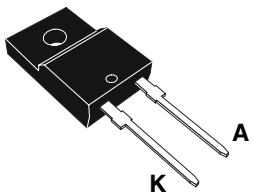
STTH12S06

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



TO-220FPAC
STTH12S06FP

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		600	V
$I_{F(AV)}$)	Average forward current		12	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	100	A
T_{stg}	Storage temperature range		- 65 + 175	°C
T_j	Maximum operating junction temperature		175	°C

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.	Typ.	Max.	Unit
I_R	Reverse leakage current	V_R = 600 V	T_j = 25 °C			30	µA
			T_j = 125 °C		35	400	
V_F	Forward voltage drop	I_F = 12 A	T_j = 25 °C			3.4	V
			T_j = 150 °C		1.5	1.9	

Table 5. Dynamic electrical characteristics

Symbol	Tests conditions		Min.	Typ.	Max.	Unit
t_{rr}	I_F = 1 A dI_F/dt = - 200 A/µs V_R = 30 V			14	21	ns
I_{RM}	V_R = 400 V I_F = 12A dI_F/dt = - 200 A/µs	T_j = 125 °C		6.0	8.0	A
S factor	V_R = 200 V I_F = 12A dI_F/dt = - 200 A/µs			0.3		
Q_{rr}				160		nC

Figure 1. Conduction losses versus average current

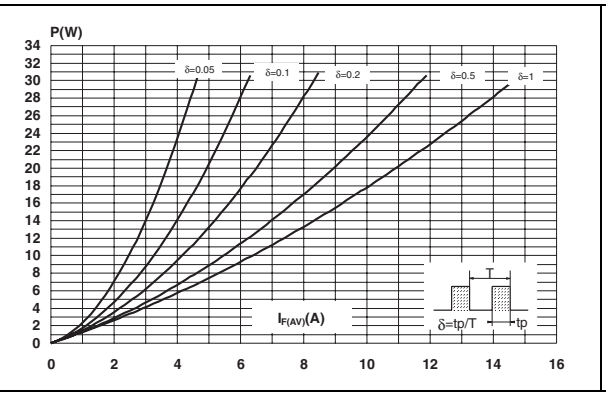


Figure 2. Forward voltage drop versus forward current

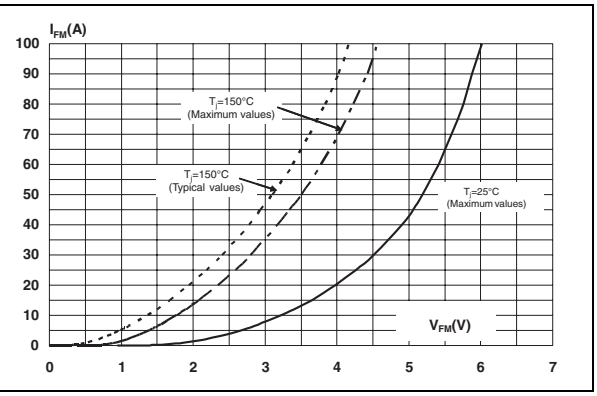


Figure 3. Relative variation of thermal impedance, junction to case, versus pulse duration

