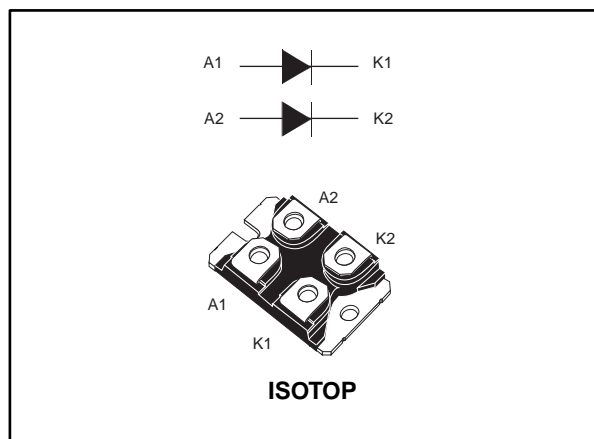


## Turbo 2 ultrafast high voltage rectifier

Datasheet - production data


**Description**

This device that uses ST Turbo 2 600 V technology, is specially suited for use in switching power supplies, and industrial applications, as rectification and freewheeling diode.

**Table 1: Device summary**

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

**Features**

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses
- Insulated package ISOTOP:
  - Insulated voltage: 2500  $V_{RMS}$  sine



TM: ISOTOP is a trademark of STMicroelectronics

# 1 Characteristics

**Table 2: Absolute ratings (limiting values, per diode)**

Symbol	Parameter		Value	Unit
V <sub>RRM</sub>	Repetitive peak reverse voltage		600	V
I <sub>F(RMS)</sub>	Forward rms current		120	A
I <sub>F(AV)</sub>	Average forward current, δ = 0.5	T <sub>C</sub> = 65 °C, per diode	60	A
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal	500	A
T <sub>stg</sub>	Storage temperature range		-55 to +150	°C
T <sub>j</sub>	Maximum operating junction temperature		150	°C

**Table 3: Thermal parameters**

Symbol	Parameter		Maximum values	Unit
R <sub>th(j-c)</sub>	Junction to case	Per diode	0.98	°C/W
		Total	0.54	
R <sub>th(c)</sub>	Coupling		0.1	

When the diodes 1 and 2 are used simultaneously:

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

**Table 4: Static electrical characteristics**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-		50	µA
		T <sub>j</sub> = 125 °C		-	50	500	
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 60 A	-		1.55	V
		T <sub>j</sub> = 150 °C		-	0.95	1.20	

