

Turbo 2 ultrafast high voltage rectifier

Main product characteristics

$I_{F(AV)}$	12 A
V_{RRM}	600 V
I_{RM} (typ)	7 A
T_j	175° C
V_F (typ)	1.4 V
t_{rr} (max)	25 ns

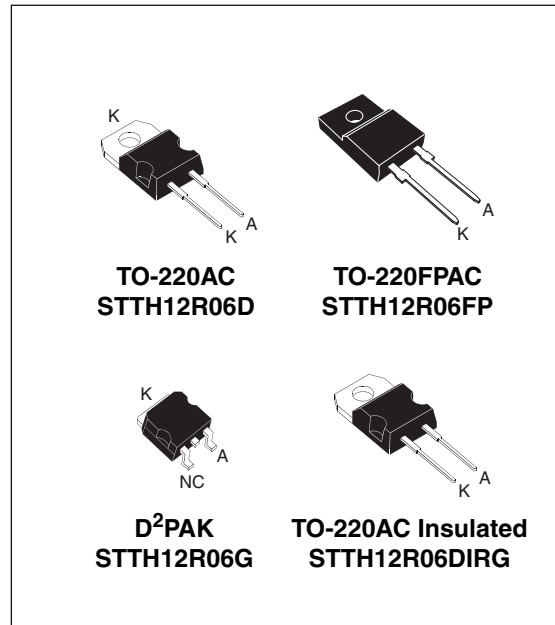
Features and benefits

- Ultrafast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses
- Package insulation voltage:
TO220AC Ins: 2500 V_{RMS}
TO-220FPAC: 2000 V_{DC}

Description

The STTH12R06, which is using ST Turbo 2 600V technology, is specially suited as boost diode in continuous mode power factor corrections and hard switching conditions.

This device is also intended for use as a free wheeling diode in power supplies and other power switching applications.



Order codes

Part Number	Marking
SSTH12R06D	SSTH12R06D
SSTH12R06FP	SSTH12R06FP
SSTH12R06G	SSTH12R06G
SSTH12R06G-TR	SSTH12R06G
SSTH12R06DIRG	SSTH12R06DI

1 Characteristics

Table 1. Absolute Ratings (limiting values)

Symbol	Parameter		Value	Unit	
V_{RRM}	Repetitive peak reverse voltage		600	V	
$I_{F(RMS)}$	RMS forward voltage	TO-220AC / TO-220FPAC / D ² PAK	30	A	
		TO-220AC Ins.	24		
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AC / D ² PAK	12	A	
		TO-220FPAC			$T_c = 125^\circ\text{C}$
		TO-220AC Ins.			$T_c = 50^\circ\text{C}$
I_{FSM}	Surge non repetitive forward current	$T_c = 80^\circ\text{C}$	100	A	
		$t_p = 10\text{ ms sinusoidal}$			
T_{stg}	Storage temperature range		-65 to + 175	$^\circ\text{C}$	
T_j	Maximum operating junction temperature		175	$^\circ\text{C}$	

Table 2. Thermal Resistance

Symbol	Parameter		Value (max).	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC / D ² PAK	1.7	$^\circ\text{C/W}$
		TO-220FPAC	4.4	
		TO-220AC Ins.	3.3	

Table 3. Static Electrical Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			45	μA
		$T_j = 125^\circ\text{C}$			50	600	
V_F	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 12\text{ A}$			2.9	V
		$T_j = 125^\circ\text{C}$			1.4	1.8	

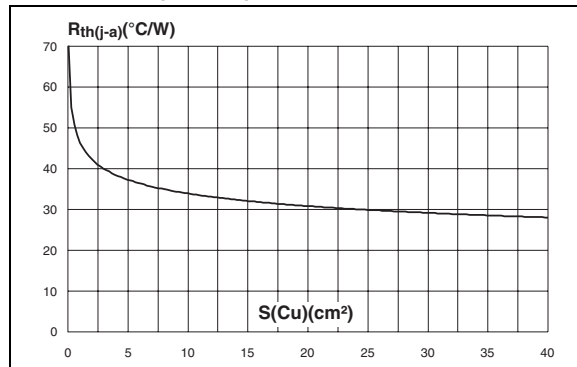
To evaluate the conduction losses use the following equation:

$$P = 1.16 \times I_{F(AV)} + 0.053 I_{F(RMS)}^2$$

Table 4. Dynamic Characteristics

Symbol	Parameter	Test conditions			Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 0.5\text{ A}$ $I_{rr} = 0.25\text{ A}$ $I_R = 1\text{ A}$				25	ns
			$I_F = 1\text{ A}$ $di_F/dt = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$				45	
I_{RM}	Reverse recovery current	$T_j = 125^\circ\text{C}$	$I_F = 12\text{ A}$ $V_R = 400\text{ V}$ $di_F/dt = -200\text{ A}/\mu\text{s}$			7.0	8.4	A
S factor	Softness factor					0.2		
Qrr	Reverse recovery charges					180		
t_{fr}	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 12\text{ A}$ $di_F/dt = 96\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$				200	ns
V_{FP}	Forward recovery voltage						5.5	V

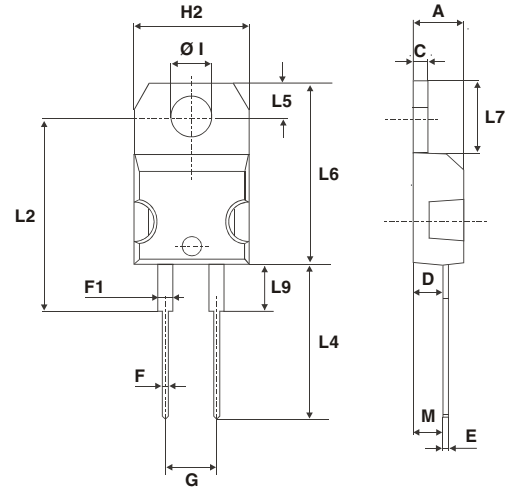
Figure 13. Thermal resistance junction to ambient versus copper surface under tab (epoxy FR4, $e_{\text{Cu}} = 35 \mu\text{m}$) (D²PAK)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 Nm (TO-220FPAC) / 0.55 Nm (TO-220AC)
- Maximum torque value: 1.0 Nm (TO-220FPAC) / 0.70 Nm (TO-220AC)

Table 5. 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

3 Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH12R06D	STTH12R06D	TO-220AC	1.90 g	50	Tube
STTH12R06G	STTH12R06G	D ² PAK	1.48 g	50	Tube
STTH12R066G-TR	STTH12R06G	D ² PAK	1.48 g	1000	Tape & reel
STTH12R06FP	STTH12R06FP	TO-220FPAC	1.70 g	50	Tube
STTH12R06DIRG	STTH12R06DI	TO-220AC Ins.	1.86 g	50	Tube

4 Revision history

Date	Revision	Changes
January-2002	1	First issue
18-Oct-2004	2	D ² PAK and TO-220AC Insulated packages added
10-Aug-2006	3	Reformatted to current standard. Added Package insulation voltages on page 1