

## Tandem 600V HYPERFAST BOOST DIODE

### MAJOR PRODUCTS CHARACTERISTICS

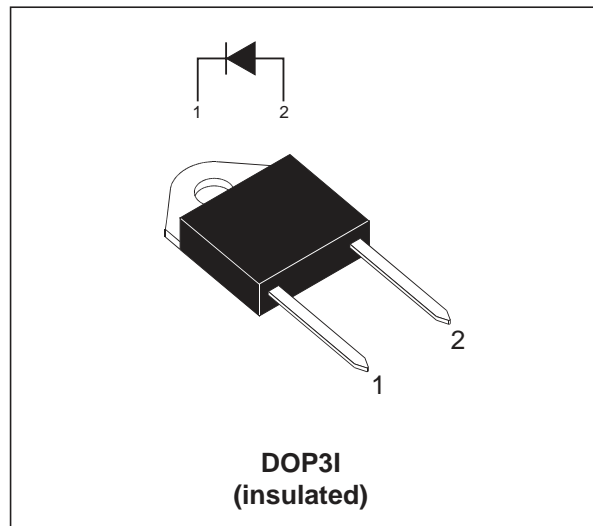
$I_{F(AV)}$	30 A
$V_{RRM}$	600 V
$T_j(max)$	150 °C
$V_F(max)$	2.4 V
$I_{RM}(typ.)$	6.7 A
$t_{rr}(typ.)$	25 ns

### 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.
- STATIC AND DYNAMIC EQUILIBRIUM OF INTERNAL DIODES ARE WARRANTED BY DESIGN
- PACKAGE CAPACITANCE: C=16pF

### ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward current		32	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10 \text{ ms}$ sinusoidal	180	A
$I_{peak}$	Peak current waveform	$\delta = 0.15$ $T_c = 120^\circ\text{C}$	50	A
$T_{stg}$	Storage temperature range		-65 +150	°C
$T_j$	Maximum operating junction temperature		+ 150	°C



### 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  $di_F/dt$ .

**THERMAL AND POWER DATA**

Symbol	Parameter	Test conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance		1.3	°C/W

**STATIC ELECTRICAL CHARACTERISTICS**

Symbol	Parameter	Tests Conditions	Min.	Typ.	Max.	Unit
$I_R^*$	Reverse leakage current	$V_R = V_{RRM}$	$T_j = 25^\circ\text{C}$		40	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$		60	
$V_F^{**}$	Forward voltage drop	$I_F = 30\text{ A}$	$T_j = 25^\circ\text{C}$		3.6	V
			$T_j = 150^\circ\text{C}$		1.95	

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 :

$$P = 1.7 \times I_{F(AV)} + 0.023 I_{F(RMS)}^2$$

**DYNAMIC CHARACTERISTICS**

Symbol	Parameter	Tests Conditions	Min.	Typ.	Max.	Unit	
$t_{rr}$	Reverse recovery time	$I_F = 0.5\text{ A}$ $I_{rr} = 0.25\text{ A}$ $I_R = 1\text{ A}$	$T_j = 25^\circ\text{C}$		25	ns	
		$I_F = 1\text{ A}$ $di_F/dt = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$					45
$I_{RM}$	Reverse recovery current	$V_R = 400\text{ V}$ $I_F = 30\text{ A}$ $di_F/dt = -200\text{ A}/\mu\text{s}$	$T_j = 125^\circ\text{C}$		6.7	8.5	A
S	Reverse recovery softness factor				0.3		-
$Q_{rr}$	Reverse recovery charges				145		nC

**TURN-ON SWITCHING CHARACTERISTICS**

Symbol	Parameter	Tests Conditions	Min.	Typ.	Max.	Unit
$t_{fr}$	Forward recovery time	$I_F = 30\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_F\text{ max}$			400	ns
$V_{FP}$	Transient peak forward recovery voltage	$I_F = 30\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$			6	V

Fig. 1: Conduction losses versus average current.

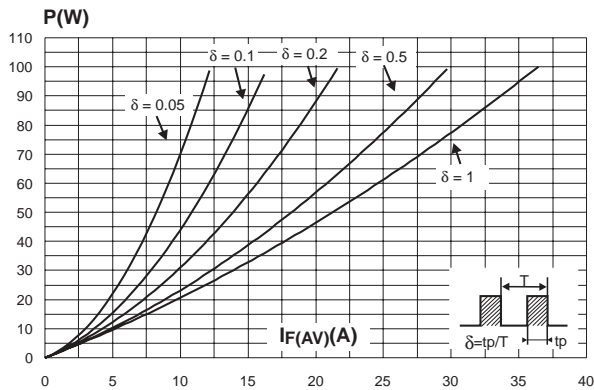


Fig. 2: Forward voltage drop versus forward current.

