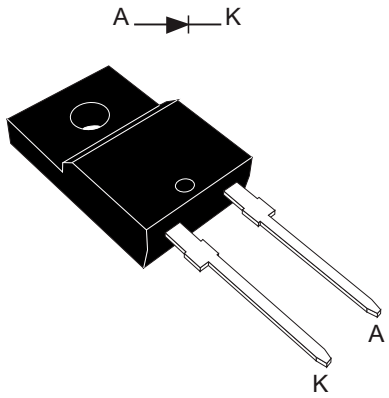
STTH15AC06

Turbo 2 ultrafast high voltage rectifier

Datasheet – production data



TO-220FPAC

Features

- Ultrafast switching
- Low reverse current
- Reduces switching and conduction losses
- Low thermal resistance
- Insulated package TO-220FPAC:
  - Insulated voltage: 2000 V_{RMS} 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	µA
		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, δ < 2%
2. Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:

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

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
			I_F = 1 A, V_R = 30 V, dI_F/dt = -50 A/µs		40	55	
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 15 A, V_R = 400 V, dI_F/dt = -100 A/µs		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/µs			300	ns
V_{FP}	Forward recovery voltage				2.5		V

Figure 1. Average forward power dissipation versus average forward current

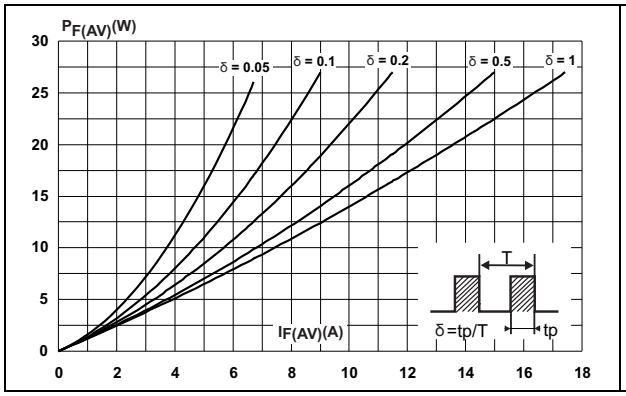


Figure 2. Forward voltage drop versus forward current (typical values)

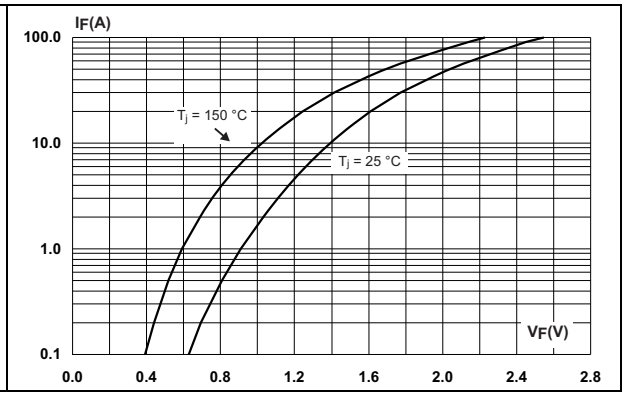


Figure 3. Forward voltage drop versus forward current (maximum values)

