

BI-DIRECTIONAL CONTROL THYRISTOR TSB193-1600

<ul style="list-style-type: none"> ◆ $V_{RM} = \mathbf{6000 - 6500\ V}$ ◆ $I_{TRMS} = \mathbf{2598\ A}$ ($T_C = 55\ ^\circ\text{C}$) ◆ $I_{T(AV)} = \mathbf{1655\ A}$ ($T_C = 55\ ^\circ\text{C}$) ◆ $I_{T(AV)} = \mathbf{1409\ A}$ ($T_C = 70\ ^\circ\text{C}$) ◆ $I_{TSM} = \mathbf{22\ kA}$ ($T_j = 125\ ^\circ\text{C}$) 		
<ul style="list-style-type: none"> ◆ 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, $T_j = -40 \dots +125\ ^\circ\text{C}$	V_{RM}	6000 - 6500	V
Non-repetitive peak forward blocking voltage, $T_j = -40 \dots +125\ ^\circ\text{C}$	V_{SM}	6100 - 6600	
Repetitive peak off-state current, $T_j = 125\ ^\circ\text{C}, V_{RM}$	I_{RM}	400	mA
Average on-state current, $f = 50\ \text{Hz}$, double side cooling, $T_C = 85\ ^\circ\text{C}$ $T_C = 70\ ^\circ\text{C}$ $T_C = 55\ ^\circ\text{C}$	$I_{T(AV)}$	1126 1409 1655	A
RMS on-state current, $T_C = 55\ ^\circ\text{C}, f = 50\ \text{Hz}$	I_{TRMS}	2598	A
Surge non-repetitive on-state current, $T_j = 125\ ^\circ\text{C}, V_R = 0, t_p = 10\ \text{ms}$	I_{TSM}	22	kA
Safety factor	I^2t	$2.4 \cdot 10^6$	A^2s
Critical rate of rise of on-state current, $T_j = 125\ ^\circ\text{C}, V_D = 0.67V_{RM}, I_T = 3200\ \text{A},$ $t_p = 10\ \mu\text{s}, f = 50\ \text{Hz}$	$(di_T/dt)_{crit}$	250	$\text{A}/\mu\text{s}$
Critical rate of rise of off-state voltage, $T_j = 125\ ^\circ\text{C}, V_D = 0.67V_{RM}$	$(dv_D/dt)_{crit}$	1000	$\text{V}/\mu\text{s}$
Operation junction temperature range	T_j	-40... +125	$^\circ\text{C}$
Storage temperature range	T_{stg}	-40... +50	

