STTH8S06

Turbo 2 ultrafast high voltage rectifier

Features

■ Ultrafast recovery

■ Low reverse recovery current

■ Reduces losses in diode and switching transistor

■ Low thermal resistance

■ Higher frequency operation

■ Insulated TO-220FPAC version
  – Insulation voltage = 1500 V rms
  – Package capacitance = 12 pF

Description

ST's **STTH8S06** is a state of the art ultrafast recovery diode. By the use of **600 V Pt doping planar technology**, this diode will out-perform the power factor corrections circuits operating in hardswitching conditions. The extremely low reverse recovery current of the **STTH8S06**, reduces significantly the switching power losses of the MOSFET and thus increases the efficiency of the application. This leads designers to reduce the size of their heatsinks.

This device is also intended for applications in power supplies and power conversions systems, motor drive, and other power switching applications.
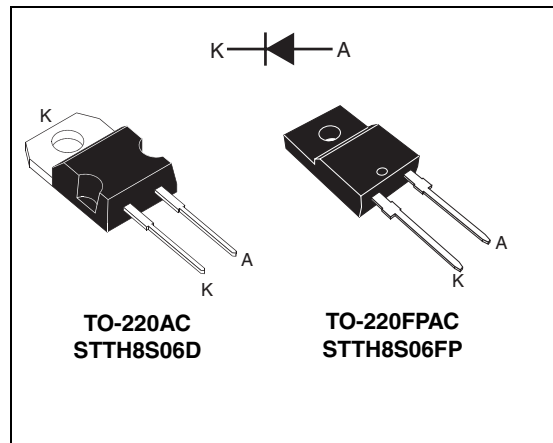

TO-220AC STTH8S06D   **TO-220FPAC STTH8S06FP**

Table 1.   Device summary

$I_{F(AV)}$	8 A
V_{RRM}	600 V
I_{RM}(typ.)	4.4 A
T_j (max)	175 °C
V_F (typ)	1.5 V
t_{rr} (typ)	12 ns

1   Characteristics

Table 2.   Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
$I_{F(AV)}$	Average forward current		8	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms	60	A
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Maximum operating junction temperature		175	°C

Table 3.   Thermal parameter

Symbol	Parameter		Maximum	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC	3.0	°C/W
		TO220FPAC	5.5	

Table 4.   Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R	Reverse leakage current	T_j = 25 °C	V_R = 600 V			20	µA
		T_j= 125 °C			25	200	
V_F	Forward voltage drop	T_j = 25 °C	I_F = 8 A			3.4	V
		T_j = 125 °C			1.5	1.9	

To evaluate the maximum conduction losses use the following equation:
$$P = 1.20 \times I_{F(AV)} + 0.087\, I_F^2{}_{(RMS)}$$

Table 5.   Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 1 A, dI_F/dt = - 200 A/µs, V_R = 30 V			12	18	ns
I_{RM}	Reverse current	T_j = 25 °C	I_F = 8 A, dI_F/dt = - 200 A/µs, V_R = 200 V		1.6	2.2	A
S_{factor}	Softness factor				1		-
Q_{rr}	Reverse recovery charges				17		nC
I_{RM}	Reverse current	T_j = 125 °C	I_F = 8 A, dI_F/dt = - 200 A/µs, V_R = 200 V		4.4	6.0	A
S_{factor}	Softness factor				0.3		-
Q_{rr}	Reverse recovery charges				90		nC

Figure 1.   Forward voltage drop versus forward current
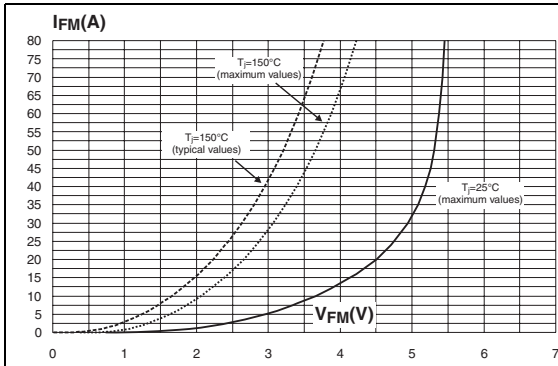

Figure 2.   Relative variation of thermal impedance junction to case versus pulse duration (TO-220AC)
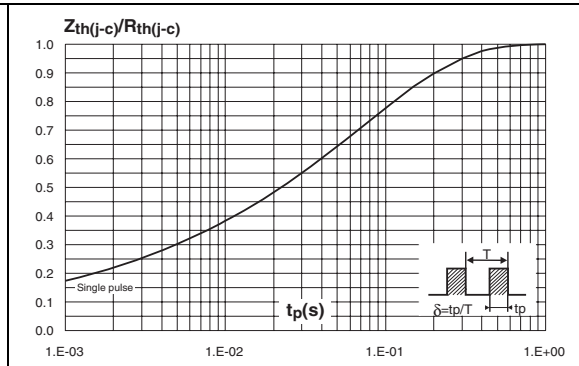

Figure 3.   Relative variation of thermal impedance junction to case versus pulse duration(TO-220FPAC)
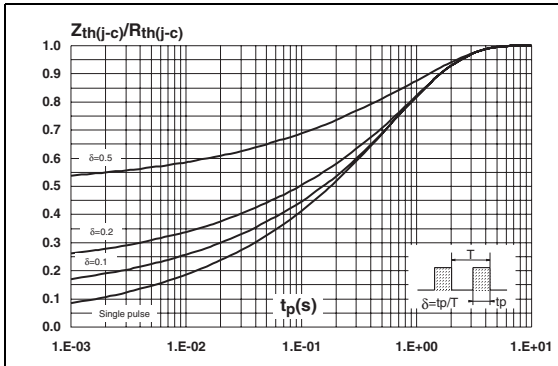

