



# STTH4L06

## Turbo 2 ultrafast high voltage rectifier

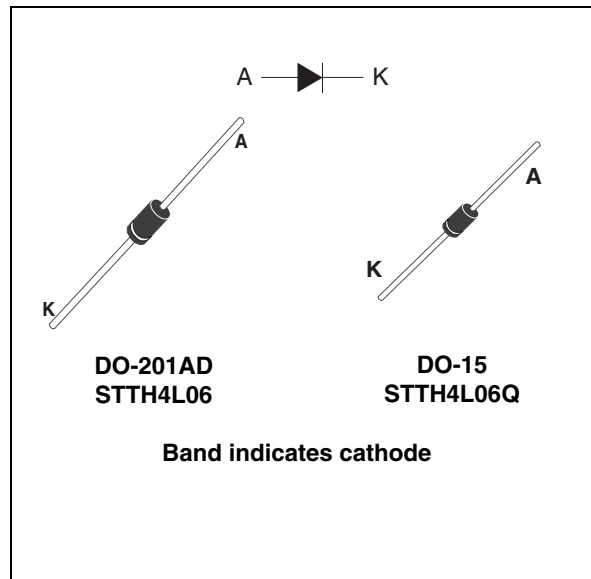
### Features

- 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	$V_R = V_{RRM}$	-	-	3	µA
		$T_j = 150$ °C		-	15	100	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25$ °C	$I_F = 3$ A	-	-	1.30	V
		$T_j = 150$ °C		-	0.85	1.05	
		$T_j = 150$ °C	$I_F = 4$ A	-	0.90	1.10	

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	$I_F = 1$ A, $V_R = 30$ V	-	55	75	ns
		$di_F/dt = -100$ A/µs		-	40	55	
$I_{RM}$	Reverse recovery current	$T_j = 25$ °C	$I_F = 4$ A, $V_R = 400$ V, $di_F/dt = -100$ A/µs	-	3	4	A
		$T_j = 150$ °C		-	5	6.5	
$t_{fr}$	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

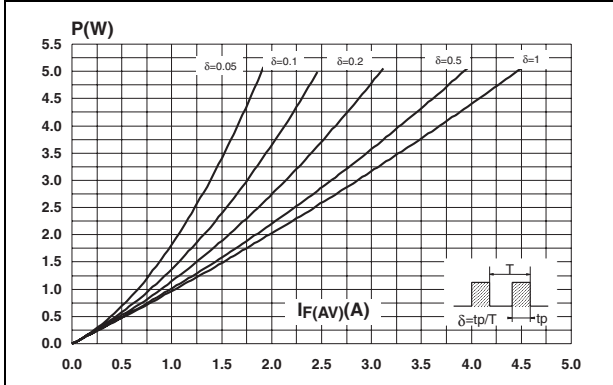


Figure 2. Forward voltage drop versus forward current

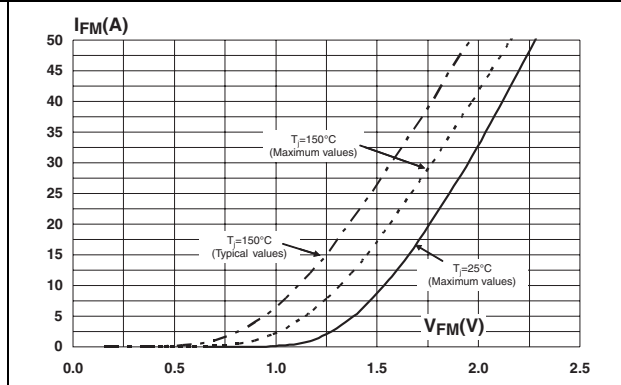


Figure 3. Relative variation of thermal impedance junction ambient versus pulse duration (DO-201AD)

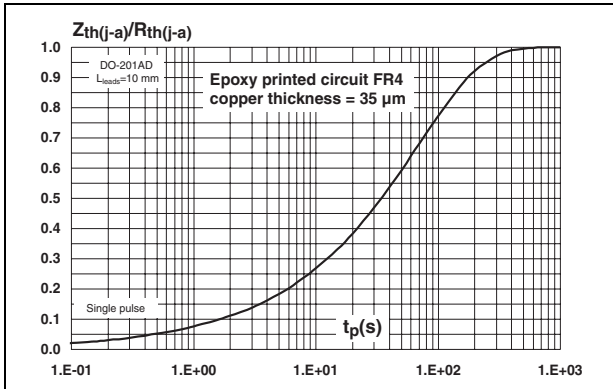


Figure 4. Relative variation of thermal impedance junction ambient versus pulse duration (DO-15)

