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STTH200W03TV1

Turbo 2 ultrafast high voltage rectifier

Datasheet – production data

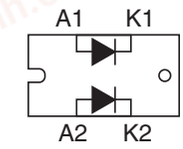
Features

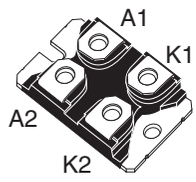
- Ultrafast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching and conduction losses
- Insulated package
  - Insulating voltage = 2500 V rms
  - Capacitance = 45 pF
- Complies with UL standards (File ref: E81734)

Description

The STTH200W03TV1, which uses ST Turbo 2, 300 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.





ISOTOP
STTH200W03TV1

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 100 A
V_{RRM}	300 V
T_j (max)	150 °C
V_F (typ)	0.95 V
t_{rr} (typ)	40 ns

This is information on a product in full production. www.st.com

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1 Characteristics

Table 2. Absolute ratings (limiting values at T_j = 25 °C, unless otherwise specified, per diode)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		300	V
$I_{F(RMS)}$	Forward rms current	Per diode	145	A
$I_{F(peak)}$	Average forward current, δ = 0.2	Per diode T_c = 105 °C	200	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal	800	A
T_{stg}	Storage temperature range		-65 to + 150	°C
T_j	Maximum operating junction temperature		150	°C

Table 3. Thermal parameters

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

When the two diodes 1 and 2 are used simultaneously:

ΔT_j(diode 1) = P (diode 1) X $R_{th(j-c)}$ (per diode) + P (diode 2) x $R_{th(c)}$

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		100	µA
		T_j = 125 °C		-	100	1000	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 100 A			1.50	V
		T_j = 150 °C		-	0.95	1.15	
		T_j = 25 °C	I_F = 200 A	-		1.80	
		T_j = 150 °C		-	1.22	1.50	

1. Pulse test: t_p = 5 ms, δ < 2%
2. Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:

$P = 0.8 \times I_{F(AV)} + 0.0035 \times I_F^2{}_{(RMS)}$

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Table 5. Dynamic characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 100 A, V_R = 200 V dI_F/dt = -200 A/µs	-	9	12	A
Q_{RR}	Reverse recovery charge				400		nC
S_{factor}	Softness factor				0.3		
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 1 A, V_R = 30 V dI_F/dt = -100 A/µs	-	40	50	ns
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 100 A, V_{FR} = 1.5 V dI_F/dt = 100 A/µs	-		2400	ns
V_{FP}	Forward recovery voltage	T_j = 25 °C		-	2	3	V

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

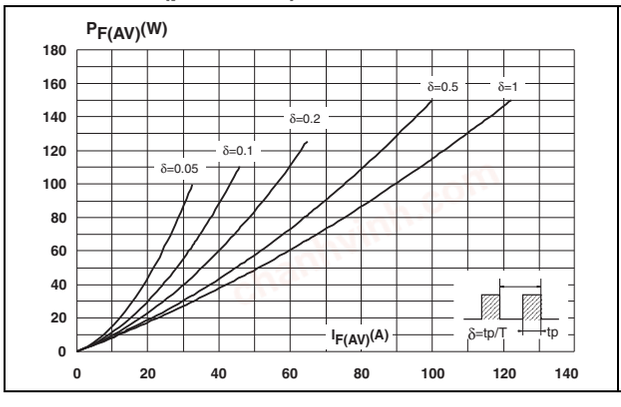


Figure 2. Forward voltage drop versus forward current (per diode)

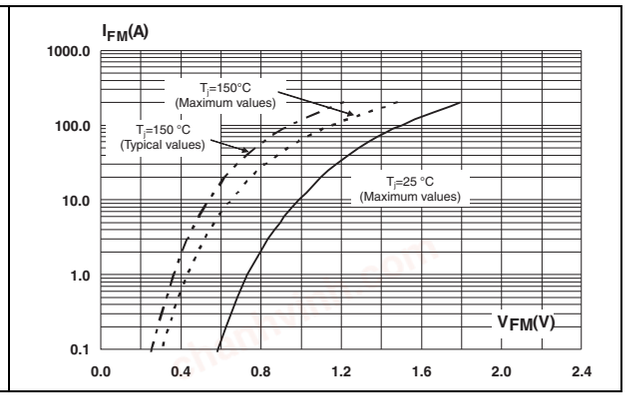


Figure 3. Relative variation of thermal impedance, junction to case, versus pulse duration