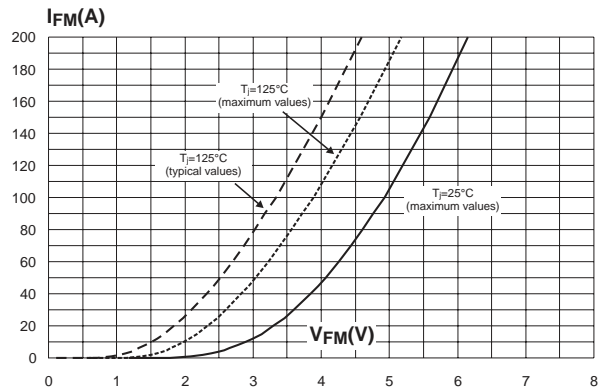


Fig. 3: Relative variation of thermal impedance junction to case versus pulse duration.

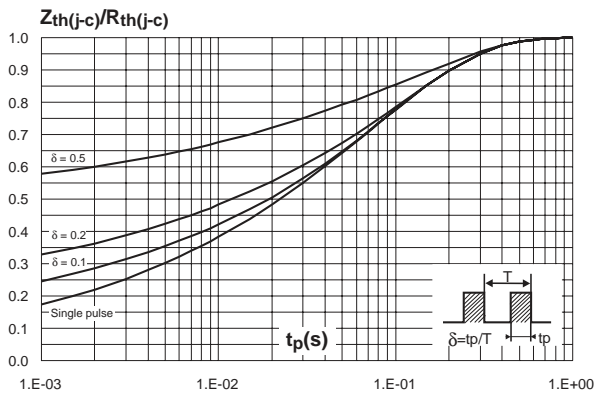


Fig. 4: Peak reverse recovery current versus di\_F/dt (typical values).

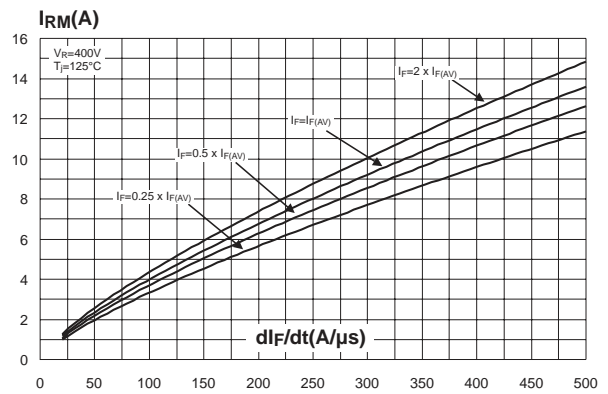


Fig. 5: Reverse recovery time versus di\_F/dt (typical values).

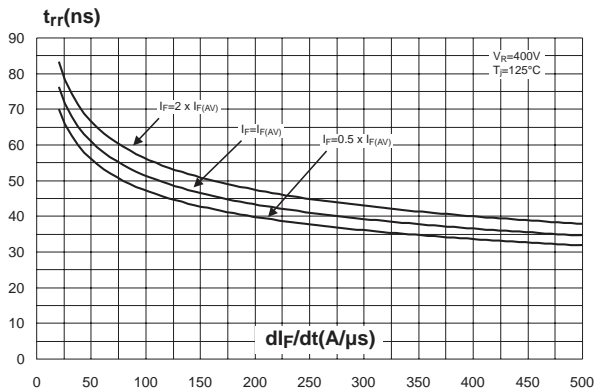
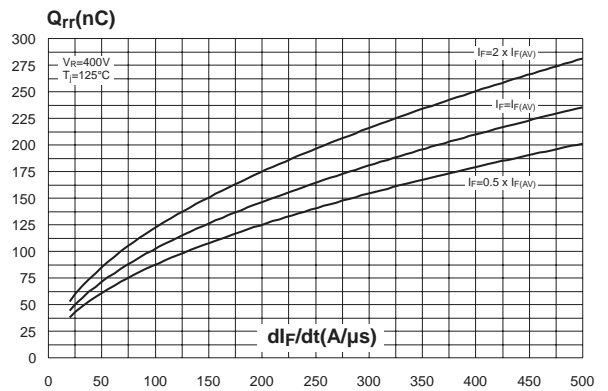
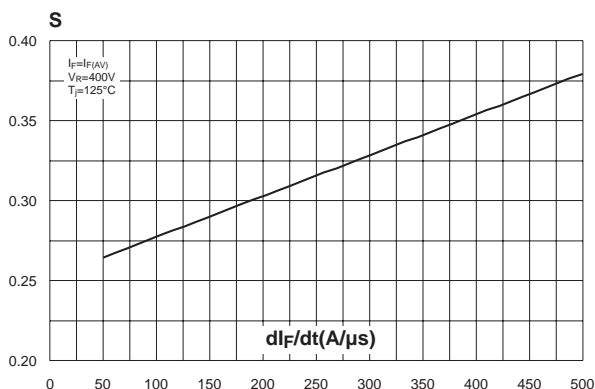


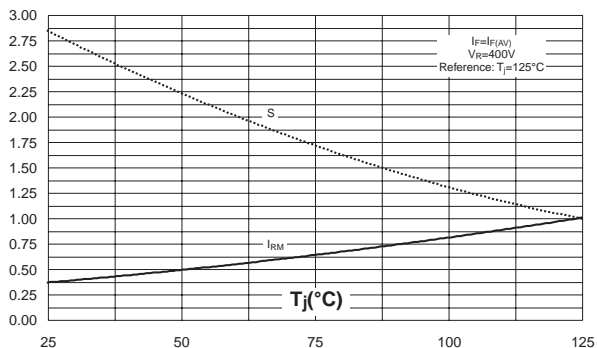
Fig. 6: Reverse recovery charges versus di\_F/dt (typical values).



