



High-end Power Semiconductor Manufacturer

KP320A 4600V-6500V Phase Control Thyristor

- High power cycling capability
- Low on-state and switching losses
- Designed for traction and industrial applications



Mean on-state current	I_{TAV}		320 A									
Repetitive peak off-state voltage	V_{DRM}		4600 – 6500 V									
Repetitive peak reverse voltage	V_{RRM}											
Turn-off time	t_q		630 μ s									
V_{DRM}, V_{RRM}, V	4600	4800	5000	5200	5400	5600	5800	6000	6200	6400	6500	
Voltage code	46	48	50	52	54	56	58	60	62	64	65	
$T_j, ^\circ C$	-60 – 125											

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions
ON-STATE				
I_{TAV}	Mean on-state current	A	320	$T_c=85^\circ C$; Double side cooled; 180° half-sine wave; 50 Hz
I_{TRMS}	RMS on-state current	A	502.4	$T_c=85^\circ C$; Double side cooled; 180° half-sine wave; 50 Hz
I_{TSM}	Surge on-state current	kA	4.5 5.0	$T_j=T_{j\max}$ $T_j=25^\circ C$ 180° half-sine wave; 50 Hz ($t_p=10$ ms); single pulse; $V_D=V_R=0$ V; Gate pulse: $I_G=2$ A; $t_{GP}=50$ μ s; $di_G/dt \geq 1$ A/ μ s
			5.0 6.0	$T_j=T_{j\max}$ $T_j=25^\circ C$ 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; $t_{GP}=50$ μ s; $di_G/dt \geq 1$ A/ μ s
I^2t	Safety factor	$A^2s \cdot 10^3$	100 125	$T_j=T_{j\max}$ $T_j=25^\circ C$ 180° half-sine wave; 50 Hz ($t_p=10$ ms); single pulse; $V_D=V_R=0$ V; Gate pulse: $I_G=2$ A; $t_{GP}=50$ μ s; $di_G/dt \geq 1$ A/ μ s
			100 145	$T_j=T_{j\max}$ $T_j=25^\circ C$ 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; $t_{GP}=50$ μ s; $di_G/dt \geq 1$ A/ μ s
BLOCKING				
V_{DRM}, V_{RRM}	Repetitive peak off-state and Repetitive peak reverse voltages	V	4600 – 6500	$T_{j\min} < T_j < T_{j\max}$; 180° half-sine wave; 50 Hz; Gate open
V_{DSM}, V_{RSM}	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	4700 – 6600	$T_{j\min} < T_j < T_{j\max}$; 180° half-sine wave; 50 Hz; single pulse; Gate open
V_D, V_R	Direct off-state and Direct reverse voltages	V	$0.75 \cdot V_{DRM}$ $0.75 \cdot V_{RRM}$	$T_j = T_{j\max}$; Gate open

TRIGGERING				
I_{FGM}	Peak forward gate current	A	8	$T_j = T_{j\ max}$
V_{RGM}	Peak reverse gate voltage	V	5	
P_G	Gate power dissipation	W	4	$T_j = T_{j\ max}$ 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	400	$T_j = T_{j\ max}; V_D = 0.67 \cdot V_{DRM}; I_{TM} = 2 I_{TAV};$ 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				
F	Mounting force	kN	14.0 – 16.0	
a	Acceleration	m/s^2	50 100	Device unclamped Device clamped

