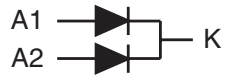
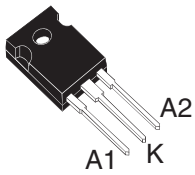
STTH6002C

High efficiency ultrafast diode

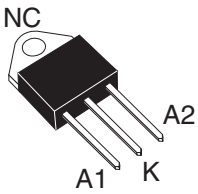
Main product characteristics

$I_{F(AV)}$	2 x 30 A
V_{RRM}	200 V
T_j (max)	175° C
V_F (typ)	0.75 V
t_{rr} (typ)	22 ns





TO-247
STTH6002CW



TOP3I
STTH6002CPI

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

1 Characteristics

Table 1. Absolute ratings (limiting values at T_j = 25° C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			200	V
$I_{F(RMS)}$	RMS forward current			50	A
$I_{F(AV)}$	Average forward current, δ = 0.5	TO-247	Per diode T_c = 140° C	30	A
			Per device T_c = 125° C	60	
		TOP3I	Per diode T_c = 120° C	30	
			Per device T_c = 105° C	60	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal		330	A
T_{stg}	Storage temperature range			-65 to +175	° C
T_j	Maximum operating junction temperature			175	° C

Table 2. Thermal parameters

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-247	Per diode	1.2	° C/W
			Total	0.8	
		TOP3I	Per diode	1.8	
			Total	1.20	
$R_{th(c)}$	Coupling	TO-247		0.4	
		TOP3I		0.6	

When the two diodes 1 and 2 are used simultaneously:

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

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Typ	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$		30	µA
		T_j = 125° C		30	300	
V_F(2)	Forward voltage drop	T_j = 25° C	I_F = 30 A		1.05	V
			I_F = 60 A		1.18	
		T_j = 150° C	I_F = 30 A	0.75	0.84	
			I_F = 60 A	0.9	0.99	

1. Pulse test: t_p = 5 ms, δ < 2 %
2. Pulse test: t_p = 380 µs, δ < 2 %

To evaluate the conduction losses use the following equation:
$P = 0.69 \times I_{F(AV)} + 0.005\ I_F{}^2{}_{(RMS)}$

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Typ	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 1 A, dI_F/dt = 200 A/µs, V_R = 30 V, T_j = 25 °C	22	27	ns
I_{RM}	Reverse recovery current	I_F = 30 A, dI_F/dt = 200 A/µs, V_R = 160 V, T_j = 125 °C	7.6	9.5	A
t_{fr}	Forward recovery time	I_F = 30 A, dI_F/dt = 200 A/µs V_{FR} = 1.1 x V_{Fmax}, T_j = 25 °C		220	ns
V_{FP}	Forward recovery voltage	I_F = 30 A, dI_F/dt = 200 A/µs, T_j = 25 °C	2.5		V

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

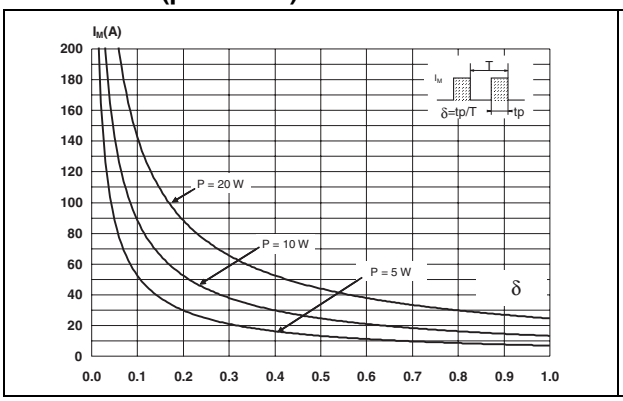


Figure 2. Forward voltage drop versus forward current (per diode)

