



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

Avalanche Stud Thyristor Type TA271-320-12

Mean on-state current		I_{TAV}		320 A			
Repetitive peak off-state voltage		V_{DRM}		600÷1200 V			
Repetitive peak reverse voltage		V_{RRM}					
Turn-off time		t_q		160 μ s			
V_{DRM}, V_{RRM}, V	600	700	800	900	1000	1100	1200
Voltage code	6	7	8	9	10	11	12
$T_j, ^\circ C$	-60÷140						

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions	
ON-STATE					
I_{TAV}	Mean on-state current	A	320 395	$T_c = 100\ ^\circ C$; $T_c = 85\ ^\circ C$; 180° half-sine wave; 50 Hz	
I_{TRMS}	RMS on-state current	A	502	$T_c = 100\ ^\circ C$; 180° half-sine wave; 50 Hz	
I_{TSM}	Surge on-state current	kA	9.00 10.4	$T_j = T_{j\ max}$ $T_j = 25\ ^\circ C$	180° half-sine wave; 50 Hz ($t_p = 10\ ms$); single pulse; $V_D = V_R = 0\ V$; Gate pulse: $I_G = 2\ A$; $t_{GP} = 50\ \mu s$; $di_G/dt \geq 1\ A/\mu s$
			10.0 11.5	$T_j = T_{j\ max}$ $T_j = 25\ ^\circ C$	180° half-sine wave; 60 Hz ($t_p = 8.3\ ms$); single pulse; $V_D = V_R = 0\ V$; Gate pulse: $I_G = 2\ A$; $t_{GP} = 50\ \mu s$; $di_G/dt \geq 1\ A/\mu s$
I^2t	Safety factor	$A^2s \cdot 10^3$	405 540	$T_j = T_{j\ max}$ $T_j = 25\ ^\circ C$	180° half-sine wave; 50 Hz ($t_p = 10\ ms$); single pulse; $V_D = V_R = 0\ V$; Gate pulse: $I_G = 2\ A$; $t_{GP} = 50\ \mu s$; $di_G/dt \geq 1\ A/\mu s$
			415 545	$T_j = T_{j\ max}$ $T_j = 25\ ^\circ C$	180° half-sine wave; 60 Hz ($t_p = 8.3\ ms$); single pulse; $V_D = V_R = 0\ V$; Gate pulse: $I_G = 2\ A$; $t_{GP} = 50\ \mu s$; $di_G/dt \geq 1\ A/\mu s$
BLOCKING					
V_{DRM}, V_{RRM}	Repetitive peak off-state and Repetitive peak reverse voltages	V	600÷1200	$T_{j\ min} < T_j < T_{j\ max}$; 180° half-sine wave; 50 Hz; Gate open	
V_{DSM}, V_{RSM}	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	700÷1300	$T_{j\ min} < T_j < T_{j\ max}$; 180° half-sine wave; 50 Hz; single pulse; Gate open	
$V_{(BR)}$	Breakdown voltage	V	850÷1700	$T_{j\ min} < T_j < T_{j\ max}$; $I_{RRM} = 100\ mA$; 180° half-sine wave; single pulse; Gate open	

V_{D_r}, V_R	Direct off-state and Direct reverse voltages	V	$0.75 \cdot V_{DRM}$ $0.75 \cdot V_{RRM}$	$T_j = T_{j\max}$; Gate open
P_{RSM}	Surge reverse power dissipation	kW	16	$T_j = T_{j\max}$; $t_p = 100 \mu s$; 180° half-sine wave; single pulse
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/ μs	125	$T_j = T_{j\max}$; $V_D = 0.67 \cdot V_{DRM}$; $I_{TM} = 2 I_{TAV}$; Gate pulse: $I_G = 2 A$; $t_{GP} = 50 \mu s$; $di_G/dt \geq 1 A/\mu s$
THERMAL				
T_{stg}	Storage temperature	°C	-60÷50	
T_j	Operating junction temperature	°C	-60÷140	
MECHANICAL				
M	Tightening torque	Nm	25÷35	
a	Acceleration	m/s ²	100	

