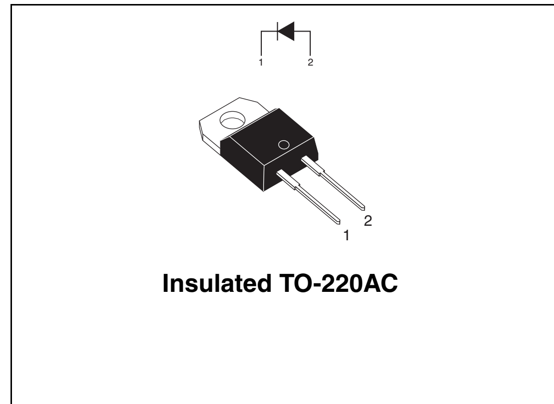
STTH806DTI

Tandem 600 V hyperfast boost diode

Table 1. Main product characteristics

$I_{F(AV)}$	8 A
V_{RRM}	600 V
$T_{j\ (max)}$	150° C
$V_{F\ (max)}$	2.24 V
$I_{RM\ (typ.)}$	4 A
$t_{rr\ (typ.)}$	13 ns



Insulated TO-220AC

Features and benefits

- Especially suited as boost diode in continuous mode power factor correctors and hard switching conditions
- Designed for high di/dt operation. Hyperfast recovery current to compete with SiC devices. Allows downsizing of mosfet and heatsinks
- Internal ceramic insulated devices with equal thermal conditions for both 300 V diodes
- Insulation (2500 V_{RMS}) allows placement on same heatsink as mosfet and flexible heatsinking on common or separate heatsink
- Static and dynamic equilibrium of internal diodes are warranted by design
- Package Capacitance: C = 7 pF

Description

The TURBOSWITCH “H” is an ultra high performance diode composed of two 300 V dice in series. TURBOSWITCH “H” family drastically cuts losses in the associated MOSFET when run at high dI_F/dt.

Table 2. Order codes

Part number	Marking
STTH806DTI	STTH806DTI

Table 3. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward voltage		14	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	180	A
T_{stg}	Storage temperature range		-65 to + 150	° C
T_j	Maximum operating junction temperature		150	° C

Downloaded from Elcodis.com electronic components distributor

1 Characteristics

Table 4. Thermal parameter

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	2.6	°C/W

Table 5. 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			15	100	
V_F [2]	Forward voltage drop	T_j = 25° C	I_F = 8 A			3.6	V
		T_j = 150° C			1.95	2.4	

1. Pulse test: tp = 100 ms, δ < 2%
2. Pulse test: tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 1.7 \times I_{F(AV)} + 0.087\ I_F{}^2{}_{(RMS)}$

Table 6. Dynamic 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		ns
			I_F = 1 A, dI_F/dt = - 50 A/µs V_R = 30 V			30	
I_{RM}	Reverse recovery current	T_j = 125° C	I_F = 8 A, V_R = 400, VdI_F/dt = - 200 A/µs		4	5.5	A
S	Reverse recovery softness factor				0.4		
Q_{rr}	Reverse recovery charges				50		

Table 7. Turn-on switching characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{fr}	Forward recovery time	T_j = 25° C	I_F = 8 A, dI_F/dt = 100 A/µs V_{FR} = 1.1 x V_F max			200	ns
V_{FP}	Forward recovery voltage	T_j = 25° C	I_F = 8 A, dI_F/dt = 100 A/µs			7	V

