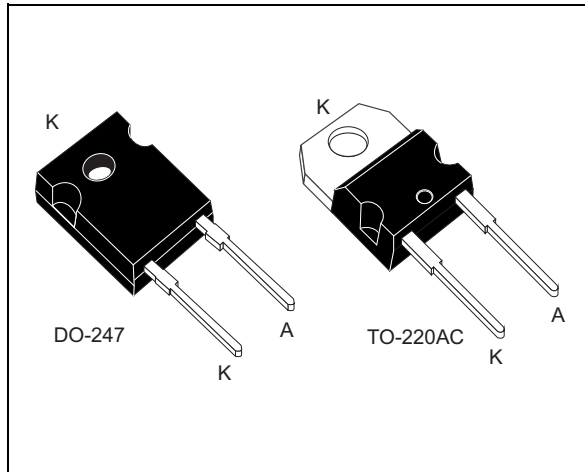


## Turbo 2 ultrafast high voltage rectifier

Datasheet — production data



### Description

The STTH15S12 is developed using ST's Turbo 2 1200 V technology. It is well-suited as a boost diode, especially for use in UPS.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	15 A
$V_{RRM}$	1200 V
$t_{rr}$ (typ)	27 ns
$V_F$ (typ)	1.9 V
$T_j$ (max)	175 °C

### Features

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

# 1 Characteristics

**Table 2. Absolute ratings (limiting values at  $T_j = 25\text{ °C}$ , unless otherwise specified)**

Symbol	Parameter	Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage	1200	V
$I_{F(RMS)}$	Forward rms current	50	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	$T_c = 100\text{ °C}$	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	A
$T_{stg}$	Storage temperature range	-65 to +175	°C
$T_j$	Maximum operating junction temperature	175	°C

**Table 3. Thermal parameters**

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	1.4	°C/W

**Table 4. Static electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$		10	$\mu\text{A}$
		$T_j = 150\text{ °C}$		40	400	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 15\text{ A}$	3.1		V
		$T_j = 150\text{ °C}$		1.9	2.7	

1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

2. Pulse test:  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 1.9 \times I_{F(AV)} + 0.0533 I_{F(RMS)}^2$$

**Table 5. Dynamic characteristics**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t <sub>rr</sub>	Reverse recovery time	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 1 A, V <sub>R</sub> = 30 V, dI <sub>F</sub> /dt = 200 A/μs		27	40	ns
I <sub>RM</sub>	Reverse recovery current	T <sub>j</sub> = 125 °C	I <sub>F</sub> = 15 A, V <sub>R</sub> = 600 V, dI <sub>F</sub> /dt = 200 A/μs		12	17	A
S	Softness factor				2		
Q <sub>RR</sub>	Reverse recovery charge				1300		nC

Figure 1. Average forward power dissipation versus average forward current

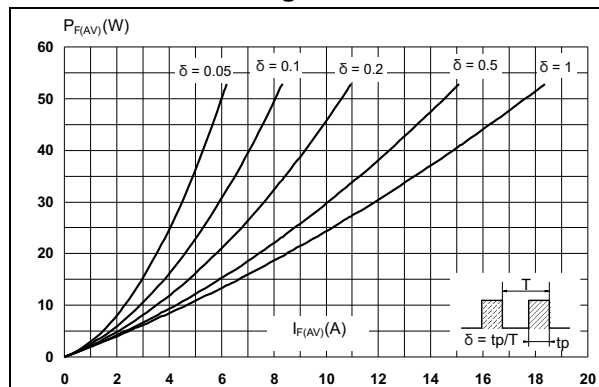


Figure 2. Forward voltage drop versus forward current (typical values)

