

## TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

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

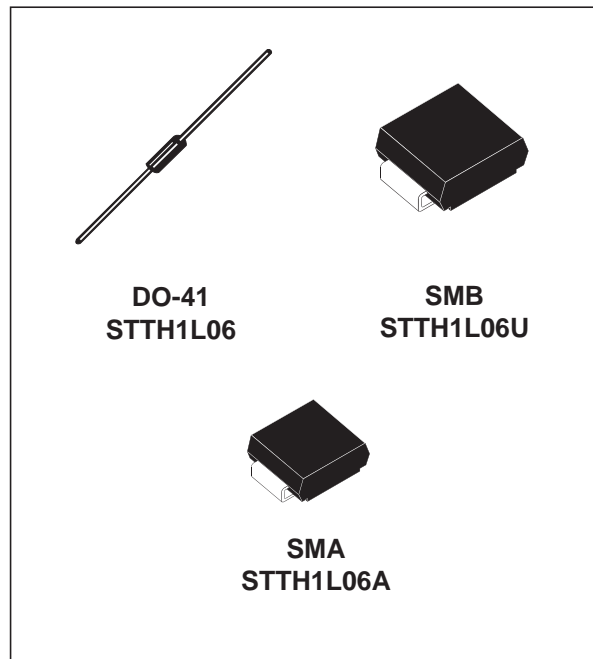
### FEATURES AND BENEFITS

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

### DESCRIPTION

The STTH1L06/U/A, which is using ST Turbo 2 600V 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.



### ABSOLUTE RATINGS (limiting values)

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

**THERMAL PARAMETERS**

Symbol	Parameter			Maximum	Unit
R <sub>th(j-l)</sub>	Junction to lead	L = 10 mm	DO-41	45	°C/W
			SMA	30	
			SMB	25	
R <sub>th(j-a)</sub>	Junction to ambient (note 1)	L = 10 mm	DO-41	70	

Note 1: R<sub>th(j-a)</sub> is measured with a copper area S = 5cm<sup>2</sup> (see Fig 12)

**STATIC ELECTRICAL CHARACTERISTICS**

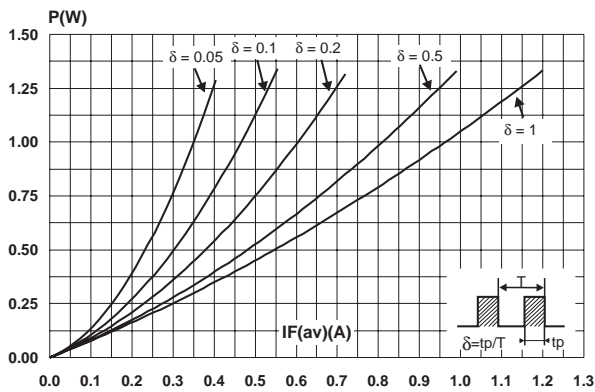
Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub>	Reverse leakage current	V <sub>R</sub> = 600V	T <sub>j</sub> = 25°C			1	μA
			T <sub>j</sub> = 150°C		10	75	
V <sub>F</sub>	Forward voltage drop	I <sub>F</sub> = 1 A	T <sub>j</sub> = 25°C			1.3	V
			T <sub>j</sub> = 150°C		0.85	1.05	