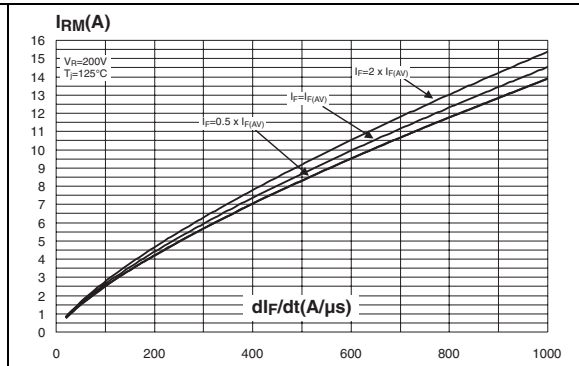**Figure 4.   Peak reverse recovery current versus dI$_F$/dt (typical values)**

Figure 5.   Reverse recovery time versus dI$_F$/dt   Figure 6.   Reverse recovery charges versus (typical values)   dI$_F$/dt (typical values)
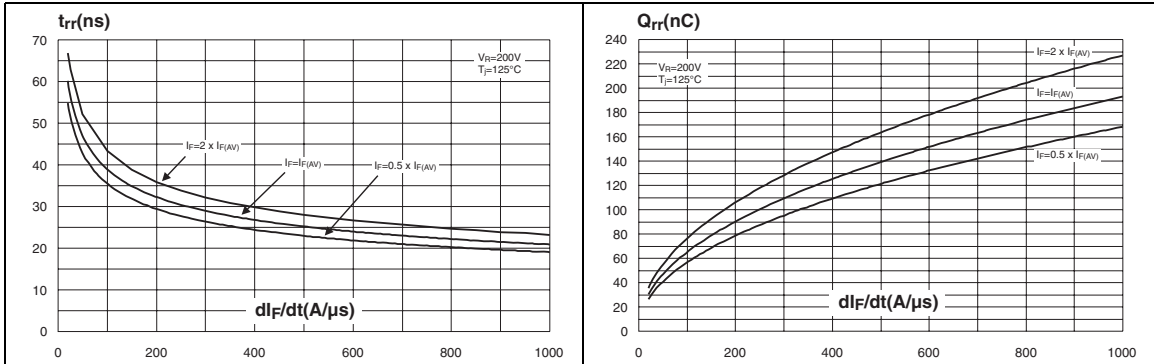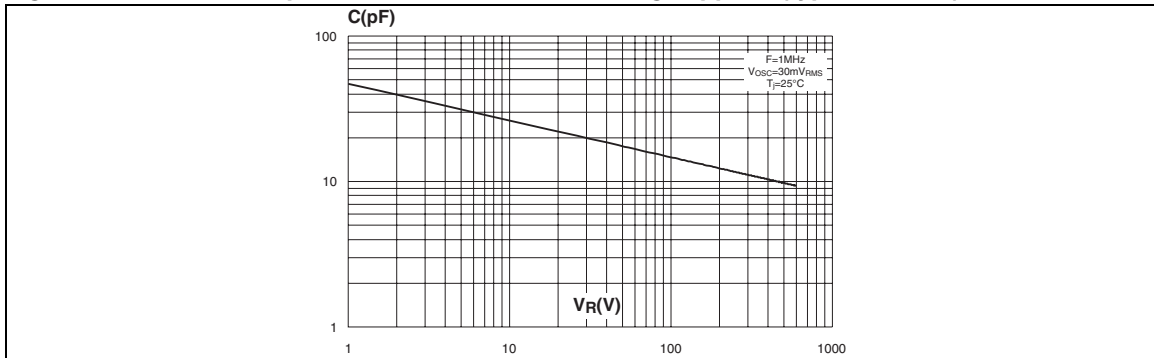

Figure 7.   Junction capacitance versus reverse voltage applied (typical values)

2   Package information

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

In order to meet environmental requirements, ST (also) offers these devices in ECOPACK® packages. ECOPACK® packages are Lead-free. 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.

Table 6.   TO-220AC dimensions

| Ref. | Dimensions | | | |
| | Millimeters | | Inches | |
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
H2	10.00	10.40	0.393	0.409
L2	16.40 typ.		0.645 typ.	
L4	13.00	14.00	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam. I	3.75	3.85	0.147	0.151
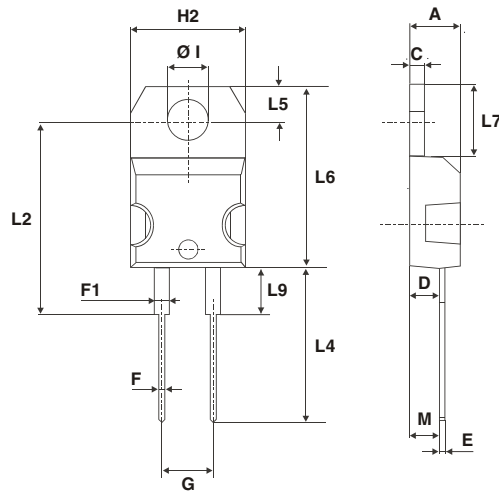
Table 7. TO-220FPAC dimensions

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
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
STTH8S06D	STTH8S06D	TO-220AC	1.9 g	50	Tube
STTH8S06FP	STTH8S06FP	TO-220FPAC	1.64 g	50	Tube

4   Revision history

Table 9.   Document revision history

Date	Revision	Description of changes
18-Dec-2007	1	First issue.

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