

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.

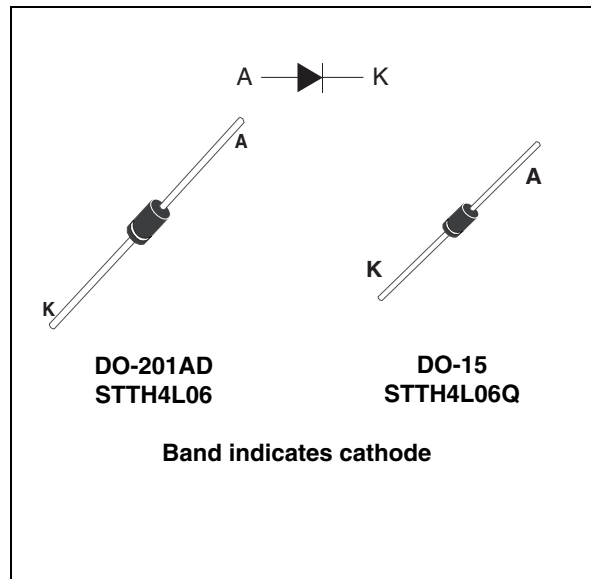


Table 1. Device summary

$I_{F(AV)}$	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

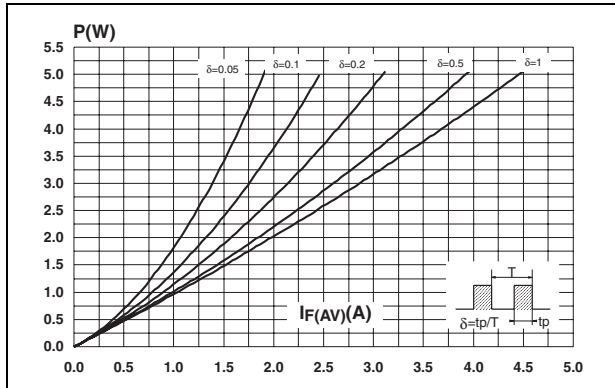


Figure 2. Forward voltage drop versus forward current

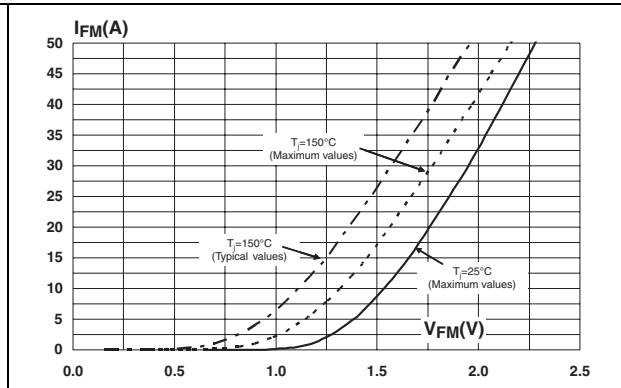


Figure 3. Relative variation of thermal impedance junction ambient versus pulse duration (DO-201AD)

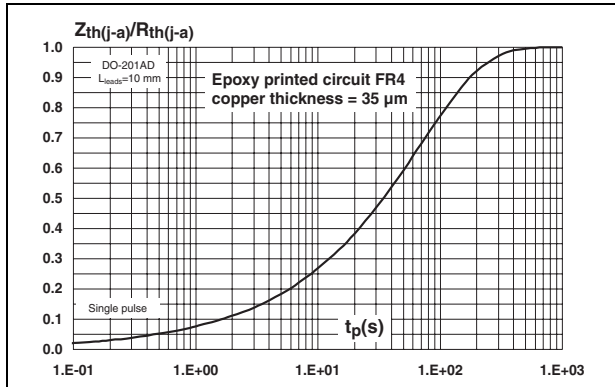


Figure 4. Relative variation of thermal impedance junction ambient versus pulse duration (DO-15)

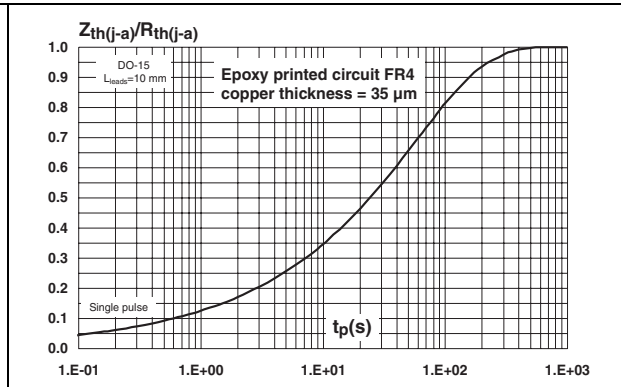


Figure 5. Peak reverse recovery current versus dIF/dt (typical values)

