



High-end Power Semiconductor Manufacturer

KP1600A 3000V-3600V 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}	1600 A			
Repetitive peak off-state voltage	V_{DRM}	3000 – 3600 V			
Repetitive peak reverse voltage	V_{RRM}				
Turn-off time	t_q	500 μ s			
V_{DRM}, V_{RRM}, V	3000	3200	3400	3600	
Voltage code	30	32	34	36	
$T_j, ^\circ\text{C}$	-60 – 125				

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions	
ON-STATE					
I_{TAV}	Mean on-state current	A	1600	$T_c=85^\circ\text{C}$, Double side cooled 180° half-sine wave; 50 Hz	
I_{TRMS}	RMS on-state current	A	2512	$T_c=85^\circ\text{C}$, Double side cooled 180° half-sine wave; 50 Hz	
I_{TSM}	Surge on-state current	kA	36.0 41.0	$T_j=T_{j\max}$ $T_j=25^\circ\text{C}$	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
			38.0 44.0		
I^2t	Safety factor	$\text{A}^2\text{s}\cdot 10^3$	6480 8405	$T_j=T_{j\max}$ $T_j=25^\circ\text{C}$	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
			5990 8030		
BLOCKING					
V_{DRM}, V_{RRM}	Repetitive peak off-state and Repetitive peak reverse voltages	V	3000 – 3600	$T_{j\min} < T_j < T_{j\max}$; 180° half-sine wave; 50 Hz; Gate open	
V_{DSM}, V_{RSM}	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	3100 – 3700	$T_{j\min} < T_j < T_{j\max}$; 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	10	$T_j = T_{j \max}$
V_{RGM}	Peak reverse gate voltage	V	5	
P_G	Gate power dissipation	W	5	$T_j = T_{j \max}$ 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	800	$T_j = T_{j \max}; V_D = 0.67 \cdot V_{DRM}; I_{TM} = 2 I_{TAV};$ Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ μ s
THERMAL				
T_{stg}	Storage temperature	$^{\circ}$ C	-60 –125	
T_j	Operating junction temperature	$^{\circ}$ C	-60 –125	
MECHANICAL				
F	Mounting force	kN	40.0 –50.0	
a	Acceleration	m/s^2	50 100	Device unclamped Device clamped

