

## TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

**Table 1: Main Product Characteristics**

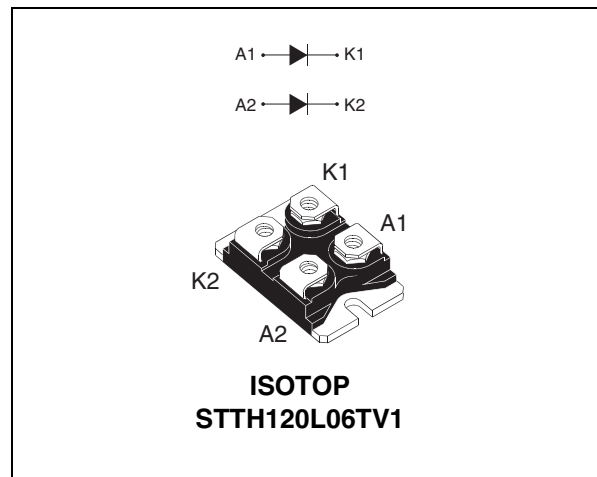
$I_{F(AV)}$	<b>2 x 60 A</b>
$V_{RRM}$	<b>600 V</b>
$T_j$	<b>150°C</b>
$V_F$ (typ)	<b>0.95 V</b>
$t_{rr}$ (max)	<b>70 ns</b>

### FEATURES AND BENEFITS

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

### DESCRIPTION

The STTH120L06TV, which is using ST Turbo 2 600V technology, is specially suited for use in switching power supplies, and industrial applications, as rectification and free-wheeling diode.



**Table 2: Order Codes**

Part Number	Marking
STTH120L06TV1	STTH120L06TV1

**Table 3: Absolute Ratings** (limiting values, per diode)

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward voltage		120	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	$T_c = 65^\circ\text{C}$ Per diode	60	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ms}$ sinusoidal	500	A
$T_{stg}$	Storage temperature range		-55 to + 150	°C
$T_j$	Maximum operating junction temperature		150	°C

Table 4: Thermal Resistance

Symbol	Parameter		Value (max.)	Unit
$R_{th(j-c)}$	Junction to case	Per diode	0.98	°C/W
		Total	0.54	
$R_{th(c)}$	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_{j(\text{diode } 1)} = P(\text{diode } 1) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode } 2) \times R_{th(c)}$$

Table 5: Static Electrical Characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R^*$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			50	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$			50	500	
$V_F^{**}$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 60\text{A}$			1.55	V
		$T_j = 150^\circ\text{C}$			0.95	1.2	

Pulse test: \*  $t_p = 5 \text{ ms}$ ,  $\delta < 2\%$

\*\*  $t_p = 380 \mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:  $P = 0.93 \times I_{F(AV)} + 0.0045 I_F^2(\text{RMS})$

Table 6: Dynamic Characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 0.5\text{A}$ $I_{rr} = 0.25\text{A}$ $I_R = 1\text{A}$			70	ns
			$I_F = 1\text{A}$ $di_F/dt = 50 \text{ A}/\mu\text{s}$ $V_R = 30\text{V}$		75	105	
$I_{RM}$	Reverse recovery current	$T_j = 125^\circ\text{C}$	$I_F = 60\text{A}$ $V_R = 400\text{V}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$		14	19	A
$t_{fr}$	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 60\text{A}$ $di_F/dt = 200 \text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			500	ns
$V_{FP}$	Forward recovery voltage	$T_j = 25^\circ\text{C}$	$I_F = 60\text{A}$ $di_F/dt = 200 \text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$		3		V

Figure 1: Conduction losses versus average forward current (per diode)

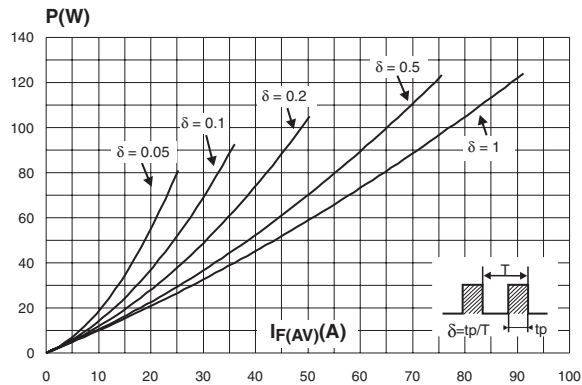


Figure 2: Forward voltage drop versus forward current (per diode)