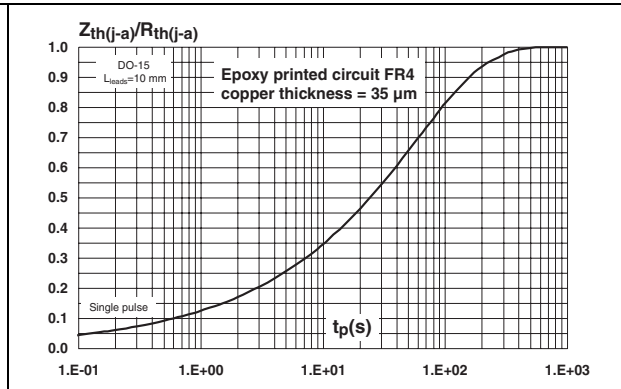


Figure 5. Peak reverse recovery current versus diF/dt (typical values)

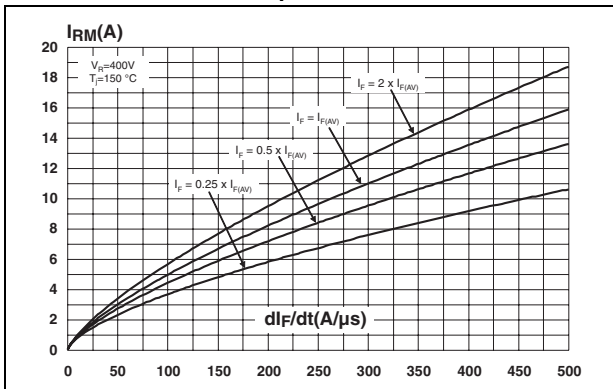
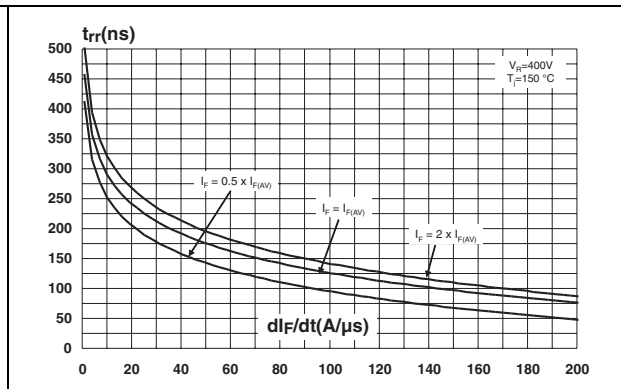
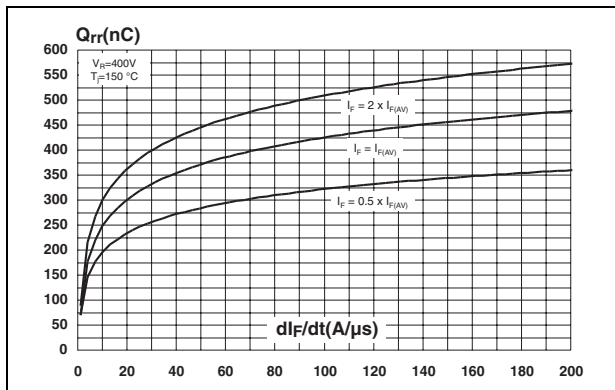


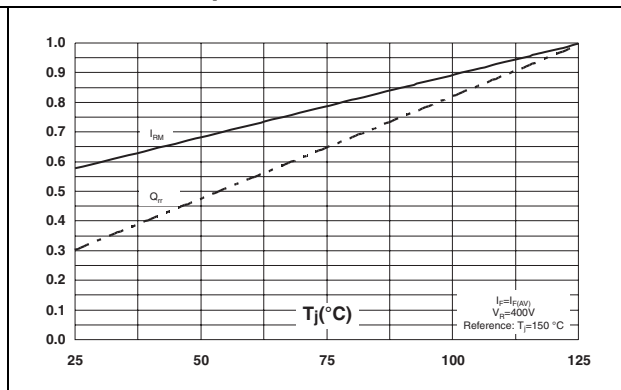
Figure 6. Reverse recovery time versus diF/dt (typical values)



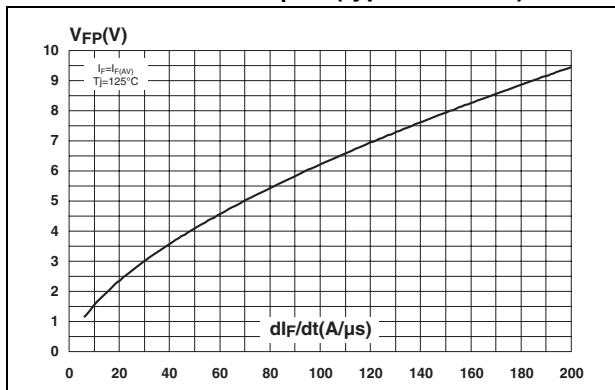
**Figure 7. Reverse recovery charges versus  $dl_f/dt$  (typical values)**



