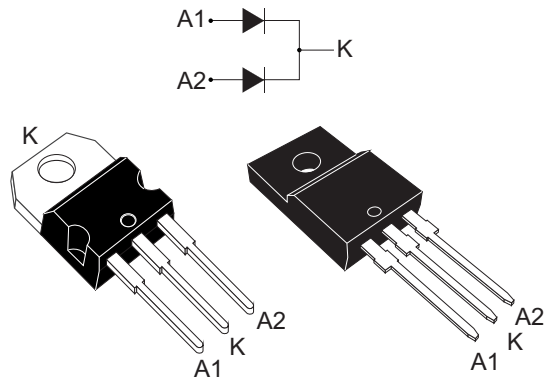
STTH15AC06C

Turbo 2 ultrafast high voltage rectifier

Datasheet – production data



TO-220AB
STTH15AC06CT

TO-220FPAB
STTH15AC06CFP

Features

- Ultrafast switching
- Low reverse recovery current
- Reduces switching and conduction losses
- Low thermal resistance
- insulated package TO-220FPAB:
  - Insulated voltage: 2500 V_{DC}

Description

The STTH15AC06C uses ST Turbo 2 600 V technology and is suited as a boost diode in air conditioning equipment for continuous mode interleaved power factor correction.

The device is also intended for use as a freewheeling diode in power supplies and other power switching applications.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 7.5 A
V_{RRM}	600 V
t_{rr} (max)	25 ns
V_F (max)	1.5 V
T_j (max)	175 °C

1 Characteristics

Table 2. Absolute ratings (limiting values per diode at 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	Forward rms current		15	A
$I_{F(AV)}$	Average forward current	Per diode	7.5	A
		Per device	15	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	80	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature		175	°C

Table 3. Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case (TO-220AB)	Per diode	2.8	°C/W
		Total	1.7	
	Coupling (TO-220AB)		0.6	
	Junction to case (TO-220FPAB)	Per diode	6	
		Total	4.5	
	Coupling (TO-220FPAB)		3	

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			1	µA
		T_j = 150 °C			10	100	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 7.5A			1.9	V
		T_j = 150 °C			1.15	1.50	
		T_j = 25 °C	I_F = 15A			2.2	
		T_j = 150 °C			1.4	1.8	

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:

$P = 1.2 \times I_{F(AV)} + 0.04\ I_F{}^2{}_{(RMS)}$

Table 5. Dynamic characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 0.5 A, I_{rr} = 0.25 A, I_R= 1 A			25	ns
			I_F = 1 A, V_R = 30 V, dI_F/dt = -50 A/µs		35	50	
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 7.5 A, V_R = 400 V, dI_F/dt = -100 A/µs		3.7	5	A
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 7.5 A, V_{FR} = 1.5 V, dI_F/dt = 100 A/µs			100	ns
V_{FP}	Forward recovery voltage				2.5		V

Figure 1. Average forward power dissipation versus average forward current (per diode)

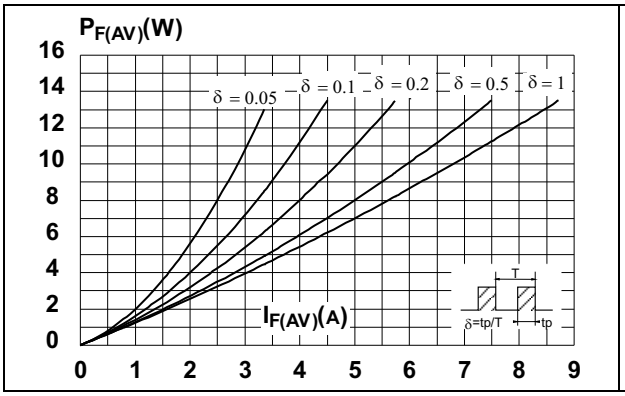


Figure 2. Forward voltage drop versus forward current (typical values, per diode)