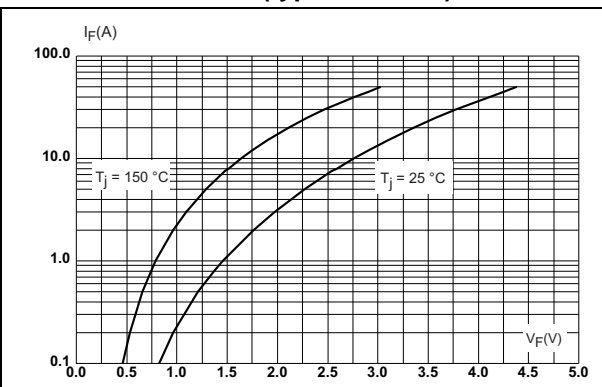


Figure 3. Forward voltage drop versus forward current (maximum values)

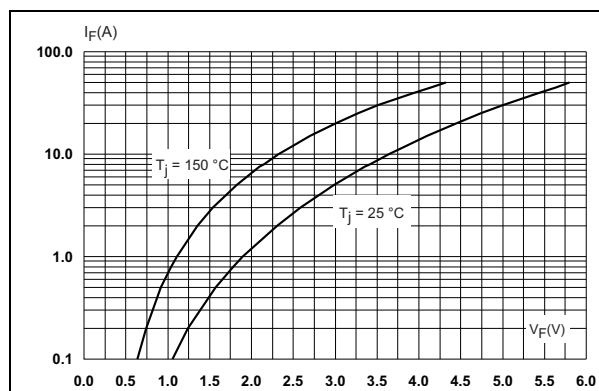


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

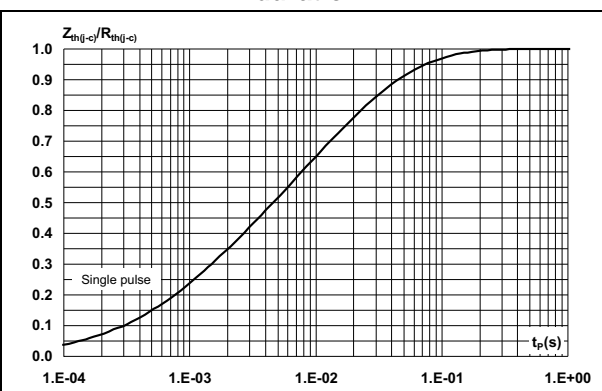
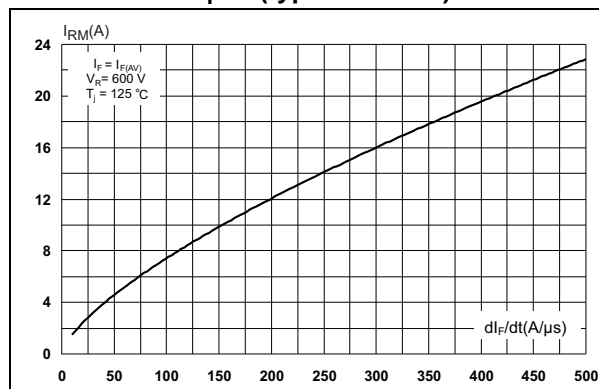
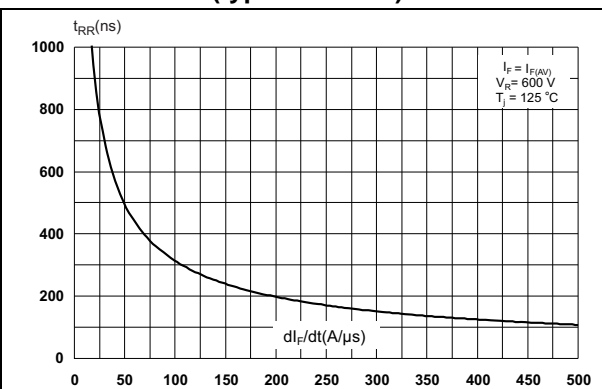
Figure 5. Peak reverse recovery current versus  $di_F/dt$  (typical values)Figure 6. Reverse recovery time versus  $di_F/dt$  (typical values)

Figure 7. Reverse recovery charges versus  $di_F/dt$  (typical values)

