STTH61W04S

Turbo 2 ultrafast high voltage rectifier

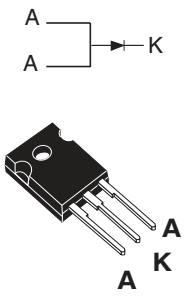
Datasheet – production data

Features

- Ultrafast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses
- ECOPACK®2 compliant component
- Ribbon bonding for more robustness

Description

The STTH61W04SW, uses ST Turbo 2, 400 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.



TO-247
STTH61W04SW

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	60 A
V_{RRM}	400 V
t_{rr} (typ)	40 ns
T_j(max)	175 °C
V_F (typ)	0.93 V

1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			400	V
$I_{F(RMS)}$	Forward rms current			90	A
$I_{F(AV)}$	Average forward current, δ = 0.5	T_c = 110°C	Per diode	60	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		500	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	Total	0.7	°C / W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			20	µA
		T_j = 125 °C			20	200	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 60 A			1.35	
		T_j = 150 °C			0.93	1.15	

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

To evaluate the conduction losses use the following equation:

$P = 0.85 \times I_{F(AV)} + 0.005\ I_F{}^2{}_{(RMS)}$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 60 A, V_R = 320 V dI_F/dt = -200 A/µs		19	26	A
Q_{RR}	Reverse recovery charge				1400		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	55	ns
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 60 A, V_{FR} = 1.2 V dI_F/dt = 400 A/µs			250	ns
V_{FP}	Forward recovery voltage	T_j = 25 °C			2	3	V

