



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

Phase Control Stud Thyristor
Type T471-320-16

Mean on-state current	I_{TAV}	320 A															
Repetitive peak off-state voltage*	V_{DRM}	100÷1600 V															
Repetitive peak reverse voltage*	V_{RRM}																
Turn-off time	t_q	125 μ s															
V_{DRM}, V_{RRM}, V		100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
Voltage code		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
$T_{jv}, ^\circ C$		-60÷125															

* **1800 V** – Voltage class on demand

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions
ON-STATE				
I_{TAV}	Mean on-state current	A	320 355	$T_c = 90^\circ C$; $T_c = 85^\circ C$; 180° half-sine wave; 50 Hz
I_{TRMS}	RMS on-state current	A	502	$T_c = 90^\circ C$; 180° half-sine wave; 50 Hz
I_{TSM}	Surge on-state current	kA	10.0 12.0	$T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; 50 Hz ($t_p = 10$ ms); single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu s$; $di_G/dt \geq 1$ A/ μs
			11.0 13.0	$T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; 60 Hz ($t_p = 8.3$ ms); single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu s$; $di_G/dt \geq 1$ A/ μs
I^2t	Safety factor	$A^2s \cdot 10^3$	500 720	$T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; 50 Hz ($t_p = 10$ ms); single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu s$; $di_G/dt \geq 1$ A/ μs
			500 700	$T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; 60 Hz ($t_p = 8.3$ ms); single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu s$; $di_G/dt \geq 1$ A/ μs
BLOCKING				
V_{DRM}, V_{RRM}	Repetitive peak off-state and Repetitive peak reverse voltages	V	100÷1600	$T_{jmin} < T_j < T_{jmax}$; 180° half-sine wave; 50 Hz; Gate open
V_{DSM}, V_{RSM}	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	110÷1700	$T_{jmin} < T_j < T_{jmax}$; 180° half-sine wave; 50 Hz; single pulse; Gate open
V_D, V_R	Direct off-state and Direct reverse voltages	V	$0.75 \cdot V_{DRM}$ $0.75 \cdot V_{RRM}$	$T_j = T_{jmax}$; Gate open

TRIGGERING				
I_{FGM}	Peak forward gate current	A	6	$T_j = T_{j\ max}$
V_{RGM}	Peak reverse gate voltage	V	5	
P_G	Gate power dissipation	W	3	$T_j = T_{j\ max}$ for DC gate current
SWITCHING				
$(di_T/dt)_{crit}$	Critical rate of rise of on-state current non-repetitive (f=1 Hz)	A/ μ s	320	$T_j = T_{j\ max}; V_D = 0.67 \cdot V_{DRM}; I_{TM} = 2 I_{TAV};$ Gate pulse: $I_G = 2\ A;$ $t_{GP} = 50\ \mu s; di_G/dt \geq 1\ A/\mu s$
THERMAL				
T_{stg}	Storage temperature	$^{\circ}C$	-60÷125	
T_j	Operating junction temperature	$^{\circ}C$	-60÷125	
MECHANICAL				
M	Tightening torque	Nm	25÷35	
a	Acceleration	m/s ²	100	

CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions	
ON-STATE					
V_{TM}	Peak on-state voltage, max	V	1.60	$T_j = 25\ ^{\circ}C; I_{TM} = 1005\ A$	
$V_{T(TO)}$	On-state threshold voltage, max	V	0.95	$T_j = T_{j\ max};$	
r_T	On-state slope resistance, max	m Ω	0.510	$0.5\ \pi\ I_{TAV} < I_T < 1.5\ \pi\ I_{TAV}$	
I_L	Latching current, max	mA	700	$T_j = 25\ ^{\circ}C; V_D = 12\ V;$ Gate pulse: $I_G = 2\ A;$ $t_{GP} = 50\ \mu s; di_G/dt \geq 1\ A/\mu s$	
I_H	Holding current, max	mA	300	$T_j = 25\ ^{\circ}C;$ $V_D = 12\ V; \text{Gate open}$	
BLOCKING					
I_{DRM}, I_{RRM}	Repetitive peak off-state and Repetitive peak reverse currents, max	mA	70	$T_j = T_{j\ max};$ $V_D = V_{DRM}; V_R = V_{RRM}$	
$(dv_D/dt)_{crit}$	Critical rate of rise of off-state voltage ¹⁾ , min	V/ μ s	1000	$T_j = T_{j\ max};$ $V_D = 0.67 \cdot V_{DRM}; \text{Gate open}$	
TRIGGERING					
V_{GT}	Gate trigger direct voltage, max	V	4.00 2.50 2.00	$T_j = T_{j\ min}$ $T_j = 25\ ^{\circ}C$ $T_j = T_{j\ max}$	$V_D = 12\ V; I_D = 3\ A;$ Direct gate current
I_{GT}	Gate trigger direct current, max	mA	400 250 200	$T_j = T_{j\ min}$ $T_j = 25\ ^{\circ}C$ $T_j = T_{j\ max}$	
V_{GD}	Gate non-trigger direct voltage, min	V	0.25	$T_j = T_{j\ max};$ $V_D = 0.67 \cdot V_{DRM};$	
I_{GD}	Gate non-trigger direct current, min	mA	10.00	Direct gate current	
SWITCHING					
t_{gd}	Delay time	μ s	2.00	$T_j = 25\ ^{\circ}C; V_D = 0.4 \cdot V_{DRM}; I_{TM} = I_{TAV};$ Gate pulse: $I_G = 2\ A;$ $t_{GP} = 50\ \mu s; di_G/dt \geq 1\ A/\mu s$	
t_q	Turn-off time ²⁾ , max	μ s	125	$dv_D/dt = 50\ V/\mu s; T_j = T_{j\ max}; I_{TM} = I_{TAV};$ $di_R/dt = -10\ A/\mu s; V_R = 100V;$ $V_D = 0.67 \cdot V_{DRM};$	

THERMAL				
R _{thjc}	Thermal resistance, junction to case, max	°C/W	0.0800	Direct current
MECHANICAL				
w	Weight, typ	g	470	
D _s	Surface creepage distance	mm (inch)	12.40 (4.882)	
D _a	Air strike distance	mm (inch)	12.40 (4.882)	

PART NUMBERING GUIDE

T	471	320	16	N
1	2	3	4	5

1. Phase Control Thyristor
2. Design version
3. Mean on-state current, A
4. Voltage code
5. Ambient conditions: N – normal; T – tropical

