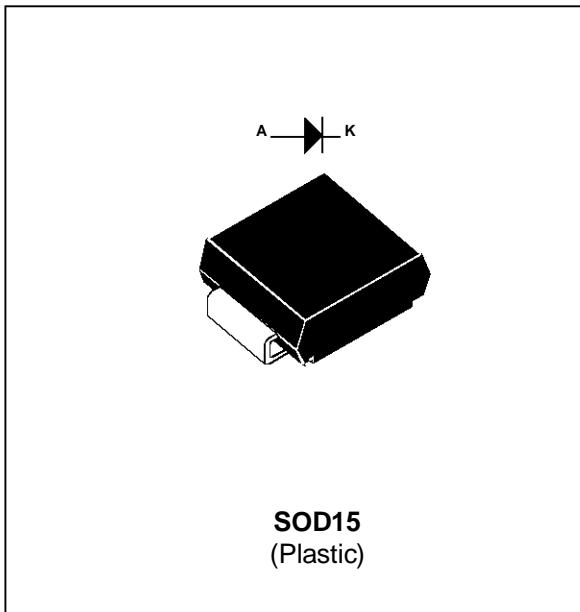


TURBOSWITCH™ "B". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	2A
V_{RRM}	600V
t_{rr} (typ)	45ns
V_F (max)	1.3V

PRELIMINARY DATASHEET



FEATURES AND BENEFITS

- SPECIFIC TO THE FOLLOWING OPERATIONS: SNUBBING OR CLAMPING, DEMAGNETIZATION AND RECTIFICATION
- ULTRA-FAST, VERY SOFT AND FREE-NOISE RECOVERY
- VERY LOW OVERALL POWER LOSSES AND PARTICULARLY LOW FORWARD VOLTAGE
- DESIGNED FOR HIGH PULSED CURRENT OPERATIONS
- SURFACE MOUNT DEVICE

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.

TURBOSWITCH "B" family drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes. They are particularly suitable in the primary circuit

of an SMPS as snubber, clamping or demagnetizer diodes, and also in most power converters as high performance Rectifier diodes.

Packaged in SOD15 surface mount envelope, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	600	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	600	V
$I_{F(RMS)}$	RMS Forward Current	8	A
I_{FRM}	Repetitive Peak Forward Current ($t_p = 5 \mu s$, $f = 1\text{kHz}$)	110	A
T_j	Max. Operating Junction Temperature	125	°C
T_{stg}	Storage Temperature range	- 65 to + 150	°C

STTB206S

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-l)}$	Junction to Lead Thermal Resistance		21	°C/W
P_1	Conduction Power Dissipation (see fig. 5)	$I_F(AV) = 1.5A \quad \delta = 0.5$ $T_{lead} = 81^\circ C$	2.1	W
P_{max}	Total Power Dissipation $P_{max} = P_1 + P_3 \quad (P_3 = 10\% P_1)$	$T_{lead} = 76^\circ C$ (Square waveform)	2.4	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig. 5)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward Voltage Drop	$I_F = 2A$	$T_j = 25^\circ C$ $T_j = 125^\circ C$		0.9	1.35 1.2	V
I_R **	Reverse Leakage Current	$V_R = 0.8$ $\times V_{RRM}$	$T_j = 25^\circ C$ $T_j = 125^\circ C$		150	20 500	μA

Test pulses widths : * $t_p = 380 \mu s$, duty cycle < 2%

** $t_p = 5 ms$, duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig. 6)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse Recovery Time	$T_j = 25^\circ C$ $I_F = 0.5 A \quad I_R = 1A \quad Irr = 0.25A$ $I_F = 1 A \quad dI_F/dt = -50A/\mu s \quad V_R = 30V$		45	95	ns
I_{RM}	Maximum Recovery Current	$T_j = 125^\circ C \quad V_R = 400V \quad I_F = 2A$ $dI_F/dt = -16 A/\mu s$ $dI_F/dt = -50 A/\mu s$		3.6	2.4	A
S factor	Softness factor	$T_j = 125^\circ C \quad V_R = 400V \quad I_F = 2A$ $dI_F/dt = -50 A/\mu s$		TBD		/