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

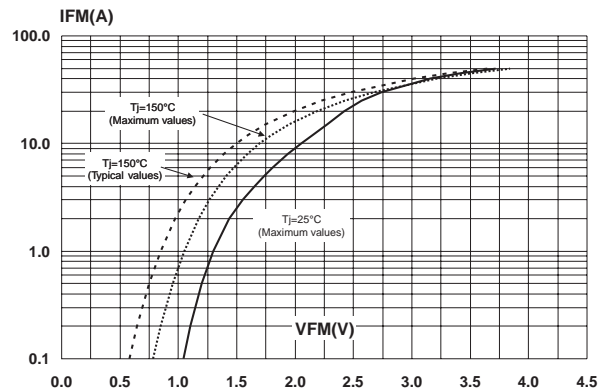
**DYNAMIC ELECTRICAL CHARACTERISTICS**

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
t <sub>rr</sub>	Reverse recovery time	I <sub>F</sub> = 1 A dI <sub>F</sub> /dt = - 50 A/μs V <sub>R</sub> = 30V	T <sub>j</sub> = 25°C		55	80	ns
t <sub>fr</sub>	Forward recovery time	I <sub>F</sub> = 1 A dI <sub>F</sub> /dt = 100 A/μs V <sub>FR</sub> = 3.5V	T <sub>j</sub> = 25°C			50	ns
V <sub>FP</sub>	Forward recovery voltage	I <sub>F</sub> = 1A dI <sub>F</sub> /dt = 100 A/μs	T <sub>j</sub> = 25°C			10	V

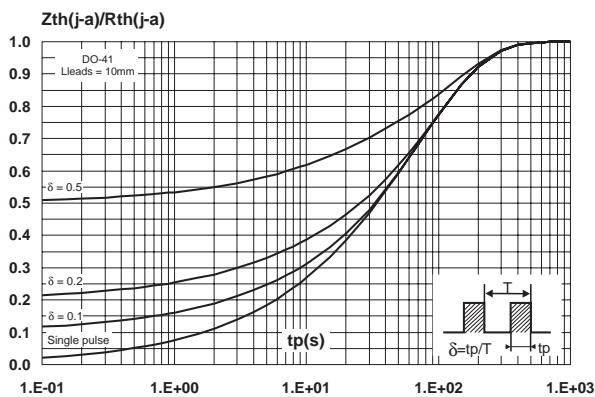
**Fig. 1:** Conduction losses versus average current.



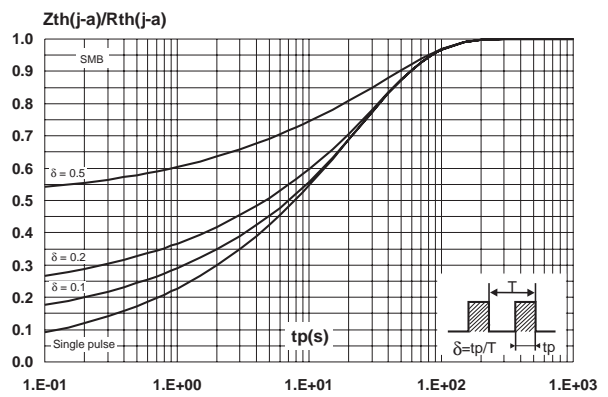
**Fig. 2:** Forward voltage drop versus forward current.



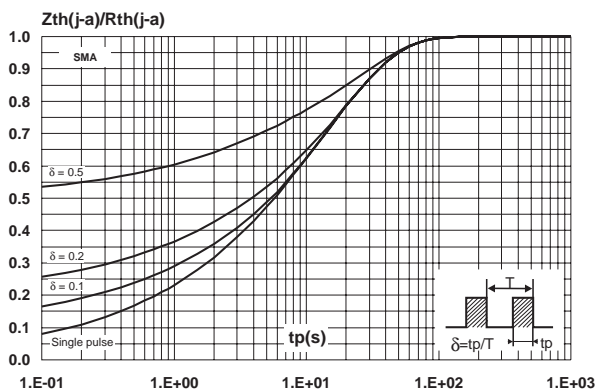
**Fig. 3-1:** Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, Leads = 10mm)



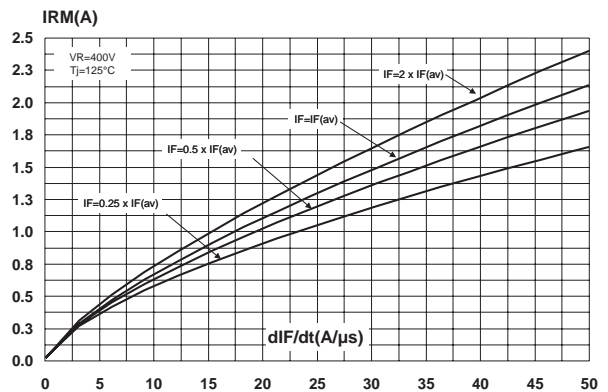
**Fig. 3-2:** Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, S = 1cm²)



