



Pressure contact
 Low switching losses
 Low reverse recovery charge
 High power cycling capability
 Distributed amplified gate for high di_T/dt

**Fast Inverter
 Stud Thyristor
 Type TFI271-320-14**

Mean on-state current	I_{TAV}					320 A
Repetitive peak off-state voltage	V_{DRM}					1000 ÷ 1400 V
Repetitive peak reverse voltage	V_{RRM}					
Turn-off time	t_q					32.0, 40.0, 50.0, 63.0 μ s
V_{DRM}, V_{RRM}, V	1000	1100	1200	1300	1400	
Voltage code	10	11	12	13	14	
$T_j, ^\circ C$						- 60 ÷ 125

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions	
ON-STATE					
I_{TAV}	Mean on-state current	A	320 490	$T_c=86^\circ C$; $T_c=55^\circ C$; 180° half-sine wave; 50 Hz	
I_{TRMS}	RMS on-state current	A	502	$T_c=86^\circ C$; 180° half-sine wave; 50 Hz	
I_{TSM}	Surge on-state current	kA	9.0 10.4	$T_j=T_{jmax}$ $T_j=25^\circ C$	180° half-sine wave; $t_p=10$ ms; single pulse; $V_D=V_R=0$ V; Gate pulse: $I_G=I_{FGM}$; $V_G=20$ V; $t_{GP}=50 \mu$ s; $di_G/dt=1$ A/ μ s
			9.5 11.0	$T_j=T_{jmax}$ $T_j=25^\circ C$	180° half-sine wave; $t_p=8.3$ ms; single pulse; $V_D=V_R=0$ V; Gate pulse: $I_G=I_{FGM}$; $V_G=20$ V; $t_{GP}=50 \mu$ s; $di_G/dt=1$ A/ μ s
I^2t	Safety factor	$A^2s \cdot 10^3$	400 540	$T_j=T_{jmax}$ $T_j=25^\circ C$	180° half-sine wave; $t_p=10$ ms; single pulse; $V_D=V_R=0$ V; Gate pulse: $I_G=I_{FGM}$; $V_G=20$ V; $t_{GP}=50 \mu$ s; $di_G/dt=1$ A/ μ s
			370 500	$T_j=T_{jmax}$ $T_j=25^\circ C$	180° half-sine wave; $t_p=8.3$ ms; single pulse; $V_D=V_R=0$ V; Gate pulse: $I_G=I_{FGM}$; $V_G=20$ V; $t_{GP}=50 \mu$ s; $di_G/dt=1$ A/ μ s
BLOCKING					
V_{DRM}, V_{RRM}	Repetitive peak off-state and Repetitive peak reverse voltages	V	1000÷1400	$T_{jmin} < T_j < T_{jmax}$; 180° half-sine wave; 50 Hz; Gate open	
V_{DSM}, V_{RSM}	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	1100÷1500	$T_{jmin} < T_j < T_{jmax}$; 180° half-sine wave; single pulse; Gate open	
V_D, V_R	Direct off-state and Direct reverse voltages	V	$0.6 \cdot V_{DRM}$ $0.6 \cdot V_{RRM}$	$T_j=T_{jmax}$; 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	1600	$T_j = T_{j\max}$; $V_D = 0.67 \cdot V_{DRM}$; $I_{TM} = 2 I_{TAV}$; Gate pulse: $I_G = 2$ A; $V_G = 20$ V; $t_{GP} = 50$ μ s; $di_G/dt = 2$ A/ μ s
THERMAL				
T_{stg}	Storage temperature	$^{\circ}$ C	-60 ÷ 50	
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	1.80	$T_j = 25$ $^{\circ}$ C; $I_{TM} = 1005$ A	
$V_{T(TO)}$	On-state threshold voltage, max	V	1.00	$T_j = T_{j\max}$;	
r_T	On-state slope resistance, max	m Ω	0.650	$0.5 \pi I_{TAV} < I_T < 1.5 \pi I_{TAV}$	
I_H	Holding current, max	mA	500	$T_j = 25$ $^{\circ}$ C; $V_D = 12$ V; 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	200, 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	4.00	$T_j = T_{j\min}$ $T_j = 25$ $^{\circ}$ C $T_j = T_{j\max}$	$V_D = 12$ V; $I_D = 3$ A; Direct gate current
			2.50		
			2.00		
I_{GT}	Gate trigger direct current, max	mA	400	$T_j = T_{j\min}$ $T_j = 25$ $^{\circ}$ C $T_j = T_{j\max}$	
			250		
			200		
V_{GD}	Gate non-trigger direct voltage, min	V	0.45	$T_j = T_{j\max}$; $V_D = 0.67 \cdot V_{DRM}$;	
I_{GD}	Gate non-trigger direct current, min	mA	10.00	Direct gate current	
SWITCHING					
t_{gd}	Delay time, max	μ s	0.58	$T_j = 25$ $^{\circ}$ C; $V_D = 600$ V; $I_{TM} = I_{TAV}$; $di/dt = 200$ A/ μ s;	
t_{gt}	Turn-on time ²⁾	μ s	1.25, 1.60, 2.00, 2.50	Gate pulse: $I_G = 2$ A; $V_G = 20$ V; $t_{GP} = 50$ μ s; $di_G/dt = 2$ A/ μ s	
t_q	Turn-off time ³⁾	μ s	32.0, 40.0, 50.0, 63.0	$dv_D/dt = 50$ V/ μ s; $T_j = T_{j\max}$; $I_{TM} = I_{TAV}$; $di_R/dt = -10$ A/ μ s; $V_R = 100$ V; $V_D = 0.67 V_{DRM}$	
Q_{rr}	Total recovered charge, max	μ C	250	$T_j = T_{j\max}$; $I_{TM} = I_{TAV}$;	
t_{rr}	Reverse recovery time, typ	μ s	4.0	$di_R/dt = -50$ A/ μ s;	
I_{rrM}	Peak reverse recovery current, max	A	125	$V_R = 100$ V	

THERMAL				
R_{thjc}	Thermal resistance, junction to case, max	$^{\circ}\text{C}/\text{W}$	0.0800	Direct current
MECHANICAL				
w	Weight, max	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					
TFI	271	320	14	A2	K3	X4	N	1) Critical rate of rise of off-state voltage					
1	2	3	4	5	6	7	8	Symbol of group		P2	K2	E2	A2
								$(dv_D/dt)_{crit}$, V/ μs		200	320	500	1000
1. Fast Inverter Thyristor								2) Turn-on time					
2. Design version								Symbol of group		X4	T4	P4	M4
3. Mean on-state current, A								t_{gt} , μs		1.25	1.60	2.00	2.50
4. Voltage code								3) Turn-off time ($dv_D/dt=50$ V/ μs)					
5. Critical rate of rise of off-state voltage								Symbol of group		K3	H3	E3	C3
6. Group of turn-off time ($dv_D/dt=50$ V/ μs)								t_q , μs		32.0	40.0	50.0	63.0
7. Group of turn-on time													
8. Ambient conditions: N – normal; T – tropica													

