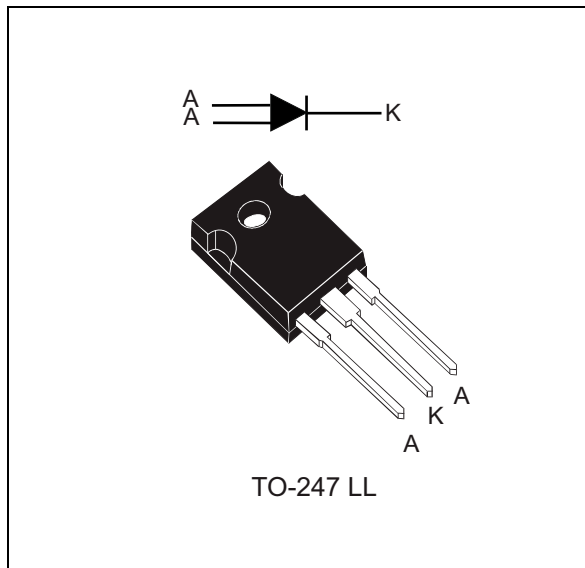


## Turbo 2 ultrasoft high voltage rectifier

Datasheet – production data



### Description

The STTH31AC06S uses a new technology which allows a very high softness during the application. It is well-suited as boost diode, especially for use in air conditioning equipment as continuous mode interleaved power factor correction.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	30 A
$V_{RRM}$	600 V
$t_{rr}$ (typ)	45 ns
$V_F$ (typ)	1.35 V
$T_j$ (max)	175 °C

### Features

- Ultrafast switching
- Low reverse recovery current
- High thermal resistance
- Reduces switching losses

# 1 Characteristics

**Table 2. Absolute ratings (limiting values per diode at 25 °C, unless otherwise specified)**

Symbol	Parameter	Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage	600	V
$I_{F(AV)}$	Average forward current	$t_C = 90\text{ °C}$	A
$I_{F(RMS)}$	Forward rms current	45	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	A
$T_{stg}$	Storage temperature range	-40 to +175	°C
$T_j$	Maximum operating junction temperature	175	°C

**Table 3. Thermal parameters**

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	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$		10	$\mu\text{A}$	
		$T_j = 150\text{ °C}$		20	200		
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 30\text{ A}$		1.55	2.0	V
		$T_j = 150\text{ °C}$		1.35	1.75		

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:

$$P = 1.24 \times I_{F(AV)} + 0.017 I_{F(RMS)}^2$$

Table 5. Dynamic characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 1\text{ A}, V_R = 30\text{ V}, dI_F/dt = -100\text{ A}/\mu\text{s}$		45	65	ns
$I_{RM}$	Reverse recovery current	$T_j = 150\text{ }^\circ\text{C}$	$I_F = 30\text{ A}, V_R = 400\text{ V}, dI_F/dt = -1000\text{ A}/\mu\text{s}$		36		A
$Q_{RR}$	Reverse recovery charge				2.5		$\mu\text{C}$
$S_{factor}$	Softness factor				2.2		
$t_{fr}$	Forward recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 30\text{ A}, V_{FR} = 2.5\text{ V}, dI_F/dt = +500\text{ A}/\mu\text{s}$			150	ns
$V_{FP}$	Forward recovery voltage				5.5		V

Figure 1. Average forward power dissipation versus average forward current

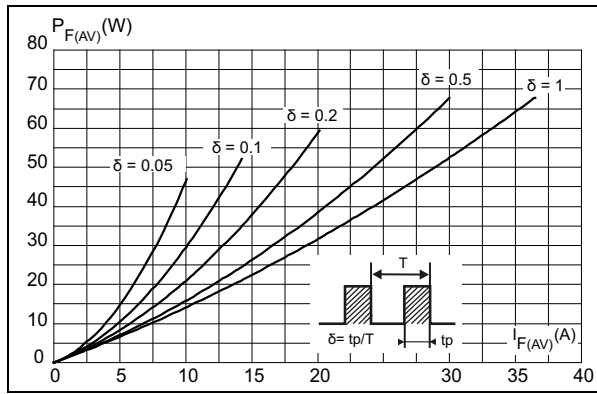


Figure 2. Forward voltage drop versus forward current (typical values)

