STTH4L06

Turbo 2 ultrafast high voltage rectifier

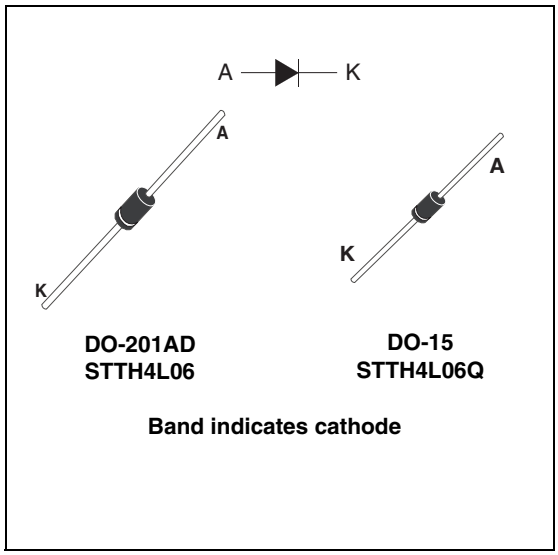
Features

- 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.



DO-201AD
STTH4L06

DO-15
STTH4L06Q

Band indicates cathode

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	Terminal length = 10 mm	DO-15	25	°C/W
			DO-201AD	20	
$R_{th(j-a)}$	Junction to ambient		DO-15	80	°C/W
			DO-201AD	75	

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

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

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 x 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

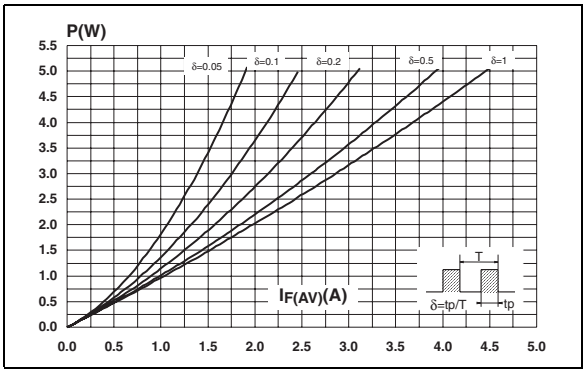


Figure 2. Forward voltage drop versus forward current

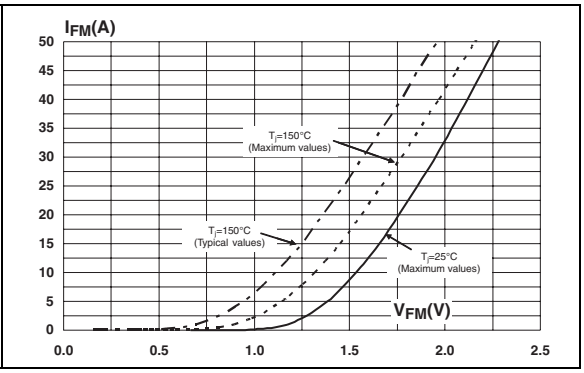


Figure 3. Relative variation of thermal impedance junction ambient versus pulse duration (DO-201AD)

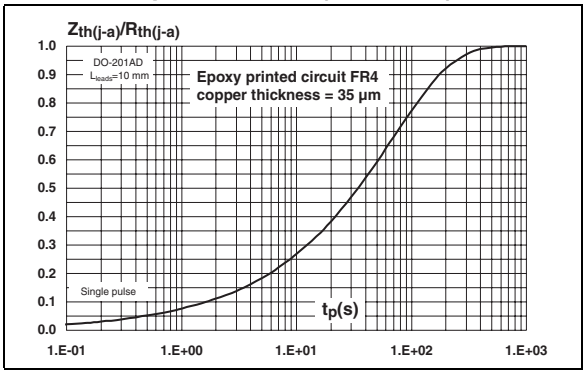


Figure 4. Relative variation of thermal impedance junction ambient versus pulse duration (DO-15)

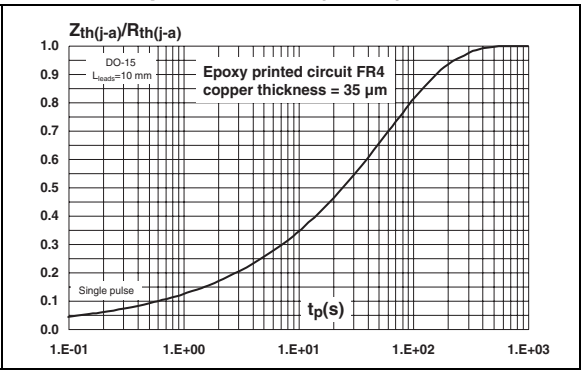


Figure 5. Peak reverse recovery current versus dI_F/dt (typical values)

