STTH3006DPI

Tandem 600V HYPERFAST BOOST DIODE

MAJOR PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	30 A
V_{RRM}	600 V
Tj (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_{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=16pF

**DOP3I
(insulated)**
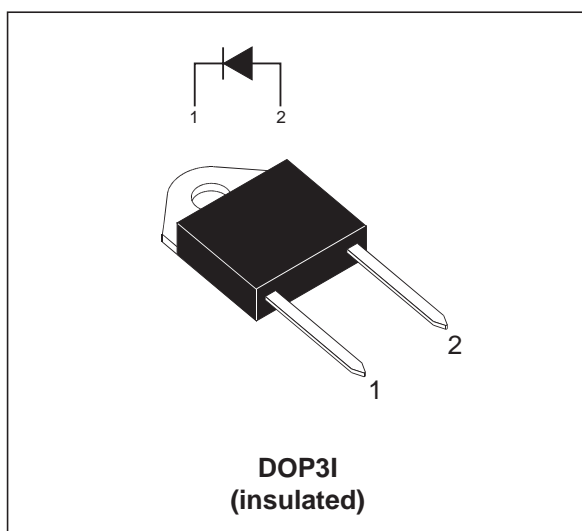
DESCRIPTION

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		32	A
I_{FSM}	Surge non repetitive forward current	tp = 10 ms sinusoidal	180	A
Ipeak	Peak current waveform	δ = 0.15 Tc = 120°C	50	A
T_{stg}	Storage temperature range		-65 +150	°C
Tj	Maximum operating junction temperature		+ 150	°C

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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	$V_R = V_{RRM}$	Tj = 25°C			40	µA
			Tj = 125°C		60	400	
V_F **	Forward voltage drop	$I_F = 30$ 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 :
$P = 1.7 \times I_{F(AV)} + 0.023 \, I_F^2{}_{(RMS)}$

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		25		ns
		$I_F = 1$ A $dI_F/dt = -50$ A/µs $V_R = 30$ V				45	
I_{RM}	Reverse recovery current	$V_R = 400$ V $I_F = 30$ A $dI_F/dt = -200$ A/µs	Tj = 125°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	$I_F = 30$ A $dI_F/dt = 100$ A/µs $V_{FR} = 1.1 \times V_F$ max	Tj = 25°C			400	ns
V_{FP}	Transient peak forward recovery voltage	$I_F = 30$ A $dI_F/dt = 100$ A/µs	Tj = 25°C			6	V

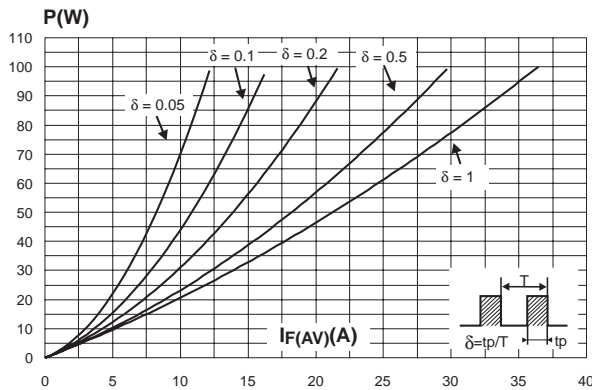**Fig. 1:** Conduction losses versus average current.

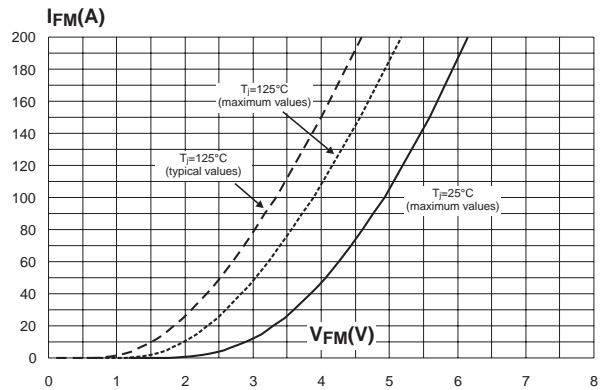**Fig. 2:** Forward voltage drop versus forward current.

