

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

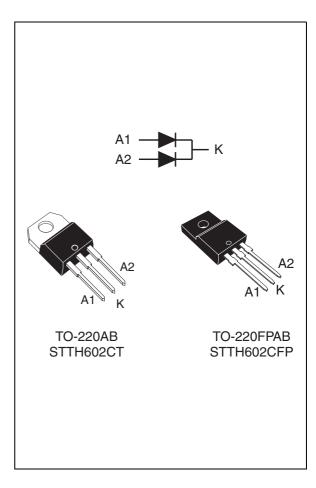
Features and benefits

- 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

Characteristics STTH602C

1 Characteristics

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

Symbol	Parameter			Value	Unit	
V _{RRM}	Repetitive peak reverse voltage			200	V	
I _{F(RMS)}	RMS forward current			22	Α	
		TO-220AB	Per diode T _c = 160° C	3	Α	
1	$I_{F(AV)}$ Average forward current, $\delta = 0.5$	10-220AB	Per device T _c = 155° C	6	A	
'F(AV)		TO-220FPAB	Per diode T _c = 150° C	3	Α	
			Per device T _c = 140° C	6	^	
I _{FSM}	Surge non repetitive forward current $t_p = 10 \text{ ms Sinusoidal}$			60	Α	
T _{stg}	Storage temperature range			-65 to + 175	° C	
Tj	Maximum operating junction temperature			175	° C	

Table 2. Thermal parameters

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

When the two diodes 1 and 2 are used simultaneously:

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

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Тур	Max.	Unit
ı (1)	I _D ⁽¹⁾ Reverse leakage current	T _j = 25° C	V _R = V _{RRM}		3	μА
'R`´		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
v (2)		T _j = 150° C		0.8	0.95	
v _F , ,		T _j = 25° C	I - 6 A	1.1	1.25	V
		T _j = 150° C	I _F = 6 A	0.9	1.05	,

^{1.} Pulse test: t_p = 5 ms, δ < 2 %

To evaluate the conduction losses use the following equation:

$$P = 0.85 \text{ x } I_{F(AV)} + 0.033 I_{F}^{2}_{(RMS)}$$

^{2.} Pulse test: t_p = 380 μ s, δ < 2 %

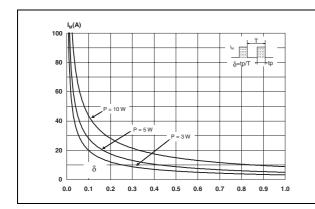
STTH602C Characteristics

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Тур	Max.	Unit
+	Payarsa racayary tima	I_F = 1 A, dI_F/dt = -100 A/ μ s, V_R = 30 V, T_j = 25 °C		14	20	ns
t _{rr} Reverse recovery time		I_F = 1 A, dI_F/dt = -50 A/ μ s, V_R = 30 V, T_j = 25 °C		21	30	
I _{RM}	Reverse recovery current	$I_F = 3$ A, $dI_F/dt = 200$ A/ μ s, $V_R = 160$ V, $T_j = 125$ °C		4	5.5	Α
t _{fr}	Forward recovery time	I_F = 3 A, dI_F/dt = 200 A/ μ s V_{FR} = 1.1 x V_{Fmax} , T_j = 25 °C		24		ns
V _{FP}	Forward recovery voltage	$I_F = 3 \text{ A, } dI_F/dt = 200 \text{ A/}\mu\text{s,}$ $T_j = 25 ^{\circ}\text{C}$		3.7		٧

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

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



100 I_{FM}(A)

80

60

40

7_=150°C

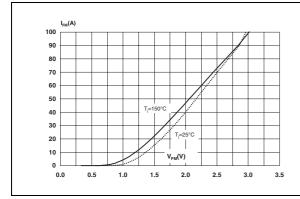
T_=25°C

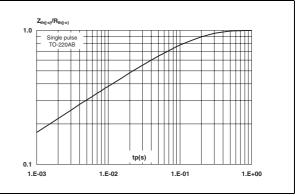
V_{FM}(V)