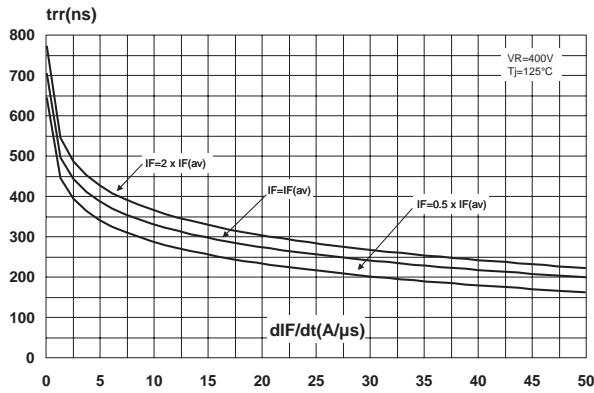
**Fig. 3-3:** Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4)



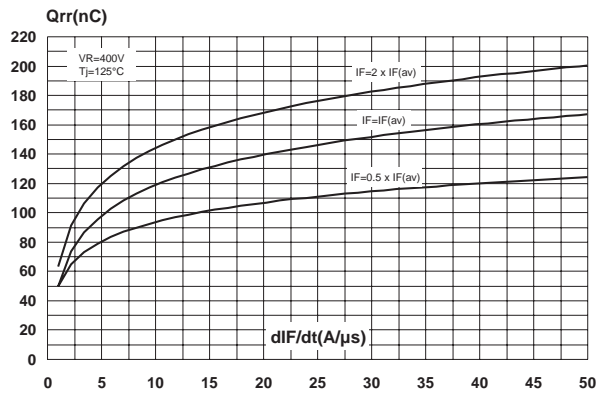
**Fig. 4:** Peak reverse recovery current versus dIF/dt (90% confidence).



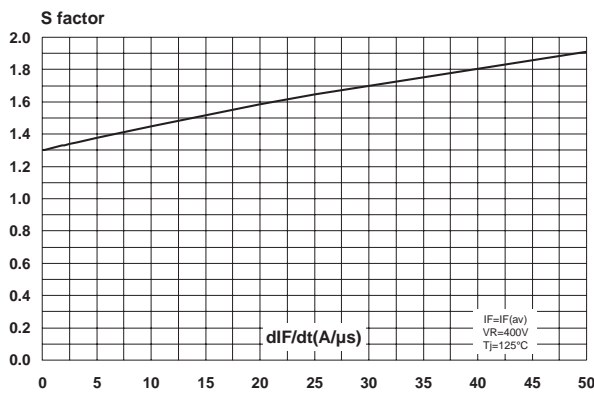
**Fig. 5:** Reverse recovery time versus  $di_F/dt$  (90% confidence).



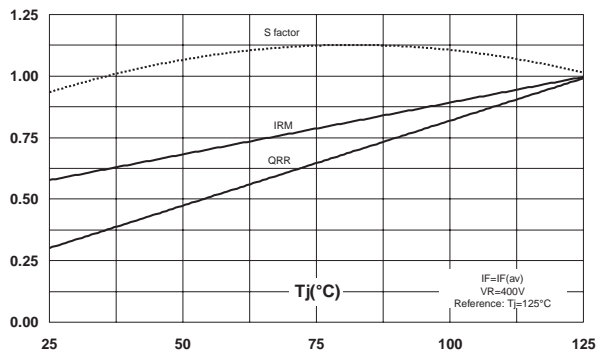
**Fig. 6:** Reverse recovery charges versus  $di_F/dt$  (90% confidence).



