

## Turbo 2 ultrafast high voltage rectifier

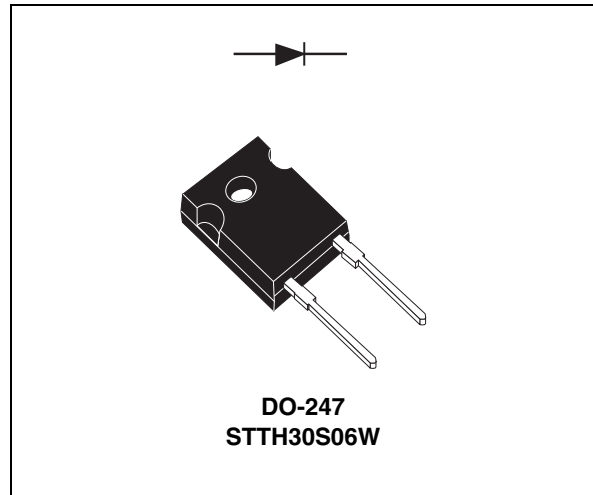
Datasheet – production data

### Features

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

### Description

The STTH30S06, which uses ST turbo 2, 600 V technology, is especially suited for use in switching power supplies and industrial applications, as rectification and continuous mode PCF boost diode.



**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	30 A
$V_{RRM}$	600 V
$t_{rr} (max)$	50 ns
$T_j$	-40 to +175 °C
$V_F (typ)$	1.75 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	600	V
$I_{F(RMS)}$	Forward rms current	64	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	$T_c = 65\text{ °C}$	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	-40 to + 175	°C

**Table 3. Thermal resistance**

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	1.25	°C / W

**Table 4. Static electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	$V_R = V_{RRM}$		50 500	$\mu\text{A}$
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	$I_F = 30\text{ A}$		3.6 2.2	V

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

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

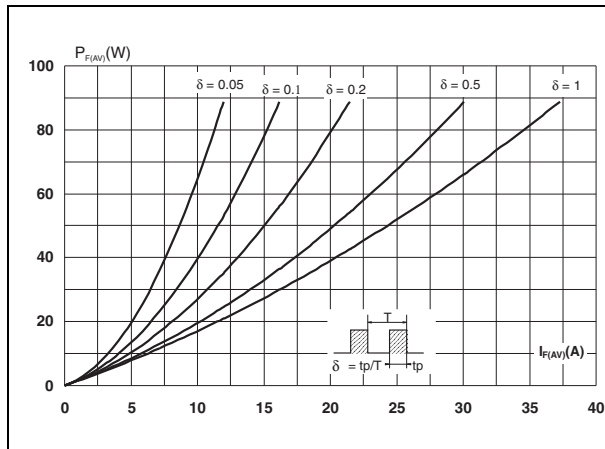
To evaluate the conduction losses use the following equation:

$$P = 1.45 \times I_{F(AV)} + 0.025 I_F^2 (RMS)$$

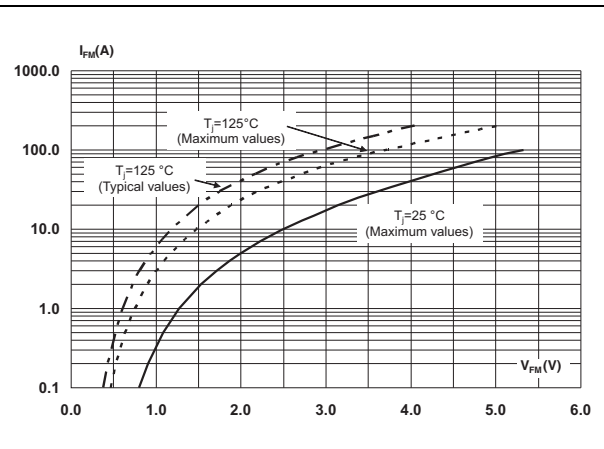
**Table 5. Dynamic electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit
$I_{RM}$	Reverse recovery current	$T_j = 125\text{ °C}$	$I_F = 30\text{ A}$ , $V_R = 400\text{ V}$	4	5.5	A
$S_{factor}$	Softness factor	$dI_F/dt = -100\text{ A}/\mu\text{s}$		0.35		
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ °C}$	$I_F = 1\text{ A}$ , $V_R = 30\text{ V}$ $dI_F/dt = -50\text{ A}/\mu\text{s}$		50	ns
$t_{fr}$	Forward recovery time		$I_F = 0.5\text{ A}$ , $I_{rr} = 0.25\text{ A}$ , $I_R = 1\text{ A}$		30	
$V_{FP}$	Forward recovery voltage		$I_F = 30\text{ A}$ , $V_{FR} = 2.6\text{ V}$ $dI_F/dt = 300\text{ A}/\mu\text{s}$	3.7	100	V

