

**TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER**
**MAIN PRODUCT CHARACTERISTICS**

<b>I<sub>F(AV)</sub></b>	<b>1 A</b>
<b>V<sub>RRM</sub></b>	<b>600 V</b>
<b>I<sub>R (max)</sub></b>	<b>75 µA</b>
<b>T<sub>j (max)</sub></b>	<b>175 °C</b>
<b>V<sub>F (max)</sub></b>	<b>1.05 V</b>
<b>trr (max)</b>	<b>80 ns</b>

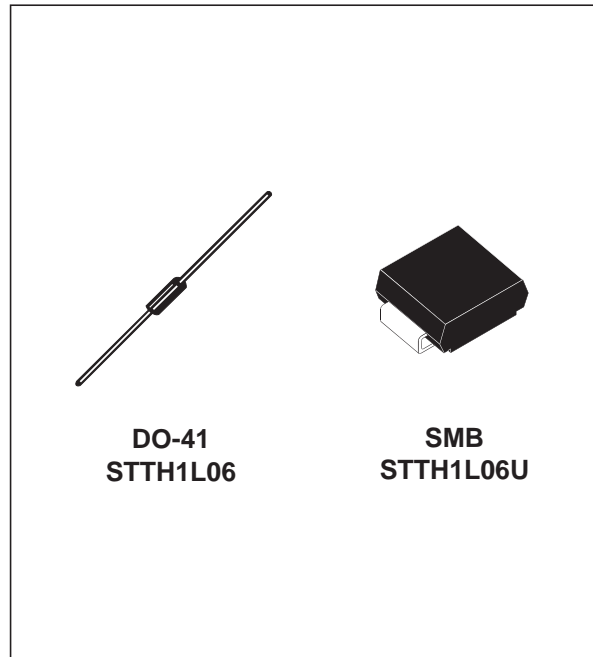
**FEATURES AND BENEFITS**

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

**DESCRIPTION**

The STTH1L06/U, 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)**

<b>Symbol</b>	<b>Parameter</b>		<b>Value</b>	<b>Unit</b>
V <sub>RRM</sub>	Repetitive peak reverse voltage		600	V
I <sub>F(RMS)</sub>	RMS forward current	DO-41 SMB	10 7	A
I <sub>F(AV)</sub>	Average forward current	T <sub>I</sub> = 120°C δ = 0.5 DO-41 T <sub>I</sub> = 145°C δ = 0.5 SMB	1 1	A
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms Sinusoidal DO-41 t <sub>p</sub> = 10 ms Sinusoidal SMB	30 20	A
T <sub>stg</sub>	Storage temperature range		- 65 + 175	°C
T <sub>j</sub>	Maximum operating junction temperature		+ 175	°C

# STTH1L06/U

## THERMAL PARAMETERS

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

Note 1:  $R_{th(j-a)}$  is measured with a copper area  $S = 5\text{cm}^2$  (see Fig 12)

## STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
$I_R$	Reverse leakage current	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$			1	$\mu\text{A}$
			$T_j = 150^\circ\text{C}$		10	75	
$V_F$	Forward voltage drop	$I_F = 1\text{A}$	$T_j = 25^\circ\text{C}$			1.3	V
			$T_j = 150^\circ\text{C}$		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	
$t_{rr}$	Reverse recovery time	$I_F = 1\text{A}$	$dI_F/dt = -50\text{A}/\mu\text{s}$ $V_R = 30\text{V}$	$T_j = 25^\circ\text{C}$		55	80	ns
$t_{fr}$	Forward recovery time	$I_F = 1\text{A}$	$dI_F/dt = 100\text{A}/\mu\text{s}$ $V_{FR} = 3.5\text{V}$	$T_j = 25^\circ\text{C}$			50	ns
$V_{FP}$	Forward recovery voltage	$I_F = 1\text{A}$	$dI_F/dt = 100\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$			10	V

Fig. 1: Conduction losses versus average current.

