

Turbo 2 ultrafast high voltage rectifier

Features

- Ultrafast switching
- Low forward voltage drop
- Low leakage current (platinum doping)
- High operating junction temperature

Description

The STTH4L06, which uses ST Turbo 2 600 V technology, is specially suited as boost diode in discontinuous or critical mode power factor corrections.

Packaged in DO-201AD and DO-15, this device is intended for use as a free wheeling diode in power supplies and other power switching applications.

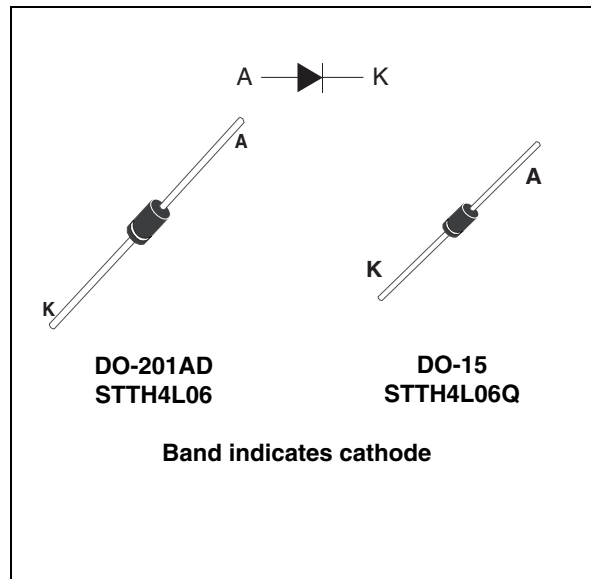


Table 1. Device summary

$I_{F(AV)}$	4 A
V_{RRM}	600 V
T_j	175 °C
V_F (typ)	0.9 V
t_{rr} (typ)	40 ns

1 Characteristics

Table 2. Absolute ratings (limiting values at 25 °C unless otherwise specified)

Symbol	Parameter	Value	Unit	
V_{RRM}	Repetitive peak reverse voltage	600	V	
$I_{F(RMS)}$	Forward rms current	10	A	
$I_{F(AV)}$	Average forward current	4	A	
I_{FSM}	Surge non repetitive forward current	$t_p = 8.3$ ms sinusoidal	80	A
T_{stg}	Storage temperature range	-65 to + 175	°C	
T_j	Maximum operating junction temperature	175	°C	

Table 3. Thermal resistance

Symbol	Parameter	Maximum	Unit
$R_{th(j-l)}$	Junction to lead	DO-15	°C/W
		DO-201AD	
$R_{th(j-a)}$	Junction to ambient	DO-15	°C/W
		DO-201AD	

Terminal length = 10 mm

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25$ °C	-	-	3	µA
		$T_j = 150$ °C				
$V_F^{(2)}$	Forward voltage drop	$T_j = 25$ °C	-	-	1.30	V
		$T_j = 150$ °C				
		$T_j = 150$ °C				

$V_R = V_{RRM}$ $I_F = 3$ A $I_F = 4$ A

1. Pulse test: $t_p = 5$ ms, $\delta < 2\%$
2. Pulse test: $t_p = 380$ µs, $\delta < 2\%$

To evaluate the maximum conduction losses use the following equation:
 $P = 0.92 \times I_{F(AV)} + 0.045 \times I_{F(RMS)}^2$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	$dI_F/dt = -50$ A/µs	-	55	75	ns
		$dI_F/dt = -100$ A/µs				
I_{RM}	Reverse recovery current	$T_j = 25$ °C	-	3	4	A
		$T_j = 150$ °C				
t_{fr}	Forward recovery time	$I_F = 4$ A, $dI_F/dt = 100$ A/µs, $V_{FR} = 1.1 \times V_{Fmax}$	-	-	130	ns
V_{FP}	Forward recovery voltage	$I_F = 4$ A, $dI_F/dt = 100$ A/µs	-	-	7.5	V

