

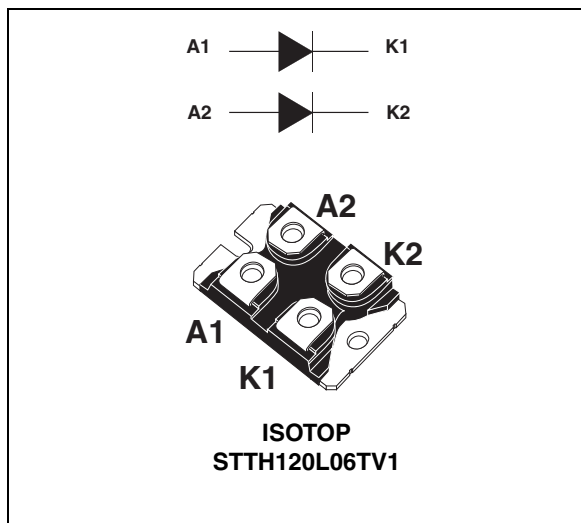
## Turbo 2 ultrafast high voltage rectifier

### Features and benefits

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

### Description

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



**Table 1. Device summary**

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

TM: ISOTOP is a trademark of STMicroelectronics

# 1 Characteristics

**Table 2. Absolute ratings (limiting values, per diode)**

Symbol	Parameter			Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage			600	V
$I_{F(RMS)}$	RMS forward current			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	$^\circ\text{C}$
$T_j$	Maximum operating junction temperature			150	$^\circ\text{C}$

**Table 3. Thermal parameter**

Symbol	Parameter		Maximum	Unit
$R_{th(j-c)}$	Junction to case	Per diode	0.98	$^\circ\text{C/W}$
		Total	0.54	
$R_{th(c)}$	Coupling		0.1	

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j (\text{diode1}) = P_{(\text{diode1})} \times R_{th(j-c)} (\text{per diode}) + P_{(\text{diode2})} \times R_{th(c)}$$

**Table 4. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R^{(1)}$	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	
$V_F^{(2)}$	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	1.20	

1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$
2. Pulse test:  $t_p = 380\ \mu\text{s}$ ,  $\delta < 2\%$

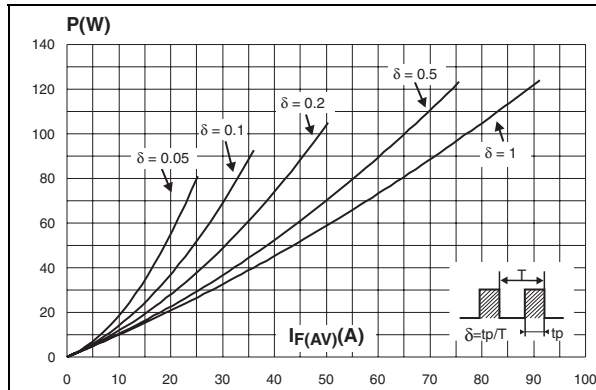
To evaluate the maximum conduction losses use the following equation:

$$P = 0.93 \times I_{F(AV)} + 0.0045 I_{F(RMS)}^2$$

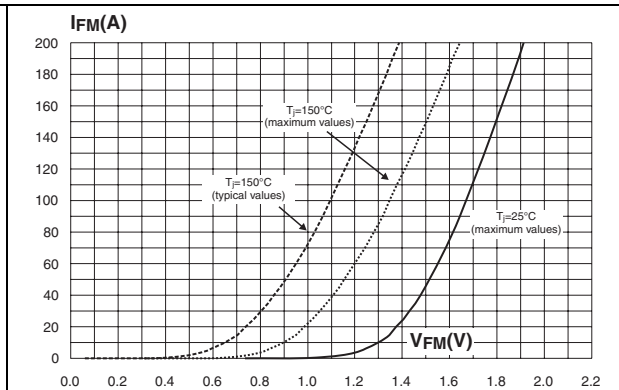
**Table 5. Dynamic characteristics (per diode)**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 0.5\text{ A}$ , $I_{rr} = 0.25\text{ A}$ , $I_R = 1\text{ A}$			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	$T_j = 125\text{ }^\circ\text{C}$		14	19	A	
$t_{fr}$	Forward recovery time	$T_j = 25\text{ }^\circ\text{C}$			500	ns	
$V_{FP}$	Forward recovery voltage	$T_j = 25\text{ }^\circ\text{C}$		3		V	

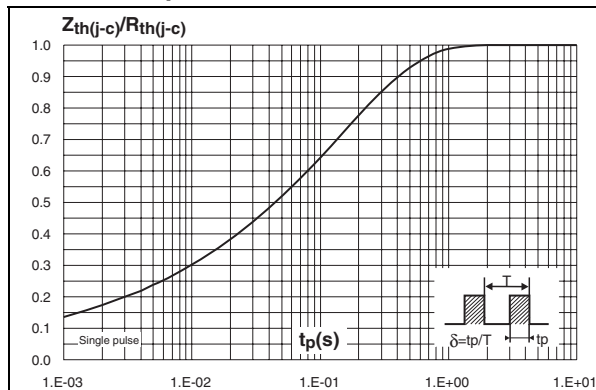
**Figure 1. Conduction losses versus average forward current (per diode)**