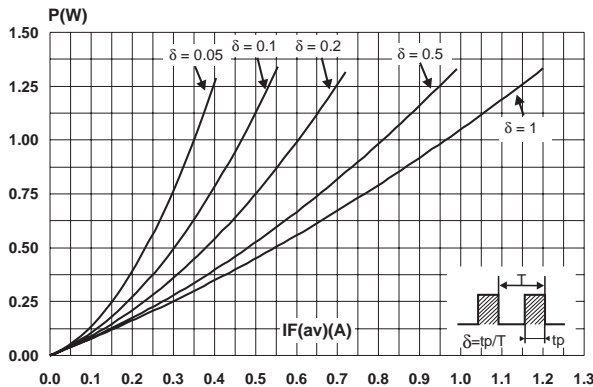
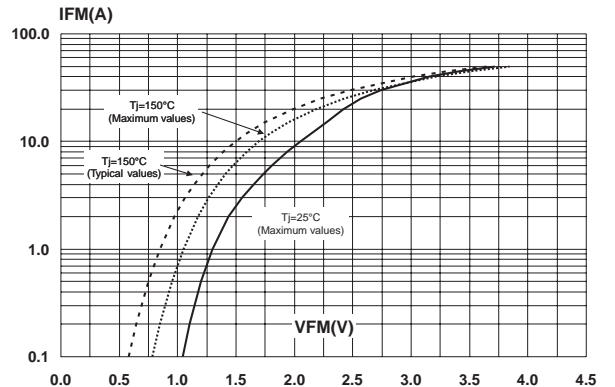
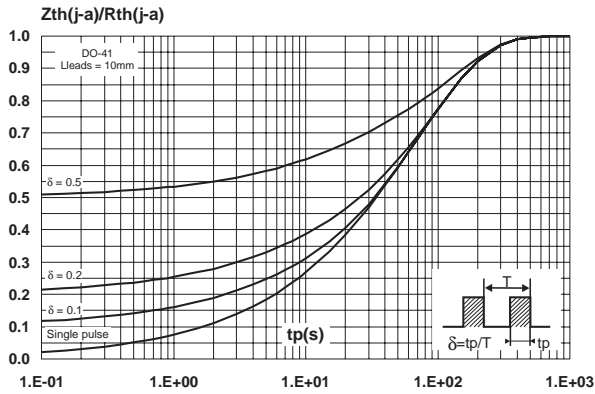


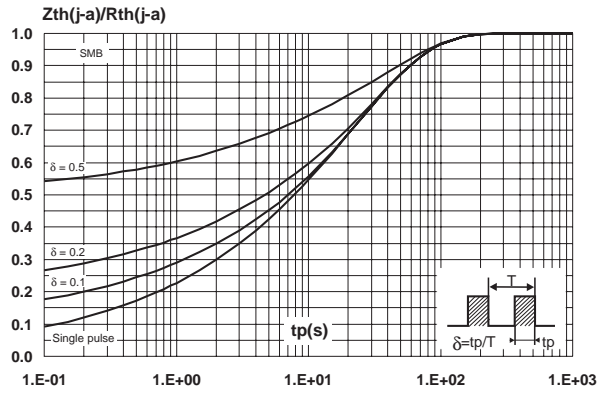
Fig. 2: Forward voltage drop versus forward current.



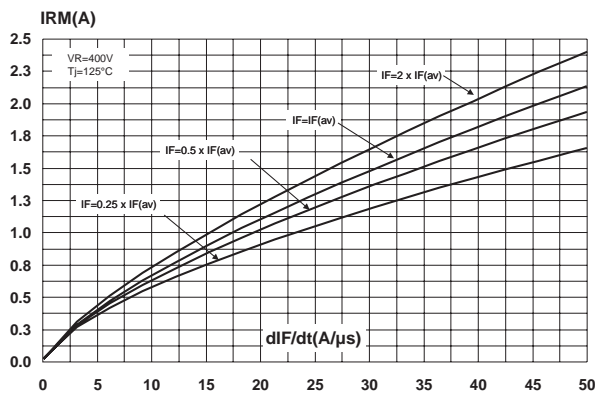
**Fig. 3-1:** Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, Leads = 10mm)



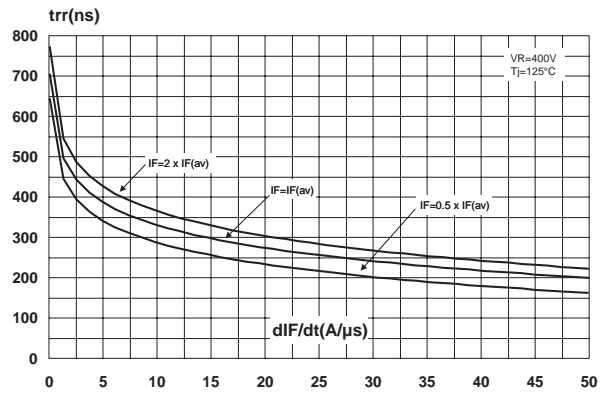
**Fig. 3-2:** Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, S = 1cm²)