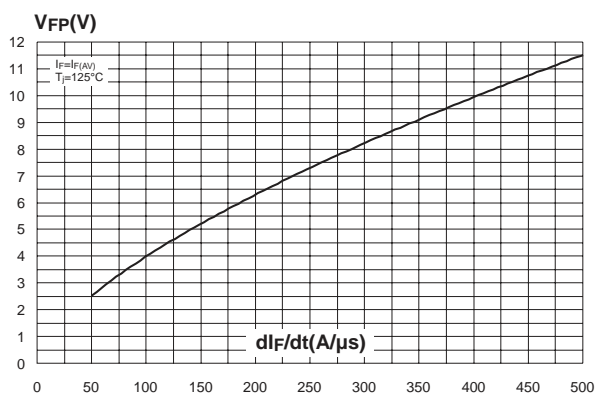
**Fig. 7:** Reverse recovery softness factor versus  $di_F/dt$  (typical values).



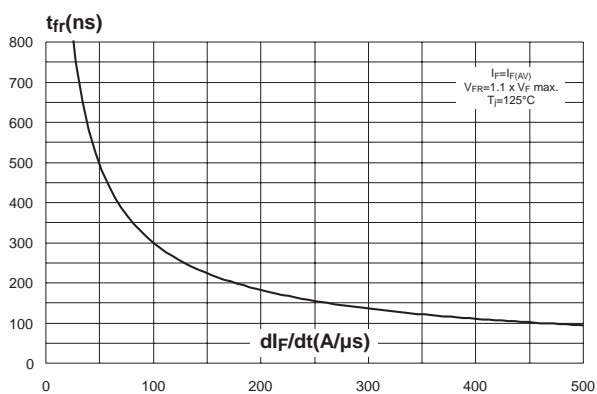
**Fig. 8:** Relative variation of dynamic parameters versus junction temperature (reference:  $T_J = 125^\circ\text{C}$ ).



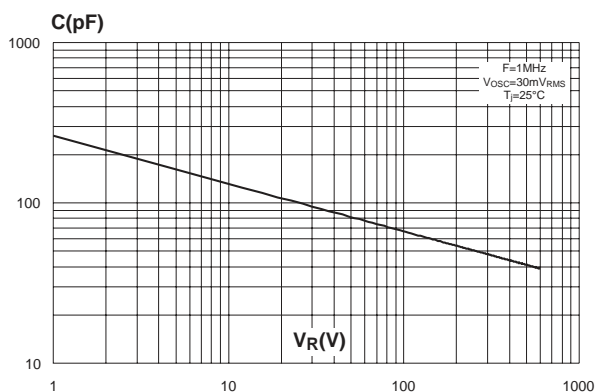
**Fig. 9:** Transient peak forward voltage versus  $di_F/dt$  (typical values).



**Fig. 10:** Forward recovery time versus  $di_F/dt$  (typical values).

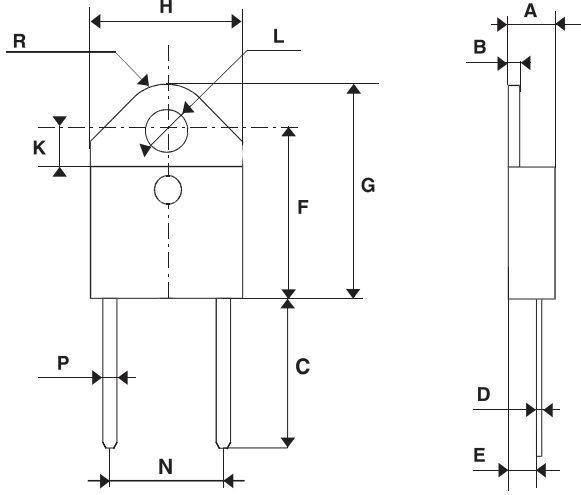


**Fig. 11:** Junction capacitance versus reverse voltage applied (typical values).



**PACKAGE MECHANICAL DATA**  
 DOP3I

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	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
K	3.4	3.65	0.134	0.144
L	4.08	4.17	0.161	0.164
N	10.8	11.3	0.425	0.444
P	1.20	1.40	0.047	0.055
R	4.60 typ.		0.181 typ.	



Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH3006DPI	STTH3006DPI	DOP3I	4.46 g.	30	Tube

- Epoxy meets UL94,V0

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