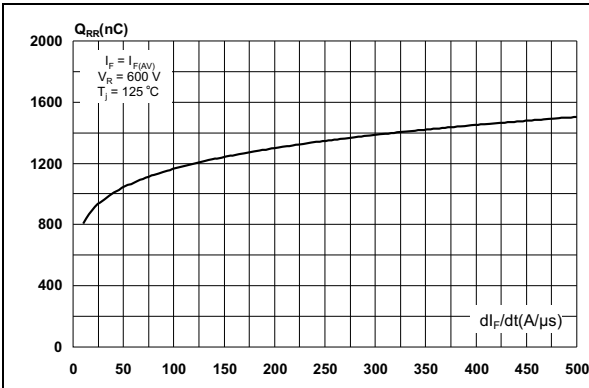


Figure 8. Reverse recovery softness factor versus  $di_F/dt$  (typical values)

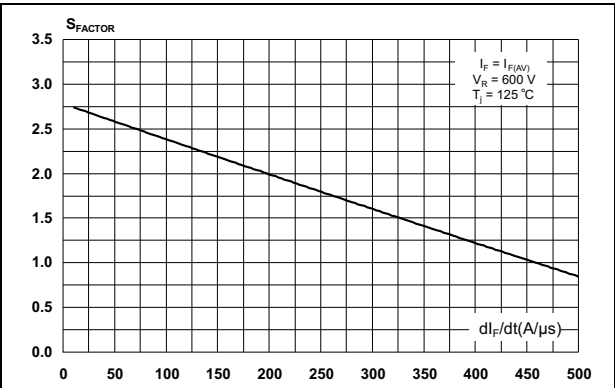


Figure 9. Relative variations of dynamic parameters versus junction temperature

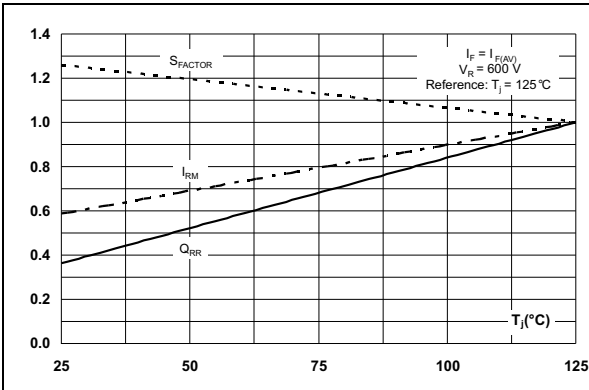
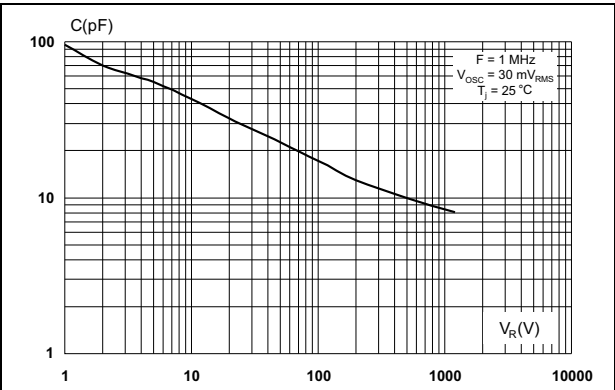


Figure 10. Junction capacitance versus reverse voltage applied (typical values)



## 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.4 N·m to 0.6 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](http://www.st.com). ECOPACK® is an ST trademark.