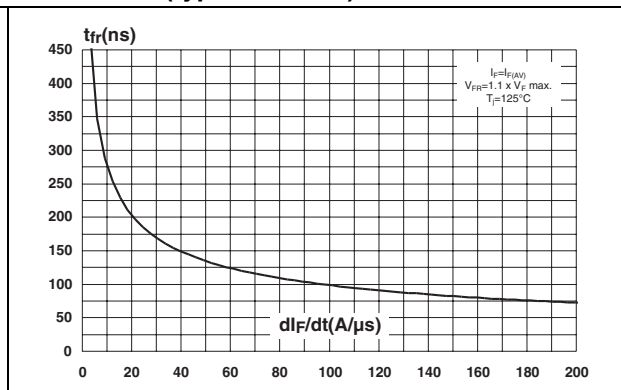
**Figure 8. Relative variations of dynamic parameters versus junction temperature**



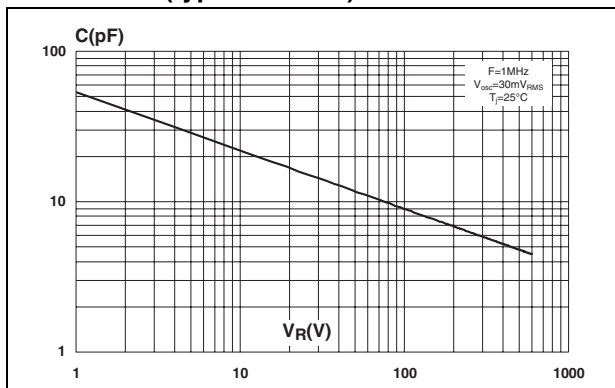
**Figure 9. Transient peak forward voltage versus  $dl_f/dt$  (typical values)**



**Figure 10. Forward recovery time versus  $dl_f/dt$  (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)**

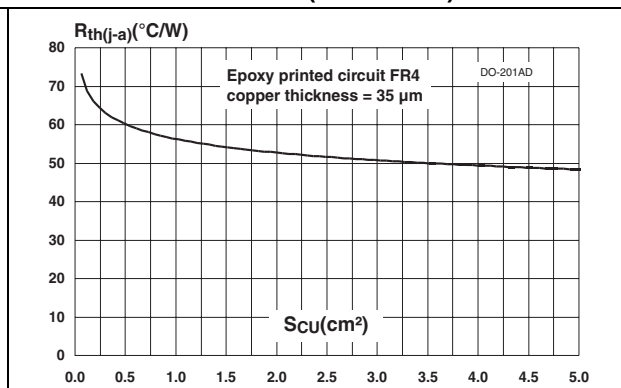
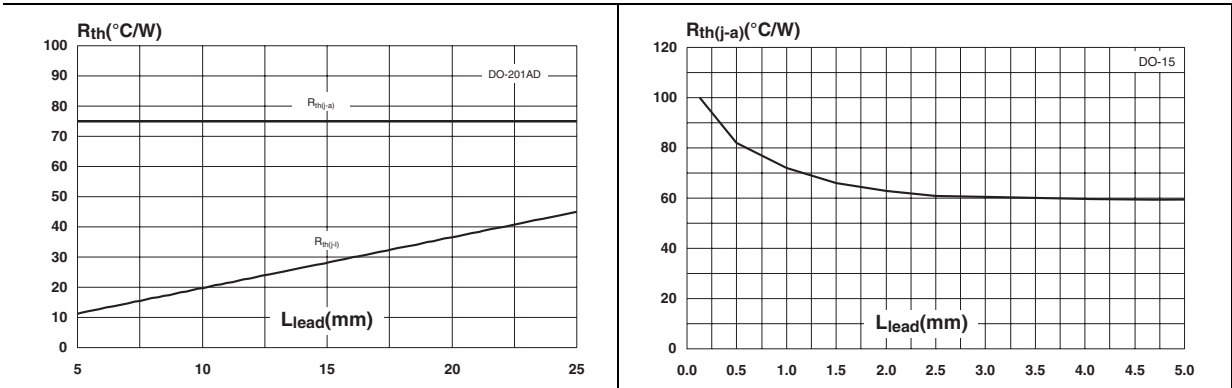


Figure 13. Thermal resistance versus lead length (DO-201AD)      Figure 14. Thermal resistance versus lead length (DO-15)



## 2 Package information

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

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**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
<b>Notes</b>	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

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