Figure 1. Average forward power dissipation versus average forward current

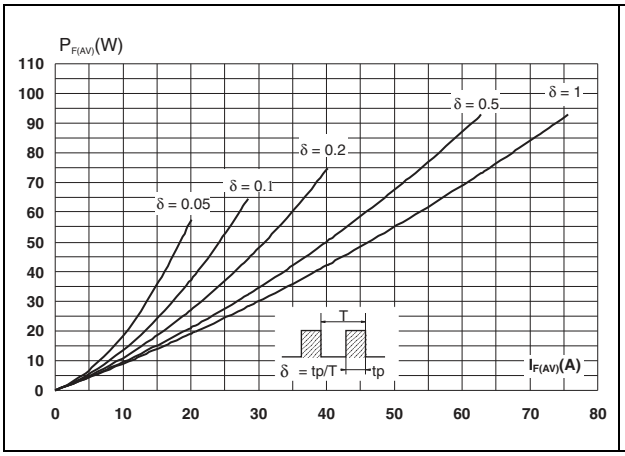


Figure 2. Forward voltage drop versus forward current

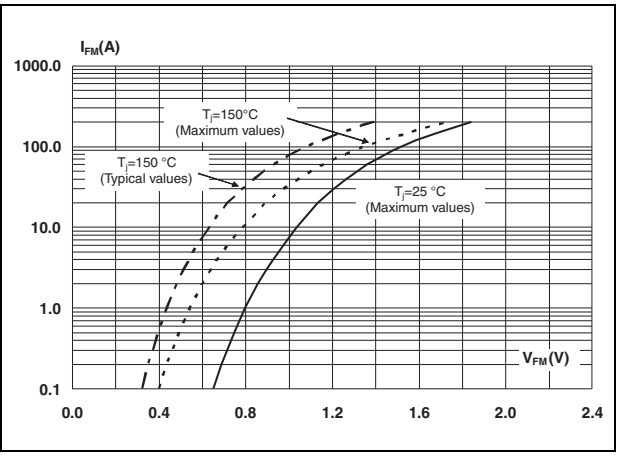


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

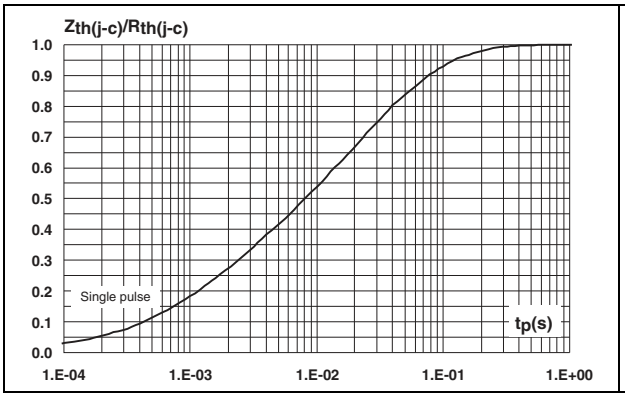


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

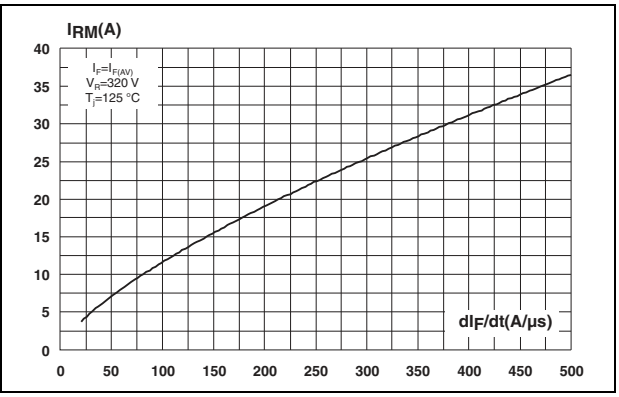


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

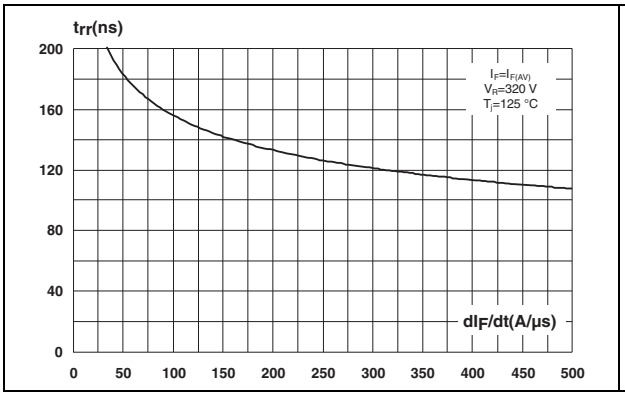


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

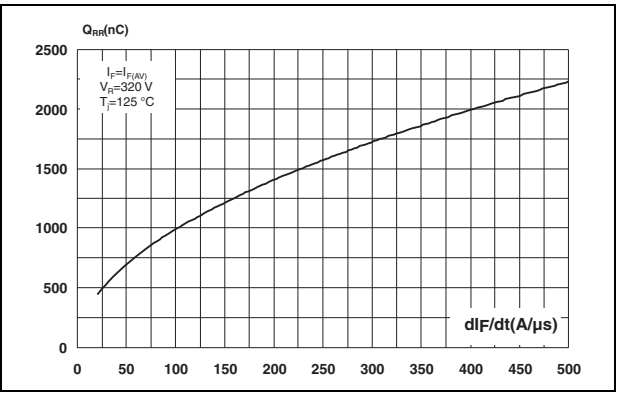


Figure 7. Reverse recovery softness factor versus dI_F/dt (typical values)