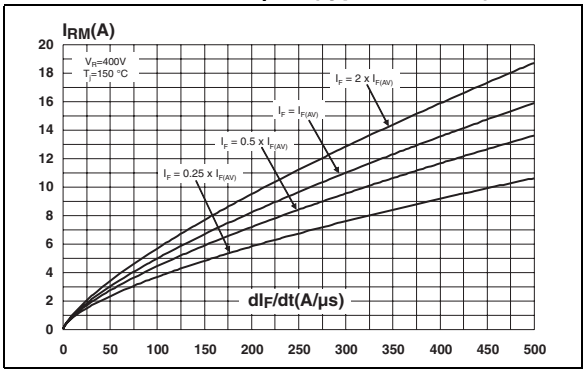


Figure 6. Reverse recovery time versus dI_F/dt (typical values)

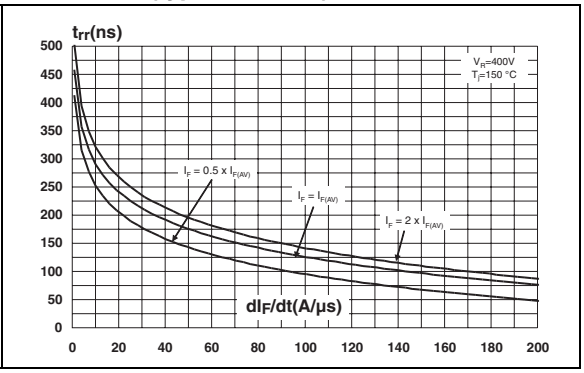


Figure 7. Reverse recovery charges versus dI_F/dt (typical values)

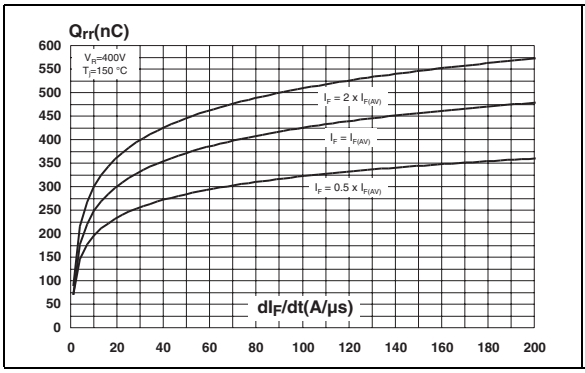


Figure 8. Relative variations of dynamic parameters versus junction temperature

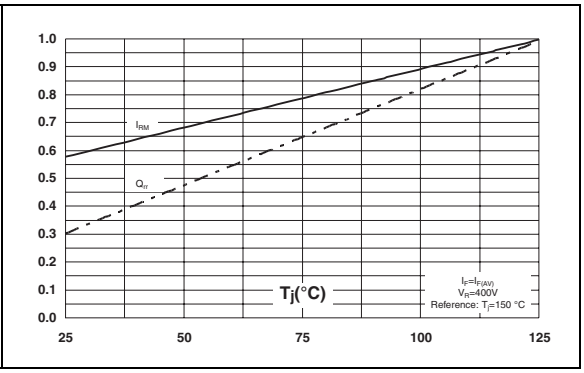


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

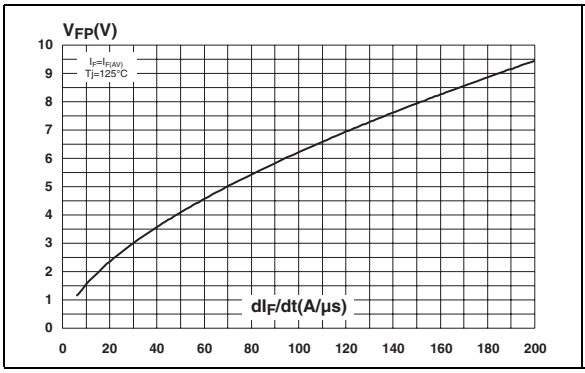


Figure 10. Forward recovery time versus dI_F/dt (typical values)

