

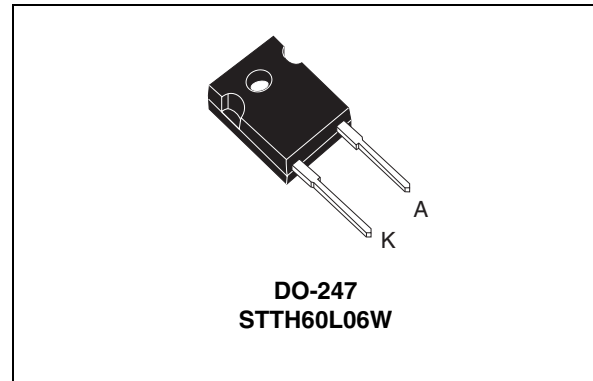
## Turbo 2 ultrafast high voltage rectifier

### Features and benefits

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

### Description

The STTH60L06, which is using ST Turbo 2 600 V technology, is specially suited for use in switching power supplies, and industrial applications, as rectification and discontinuous mode PFC boost diode. Thanks to its low  $V_F$  characteristics, this device exhibits high performances in free-wheeling applications.



**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	60 A
$V_{RRM}$	600 V
$T_j$ (max)	175 °C
$V_F$ (typ)	0.95 V
$t_{rr}$ (max)	70 ns

# 1 Characteristics

**Table 2. Absolute ratings (limiting values)**

Symbol	Parameter	Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	Forward rms current	90	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	$T_c = 110\text{ }^\circ\text{C}$	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	A
$T_{stg}$	Storage temperature range	-65 to + 175	$^\circ\text{C}$
$T_j$	Maximum operating junction temperature	175	$^\circ\text{C}$

**Table 3. Thermal parameter**

Symbol	Parameter	Value (max)	Unit
$R_{th(j-c)}$	Junction to case	0.75	$^\circ\text{C/W}$

**Table 4. Static electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ }^\circ\text{C}$			50	$\mu\text{A}$
		$T_j = 150\text{ }^\circ\text{C}$				
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 60\text{ A}$		1.55	V
		$T_j = 150\text{ }^\circ\text{C}$				

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 maximum conduction losses use the following equation:

$$P = 0.93 \times I_{F(AV)} + 0.0045 I_{F(RMS)}^2$$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ °C}$	$I_F = 0.5\text{ A}$ , $I_{rr} = 0.25\text{ A}$ $I_R = 1\text{ A}$			70	ns
			$I_F = 1\text{ A}$ , $di_F/dt = 50\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$		75	105	
$I_{RM}$	Reverse recovery current	$T_j = 125\text{ °C}$	$I_F = 60\text{ A}$ , $V_R = 400\text{ V}$ $di_F/dt = 100\text{ A}/\mu\text{s}$		14	19	A
$t_{fr}$	Forward recovery time	$T_j = 25\text{ °C}$	$I_F = 60\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			500	ns
$V_{FP}$	Forward recovery voltage	$T_j = 25\text{ °C}$	$I_F = 60\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$		3		V

Figure 1. Conduction losses versus average forward current

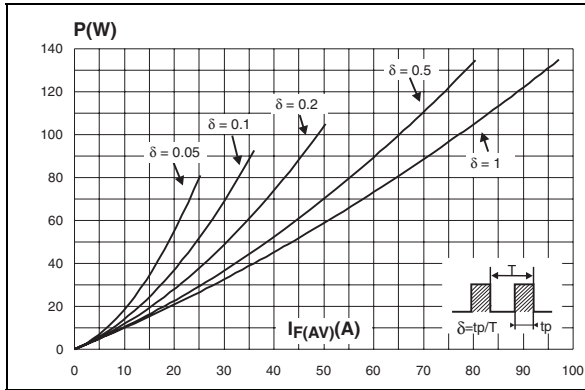


Figure 2. Forward voltage drop versus forward current

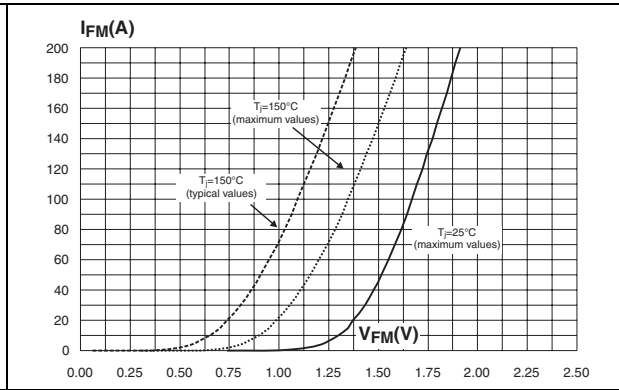


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

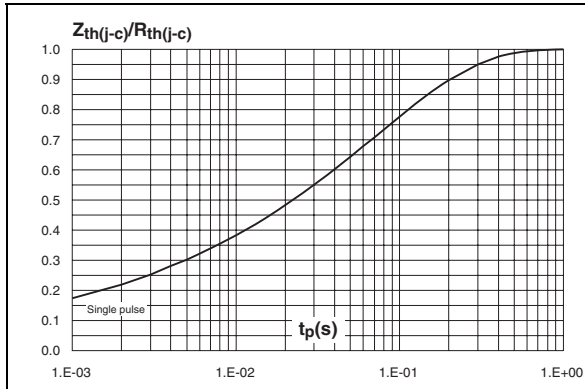


Figure 4. Peak reverse recovery current versus  $di_F/dt$  (typical values)