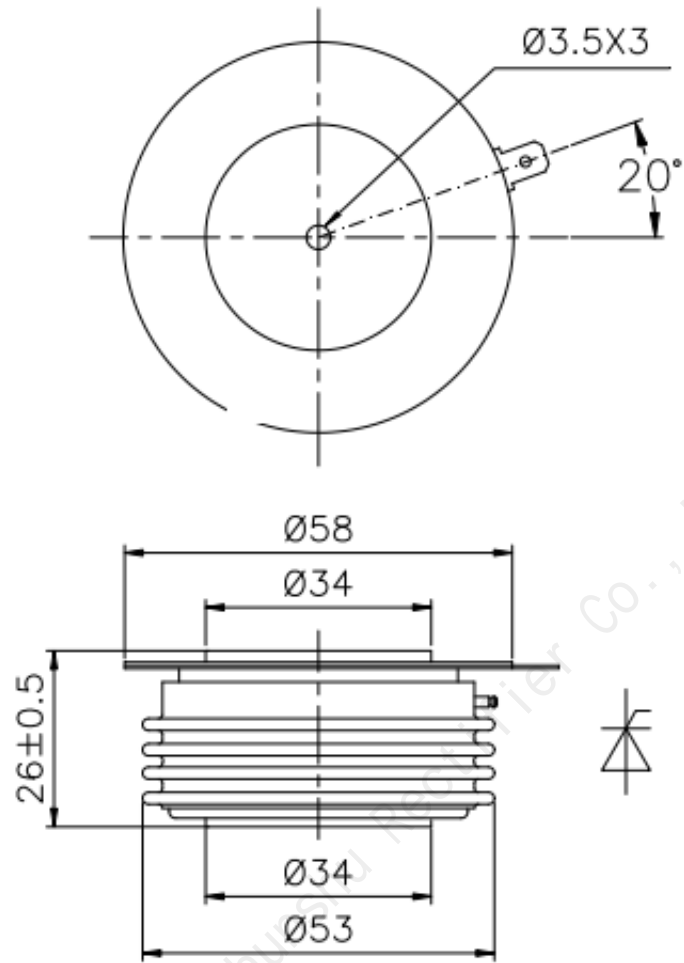
CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions
ON-STATE				
V_{TM}	Peak on-state voltage, max	V	2.80	$T_j = 25\ ^{\circ}C; I_{TM} = 785\ A$
$V_{T(TO)}$	On-state threshold voltage, max	V	1.05	$T_j = T_{j\ max};$ $0.5\ \pi\ I_{TAV} < I_T < 1.5\ \pi\ I_{TAV}$
r_T	On-state slope resistance, max	$m\Omega$	2.520	
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	$T_j = 25\ ^{\circ}C;$ $V_D = 12\ V;$ Gate open
BLOCKING				
I_{DRM}, I_{RRM}	Repetitive peak off-state and Repetitive peak reverse currents, max	mA	150	$T_j = T_{j\ max};$ $V_D = V_{DRM}; V_R = V_{RRM}$
$(dv_D/dt)_{crit}$	Critical rate of rise of off-state voltage ¹⁾ , min	V/ μ s	1000	$T_j = T_{j\ max};$ $V_D = 0.67 \cdot V_{DRM};$ Gate open
TRIGGERING				
V_{GT}	Gate trigger direct voltage, max	V	2.50 2.00	$T_j = 25\ ^{\circ}C$ $T_j = T_{j\ max}$ $V_D = 12\ V; I_D = 3\ A;$ Direct gate current
I_{GT}	Gate trigger direct current, max	mA	300 200	
V_{GD}	Gate non-trigger direct voltage, min	V	0.35	$T_j = T_{j\ max};$ $V_D = 0.67 \cdot V_{DRM};$ Direct gate current
I_{GD}	Gate non-trigger direct current, min	mA	15.00	
SWITCHING				
t_{gd}	Delay time	μ s	4.00	$T_j = 25\ ^{\circ}C; V_D = 0.4 \cdot V_{DRM}; I_{TM} = I_{TAV};$ 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	630	$dv_D/dt = 50\ V/\mu s; T_j = T_{j\ max}; I_{TM} = 1000\ A;$ $di_R/dt = -10\ A/\mu s; V_R = 100V;$ $V_D = 2000\ V$
Q_{rr}	Total recovered charge, max	μ C	3500	$T_j = T_{j\ max}; I_{TM} = 1000\ A;$ $di_R/dt = -5\ A/\mu s;$ $V_R = 100\ V$
t_{rr}	Reverse recovery time, typ	μ s	50	
I_{rrM}	Peak reverse recovery current, max	A	140	

THERMAL					
R_{thjc}	Thermal resistance, junction to case, max	°C/W	0.0350	Direct current	Double side cooled
R_{thjc-A}			0.0770		Anode side cooled
R_{thjc-K}			0.0630		Cathode side cooled
R_{thck}	Thermal resistance, case to heatsink, max	°C/W	0.0060	Direct current	
MECHANICAL					
w	Weight, typ	g	280		
D_s	Surface creepage distance	mm (inch)	27.60 (1.087)		
D_a	Air strike distance	mm (inch)	16.00 (0.630)		

Beijing Xinchuang Chunshu Rectifier Co., Ltd

OVERALL DIMENSIONS



KT40

All dimensions in millimeters