Figure 11. T0-220AC dimension definitions

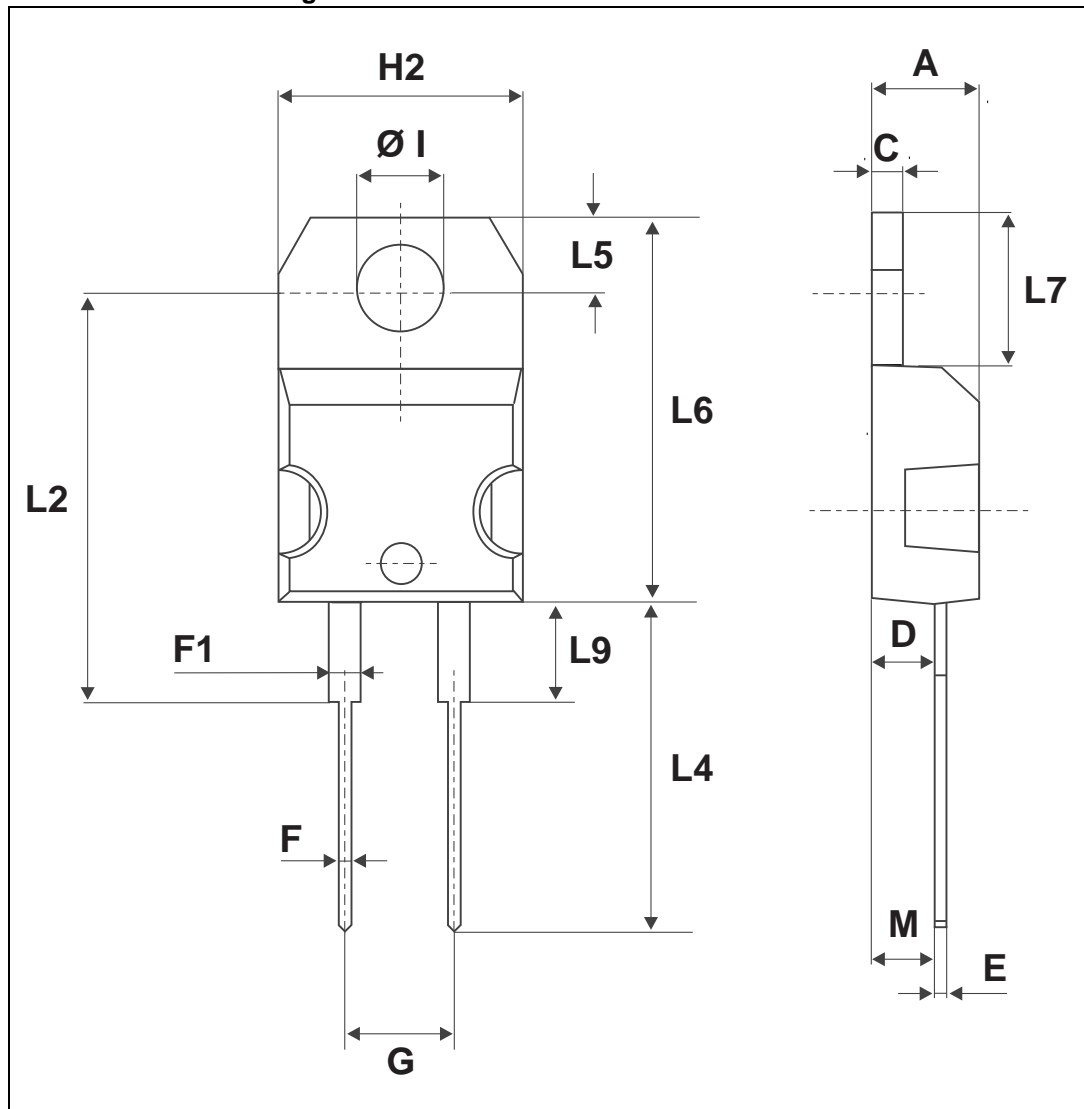


Table 6. T0-220AC dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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			0.645	
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	3.5		3.93	0.137		0.154
M		2.6			0.102	
Diam. I	3.75		3.85	0.147		0.151

