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# STTH200W06TV1

## Turbo 2 ultrafast high voltage rectifier

Datasheet – production data

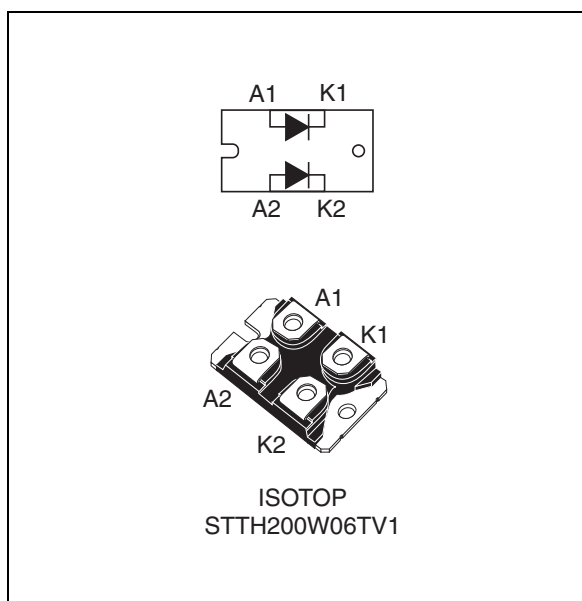
### Features

- Ultrafast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching and conduction losses
- Insulated package
  - Insulating voltage = 2500 V rms
  - Capacitance = 45 pF
- Complies with UL standards (File ref: E81734)

### Description

The STTH200W06TV1, which uses ST Turbo 2, 600 V technology, is especially suited to be used for DC/AC and DC/AC converters in primary stage of MIG/MMA/TIG welding machine.

Packaged in ISOTOP, this device offers high power integration for all welding machines and industrial equipment.



**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	2 x 100 A
$V_{RRM}$	600 V
$T_j$ (max)	150 °C
$V_F$ (typ)	1.0 V
$t_{rr}$ (typ)	55 ns

Characteristics

STTH200W06TV1

# 1 Characteristics

**Table 2. Absolute ratings (limiting values at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified, per diode)**

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	Forward rms current	Per diode	145	A
$I_{F(peak)}$	Average forward current, $\delta = 0.2$	Per diode $T_c = 105\text{ }^\circ\text{C}$	200	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms}$ Sinusoidal	800	A
$T_{stg}$	Storage temperature range		-65 to + 150	$^\circ\text{C}$
$T_j$	Maximum operating junction temperature		150	$^\circ\text{C}$

**Table 3. Thermal parameters**

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	0.7	$^\circ\text{C/W}$
		Total	0.4	
$R_{th(c)}$	Coupling		0.1	

When the two 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 4. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ }^\circ\text{C}$	$V_R = V_{RRM}$	-		30	$\mu\text{A}$
		$T_j = 125\text{ }^\circ\text{C}$		-	30	300	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 100\text{ A}$			1.5	V
		$T_j = 150\text{ }^\circ\text{C}$		-	1	1.3	
		$T_j = 25\text{ }^\circ\text{C}$	$I_F = 200\text{ A}$	-		1.75	
		$T_j = 150\text{ }^\circ\text{C}$		-	1.25	1.60	

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

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

To evaluate the conduction losses use the following equation:

$$P = 1.0 \times I_{F(AV)} + 0.003 \times I_{F(RMS)}^2$$

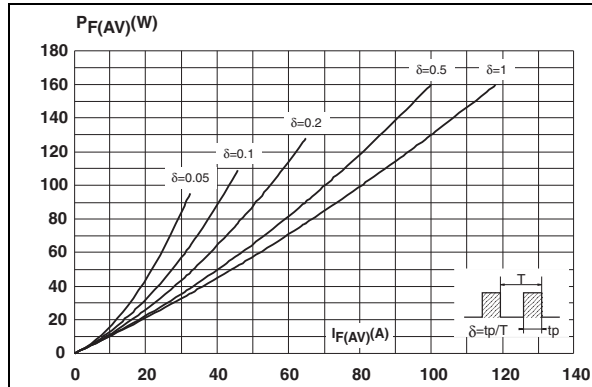
**STTH200W06TV1**

**Characteristics**

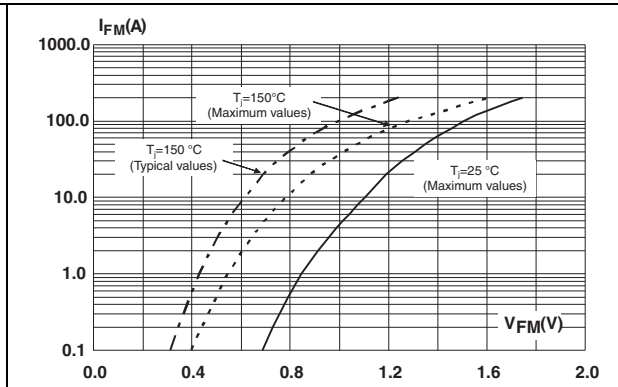
**Table 5. Dynamic characteristics (per diode)**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_{RM}$	Reverse recovery current	$T_j = 125^\circ\text{C}$	$I_F = 100\text{ A}, V_R = 400\text{ V}$ $di_F/dt = -200\text{ A}/\mu\text{s}$	-	30	40	A
$Q_{RR}$	Reverse recovery charge				4600		nC
$S_{factor}$	Softness factor				0.4		
$t_{rr}$	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 1\text{ A}, V_R = 30\text{ V}$ $di_F/dt = -100\text{ A}/\mu\text{s}$	-	55	75	ns
$t_{fr}$	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 100\text{ A}, V_{FR} = 2.5\text{ V}$ $di_F/dt = 100\text{ A}/\mu\text{s}$	-		2000	ns
$V_{FP}$	Forward recovery voltage	$T_j = 25^\circ\text{C}$		-	3.3	5	V

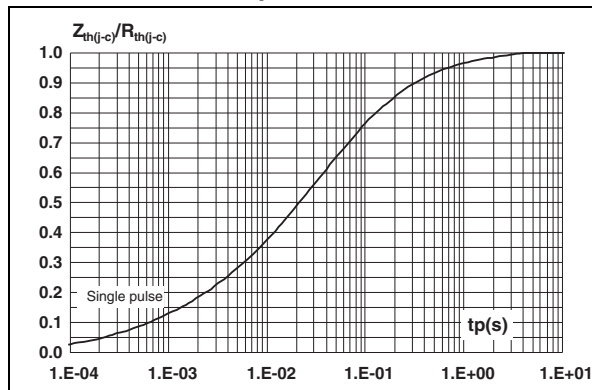
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



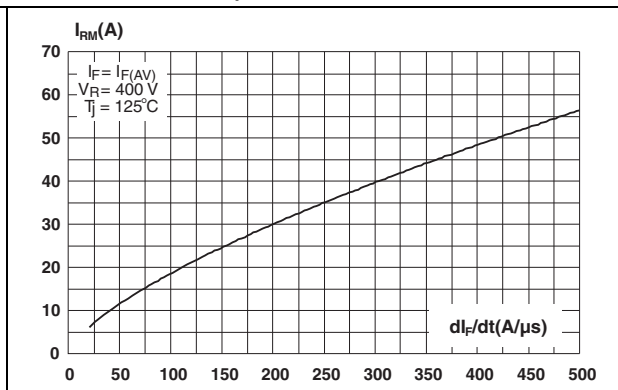
**Figure 2. Forward voltage drop versus forward current (per diode)**



**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)**



Characteristics

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

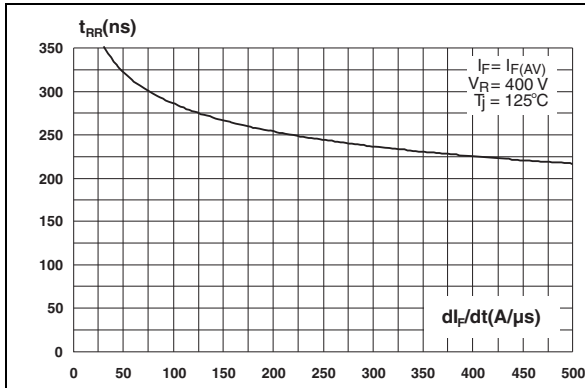


Figure 6. Reverse recovery charges versus  $di_F/dt$  (typical values, per diode)

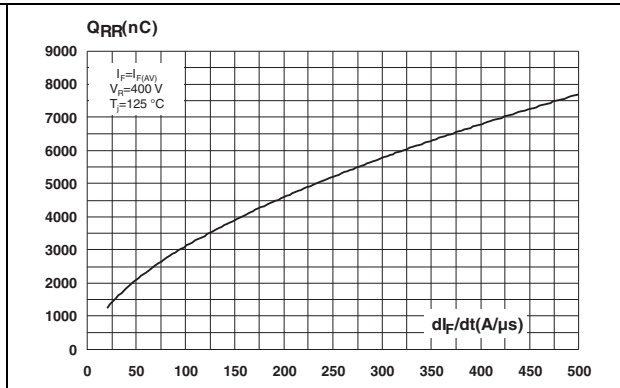


Figure 7. Reverse recovery softness factor versus  $di_F/dt$  (typical values, per diode)