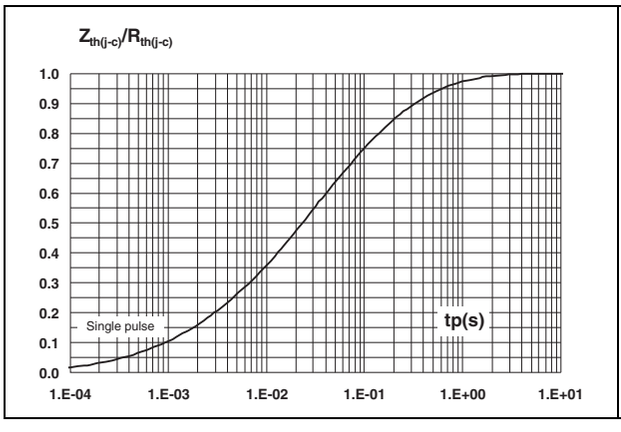
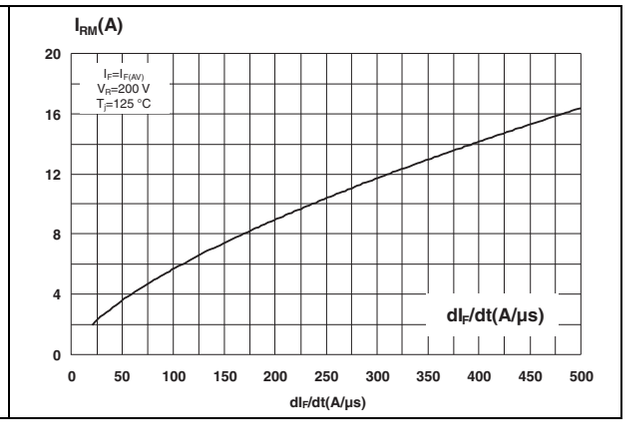


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values, per diode)



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

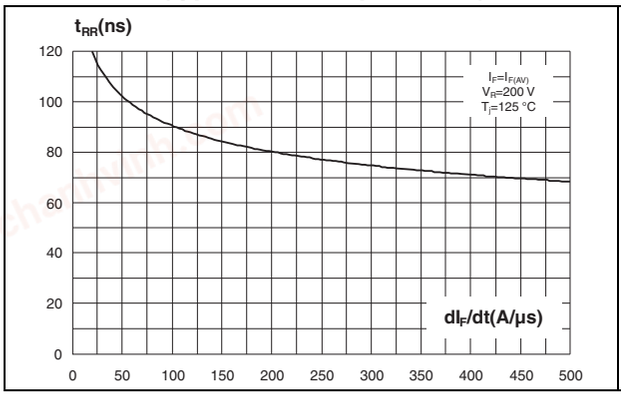


Figure 6. Reverse recovery charges versus dI_F/dt (typical values, per diode)

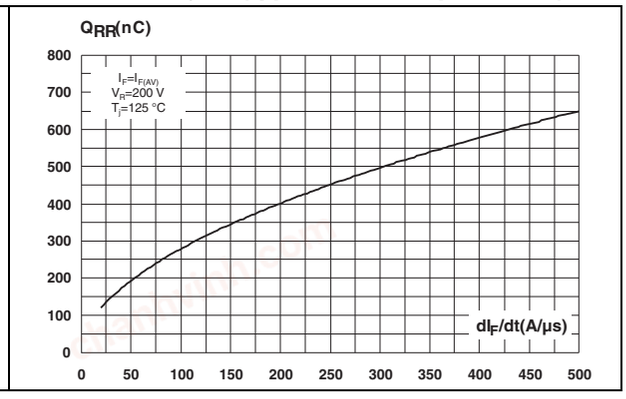


Figure 7. Reverse recovery softness factor versus dI_F/dt (typical values, per diode)