Figure 1. Conduction losses versus average current

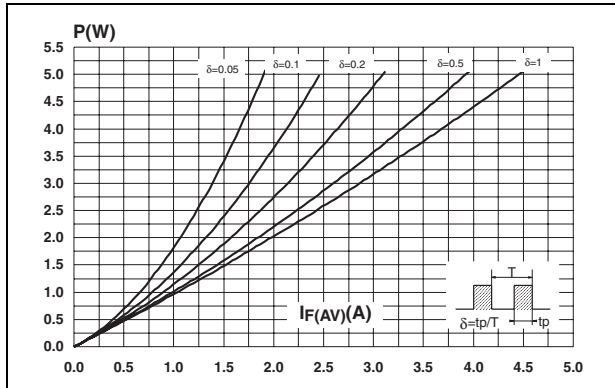


Figure 2. Forward voltage drop versus forward current

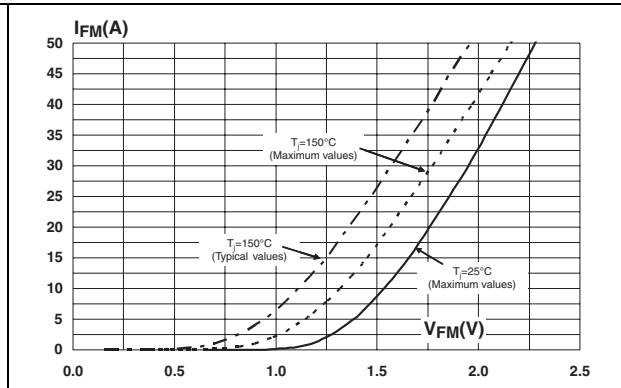


Figure 3. Relative variation of thermal impedance junction ambient versus pulse duration (DO-201AD)

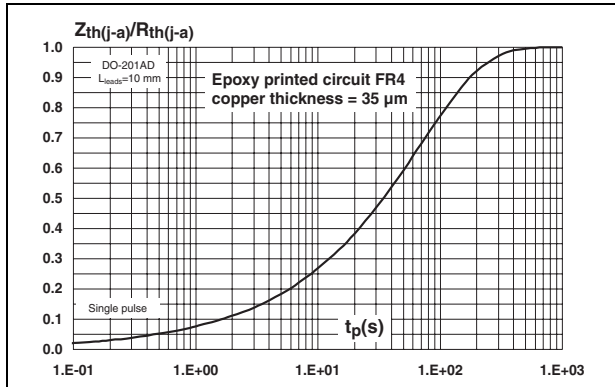


Figure 4. Relative variation of thermal impedance junction ambient versus pulse duration (DO-15)

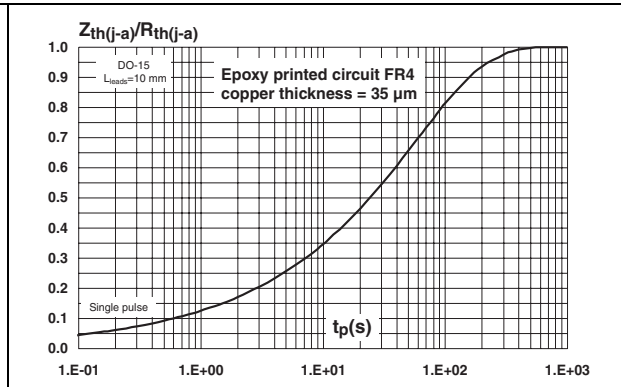


Figure 5. Peak reverse recovery current versus dIF/dt (typical values)

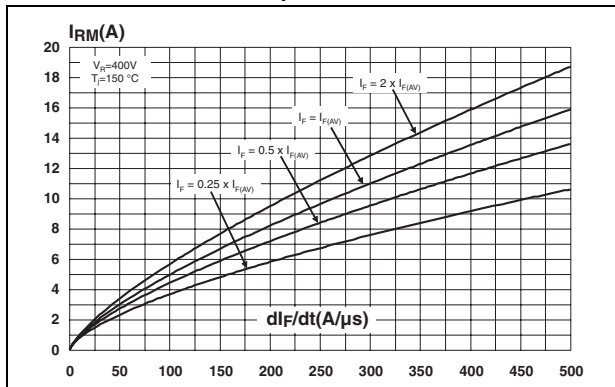


Figure 6. Reverse recovery time versus dIF/dt (typical values)

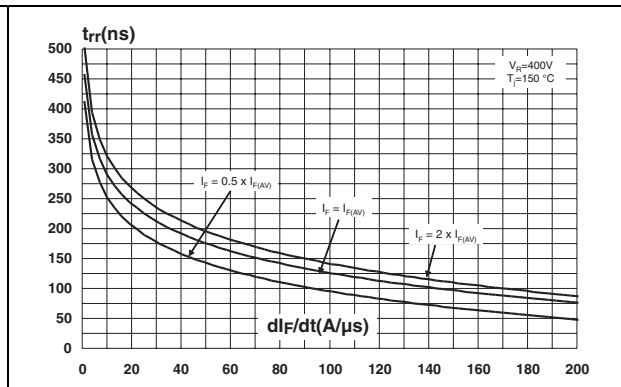


Figure 7. Reverse recovery charges versus di_F/dt (typical values)