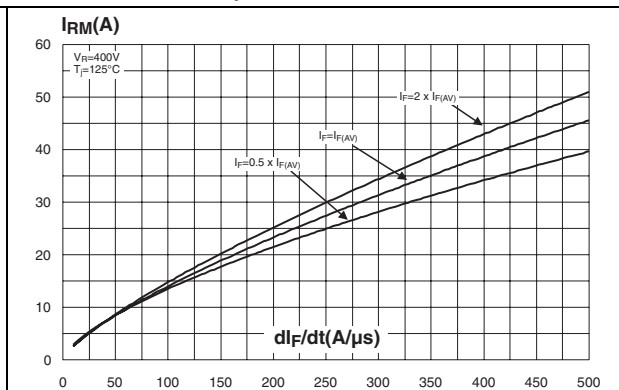
**Figure 2. Forward voltage drop versus forward current (per diode)**



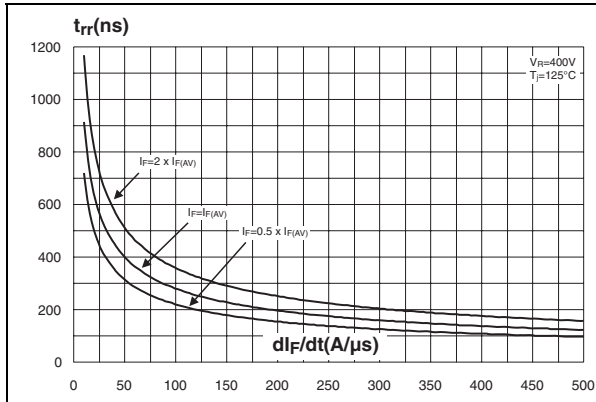
**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**



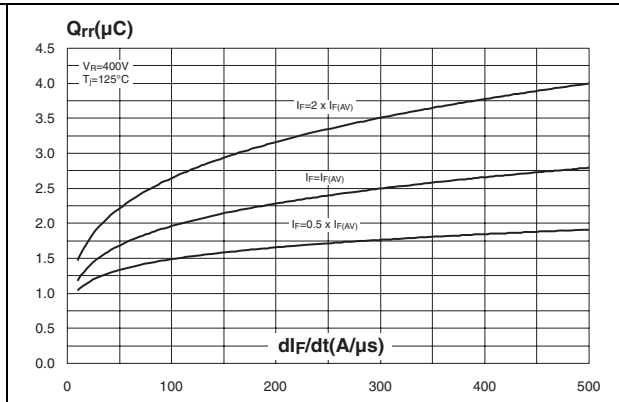
**Figure 4. Peak reverse recovery current versus di\_F/dt (typical values, per diode)**



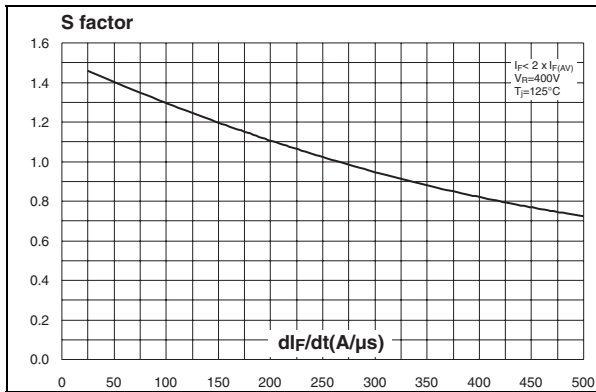
**Figure 5. Reverse recovery time versus  $di_F/dt$  (typical values, per diode)**



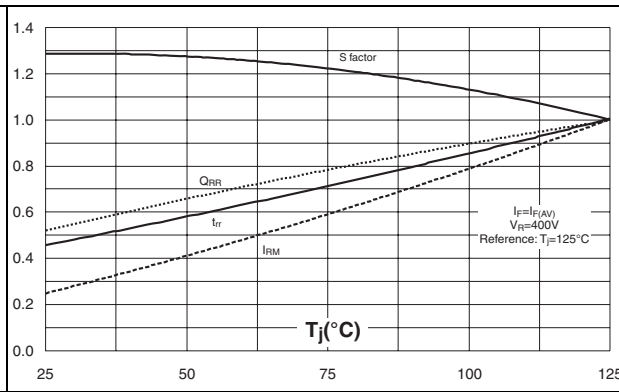
**Figure 6. Reverse recovery charges versus  $di_F/dt$  (typical values, per diode)**



