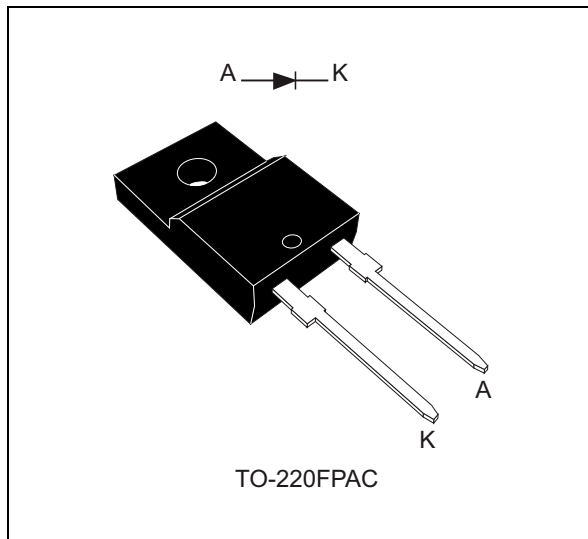


## Turbo 2 ultrafast high voltage rectifier

Datasheet – production data



## Features

- Ultrafast switching
- Low reverse current
- Reduces switching and conduction losses
- Low thermal resistance
- Insulated package TO-220FPAC:
  - Insulated voltage: 2000 V<sub>RMS</sub> sine

## Description

The STTH15AC06 uses ST Turbo 2 600 V technology and is suited as a boost diode in air conditioning equipment for continuous mode interleaved power factor correction.

The device is also intended for use as a freewheeling diode in power supplies and other power switching applications.

**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	15 A
$V_{RRM}$	600 V
$t_{rr}$ (typ)	40 ns
$V_F$ (typ)	1.15 V
$T_j$ (max)	175 °C

# 1 Characteristics

**Table 2. Absolute ratings (limiting values at 25 °C, unless otherwise specified)**

Symbol	Parameter	Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage	600	V	
$I_{F(RMS)}$	Forward rms current	30	A	
$I_{F(AV)}$	Average forward current	15	A	
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10$ ms sinusoidal	120	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	4.4	°C/W

**Table 4. Static electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25$ °C	$V_R = V_{RRM}$		2	$\mu$ A
		$T_j = 150$ °C		20	200	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25$ °C	$I_F = 15$ A		1.9	V
		$T_j = 150$ °C		1.15	1.50	

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

To evaluate the conduction losses use the following equation:

$$P = 1.2 \times I_{F(AV)} + 0.02 I_{F(RMS)}^2$$

**Table 5. Dynamic characteristics**

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		30	ns	
				40	55		
$I_{RM}$	Reverse recovery current	$T_j = 125$ °C	$I_F = 15$ A, $V_R = 400$ V, $di_F/dt = -100$ A/ $\mu$ s		4.4	6	A
$t_{fr}$	Forward recovery time	$T_j = 25$ °C	$I_F = 15$ A, $V_{FR} = 1.6$ V, $di_F/dt = 100$ A/ $\mu$ s		300	ns	
$V_{FP}$	Forward recovery voltage				2.5	V	

Figure 1. Average forward power dissipation versus average forward current

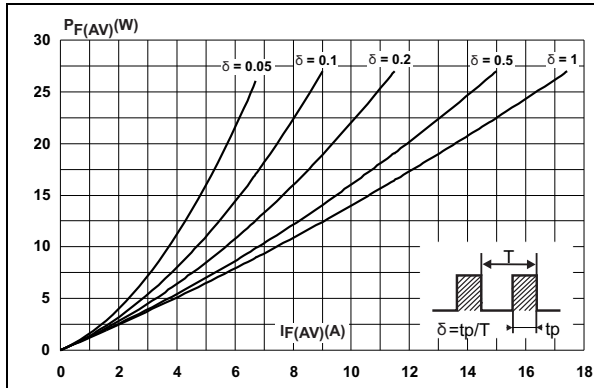


Figure 2. Forward voltage drop versus forward current (typical values)

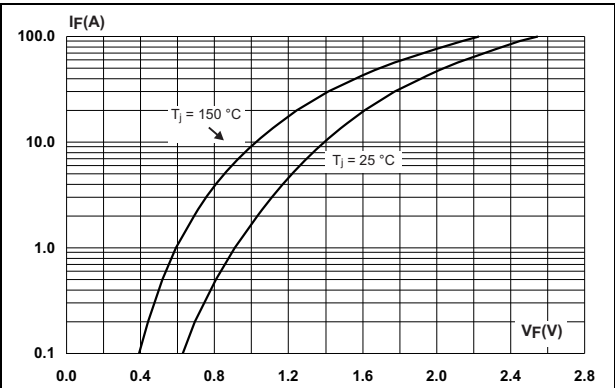


Figure 3. Forward voltage drop versus forward current (maximum values)

