

## Turbo 2 ultrafast high voltage rectifier

### Main product characteristics

$I_{F(AV)}$	20 A
$V_{RRM}$	600 V
$T_j$	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 current	50	A
$I_{F(AV)}$	Average forward current	$T_c = 120^\circ\text{C} \quad \delta = 0.5$	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	A
$T_{stg}$	Storage temperature range	-65 to + 175	° C
$T_j$	Maximum operating junction temperature	175	° C

# 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.	Typ	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ C$	$V_R = V_{RRM}$		25	$\mu A$
		$T_j = 150^\circ C$		80	800	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25^\circ C$	$I_F = 20 A$		1.75	V
		$T_j = 150^\circ C$		1.00	1.35	

1. Pulse test:  $t_p = 5 ms, \delta < 2\%$
2. Pulse test:  $t_p = 380 \mu s, \delta < 2\%$

To evaluate the conduction losses use the following equation:

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

**Table 4. Dynamic characteristics**

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit	
$t_{rr}$	Reverse recovery time	$T_j = 25^\circ C$	$I_F = 0.5 A, I_{rr} = 0.25 A, I_R = 1 A$			50	ns
			$I_F = 1 A, di_F/dt = -50 A/\mu s, V_R = 30 V$		50	70	
$I_{RM}$	Reverse recovery current	$T_j = 125^\circ C$	$I_F = 30 A, V_R = 400 V, di_F/dt = -100 A/\mu s$		8	11	A
$t_{fr}$	Forward recovery time	$T_j = 25^\circ C$	$I_F = 30 A, di_F/dt = 100 A/\mu s, V_{FR} = 1.1 \times V_{Fmax}$			500	ns
$V_{FP}$	Forward recovery voltage	$T_j = 25^\circ C$	$I_F = 30 A, di_F/dt = 100 A/\mu s, V_{FR} = 1.1 \times V_{Fmax}$		2.5		V

Figure 1. Conduction losses versus average forward current

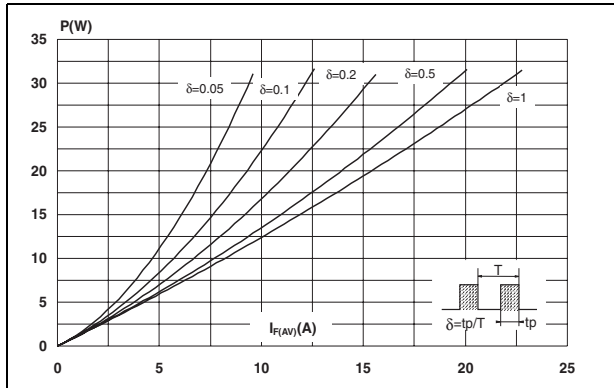


Figure 2. Forward voltage drop versus forward current

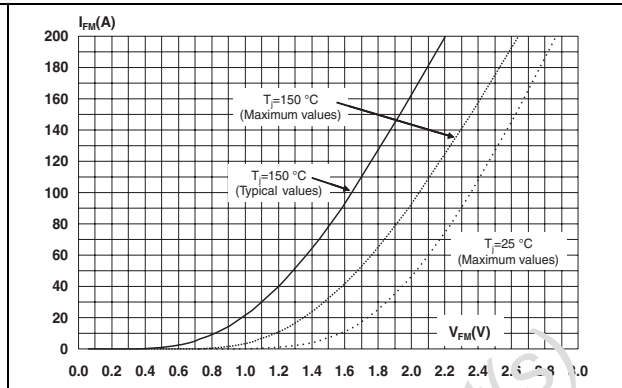


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

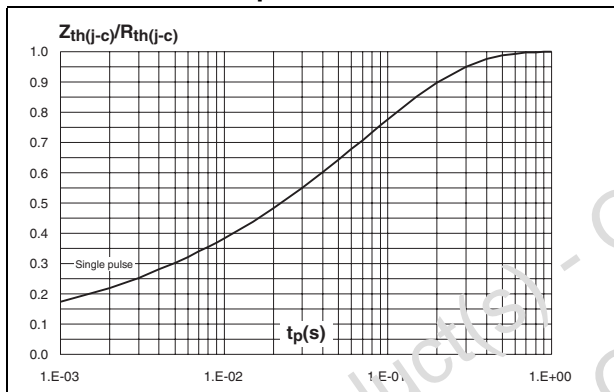


Figure 4. Peak reverse recovery current versus di\_F/dt (typical values)

