

## Turbo 2 ultrafast high voltage rectifier

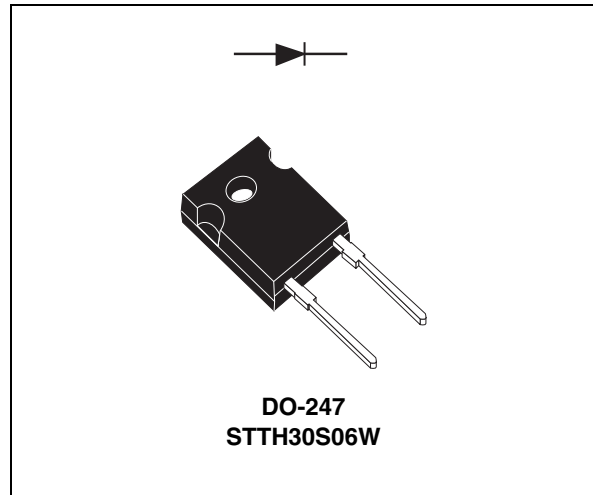
Datasheet – production data

### Features

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses
- ECOPACK<sup>®</sup>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	$T_j = 25\text{ °C}$			50	$\mu\text{A}$
		$T_j = 125\text{ °C}$			500	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 30\text{ A}$		3.6	V
		$T_j = 125\text{ °C}$			2.2	

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:

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

**Table 5. Dynamic electrical characteristics**

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

Figure 1. Average forward power dissipation versus average forward current

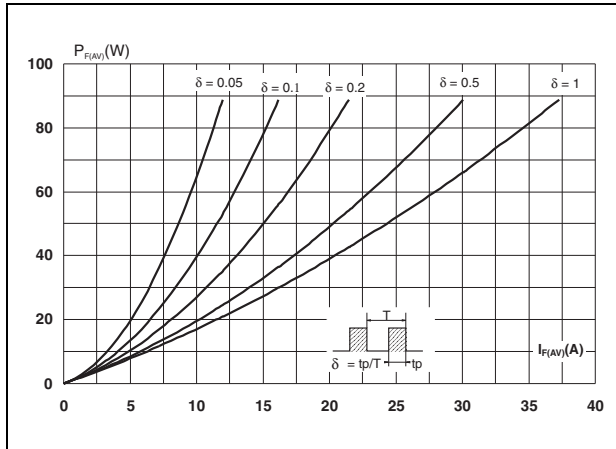


Figure 2. Forward voltage drop versus forward current

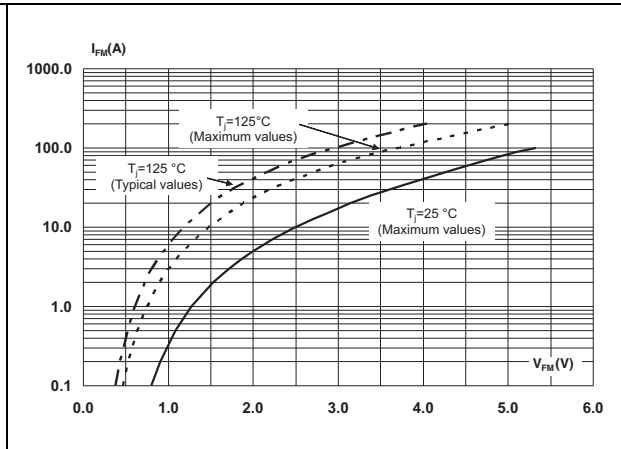


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

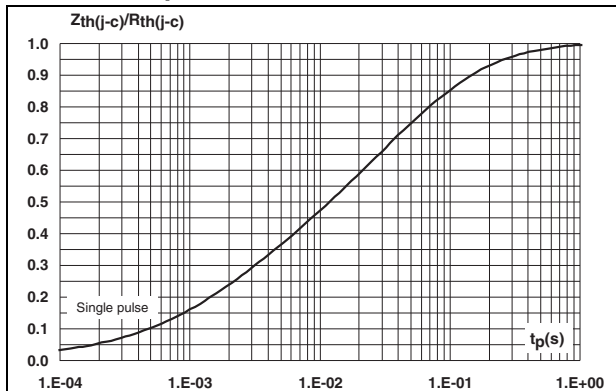


Figure 4. Peak reverse recovery current versus  $di_F/dt$  (typical values)

