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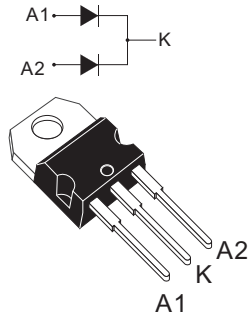
STTH16L06C-Y

Automotive turbo 2 ultrafast high voltage rectifier

Datasheet - production data



TO-220AB

Features

- AEC-Q101 qualified
- Ultrafast switching
- Low reverse recovery current
- Reduces switching and conduction losses
- Low thermal resistance
- PPAP capable
- ECOPACK®2 compliant component

Description

The STTH16L06C-Y is developed using ST's Turbo 2 600 V technology. It's specially suited for use in switching power supplies as rectifier and discontinuous mode PFC boost diode for automotive applications.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	Up to 2 x 10 A
V_{RRM}	600 V
T_j	175 °C
V_F (typ)	1.05 V
t_{rr} (max)	35 ns

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage, T_j = -40 °C				600	V
$I_{F(RMS)}$	Forward rms current				30	A
$I_{F(AV)}$	Average forward current δ = 0.5	TO-220AB	T_c = 140 °C	Per diode	8	A
			T_c = 135 °C	Per device	16	
			T_c = 130 °C	Per diode	10	
			T_c = 120 °C	Per device	20	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal			120	A
T_{stg}	Storage temperature range				-65 to + 175	°C
T_j	Operating junction temperature				-40 to +175	°C

Table 3. Thermal parameter

Symbol	Parameter			Maximum	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB	Per diode	2.5	°C/W
		TO-220AB	Total	1.6	
$R_{th(c)}$	Coupling	TO-220AB		0.7	

When the diodes 1 and 2 are used simultaneously:

$\Delta T_{j\ (diode1)} = P_{(diode1)} \times R_{th(j-c)\ (per\ diode)} + P_{(diode2)} \times R_{th(c)}$

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			8	µA
		T_j = 150 °C			25	240	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 8A			1.8	V
		T_j = 150 °C			1.05	1.35	
		T_j = 25 °C	I_F = 16A			2.08	
		T_j = 150 °C			1.28	1.64	

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

To evaluate the maximum conduction losses use the following equation:

$P = 1.06 \times I_{F(AV)} + 0.036\ I_F{}^2{}_{(RMS)}$

Table 5. Dynamic electrical characteristics

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			35	ns
			I_F = 1 A, dI_F/dt = 50 A/µs, V_R = 30 V		40	55	
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 8 A, dI_F/dt = 100 A/µs, V_R = 400 V		4.5	6.5	A
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 8 A dI_F/dt = 100 A/µs V_{FR} = 1.1 x V_{Fmax}			200	ns
V_{FP}	Forward recovery voltage				3.5		V

Figure 1. Conduction losses versus average current

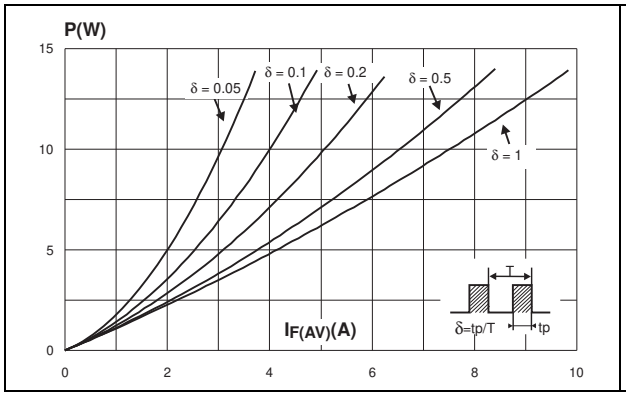


Figure 2. Forward voltage drop versus forward current

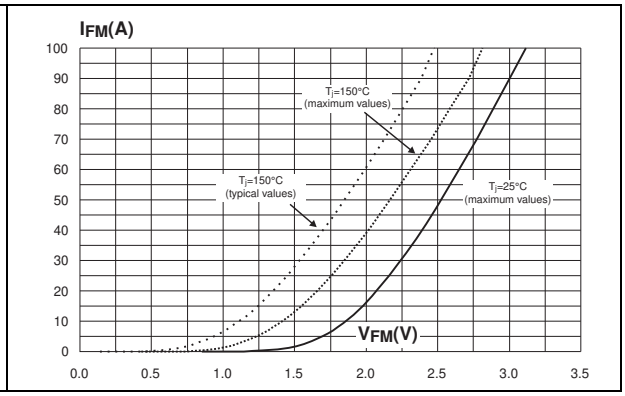


Figure 3. Peak reverse recovery current versus dI_F/dt (typical values, per diode)

