

Optimum power handling
Low on-state and switching losses
Designed for traction and industrial applications

Phase Control Thyristor Type T171-200

Mean on-state current	I_{TAV}	200 A													
Repetitive peak off-state voltage	V_{DRM}	300 ÷ 1800 V													
Repetitive peak reverse voltage	V_{RRM}														
Turn-off time	t_q	80; 100; 160; 250 μ s													
V_{DRM}, V_{RRM}, V	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1800
Voltage code	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18
$T_j, ^\circ\text{C}$	– 60 ÷ 125														

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions
ON-STATE				
I_{TAV}	Mean on-state current	A	200	$T_c=90^\circ\text{C}$; 180° half-sine wave, 50 Hz
I_{TRMS}	RMS on-state current	A	314	$T_c=90^\circ\text{C}$; Full cycle sine wave, 50 Hz
I_{TSM}	Surge on-state current	kA	5.0 5.5	$T_j=T_{j\max}$ $T_j=25^\circ\text{C}$ 180° half-sine wave, 50 Hz, single pulse; $V_R=0\text{ V}$;
I^2t	Safety factor	$\text{A}^2\text{s}\cdot 10^3$	125 150	$T_j=T_{j\max}$ $T_j=25^\circ\text{C}$ Gate pulse: 20 V, 5 Ω , 1 μ s rise time, 500 μ s
BLOCKING				
V_{DRM}, V_{RRM}	Repetitive peak off-state and Repetitive peak reverse voltages	V	300÷1800	$T_j=T_{j\max}$; 180° half-sine wave, 50 Hz; Gate open
V_{DSM}, V_{RSM}	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	335÷2000	$T_j=T_{j\max}$; 180° half-sine wave, 50 Hz, single pulse Gate open
V_D, V_R	Direct off-state and Direct reverse voltages	V	0.75· V_{DRM} 0.75· V_{RRM}	$T_j=T_{j\max}$; Gate open
TRIGGERING				
P_{GM}	Peak gate power dissipation	W	40	$T_j=T_{j\max}$
$P_{G(AV)}$	Mean gate power dissipation	W	6	$T_j=T_{j\max}$
V_{RGM}	Peak gate reverse voltage	V	5	$T_j=T_{j\max}$
SWITCHING				
$(di_T/dt)_{crit}$	Critical rate of rise of on-state current: non-repetitive repetitive	A/ μ s	125 60	$T_j=T_{j\max}$; $V_D=0.67\cdot V_{DRM}$; $I_{TM}\leq 2I_{T(AV)}$; Gate pulse: 20 V, 5 Ω , 1 μ s rise time, 50 μ s
THERMAL				
T_{stg}	Storage temperature	$^\circ\text{C}$	– 60 ÷ 50	
T_j	Junction temperature	$^\circ\text{C}$	– 60 ÷ 125	

CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions
ON-STATE				
V _{TM}	Peak on-state voltage	V	1.75	T _J =25°C; I _{TM} =3.14·I _{TAV}
V _{T(TO)}	On-state threshold voltage	V	1.00	T _J =T _{J max}
r _T	On-state slope resistance	mΩ	1.12	T _J =T _{J max}
I _L	Latching current	mA	700	T _J =25°C; V _D =12 V; Gate pulse: 20 V, 5 Ω, 1 μs rise time, 50 μs
I _H	Holding current	mA	250	T _J =25°C; V _D =12 V; Gate open
BLOCKING				
I _{DRM} , I _{RRM}	Repetitive peak off-state and repetitive peak reverse currents	mA	30	T _J =T _{J max} ; V _D =V _{DRM} ; V _R =V _{RRM}
(dV _D /dt) _{crit}	Critical rate of rise of off-state voltage ¹⁾	V/μs	20 1000	T _J =T _{J max} ; V _D =0.67·V _{DRM} ; Gate open
TRIGGERING				
V _{GT}	Gate trigger direct voltage	V	3.50	T _J =25°C; V _D =12 V; Direct gate current
I _{GT}	Gate trigger direct current	A	0.20	
V _{GD}	Gate non-trigger direct voltage	V	0.45	T _J =T _{J max} ; V _D =0.67·V _{DRM} ; Direct gate current
I _{GD}	Gate non-trigger direct current	mA	5.0	
SWITCHING				
t _{gt}	Turn-on time	μs	8.0	T _J =25°C; V _D =100 V; I _{TM} =I _{TAV} ; Gate pulse: 20 V, 5 Ω, 1 μs rise time, 50 μs
t _{gd}	Delay time	μs		
t _q	Turn-off time ²⁾	μs	80 100 160 250	T _J =T _{J max} ; I _{TM} =I _{TAV} ; di _R /dt=5 A/μs; V _R =100 V; V _D =0.67 V _{DRM} ; dV _D /dt=50 V/μs
Q _{rr}	Recovered charge	μC	400	T _J =T _{J max} ; I _{TM} =I _{TAV} ; di _R /dt=5 A/μs; V _R =100 V;
t _{rr}	Reverse recovery time	μs	15.0	
THERMAL				
R _{thjc}	Thermal resistance junction to case	°C/W	0.10	Direct current, double side cooled