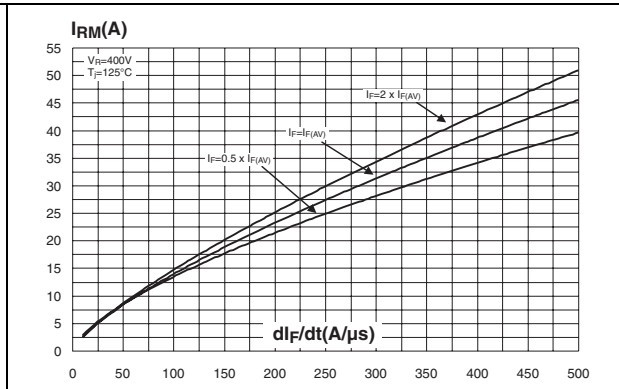


Figure 5. Reverse recovery time versus  $di_F/dt$  (typical values)

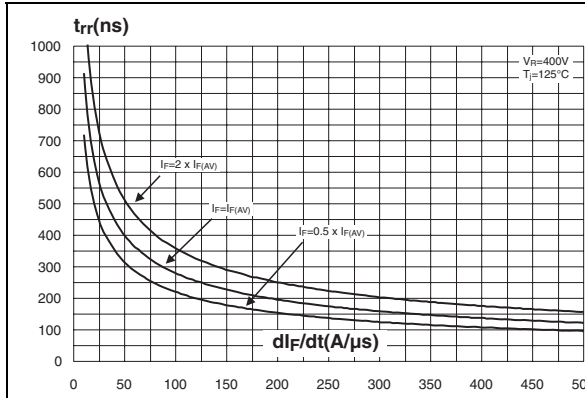
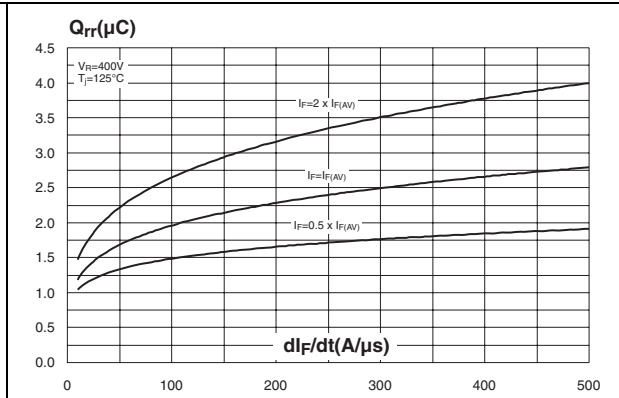
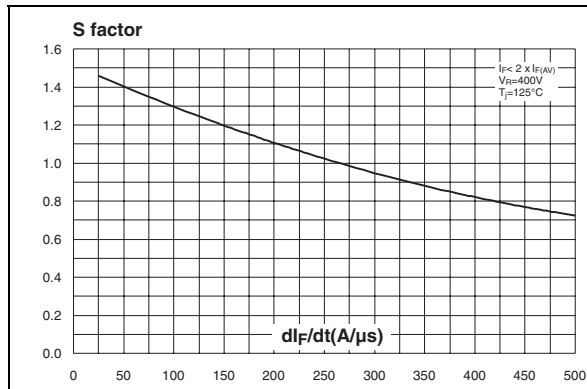


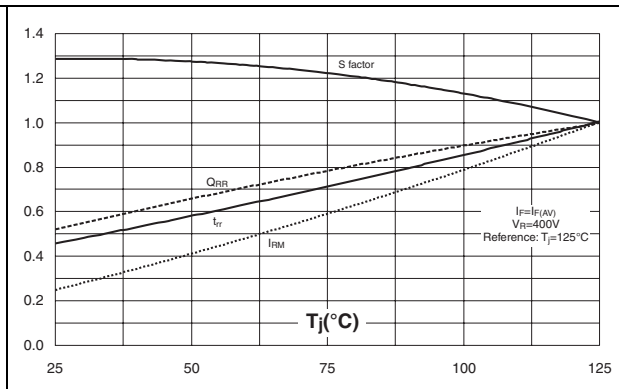
Figure 6. Reverse recovery charges versus  $di_F/dt$  (typical values)



