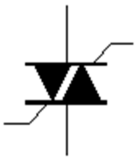
BI-DIRECTIONAL CONTROL THYRISTOR

TSB193-2000

- V_{RM} = **4200 V**
- I_{TRMS} = **3347 V** (T_C = 70°C)
- $I_{T(AV)}$ = **2132 A** (T_C = 70°C)
- $I_{T(AV)}$ = **1732 A** (T_C = 85°C)
- I_{TSM} = **32 kA** (T_j = 125°C)



- Two counter-parallel thyristors integrated into one wafer
- Ability to conduct current in both directions
- Two control electrodes
- Completely clamping construction

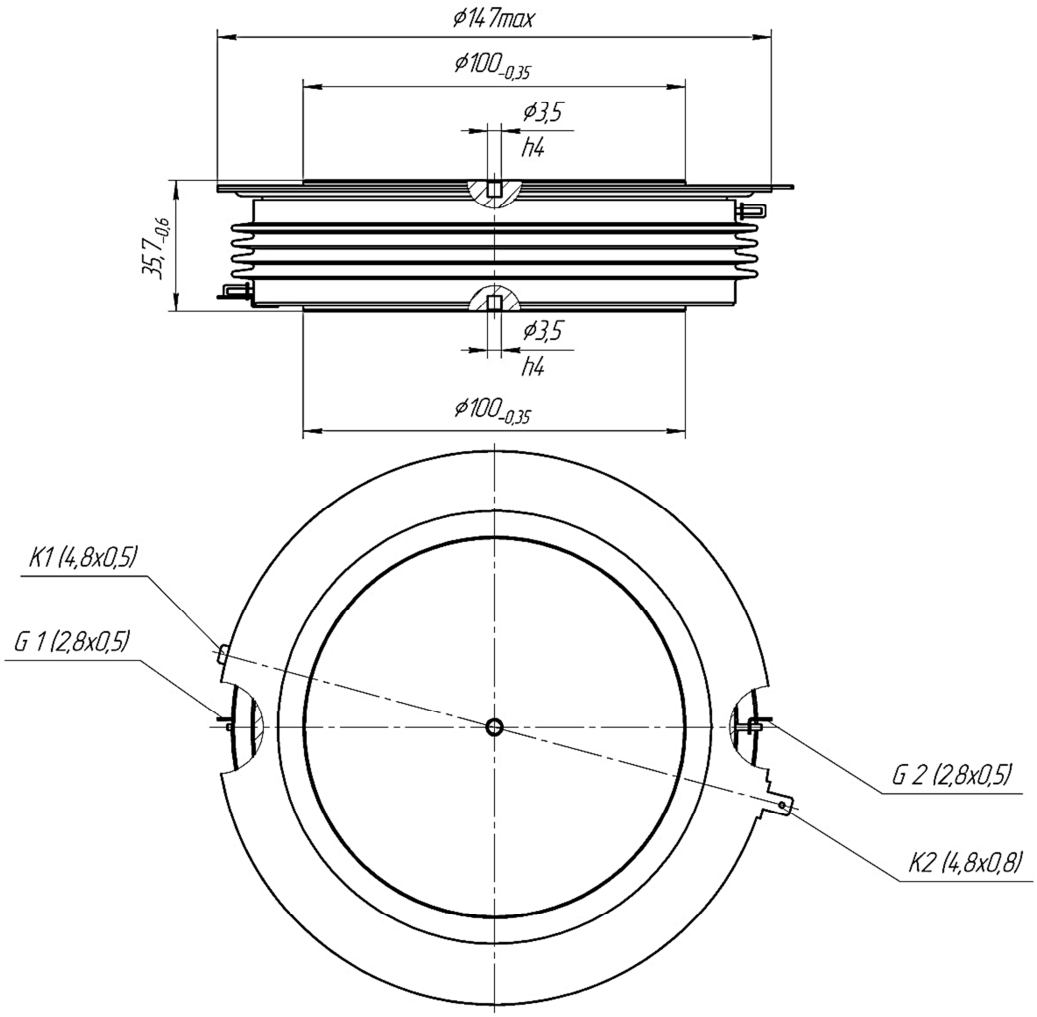
MAXIMUM RATED VALUES

Parameter and conditions	Symbol	Values	Units
Repetitive peak forward blocking voltage, T_j = -40 …+ 125°C	V_{RM}	4200	V
Non-repetitive peak forward blocking voltage, T_j = -40 …+ 125°C	V_{SM}	4300	
Repetitive peak off-state current, T_j = 125°C, V_{RM}	I_{RM}	400	mA
Average on-state current, f = 50 Hz, double side cooling, T_C = 85°C T_C = 70°C	$I_{T(AV)}$	1732 2132	A
RMS on-state current, T_C = 70°C, f = 50 Hz	I_{TRMS}	3347	
Surge non-repetitive on-state current, T_j = 125°C, V_R = 0, t_p = 10 ms	I_{TSM}	32	kA
Safety factor	I^2t	5.1×10^6	A^2s
Critical rate of rise of on-state current, T_j = 125°C, V_D = 0.67V_{RM}, I_T = 4000 A, t_p= 10 µs, f = 50 Hz	$(di_T/dt)_{crit}$	250	A/µs
Critical rate of rise of off-state voltage, T_j = 125°C, V_D = 0.67V_{RM}	$(dv_D/dt)_{crit}$	1000	V/µs
Operation junction temperature range	T_j	-40… +125	°C
Storage temperature range	T_{stg}	-40… +50	

TSB193-2000

ELECTRICAL CHARACTERISTICS					
Parameter and conditions	**Symbol**	**Values**			**Units**
		min	**typ.**	**max**	
Peak on-state voltage, T_j = 125°C, I_T = 6280 A	V_{TM}	-	-	2.93	V