Note:

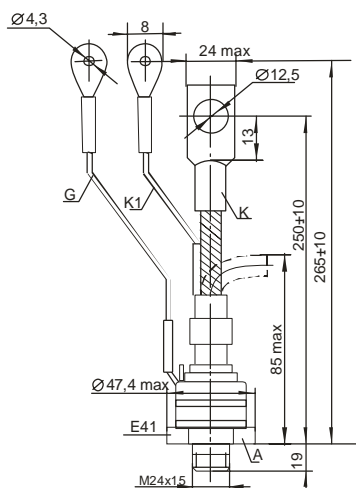
¹⁾ Critical rate of rise of off-state voltage

Symbol of group	P3	E3	A3	P2	K2	E2	A2
$(dV_D/dt)_{crit}$, V/ μs	20	50	100	200	320	500	1000

²⁾ Turn-off time

Symbol of group	B3	A3	T2	M2
t_q , μs	80	100	160	250

OVERALL DIMENSIONS



PART NUMBERING GUIDE

T	171	200	18	A2	B3	N
1	2	3	4	5	6	7

- Thyristor
- Design version
- Mean on-state current, A
- Voltage code
- Critical rate of rise of off-state voltage
- Group of turn-off time
- Ambient conditions: N – normal; T – tropical

Weight: 440 grams

Tightening torque: 25 ÷ 35 Nm

Recommended heatsink: O181; O281

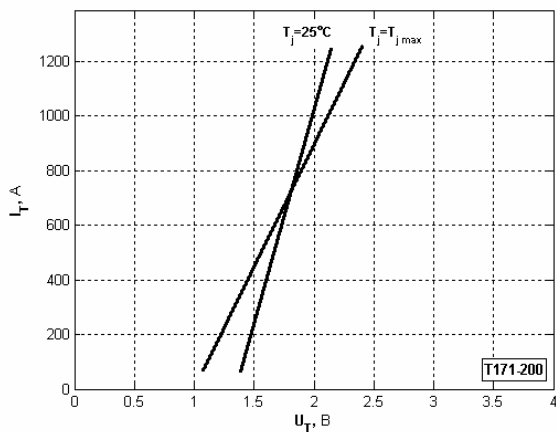


Fig 1 On-state characteristics

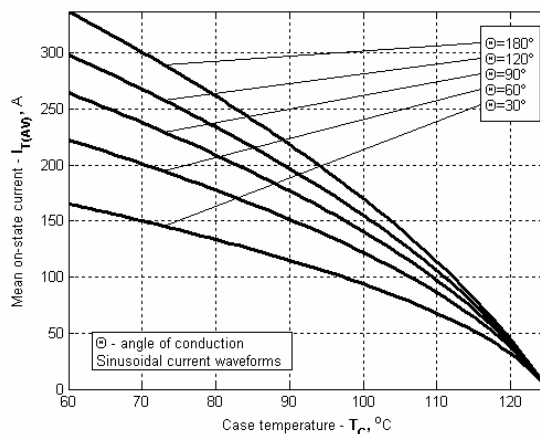


Fig 2 Maximum allowable mean on-state current I_{TAV} vs. case temperature T_C for sinusoidal current waveforms, $f=50$ Hz

