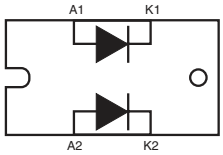
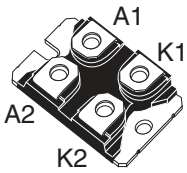
STTH6006TV

Turbo 2 ultrafast - high voltage rectifier

Main product characteristics

$I_{F(AV)}$	2 x 30 A
V_{RRM}	600 V
T_j	150° C
V_F (typ)	1.1 V
t_{rr} (max)	50 ns





ISOTOP

STTH6006TV1

Features and benefits

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces conduction and switching losses
- Insulated voltage: 2500 V_{RMS}
- Typical package capacitance: 45 pF

Description

The STTH6006TV1 uses ST Turbo2 600V technology. This device is specially suited for use in switching power supplies, and industrial applications such as rectification and PFC boost diode.

Order codes

Part Number	Marking
STTH6006TV1	STTH6006TV1

Table 1. Absolute ratings (limiting values per diode at 25° C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			600	V
$I_{F(RMS)}$	RMS forward current			100	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	Per diode	$T_c = 70°$ C	30	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10$ ms Sinusoidal		210	A
T_{stg}	Storage temperature range			-55 to + 150	°C
T_j	Maximum operating junction temperature(1)			150	°C

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ thermal runaway condition for a diode on its own heatsink

1 Characteristics

Table 2. Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1.6	° C/W
		Total	0.85	
$R_{th(c)}$	Coupling		0.1	

When the diodes are used simultaneously:
$\Delta T_{j(diode1)} = P_{(diode1)} \times R_{th(j-c)}$ (per diode) + $P_{(diode2)} \times R_{th(c)}$

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$			25	µA
		T_j = 125° C			80	800	
V_F(2)	Forward voltage drop	T_j = 25° C	I_F = 30 A			1.85	V
		T_j = 150° C			1.10	1.40	

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

To evaluate the conduction losses use the following equation:
$P = 1.07 \times I_{F(AV)} + 0.011\ I_F{}^2{}_{(RMS)}$

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 0.5 A, I_{rr} = 0.25 A, I_R = 1 A, T_j = 25° C			50	ns
		I_F = 1 A, dI_F/dt = -50 A/µs, V_R = 30 V, T_j = 25° C		50	70	
I_{RM}	Reverse recovery current	I_F = 30 A, dI_F/dt = -100 A/µs, V_R = 400 V, T_j = 125° C		8	11	
t_{fr}	Forward recovery time	I_F = 30 A dI_F/dt = 100 A/µs $V_{FR} = 1.1 \times V_{Fmax}$, T_j = 25° C			500	ns
V_{FP}	Forward recovery voltage	I_F = 30 A dI_F/dt = 100 A/µs $V_{FR} = 1.1 \times V_{Fmax}$, T_j = 25° C		2.5		V