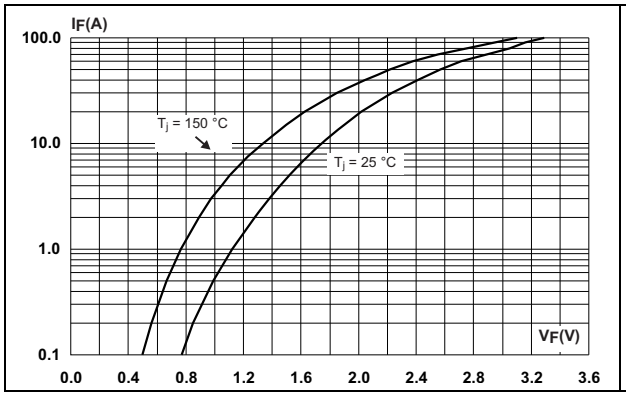


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

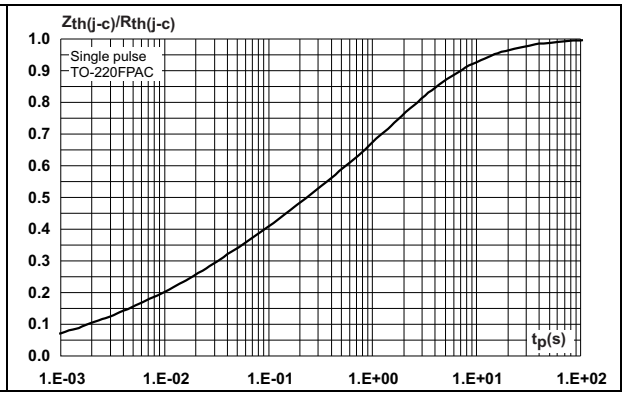


Figure 5. Peak reverse recovery current versus dI_F/dt (typical values)

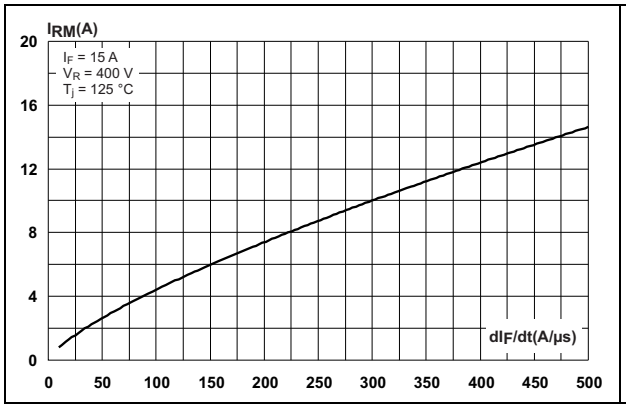


Figure 6. Reverse recovery time versus dI_F/dt (typical values)

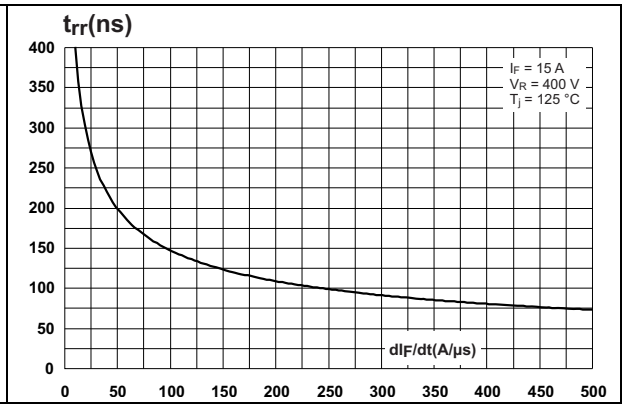


Figure 7. Reverse recovery charges versus dI_F/dt (typical values)

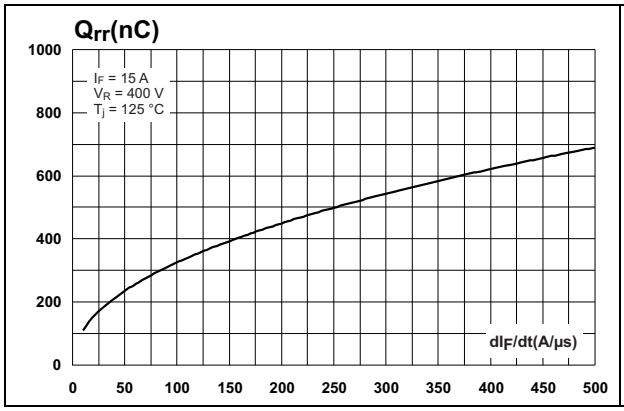


Figure 8. Reverse recovery softness factor versus dI_F/dt (typical values)