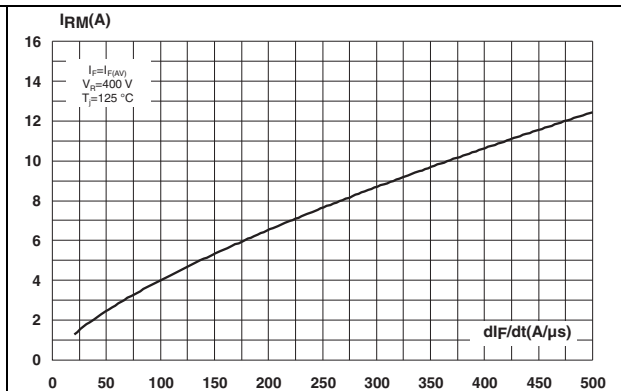


Figure 5. Reverse recovery time versus  $di_F/dt$  (typical values)

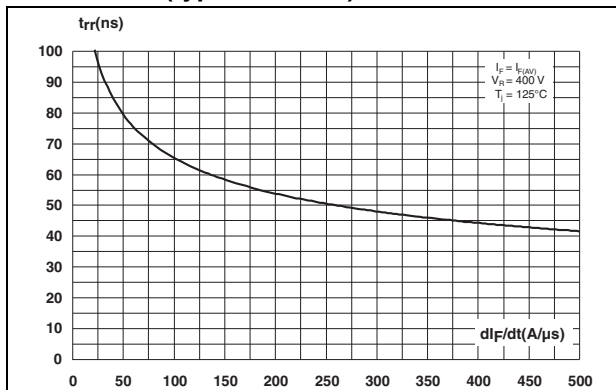


Figure 6. Reverse recovery charges versus  $di_F/dt$  (typical values)

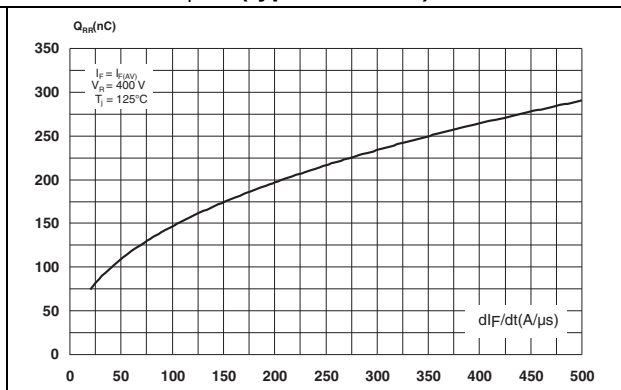


Figure 7. Reverse recovery softness factor versus  $di_F/dt$  (typical values)

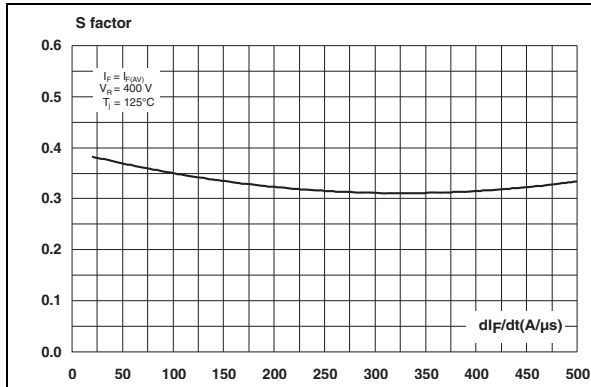


Figure 8. Relative variation of dynamic parameters versus junction temperature

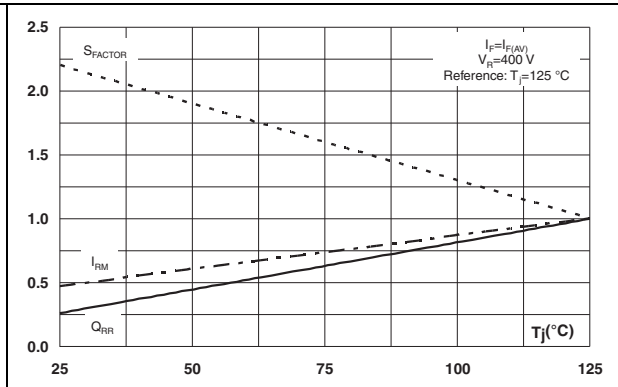


Figure 9. Transient peak forward voltage versus  $di_F/dt$  (typical values)

