

STTH602C

Ultrafast recovery diode

Main product characteristics

I _{F(AV)}	2 x 3 A
V _{RRM}	200 V
T _j (max)	175° C
V _F (typ)	0.80 V
t _{rr} (typ)	14 ns

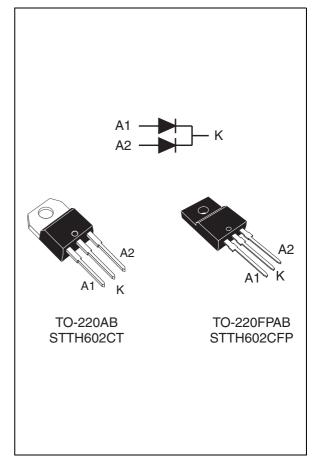
Features and benefits

- Suited for SMPS
- Low losses
- Low forward and reverse recovery time
- High surge current capability
- High junction temperature
- insulated package: TO-220FPAB

Description

Dual center tap diode suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in TO-220AB and TO-22FPAB, this device is intended for use in low voltage high frequency inverters, free wheeling and polarity protection.



Order codes

Part Number	Marking
STTH602CT	STTH602C
STTH602CFP	STTH602C

1 Characteristics

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

Symbol	Para	Value	Unit		
V _{RRM}	Repetitive peak reverse voltage			200	V
I _{F(RMS)}	RMS forward current			22	А
		TO-220AB	Per diode $T_c = 160^{\circ} C$	3	А
	Average forward surrent $\delta = 0.5$	10-220AD	Per device $T_c = 155^{\circ} C$	6	A
^I F(AV)	Average forward current, $\delta = 0.5$	TO-220FPAB	Per diode $T_c = 150^{\circ} C$	3	А
		TU-220FFAD	Per device $T_c = 140^{\circ} C$	6	A
I _{FSM}	Surge non repetitive forward current	60	А		
T _{stg}	Storage temperature range	-65 to + 175	°C		
Тj	Maximum operating junction temperature	175	°C		

Table 2.Thermal parameters

Symbol	Pa	Value	Unit		
		TO-220AB	Per diode	5	
Б	Junction to case	10-220AD	Per device	3.0	
R _{th(j-c)}	Junction to case	TO-220FPAB	Per diode	7.5	° C/W
		IU-220FFAB	Per device	5.25	
Р	Coupling	TO-220AB	Per diode	1	
R _{th(c)}	Coupling	TO-220FPAB	Per diode	3	

When the two diodes 1 and 2 are used simultaneously:

 Δ Tj(diode 1) = P (diode 1) X R_{th(i-c)} (Per diode) + P (diode 2) x R_{th(c)}

 Table 3.
 Static electrical characteristics

Symbol	Parameter	Test co	Тур	Max.	Unit		
I _B ⁽¹⁾	Poverse leakage current	T _j = 25° C			3		
'R`´	Reverse leakage current	$T_j = 125^\circ C$	V _R = V _{RRM}	3	30	μΑ	
		$T_j = 25^\circ C$	I _F = 3 A -	0.98	1.1		
V _F ⁽²⁾	Forward voltage drop	T _j = 150° C			0.8	0.95	v
VF` /	Forward voltage drop	$T_j = 25^\circ C$		1.1	1.25	v	
		$T_j = 150^\circ C$		0.9	1.05		

1. Pulse test: t_p = 5 ms, δ < 2 %

2. Pulse test: t_p = 380 µs, δ < 2 %

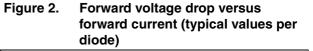
To evaluate the conduction losses use the following equation: P = 0.85 x $I_{F(AV)}$ + 0.033 ${I_F}^2_{(RMS)}$



Table 4.Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Тур	Max.	Unit
+		I _F = 1 A, dI _F /dt = -100 A/μs, V _R = 30 V, T _i = 25 °C		14	20	ns
t _{rr}	Reverse recovery time	$\label{eq:less} \begin{array}{l} I_F = 1 \ A, \ dI_F/dt = -50 \ A/\mus, \\ V_R = 30 \ V, \ T_j = 25 \ ^\circC \end{array}$		21	30	
I _{RM}	Reverse recovery current	$I_F = 3 \text{ A}, \text{ d}I_F/\text{d}t = 200 \text{ A}/\mu\text{s},$ $V_R = 160 \text{ V}, \text{ T}_j = 125 \ ^\circ\text{C}$		4	5.5	А
t _{fr}	Forward recovery time	$I_F = 3 \text{ A}, \text{ d}I_F/\text{d}t = 200 \text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \text{ x} V_{Fmax}, T_j = 25 \text{ °C}$		24		ns
V _{FP}	Forward recovery voltage	$I_F = 3 \text{ A}, \text{ dI}_F/\text{dt} = 200 \text{ A/}\mu\text{s},$ $T_j = 25 \text{ °C}$		3.7		V

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



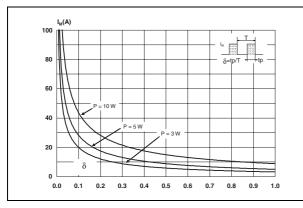
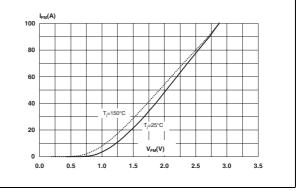
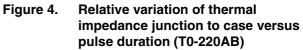
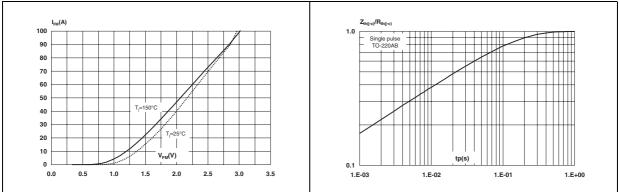