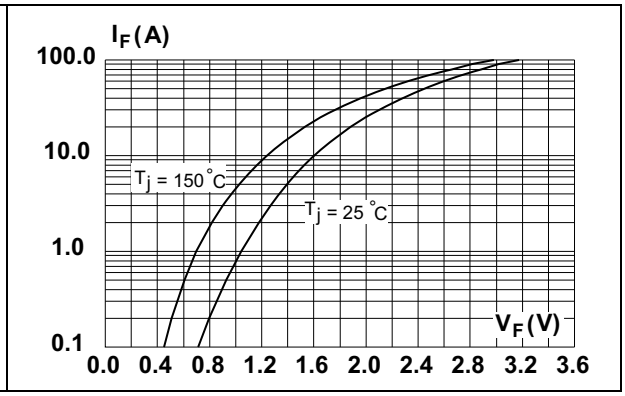


Figure 3. Forward voltage drop versus forward current (maximum values, per diode)

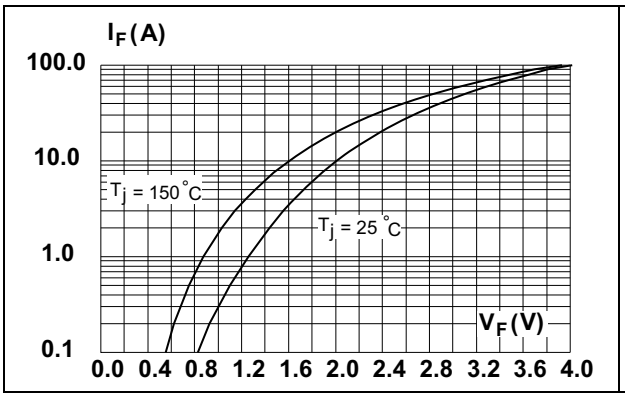


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration (TO-220AB)

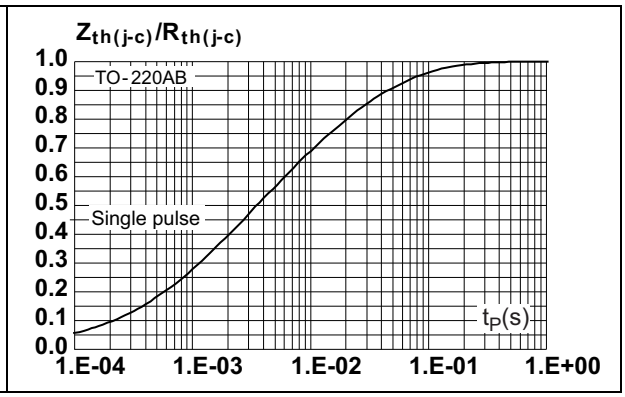


Figure 5. Relative variation of thermal impedance, junction to case, versus pulse duration (TO-220FPAB)

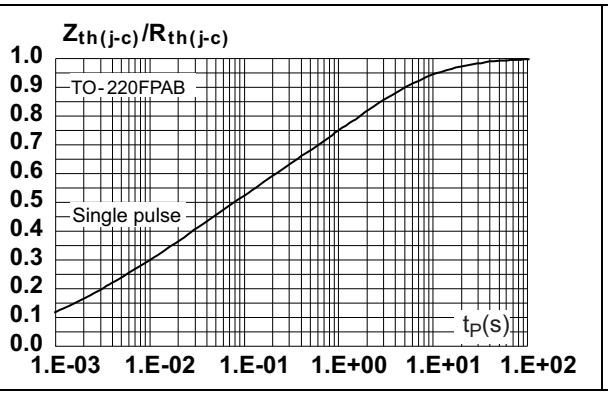


Figure 6. Peak reverse recovery versus dI_F/dt (typical values, per diode)

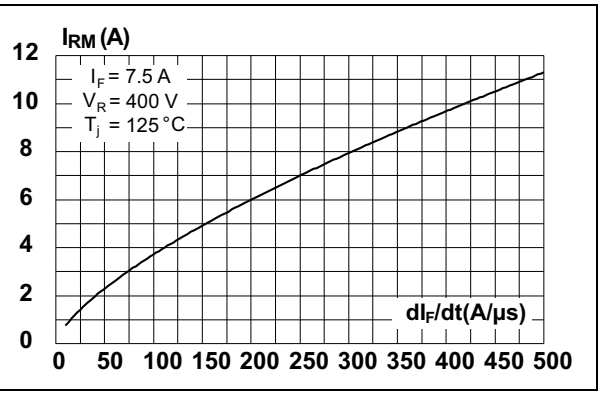


Figure 7. Reverse recovery time versus dI_F/dt (typical values, per diode)