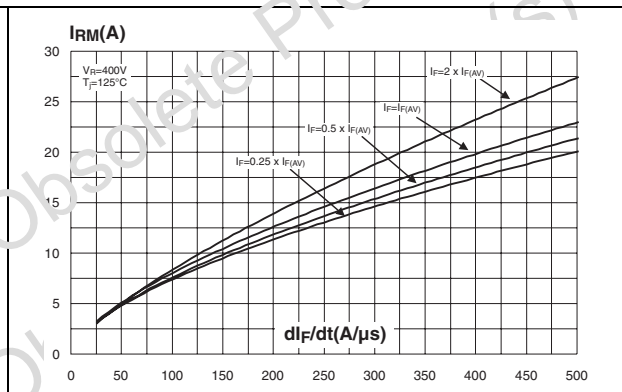


Figure 5. Reverse recovery time versus di\_F/dt (typical values)

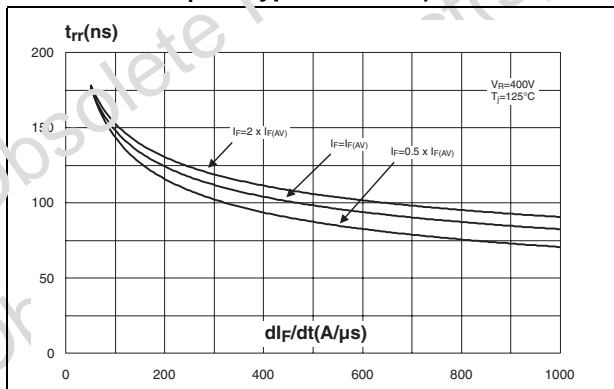
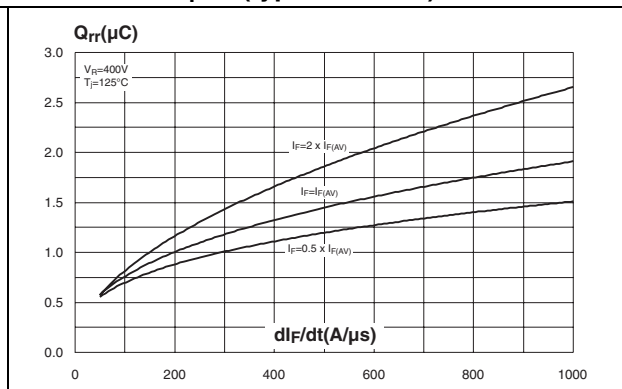
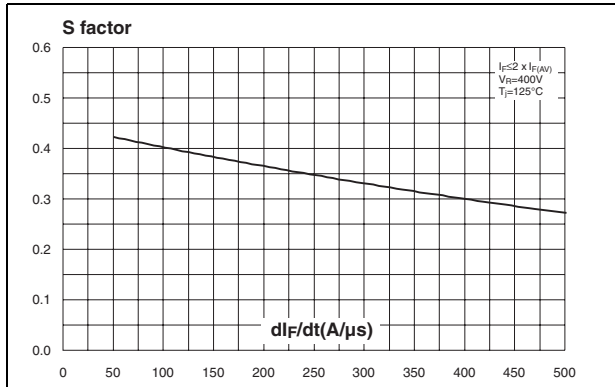


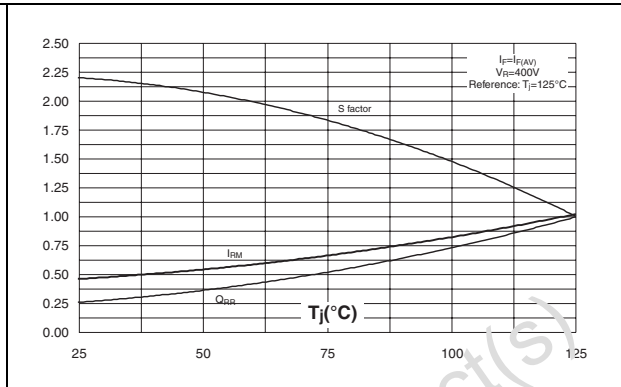
Figure 6. Reverse recovery charges versus di\_F/dt (typical values)