Figure 1. Conduction losses versus average current

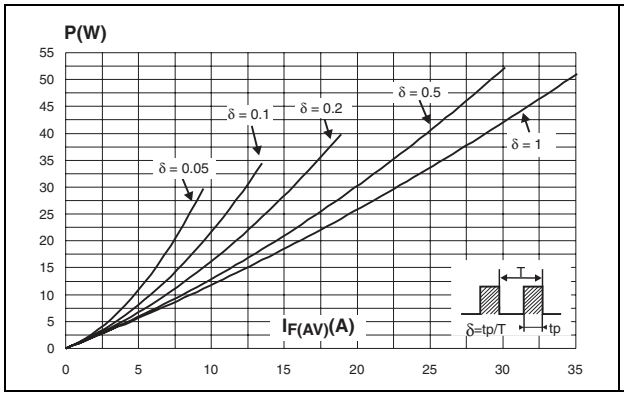


Figure 2. Forward voltage drop versus forward current

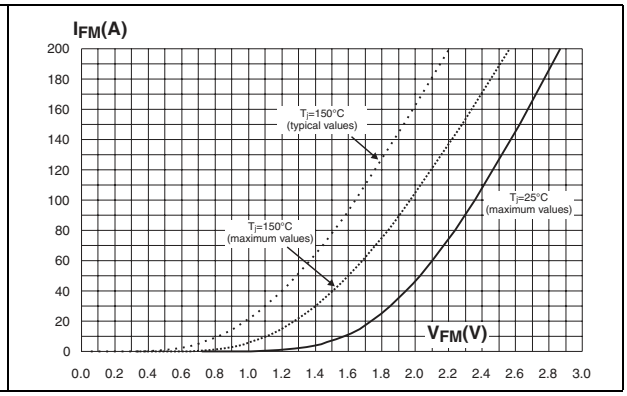


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

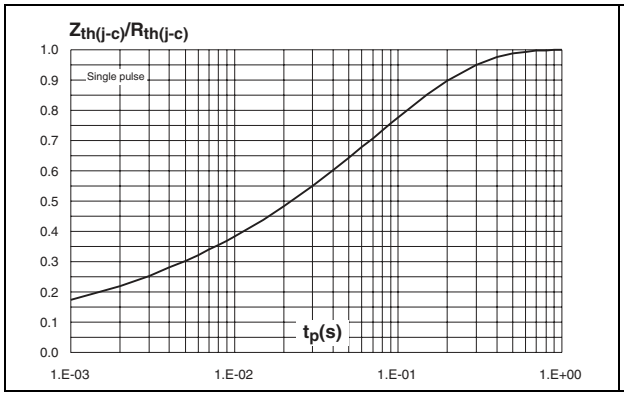


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

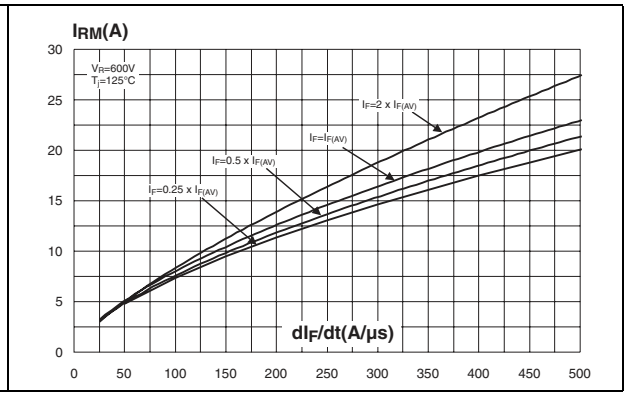


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

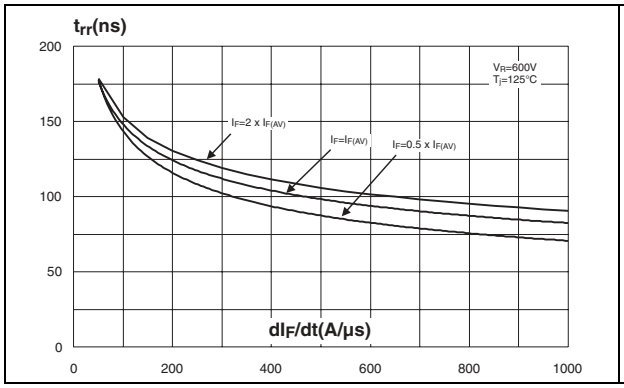


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

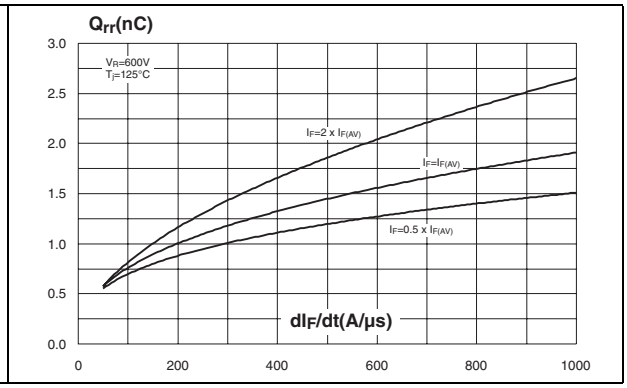


Figure 7. Softness factor versus dI_F/dt (typical values)

