STTH12S06

Turbo 2 ultrafast high voltage rectifier

Table 1. Main product characteristics

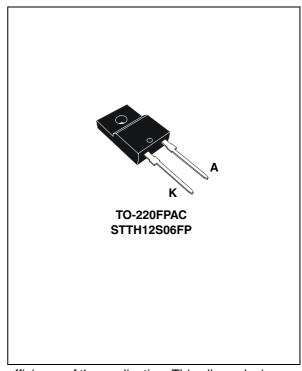
I _{F(AV)}	12 A
V _{RRM}	600 V
I _{RM (typ.)}	6 A
T _{j (max)}	175 °C
V _{F (typ)}	1.5 V
t _{rr (typ)}	14 ns

Features and benefits

- Ultrafast recovery
- Low reverse recovery current
- Reduces losses in diode and switching transistor
- Low thermal resistance
- Higher frequency operation
- Insulated voltage: 1500 V_{RMS}

Description

ST's STTH12S06 is a state of the art Ultrafast recovery diode. By the use of 600 V Pt doping Planar technology, this diode will outperform the power factor correction circuits operating in hardswitching conditions. The extremely low reverse recovery current of the STTH12S06, reduces significantly the switching power losses of the MOSFET, and thus increases the



efficiency of the application. This allows designers to reduce the size of their heatsinks.

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

Table 2. Absolute ratings (limiting values at 125 °C, unless otherwise stated)

Symbol	Parameter	Value	Unit	
V_{RRM}	Repetitive peak reverse voltage			V
I _{F(AV})	Average forward current	12	Α	
I _{FSM}	Surge non repetitive forward current	100	Α	
T _{stg}	Storage temperature range	- 65 + 175	°C	
T _j	Maximum operating junction temperature	175	°C	

Characteristics STTH12S06

1 Characteristics

Table 3. Thermal resistances

Symbol	Parameter	Value	Unit
Rth (j-c)	Junction to case	4.6	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Тур.	Max.	Unit
	Reverse leakage current	V _B = 600 V	T _j = 25 °C			30	^
I R	neverse leakage current	v _R = 600 v	T _j = 125 °C		35	400	μΑ
W	Forward voltage drop	I _F = 12 A	T _j = 25 °C			3.4	V
V _F Forward voltage drop	IF = 12 A	T _j = 150 °C		1.5	1.9	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	

 Table 5.
 Dynamic electrical characteristics

Symbol	Tests co	Min.	Тур.	Max.	Unit	
t _{rr}	$I_F = 1 \text{ A} dI_F/dt = -200 \text{ A/}\mu\text{s} V_R = 30 \text{ V}$			14	21	ns
I _{RM}	$V_R = 400 \text{ V}$ $I_F = 12\text{A}$ $dI_F/dt = -200 \text{ A/}\mu\text{s}$	_		6.0	8.0	Α
S factor	V _R = 200 V I _F = 12A	T _j = 125 °C		0.3		
Q _{rr}	dI _F /dt = - 200 A/μs			160		nC

Figure 1. Conduction losses versus average current

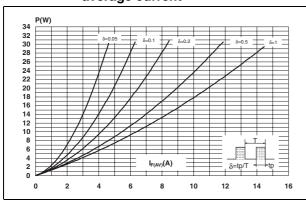
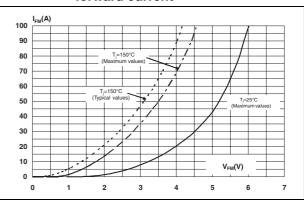


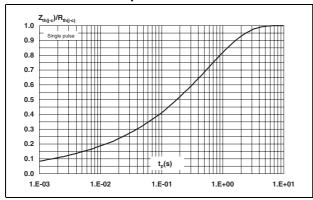
Figure 2. Forward voltage drop versus forward current



STTH12S06 Characteristics

Figure 3. Relative variation of thermal impedance, junction to case, versus pulse duration

Figure 4. Peak reverse recovery current versus dl_F/dt (typical values)



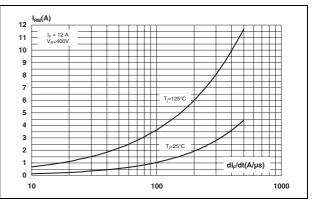
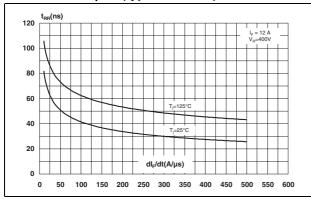


Figure 5. Reverse recovery time versus dl_F/dt (typical values)

Figure 6. Reverse recovery charges versus dI_F/dt (typical values)



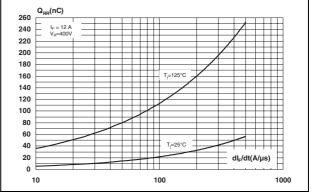
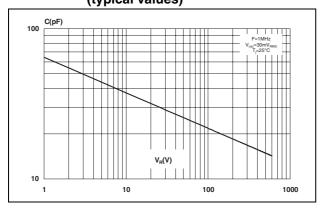


Figure 7. Junction capacitance versus reverse voltage applied (typical values)



Package information STTH12S06

2 Package information

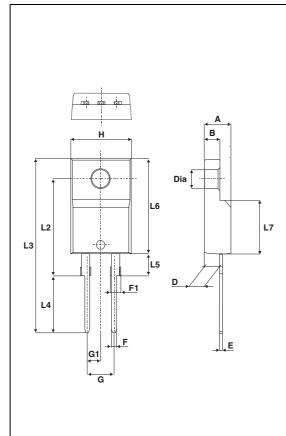
Epoxy meets UL94, V0

Cooling method: by conduction (C)Recommended torque value: 0.55 Nm

Maximum torque value: 0.7 Nm

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.

Table 6. TO-220FPAC dimensions



	Dimensions				
Ref.	Millimeters		Inc	ches	
	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	
G	4.95	5.20	0.195	0.205	
G1	2.4	2.7	0.094	0.106	
Η	10	10.4	0.393	0.409	
L2	16	Гур.	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	

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STTH12S06 Ordering information

3 Ordering information

Table 7. Ordering information

Part number	Marking	Package	Weight	Base qty	Delivery mode
STTH12S06FP	STTH12S06FP	TO-220FPAC	1.64	50	Tube

4 Revision history

 Table 8.
 Revision history

Date	Revision	Changes
02-Oct-2007	1	Initial release.

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