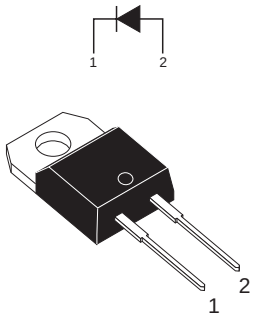
STTH506DTI

Tandem 600V HYPERFAST BOOST DIODE

MAJOR PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	5 A
V_{RRM}	600 V
Tj (max)	150 °C
V_F (max)	2.4 V
I_{RM} (typ.)	3.6 A
t_{rr} (typ.)	12 ns



Insulated TO-220AC

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 ($2500V_{RMS}$) 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=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)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward current		14	A
I_{FSM}	Surge non repetitive forward current	tp = 10 ms sinusoidal	60	A
Ipeak	Peak current waveform	δ = 0.15 Tc = 140°C	8	A
T_{stg}	Storage temperature range		-65 +150	°C
Tj	Maximum operating junction temperature		+ 150	°C

THERMAL AND POWER DATA

Symbol	Parameter	Test conditions	Value	Unit
$R_{th\ (j-c)}$	Junction to case thermal resistance		3.0	°C/W

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	$V_R = V_{RRM}$	Tj = 25°C			6	µA
			Tj = 125°C		8	60	
V_F **	Forward voltage drop	I_F = 5 A	Tj = 25°C			3.6	V
			Tj = 150°C		1.95	2.4	

Pulse test : * tp = 100 ms, δ < 2 %

** tp = 380 µs, δ < 2%

To evaluate the maximum conduction losses use the following equation :

$P = 1.7 \times I_{F(AV)} + 0.14\ I_{F^2(RMS)}$

DYNAMIC CHARACTERISTICS

Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 0.5 A Irr = 0.25 A I_R = 1 A	Tj = 25°C		12		ns
		I_F = 1 A dI_F/dt = - 50 A/µs V_R = 30 V				25	
I_{RM}	Reverse recovery current	V_R = 400 V I_F = 5 A dI_F/dt = -200 A/µs	Tj = 125°C		3.6	4.5	A
S	Reverse recovery softness factor				0.4		-
Q_{rr}	Reverse recovery charges				45		nC

TURN-ON SWITCHING CHARACTERISTICS

Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
t_{fr}	Forward recovery time	I_F = 5 A dI_F/dt = 100 A/µs V_{FR} = 1.1 x V_F max	Tj = 25°C			100	ns
V_{FP}	Transient peak forward recovery voltage	I_F = 5 A dI_F/dt = 100 A/µs	Tj = 25°C			7	V

Fig. 1: Conduction losses versus average current.

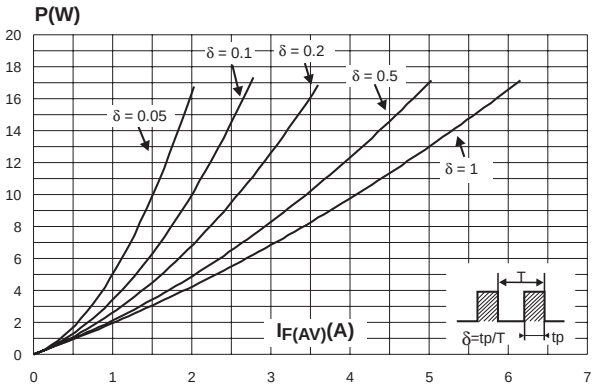


Fig. 2: Forward voltage drop versus forward current.

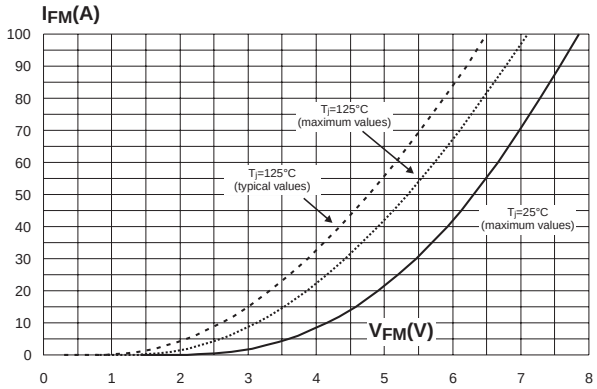


Fig. 3: Relative variation of thermal impedance junction to case versus pulse duration.