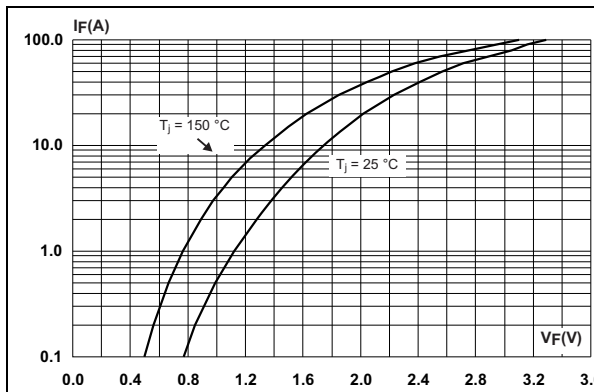


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

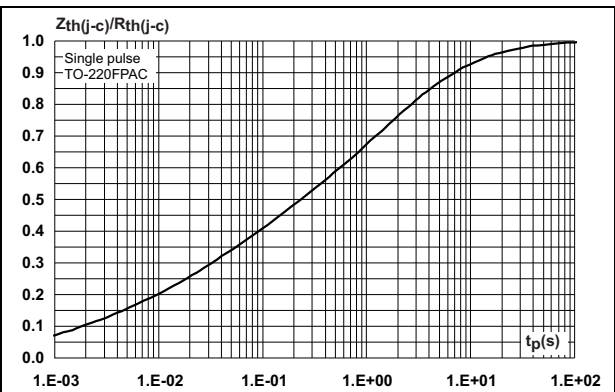


Figure 5. Peak reverse recovery current versus  $di_F/dt$  (typical values)

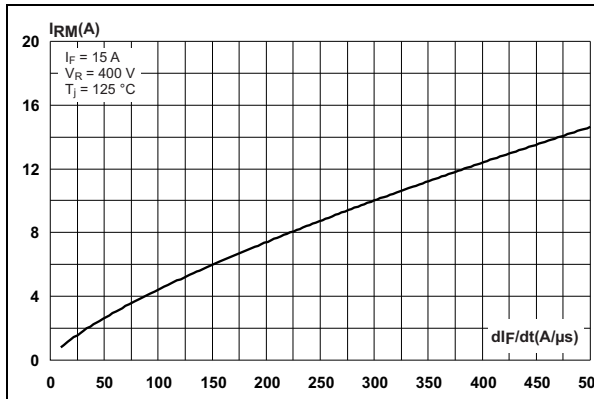


Figure 6. Reverse recovery time versus  $di_F/dt$  (typical values)

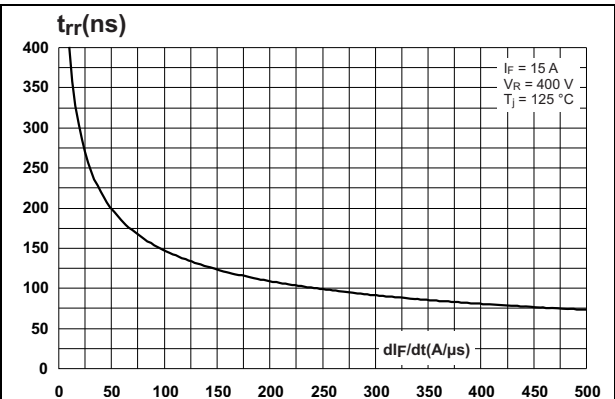


Figure 7. Reverse recovery charges versus  $di_F/dt$  (typical values)

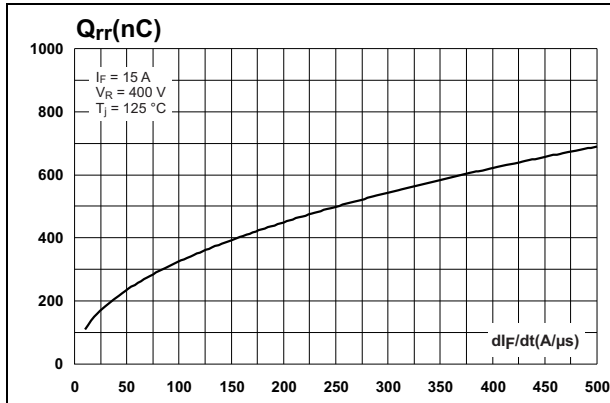


Figure 8. Reverse recovery softness factor versus  $di_F/dt$  (typical values)