CHARACTERISTICS

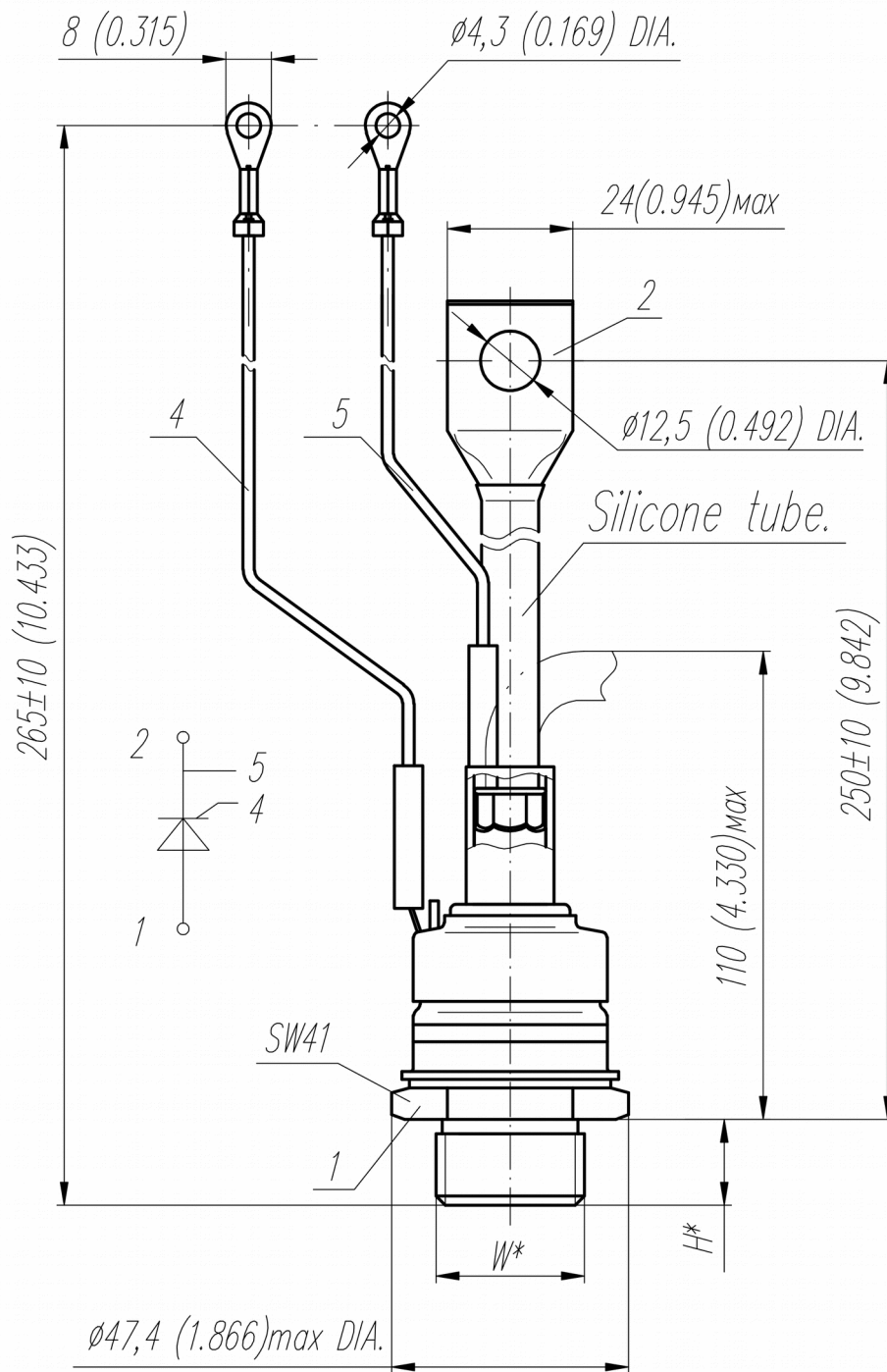
Symbols and parameters		Units	Values	Conditions	
ON-STATE					
V_{TM}	Peak on-state voltage, max	V	1.65	$T_j = 25 \text{ }^\circ\text{C}$; $I_{TM} = 1005 A$	
$V_{T(TO)}$	On-state threshold voltage, max	V	0.80	$T_j = T_{j\max}$;	
r_T	On-state slope resistance, max	m Ω	0.970	$0.5 \pi I_{TAV} < I_T < 1.5 \pi I_{TAV}$	
I_L	Latching current, max	mA	700	$T_j = 25 \text{ }^\circ\text{C}$; $V_D = 12 V$; 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	$T_j = 25 \text{ }^\circ\text{C}$; $V_D = 12 V$; Gate open	
BLOCKING					
I_{DRM}, I_{RRM}	Repetitive peak off-state and Repetitive peak reverse currents, max	mA	35	$T_j = T_{j\max}$; $V_D = V_{DRM}$; $V_R = V_{RRM}$	
$(dv_D/dt)_{crit}$	Critical rate of rise of off-state voltage ¹⁾ , min	V/ μs	320 500 1000	$T_j = T_{j\max}$; $V_D = 0.67 \cdot V_{DRM}$; Gate open	
TRIGGERING					
V_{GT}	Gate trigger direct voltage, max	V	5.50 2.50 2.00	$T_j = T_{j\min}$ $T_j = 25 \text{ }^\circ\text{C}$ $T_j = T_{j\max}$	$V_D = 12 V$; $I_D = 3 A$; Direct gate current
I_{GT}	Gate trigger direct current, max	mA	600 250 200	$T_j = T_{j\min}$ $T_j = 25 \text{ }^\circ\text{C}$ $T_j = T_{j\max}$	
V_{GD}	Gate non-trigger direct voltage, min	V	0.4	$T_j = T_{j\max}$;	
I_{GD}	Gate non-trigger direct current, min	mA	10.00	$V_D = 0.67 \cdot V_{DRM}$; Direct gate current	
SWITCHING					
t_{gd}	Delay time	μs	2.00	$T_j = 25 \text{ }^\circ\text{C}$; $V_D = 0.4 \cdot V_{DRM}$; $I_{TM} = I_{TAV}$; Gate pulse: $I_G = 2 A$; $t_{GP} = 50 \mu s$; $di_G/dt \geq 1 A/\mu s$	
THERMAL					
t_q	Turn-off time, max	μs	160	$dv_D/dt = 50 V/\mu s$; $T_j = T_{j\max}$; $I_{TM} = I_{TAV}$; $di_R/dt = -10 A/\mu s$; $V_R = 100V$; $V_D = 0.67 \cdot V_{DRM}$;	