**Notes:**

<sup>(1)</sup>Pulse test: t<sub>p</sub> = 5 ms, δ < 2%

<sup>(2)</sup>Pulse test: t<sub>p</sub> = 380 µs, δ < 2%

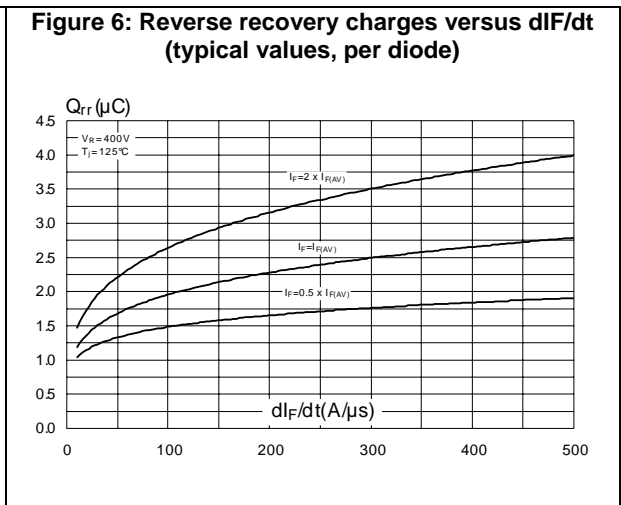
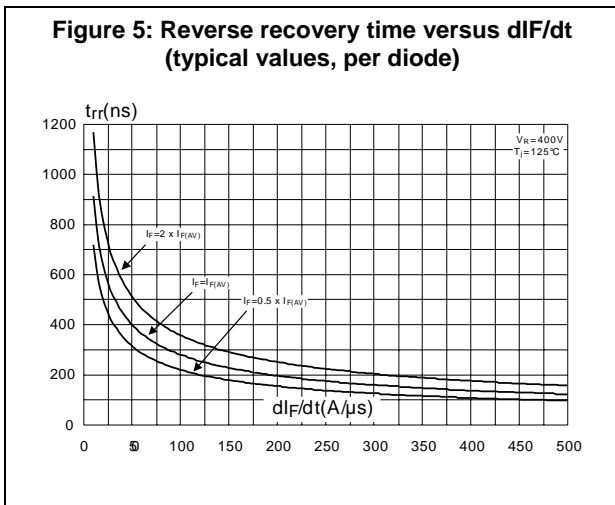