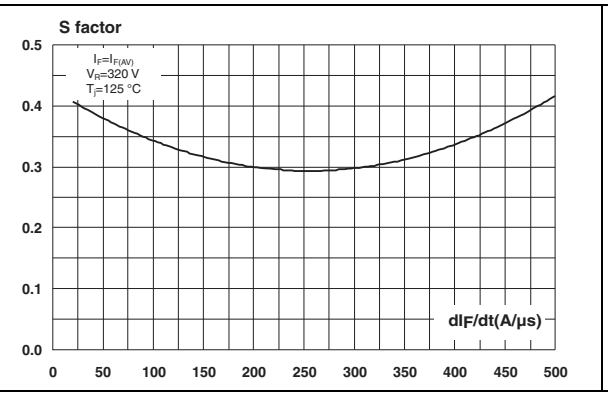


Figure 8. Relative variation of dynamic parameters versus junction temperature

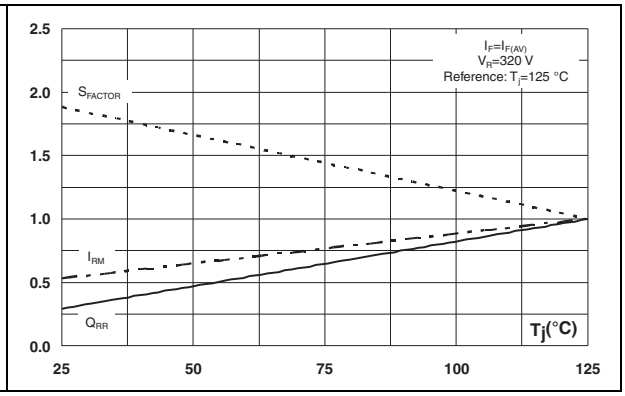


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

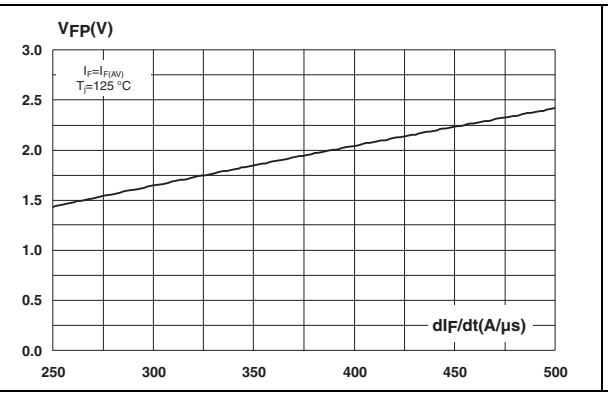


Figure 10. Forward recovery time versus dI_F/dt (typical values)

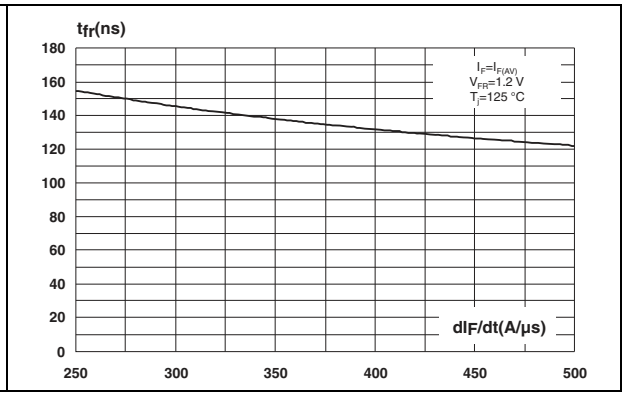
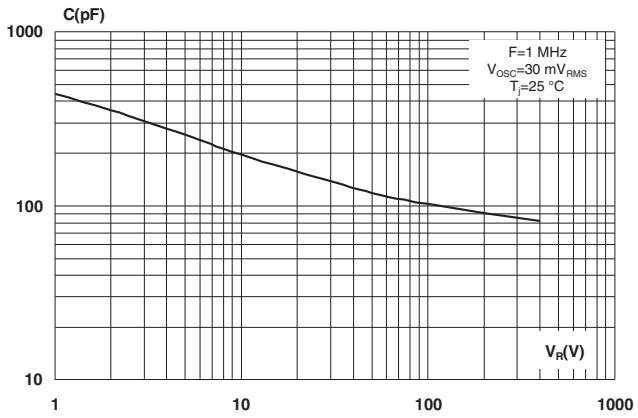


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

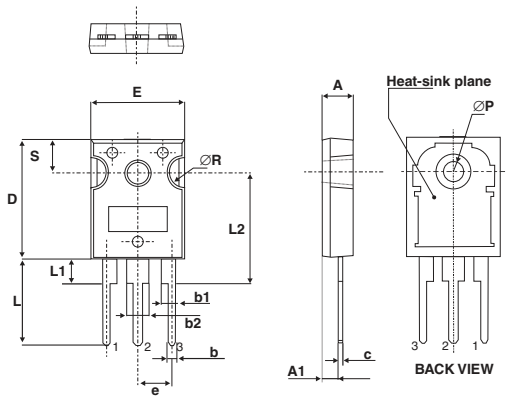


2 Package information

- 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.		
∅P(2)	3.55		3.65	0.139		0.143
∅R	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
STTH61W04SW	STTH61W04SW	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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