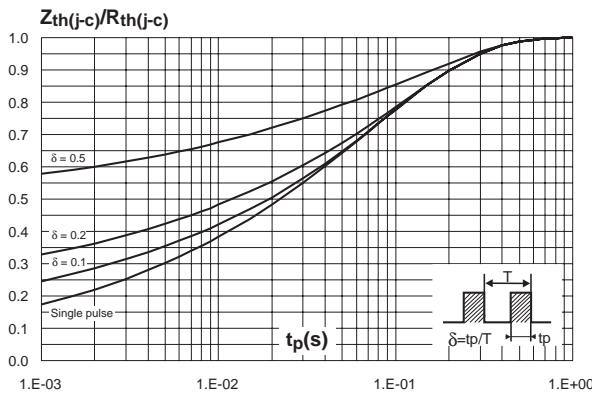**Fig. 3:** Relative variation of thermal impedance junction to case versus pulse duration.

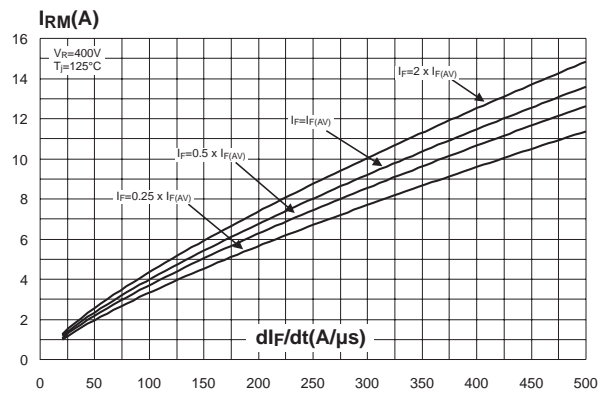**Fig. 4:** Peak reverse recovery current versus dI_F/dt (typical values).

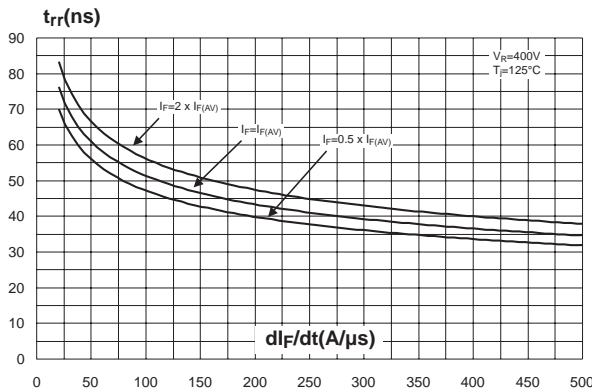**Fig. 5:** Reverse recovery time versus dI_F/dt (typical values).

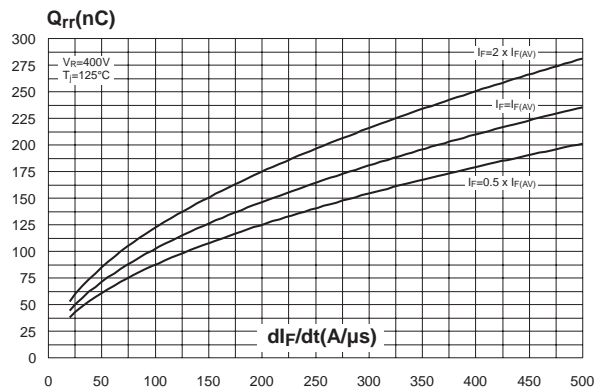**Fig. 6:** Reverse recovery charges versus dI_F/dt (typical values).
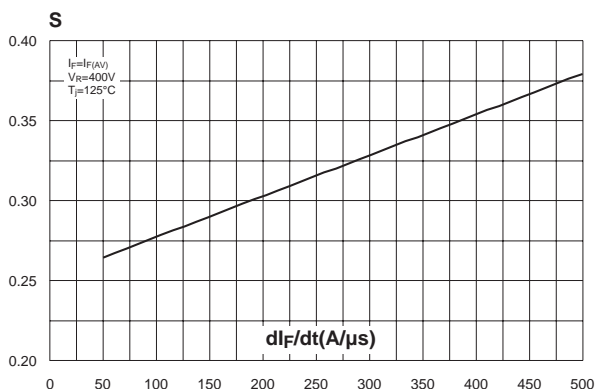
Fig. 7: Reverse recovery softness factor versus dI_F/dt (typical values).