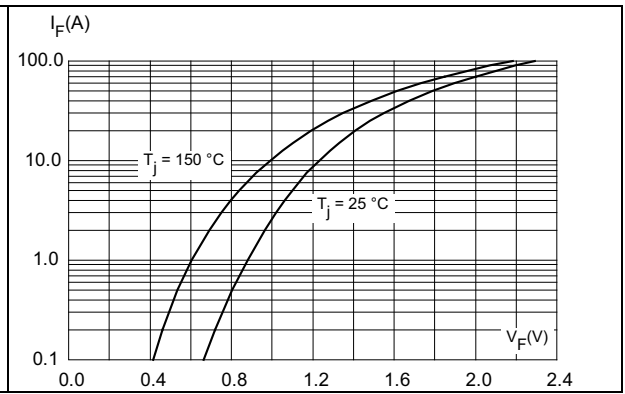


Figure 3. Forward voltage drop versus forward current (maximum values)

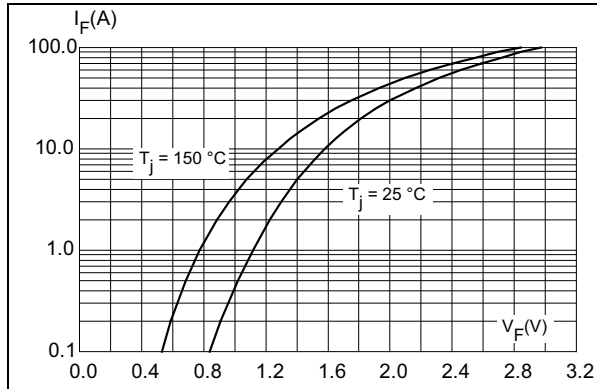


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

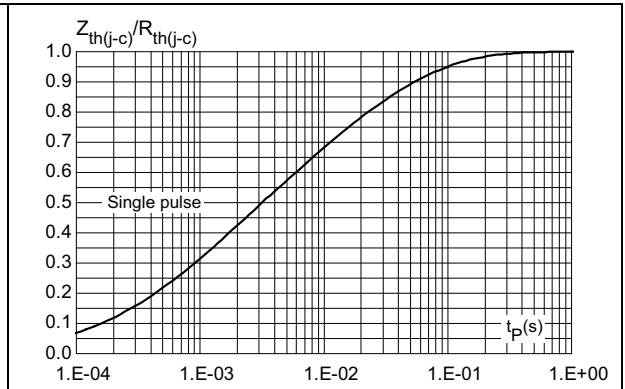
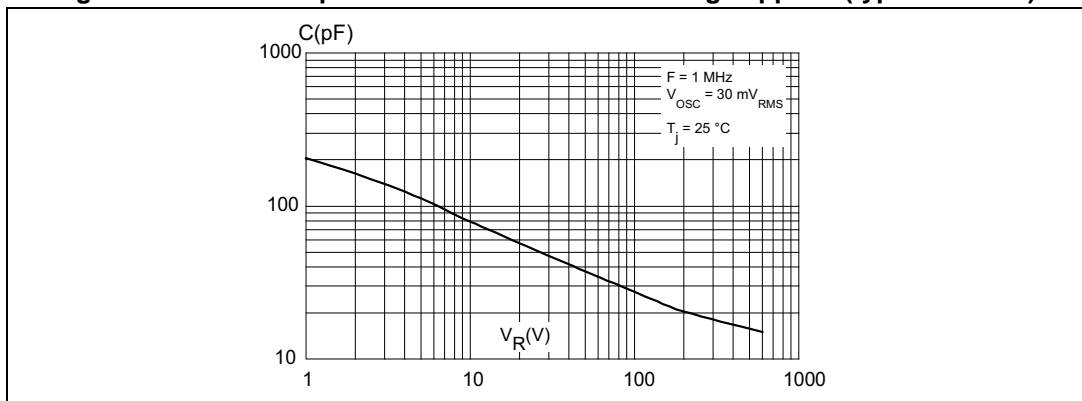


Figure 5. Junction capacitance versus reverse voltage applied (typical values)



## 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque: 0.4 to 0.6 N·m
- Maximum torque value (T0-247 LL): 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.

