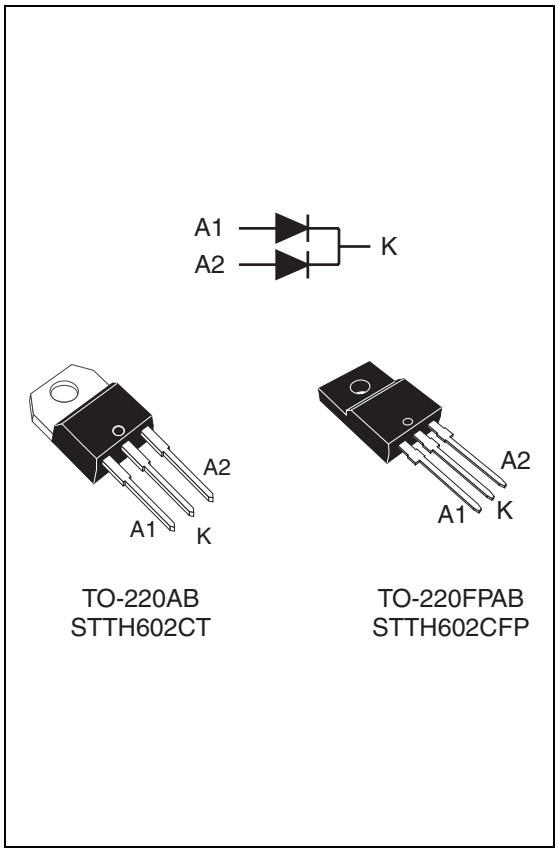
STTH602C

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



TO-220AB
STTH602CT

TO-220FPAB
STTH602CFP

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° C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			200	V
$I_{F(RMS)}$	RMS forward current			22	A
$I_{F(AV)}$	Average forward current, δ = 0.5	TO-220AB	Per diode T_c = 160° C	3	A
			Per device T_c = 155° C	6	
		TO-220FPAB	Per diode T_c = 150° C	3	A
			Per device T_c = 140° C	6	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal		60	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-220AB	Per diode	5	° C/W
			Per device	3.0	
		TO-220FPAB	Per diode	7.5	
			Per device	5.25	
$R_{th(c)}$	Coupling	TO-220AB	Per diode	1	
		TO-220FPAB	Per diode	3	

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	$V_R = V_{RRM}$		3	µA
		T_j = 125° C		3	30	
V_F (2)	Forward voltage drop	T_j = 25° C	I_F = 3 A	0.98	1.1	V
		T_j = 150° C		0.8	0.95	
		T_j = 25° C	I_F = 6 A	1.1	1.25	
		T_j = 150° 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:
$P = 0.85 \times I_{F(AV)} + 0.033\ I_F{}^2{}_{(RMS)}$

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 1 A, dI_F/dt = -100 A/µs, V_R = 30 V, T_j = 25 °C		14	20	ns
		I_F = 1 A, dI_F/dt = -50 A/µs, V_R = 30 V, T_j = 25 °C		21	30	
I_{RM}	Reverse recovery current	I_F = 3 A, dI_F/dt = 200 A/µs, V_R = 160 V, T_j = 125 °C		4	5.5	A
t_{fr}	Forward recovery time	I_F = 3 A, dI_F/dt = 200 A/µs V_{FR} = 1.1 x V_{Fmax}, T_j = 25 °C		24		ns
V_{FP}	Forward recovery voltage	I_F = 3 A, dI_F/dt = 200 A/µs, T_j = 25 °C		3.7		V

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

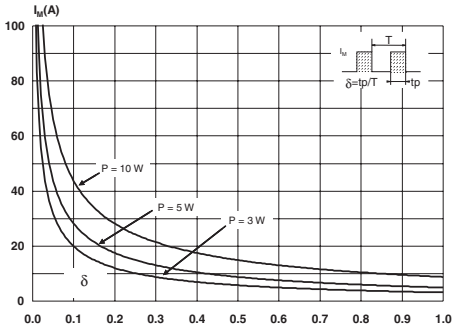


Figure 2. Forward voltage drop versus forward current (typical values per diode)

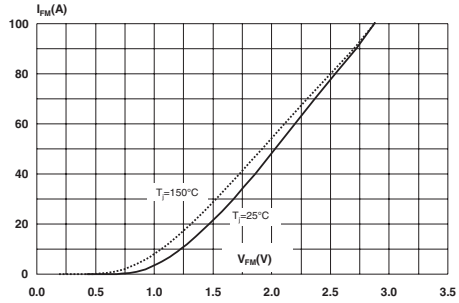


Figure 3. Forward voltage drop versus forward current (maximum values per diode)