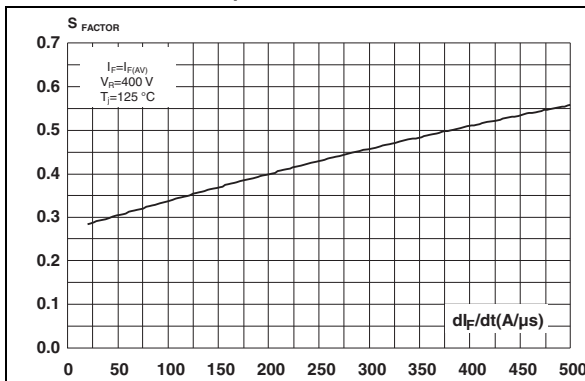


Figure 8. Relative variation of dynamic parameters versus junction temperature

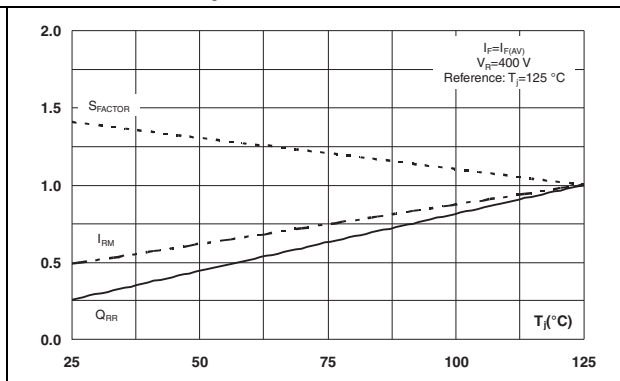


Figure 9. Transient peak forward voltage versus  $di_F/dt$  (typical values, per diode)

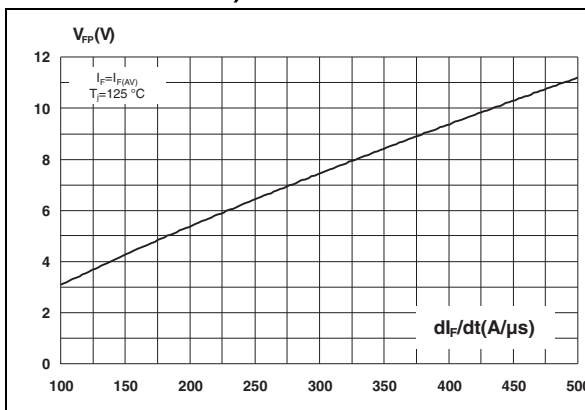
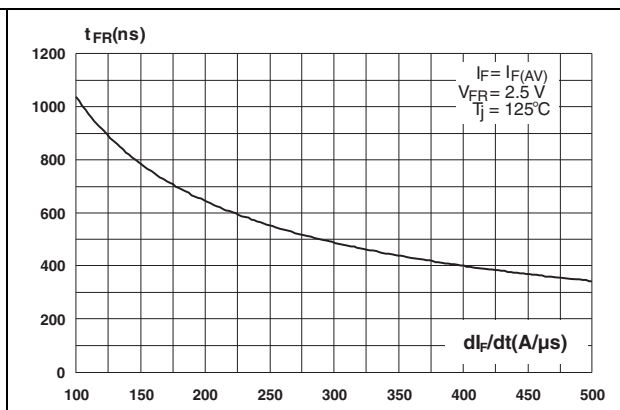


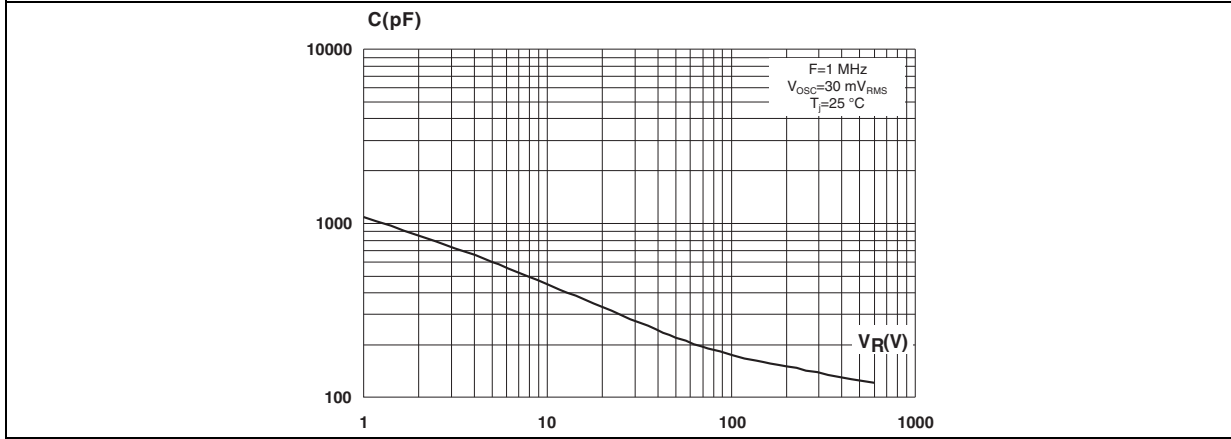
Figure 10. Forward recovery time versus  $di_F/dt$  (typical values, per diode)