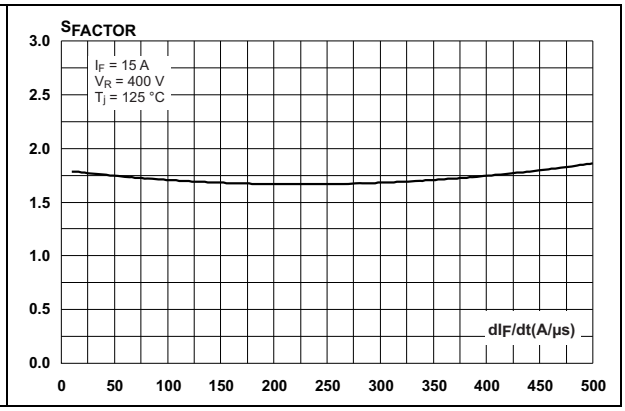


Figure 9. Relative variations of dynamic parameters versus junction temperature

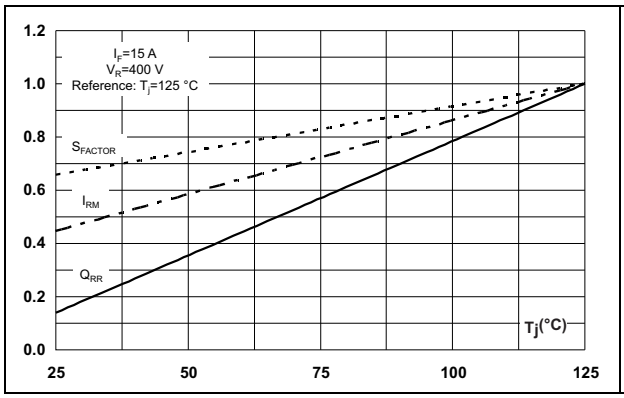


Figure 10. Transient peak forward voltage versus dI_F/dt (typical values)

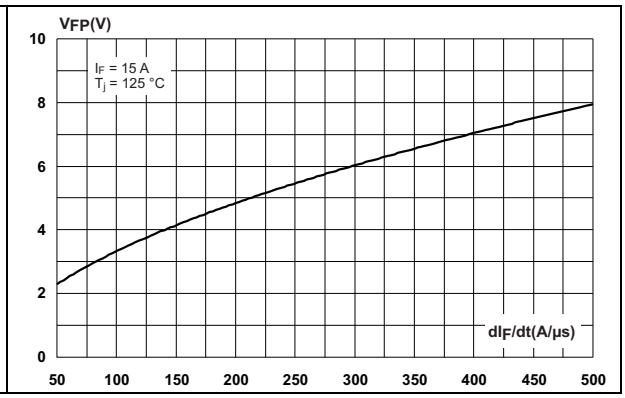


Figure 11. Forward recovery time versus dI_F/dt (typical values)

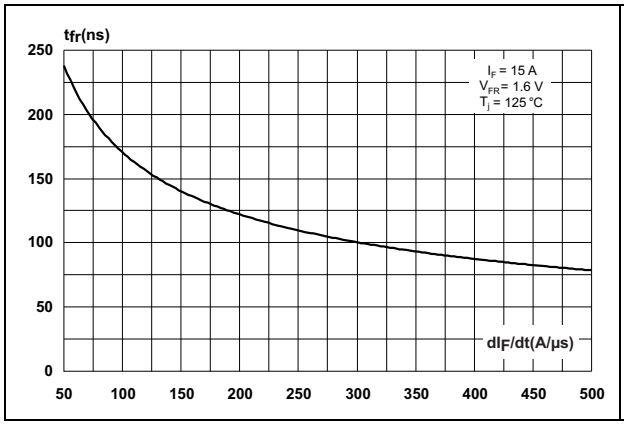
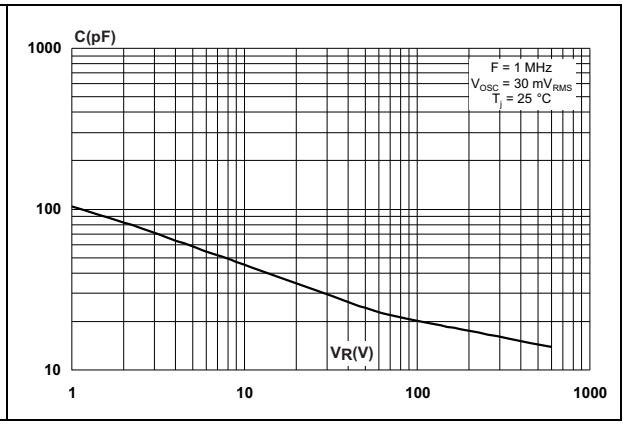


Figure 12. Junction capacitance versus reverse voltage applied (typical values)



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® 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.