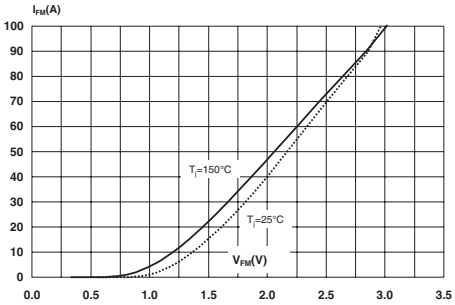


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration (T0-220AB)

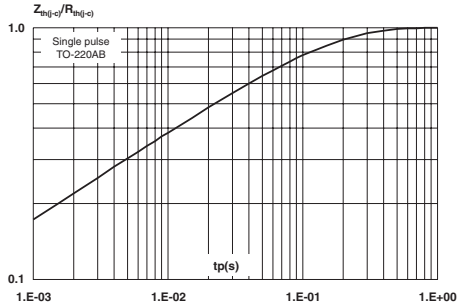


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)

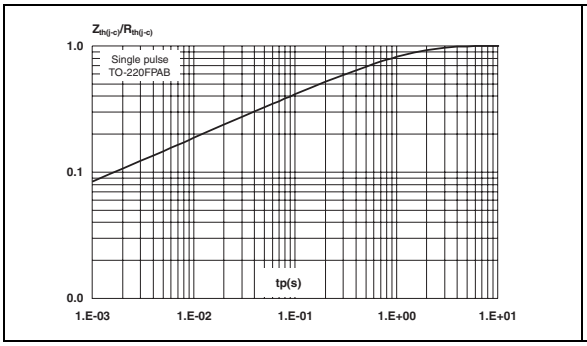


Figure 6. Junction capacitance versus reverse applied voltage (typical values per diode)

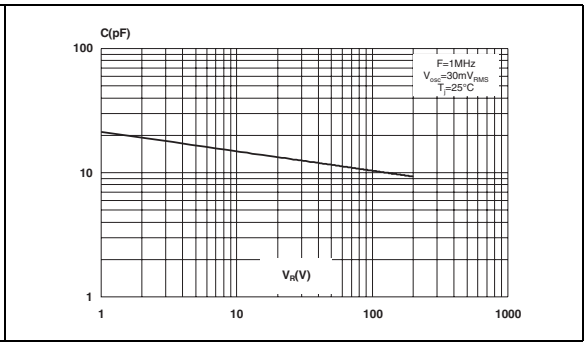


Figure 7. Reverse recovery charges versus dI_F/dt (typical values)

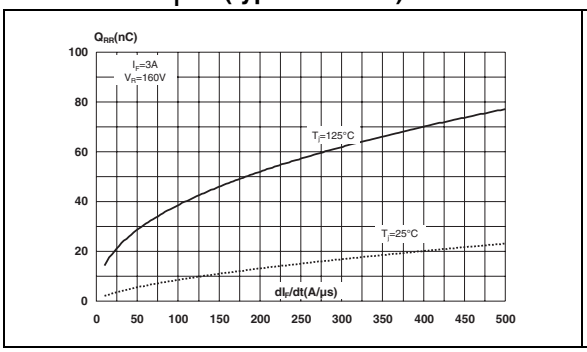


Figure 8. Reverse recovery time versus dI_F/dt (typical values)

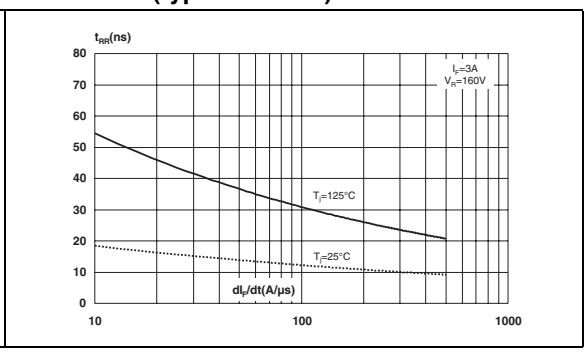


Figure 9. Peak reverse recovery current versus dI_F/dt (typical values)