**STTH200W06TV1**

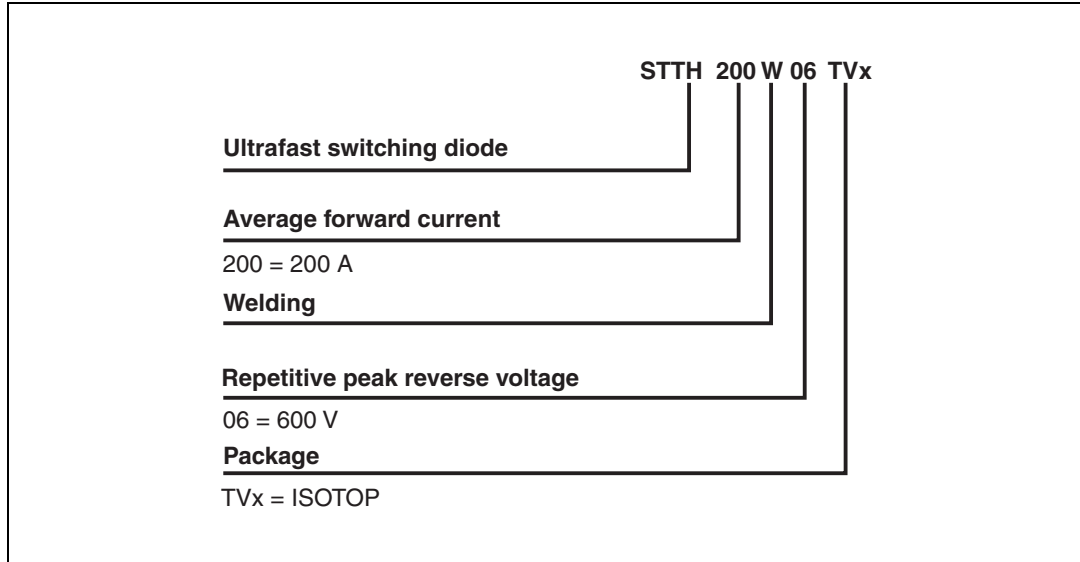
**Characteristics**

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



## 2 Ordering information scheme

Figure 12. Ordering information scheme



STTH200W06TV1

Package information

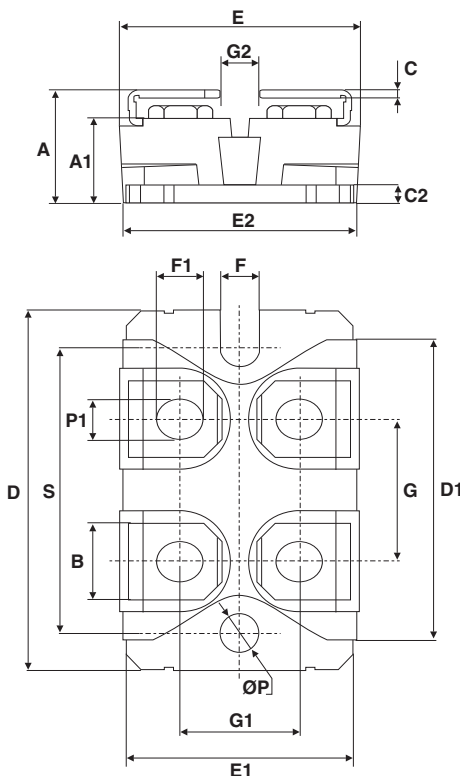
### 3 Package information

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

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

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





## 4 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty <sup>(1)</sup>	Delivery mode
STTH200W06TV1	STTH200W06TV1	ISOTOP	27 g	10 with screws	Tube

1. This product is supplied with 40 terminal screws and washers for each tube. The screws and washers are supplied in a separate pack with the order.

## 5 Revision history

Table 8. Document revision history

Date	Revision	Changes
05-Oct-2012	1	First issue

## STTH200W06TV1

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