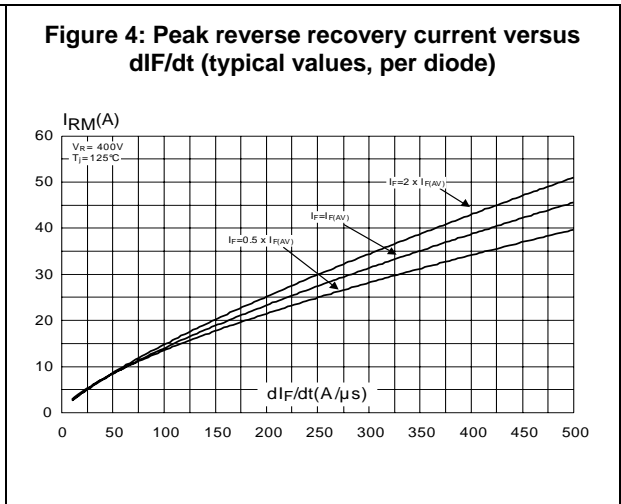
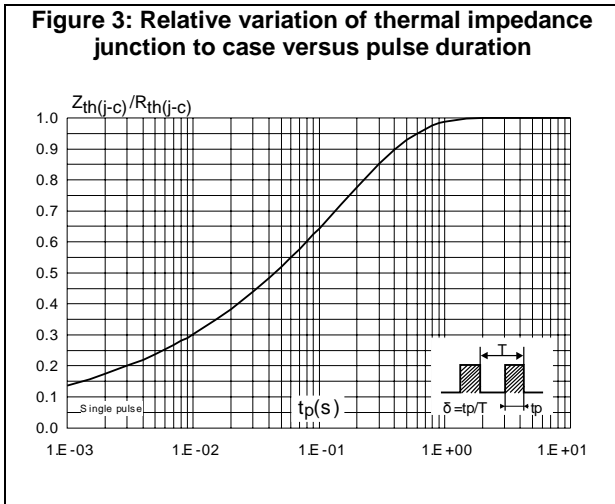
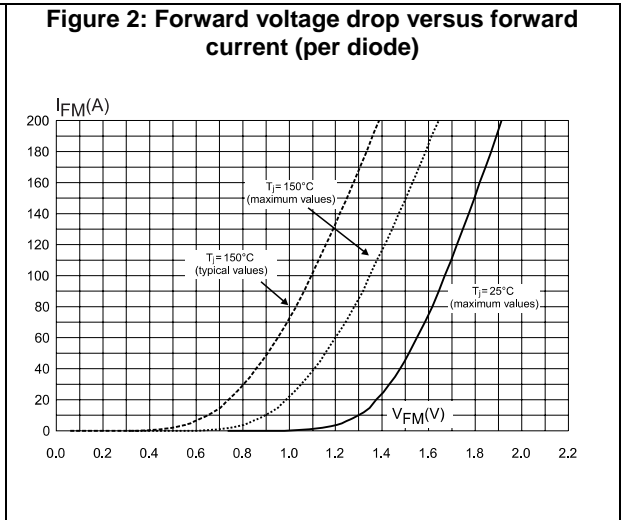
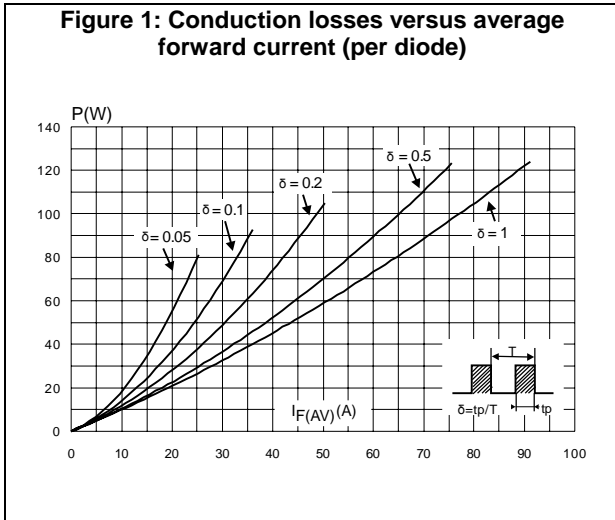
To evaluate the maximum conduction losses, use the following equation:

