

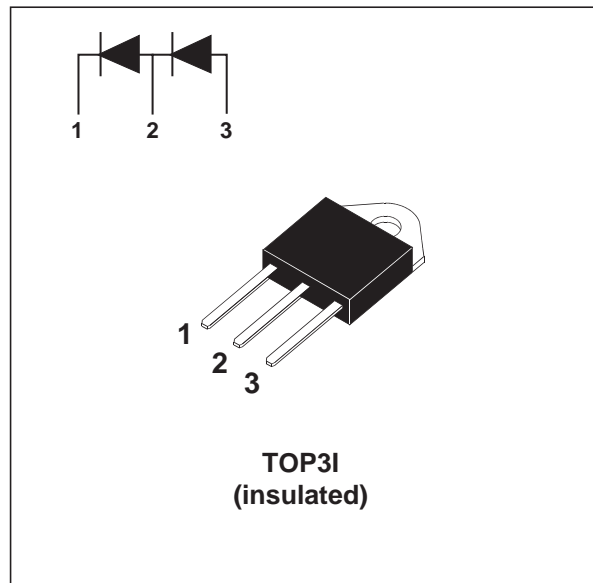
## Tandem 600V Hyperfast Rectifier

### MAJOR PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	15 A
$V_{RRM}$	600 V (in series)
$T_j(max)$	150 °C
$V_F(max)$	2.6 V
$I_{RM}(typ.)$	4.8 A

### FEATURES AND BENEFITS

- Especially suited as boost diode in continuous mode power factor correctors and hard switching conditions.
- Designed for high di/dt operation. Hyperfast recovery current to compete with GaAs devices. Allows downsizing of mosfet and heatsinks.
- Internal ceramic insulated devices with equal thermal conditions for both 300V diodes.
- Insulation (2500V RMS) allows placement on same heatsink as mosfet and flexible heatsinking on common or separate heatsink.
- Matched diodes for typical PFC application without need for voltage balance network.
- $C = 7pF$



### 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 in series)

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward current		26	A
$I_{FSM}$	Surge non repetitive forward current	tp = 10 ms sinusoidal	130	A
$T_{stg}$	Storage temperature range		-65 +150	°C
$T_j$	Maximum operating junction temperature		+ 150	°C

## STTH1506TPI

### THERMAL AND POWER DATA

Symbol	Parameter	Test conditions	Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	2.9	°C/W
$R_{th(c)}$		Coupling	0.3	
$R_{th(j-c)}$	Junction to case	Total	1.6	
$P_1$	Conduction power dissipation for both diodes	$I_{F(AV)} = 15\text{ A}$ $\delta = 0.5$ $T_c = 70^\circ\text{C}$	50	W

### STATIC ELECTRICAL CHARACTERISTICS (for both diodes)

Symbol	Parameter	Tests Conditions	Min.	Typ.	Max.	Unit	
$I_R^*$	Reverse leakage current	$V_R = V_{RRM}$	$T_j = 25^\circ\text{C}$			20	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$		30	200	
$V_F^{**}$	Forward voltage drop	$I_F = 15\text{ A}$	$T_j = 25^\circ\text{C}$			3.6	V
			$T_j = 125^\circ\text{C}$		2.1	2.6	

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

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

To evaluate the maximum conduction losses use the following equation:

$$P = 1.8 \times I_{F(AV)} + 0.053 \times I_{F(RMS)}^2$$

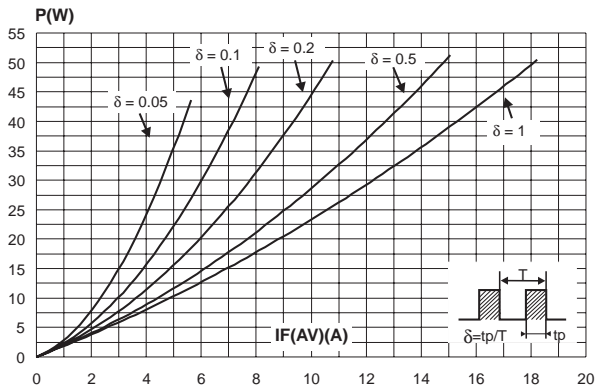
### RECOVERY CHARACTERISTICS

Symbol	Parameter	Tests Conditions	Min.	Typ.	Max.	Unit	
$t_{rr}$	Reverse recovery time	$I_F = 0.5\text{ A}$ $I_{rr} = 0.25\text{ A}$ $I_R = 1\text{ A}$	$T_j = 25^\circ\text{C}$		16	ns	
		$I_F = 1\text{ A}$ $dI_F/dt = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$					35
$I_{RM}$	Reverse recovery current	$V_R = 400\text{ V}$ $I_F = 15\text{ A}$ $dI_F/dt = -200\text{ A}/\mu\text{s}$	$T_j = 125^\circ\text{C}$		4.8	6.0	A
$S_{factor}$					0.4		-

