

Tandem 600V HYPERFAST BOOST DIODE
MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	8 A
V_{RRM}	600 V
T_j	150°C
V_F (typ)	2.24 V
I_{RM} (typ.)	4 A
t_{rr} (max)	13 ns

FEATURES AND BENEFITS

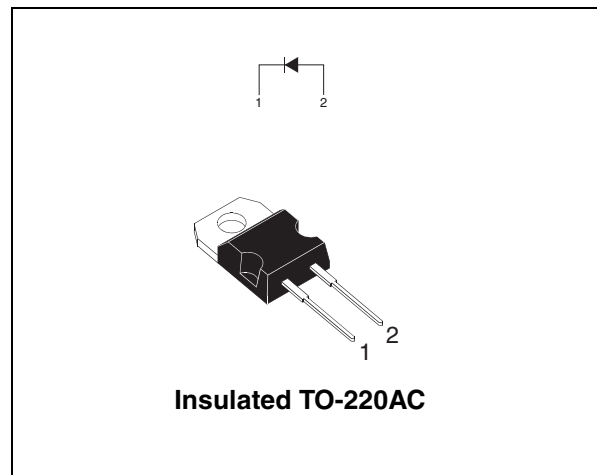
- Especially suited as boost diode in continuous mode power factor correctors and hard switching conditions
- Designed for high di/dt operation. Hyperfast recovery current to compete with SIC devices. Allows downsizing of mosfet and heatsinks
- Internal ceramic insulated devices with equal thermal conditions for both 300V diodes
- Insulation (2500V_{RMS}) allows placement on same heatsink as MOSFET and flexible heatsinking on common or separate heatsink
- Static and dynamic equilibrium of internal diodes are warranted by design
- Package capacitance: C=7pF

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward voltage		14	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10ms$ sinusoidal	180	A
I_{peak}	Peak current waveform	$\delta = 0.15$ $T_c = 130^\circ C$	17	A
T_{stg}	Storage temperature range		-65 to + 150	°C
T_j	Maximum operating junction temperature		+ 150	°C

Order Codes

Part Number	Marking
STTH806DTI	STTH806DTI


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/dt .

STTH806DTI

THERMAL RESISTANCE

Symbol	Parameter	Value (max.)	Unit
$R_{th(j-c)}$	Junction to case	2.6	°C/W

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R *	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			10	μA
		$T_j = 125^\circ\text{C}$			15	100	
V_F **	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 8\text{A}$			3.6	V
		$T_j = 150^\circ\text{C}$			1.95	2.4	

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

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

To evaluate the conduction losses use the following equation: $P = 1.7 \times I_{F(AV)} + 0.087 I_F^2(\text{RMS})$

DYNAMIC CHARACTERISTICS

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 0.5\text{A}$ $I_{rr} = 0.25\text{A}$ $I_R = 1\text{A}$		13		ns
			$I_F = 1\text{A}$ $di_F/dt = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{V}$			30	
I_{RM}	Reverse recovery current	$T_j = 125^\circ\text{C}$	$I_F = 8\text{A}$ $V_R = 400\text{V}$ $di_F/dt = -200\text{ A}/\mu\text{s}$		4	5.5	A
S	Reverse recovery softness factor				0.4		-
Q_{rr}	Reverse recovery charges				50		nC

TURN-ON SWITCHING CHARACTERISTICS

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{fr}	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 8\text{A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			200	ns
V_{FP}	Forward recovery voltage	$T_j = 25^\circ\text{C}$	$I_F = 8\text{A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$			7	V

Fig. 1: Conduction losses versus average current.

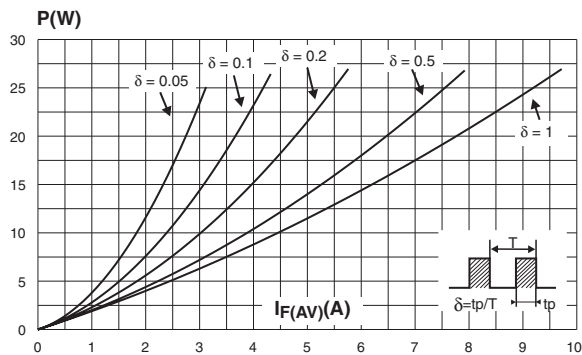


Fig. 2: Forward voltage drop versus forward current.