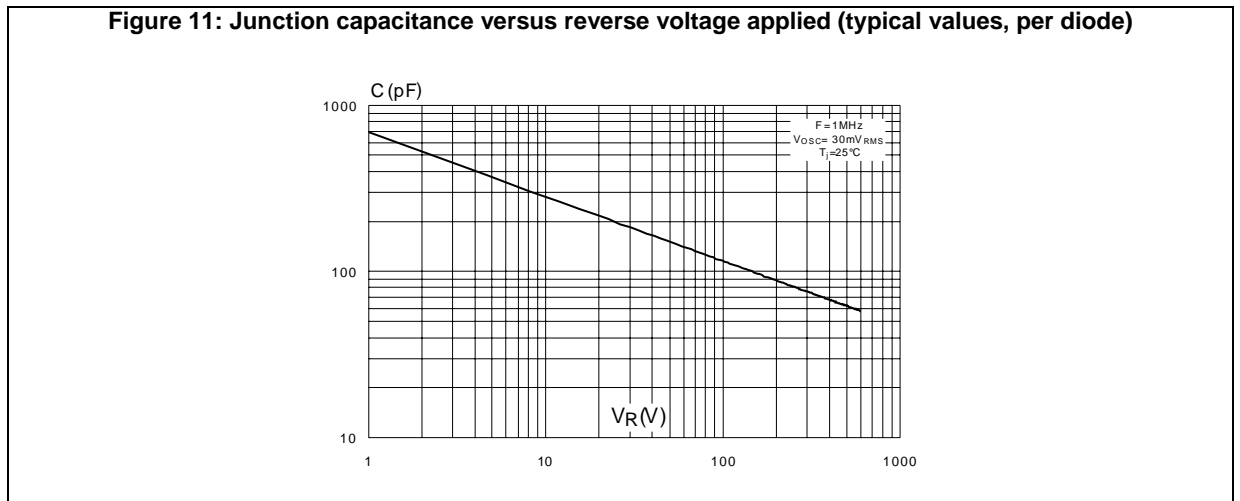
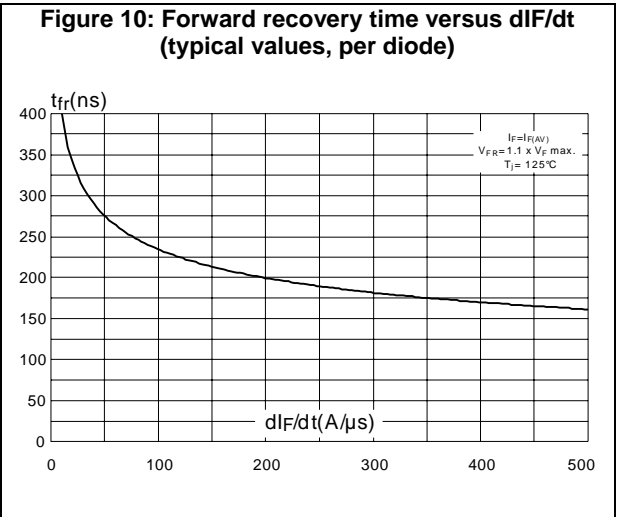
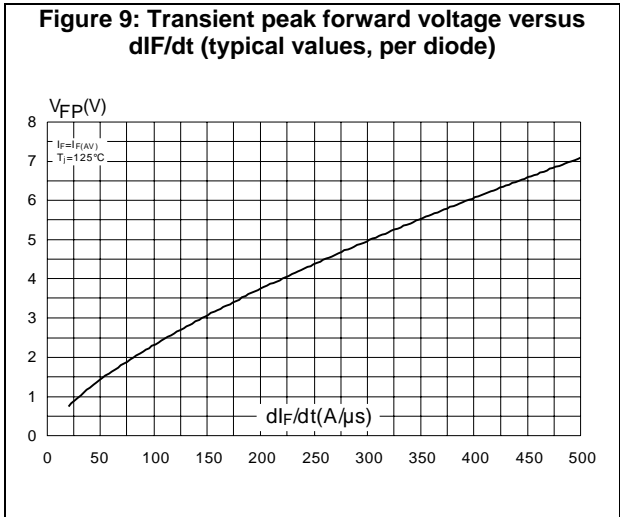
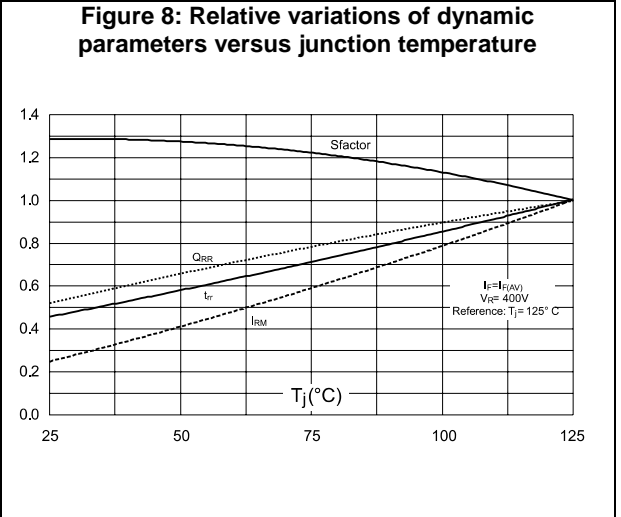
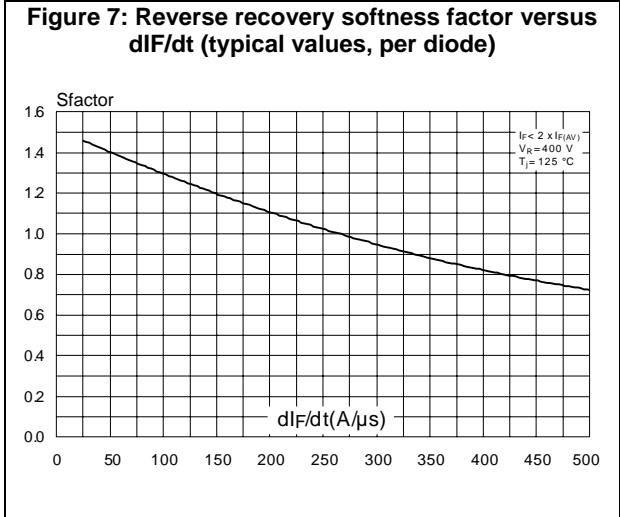
$$P = 0.93 \times I_{F(AV)} + 0.0045 \times I_{F(RMS)}^2$$