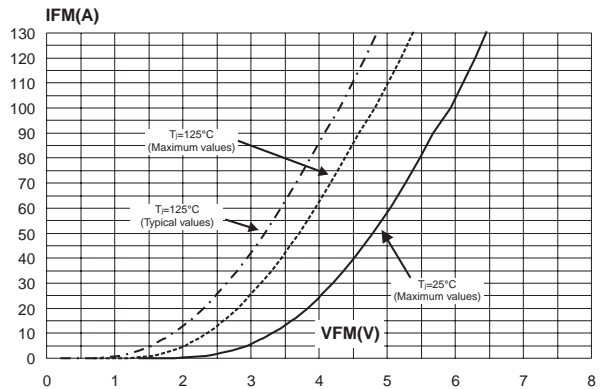
### TURN-ON SWITCHING CHARACTERISTICS

Symbol	Parameter	Tests Conditions	Min.	Typ.	Max.	Unit
$t_{fr}$	Forward recovery time	$I_F = 15\text{ A}$ $dI_F/dt = 100\text{ A}/\mu\text{s}$ , $V_{FR} = 1.1 \times V_{Fmax}$			200	ns
$V_{FP}$	Forward recovery voltage	$I_F = 15\text{ A}$ $dI_F/dt = 100\text{ A}/\mu\text{s}$			6	V

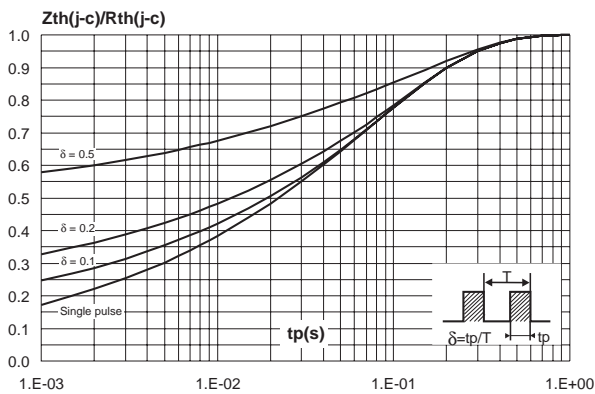
**Fig. 1:** Conduction losses versus average current.



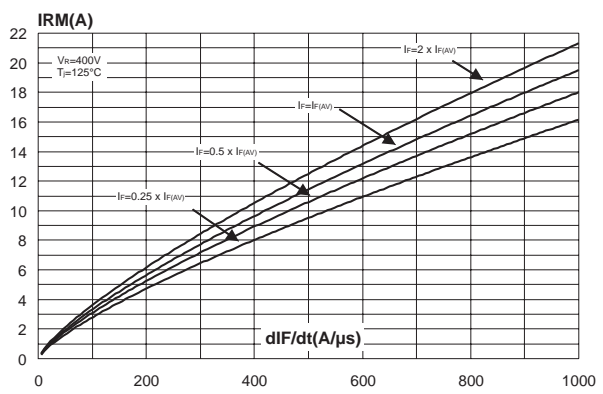
**Fig. 2:** Forward voltage drop versus forward current.



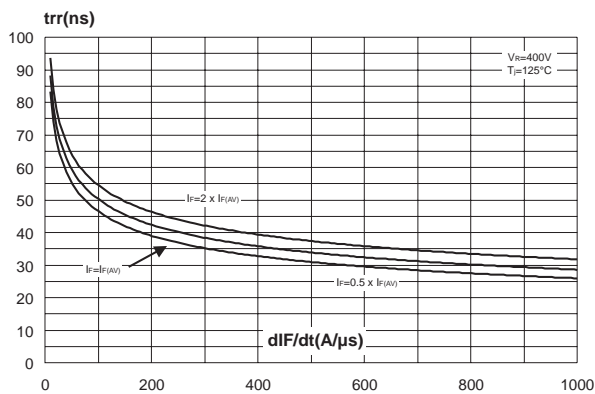
**Fig. 3:** Relative variation of thermal impedance junction to case versus pulse duration.



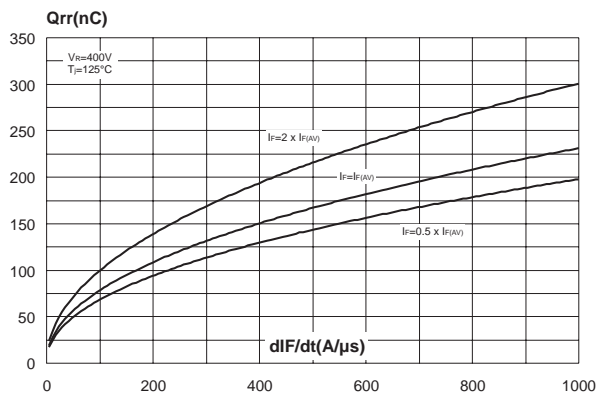
**Fig. 4:** Peak reverse recovery current versus  $di_F/dt$  (90% confidence).