Figure 3. Forward voltage drop versus forward current (maximum values per diode)

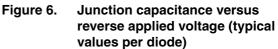






57

Figure 5. Relative variation of thermal Figure 5. Inpedance junction to case versus pulse duration (TO-220FPAB)



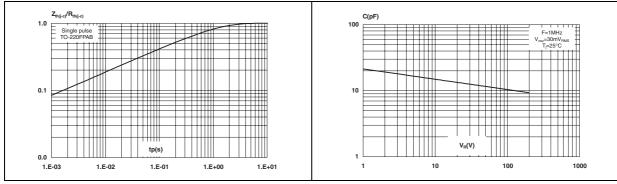
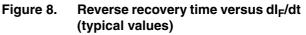


Figure 7. Reverse recovery charges versus dl_F/dt (typical values)



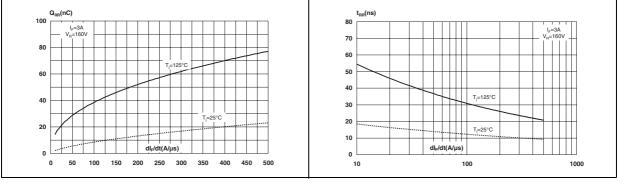
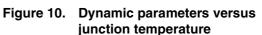
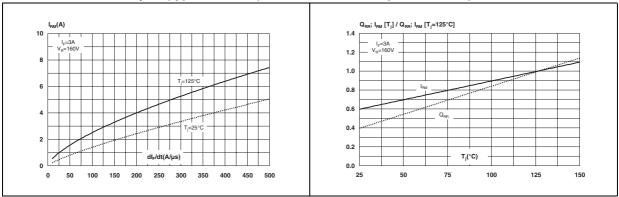


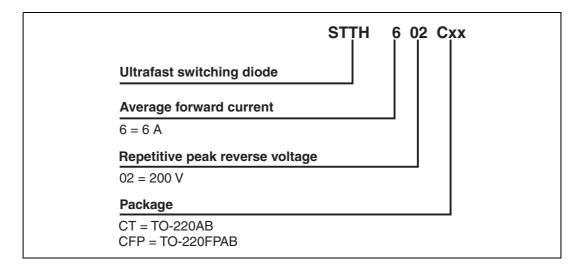
Figure 9. Peak reverse recovery current versus dl_F/dt (typical values)







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

					DIMEN	SIONS		
		REF.	М	illimete	rs		Inches	
			Min.	Тур	Max.	Min.	Тур	Max.
		А	15.20		15.90	0.598		0.625
		a1		3.75			0.147	
B ∅I		a2	13.00		14.00	0.511		0.551
	b2	В	10.00		10.40	0.393		0.409
	F	b1	0.61		0.88	0.024		0.034
A		b2	1.23		1.32	0.048		0.051
		С	4.40		4.60	0.173		0.181
	c2	c1	0.49		0.70	0.019		0.027
12 a2		c2	2.40		2.72	0.094		0.107
		е	2.40		2.70	0.094		0.106
v v v v v v v v v v v v v v v v v v v	M ↓ c1	F	6.20		6.60	0.244		0.259
l↔		ØI	3.75		3.85	0.147		0.151
		14	15.80	16.40	16.80	0.622	0.646	0.661
		L	2.65		2.95	0.104		0.116
		12	1.14		1.70	0.044		0.066
		13	1.14		1.70	0.044		0.066
		М		2.60			0.102	





			DIMEN	ISIONS	
	REF.	Millin	neters	Incl	nes
		Min.	Max.	Min.	Max.
i	А	4.4	4.6	0.173	0.181
	В	2.5	2.7	0.098	0.106
	D	2.5	2.75	0.098	0.108
	Е	0.45	0.70	0.018	0.027
Dia	F	0.75	1	0.030	0.039
L6	F1	1.15	1.70	0.045	0.067
L2 L7	F2	1.15	1.70	0.045	0.067
	G	4.95	5.20	0.195	0.205
	G1	2.4	2.7	0.094	0.106
	Н	10	10.4	0.393	0.409
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	L2	16 Тур.		0.63 Тур.	
G1 ↔→↓ ↓↓↓ ↓↓↓ ↓↓↓	L3	28.6	30.6	1.126	1.205
G	L4	9.8	10.6	0.386	0.417
	L5	2.9	3.6	0.114	0.142
	L6	15.9	16.4	0.626	0.646
	L7	9.00	9.30	0.354	0.366
	Dia.	3.00	3.20	0.118	0.126

Table 6. TO-220FPAB 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.

57

4 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH602CT	STTH602C	TO-220AB	2.23 g	50	Tube
STTH602CFP	STTH602C	TO-220FPAB	2 g	50	Tube

5 Revision history

Date	Revision	Description of Changes
05-Apr-2006	1	First issue



Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZE REPRESENTATIVE OF ST, ST PRODUCTS ARE NOT DESIGNED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS, WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2006 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