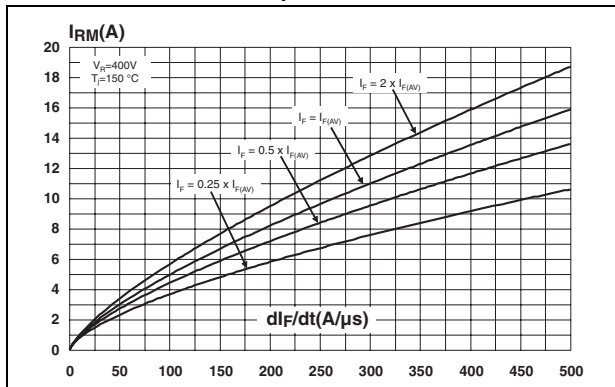


Figure 6. Reverse recovery time versus dIF/dt (typical values)

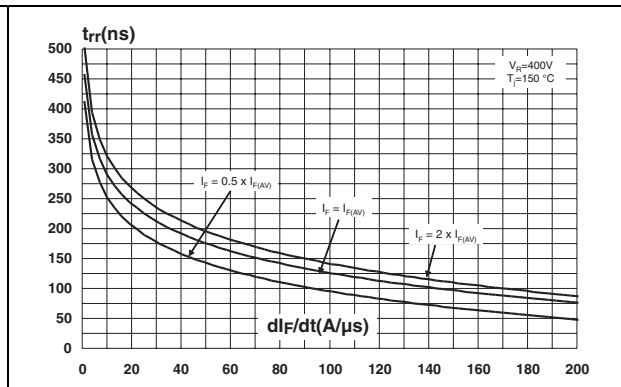


Figure 7. Reverse recovery charges versus dl_F/dt (typical values)

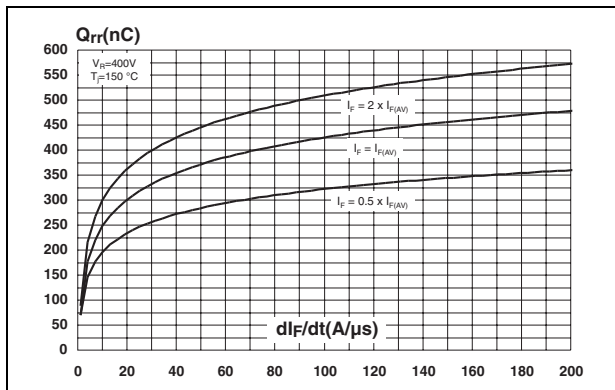


Figure 8. Relative variations of dynamic parameters versus junction temperature

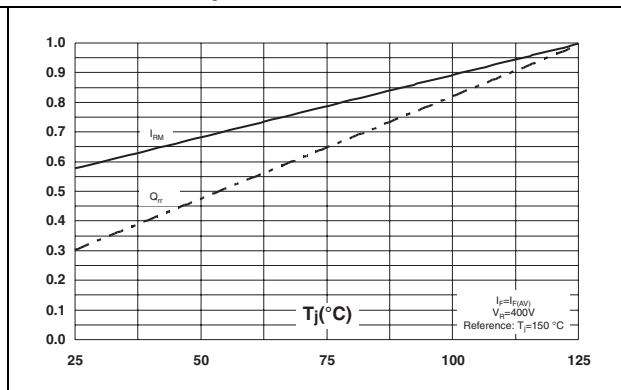


Figure 9. Transient peak forward voltage versus dl_F/dt (typical values)

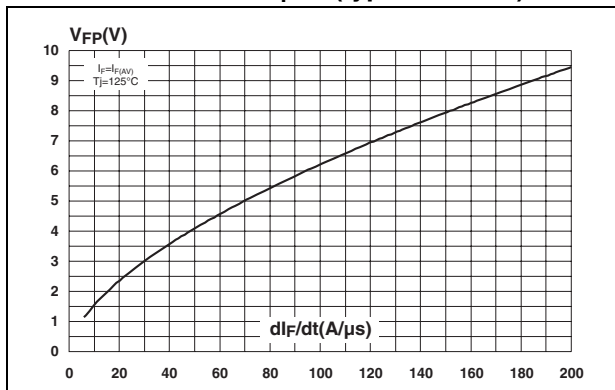


Figure 10. Forward recovery time versus dl_F/dt (typical values)