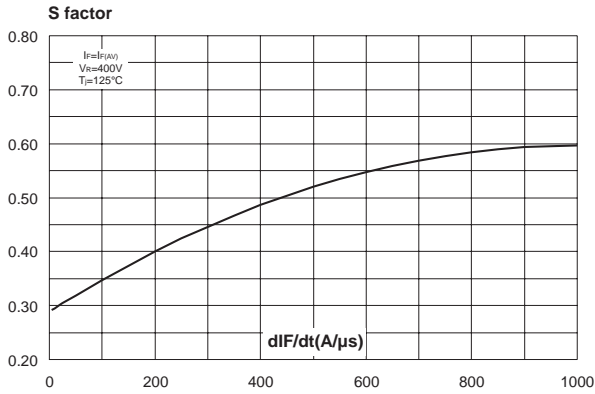
**Fig. 5:** Reverse recovery time versus  $di_F/dt$  (90% confidence).



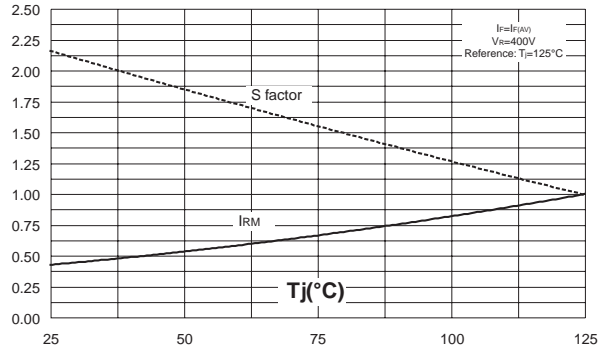
**Fig. 6:** Reverse recovery charges versus  $di_F/dt$  (90% confidence).



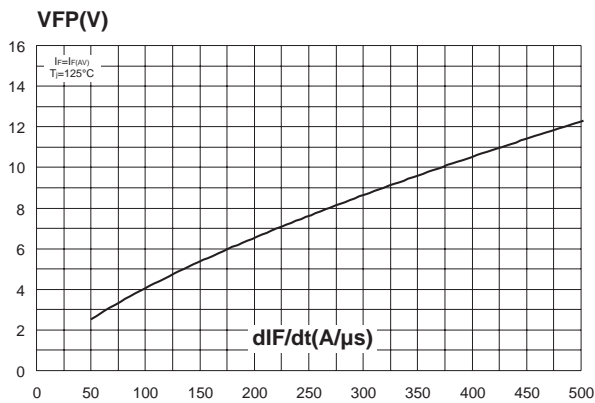
**Fig. 7:** Softness factor versus  $di_F/dt$  (typical values).



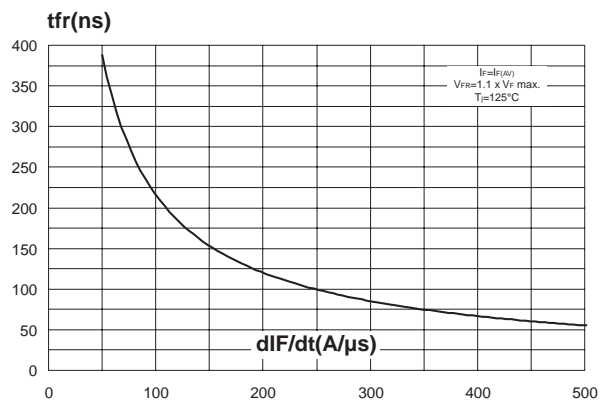
**Fig. 8:** Relative variations of dynamic parameters versus junction temperature.



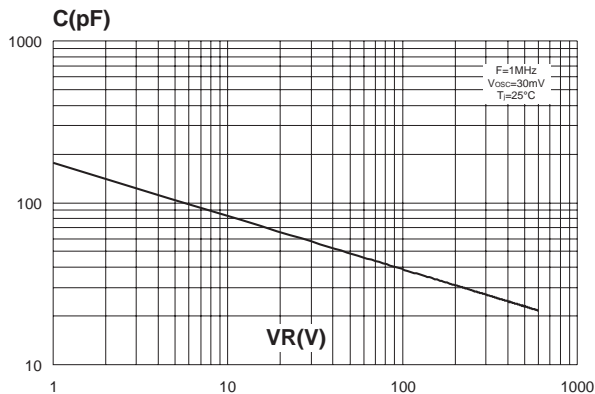
**Fig. 9:** Transient peak forward voltage versus  $di_F/dt$  (90% confidence).



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



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



**PACKAGE MECHANICAL DATA**  
 TOP3I

REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.4		4.6	0.173		0.181
B	1.45		1.55	0.057		0.061
C	14.35		15.60	0.565		0.614
D	0.5		0.7	0.020		0.028
E	2.7		2.9	0.106		0.114
F	15.8		16.5	0.622		0.650
G	20.4		21.1	0.815		0.831
H	15.1		15.5	0.594		0.610
J	5.4		5.65	0.213		0.222
K	3.4		3.65	0.134		0.144
L	4.08		4.17	0.161		0.164
P	1.20		1.40	0.047		0.055
R		4.60			0.181	

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH1506TPI	STTH1506TPI	TOP3I	4.46 g.	30	Tube

- Epoxy meets UL94,V0

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