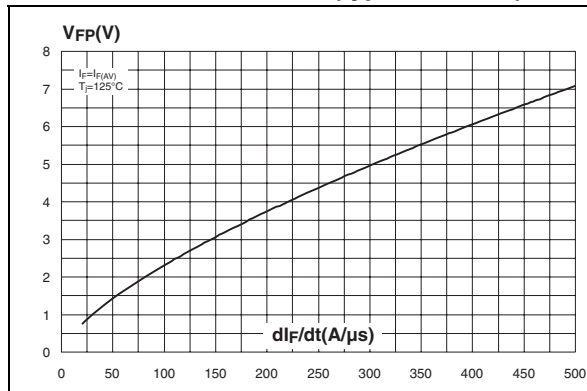
**Figure 7. Reverse recovery softness factor versus  $di_F/dt$  (typical values)**



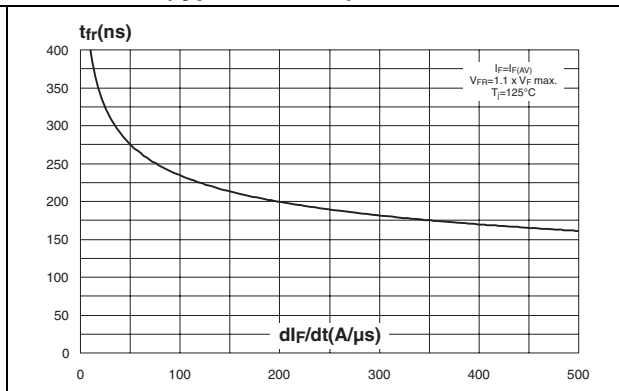
**Figure 8. Relative variations of dynamic parameters versus junction temperature**



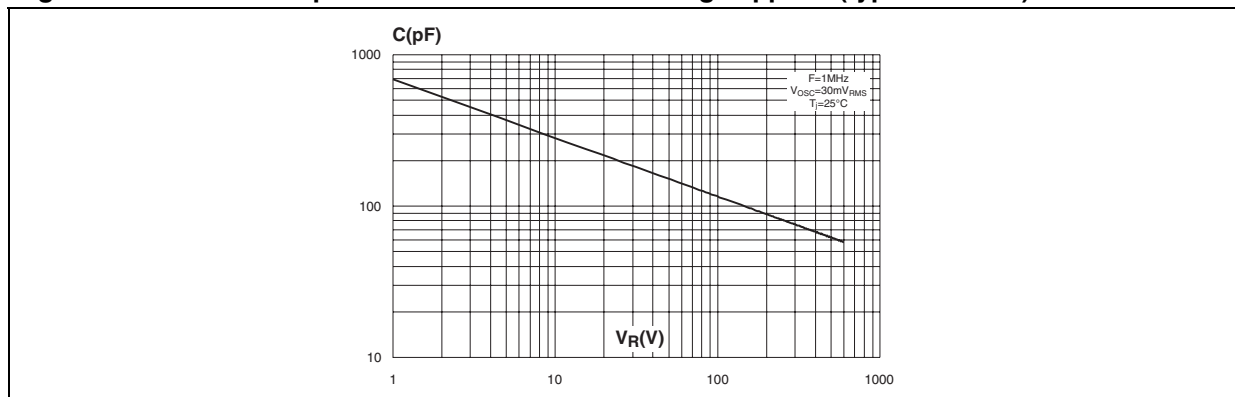
**Figure 9. Transient peak forward voltage versus  $di_F/dt$  (typical values)**



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



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



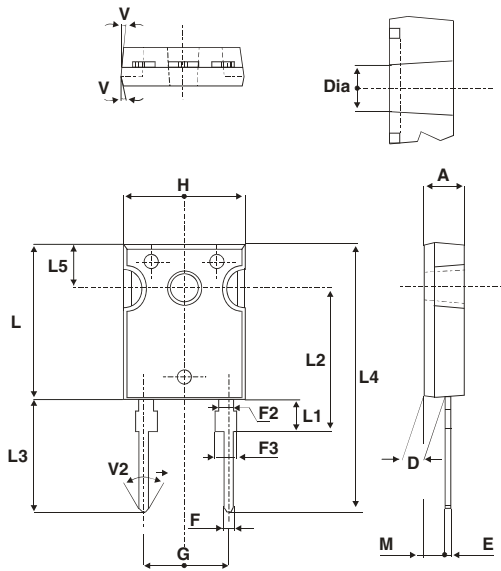
## 2 Package information

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

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

**Table 6. DO247 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**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH60L06W	STTH60L06W	DO-247	4.40 g	30	Tube

### 4 Revision history

**Table 8. Document revision history**

Date	Revision	Changes
07-Sep-2004	1	First issue
10-Sep-2004	2	Junction to case value ( <a href="#">Thermal parameter on page 2</a> ) changed from 0.70 °C/W to 0.75 °C/W
07-Sep-2011	3	Updated I <sub>FSM</sub> from 400 A to 600 A.

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