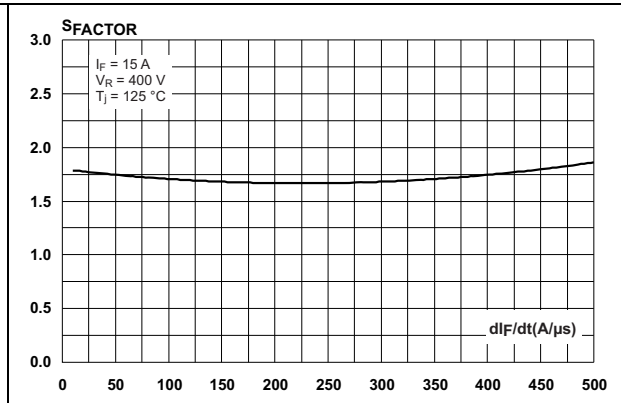


Figure 9. Relative variations of dynamic parameters versus junction temperature

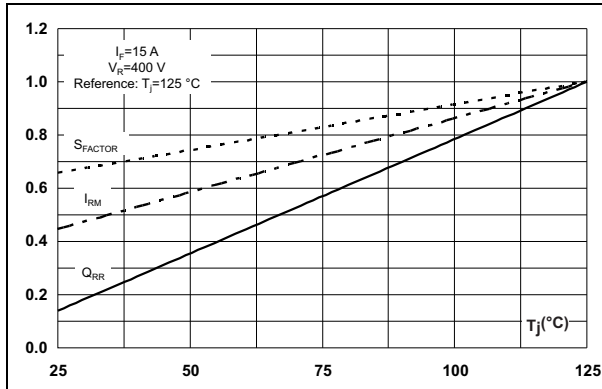


Figure 10. Transient peak forward voltage versus  $di_F/dt$  (typical values)

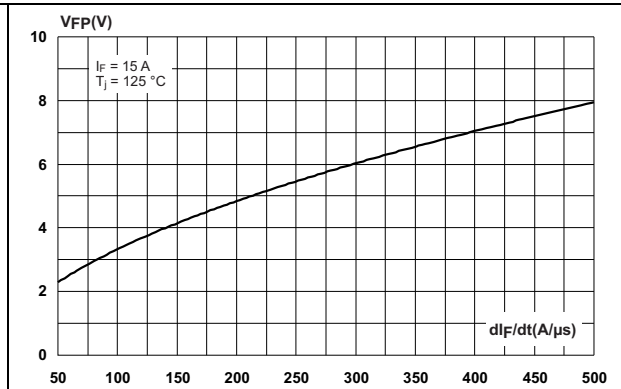


Figure 11. Forward recovery time versus  $di_F/dt$  (typical values)

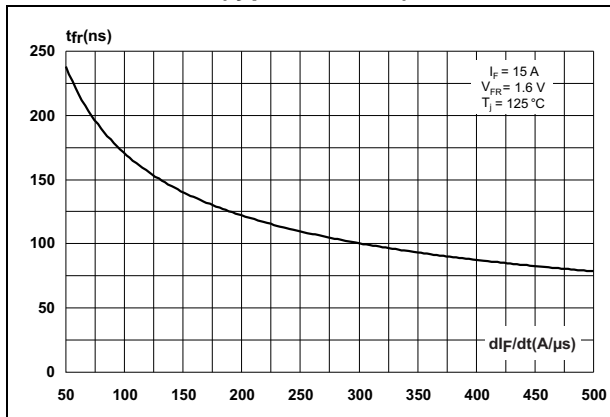
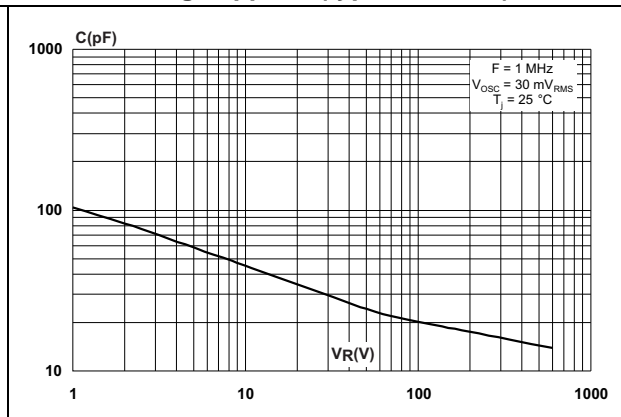


Figure 12. Junction capacitance versus reverse voltage applied (typical values)



## 2 Package information

- Epoxy meets UL94, V0
- Recommended torque value for TO-220FPAC: 0.55 N·m
- Maximum torque value for TO-220FPAC: 0.7 N·m