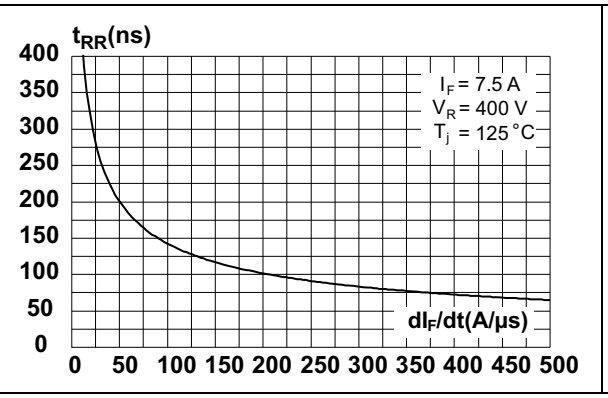


Figure 8. Reverse recovery charges versus dI_F/dt (typical values, per diode)

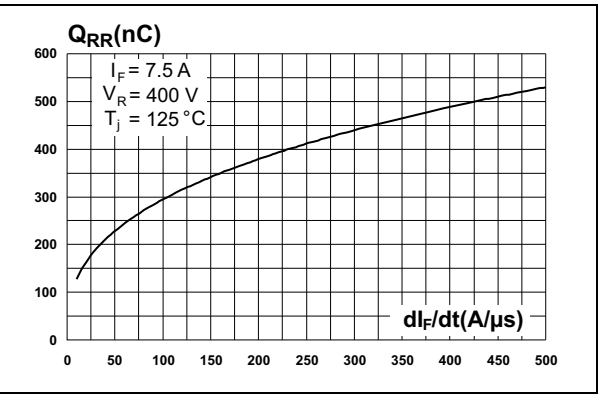


Figure 9. Reverse recovery softness factor versus dI_F/dt (typical values, per diode)

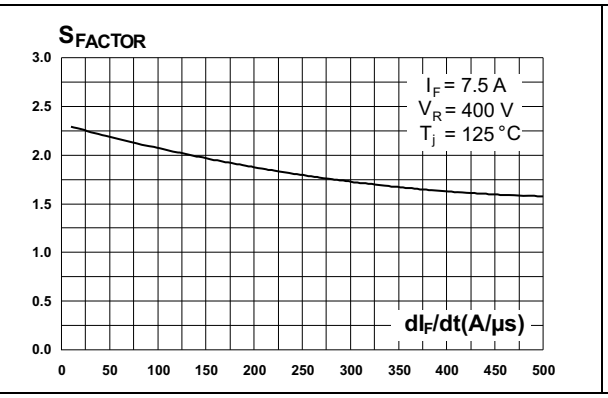


Figure 10. Relative variations of dynamic parameters versus junction temperature

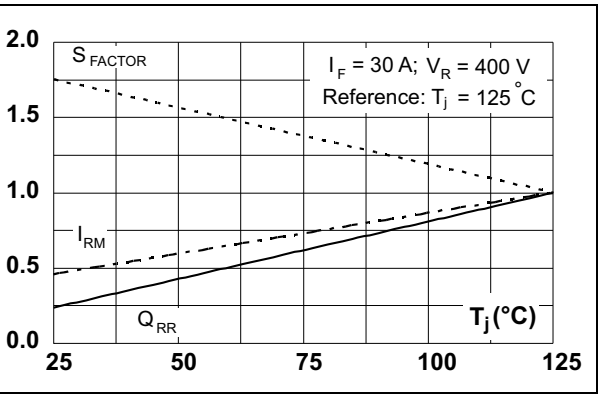


Figure 11. Transient peak forward voltage versus dI_F/dt (typical values, per diode)

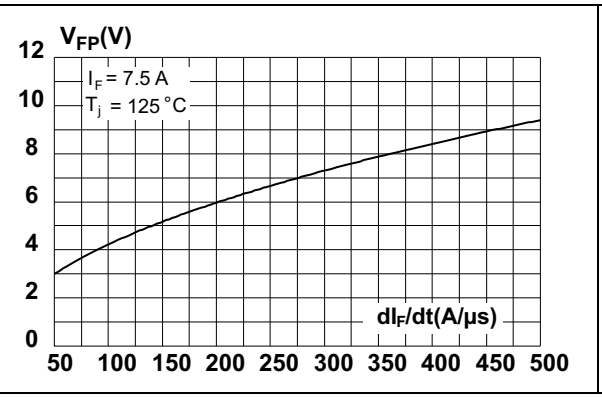


Figure 12. Forward recovery time versus dI_F/dt (typical values, per diode)