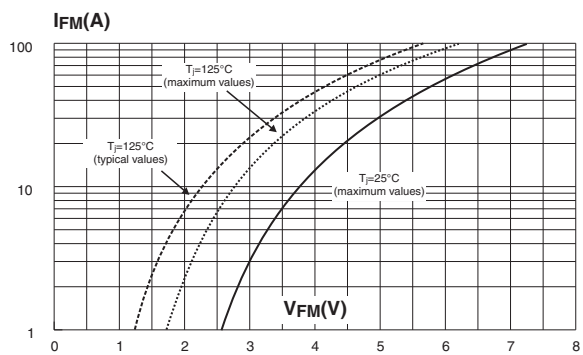


Fig. 3: Relative variation of thermal impedance junction to case versus pulse duration.

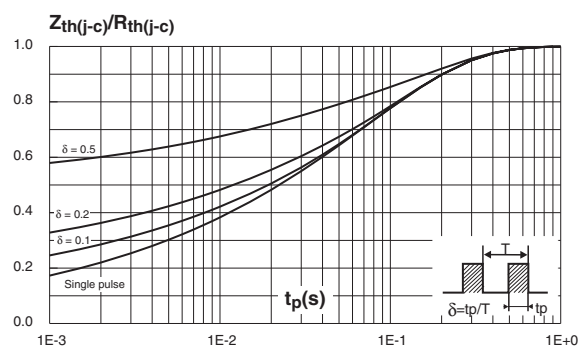


Fig. 4: Peak reverse recovery current versus di_F/dt (typical values).

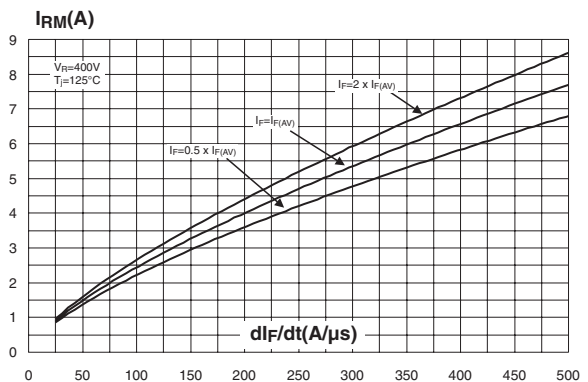


Fig. 5: Reverse recovery time versus di_F/dt (typical values).

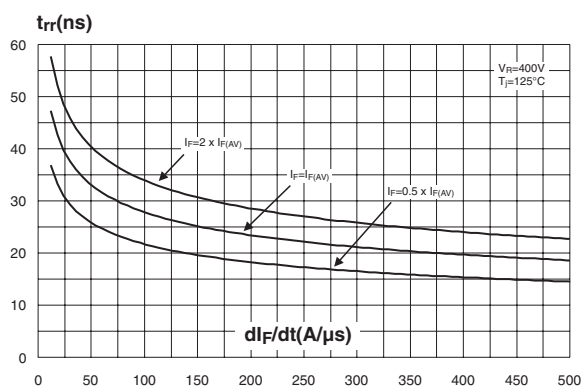


Fig. 6: Reverse recovery charges versus di_F/dt (typical values).

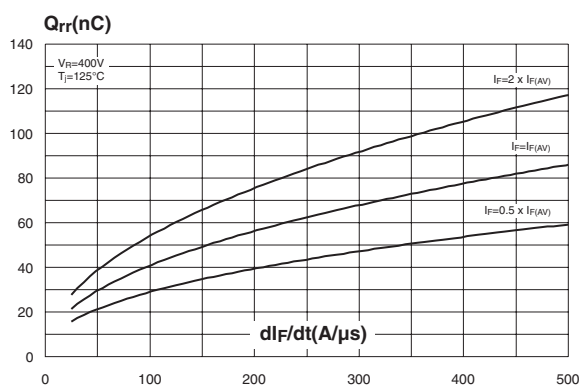


Fig. 7: Softness factor versus di_F/dt (typical values).