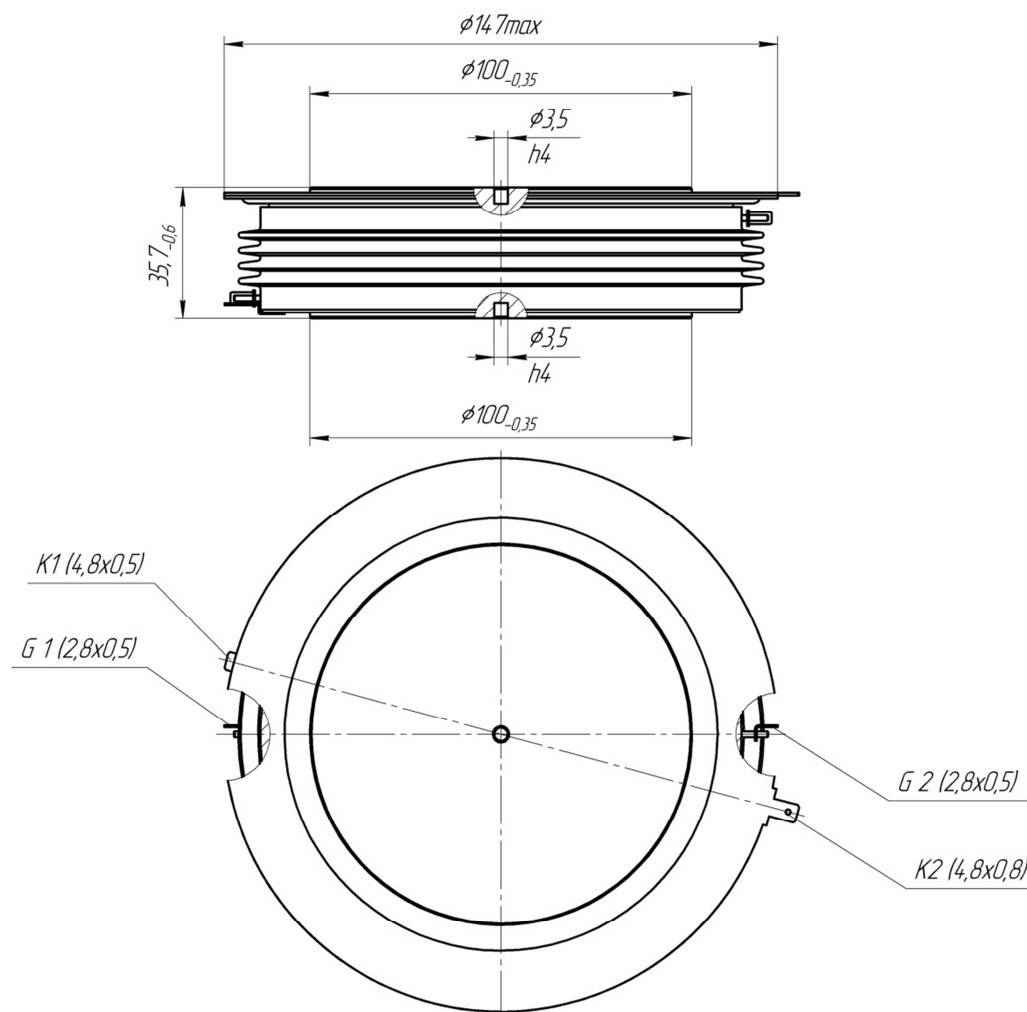


TSB193-1600

ELECTRICAL CHARACTERISTICS					
Parameter and conditions	Symbol	Values			Units
		min	typ.	max	
Peak on-state voltage, $T_j = 125\text{ }^\circ\text{C}$, $I_T = 3000\text{ A}$	V_{TM}	-	-	2.90	V
On-state threshold voltage, $T_j = 125\text{ }^\circ\text{C}$, $I_T = 670 - 2000\text{ A}$	$V_{T(TO)}$	-	-	1.20	
On-state slope resistance, $T_j = 125\text{ }^\circ\text{C}$, $I_T = 670 - 2000\text{ A}$	r_T	-	-	0.55	m Ω
Delay time, $T_j = 25\text{ }^\circ\text{C}$, $V_D = 0.4V_{RM}$, $I_{FG} = 2\text{ A}$, $t_r = 0.5\text{ }\mu\text{s}$	t_d	-	-	3.0	μs
Turn off-time, $T_j = 125\text{ }^\circ\text{C}$, $I_T = 1600\text{ A}$, $di_T/dt = -1.5\text{ A}/\mu\text{s}$, $V_R=200\text{ V}$, $V_D = 0.67V_{RM}$, $dv_D/dt = 20\text{ V}/\mu\text{s}$	t_q	-	800	-	
Reverse recovery charge, $T_j = 125\text{ }^\circ\text{C}$, $I_T = 1600\text{ A}$, $di_T/dt = -1.5\text{ A}/\mu\text{s}$, $V_R=200\text{ V}$	Q_{RR}	2500	-	3700	μAs
Holding current, $T_j = 25\text{ }^\circ\text{C}$, $V_D = 12\text{ V}$	I_H	100	-	300	mA
Latching current, $T_j = 25\text{ }^\circ\text{C}$, $V_D = 12\text{ V}$, $t_p = 10\text{ ms}$, $t_r = 0.5\text{ }\mu\text{s}$	I_L	100	-	500	
Gate trigger voltage, $T_j = 25\text{ }^\circ\text{C}$, $V_D = 12\text{ V}$,	V_{GT}	-	-	2.6	V
Gate trigger current, $T_j = 25\text{ }^\circ\text{C}$, $V_D = 12\text{ V}$,	I_{GT}	-	-	400	mA
Gate non-trigger direct voltage, $T_j = 125\text{ }^\circ\text{C}$, $V_D = 0.4V_{RM}$	V_{GD}	0.3	-	-	V
Gate non-trigger direct current, $T_j = 125\text{ }^\circ\text{C}$, $V_D = 0.4V_{RM}$	I_{GD}	10	-	-	mA
THERMAL PARAMETERS					
Thermal junction to case resistance, DC: double side cooled	$R_{th(j-c)}$	-	-	0.0114	$^\circ\text{C}/\text{W}$
Thermal case to heatsink resistance, double side cooled single side cooled	$R_{th(c-h)}$	-	-	0.002 0.004	
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



TSB193-1600



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