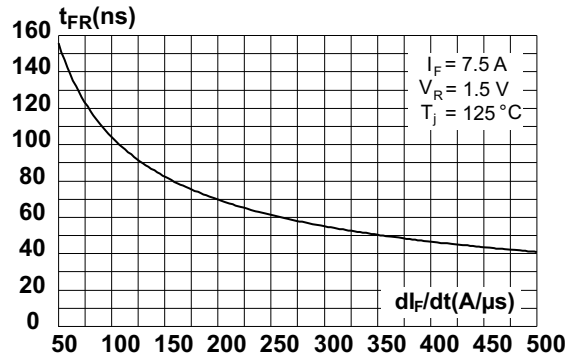
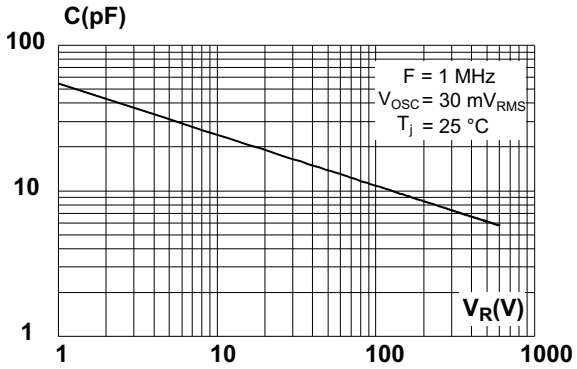


Figure 13. Junction capacitance versus reverse voltage applied (typical values, per diode)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque: 0.4 to 0.6 N·m

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Figure 14. TO220AB dimension definitions