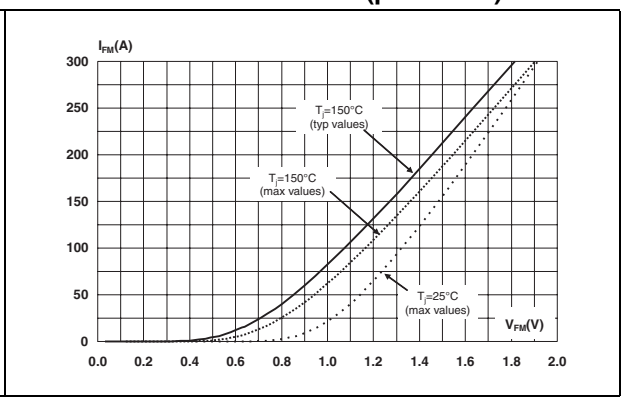


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

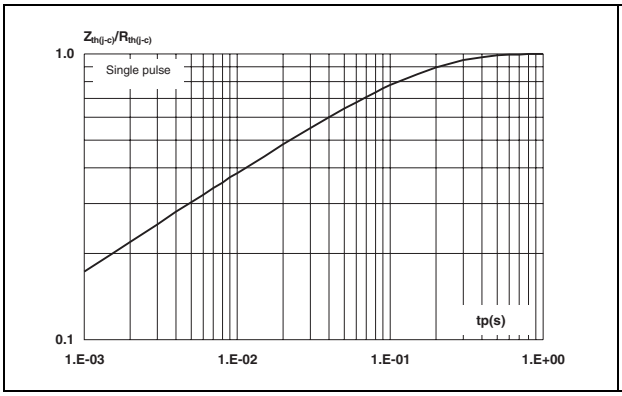


Figure 4. Junction capacitance versus reverse applied voltage (typical values)

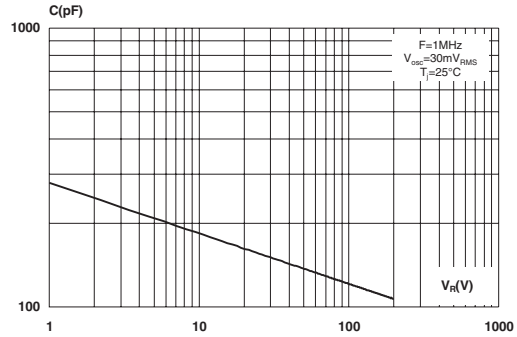


Figure 5. Reverse recovery charges versus dI_F/dt (typical values)

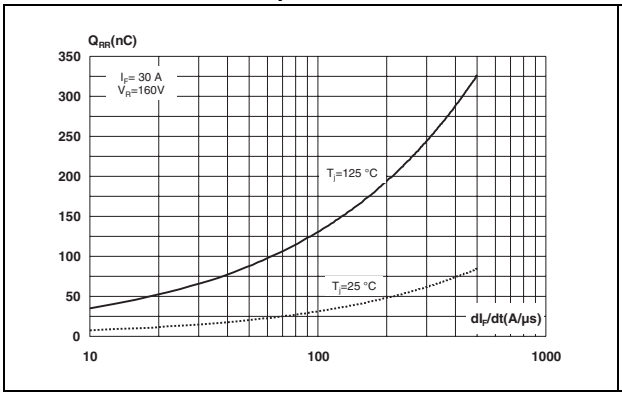


Figure 6. Reverse recovery time versus dI_F/dt (typical values)

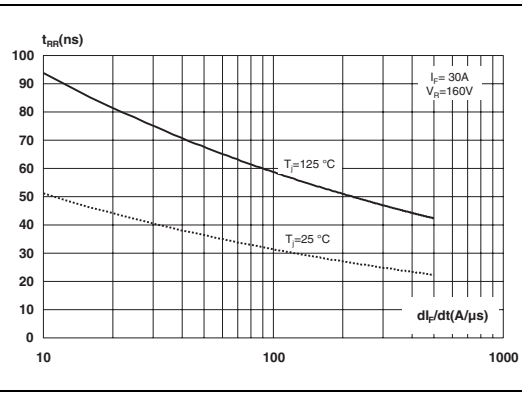


Figure 7. Peak reverse recovery current versus dI_F/dt (typical values)