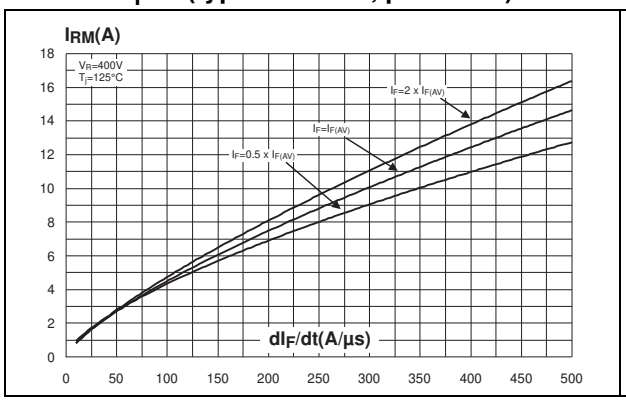


Figure 4. Reverse recovery time versus dI_F/dt (typical values, per diode)

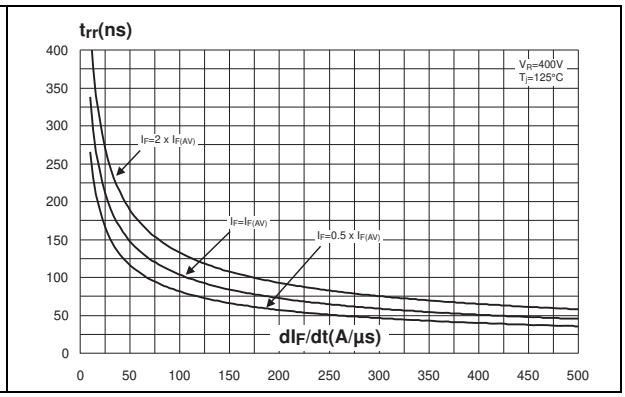


Figure 5. Reverse recovery charges versus dI_F/dt (typical values, per diode)

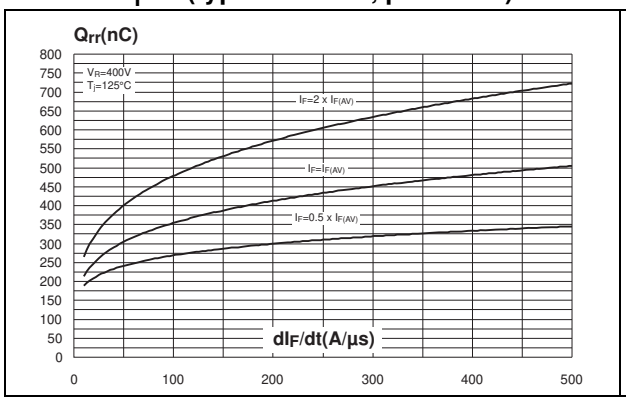


Figure 6. Softness factor versus dI_F/dt (typical values, per diode)