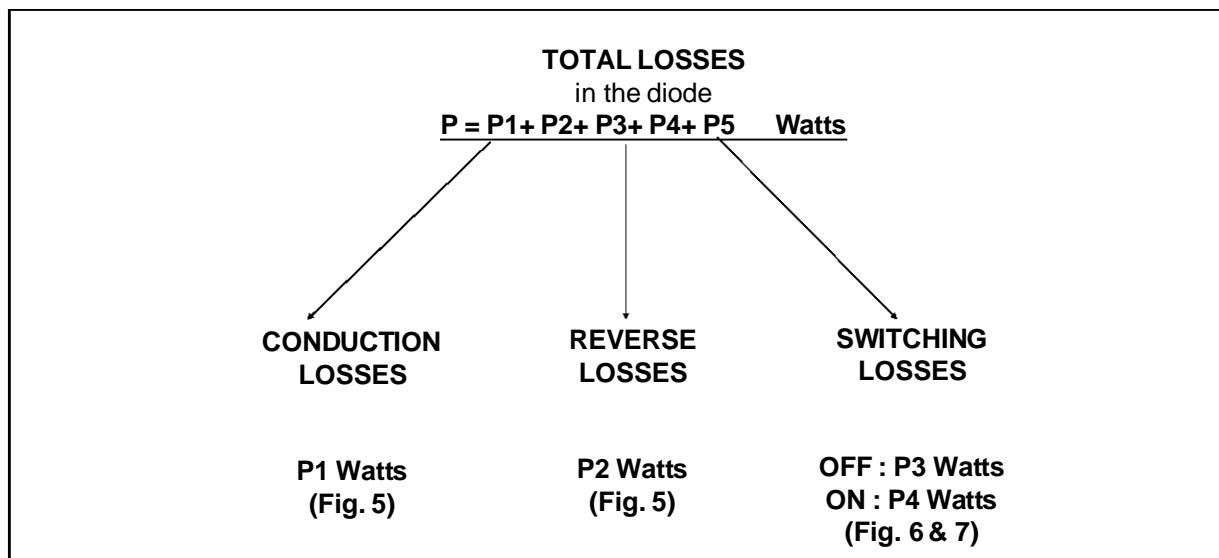
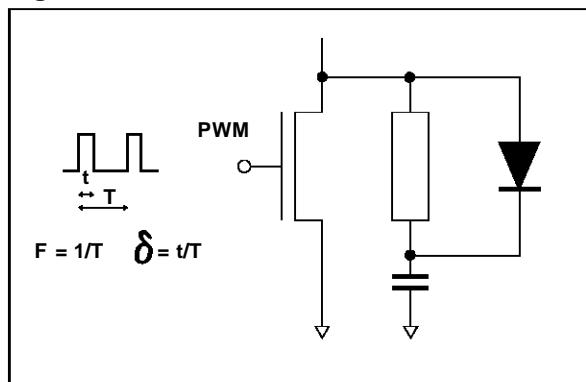
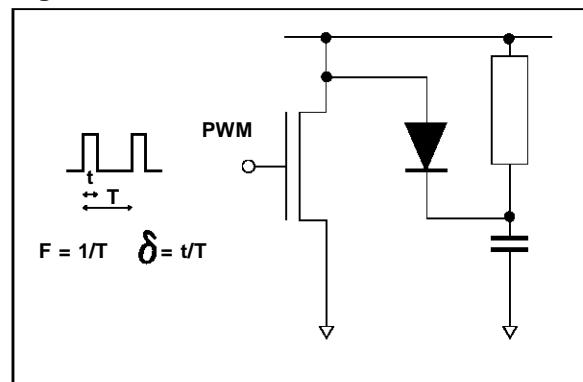
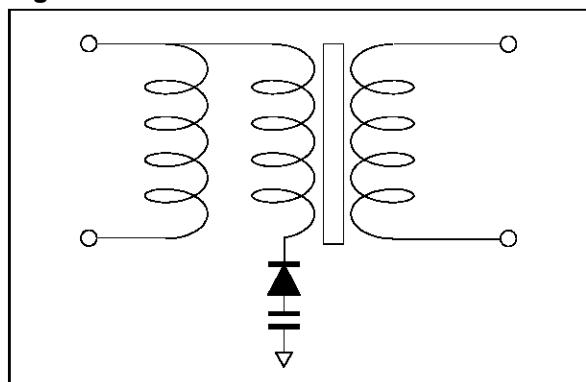
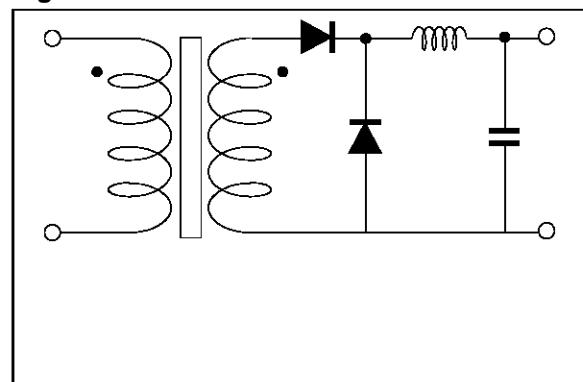
TURN-ON SWITCHING (see Fig. 7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward Recovery Time	$T_j = 25^\circ C$ $I_F = 2 A \quad dI_F/dt = 16 A/\mu s$ measured at : $1.1 \times V_F \text{ max}$			500	ns
V_{Fp}	Peak Forward Voltage	$T_j = 25^\circ C$ $I_F = 2 A \quad dI_F/dt = 16 A/\mu s$			8	V
		$T_j = 25^\circ C$ $I_F = 5 A \quad dI_F/dt = 50 A/\mu s$		6		

