STTH120L06TV

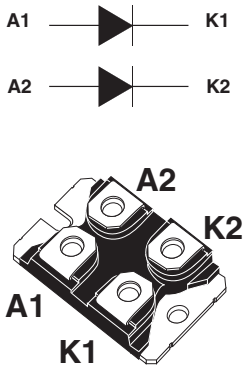
Turbo 2 ultrafast high voltage rectifier

Features and benefits

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses

Description

The STTH120L06TV, which is using ST Turbo 2 600 V technology, is specially suited for use in switching power supplies, and industrial applications, as rectification and free-wheeling diode.



ISOTOP
STTH120L06TV1

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 60 A
V_{RRM}	600 V
T_j	150 °C
V_F (typ)	0.95 V
t_{rr} (max)	70 ns

TM: ISOTOP is a trademark of STMicroelectronics

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			600	V
$I_{F(RMS)}$	RMS forward current			120	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	$T_c = 65°$ C	Per diode	60	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10$ ms Sinusoidal		500	A
T_{stg}	Storage temperature range			-55 to + 150	°C
T_j	Maximum operating junction temperature			150	°C

Table 3. Thermal parameter

Symbol	Parameter		Maximum	Unit
$R_{th(j-c)}$	Junction to case	Per diode	0.98	°C/W
		Total	0.54	
$R_{th(c)}$	Coupling		0.1	

When the diodes 1 and 2 are used simultaneously:

$\Delta T_{j\ (diode1)} = P_{(diode1)} \times R_{th(j-c)\ (per\ diode)} + P_{(diode2)} \times R_{th(c)}$

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R(1)	Reverse leakage current	$T_j = 25$ °C	$V_R = V_{RRM}$			50	µA
		$T_j = 125$ °C			50	500	
V_F(2)	Forward voltage drop	$T_j = 25$ °C	$I_F = 60$ A			1.55	V
		$T_j = 150$ °C			0.95	1.20	

1. Pulse test: $t_p = 5$ ms, $\delta < 2$ %
2. Pulse test: $t_p = 380$ µs, $\delta < 2$ %

To evaluate the maximum conduction losses use the following equation:
$P = 0.93 \times I_{F(AV)} + 0.0045\ I_F{}^2{}_{(RMS)}$

Table 5. Dynamic characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 0.5 A, I_{rr} = 0.25 A, I_R = 1 A			70	ns
			I_F = 1 A, dI_F/dt = 50 A/µs, V_R = 30 V		75	105	
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 60 A, dI_F/dt = 400 A/µs, dI_F/dt = 100 A/µs		14	19	A
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 60 A, dI_F/dt = 200 A/µs V_{FR} = 1.1 x V_{Fmax}			500	ns
V_{FP}	Forward recovery voltage	T_j = 25 °C	I_F = 60 A, dI_F/dt = 200 A/µs V_{FR} = 1.1 x V_{Fmax}		3		V

Figure 1. Conduction losses versus average forward current (per diode)

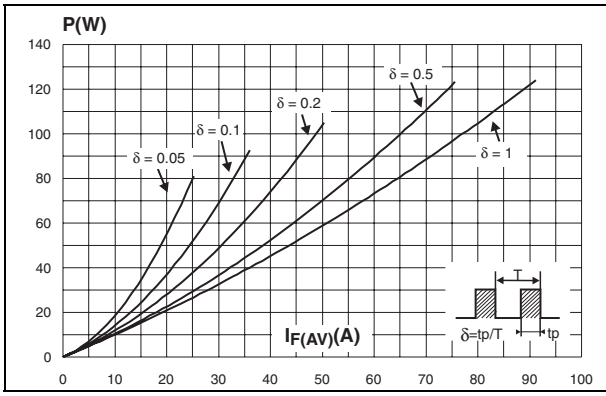


Figure 2. Forward voltage drop versus forward current (per diode)

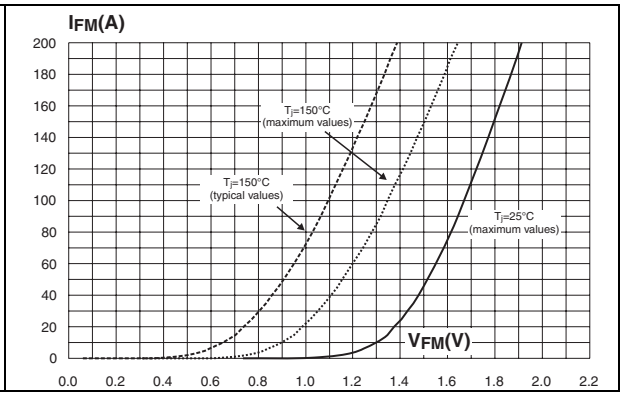


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

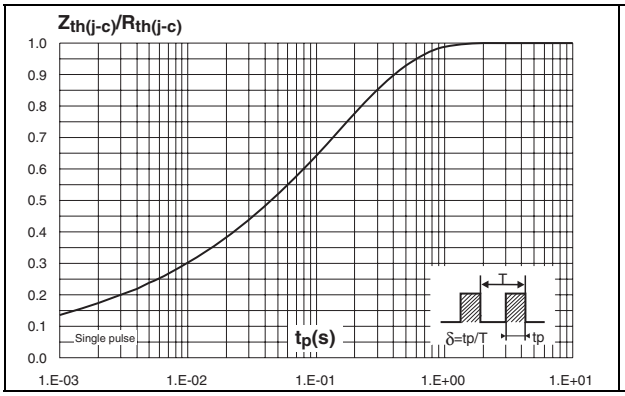


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values, per diode)

