STTH1L06

Turbo 2 ultrafast high voltage rectifier

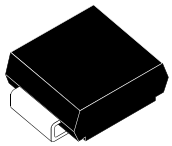
Features

- Ultrafast switching
- Low reverse recovery current
- Reduces switching and conduction losses
- Low thermal resistance

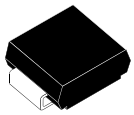
Description

The STTH1L06/U/A, which is using ST Turbo 2 600 V technology, is specially suited as boost diode in discontinuous or critical mode power factor corrections.
The device is also intended for use as a free wheeling diode in power supplies and other power switching applications.

DO-41
STTH1L06



SMB
STTH1L06U



SMA
STTH1L06A

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	1 A
V_{RRM}	600 V
I_R (max)	75 µA
T_j (max)	175 °C
V_F (max)	1.05 V
t_{rr} (max)	80 ns

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			600	V
$I_{F(RMS)}$	Forward rms voltage	DO-41		10	A
		SMA / SMB		7	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	DO-41	T_c = 120 °C	1	A
		SMA	T_c = 135 °C		
		SMB	T_c = 145 °C		
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal DO-41 t_p = 10 ms sinusoidal SMA / SMB		30 20	A
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature			175	°C

Table 3. Thermal parameters

Symbol	Parameter			Value (max)	Unit
$R_{th(j-l)}$	Junction to lead	L = 10 mm	DO-41	45	°C/W
			SMA	30	
			SMB	25	
$R_{th(j-a)}$	Junction to ambient (1)	L = 10 mm	DO-41	70	

1. Rth(j-a) is measured with a copper area S = 5 cm^2 (see *Figure 14.*)

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R	Reverse leakage current	T_j = 25 °C	V_R = 600 V			1	µA
		T_j = 150 °C			10	75	
V_F	Forward voltage drop	T_j = 25 °C	I_F = 1 A			1.3	V
		T_j = 150 °C			0.85	1.05	

To evaluate the conduction losses use the following equation:
$P = 0.89 \times I_{F(AV)} + 0.165\ I_F{}^2{}_{(RMS)}$

Table 5. Dynamic characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 1 A, dI_F/dt = -50, A/µs, V_R = 30 V		55	80	ns
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 1 A, dI_F/dt = 100 A/µs V_{FR} = 3.5 V			50	ns
V_{FP}	Forward recovery voltage	T_j = 25 °C	I_F = 1 A, dI_F/dt = 100 A/µs			10	V

Figure 1. Conduction losses versus average current

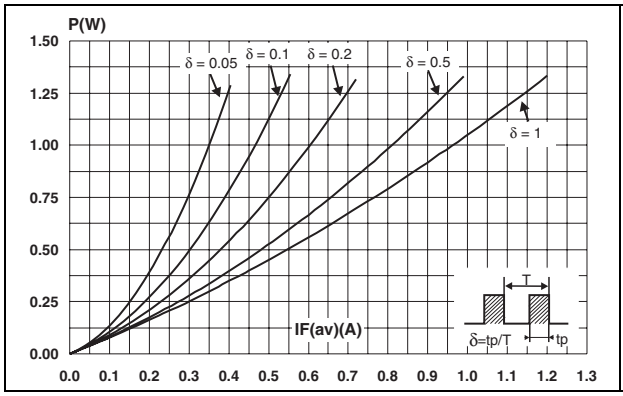


Figure 2. Forward voltage drop versus forward current

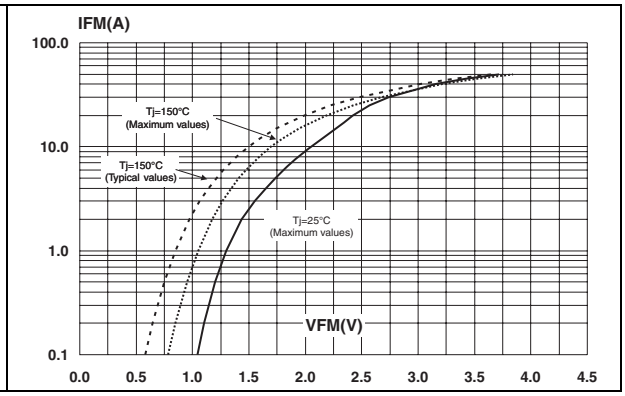


Figure 3. Relative variation of thermal impedance junction ambient versus pulse duration