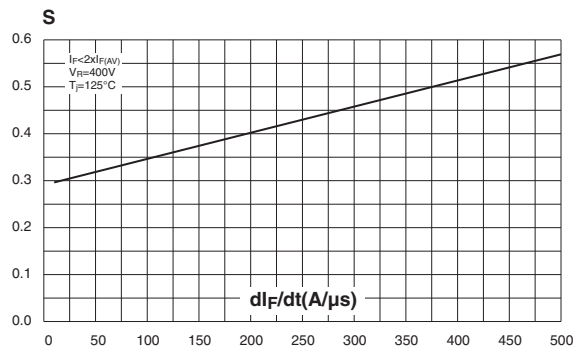


Fig. 8: Relative variation of dynamic parameters versus junction temperature (reference: $T_j = 125^\circ C$).

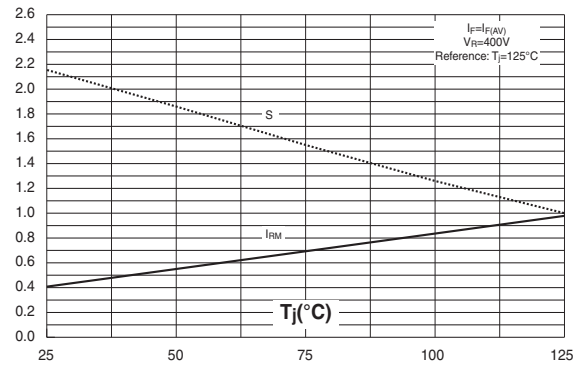


Fig. 9: Transient peak forward voltage versus di_F/dt (typical values).

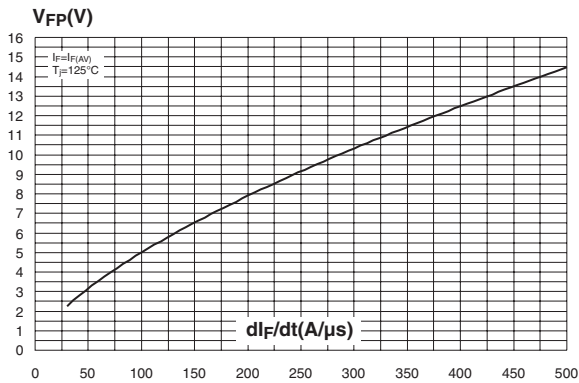
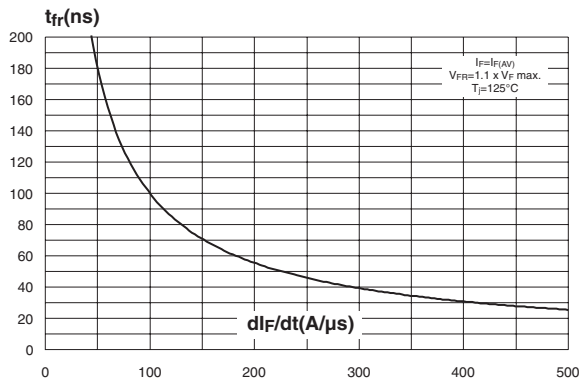


Fig. 10: Forward recovery time versus di_F/dt (typical values).



PACKAGE MECHANICAL DATA

Insulated TO-220AC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
H2	10.00	10.40	0.393	0.409
L2	16.40 typ.		0.645 typ.	
L4	13.00	14.00	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam. I	3.75	3.85	0.147	0.151

ORDERING INFORMATION

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH806DTI	STTH806DTI	Insulated TO-220AC	1.90 g	50	Tube

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 m.N.
- Maximum torque value: 0.70 m.N.

Date	Revision	Changes
Oct-2003	2A	Initial release
May-2004	3	Reformatted
29-Jun-2005	4	Corrections to typographical errors. No technical changes.

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