Downloaded from Elcodis.com electronic components distributor

Figure 1. Conduction losses versus average current

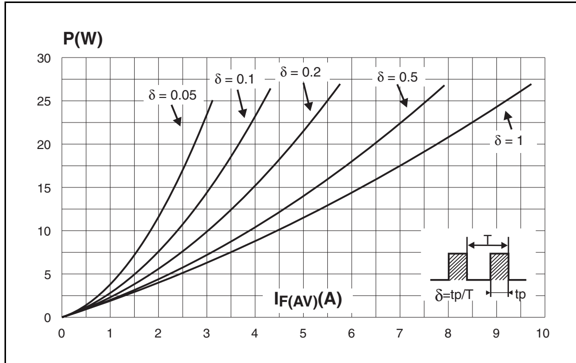


Figure 2. Forward voltage drop versus forward current

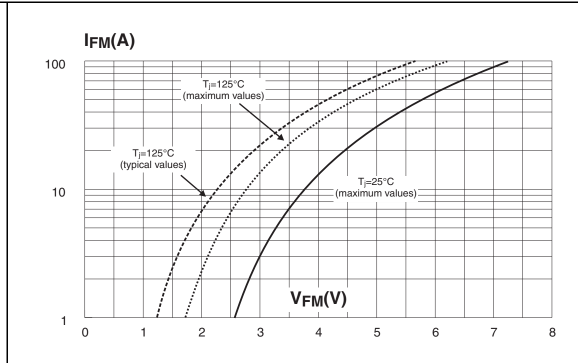


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

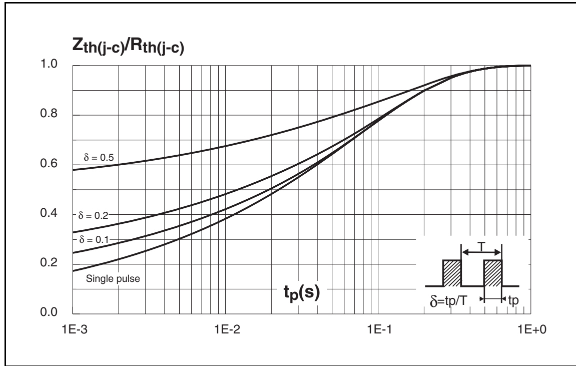


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

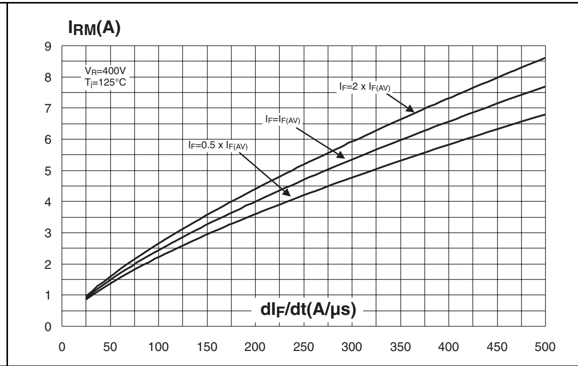


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

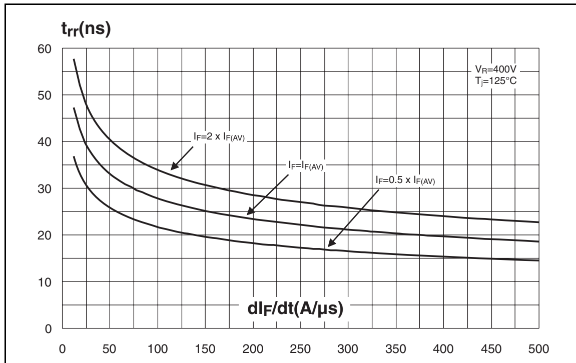
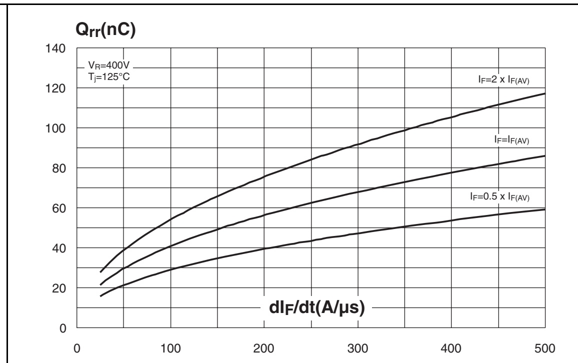


Figure 6. Reverse charges versus dI_F/dt (typical values)



Downloaded from Elcodis.com electronic components distributor

Figure 7. Softness factor versus dI_F/dt (typical values)

