STTH30W02C

Turbo 2 ultrafast high voltage rectifier

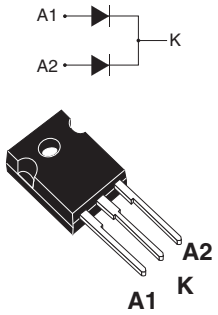
Datasheet – production data

Features

- Ultrafast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses
- ECOPACK®2 compliant component

Description

The STTH30W02CW, uses ST Turbo 2, 200 V technology. It is especially suited to be used for DC/DC and DC/AC converters in secondary stage of MIG/MMA/TIG welding machine. Housed in ST's TO-247, this device offers high power integration for all welding machines and industrial applications.



TO-247
STTH30W02CW

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 15 A
V_{RRM}	200 V
t_{rr} (typ)	20 ns
T_j (max)	175 °C
V_F (typ)	0.90 V

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

1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			200	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	T_c = 125 °C	Per diode	15	A
		T_c = 115°C	Per device	30	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		140	A
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature			+ 175	°C

Table 3. Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	2.5	°C / W
		Total	1.5	
$R_{th(c)}$	Coupling		0.5	

When diodes 1 and 2 are used simultaneously:

T_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

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			10	µA
		T_j = 125 °C			5	50	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 15A			1.20	V
		T_j = 150 °C			0.90	1.05	
		T_j = 25 °C	I_F = 30 A			1.4	
		T_j = 150 °C			1.1	1.3	

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:

$P = 0.8 \times I_{F(AV)} + 0.0167\ I_F{}^2{}_{(RMS)}$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 15 A, V_R = 160 V dI_F/dt = -200 A/µs		7	9	A
Q_{RR}	Reverse recovery charge				160		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		20	25	ns
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 15 A, V_{FR} = 1.1 V dI_F/dt = 100 A/µs			200	ns
V_{FP}	Forward recovery voltage	T_j = 25 °C			1.6	2.4	V

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

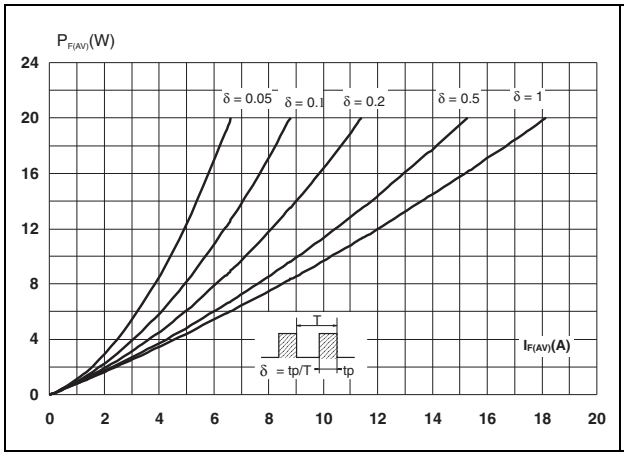


Figure 2. Forward voltage drop versus forward current (per diode)

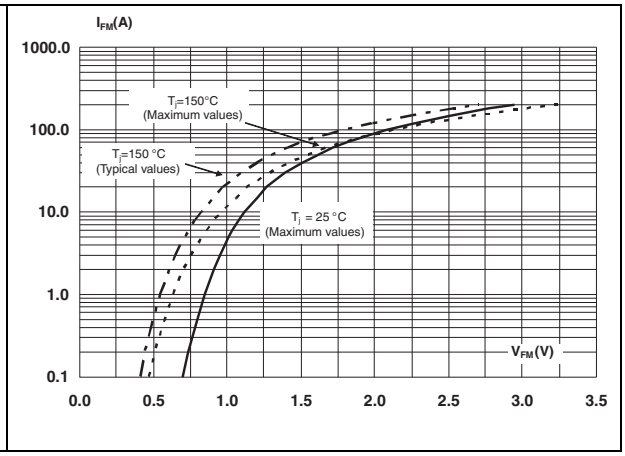


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

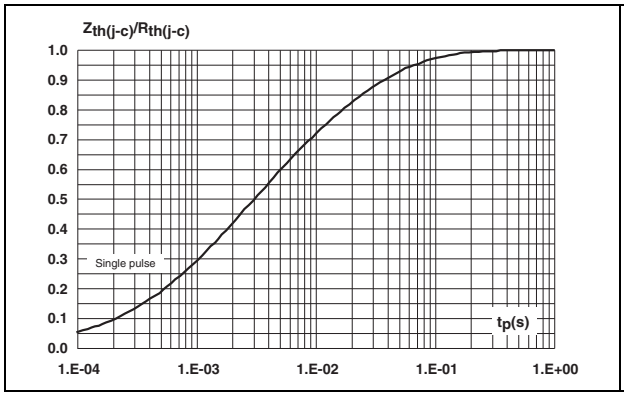


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values, per diode)