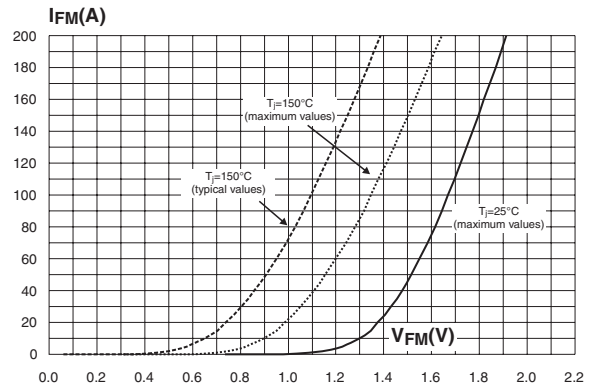


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

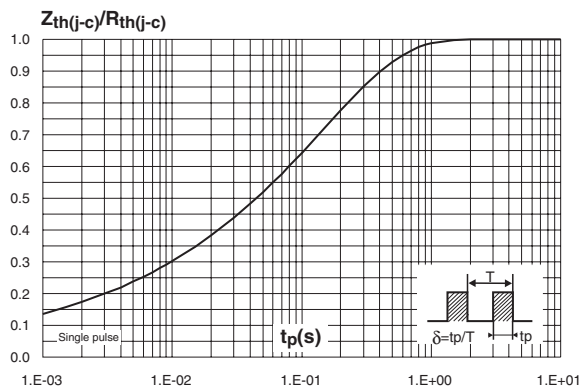


Figure 4: Peak reverse recovery current versus di/dt (typical values, per diode)

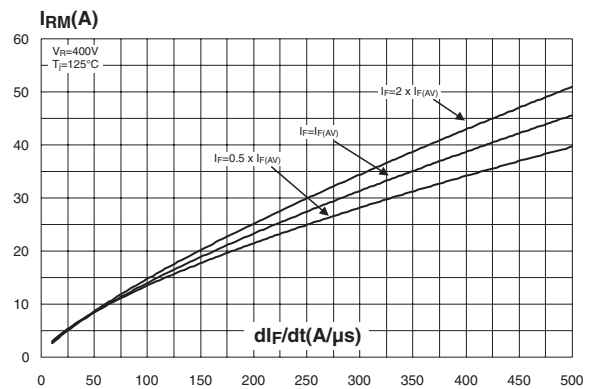


Figure 5: Reverse recovery time versus di/dt (typical values, per diode)

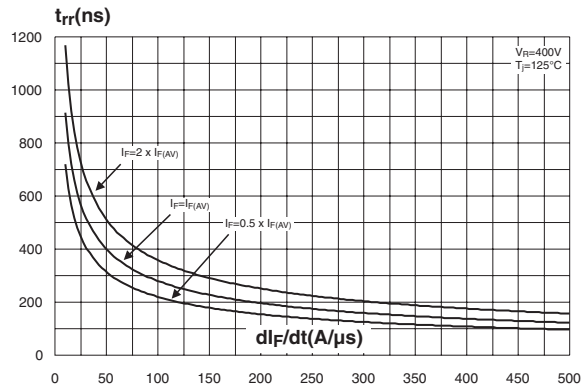
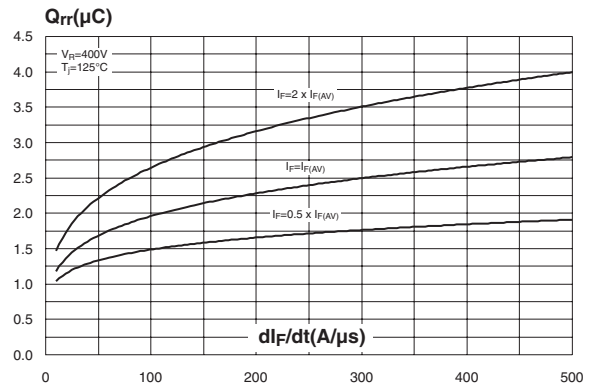
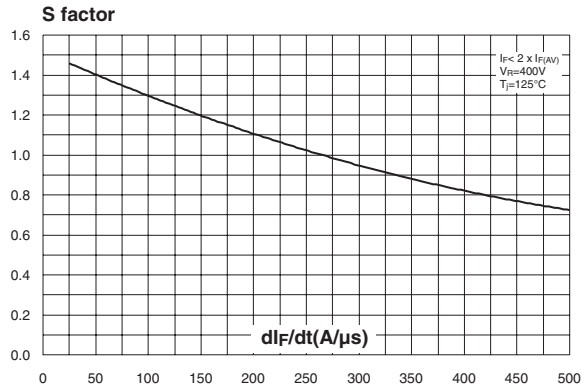