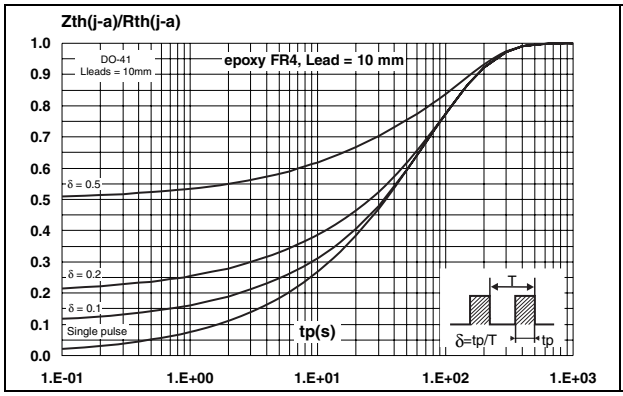


Figure 4. Relative variation of thermal impedance junction ambient versus pulse duration

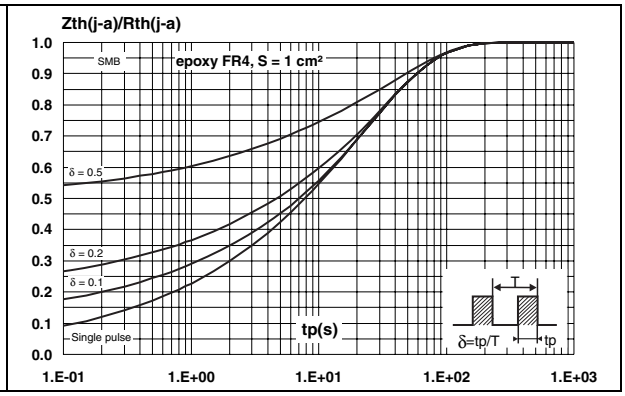


Figure 5. Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4)

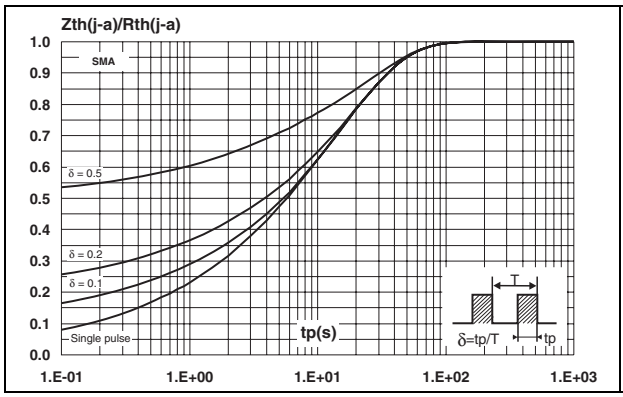


Figure 6. Peak reverse recovery current versus dI_F/dt (90% confidence)

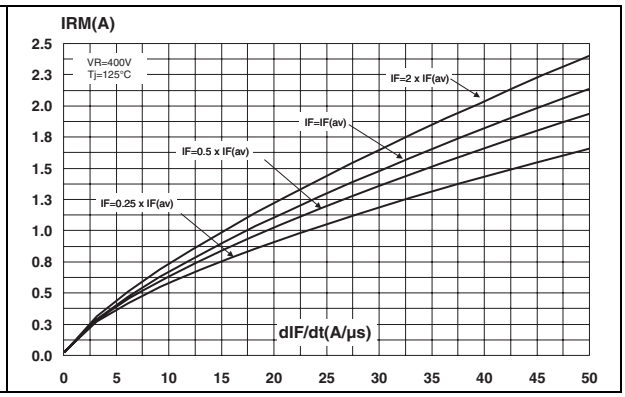


Figure 7. Reverse recovery time versus dI_F/dt (90% confidence)