On-state threshold voltage, T_j = 125°C, I_T = 3140 - 9425 A	$V_{(TO)}$	-	-	1.00	
On-state slope resistance, T_j = 125°C, I_T = 3140 - 9425 A	r_T	-	-	0.24	mΩ
Delay time, T_j = 25°C, V_D = 0.67V_{RM}, I_{FG} = 5 A, t_r = 0.5 µs	t_d	-	-	5.0	µs
Turn off-time, T_j = 125°C, I_T = 2000 A, di_T/dt = - 1.5 A/µs, V_R=200 V, V_D = 0.67V_{RM}, dv_D/dt = 20 V/µs	t_q	-	800	-	
Reverse recovery charge, T_j = 125°C, I_T = 2000 A, di_T/dt = - 1.5 A/µs, V_R=200 V	Q_{rr}	-	-	3200	µAs
Holding current, T_j = 25°C, V_D = 12 V	I_H	100	-	300	mA
Latching current, T_j = 25°C, V_D = 12 V, t_p = 10 ms, t_r = 0.5 µs	I_L	100	-	500	
Gate trigger voltage, T_j = 25°C, V_D = 12 V,	V_{GT}	-	-	2.6	V
Gate trigger current, T_j = 25°C, V_D = 12 V,	I_{GT}	-	-	400	mA
Gate non-trigger direct voltage, T_j = 125°C, V_D = 0.4V_{RM}	V_{GD}	0.3	-	-	V
Gate non-trigger direct current, T_j = 125°C, V_D = 0.4V_{RM}	I_{GD}	10	-	-	mA
THERMAL PARAMETERS					
Thermal junction to case resistance, DC double side cooled	$R_{th(j-c)}$	-	-	0.0114	°C/W
Thermal case to heatsink resistance, double side cooled single side cooled	$R_{th(c-h)}$	-	-	0.0020 0.0064	
MECHANICAL PARAMETERS					
Weight	w	-	2.70	-	kg
Clamping force	F	70	-	90	kN
Maximum acceleration (at nominal mounting force)	a	-	-	50	m/s^2
Minimal gate-anode distance on insulator surface	D_s	-	59	-	mm

TSB193-2000



Device Outline Drawing
(dimensions in mm)

126, Proletarskaya str.,
430001, Saransk, Republic Mordovia, Russia
Tel: +7(8342) 47-04-30
Tel/Fax: +7 (8342) 47-15-01
E-mail: vpruvs@elvpr.ru
Internet: www.elvpr.ru