

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.

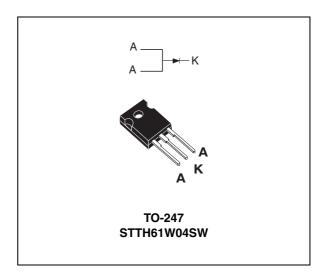


Table 1. Device summary

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

Characteristics STTH61W04S

1 Characteristics

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

Symbol	Paramete	Value	Unit		
V_{RRM}	Repetitive peak reverse voltage	400	V		
I _{F(RMS)}	Forward rms current	90	Α		
I _{F(AV)}	Average forward current, δ = 0.5	T _c = 110°C	Per diode	60	Α
I _{FSM}	Surge non repetitive forward current	petitive forward current $t_p = 10 \text{ ms sinusoidal}$			Α
T _{stg}	Storage temperature range	-65 to + 175	°C		
T _j	Maximum operating junction temperat	+ 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.	Тур.	Max.	Unit
I _B ⁽¹⁾	Reverse leakage current	T _j = 25 °C				20	μA
'R`	Theverse leakage current	T _j = 125 °C	$V_R = V_{RRM}$		20	200	μΛ
V _E ⁽²⁾	Forward voltage drop	T _j = 25 °C	= 25 °C			1.35	
v _F `′	Forward voltage drop	T _j = 150 °C	I _F = 60 A		0.93	1.15	

^{1.} Pulse test: tp = 5 ms, δ < 2%

To evaluate the conduction losses use the following equation:

$$P = 0.85 \text{ x I}_{F(AV)} + 0.005 \text{ I}_{F}^{2}_{(RMS)}$$

Table 5. Dynamic electrical characteristics

Symb ol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
I _{RM}	Reverse recovery current				19	26	Α
Q_{RR}	Reverse recovery charge	T _j = 125 °C	$I_F = 60 \text{ A}, V_R = 320 \text{ V}$ $dI_F/dt = -200 \text{ A/}\mu\text{s}$		1400		nC
S _{factor}	Softness factor		αι _Ε /αι – -200 Α/μδ		0.3		
t _{rr}	Reverse recovery time	T _j = 25 °C	$I_F = 1 A, V_R = 30 V$ $dI_F/dt = -100 A/\mu s$		40	55	ns
t _{fr}	Forward recovery time	T _j = 25 °C	, ,			250	ns
V _{FP}	Forward recovery voltage	T _j = 25 °C	V _{FR} = 1.2 V dI _F /dt = 400 A/μs		2	3	٧

^{2.} Pulse test: tp = 380 μ s, δ < 2%

STTH61W04S Characteristics

Figure 1. Average forward power dissipation Figure 2. Forward voltage drop versus versus average forward current forward current

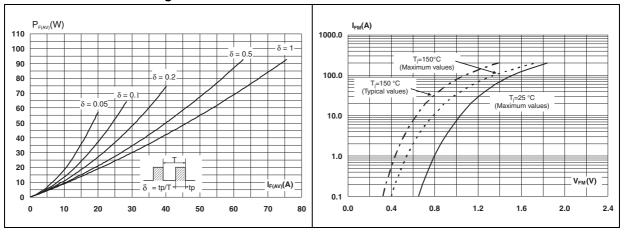


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

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

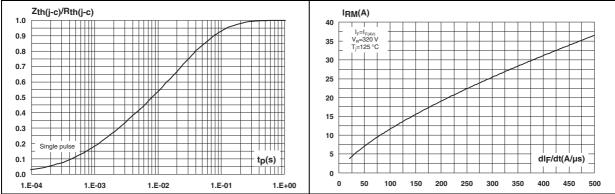
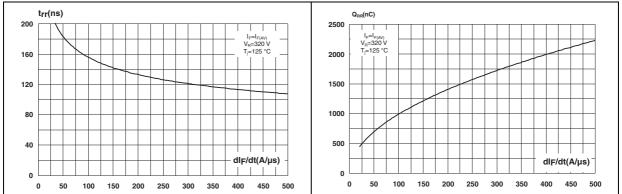


Figure 5. Reverse recovery time versus dl_F/dt Figure 6. Reverse recovery charges versus dl_F/dt (typical values)



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

Figure 8. Relative variation of dynamic parameters versus junction temperature

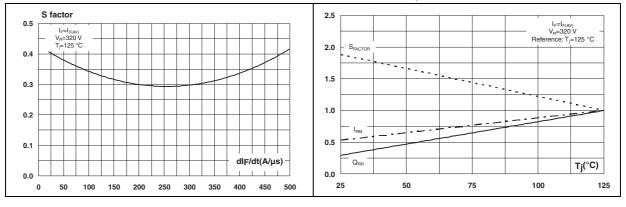


Figure 9. Transient peak forward voltage versus dl_F/dt (typical values)

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

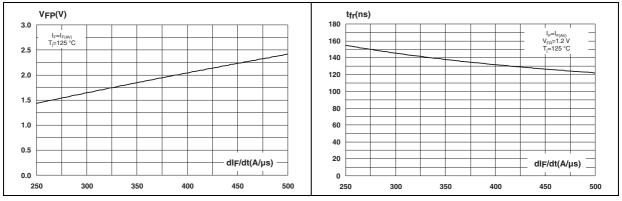
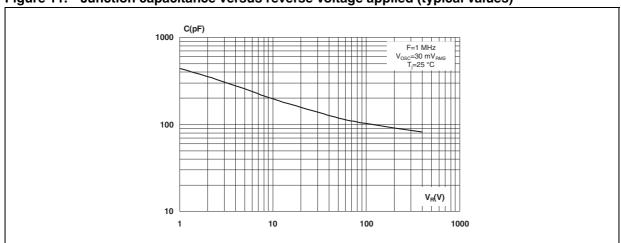


Figure 11. Junction capacitance versus reverse voltage applied (typical values)



2 Package information

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

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Table 6. TO-247 dimensions

					Dimer	nsions			
		Ref.	Mi	Millimeters			Inches		
			Min.	Тур.	Max.	Min.	Тур	Max.	
	Α	4.85		5.15	0.191		0.203		
į	A1	2.20		2.60	0.086		0.102		
		b	1.00		1.40	0.039		0.055	
E Heat-sink plane D L2	b1	2.00		2.40	0.078		0.094		
		b2	3.00		3.40	0.118		0.133	
	С	0.40		0.80	0.015		0.031		
	D ⁽¹⁾	19.85		20.15	0.781		0.793		
	Е	15.45		15.75	0.608		0.620		
L + + + b1 b2		е	5.30	5.45	5.60	0.209	0.215	0.220	
Ψ1 Ψ2 Ψβ b	A1 3 2 1 1 BACK VIEW	L	14.20		14.80	0.559		0.582	
! <u>←</u> e		L1	3.70		4.30	0.145		0.169	
		L2	1	8.50 ty	p.	0	.728 typ	ο.	
		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 \mbox{mm}

Ordering information STTH61W04S

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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