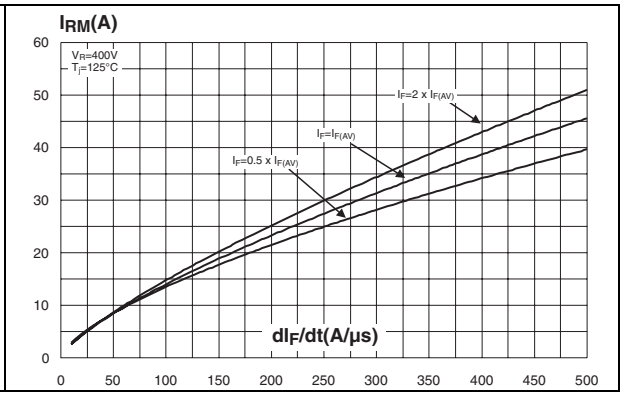


Figure 5. Reverse recovery time versus dI_F/dt (typical values, per diode)

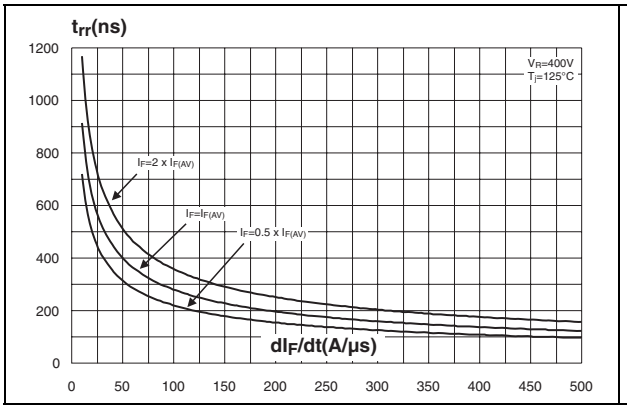


Figure 6. Reverse recovery charges versus dI_F/dt (typical values, per diode)

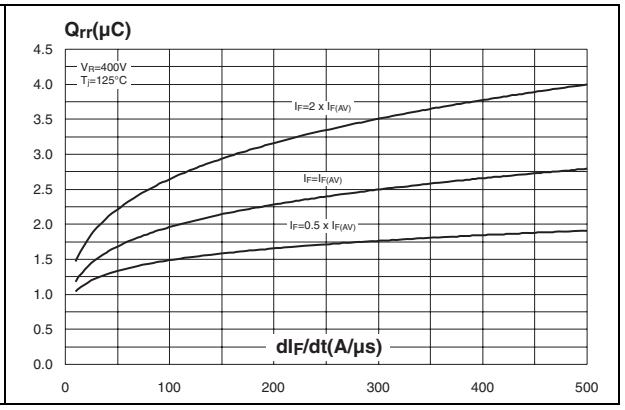


Figure 7. Reverse recovery softness factor versus dI_F/dt (typical values, per diode)

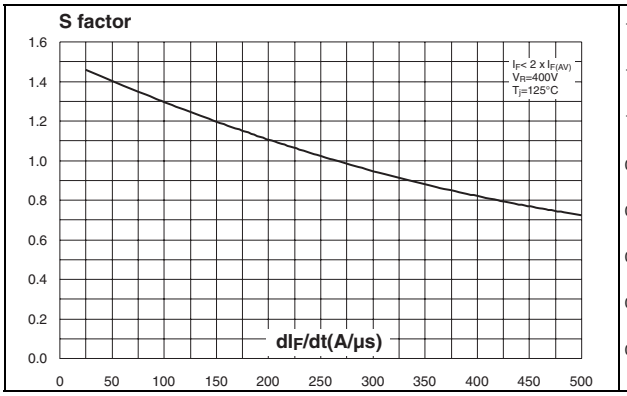


Figure 8. Relative variations of dynamic parameters versus junction temperature

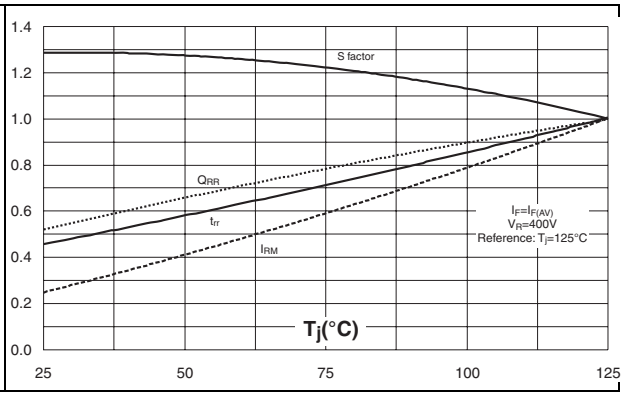


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values, per diode)