Figure 6. TO-247 LL dimension definitions

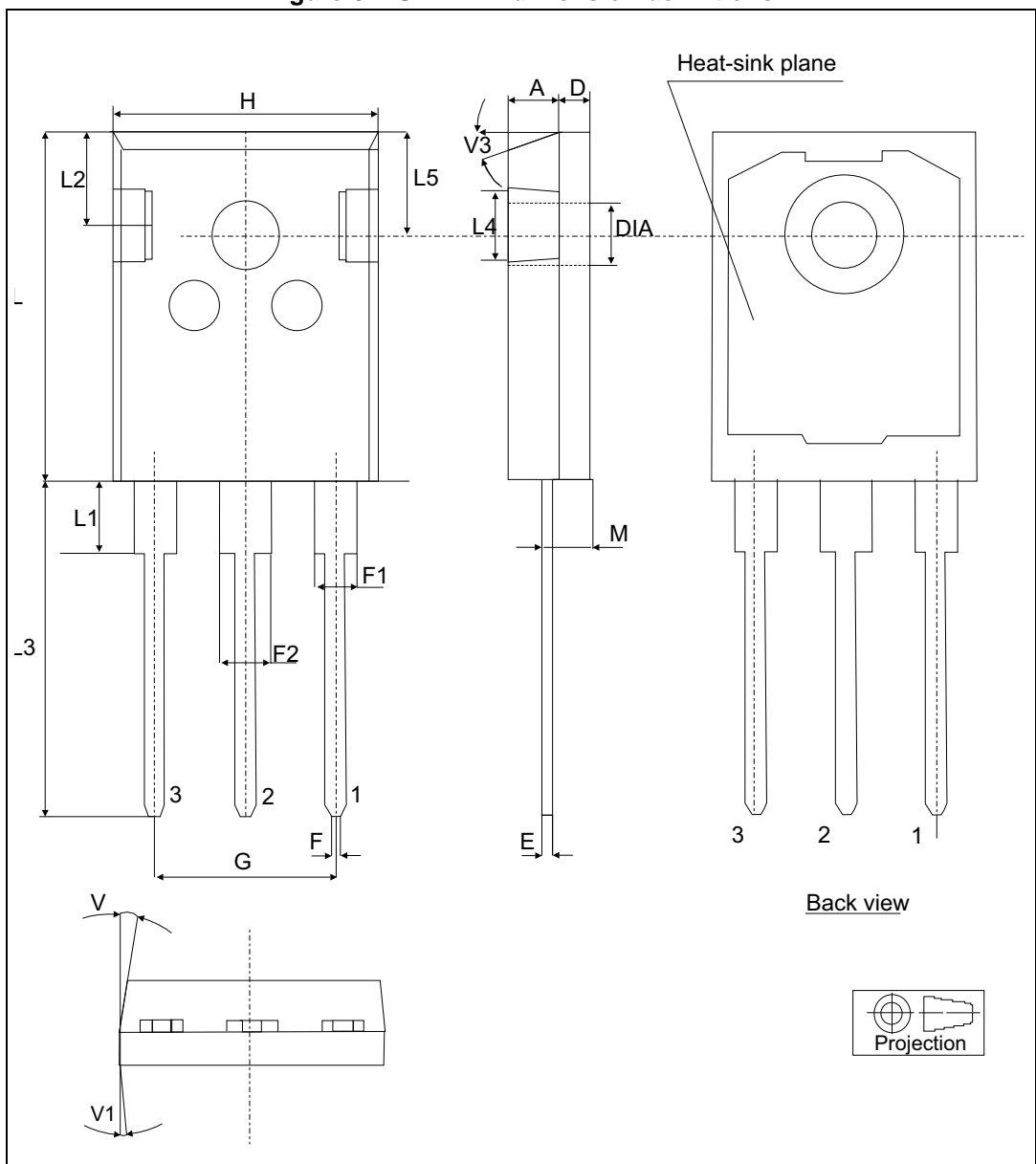


Table 6. TO-247 LL dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ	Max.
A	4.90		5.15	0.192		0.202
D	1.85		2.10	0.072		0.082
E	0.55		0.67	0.021		0.026
F	1.07		1.32	0.042		0.051
F1	1.90		2.38	0.074		0.093
F2	2.87		3.38	0.11		0.133
G	10.90 BSC			0.429 BSC		
H	15.77		16.02	0.62		0.63
L	20.82		21.07	0.81		0.82
L1	4.16		4.47	0.163		0.175
L2	5.49		5.74	0.216		0.225
L3	20.05		20.30	0.789		0.799
L4	3.68		3.93	0.144		0.154
L5	6.04		6.29	0.237		0.247
M	2.25		2.55	0.088		0.10
V		10°			10°	
V1		3°			3°	
V3		20°			20°	
∅	3.55		3.66	0.139		0.143

### 3 Ordering information

**Table 7. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH31AC06SWL	STTH31AC06SWL	TO-247 LL	4.36	30	Tube

### 4 Revision history

**Table 8. Document revision history**

Date	Revision	Changes
13-Oct-2014	1	First release.

**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2014 STMicroelectronics – All rights reserved