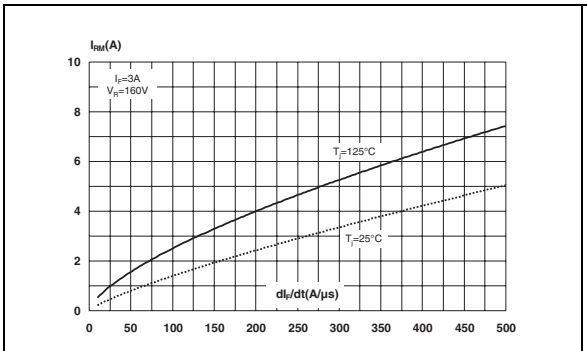
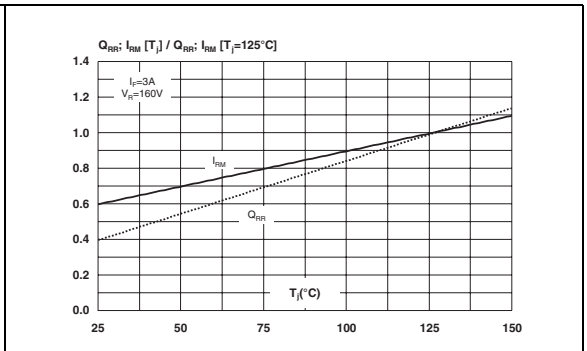
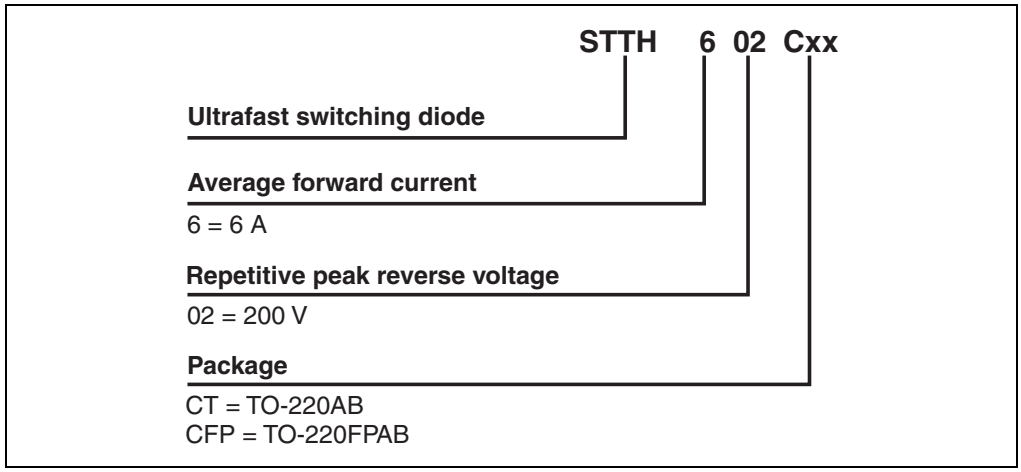


Figure 10. Dynamic parameters versus junction temperature



2 Ordering information scheme



3 Package information

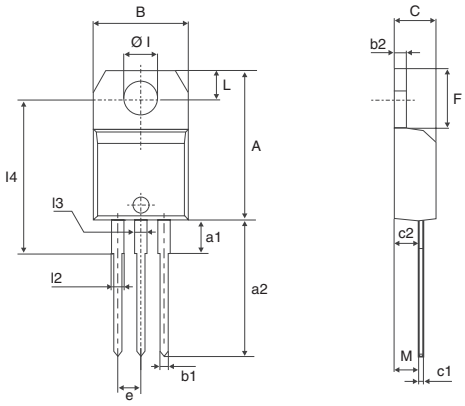
Epoxy meets UL94, V0

Cooling method: by conduction (C)

Recommended torque value: 0.8 Nm

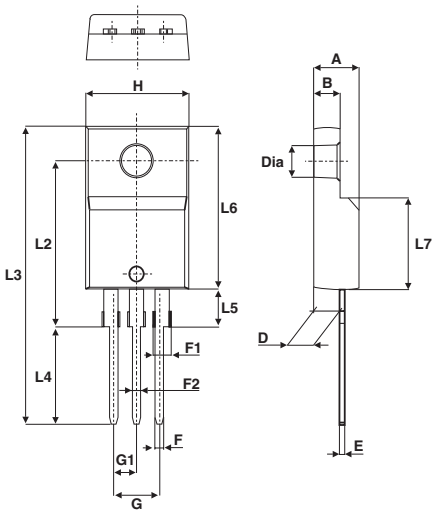
Maximum torque value: 1.0 Nm

Table 5. TO-220AB Dimensions



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ	Max.	Min.	Typ	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
l4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
l2	1.14		1.70	0.044		0.066
l3	1.14		1.70	0.044		0.066
M		2.60			0.102	

Table 6. TO-220FPAB Dimensions



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
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
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
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

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
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

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