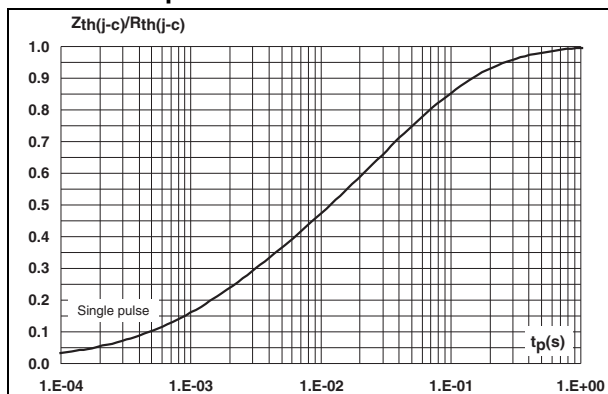
**Figure 1. Average forward power dissipation versus average forward current**



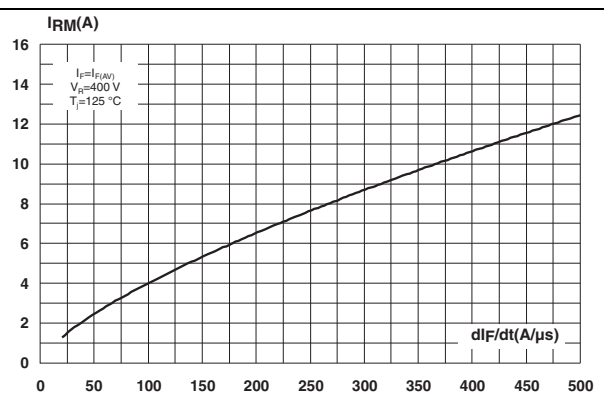
**Figure 2. Forward voltage drop versus forward current**



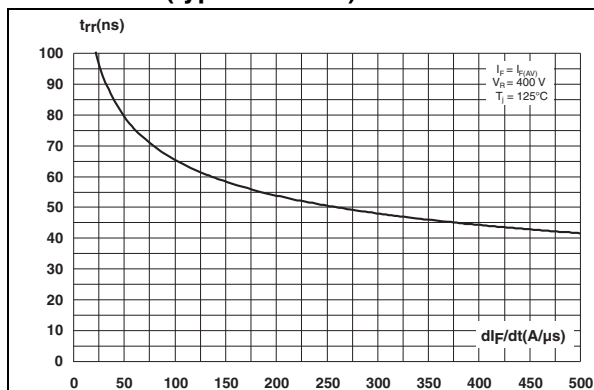
**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**



**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)**

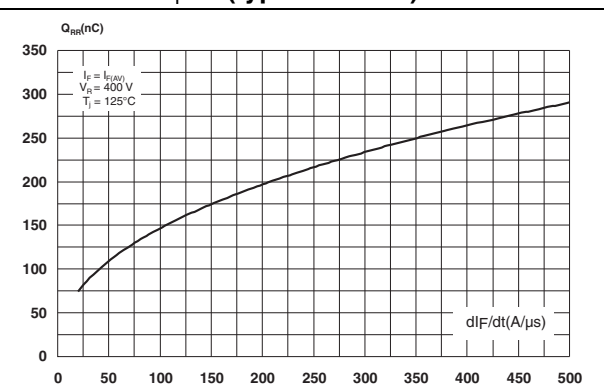


Figure 7. Reverse recovery softness factor versus  $dl_F/dt$  (typical values)