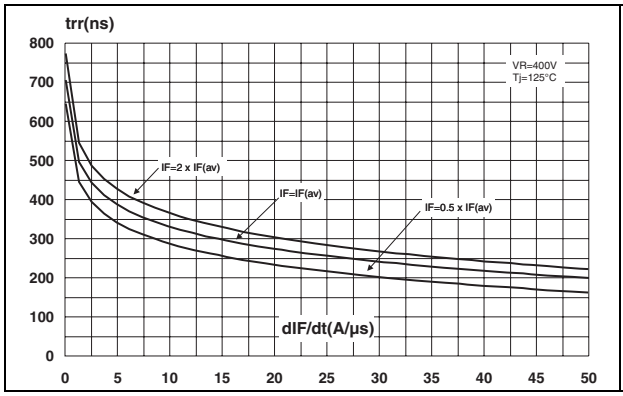


Figure 8. Reverse recovery charges versus dI_F/dt (90% confidence)

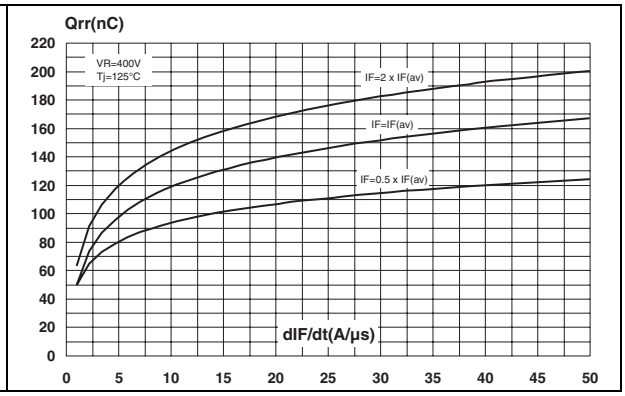


Figure 9. Softness factor versus dI_F/dt (typical values)

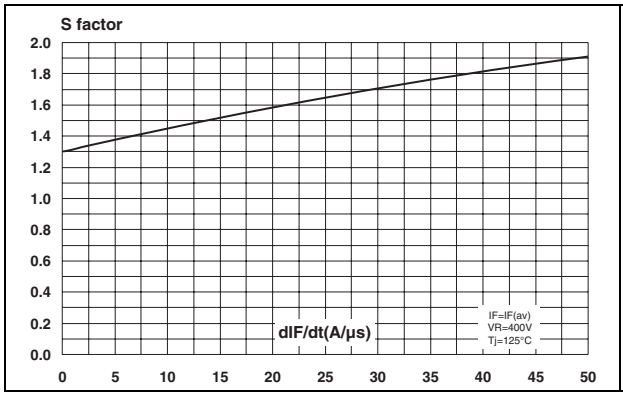


Figure 10. Relative variations of dynamic parameters versus junction temperature

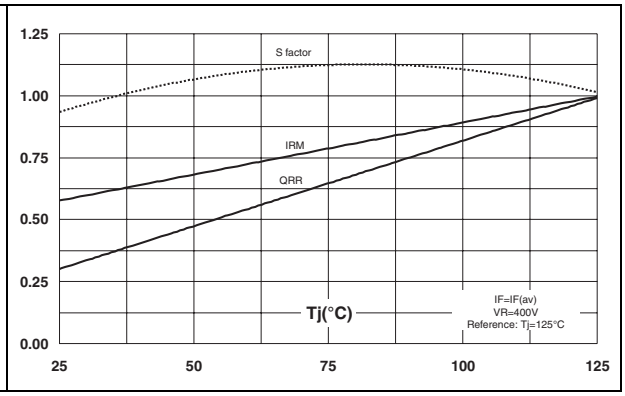


Figure 11. Transient peak forward voltage versus dI_F/dt (90% confidence)

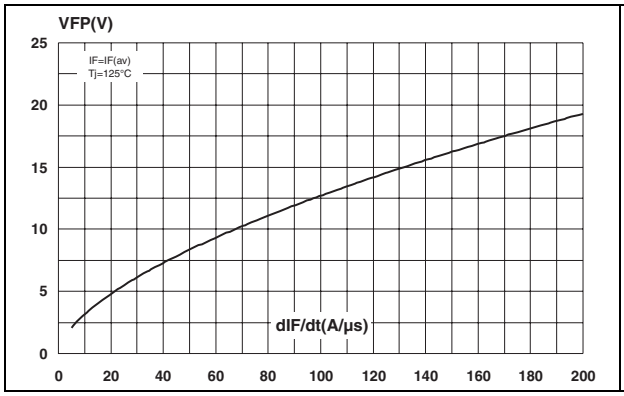


Figure 12. Forward recovery time versus dI_F/dt (90% confidence)