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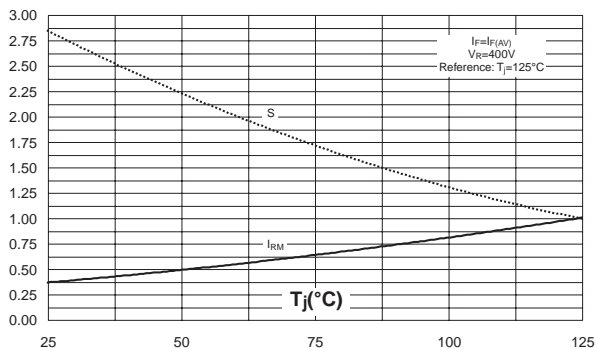

Fig. 9: Transient peak forward voltage versus dI_F/dt (typical values).
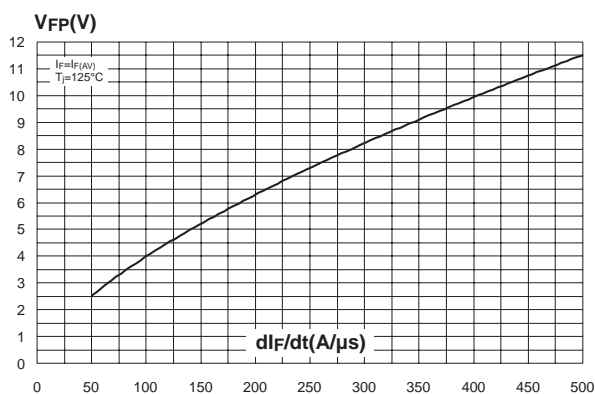

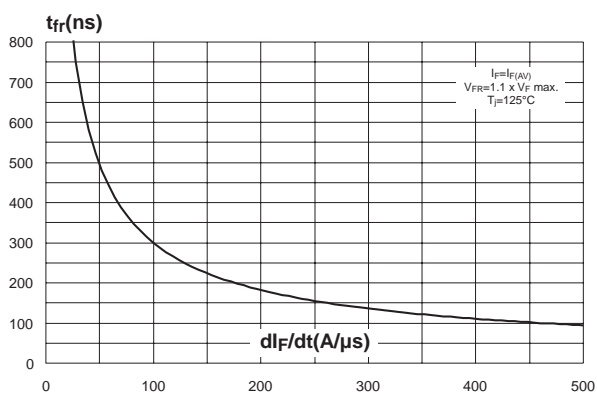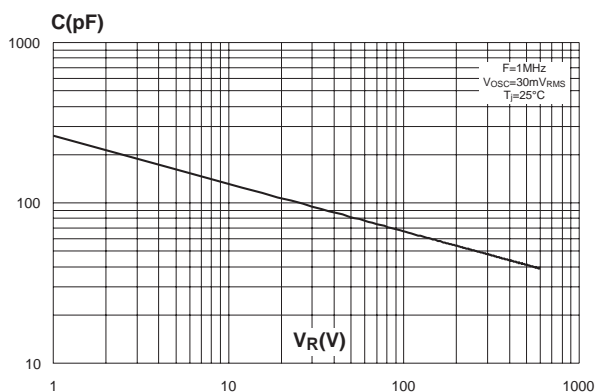**Fig. 10:** Forward recovery time versus dI_F/dt (typical values).

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

PACKAGE MECHANICAL DATA
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

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