2.1 TO-220FPAC package information

Figure 13. TO-220FPAC package outline

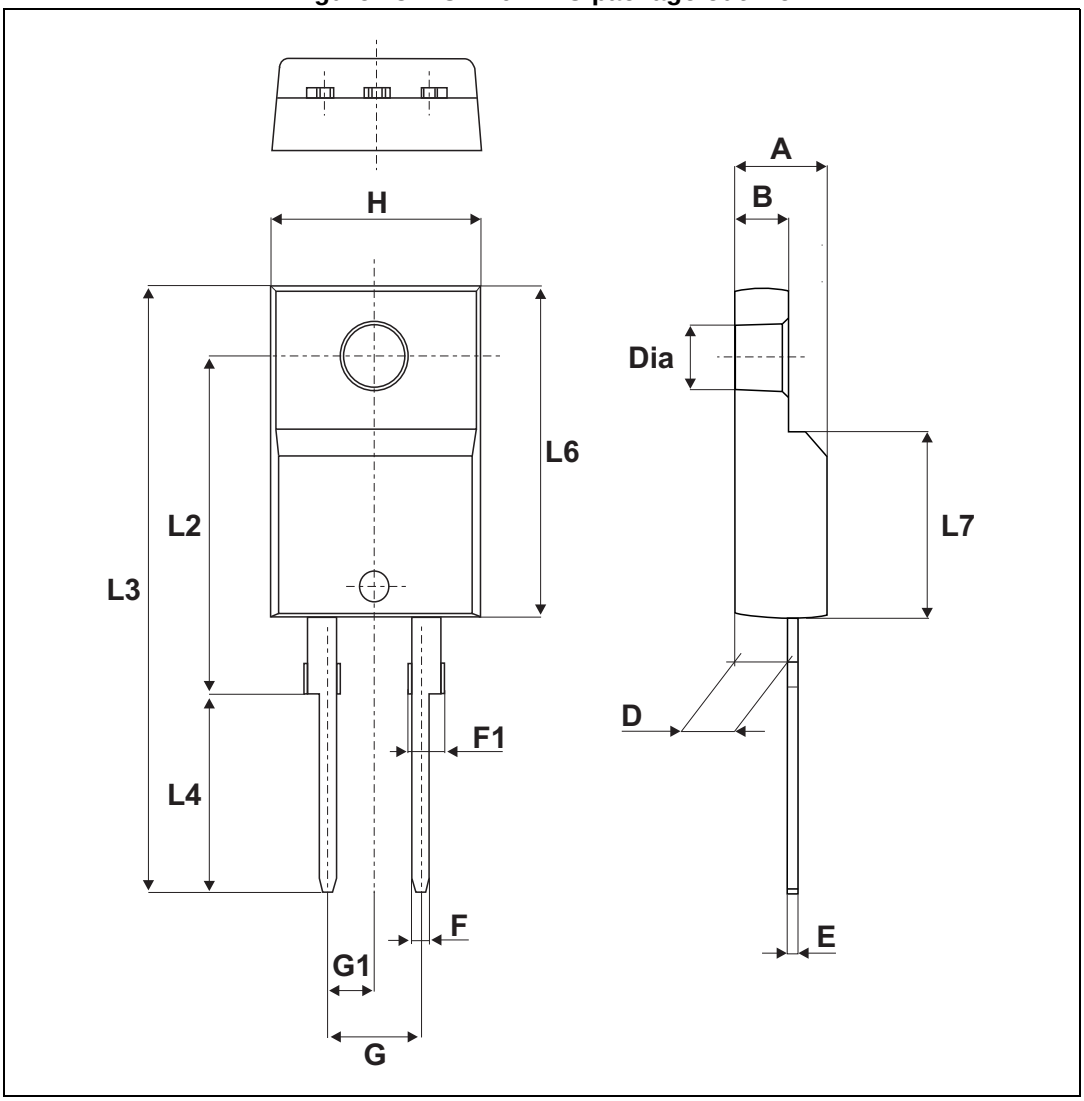


Table 6. TO-220FPAC package mechanical data

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 *Features* and *Table 3*.