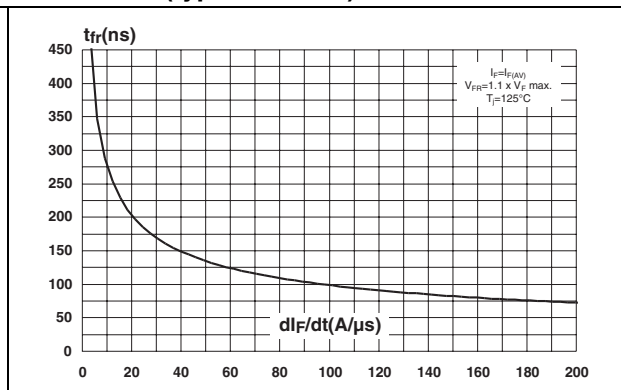


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

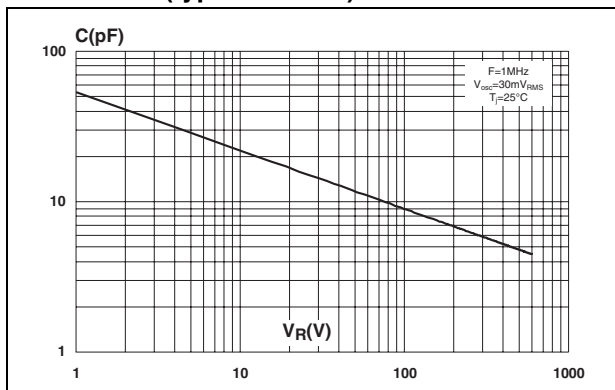


Figure 12. Thermal resistance junction to ambient versus copper surface under lead (DO-201AD)

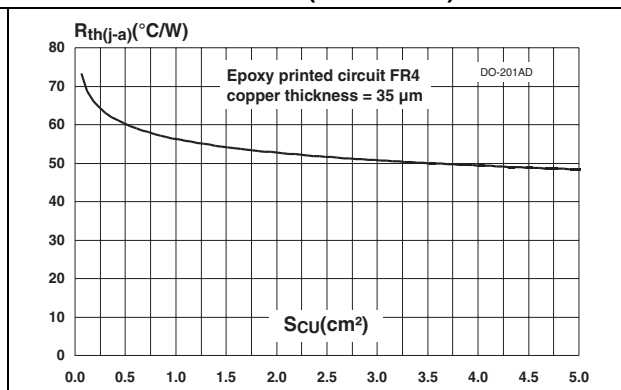
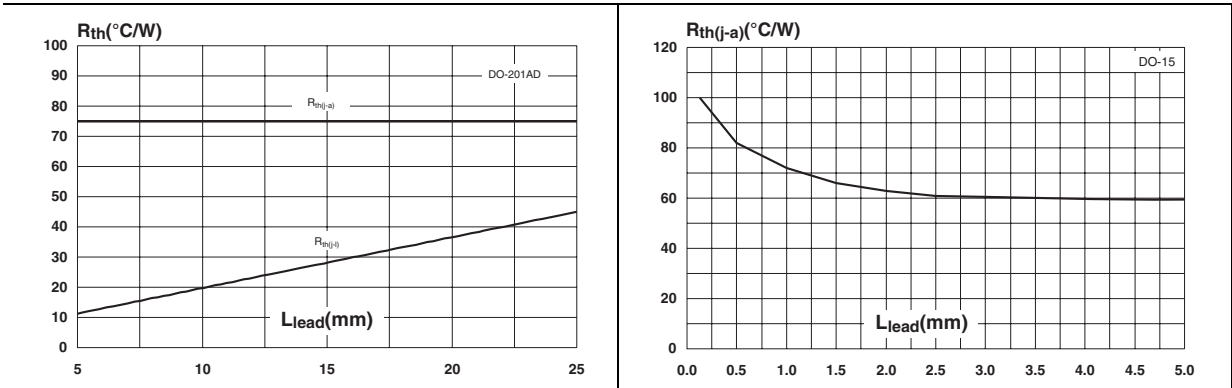


Figure 13. Thermal resistance versus lead length (DO-201AD) Figure 14. Thermal resistance versus lead length (DO-15)



2 Package information

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

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

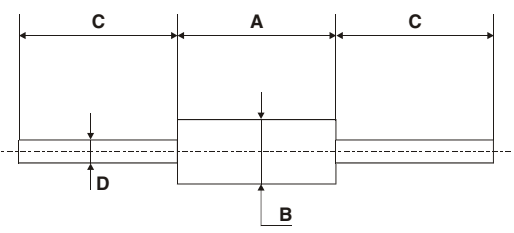
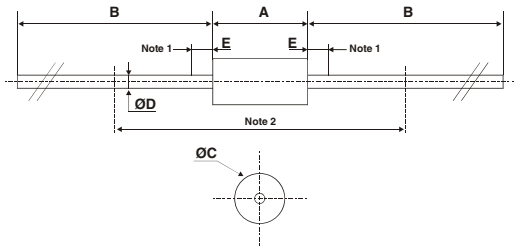
	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
	A	6.05	6.75	0.238
B	2.95	3.53	0.116	0.139
C	26	31	1.024	1.220
D	0.71	0.88	0.028	0.035

Table 7. DO-201AD dimensions

	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

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