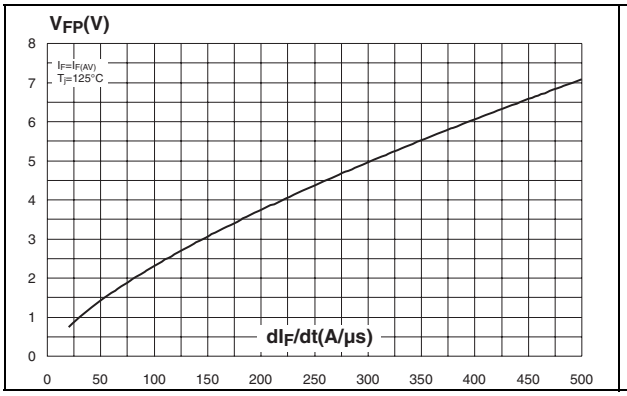


Figure 10. Forward recovery time versus dI_F/dt (typical values, per diode)

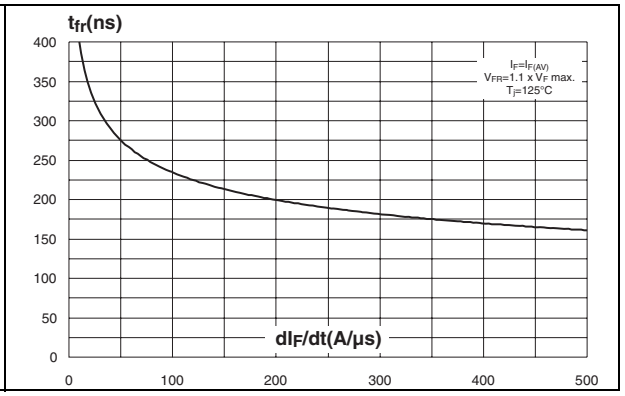
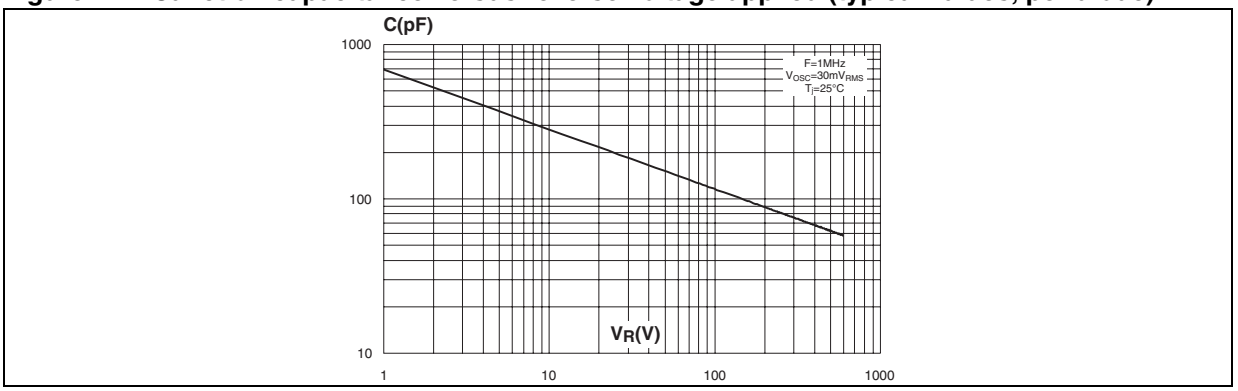


Figure 11. Junction capacitance versus reverse voltage applied (typical values, per diode)

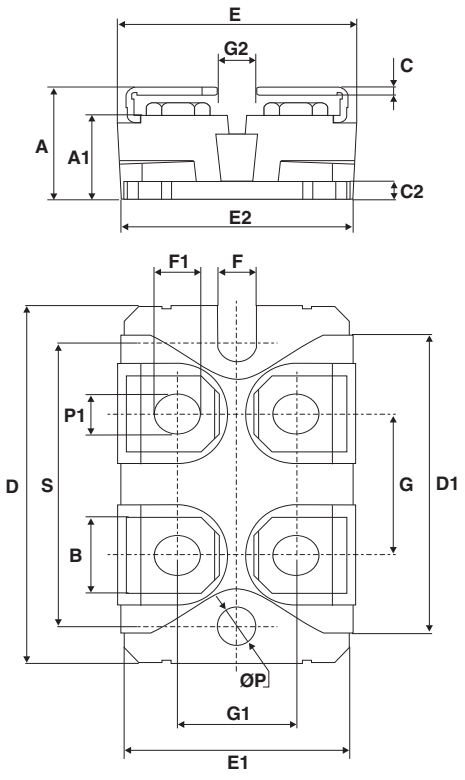


2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 1.3 N·m
- Maximum torque value: 1.5 N·m

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 6. 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

3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH120L06TV1	STTH120L06TV1	ISOTOP	27 g (without screws)	10 (with screws)	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
07-Sep-2004	1	First issue.
04-Apr-2011	2	Updated *Chapter 2: Package information*.