R_{thjc}	Thermal resistance, junction to case, max	$^{\circ}\text{C}/\text{W}$	0.0800	Direct current
MECHANICAL				
w	Weight, typ	g	440	
D_s	Surface creepage distance	mm (inch)	12.4 (4.882)	
D_a	Air strike distance	mm (inch)	12.4 (4.882)	

PART NUMBERING GUIDE							NOTES								
TA	271	320	12	A2	T2	N	1) Critical rate of rise of on-state current non-repetitive								
1	2	3	4	5	6	7									
1. Phase Control Thyristor 2. Design version 3. Mean on-state current, A 4. Voltage code 5. Critical rate of rise of on-state current non-repetitive, $\text{V}/\mu\text{s}$ 6. Turn-off time ($dv_D/dt=50 \text{ V}/\mu\text{s}$) 7. Ambient conditions: N – normal; T – tropical							<table border="1"> <thead> <tr> <th>Symbol of Group</th> <th>K2</th> <th>E2</th> <th>A2</th> </tr> </thead> <tbody> <tr> <td>$(dv_D/dt)_{crit}, \text{V}/\mu\text{s}$</td> <td>320</td> <td>500</td> <td>1000</td> </tr> </tbody> </table>	Symbol of Group	K2	E2	A2	$(dv_D/dt)_{crit}, \text{V}/\mu\text{s}$	320	500	1000
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OVERALL DIMENSIONS

Package type: T.SB1



Type of screw	W	H
Metric Screw Type C	M24x1,5 – 8g	19
Metric Screw Type B (upon request)	M20x1,5 – 8g	15

Polarity	Example of code designation	Reference designation	Colors		
			Anode	Cathode	Gate
Anode to stud	TA271-320-12		-	Red tube	White

All dimensions in millimeters (inches)

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