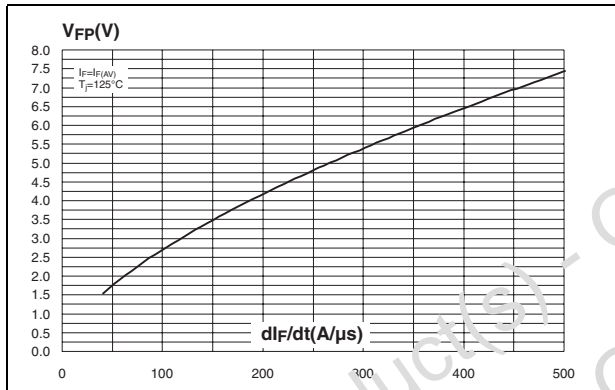
**Figure 7. Softness factor versus  $di_F/dt$  (typical values)**



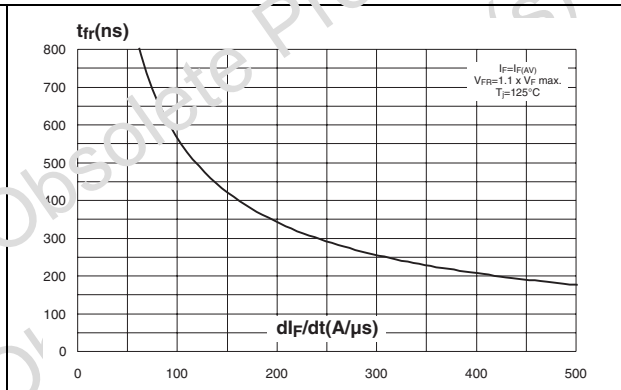
**Figure 8. Relative variations of dynamic parameters versus junction temperature**



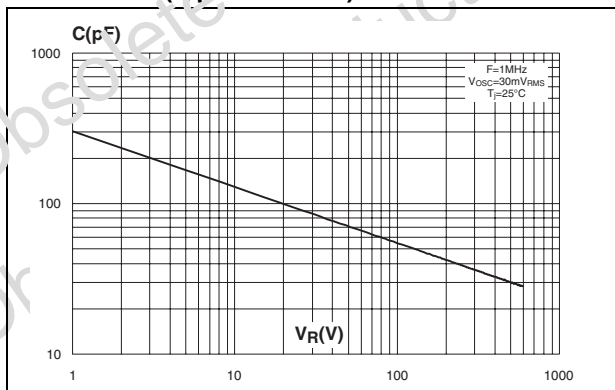
**Figure 9. Transient peak forward voltage versus  $di_F/dt$  (typical values)**



**Figure 10. Forward recovery time versus  $di_F/dt$  (typical values)**



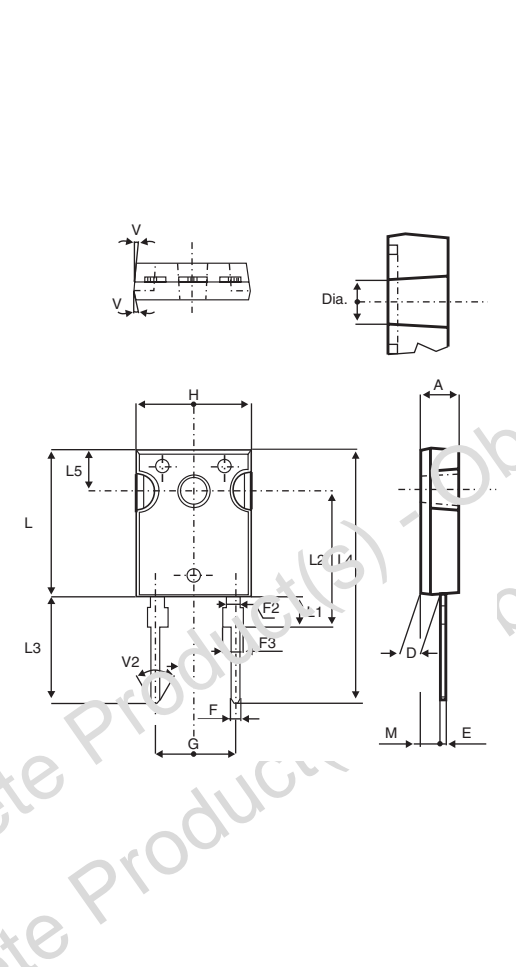
**Figure 11. Junction capacitance versus reverse voltage applied (typical values)**



## 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 Nm
- Maximum torque value: 0.70 Nm

Table 5. DO-247 Package dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F2		2.00			0.078	
F3		2.00	2.40		0.078	0.094
G		10.90			0.429	
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
L3	14.20		14.80	0.559		0.582
L4		34.60			1.362	
L5		5.50			0.216	
M	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143

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### 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.

Obsolete Product(s) - Obsolete Product(s)  
Obsolete Product(s) - Obsolete Product(s)

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