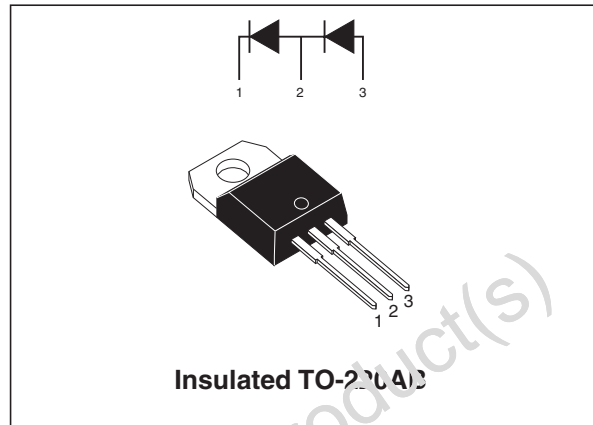


**Tandem 600V HYPERFAST RECTIFIER**
**MAJOR PRODUCTS CHARACTERISTICS**

<b>I<sub>F(AV)</sub></b>	<b>5 A</b>
<b>V<sub>RRM</sub></b>	<b>600 V (in series)</b>
<b>T<sub>j (max)</sub></b>	<b>150 °C</b>
<b>V<sub>F (max)</sub></b>	<b>2.6 V</b>
<b>I<sub>RM (typ.)</sub></b>	<b>3.6 A</b>

**FEATURES AND BENEFITS**

- ESPECIALLY SUITED AS BOOST DIODE IN CONTINUOUS MODE POWER FACTOR CORRECTORS AND HARD SWITCHING CONDITIONS
- DESIGNED FOR HIGH  $di_F/dt$  OPERATION. HYPERFAST RECOVERY CURRENT TO COMPETE WITH SiC DEVICES. ALLOWS DOWNSIZING OF MOSFET AND HEATSINKS
- INTERNAL CERAMIC INSULATED DEVICES WITH EQUAL THERMAL CONDITIONS FOR BOTH 300V DIODES
- INSULATION (2500V<sub>RMS</sub>) ALLOWS PLACEMENT ON SAME HEATSINK AS MOSFET FLEXIBLE HEATSINKING ON COMMON OR SEPARATE HEATSINK.
- MATCHED DIODES FOR TYPICAL PFC APPLICATION WITHOUT NEED FOR VOLTAGE BALANCE NETWORK
- Package Capacitance: C=7pF


**DESCRIPTION**

The TURBOSWITCH "H" is an ultra high performance diode composed of two 300V dice in series. TURBOSWITCH "H" family drastically cuts losses in the associated MOSFET when run at high  $di_F/dt$ .

**ABSOLUTE RATINGS** (limiting values, for both diodes)

Symbol	Parameter	Value	Unit
V <sub>RRM</sub>	Repetitive peak reverse voltage	600	V
I <sub>F(RMS)</sub>	RMS forward current	14	A
I <sub>FSM</sub>	Surge non repetitive forward current	tp = 10 ms sinusoidal 60	A
T <sub>stg</sub>	Storage temperature range	-65 +150	°C
T <sub>j</sub>	Maximum operating junction temperature	+ 150	°C

TM: TURBOSWITCH is a trademark of STMicroelectronics

## THERMAL AND POWER DATA

Symbol	Parameter	Test conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	Total	3.0	°C/W
P	Conduction power dissipation for both diodes	$I_{F(AV)} = 5\text{ A}$ $\delta = 0.5$ $T_c = 100^\circ\text{C}$	17	W

## STATIC ELECTRICAL CHARACTERISTICS (for both diodes)

Symbol	Parameter	Tests Conditions	Min.	Typ.	Max.	Unit
$I_R^*$	Reverse leakage current	$V_R = V_{RRM}$	$T_j = 25^\circ\text{C}$		6	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$		8	
$V_F^{**}$	Forward voltage drop	$I_F = 5\text{ A}$	$T_j = 25^\circ\text{C}$		3.6	V
			$T_j = 125^\circ\text{C}$		2.1	

Pulse test : \*  $t_p = 100\text{ ms}$ ,  $\delta < 2\%$

\*\*  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the maximum conduction losses use the following equation :

$$P = 1.8 \times I_{F(AV)} + 0.16 I_{F(RMS)}^2$$

## DYNAMIC CHARACTERISTICS (for both diodes)

Symbol	Parameter	Tests Conditions	Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$I_F = 0.5\text{ A}$ $I_{rr} = 0.25\text{ A}$ $T_j = 25^\circ\text{C}$ $I_R = 1\text{ A}$		12		ns
		$I_F = 1\text{ A}$ $di_F/dt = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$			25	
$I_{RM}$	Reverse recovery current	$V_R = 400\text{ V}$ $I_F = 5\text{ A}$ $di_F/dt = -200\text{ A}/\mu\text{s}$		3.8	4.5	A
S	Reverse recovery softness factor			0.4		-