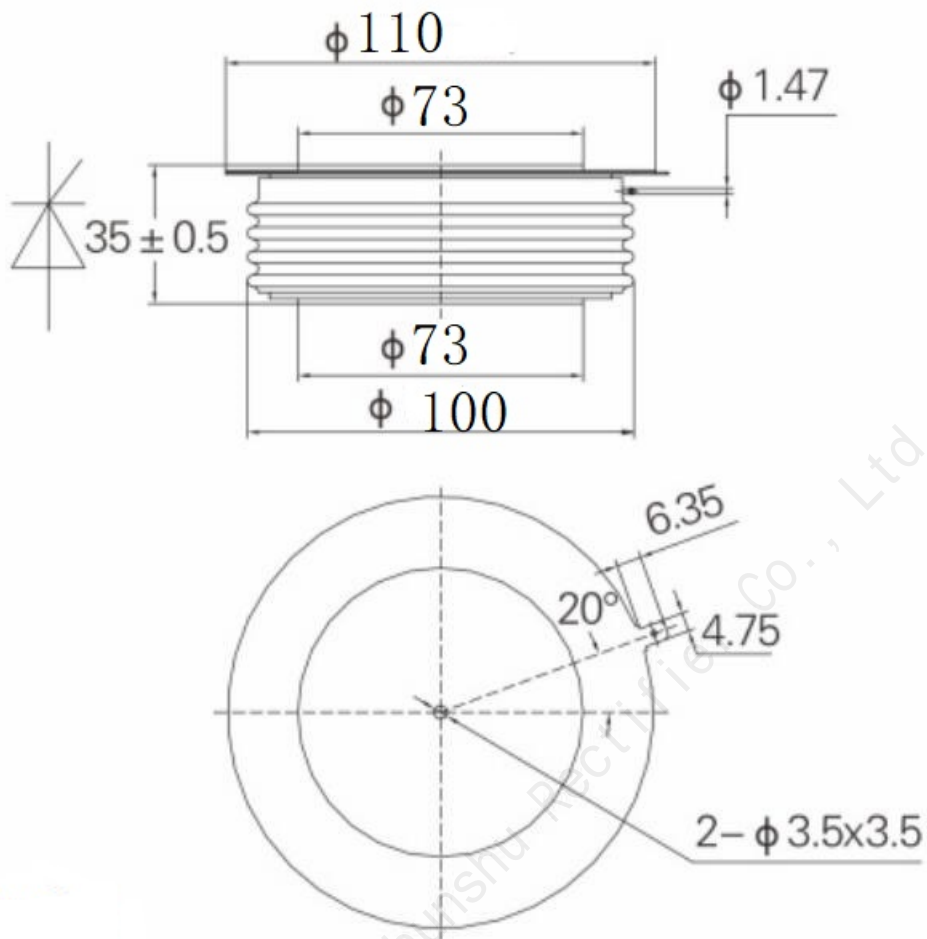
CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions	
ON-STATE					
V_{TM}	Peak on-state voltage, max	V	2.15	$T_j = 25 \text{ }^{\circ}\text{C}; I_{TM} = 5024$ A	
$V_{T(TO)}$	On-state threshold voltage, max	V	1.20	$T_j = T_{j \max};$	
r_T	On-state slope resistance, max	m Ω	0.250	$0.5 \pi I_{TAV} < I_T < 1.5 \pi I_{TAV}$	
I_L	Latching current, max	mA	1500	$T_j = 25 \text{ }^{\circ}\text{C}; V_D = 12$ V; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ μ 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	300	$T_j = T_{j \max};$ $V_D = V_{DRM}; V_R = V_{RRM}$	
$(dv_D/dt)_{crit}$	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	3.00 2.00	$T_j = 25 \text{ }^{\circ}\text{C}$ $T_j = T_{j \max}$	$V_D = 12$ V; $I_D = 3$ A; Direct gate current
I_{GT}	Gate trigger direct current, max	mA	300 200	$T_j = 25 \text{ }^{\circ}\text{C}$ $T_j = T_{j \max}$	
V_{GD}	Gate non-trigger direct voltage, min	V	0.35	$T_j = T_{j \max};$ $V_D = 0.67 \cdot V_{DRM};$	
I_{GD}	Gate non-trigger direct current, min	mA	15.00	Direct gate current	
SWITCHING					
t_{gd}	Delay time	μ s	3.00	$T_j = 25 \text{ }^{\circ}\text{C}; V_D = 0.4 \cdot V_{DRM}; I_{TM} = I_{TAV};$ Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ μ s	
t_q	Turn-off time ²⁾ , max	μ s	500	$dv_D/dt = 50$ V/ μ s; $T_j = T_{j \max}; I_{TM} = I_{TAV};$ $di_R/dt = -10$ A/ μ s; $V_R = 100$ V; $V_D = 0.67 \cdot V_{DRM}$	

THERMAL					
R_{thjc}	Thermal resistance, junction to case, max	°C/W	0.010	Direct current	Double side cooled
R_{thjc-A}			0.022		Anode side cooled
R_{thjc-K}			0.018		Cathode side cooled
R_{thck}	Thermal resistance, case to heatsink, max	°C/W	0.002	Direct current	
MECHANICAL					
w	Weight, typ	g	1700		
D_s	Surface creepage distance	mm (inch)	36.60 (1.441)		
D_a	Air strike distance	mm (inch)	16.20 (0.638)		

Beijing Xinchuang Chunshu Rectifier Co., Ltd

OVERALL DIMENSIONS



KT80DT

All dimensions in millimeters