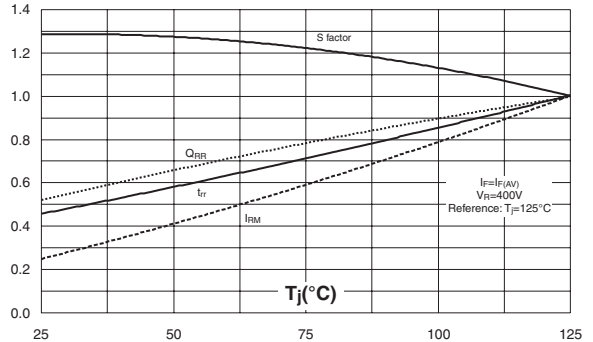
Figure 6: Reverse recovery charges versus di/dt (typical values, per diode)



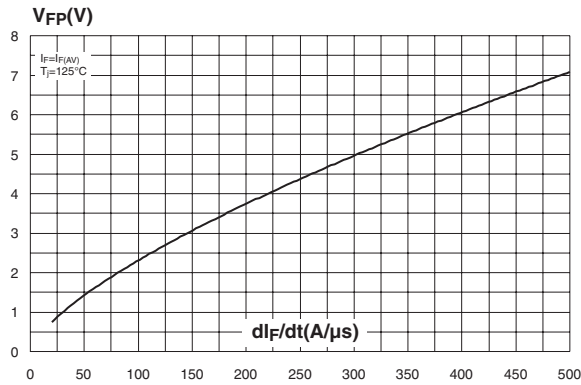
**Figure 7: Reverse recovery softness factor versus  $di_F/dt$  (typical values, per diode)**



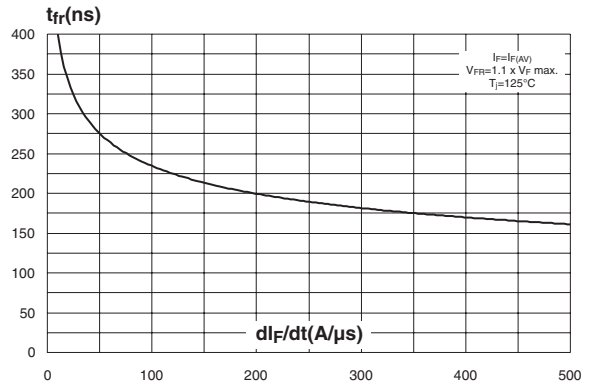
**Figure 8: Relative variations of dynamic parameters versus junction temperature**



**Figure 9: Transient peak forward voltage versus  $di_F/dt$  (typical values, per diode)**



**Figure 10: Forward recovery time versus  $di_F/dt$  (typical values, per diode)**



**Figure 11: Junction capacitance versus reverse voltage applied (typical values, per diode)**

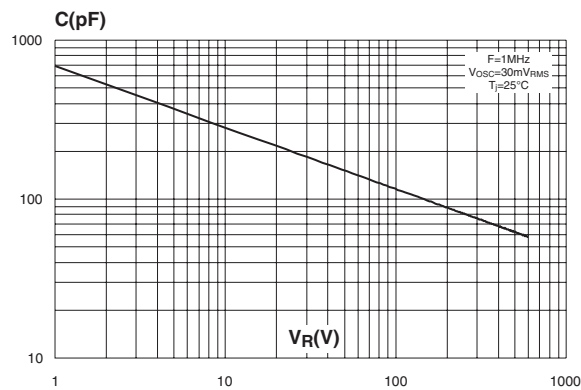


Figure 12: ISOTOP Package Mechanical Data

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	11.80	12.20	0.465	0.480
A1	8.90	9.10	0.350	0.358
B	7.8	8.20	0.307	0.323
C	0.75	0.85	0.030	0.033
C2	1.95	2.05	0.077	0.081
D	37.80	38.20	1.488	1.504
D1	31.50	31.70	1.240	1.248
E	25.15	25.50	0.990	1.004
E1	23.85	24.15	0.939	0.951
E2	24.80 typ.		0.976 typ.	
G	14.90	15.10	0.587	0.594
G1	12.60	12.80	0.496	0.504
G2	3.50	4.30	0.138	0.169
F	4.10	4.30	0.161	0.169
F1	4.60	5.00	0.181	0.197
P	4.00	4.30	0.157	0.69
P1	4.00	4.40	0.157	0.173
S	30.10	30.30	1.185	1.193

Table 7: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH120L06TV1	STTH120L06TV1	ISOTOP	27 g (without screws)	10 (with screws)	Tube

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

Table 8: Revision History

Date	Revision	Description of Changes
07-Sep-2004	1	First issue

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