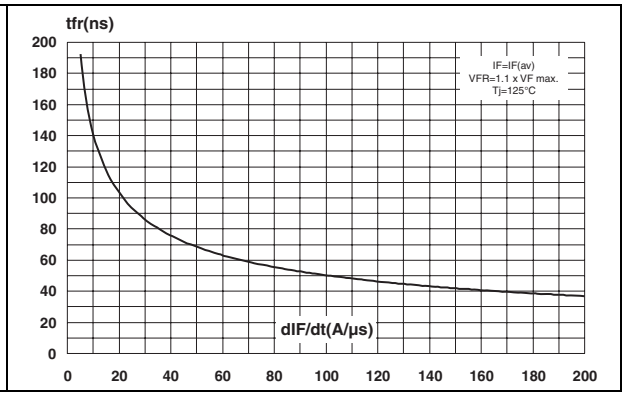


Figure 13. Junction capacitance versus reverse voltage applied (typical values)

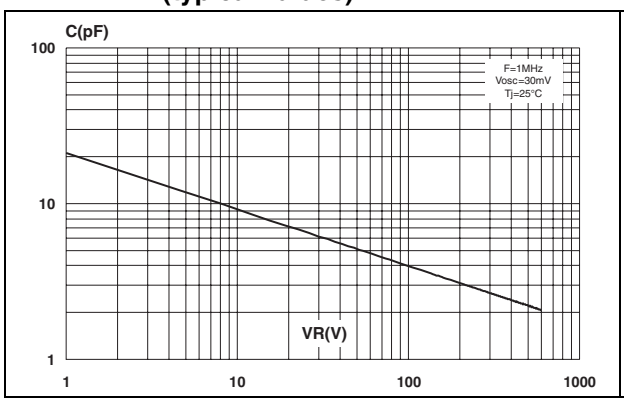


Figure 14. Thermal resistance junction to ambient versus copper surface under each lead

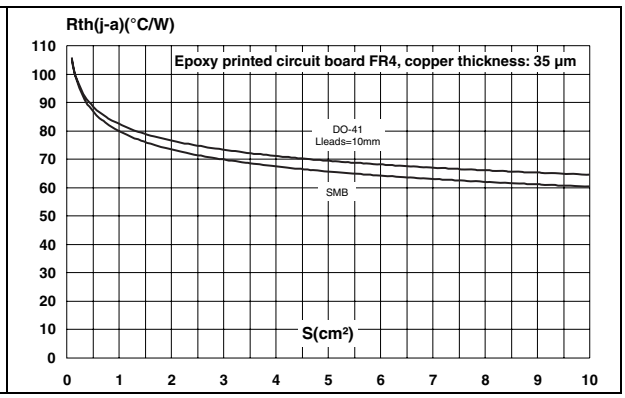
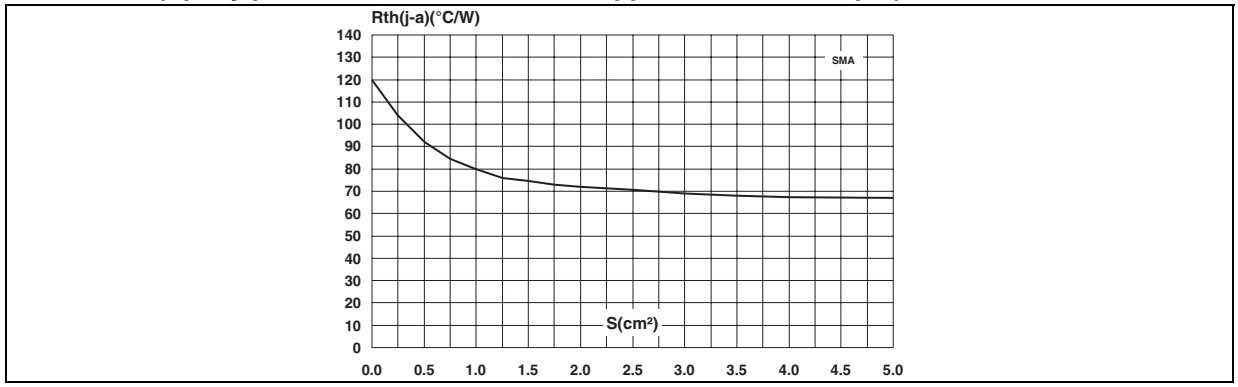