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

### 2.1 TO-220FPAC package information

Figure 13. TO-220FPAC package outline

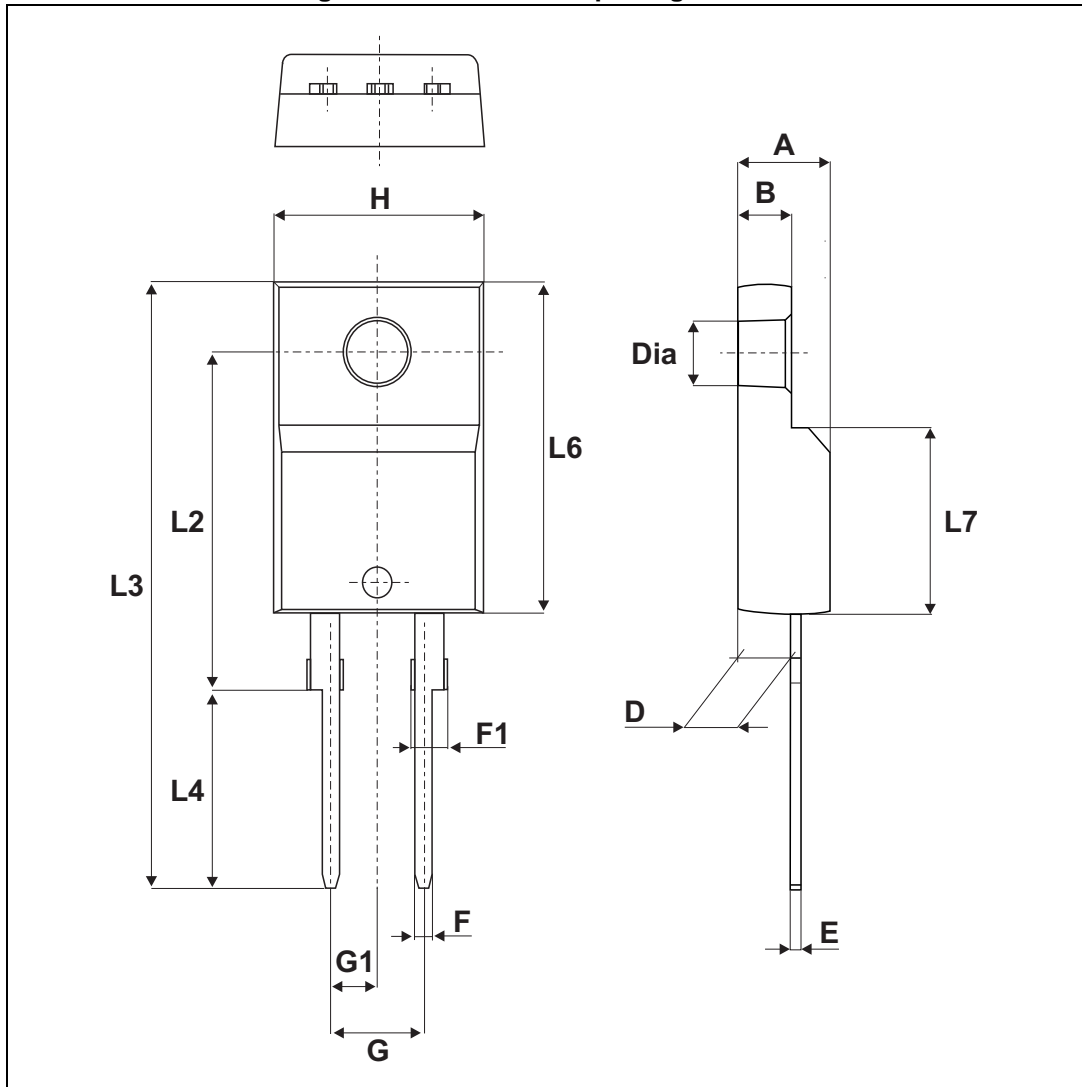


Table 6. TO-220FPAC package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.4		4.6	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.70	0.018		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.70	0.045		0.067
G	4.95		5.20	0.195		0.205
G1	2.4		2.7	0.094		0.106
H	10		10.4	0.393		0.409
L2		16 Typ.			0.63 Typ.	
L3	28.6		30.6	1.126		1.205
L4	9.8		10.6	0.386		0.417
L6	15.9		16.4	0.626		0.646
L7	9.00		9.30	0.354		0.366
Dia.	3.00		3.20	0.118		0.126

### 3 Ordering information

**Table 7. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH15AC06FP	STTH15AC06FP	TO-220FPAC	1.8 g	50	Tube

### 4 Revision history

**Table 8. Document revision history**

Date	Revision	Changes
17-Apr-2014	1	First release.
24-Apr-2015	2	Updated <a href="#">Features</a> and <a href="#">Table 3</a> .

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