

Turbo 2 ultrafast high voltage rectifier

Main product characteristics

I _{F(AV)}	20 A
V _{RRM}	600 V
Tj	175° C
V _F (typ)	1.0 V
t _{rr} (max)	50 ns

Features and benefits

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses

Description

The STTH2006 uses ST Turbo 2 600 V technology and is especially suited for use in switching power supplies, and industrial applications, such as rectification and continuous mode PFC boost diode.



Order Codes

Part Number	Marking
STTH2006W	STTH2006W

Table 1. Absolute Ratings (limiting values)

Symbol	Parameter	Value	Unit	
V _{RRM}	Repetitive peak reverse voltage	600	V	
I _{F(RMS)}	RMS forward voltage	50	Α	
I _{F(AV)}	Average forward current	20	Α	
I _{FSM}	Surge non repetitive forward current	160	Α	
T _{stg}	Storage temperature range		-65 to + 175	° C
T _j	Maximum operating junction temperature		175	° C

Characteristics STTH2006

1 Characteristics

Table 2. Thermal resistance

Symbol	Parameter	Value (max).	Unit
R _{th(j-c)}	Junction to case	1.1	°C/W

Table 3. Static electrical characteristic

Symbol	Parameter	Test conditions		Min.	Тур	Max.	Unit
I _R ⁽¹⁾	Reverse leakage	T _j = 25° C	V - V			25	
^{IR} current	T _j = 150° C	$V_R = V_{RRM}$		80	800	μΑ	
V _E ⁽²⁾	Forward voltage drop	T _j = 25° C	I _E = 20 A			1.75	V
v _E `, r	i orward voltage drop	T _j = 150° C	1F - 20 A		1.00	1.35	V

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

To evaluate the conduction losses use the following equation:

 $P = 1.13 \times I_{F(AV)} + 0.011 I_{F^2(RMS)}$

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions			Тур	Max.	Unit
	Reverse recovery		$I_F = 0.5 \text{ A}$ $I_{rr} = 0.25 \text{ A}$ $I_R = 1 \text{ A}$			50	
t _{rr}	time	T _j = 25° C	$I_F=1~A~dI_F/dt=-50~A/\mu s$ $V_R=30~V$		50	70	ns
I _{RM}			$I_F = 30 \text{ A}$ $V_R = 400 \text{ V}$ $dI_F/dt = -100 \text{ A}/\mu\text{s}$		8	11	Α
t _{fr}	Forward recovery time	T _j = 25 °C	$I_F = 30 \text{ A}$ $dI_F/dt = 100 \text{ A/}\mu\text{s}$ $V_{FR} = 1.1 \text{ x } V_{Fmax}$			500	ns
V _{FP}	Forward recovery voltage	T _j = 25° C	$I_F = 30 \text{ A}$ $dI_F/dt = 100 \text{ A/}\mu\text{s}$ $V_{FR} = 1.1 \text{ x } V_{Fmax}$		2.5		V

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

STTH2006 Characteristics

Figure 1. Conduction losses versus average forward current

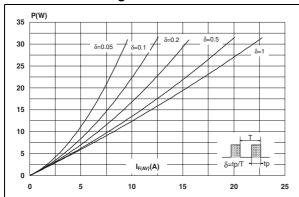


Figure 2. Forward voltage drop versus forward current

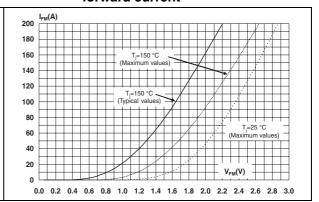
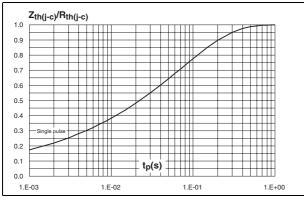


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

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



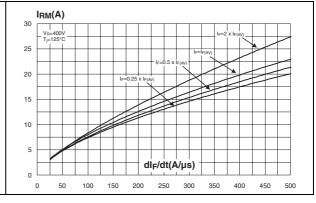


Figure 5. Reverse recovery time versus dl_F/dt (typical values)

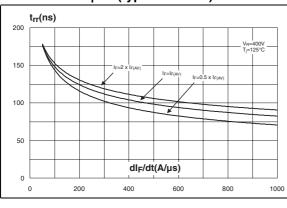
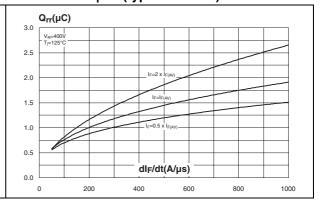


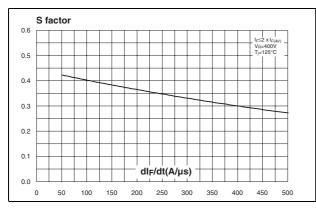
Figure 6. Reverse recovery charges versus dl_F/dt (typical values)



Characteristics STTH2006

Figure 7. Softness factor versus dI_F/dt (typical values)

Figure 8. Relative variations of dynamic parameters versus junction temperature



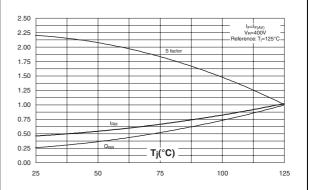
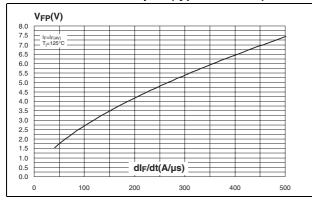


Figure 9. Transient peak forward voltage versus dl_F/dt (typical values)

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



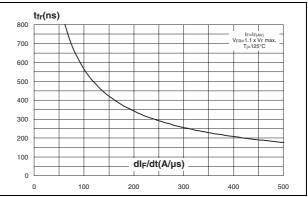
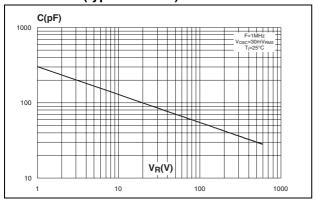


Figure 11. Junction capacitance versus reverse voltage applied (typical values)



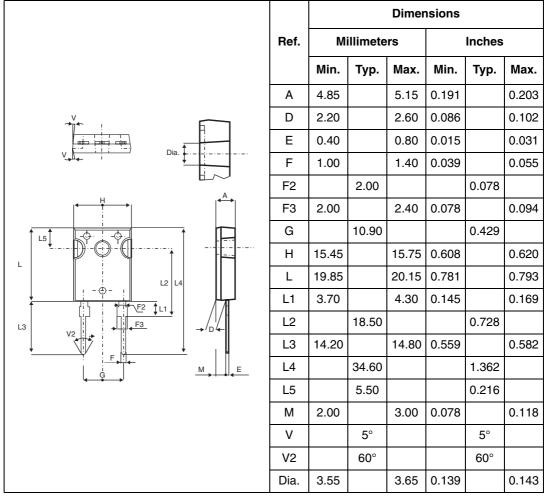
STTH2006 Package information

2 Package information

Epoxy meets UL94, V0

Cooling method: by conduction (C)
Recommended torque value: 0.55 Nm
Maximum torque value: 0.70 Nm

Table 5. DO-247 Package dimensions



In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

5/

Ordering information STTH2006

3 Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH2006W	STTH2006W	DO-247	4.40 g	30	Tube

4 Revision history

Date	Revision	Changes
13-Jul-2006	1	Initial release.

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