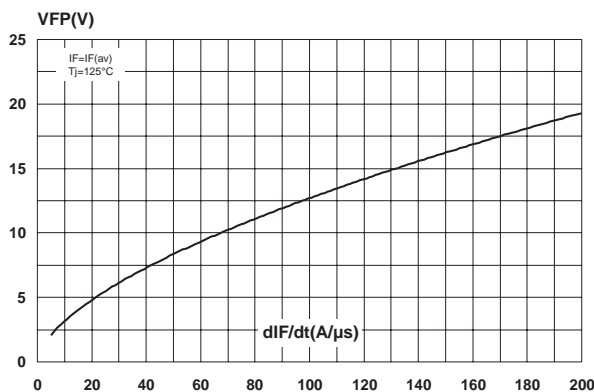
**Fig. 7:** Softness factor versus  $di_F/dt$  (typical values).



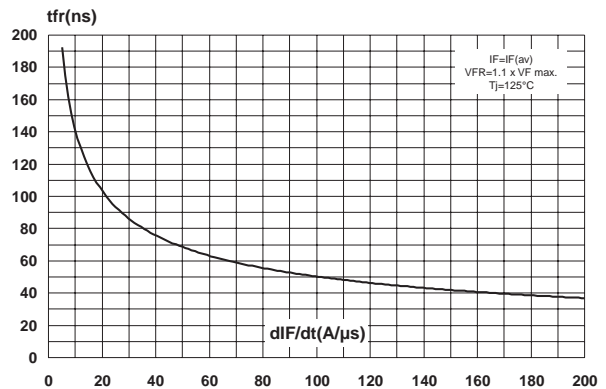
**Fig. 8:** Relative variations of dynamic parameters versus junction temperature.



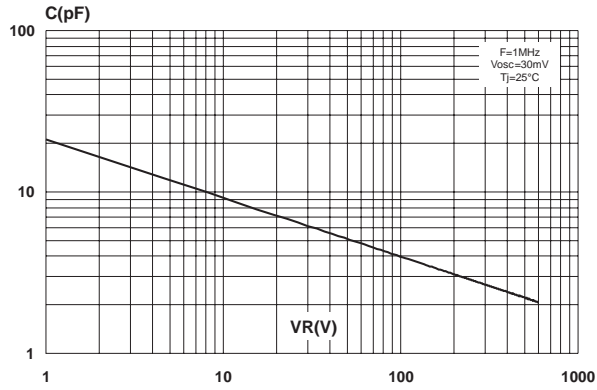
**Fig. 9:** Transient peak forward voltage versus  $di_F/dt$  (90% confidence).



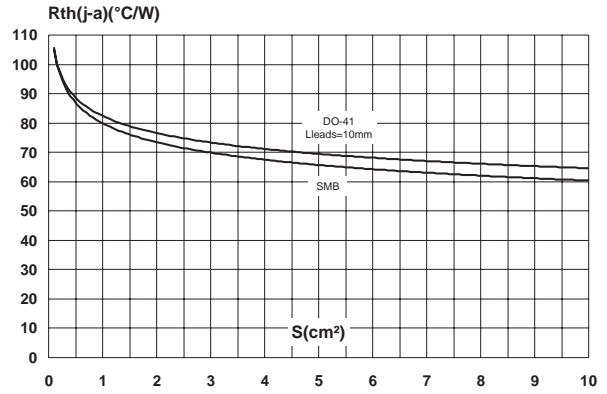
**Fig. 10:** Forward recovery time versus  $di_F/dt$  (90% confidence).



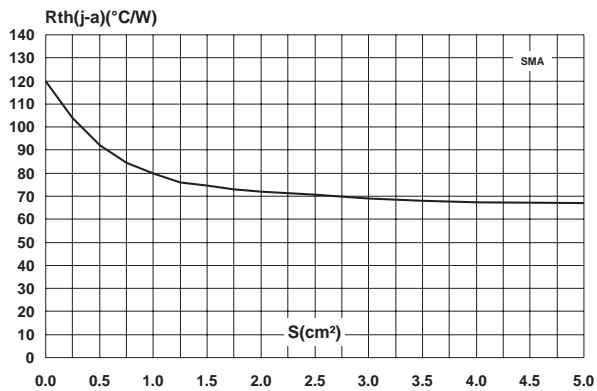
**Fig. 11:** Junction capacitance versus reverse voltage applied (typical values).