## TURN-ON SWITCHING CHARACTERISTICS (for both diodes)

Symbol	Parameter	Tests Conditions	Min.	Typ.	Max.	Unit
$t_{fr}$	Forward recovery time	$I_F = 5\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_F\text{ max}$			100	ns
$V_{FP}$	Transient peak forward recovery voltage	$I_F = 5\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$			7	V

Fig. 1: Conduction losses versus average current.

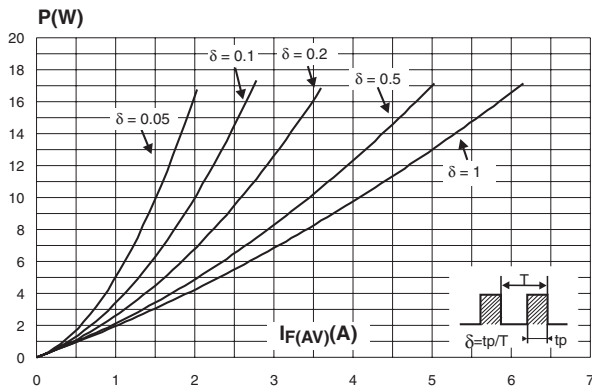


Fig. 2: Forward voltage drop versus forward current.

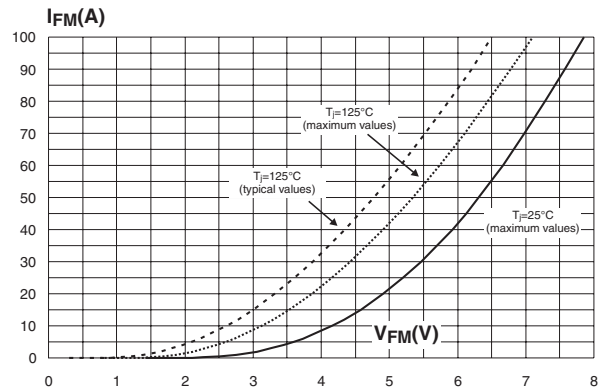


Fig. 3: Relative variation of thermal impedance junction to case versus pulse duration.

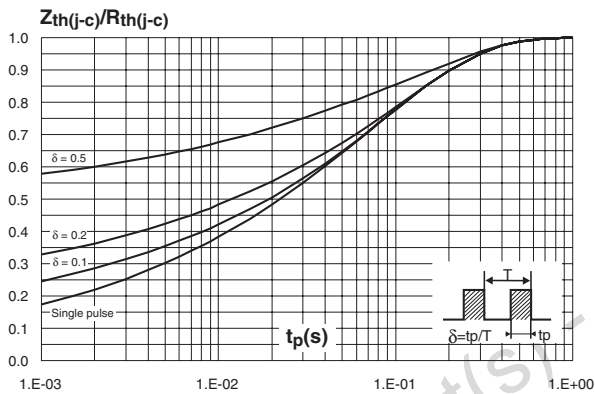


Fig. 4: Peak reverse recovery current versus di\_F/dt (90% confidence).

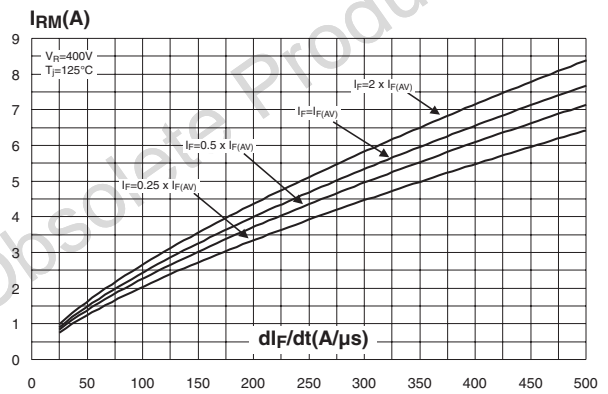


Fig. 5: Reverse recovery time versus di\_F/dt (90% confidence).