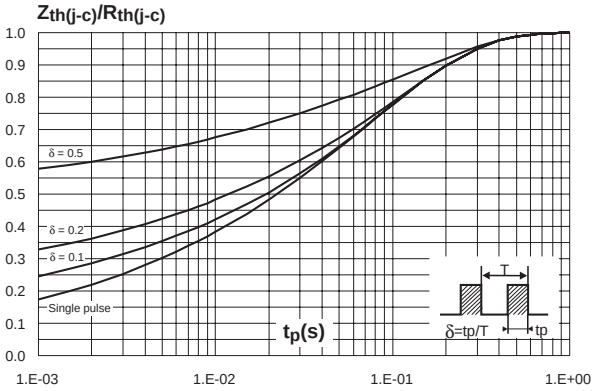


Fig. 4: Peak reverse recovery current versus dI_F/dt (typical values).

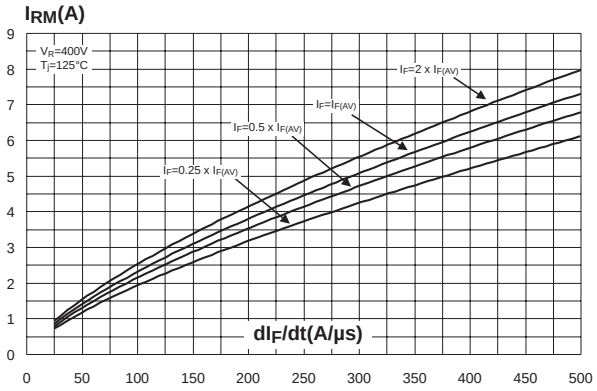


Fig. 5: Reverse recovery time versus dI_F/dt (typical values).

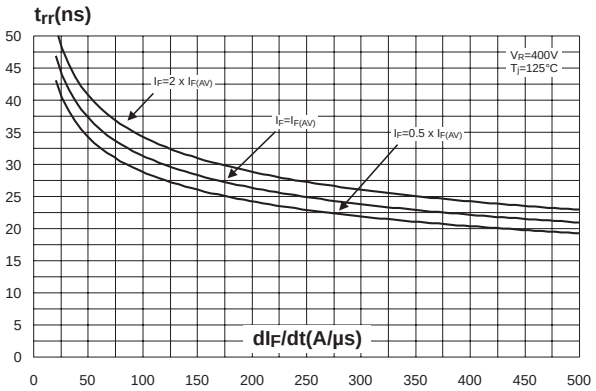


Fig. 6: Reverse recovery charges versus dI_F/dt (typical values).

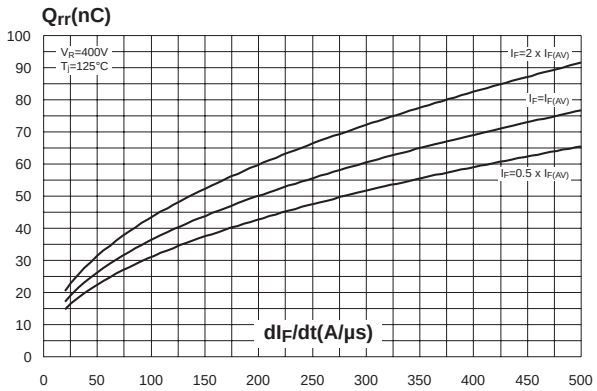


Fig. 7: Reverse recovery softness factor versus dI_F/dt (typical values).

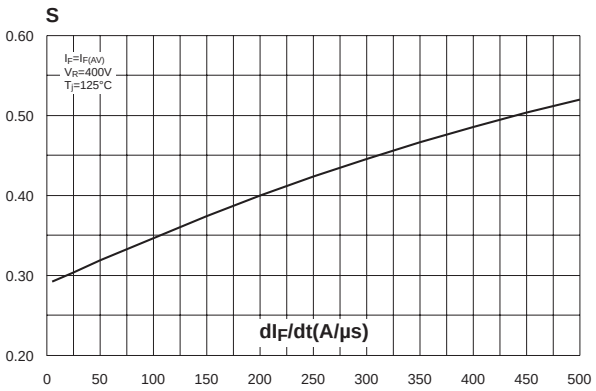


Fig. 8: Relative variation of dynamic parameters versus junction temperature (reference: Tj = 125°C).

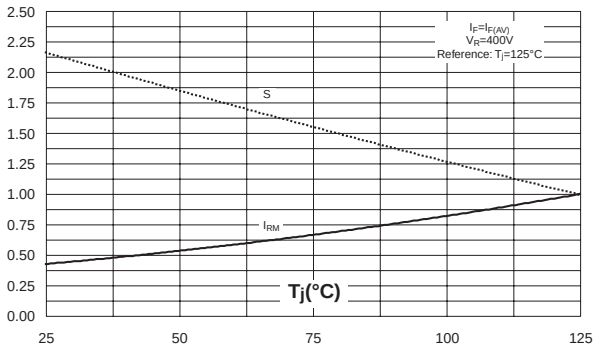


Fig. 9: Transient peak forward voltage versus dI_F/dt (typical values).