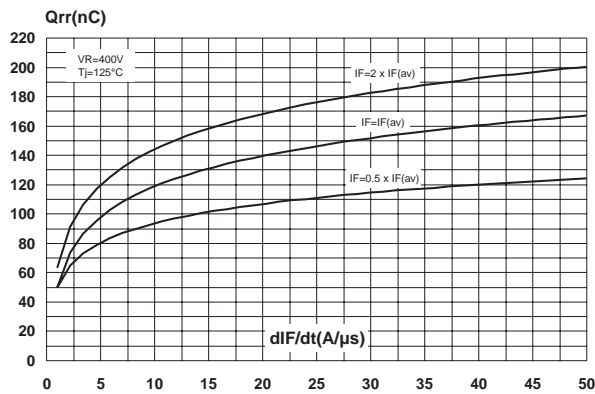
**Fig. 4:** Peak reverse recovery current versus  $dI_F/dt$  (90% confidence).



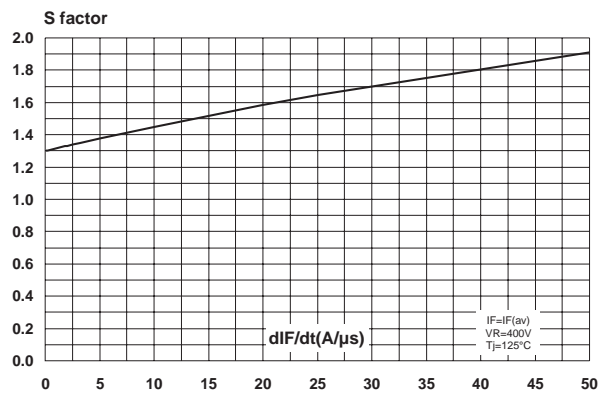
**Fig. 5:** Reverse recovery time versus  $dI_F/dt$  (90% confidence).



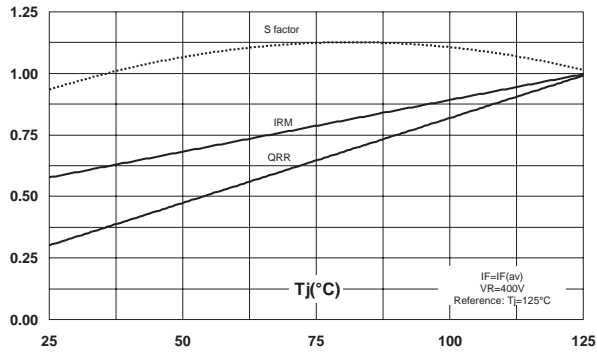
**Fig. 6:** Reverse recovery charges versus  $dI_F/dt$  (90% confidence).



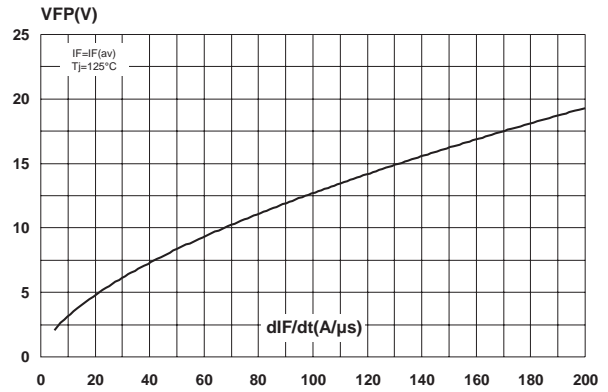
**Fig. 7:** Softness factor versus  $dI_F/dt$  (typical values).



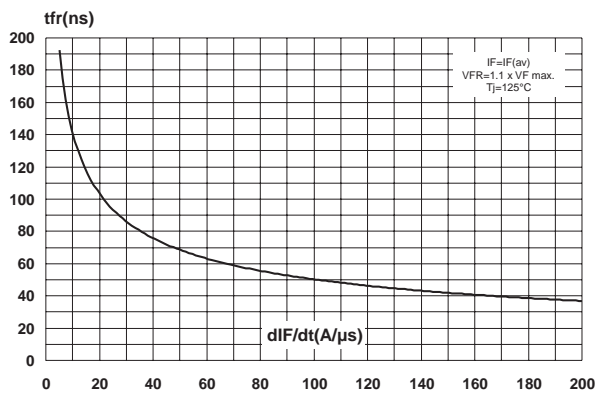
**Fig. 8:** Relative variations of dynamic parameters versus junction temperature.