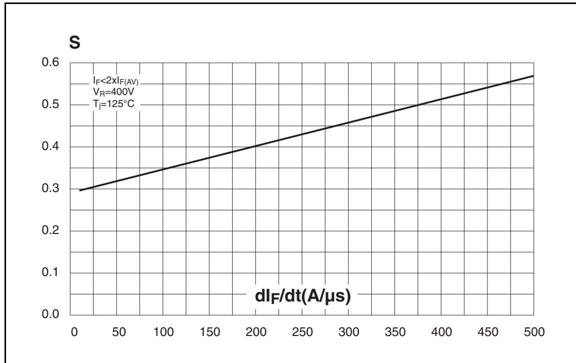


Figure 8. Relative variation of dynamic parameters versus junction temperature (reference: T_j = 125° C)

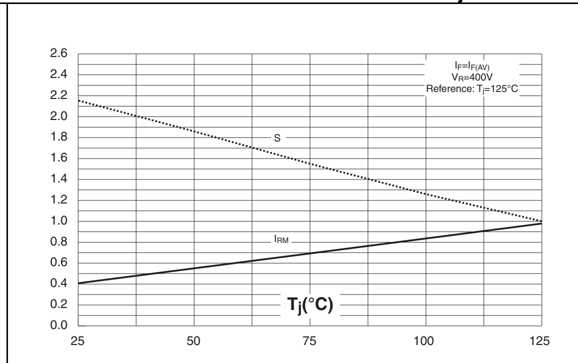


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

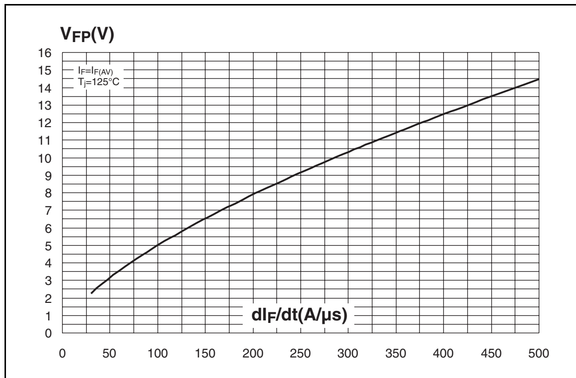
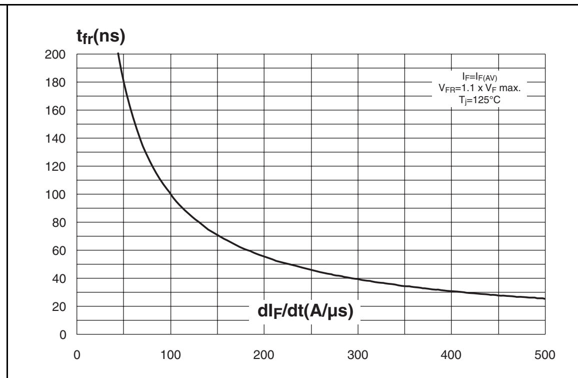


Figure 10. Forward recovery time versus dI_F/dt (typical values)



Downloaded from Elcodis.com electronic components distributor

2 Package information

- Epoxy meets UL94, V0
- Cooling method: C
- Recommended torque value: 0.4 to 0.6 Nm

Table 8. TO-220AC insulated dimensions

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	4.80		5.40	0.189		0.212
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
l2	1.14		1.70	0.044		0.066
M		2.60			0.102	

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

Downloaded from Elcodis.com electronic components distributor

3 Ordering information

Table 9. Ordering information

Part number	Marking	Package	Weight	Base qty	Delivery mode
STTH806DTI	STTH806DTI	TO-220AC	2.3 g	50	Tube

4 Revision history

Table 10. Revision history

Date	Revision	Changes
Oct-2003	2A	Initial release
May-2004	3	Reformatted
29-Jun-2005	4	Corrections to typographical errors. No technical changes.
11-Jul-2007	5	Reformatted to current standards. Removed I_{PEAK} parameter from *Table 3: Absolute ratings (limiting values)*.

Downloaded from Elcodis.com electronic components distributor

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 AN AUTHORIZED ST REPRESENTATIVE, 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.

© 2007 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

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

www.st.com

Downloaded from Elcodis.com electronic components distributor