Figure 15. Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35 µm)



2 Package information

- Epoxy meets UL 94, V0
- Band indicates cathode
- Bending method (DO-41): see Application note AN1471

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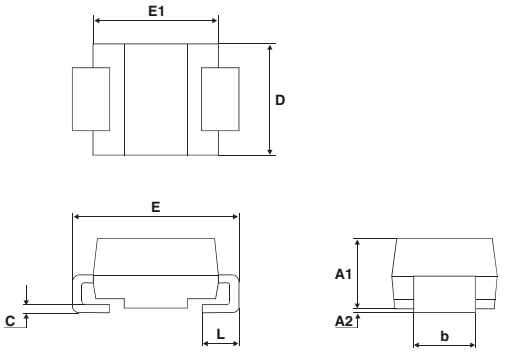
Table 6. SMA dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.094
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.40	0.006	0.016
D	2.25	2.90	0.089	0.114
E	4.80	5.35	0.189	0.211
E1	3.95	4.60	0.156	0.181
L	0.75	1.50	0.030	0.059

Figure 16. Footprint (dimensions in mm)

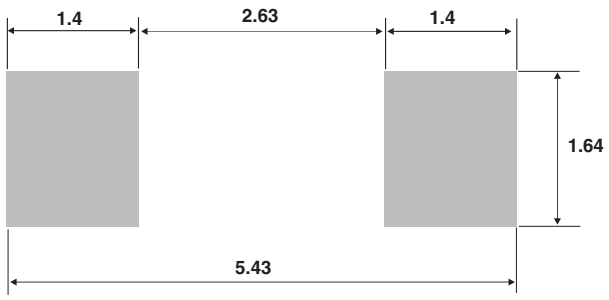
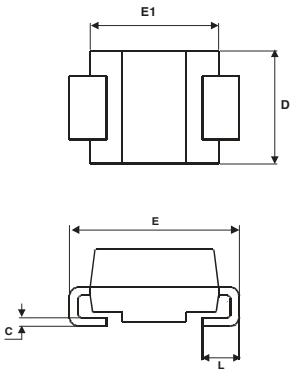


Table 7. SMB dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.40	0.006	0.016
D	3.30	3.95	0.130	0.156
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
L	0.75	1.50	0.030	0.059

Figure 17. Footprint (dimensions in mm)

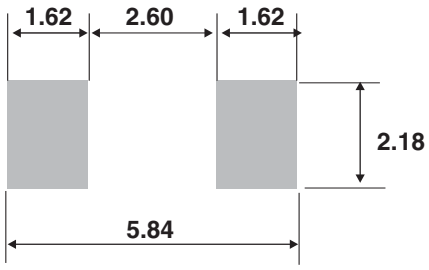
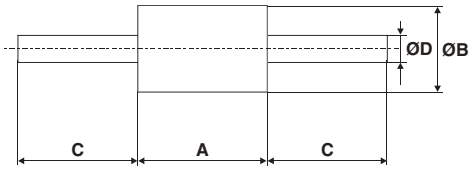


Table 8. DO-41 (plastic) dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.07	5.20	0.160	0.205
B	2.04	2.71	0.080	0.107
C	25.4		1	
D	0.71	0.86	0.028	0.034

3 Ordering information

Table 9. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH1L06	STTH1L06	DO-41	0.34 g	2000	Ammopack
STTH1L06RL	STTH1L06	DO-41	0.34 g	5000	Tape and reel
STTH1L06U	BL6	SMB	0.11 g	2500	Tape and reel
STTH1L06A	HL6	SMA	0.068 g	5000	Tape and reel

4 Revision history

Table 10. Document revision history

Date	Revision	Changes
Jul-2002	3C	Last issue.
30-Sep-2009	4	Updated table 8 package dimensions.

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