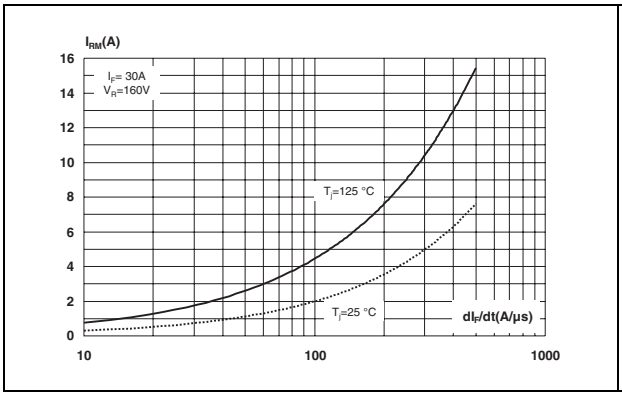
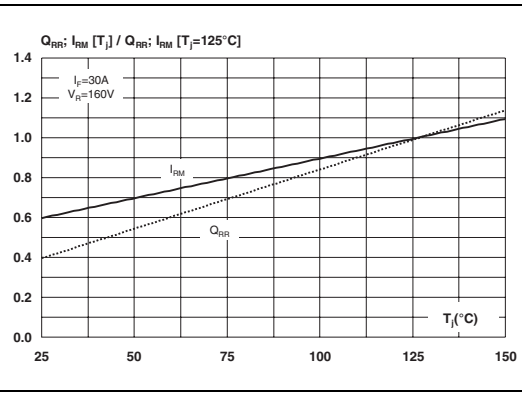
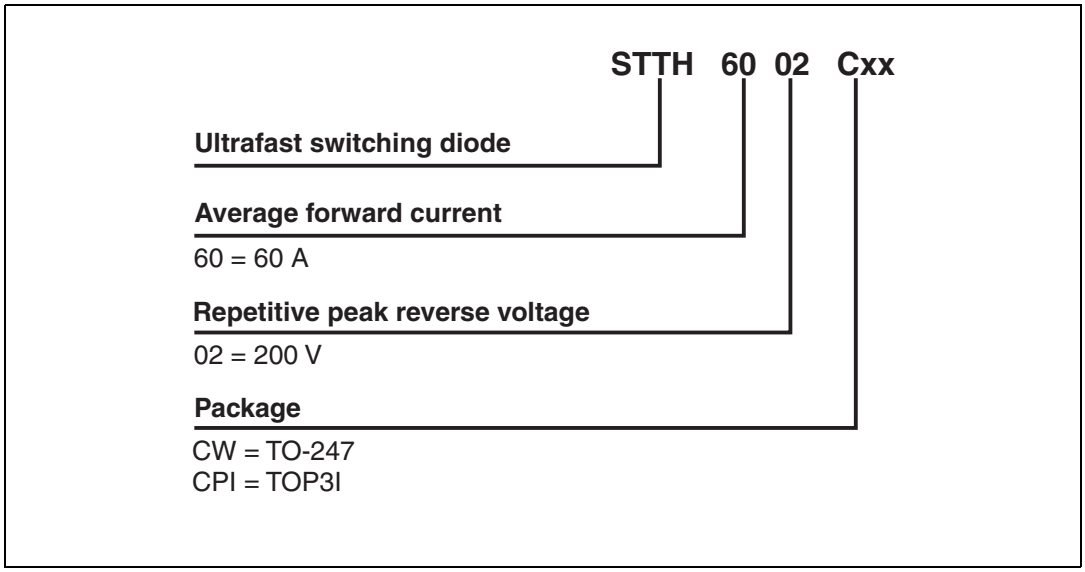


Figure 8. Dynamic parameters versus junction temperature



2 Ordering information scheme



3 Package information

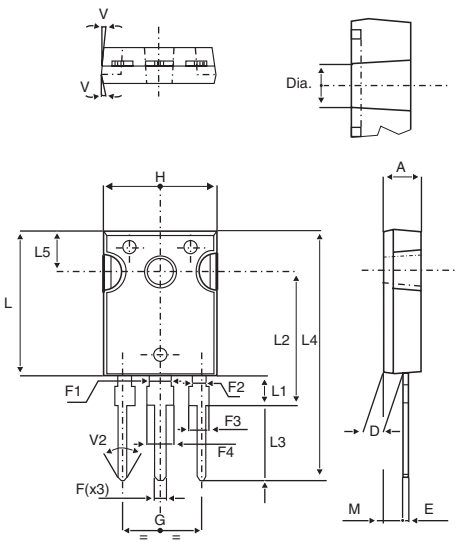
Epoxy meets UL94, V0

Cooling method: by conduction (C)

Recommended torque value: 0.8 Nm

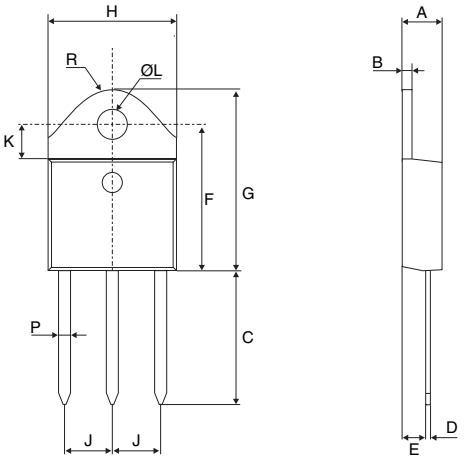
Maximum torque value: 1.0 Nm

Table 5. TO-247 Dimensions



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
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	
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

Table 6. TOP3I dimensions



REF	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	1.45	1.55	0.057	0.061
C	14.35	15.60	0.565	0.614
D	0.5	0.7	0.020	0.028
E	2.7	2.9	0.106	0.114
F	15.8	16.5	0.622	0.650
G	20.4	21.1	0.815	0.831
H	15.1	15.5	0.594	0.610
J	5.4	5.65	0.213	0.222
K	3.4	3.65	0.134	0.144
ØL	4.08	4.17	0.161	0.164
P	1.20	1.40	0.047	0.055
R	4.60 Typ.		0.181 Typ.	

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.

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.