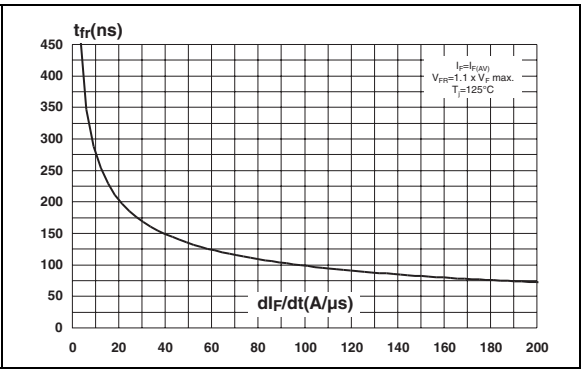


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

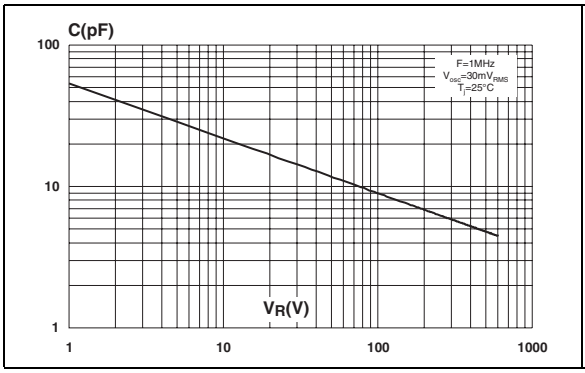


Figure 12. Thermal resistance junction to ambient versus copper surface under lead (DO-201AD)

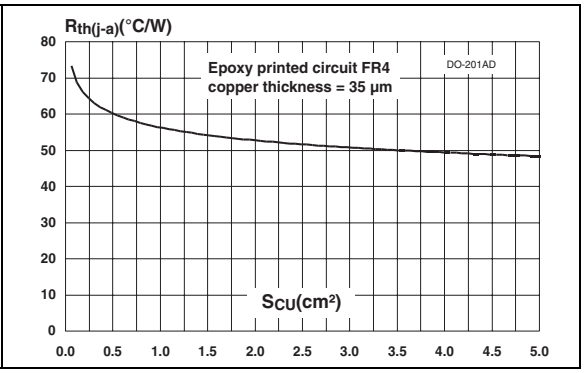


Figure 13. Thermal resistance versus lead length (DO-201AD)

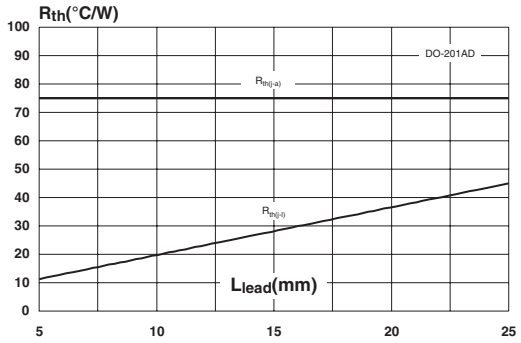
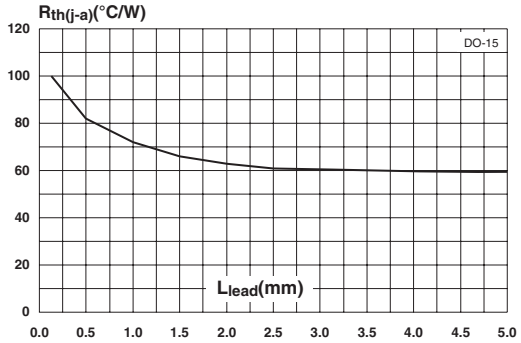


Figure 14. Thermal resistance versus lead length (DO-15)

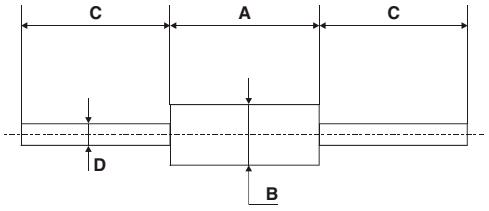


2 Package information

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

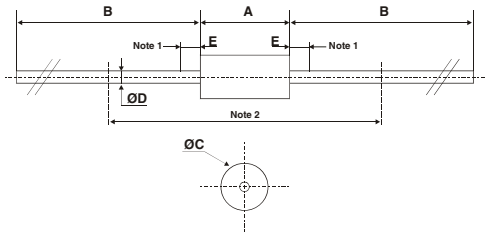
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

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 ø 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 andreel
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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