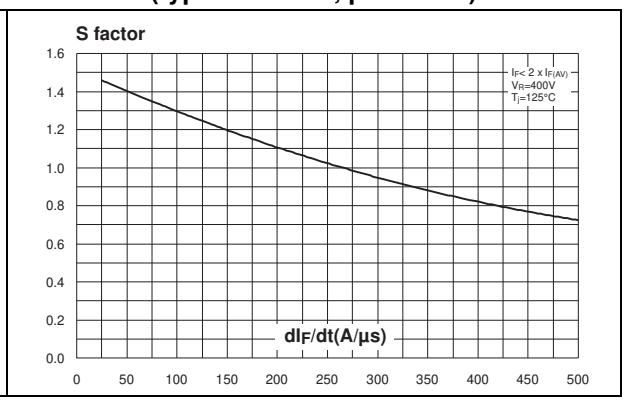


Figure 7. Relative variations of dynamic parameters versus junction temperature

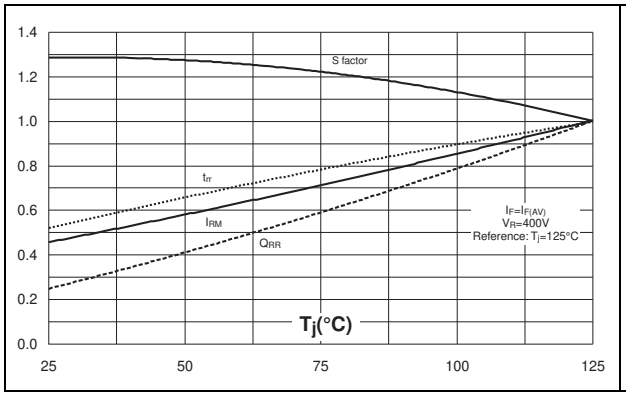


Figure 8. Transient peak forward voltage versus dI_F/dt (typical values, per diode)

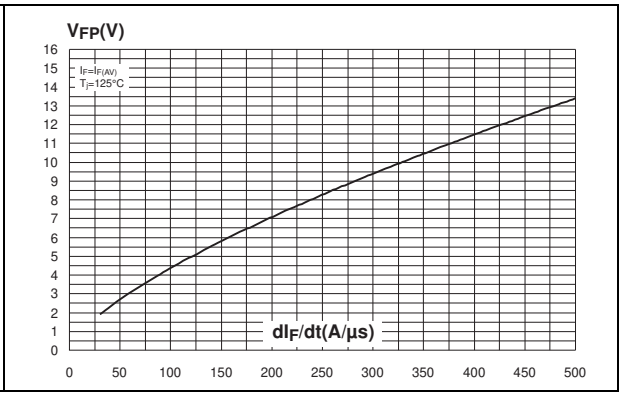


Figure 9. Forward recovery time versus dI_F/dt (typical values, per diode)

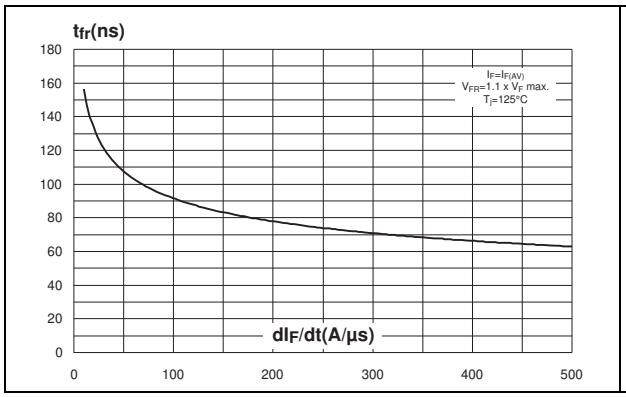
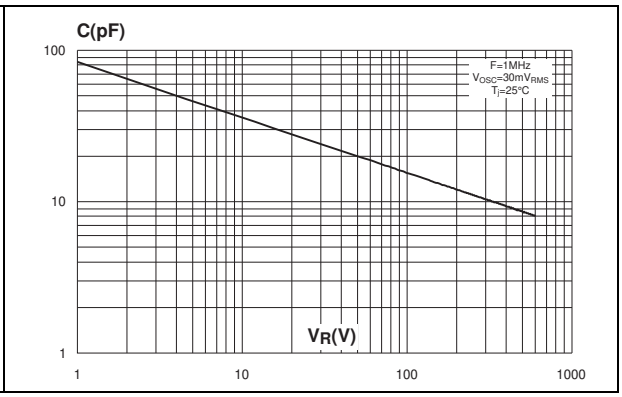


Figure 10. Junction capacitance versus reverse voltage applied (typical values, per diode)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value for TO-220AB and TO-220FPAB: 0.4 N·m to 0.6 N·m