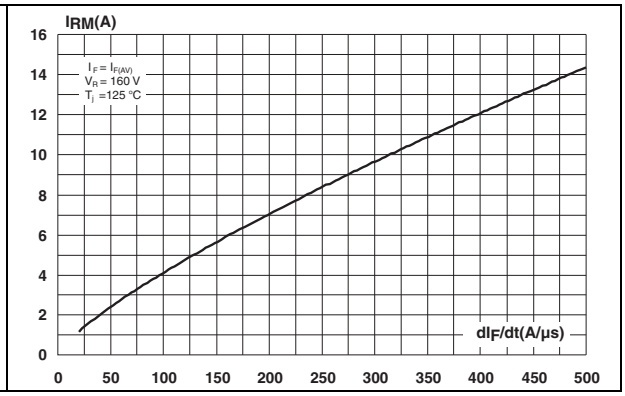


Figure 5. Reverse recovery time versus dI_F/dt (typical values, per diode)

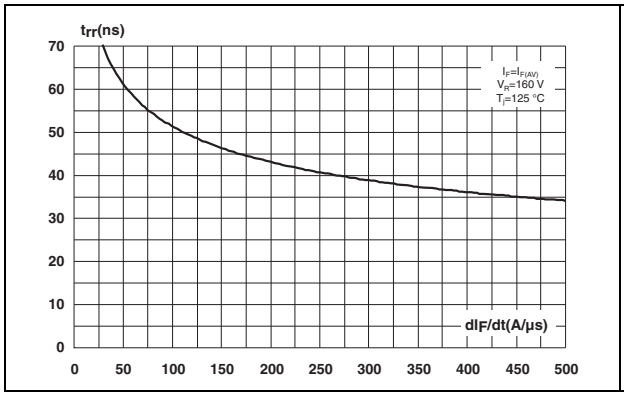


Figure 6. Reverse recovery charges versus dI_F/dt (typical values, per diode)

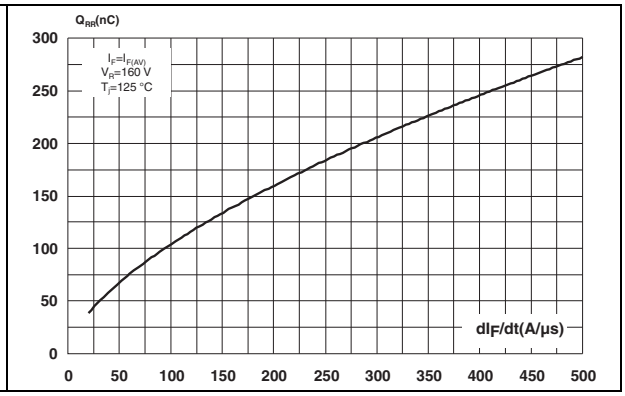


Figure 7. Relative variations of dynamic parameters versus junction temperature

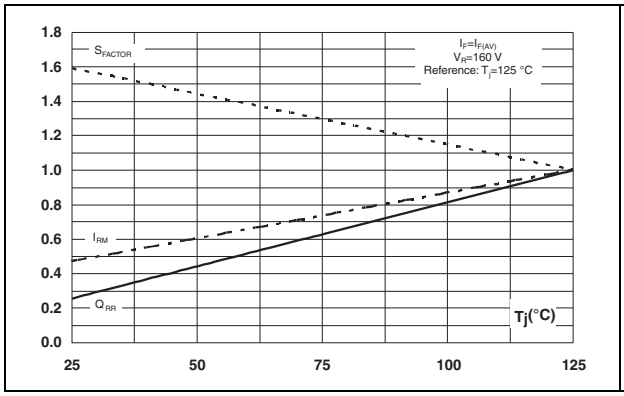


Figure 8. Reverse recovery softness factor versus dI_F/dt (typical values, per diode)

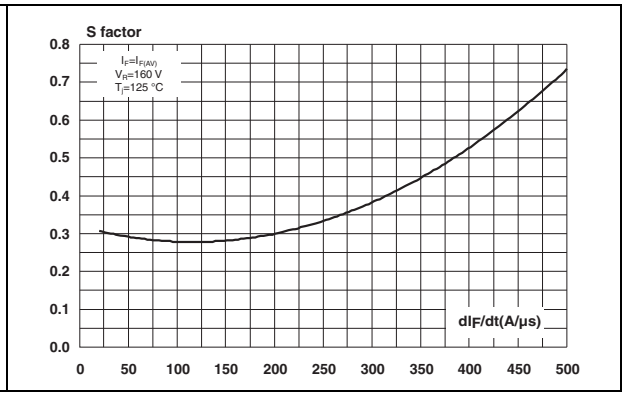


Figure 9. Forward recovery time versus dI_F/dt (typical values, per diode)