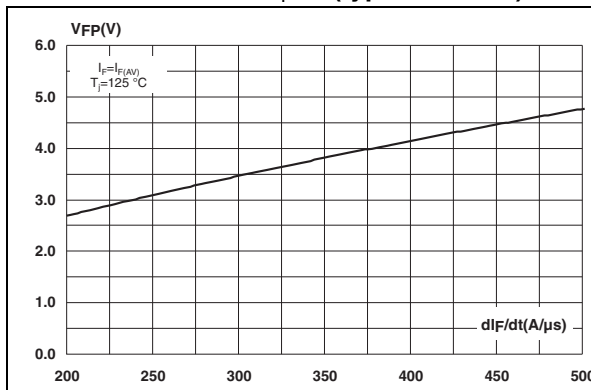


Figure 10. Forward recovery time versus  $di_F/dt$  (typical values)

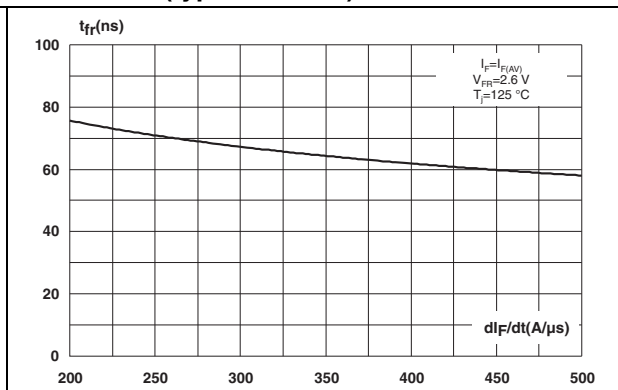
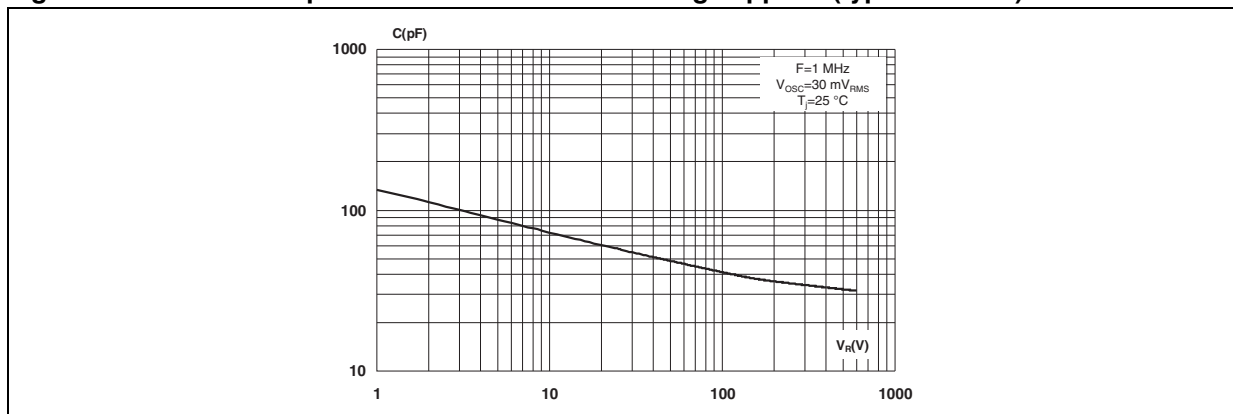


Figure 11. Junction capacitance versus reverse voltage applied (typical values)



## 2 Package information

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

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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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