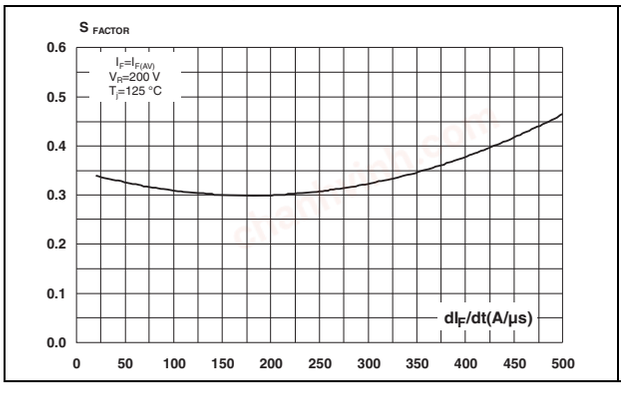


Figure 8. Relative variation of dynamic parameters versus junction temperature

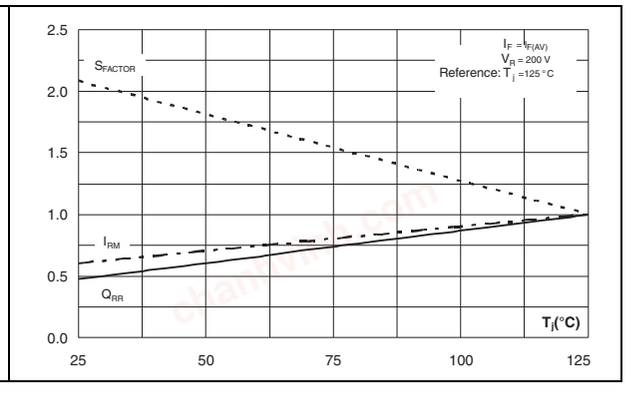


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values, per diode)

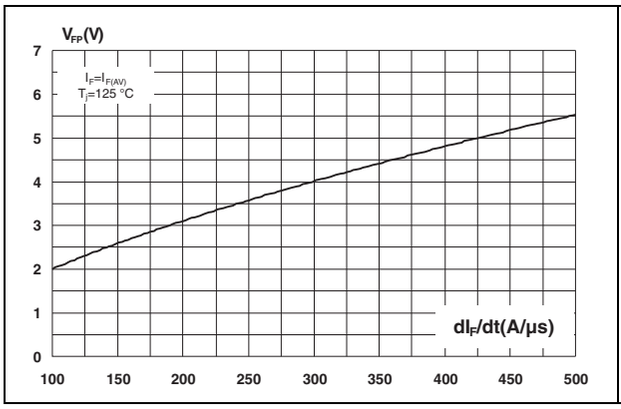
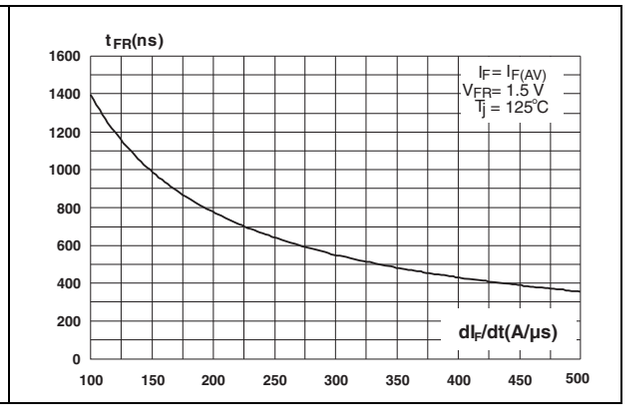
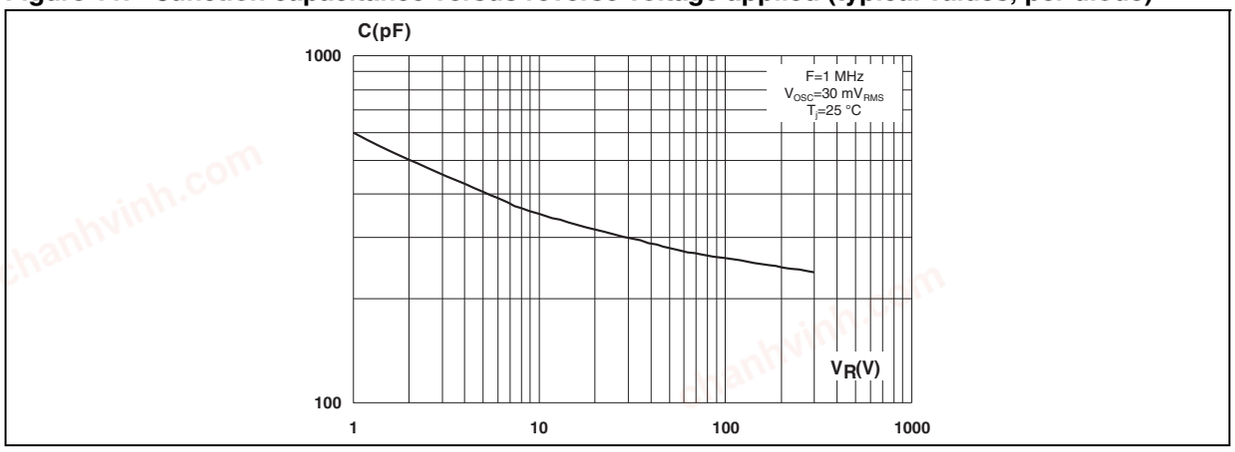


