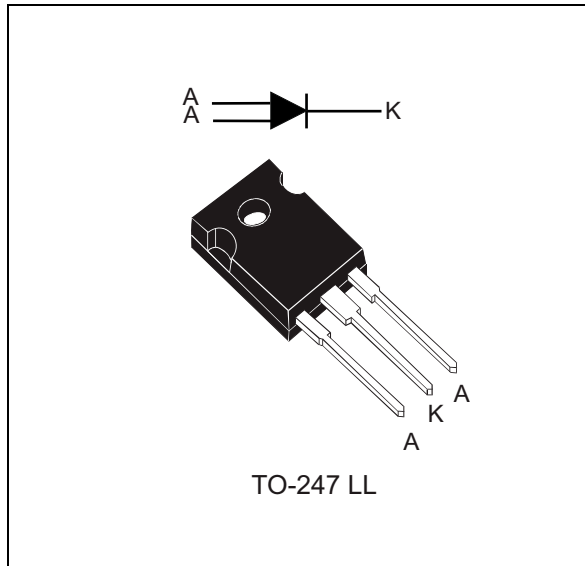


Turbo 2 ultrasoft high voltage rectifier

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	μA	
		$T_j = 150\text{ °C}$			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		μC
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

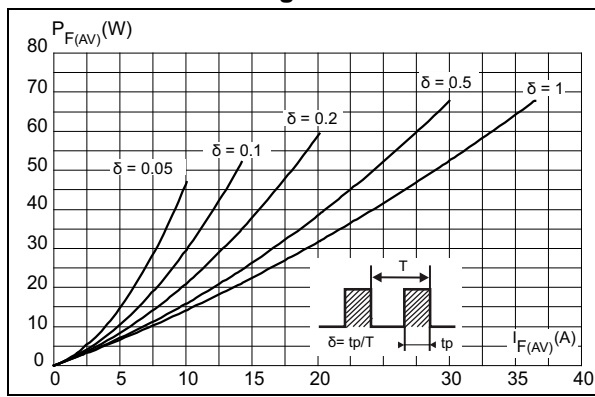


Figure 2. Forward voltage drop versus forward current (typical values)

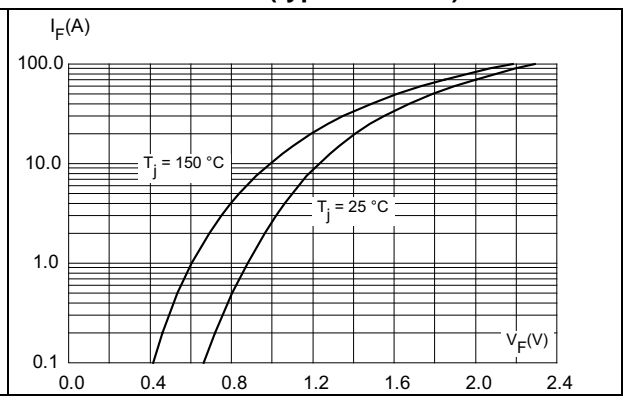


Figure 3. Forward voltage drop versus forward current (maximum values)

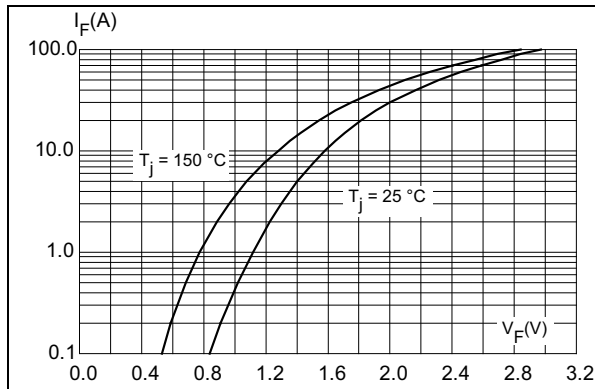


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

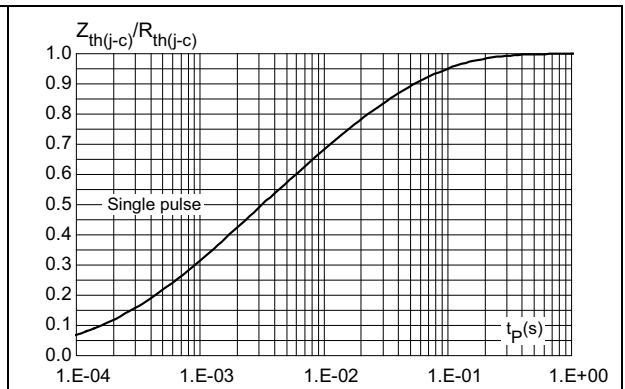


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

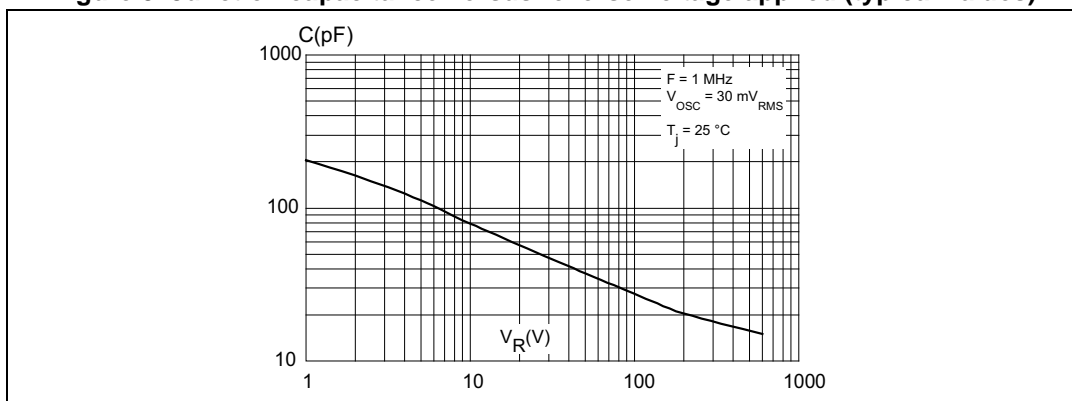


Table 6. TO-247 LL dimension values

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.

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