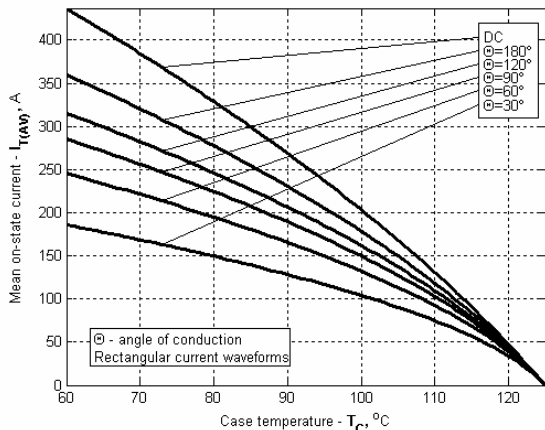


Fig 3 Maximum allowable mean on-state current I_{TAV} vs. case temperature T_C for rectangular current waveforms and for DC, $f=50$ Hz

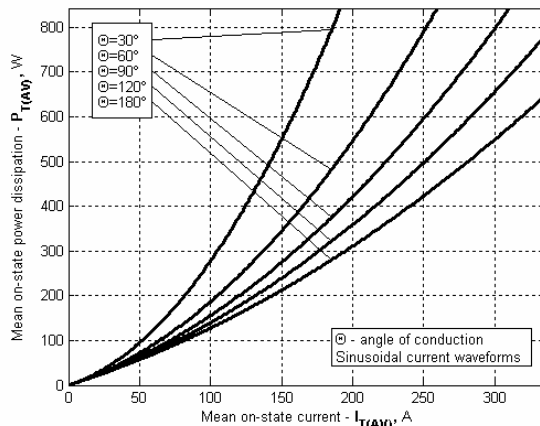


Fig 4 On-state power dissipation P_{TAV} vs. mean on-state current I_{TAV} for sinusoidal current waveforms at different conduction angles, $f=50$ Hz

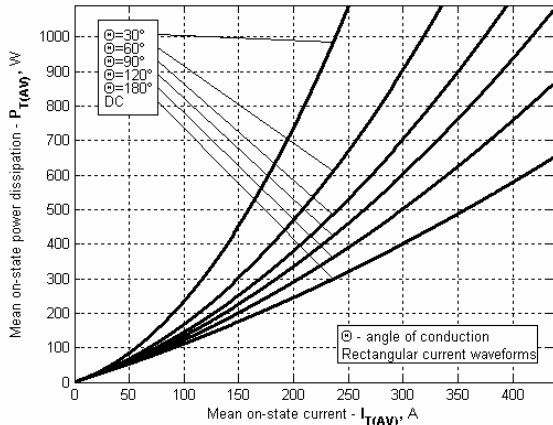


Fig 5 On-state power dissipation P_{TAV} vs. mean on-state current I_{TAV} for rectangular current waveforms and for DC at different conduction angles, $f=50$ Hz

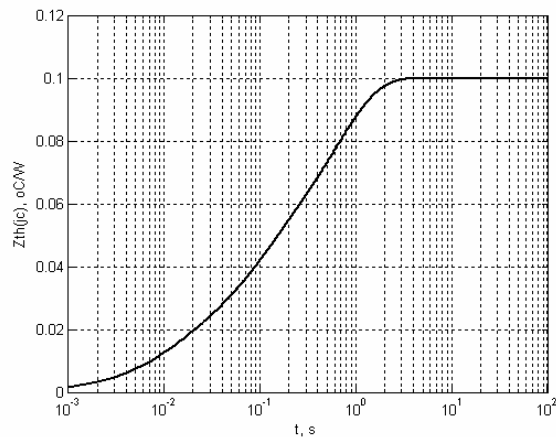


Fig 6 Transient thermal impedance junction to case $Z_{th(jc)}$

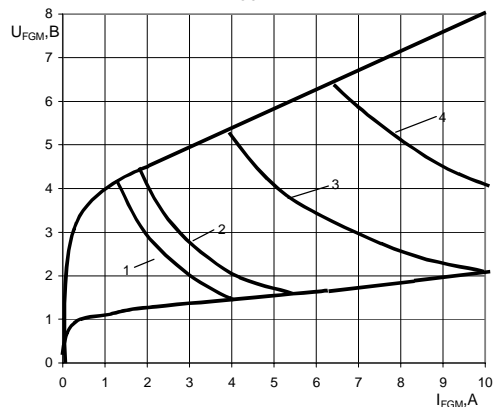


Fig 7 Max. peak gate power loss:

Position (See Fig. 7)	On-Off time ratio	Gate pulse length, ms	Gate Pulse Power, W
1	1	DC	6
2	2	10	8
3	20	1	20
4	40	0,5	40