

## **STTH6002C**

## High efficiency ultrafast diode

## Main product characteristics

I <sub>F(AV)</sub>	2 x 30 A
V <sub>RRM</sub>	200 V
T <sub>j</sub> (max)	175° C
V <sub>F</sub> (typ)	0.75 V
t <sub>rr</sub> (typ)	22 ns

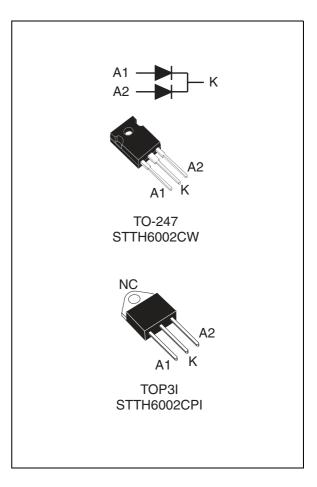
#### Features and benefits

- Suited for SMPS
- Low losses
- Low forward and reverse recovery times
- High surge current capability
- High junction temperature

### **Description**

Dual center tab rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in TO-247 and TOP3I, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection



#### **Order codes**

Part Number	Marking
STTH6002CW	STTH6002C
STTH6002CPI	STTH6002C

Characteristics STTH6002C

## 1 Characteristics

Table 1. Absolute ratings (limiting values at  $T_i = 25^{\circ}$  C, unless otherwise specified)

Symbol	Parameter			Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage			200	٧	
I <sub>F(RMS)</sub>	RMS forward current	RMS forward current			Α	
		TO-247	Per diode T <sub>c</sub> = 140° C	30		
	Assessment of the second of th	1.5 =	Per device T <sub>c</sub> = 125° C	60		
IF(AV)	$I_{F(AV)}$ Average forward current, $\delta = 0.5$	T0001	Per diode T <sub>c</sub> = 120° C	30	- A	
		TOP3I	Per device T <sub>c</sub> = 105° C	60		
I <sub>FSM</sub>	Surge non repetitive forward current $t_p = 10 \text{ ms Sinusoidal}$			330	Α	
T <sub>stg</sub>	Storage temperature range			-65 to +175	° C	
T <sub>j</sub>	Maximum operating junction temperature			175	°C	

Table 2. Thermal parameters

Symbol	Parameter			Value	Unit
	R <sub>th(j-c)</sub> Junction to case	TO 047		1.2	
Б		TO-247	Total	0.8	° C/W
Hth(j-c)		TOP3I	Per diode	1.8	
			Total	1.20	
В	D. Counting	TO-247		0.4	
R <sub>th(c)</sub> Coupling	TOP3I		0.6		

When the two diodes 1 and 2 are used simultaneously:

 $\Delta Tj(diode 1) = P (diode 1) X R_{th(j-c)} (Per diode) + P (diode 2) x R_{th(c)}$ 

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Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Тур	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Deverse leekens surrent	T <sub>j</sub> = 25° C	W W		30	
I <sub>R</sub> <sup>(1)</sup> Reverse leakage current	T <sub>j</sub> = 125° C	$V_R = V_{RRM}$	30	300	μA	
		T <sub>j</sub> = 25° C	I <sub>F</sub> = 30 A		1.05	
V <sub>F</sub> <sup>(2)</sup>		1 <sub>j</sub> = 25 C	I <sub>F</sub> = 60 A		1.18	V
V <sub>F</sub> <sup>(2)</sup> Forward voltage drop		T: = 150° C	I <sub>F</sub> = 30 A	0.75	0.84	V
			I <sub>F</sub> = 60 A	0.9	0.99	

- 1. Pulse test:  $t_p$  = 5 ms,  $\delta$  < 2 %
- 2. Pulse test:  $t_p$  = 380  $\mu$ s,  $\delta$  < 2 %

To evaluate the conduction losses use the following equation:

 $P = 0.69 \text{ x } I_{F(AV)} + 0.005 I_{F}^{2}_{(RMS)}$ 

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Тур	Max.	Unit
t <sub>rr</sub>	Reverse recovery time	$I_F = 1 \text{ A, } dI_F/dt = 200 \text{ A/}\mu\text{s,}$ $V_R = 30 \text{ V, } T_j = 25 \text{ °C}$	22	27	ns
I <sub>RM</sub>	Reverse recovery current	$I_F = 30 \text{ A}, dI_F/dt = 200 \text{ A}/\mu\text{s}, \ V_R = 160 \text{ V}, T_j = 125 ^{\circ}\text{C}$	7.6	9.5	А
t <sub>fr</sub>	Forward recovery time	$I_F = 30 \text{ A}, dI_F/dt = 200 \text{ A/}\mu\text{s}$ $V_{FR} = 1.1 \text{ x } V_{Fmax}, T_j = 25 \text{ °C}$		220	ns
V <sub>FP</sub>	Forward recovery voltage	$I_F = 30 \text{ A}, dI_F/dt = 200 \text{ A/}\mu\text{s},$ $T_j = 25 ^{\circ}\text{C}$	2.5		V

Figure 1. Peak current versus duty cycle (per diode)