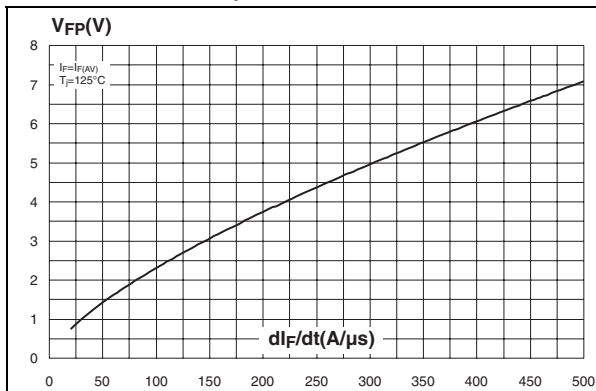
**Figure 7. Reverse recovery softness factor versus  $di_F/dt$  (typical values, per diode)**



**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)**

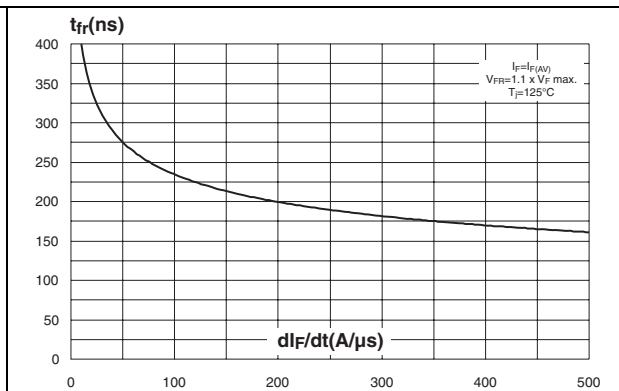
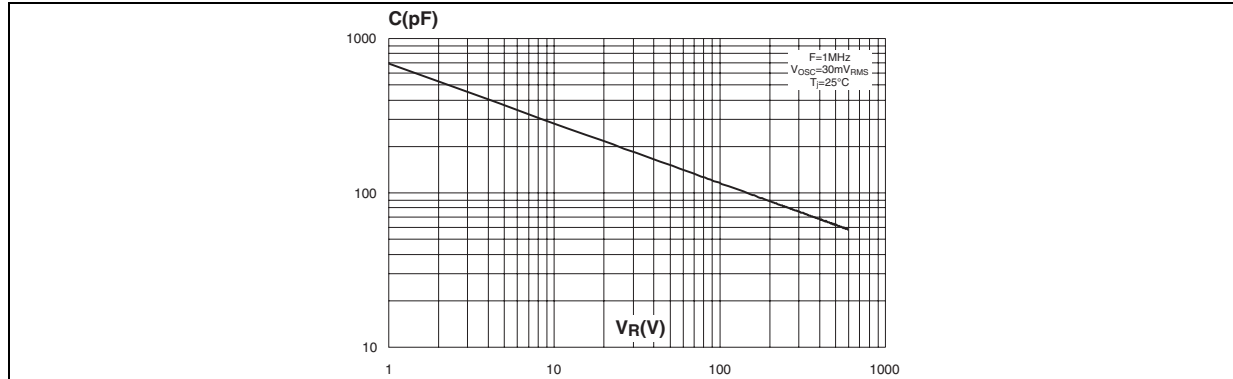


Figure 11. Junction capacitance versus reverse voltage applied (typical values, per diode)



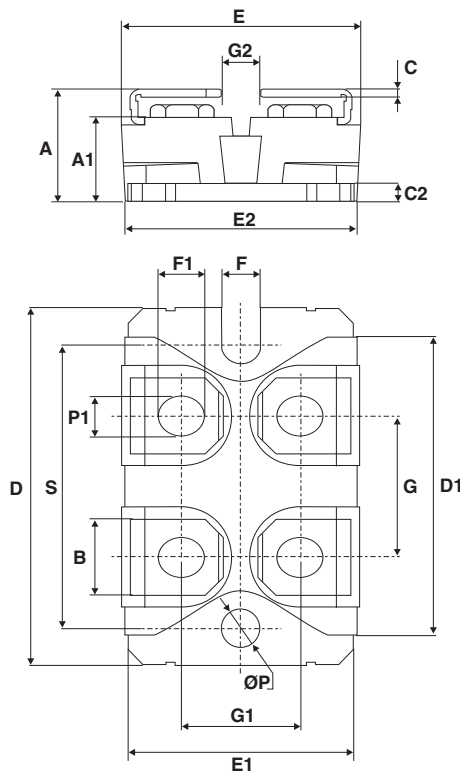
## 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 1.3 N·m
- Maximum torque value: 1.5 N·m

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**Table 6. ISOTOP dimensions**

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



### 3 Ordering information

Table 7. Ordering information

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

### 4 Revision history

Table 8. Document revision history

Date	Revision	Changes
07-Sep-2004	1	First issue.
04-Apr-2011	2	Updated <a href="#">Chapter 2: Package information</a> .

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