0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5

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)

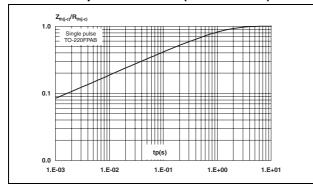




Characteristics STTH602C

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)



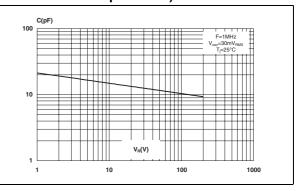
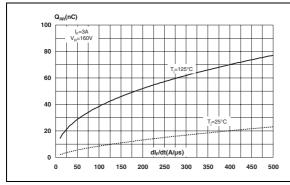


Figure 7. Reverse recovery charges versus dl_F/dt (typical values)

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



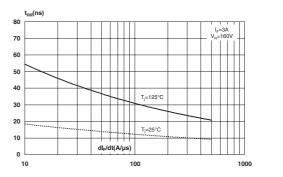
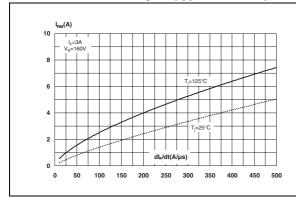
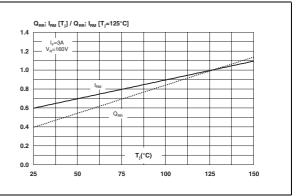


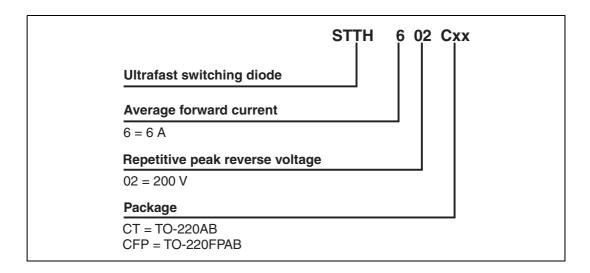
Figure 9. Peak reverse recovery current versus dl_F/dt (typical values)

Figure 10. Dynamic parameters versus junction temperature





2 Ordering information scheme



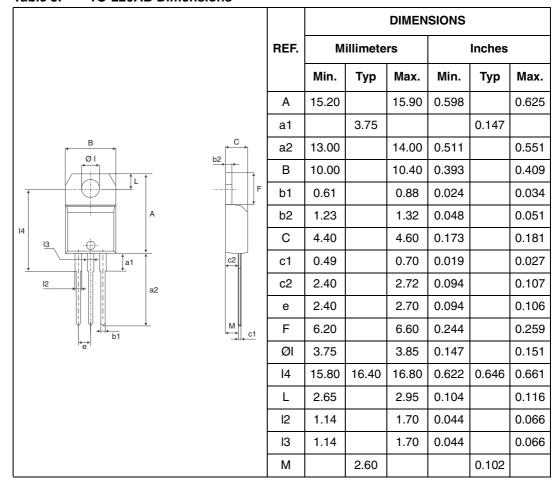
Package information STTH602C

3 Package information

Epoxy meets UL94, V0

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

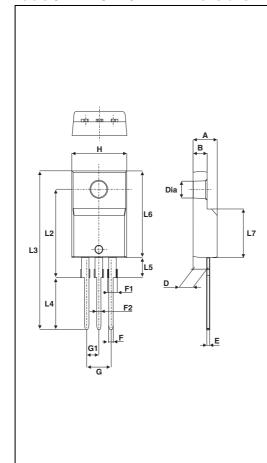
Table 5. TO-220AB Dimensions



6/9

STTH602C Package information

Table 6. TO-220FPAB Dimensions



	DIMENSIONS			
REF.	Millim	neters	Inc	hes
	Min.	Max.	Min.	Max.
Α	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
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
Н	10	10.4	0.393	0.409
L2	16	Тур.	0.63	Тур.
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.

7/9

Ordering information STTH602C

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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