APPLICATION DATA

The TURBOSWITCH™ "B" is especially designed to provide the lowest overall power losses in any application such as snubbing, clamping, demagnetization and rectification.

In such applications (fig. 1 to 4), the way of calculating the power losses is given below :

**Fig. 1 : SNUBBER DIODE.****Fig. 2 : CLAMPING DIODE.****Fig. 3 : DEMAGNETIZING DIODE.****Fig. 4 : RECTIFIER DIODE.**

STTB206S

APPLICATION DATA (Cont'd)

Fig. 5: STATIC CHARACTERISTICS

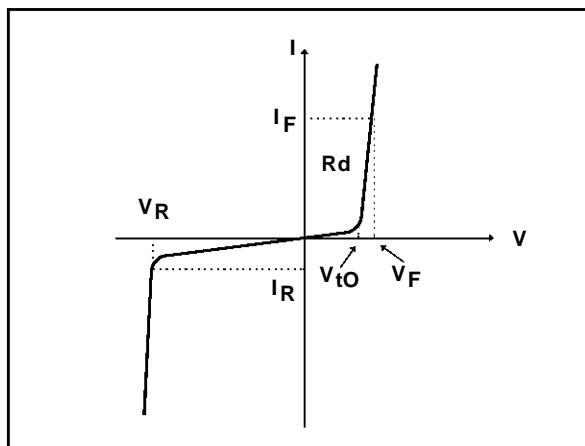
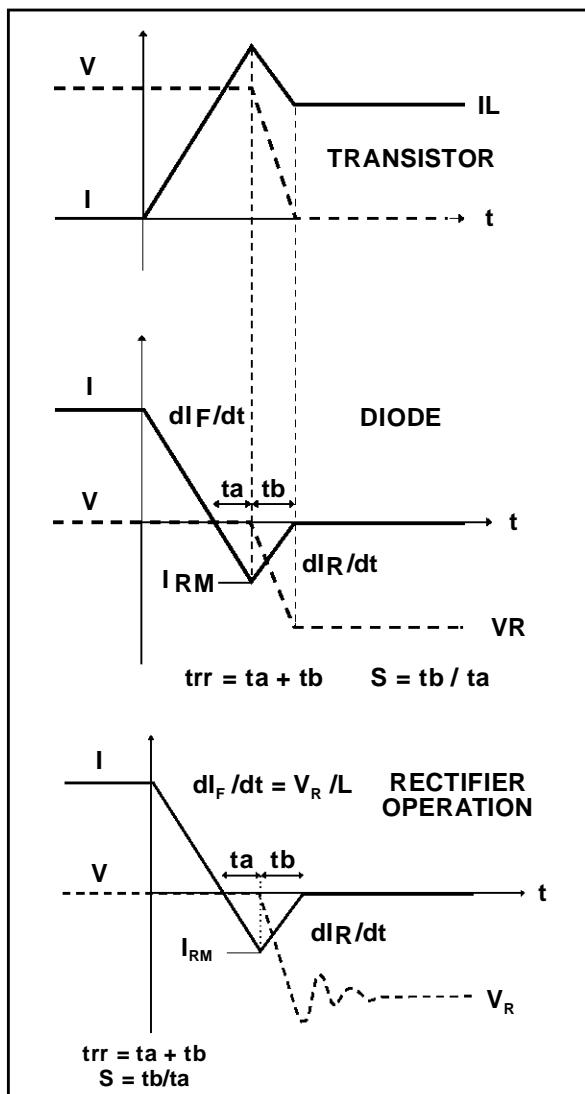


