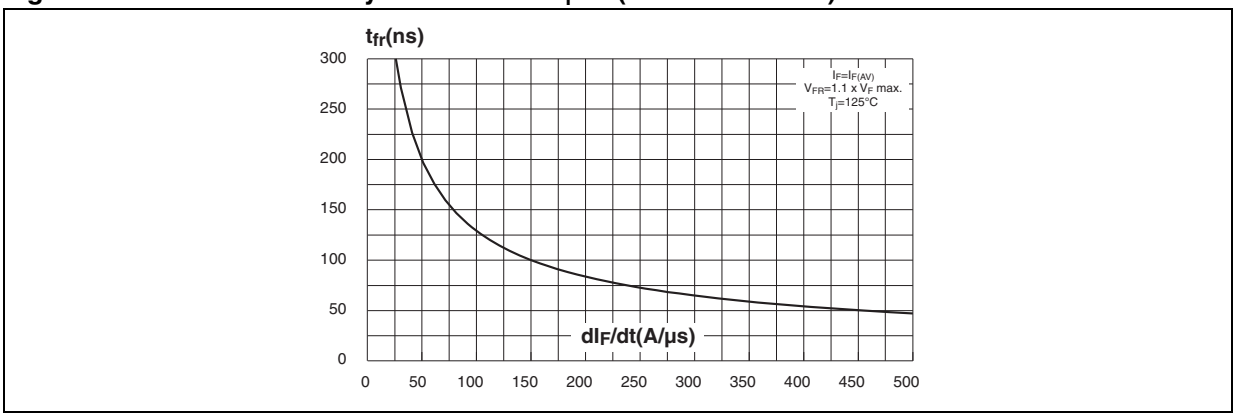


Figure 7. Forward recovery time versus dI_F/dt (90% confidence)

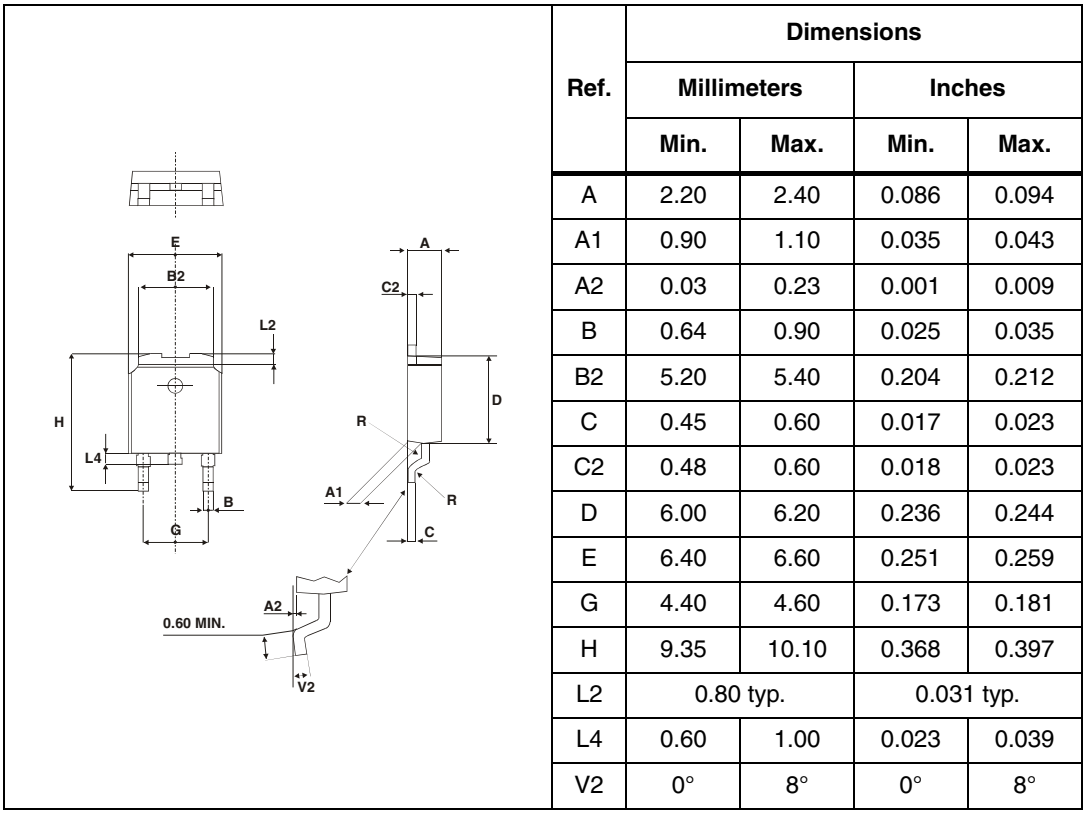


2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction

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. DPAK dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.40	0.086	0.094
A1	0.90	1.10	0.035	0.043
A2	0.03	0.23	0.001	0.009
B	0.64	0.90	0.025	0.035
B2	5.20	5.40	0.204	0.212
C	0.45	0.60	0.017	0.023
C2	0.48	0.60	0.018	0.023
D	6.00	6.20	0.236	0.244
E	6.40	6.60	0.251	0.259
G	4.40	4.60	0.173	0.181
H	9.35	10.10	0.368	0.397
L2	0.80 typ.		0.031 typ.	
L4	0.60	1.00	0.023	0.039
V2	0°	8°	0°	8°

3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH1003SBY-TR	STTH1003SY	DPAK	0.3 g	2500	Tape and reel

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
24-Oct-2012	1	Initial release.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER’S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com