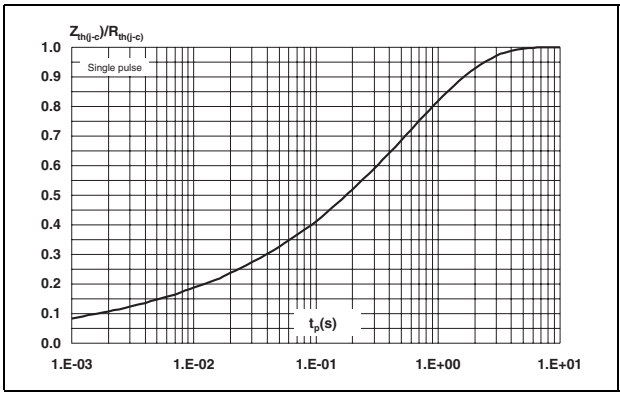


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

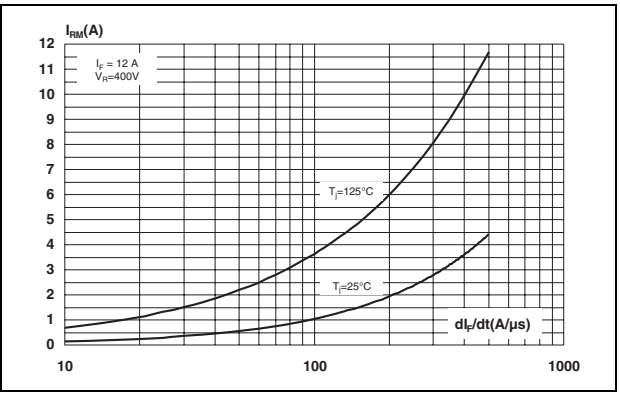


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

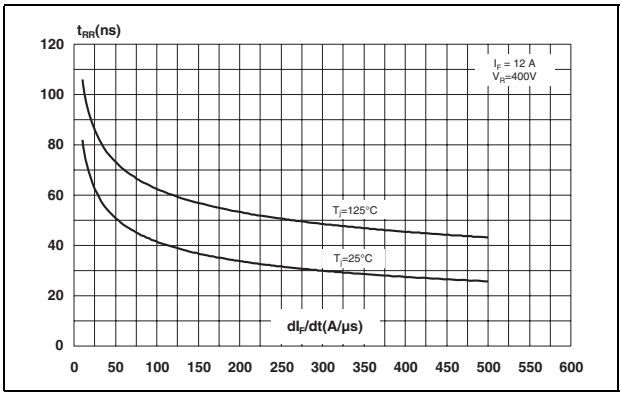


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

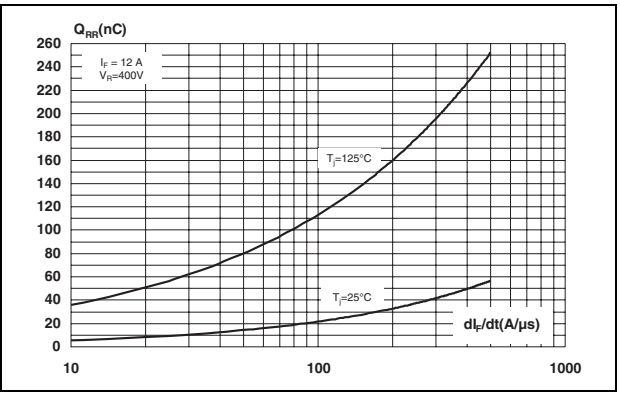
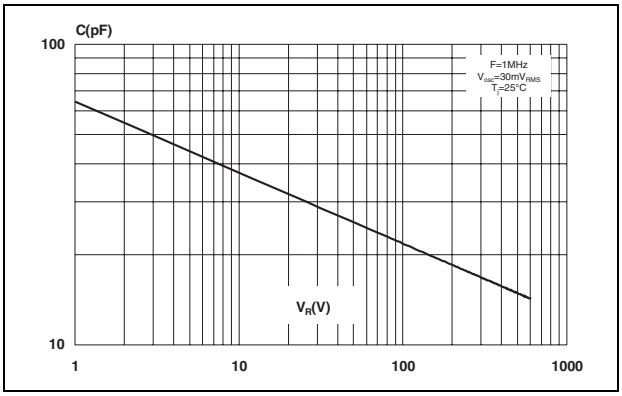


Figure 7. Junction capacitance versus reverse voltage applied (typical values)

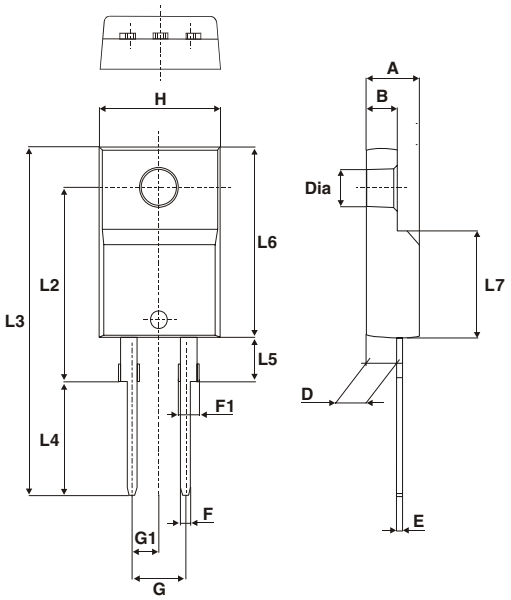


2 Package information

- 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



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 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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