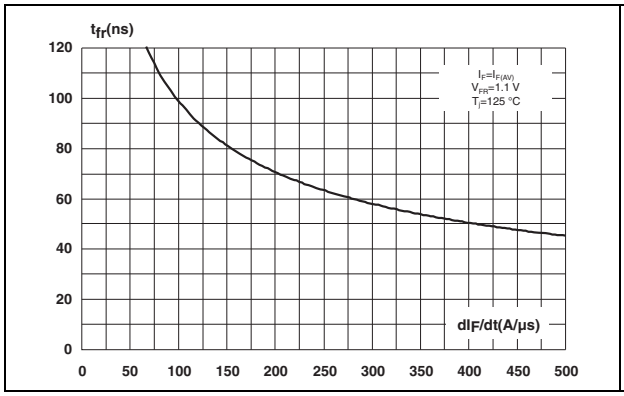


Figure 10. Transient peak forward voltage versus dI_F/dt (typical values, per diode)

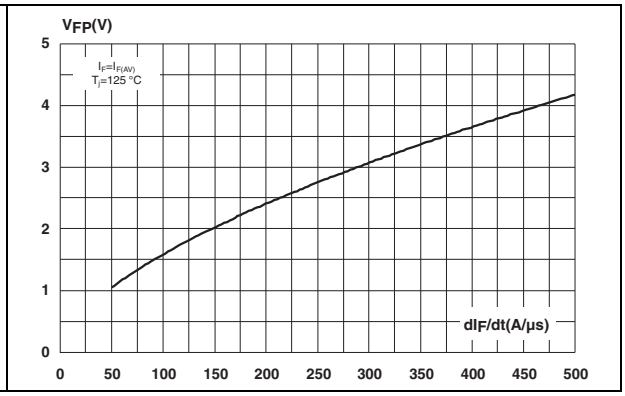
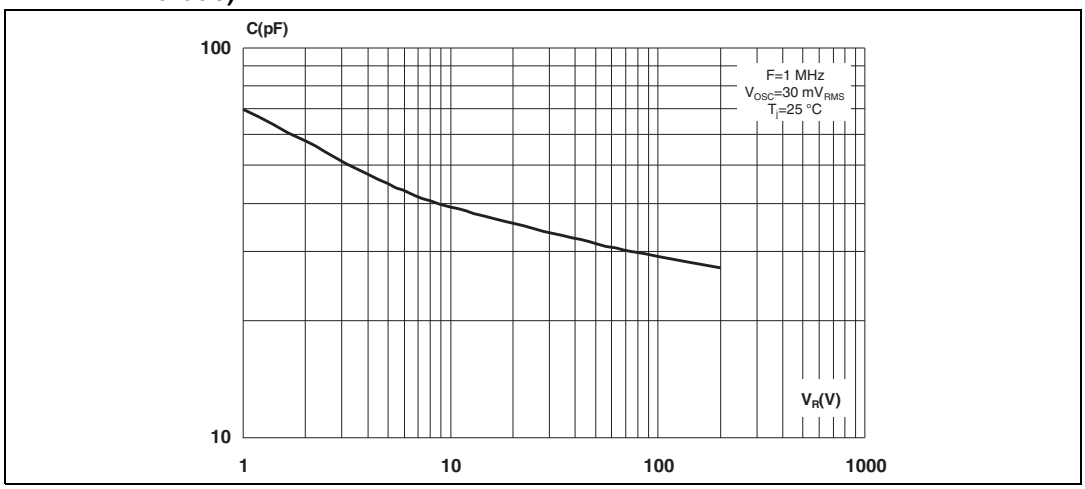


Figure 11. Junction capacitance versus reverse voltage applied (typical values, per diode)

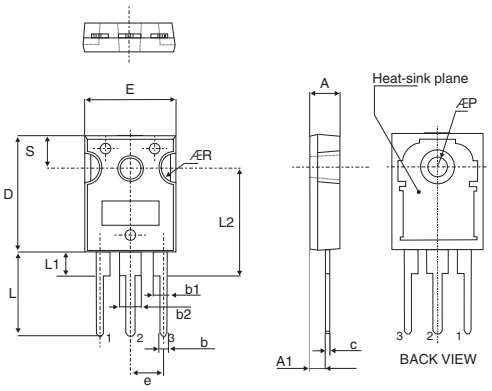


2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m (1.0 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. TO-247 dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ	Max.
A	4.85		5.15	0.191		0.203
A1	2.20		2.60	0.086		0.102
b	1.00		1.40	0.039		0.055
b1	2.00		2.40	0.078		0.094
b2	3.00		3.40	0.118		0.133
c	0.40		0.80	0.015		0.031
D(1)	19.85		20.15	0.781		0.793
E	15.45		15.75	0.608		0.620
e	5.30	5.45	5.60	0.209	0.215	0.220
L	14.20		14.80	0.559		0.582
L1	3.70		4.30	0.145		0.169
L2	18.50 typ.			0.728 typ.		
ØP(2)	3.55		3.65	0.139		0.143
ØR	4.50		5.50	0.177		0.217
S	5.30	5.50	5.70	0.209	0.216	0.224

1. Dimension D plus gate protrusion does not exceed 20.5 mm
2. Resin thickness around the mounting hole is not less than 0.9 mm

3 Ordering information

Table 7. Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH30W02CW	STTH30W02CW	TO-247	4.46 g	50	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
05-Oct-2012	1	First issue.

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