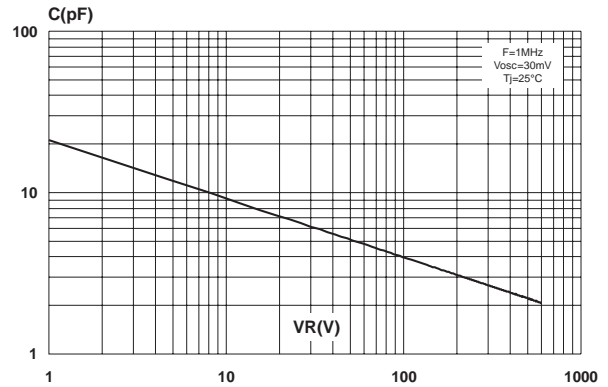
**Fig. 9:** Transient peak forward voltage versus  $dI_F/dt$  (90% confidence).



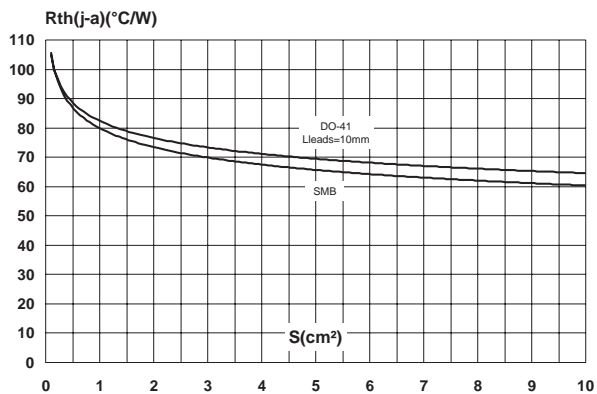
**Fig. 10:** Forward recovery time versus  $dI_F/dt$  (90% confidence).



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



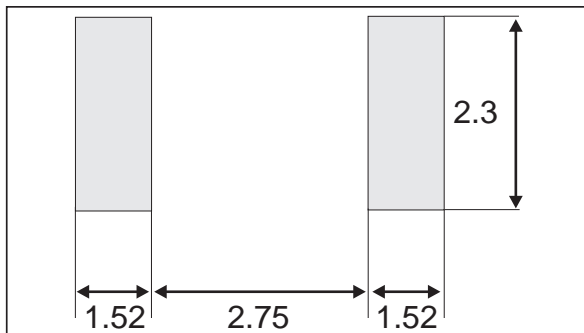
**Fig. 12:** Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35μm).



**PACKAGE MECHANICAL DATA**  
SMB

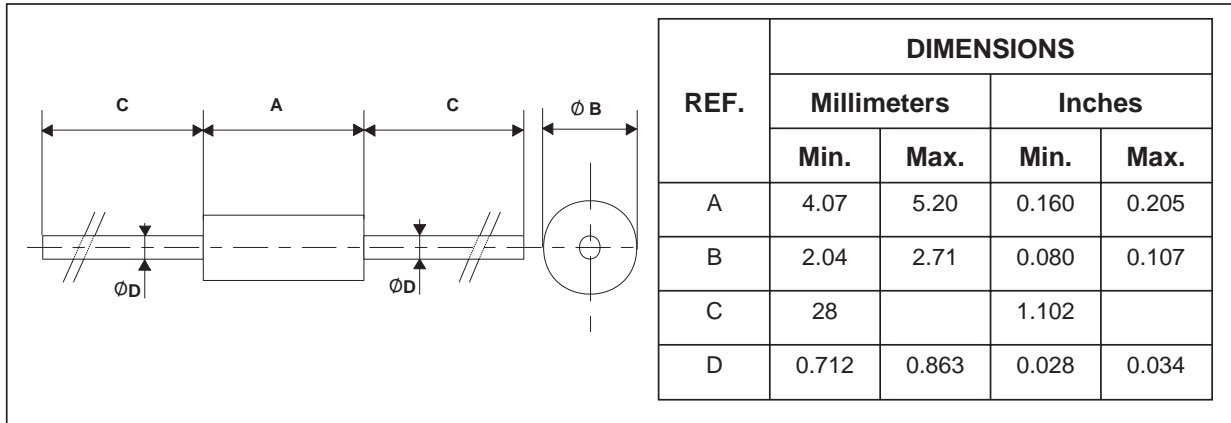
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.41	0.006	0.016
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
D	3.30	3.95	0.130	0.156
L	0.75	1.60	0.030	0.063

**FOOTPRINT**



# STTH1L06/U

## 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

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

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