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

Figure 11. TO-220AB dimension definitions

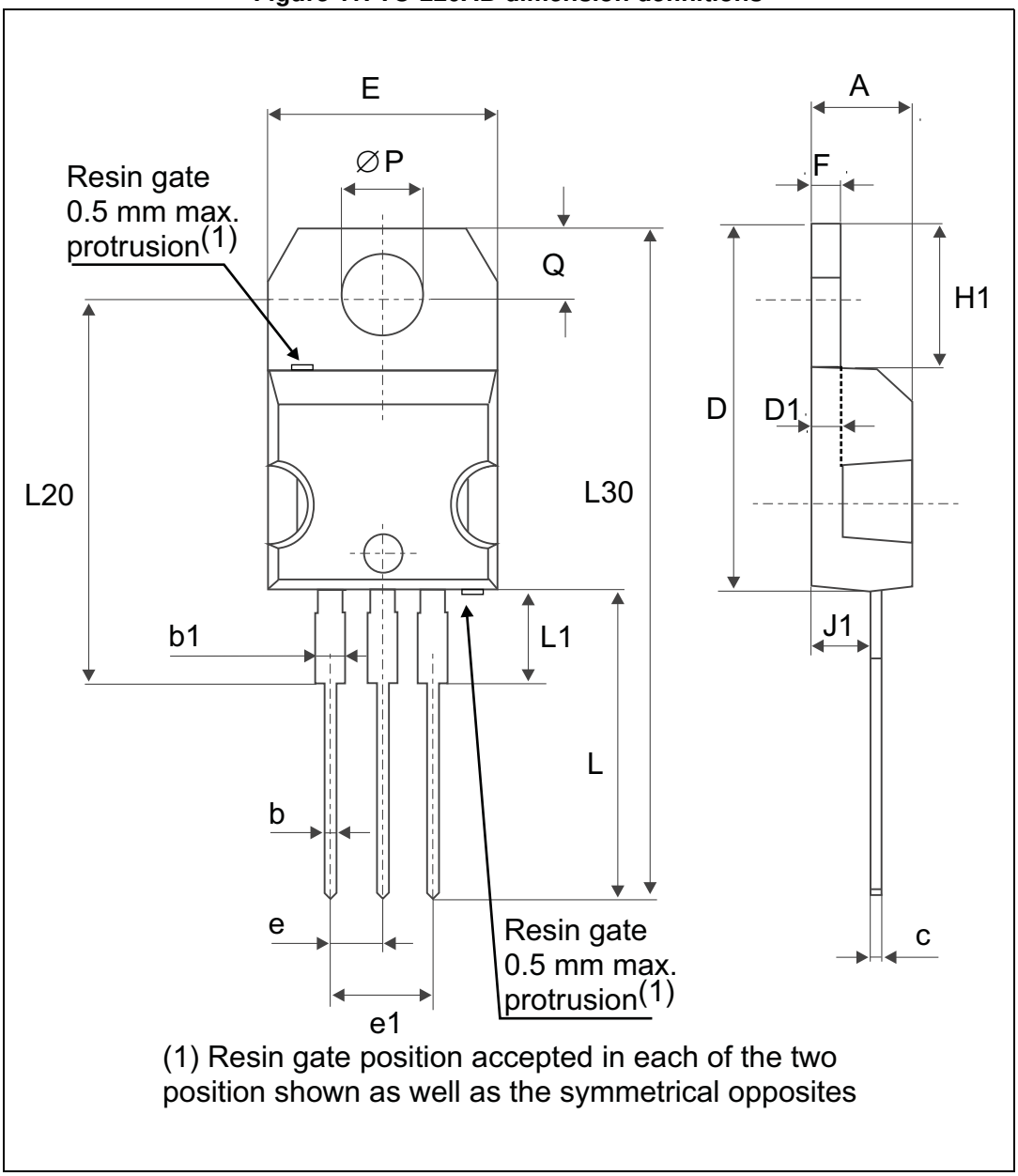


Table 6. TO-220AB dimension values

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	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

3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH16L06CTY	STTH16L06CTY	TO-220AB	2.23 g	50	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
19-Nov-2014	1	First issue.
12-Dec-2014	2	Removed TO-220FPAB and D²PAK package information.