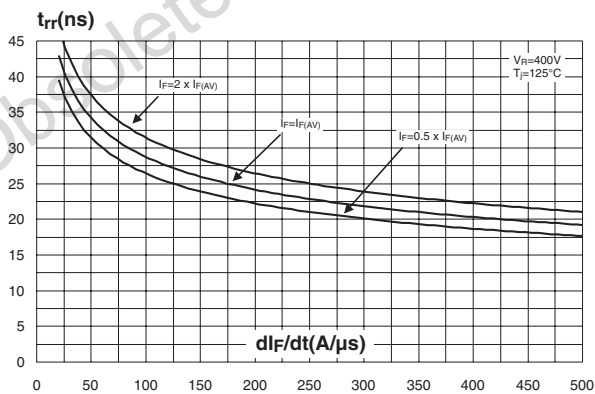
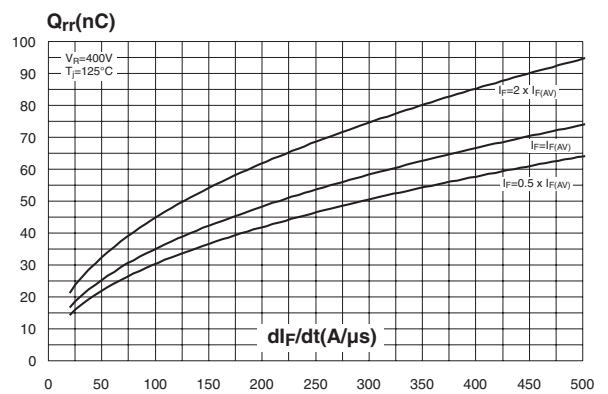
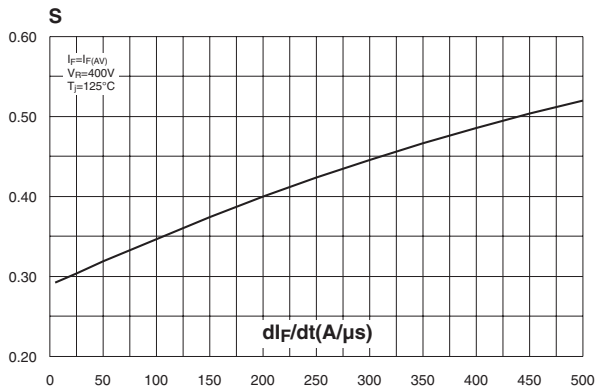


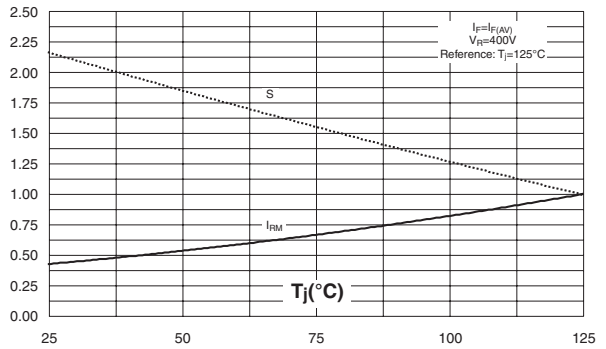
Fig. 6: Reverse recovery charges versus di\_F/dt (90% confidence).



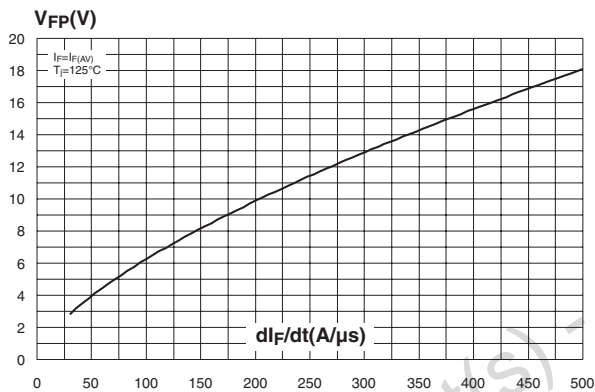
**Fig. 7:** Reverse recovery softness factor versus  $di_F/dt$  (typical values).



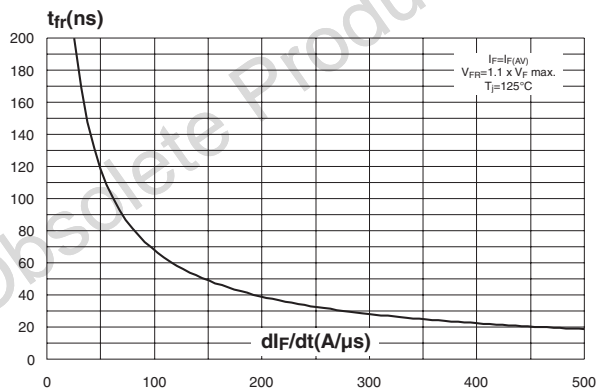
**Fig. 8:** Relative variation of dynamic parameters versus junction temperature (reference:  $T_J = 125^\circ\text{C}$ ).