Figure 12. DO-247 dimension definitions

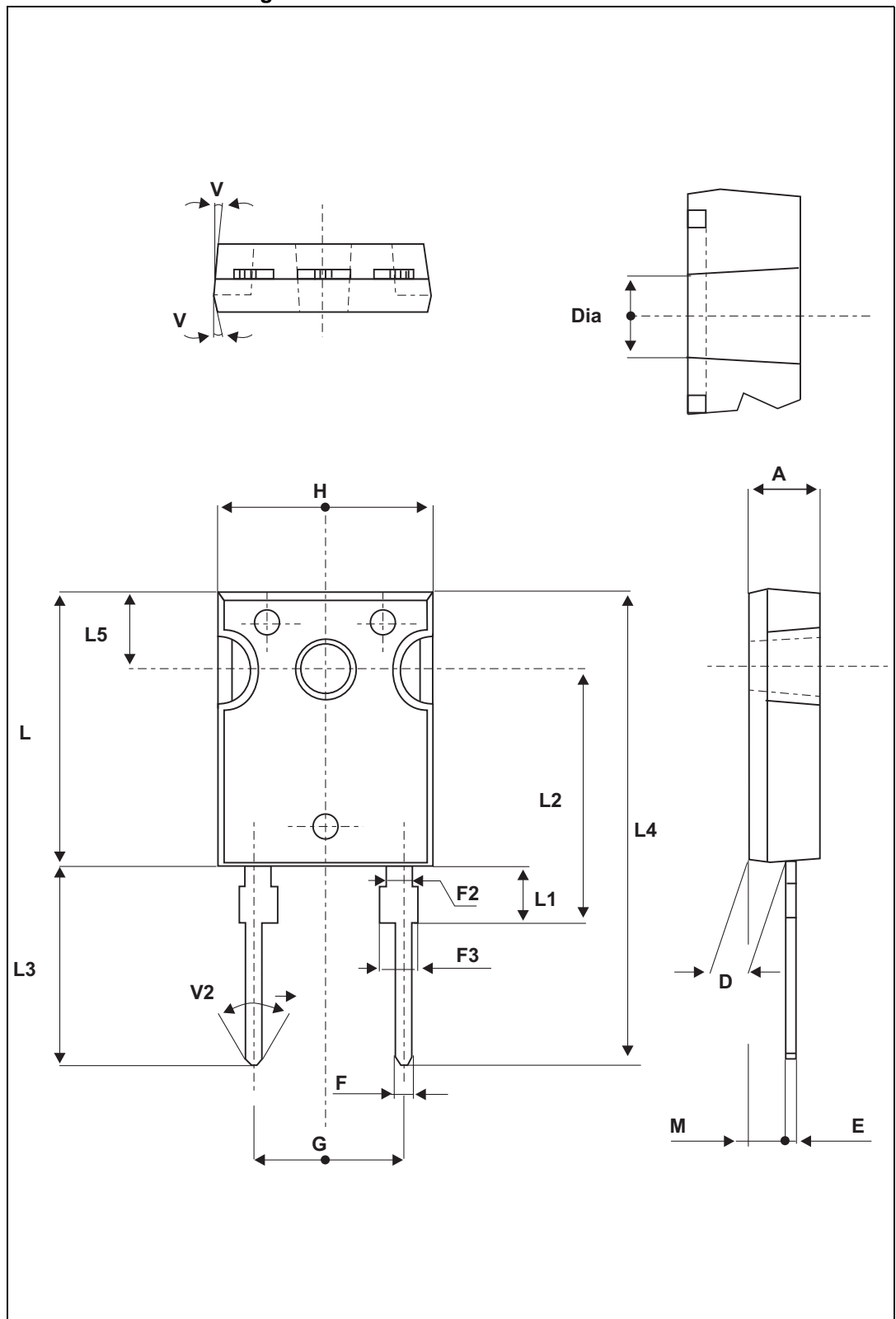


Table 7. DO-247 dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
G		10.90			0.429	
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
L3	14.20		14.80	0.559		0.582
L4		34.60			1.362	
L5		5.50			0.216	
M	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143



### 3 Ordering information

**Table 8. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH15S12D	STTH15S12D	TO-220AC	1.9 g	50	Tube
STTH15S12W	STTH15S12W	DO-247	4.46 g	50	Tube

### 4 Revision history

**Table 9. Document revision history**

Date	Revision	Changes
18-Sep-2014	1	Initial release

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