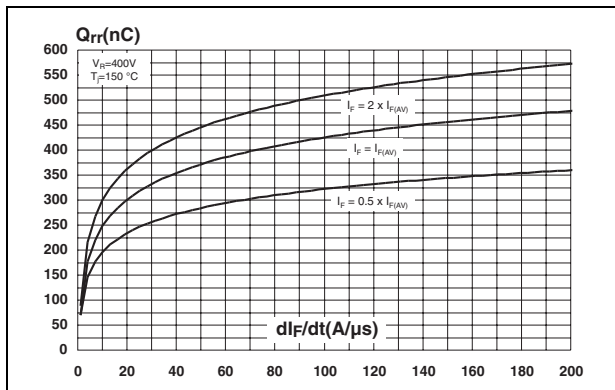


Figure 8. Relative variations of dynamic parameters versus junction temperature

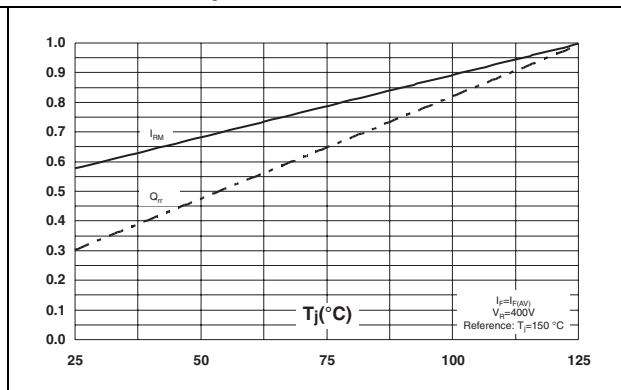


Figure 9. Transient peak forward voltage versus di_F/dt (typical values)

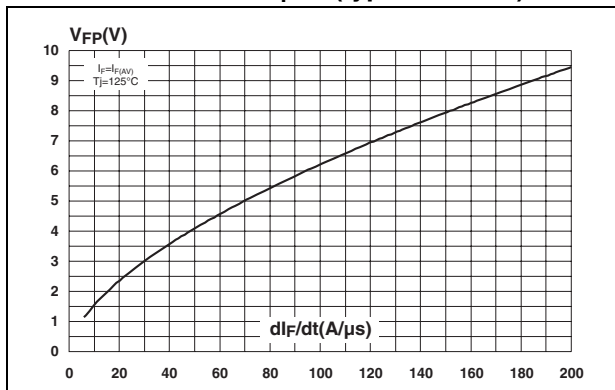


Figure 10. Forward recovery time versus di_F/dt (typical values)

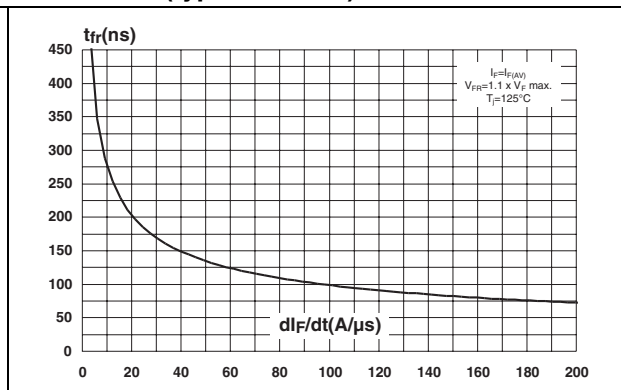


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

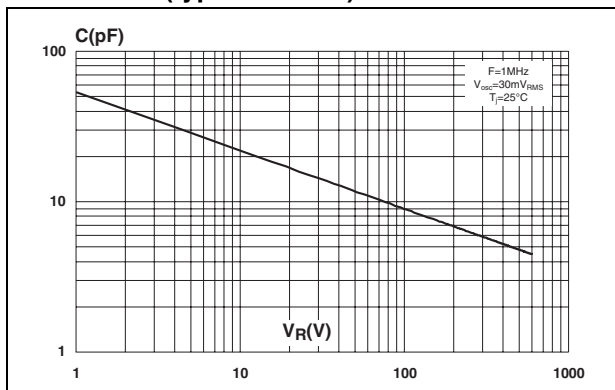


Figure 12. Thermal resistance junction to ambient versus copper surface under lead (DO-201AD)