Figure 10. Forward recovery time versus dI_F/dt (typical values, per diode)



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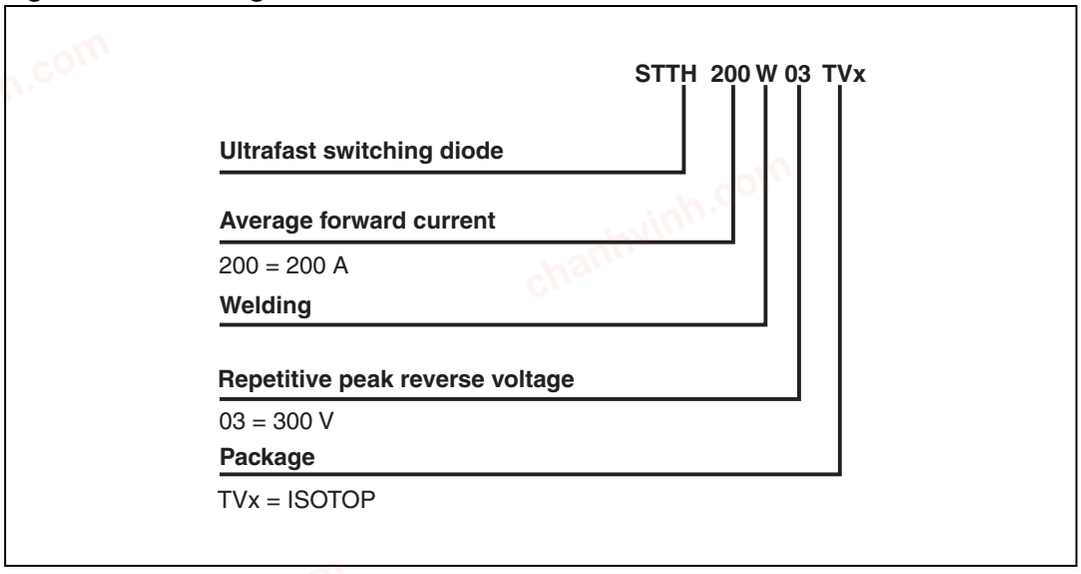
Figure 11. Junction capacitance versus reverse voltage applied (typical values, per diode)



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2 Ordering information scheme

Figure 12. Ordering information scheme



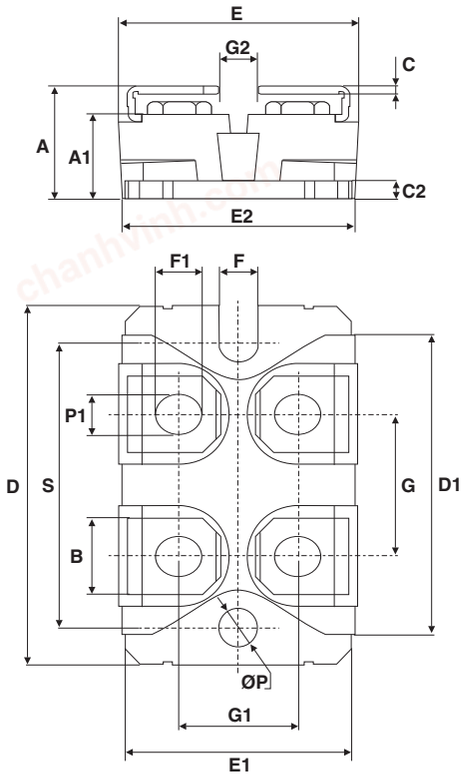
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3 Package information

- 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*. 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

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4 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty[1]	Delivery mode
STTH200W03TV1	STTH200W03TV1	ISOTOP	27 g without screws	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

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