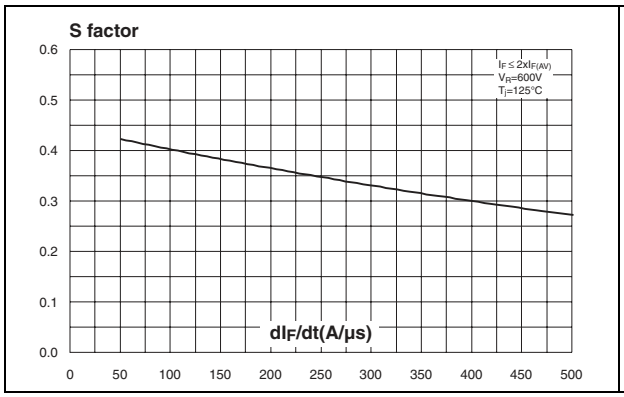


Figure 8. Relative variations of dynamic parameters versus junction temperature

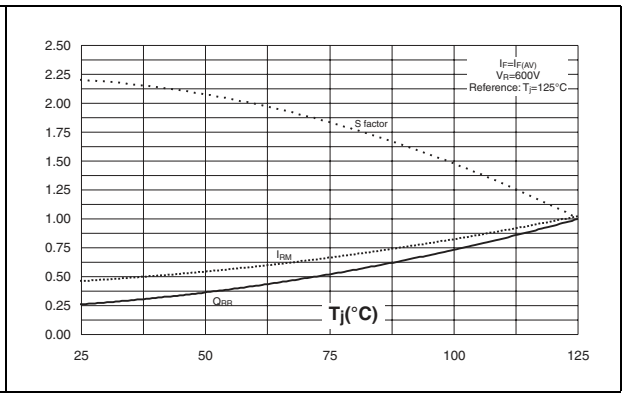


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

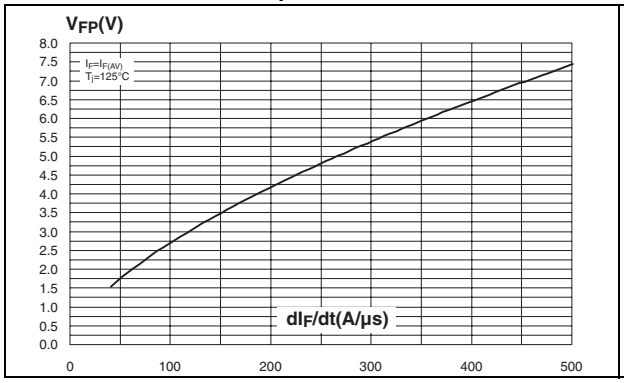


Figure 10. Forward recovery time versus dI_F/dt (typical values)

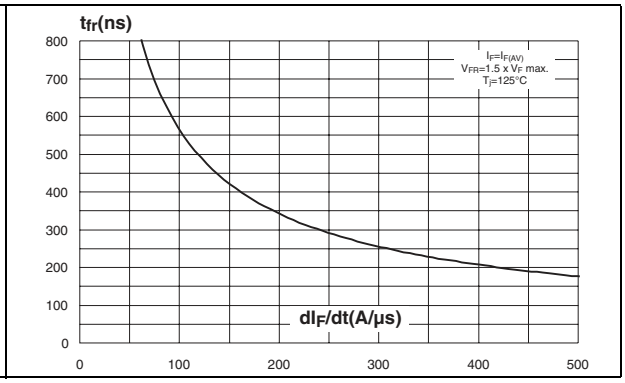
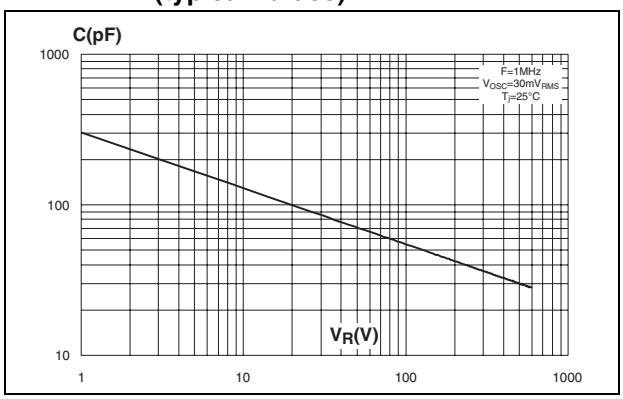


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

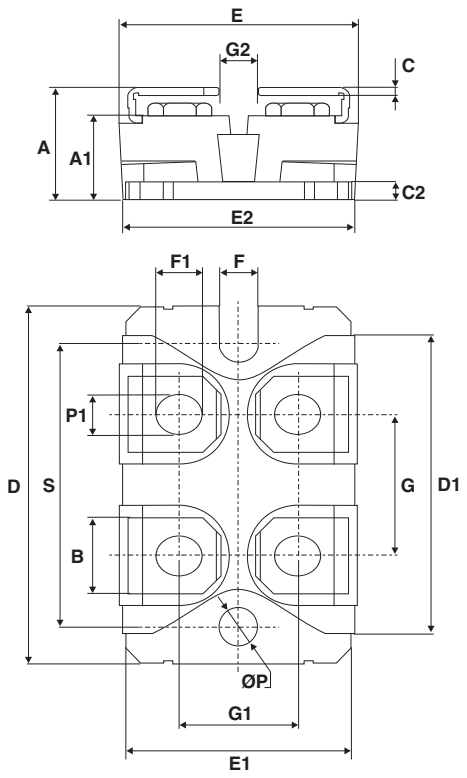


2 Package mechanical data

Epoxy meets UL94, V0

Cooling method: by conduction (C)

Table 5. ISOTOP dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max	Min.	Max.
A	11.80	12.20	0.465	0.480
A1	8.90	9.10	0.350	0.358
B	7.8	8.20	0.307	0.323
C	0.75	0.85	0.030	0.033
C2	1.95	2.05	0.077	0.081
D	37.80	38.20	1.488	1.504
D1	31.50	31.70	1.240	1.248
E	25.15	25.50	0.990	1.004
E1	23.85	24.15	0.939	0.951
E2	24.80 typ.		0.976 typ.	
G	14.90	15.10	0.587	0.594
G1	12.60	12.80	0.496	0.504
G2	3.50	4.30	0.138	0.169
F	4.10	4.30	0.161	0.169
F1	4.60	5.00	0.181	0.197
P	4.00	4.30	0.157	0.69
P1	4.00	4.40	0.157	0.173
S	30.10	30.30	1.185	1.193

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.

3 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH6006TV1	STTH6006TV1	ISOTOP	27 g (without screws)	10 (with screws)	Tube

4 Revision history

Date	Revision	Description of Changes
18-May-2006	1	First issue.