Table 5: Dynamic characteristics (per diode)

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

# 1.1 Characteristics (curves)





## 2 Package information

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](http://www.st.com). ECOPACK® is an ST trademark.

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

STMicroelectronics strongly recommends the use of the screws delivered with this product.

The use of any other screws is entirely at the user's own risk and will invalidate the warranty.

### 2.1 ISOTOP package information

Figure 12: ISOTOP package outline

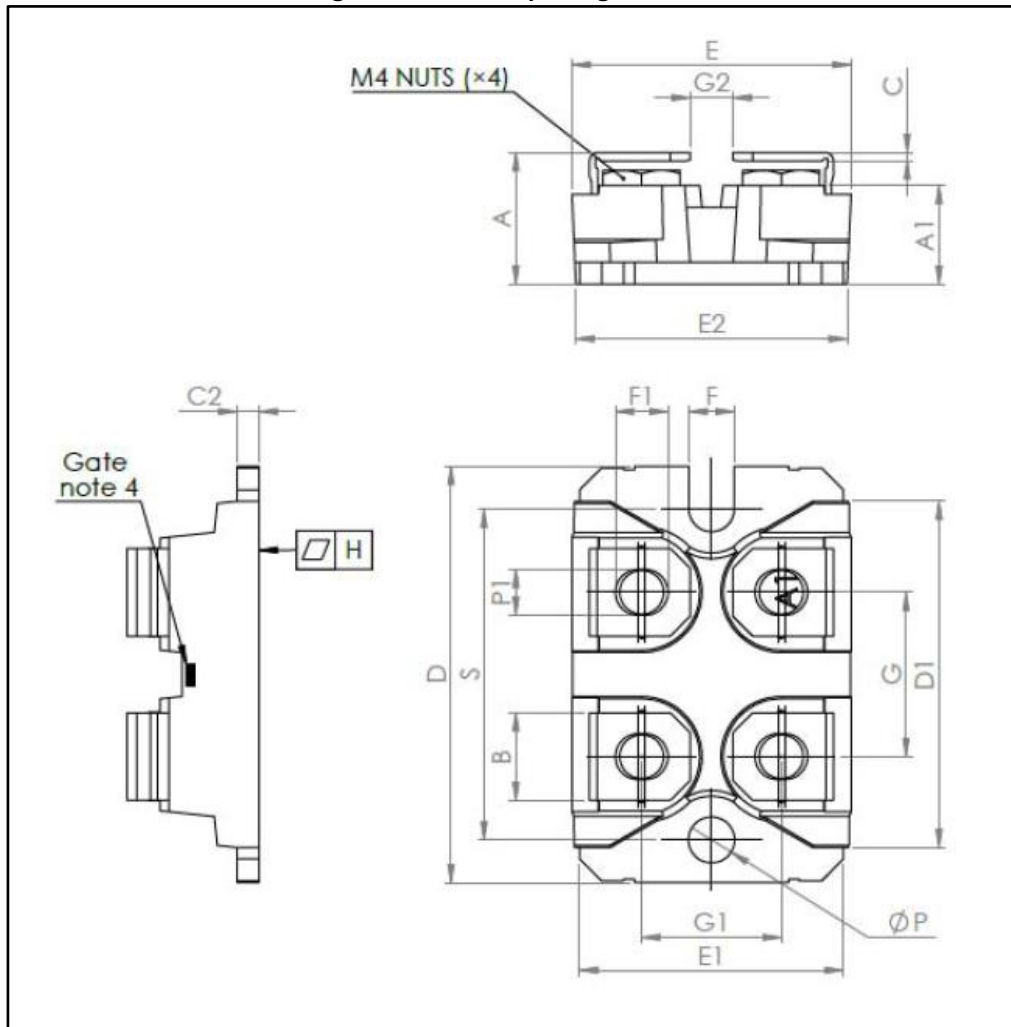


Table 6: ISOTOP package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	11.80	12.20	0.460	0.480
A1	8.90	9.10	0.350	0.358
B	7.80	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		0.976	
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	0.181	0.197
H	-0.05	0.1	-0.002	0.004
Diam P	4	4.30	0.157	0.169
P1	4	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 <i>Chapter 2: Package information..</i>
20-Jan-2017	3	Updated section "Features" and section 2.2: "ISOTOP package information".
22-Jan-2018	4	Added cote "H" (-0.05 mm min - 0.1mm max in ISOTOP package information.



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