**Fig. 12-1:** Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35 $\mu\text{m}$ ).



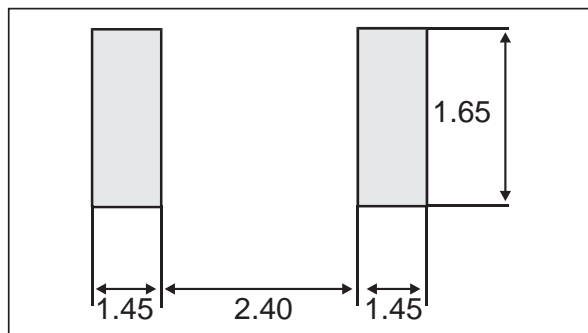
**Fig. 12-2:** Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35 $\mu\text{m}$ ).



**PACKAGE MECHANICAL DATA**  
SMA

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.70	0.075	0.106
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.41	0.006	0.016
E	4.80	5.60	0.189	0.220
E1	3.95	4.60	0.156	0.181
D	2.25	2.95	0.089	0.116
L	0.75	1.60	0.030	0.063

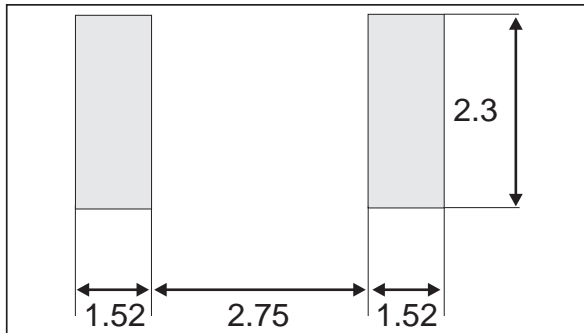
**FOOTPRINT**



**PACKAGE MECHANICAL DATA**  
SMB

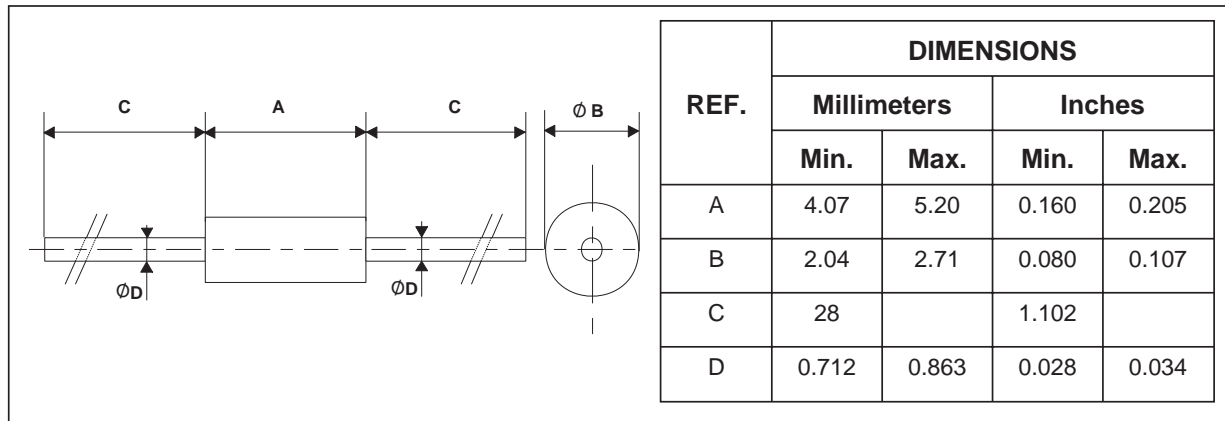
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.41	0.006	0.016
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
D	3.30	3.95	0.130	0.156
L	0.75	1.60	0.030	0.063

**FOOTPRINT**



# STTH1L06/U/A

## PACKAGE MECHANICAL DATA DO-41



Ordering 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 & reel
STTH1L06U	BL6	SMB	0.11 g	2500	Tape & reel
STTH1L06A	HL6	SMA	0.068 g	5000	Tape & reel

- Epoxy meets UL 94,V0
- Band indicated cathode
- Bending method: Application note AN1471

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