Fig. 6: TURN-OFF CHARACTERISTICS



Conduction losses :

$$P1 = V_{t0} \times I_F(AV) + R_d \times I_F^2(RMS)$$

with

$$\begin{aligned} V_{t0} &= 1.05 \text{ V} \\ R_d &= 0.125 \text{ Ohm} \\ (\text{Max values at } 125^\circ\text{C}) \end{aligned}$$

Reverse losses :

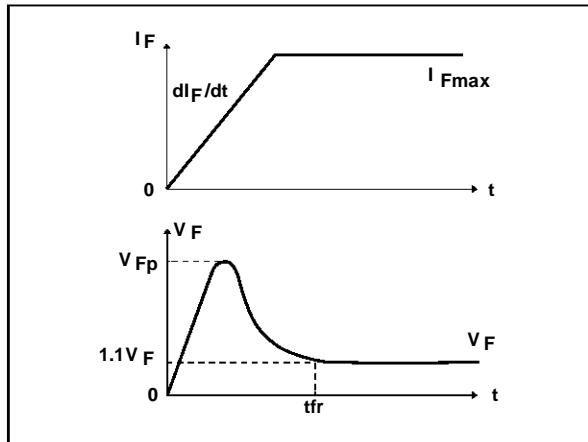
$$P2 = V_R \times I_R \times (1 - \delta)$$

Turn-off losses :

$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

Turn-off losses :
with non negligible serial inductance

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

APPLICATION DATA (Cont'd)**Fig. 7: TURN-ON CHARACTERISTICS****Turn-on losses :**

$$P_4 = 0.4 (V_{FP} - V_F) \times I_{Fmax} \times t_{fr} \times F$$

Ratings and characteristics curves are ON GOING.

STTB206S

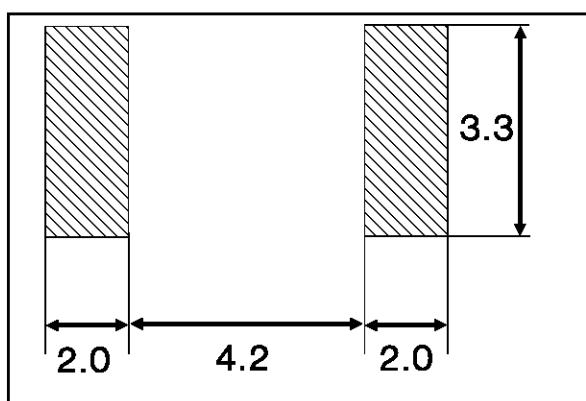
PACKAGE MECHANICAL DATA

SOD15 Plastic

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.50	3.10	0.098	0.122
a1	0.05	0.20	0.002	0.008
B	2.90	3.10	0.114	0.122
b1	0.29	0.32	0.011	0.012
C	4.80	5.20	0.189	0.204
D	7.60	8.00	0.299	0.315
E	6.30	6.60	0.225	0.259
F	1.30	1.70	0.051	0.056

FOOTPRINT DIMENSIONS

SOD15 Plastic



Marking : T61

Laser marking

Logo indicates cathode

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1995 SGS-THOMSON Microelectronics - Printed in Italy - All rights reserved.

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.