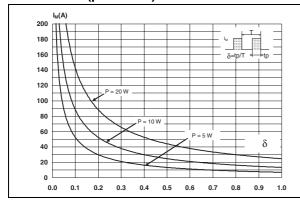
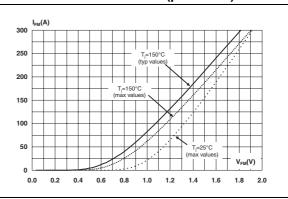


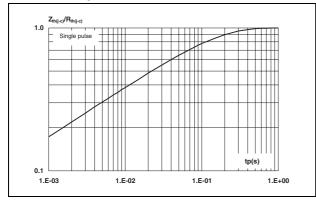
Figure 2. Forward voltage drop versus forward current (per diode)



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

Figure 4. Junction capacitance versus reverse applied voltage (typical values)



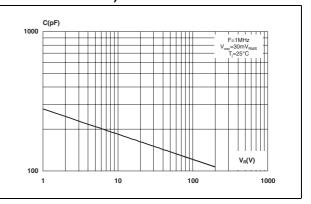
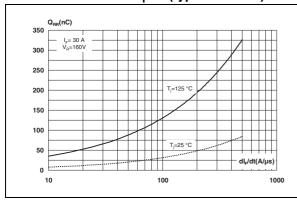


Figure 5. Reverse recovery charges versus dl<sub>F</sub>/dt (typical values)

Figure 6. Reverse recovery time versus  $dI_F/dt$  (typical values)



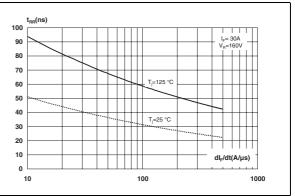
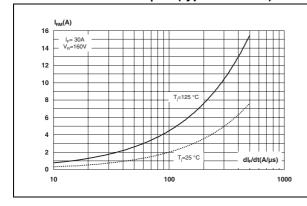
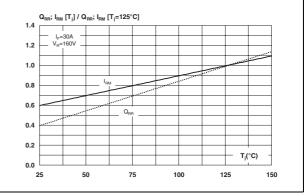


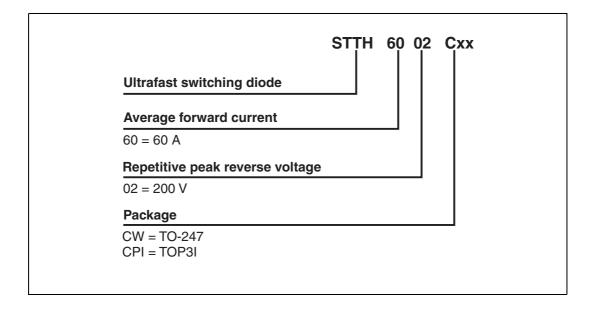
Figure 7. Peak reverse recovery current versus dl<sub>F</sub>/dt (typical values)

Figure 8. Dynamic parameters versus junction temperature





# 2 Ordering information scheme



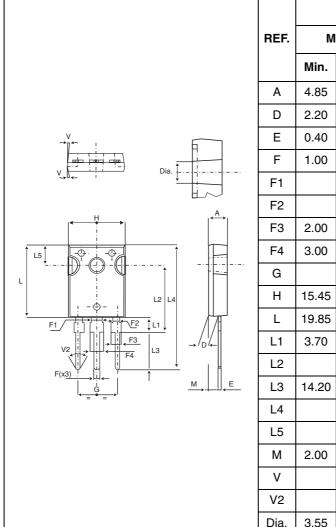
Package information STTH6002C

# 3 Package information

Epoxy meets UL94, V0

Cooling method: by conduction (C)
Recommended torque value: 0.8 Nm
Maximum torque value: 1.0 Nm

Table 5. TO-247 Dimensions

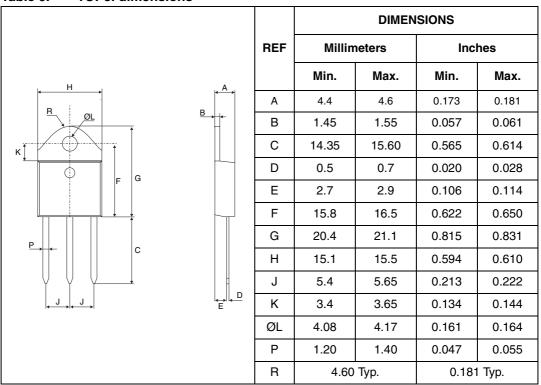


			DIMEN	SIONS		
REF.	М	illimete	rs		Inches	
	Min.	Тур	Max.	Min.	Тур	Max.
Α	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
Е	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F1		3.00			0.118	
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
F4	3.00		3.40	0.118		0.133
G		10.90			0.429	
Н	15.45		15.75	0.608		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	
М	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143

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STTH6002C Package information

Table 6. TOP3I dimensions



In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

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# 4 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH6002CW	STTH6002C	TO-247	4.46 g	30	Tube
STTH6002CPI	STTH6002C	TOP3I	4.7 g	30	Tube

# 5 Revision history

Date	Revision	Description of Changes
Feb-2004	1	First issue
05-Apr-2006	2	Reformatted to current template. Package TOP3I added.

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