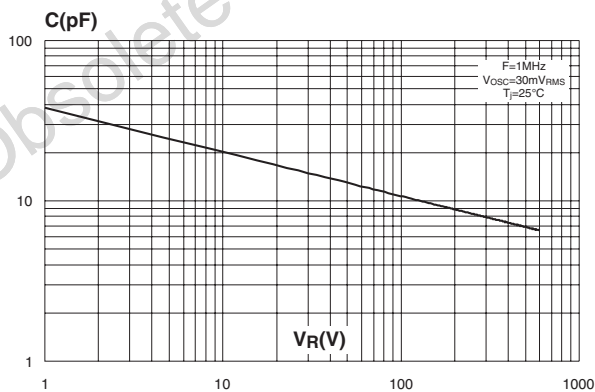
**Fig. 9:** Transient peak forward voltage versus  $di_F/dt$  (90% confidence).

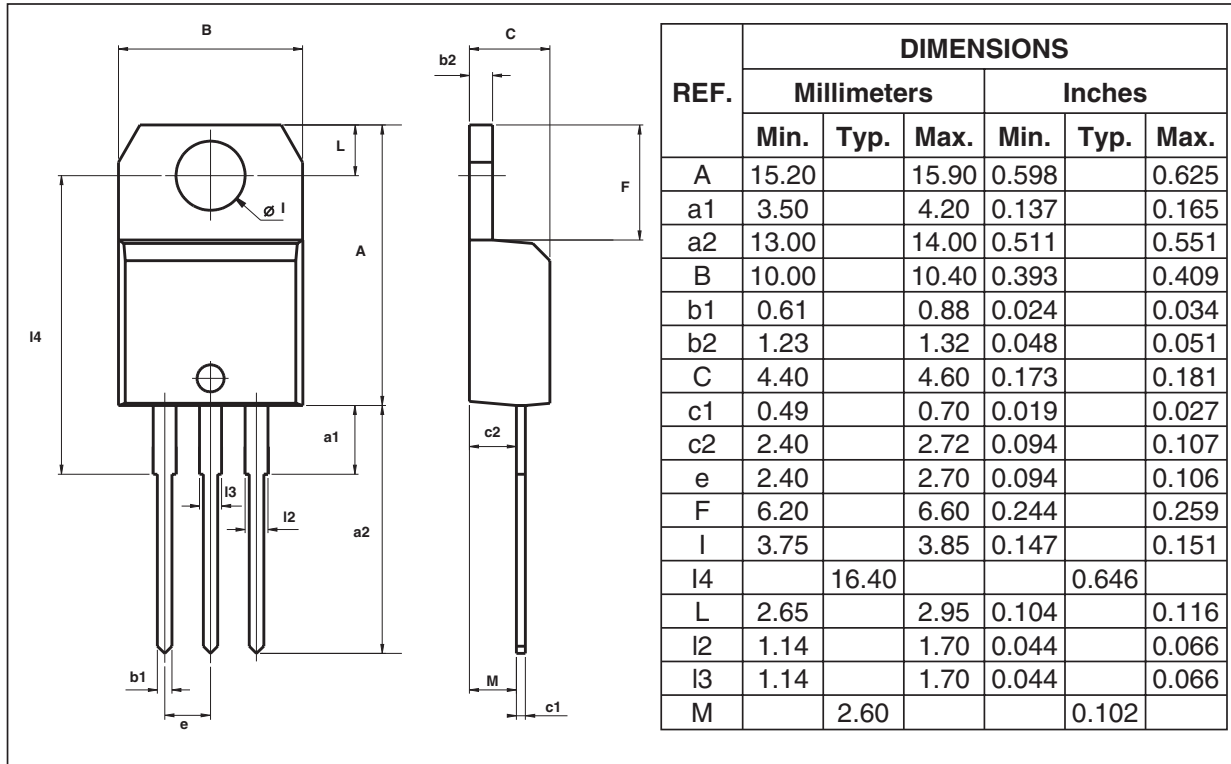


**Fig. 10:** Forward recovery time versus  $di_F/dt$  (90% confidence).



**Fig. 11:** Junction capacitance versus reverse voltage applied (typical values).



**PACKAGE MECHANICAL DATA**  
 TO-220AB


Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH506TTI	STTH506TTI	TO-220AB	2.3 g.	50	Tube

- Cooling method: C
- Recommended torque value: 0.8 N.m.
- Maximum torque value: 1 N.m.
- Epoxy meets UL94,V0

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