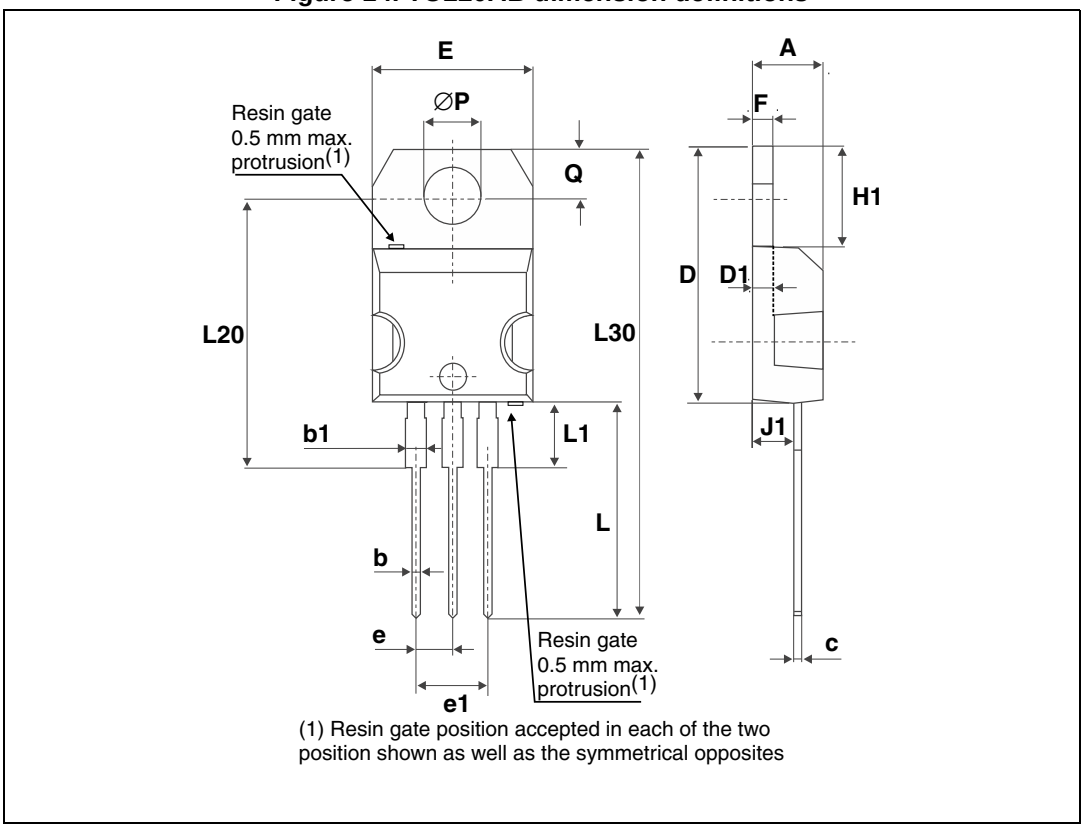

Table 6. TO220AB dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.17		0.18
b	0.61		0.88	0.024		0.035
b1	1.14		1.70	0.045		0.067
c	0.48		0.70	0.019		0.027
D	15.25		15.75	0.60		0.62
D1		1.27 typ			0.05 typ.	
E	10		10.40	0.39		0.41
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.19		0.20
F	1.23		1.32	0.048		0.052
H1	6.20		6.60	0.24		0.26
J1	2.40		2.72	0.094		0.107
L	13		14	0.51		0.55
L1	3.50		3.93	0.137		0.154
L20		16.40 typ			0.64 typ.	
L30		28.90 typ			1.13 typ.	
∅P	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116

Figure 15. TO220FPAB dimension definitions

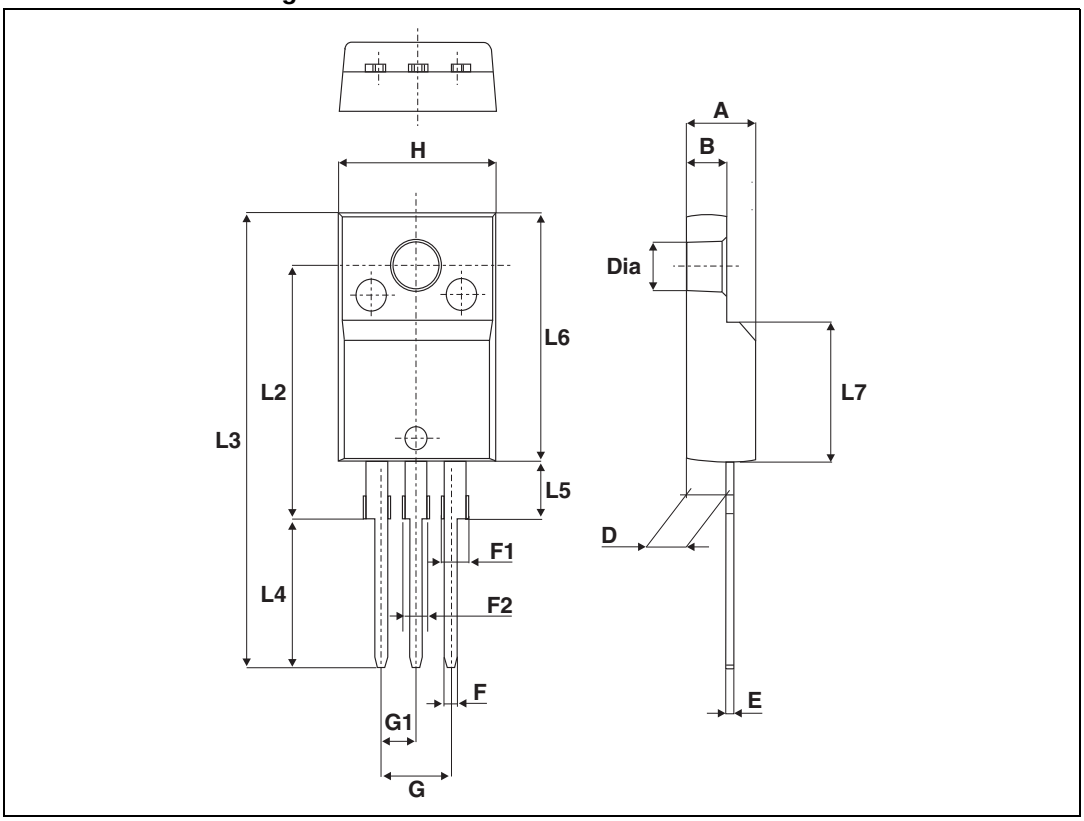

Table 7. T0-220FPAB dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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

3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH15AC06CT	STTH15AC06CT	TO-220AB	1.9 g	50	Tube
STTH15AC06CFP	STTH15AC06CFP	TO-220FPAB	2.0 g	50	Tube

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
21-Oct-2013	1	First release.

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