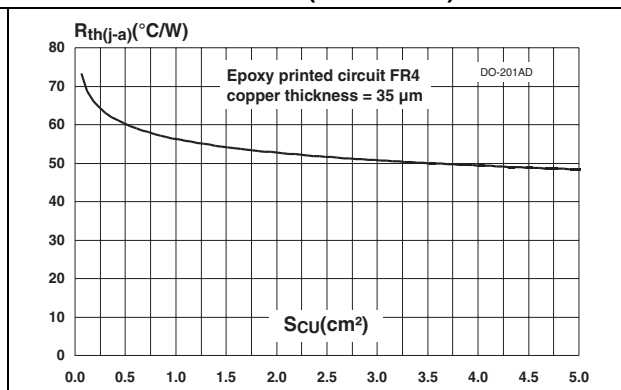
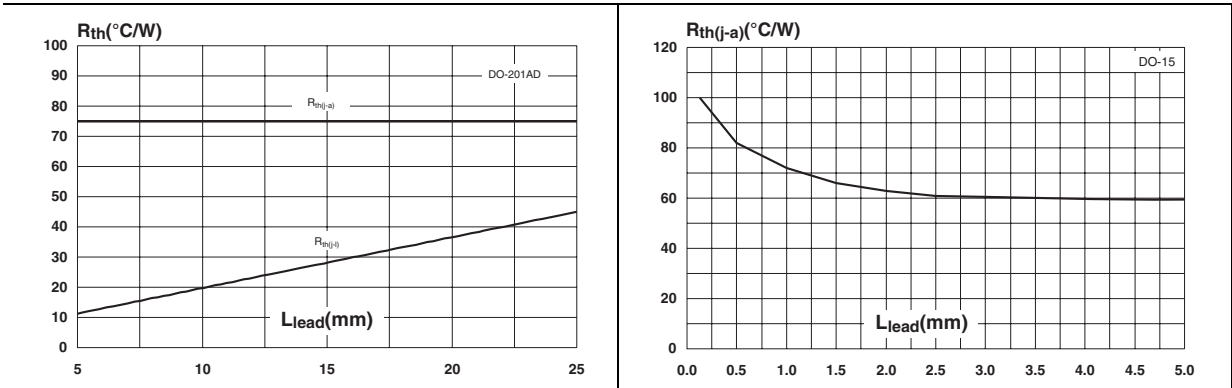


Figure 13. Thermal resistance versus lead length (DO-201AD) Figure 14. Thermal resistance versus lead length (DO-15)



2 Package information

- Epoxy meets UL94, V0
- Band indicates cathode
- Bending method: see application note AN1471

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. DO-15 dimensions

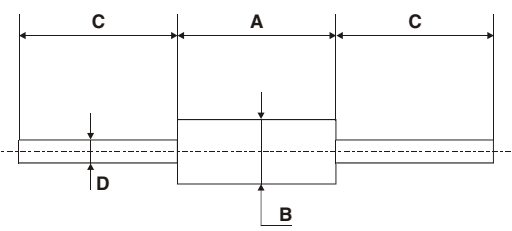
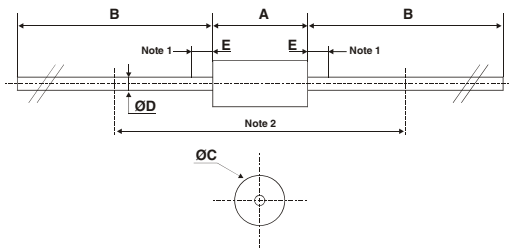
	Ref.	Dimensions			
		Millimeters		Inches	
		Min.	Max.	Min.	Max.
	A	6.05	6.75	0.238	0.266
B	2.95	3.53	0.116	0.139	
C	26	31	1.024	1.220	
D	0.71	0.88	0.028	0.035	

Table 7. DO-201AD dimensions

	Ref.	Dimensions			
		Millimeters		Inches	
		Min.	Max.	Min.	Max.
	A		9.50		0.374
	B	25.40		1.000	
	C		5.30		0.209
D		1.30		0.051	
E		1.25		0.049	
Notes	1 - The lead diameter $\varnothing D$ is not controlled over zone E 2 - The minimum length which must stay straight between the right angles after bending is 0.59" (15mm)				

3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH4L06	STTH4L06	DO-201AD	1.16 g	600	Ammopack
STTH4L06RL	STTH4L06	DO-201AD	1.16 g	1900	Tape and reel
STTH4L06Q	STTHLO6Q	DO-15	0.4 g	600	Ammopack
STTH4L06QRL	STTHLO6Q	DO-15	0.4 g	1900	Tape and reel

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
22-Sep-2009	1	First issue

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.

© 2009 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 - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com