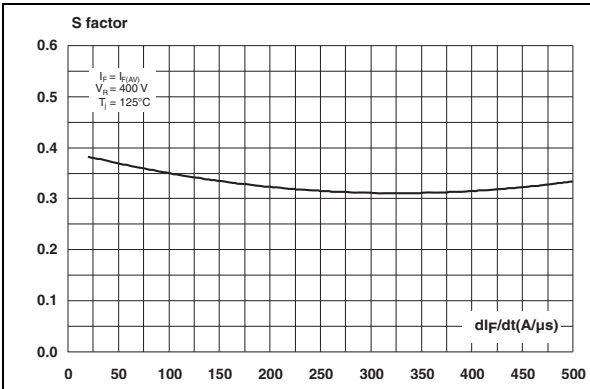


Figure 8. Relative variation of dynamic parameters versus junction temperature

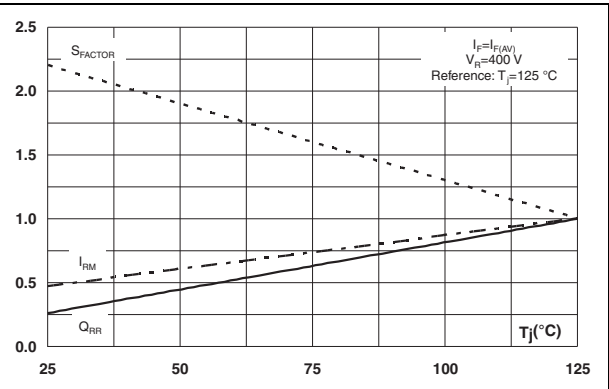


Figure 9. Transient peak forward voltage versus  $dl_F/dt$  (typical values)

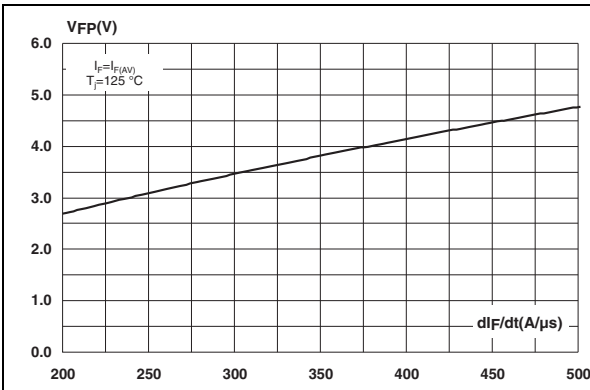


Figure 10. Forward recovery time versus  $dl_F/dt$  (typical values)

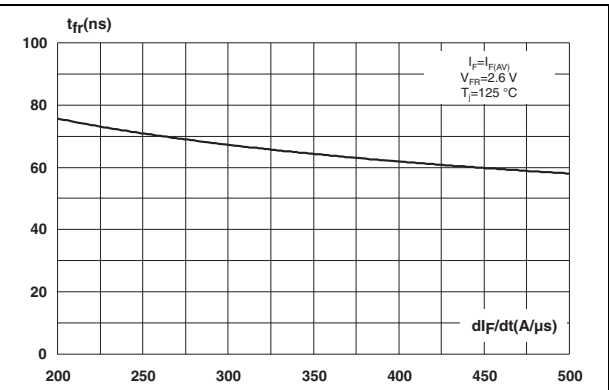
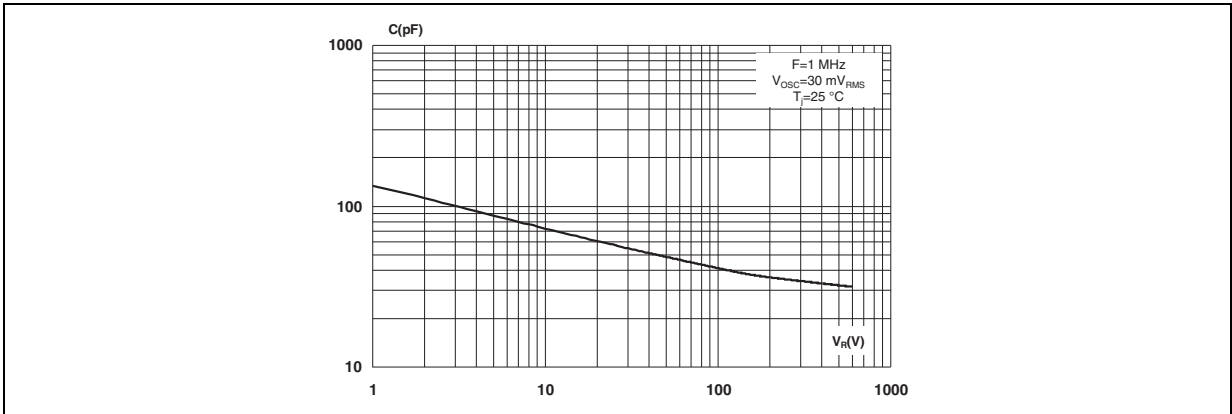


Figure 11. Junction capacitance versus reverse voltage applied (typical values)



## 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. DO-247 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

### 3 Ordering information

Table 7. Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH30S06W	STTH30S06W	DO-247	4.40 g	30	Tube

### 4 Revision history

Table 8. Document revision history

Date	Revision	Changes
17-Jan-2013	1	First issue.

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