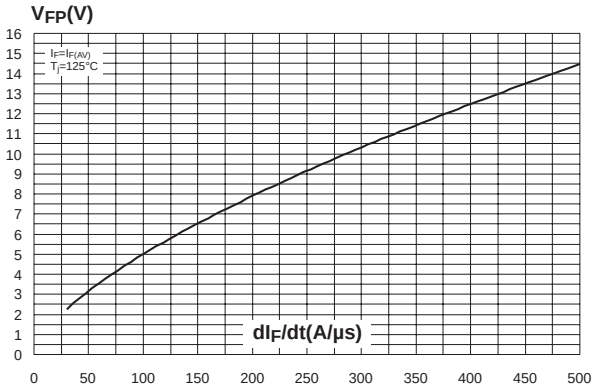


Fig. 10: Forward recovery time versus dI_F/dt (typical values).

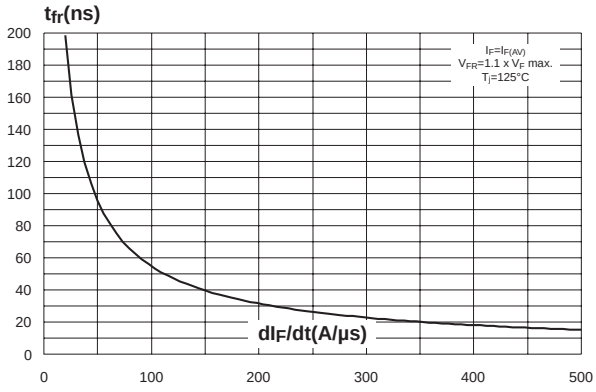
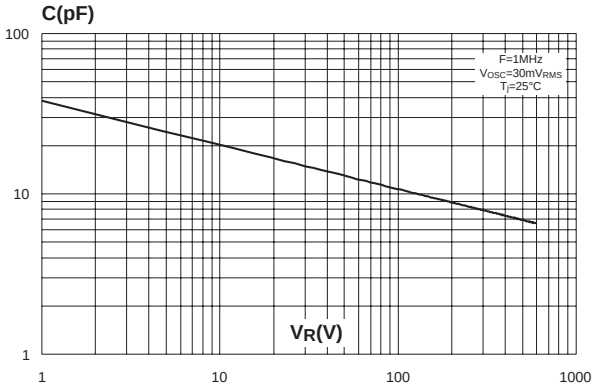
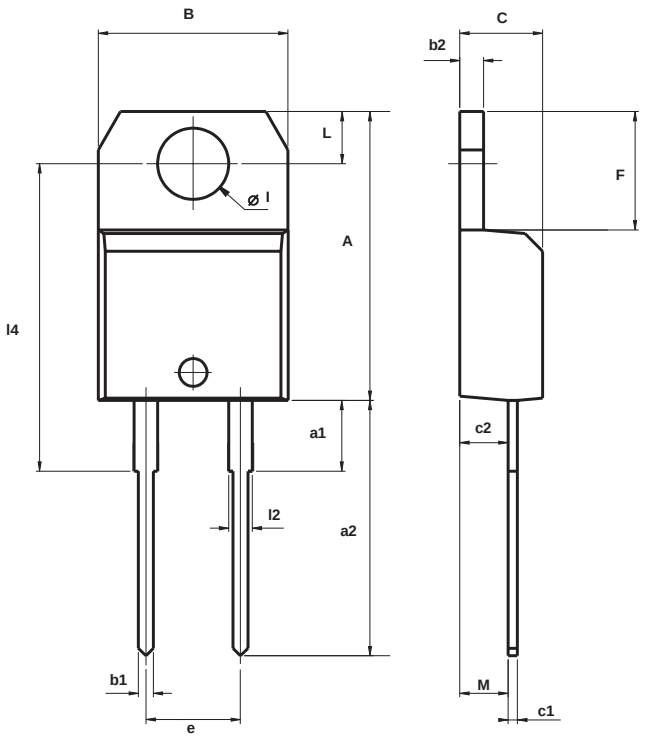


Fig. 11: Junction capacitance versus reverse voltage applied (typical values).



PACKAGE MECHANICAL DATA

TO-220AC



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	4.80		5.40	0.189		0.212
F	6.20		6.60	0.244		0.259
I	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
M		2.60			0.102	

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH506DTI	STTH506DTI	TO-220AC	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