

## ELECTRICAL CHARACTERISTICS AND RATINGS

### Asymmetric thyristors

### Type: YZPST A60110

#### Blocking - Off State

|               |               |
|---------------|---------------|
| $V_{RRM}$ (1) | $V_{DRM}$ (1) |
| 20            | 1600          |

$V_{RRM}$  = Repetitive peak reverse voltage

$V_{DRM}$  = Repetitive peak off state voltage

|                                               |                     |                   |
|-----------------------------------------------|---------------------|-------------------|
| Repetitive peak reverse leakage and off state | $I_{RRM} / I_{DRM}$ | 100 mA            |
| Critical rate of voltage rise                 | $dV/dt$ (4)         | 1000 V/ $\mu$ sec |

#### Conducting - on state

Notes:

All ratings are specified for  $T_j = 25^\circ\text{C}$  unless otherwise stated.

(1) All voltage ratings are specified for an applied

50Hz/60Hz sinusoidal waveform over the temperature range  $-40$  to  $+125^\circ\text{C}$ .

(2) 10 msec. max. pulse width

(3) Maximum value for  $T_j = 125^\circ\text{C}$ .

(4) Minimum value for linear and exponential waveshape to 80% rated  $V_{DRM}$ . Gate open.  $T_j = 125^\circ\text{C}$ .

(5) Non-repetitive value.

(6) The value of  $di/dt$  is established in accordance

with EIA/NIMA Standard RS-397, Section 5-2-2-6. The value defined would be in addition to that obtained from a snubber circuit, comprising a  $0.2\ \mu\text{F}$  capacitor and 20 ohms resistance in parallel with the thristor under test.

| Parameter                                        | Symbol       | Min. | Max.            | Typ. | Units                | Conditions                                                                                 |
|--------------------------------------------------|--------------|------|-----------------|------|----------------------|--------------------------------------------------------------------------------------------|
| Average value of on-state current                | $I_{T(AV)M}$ |      | 1000            |      | A                    | Sinewave, $180^\circ$ conduction, $T_{\text{sink}} = 55^\circ\text{C}$                     |
| RMS value of on-state current                    | $I_{TRMS}$   |      | 2000            |      | A                    | Nominal value                                                                              |
| Peak one cPSTCle surge (non repetitive) current  | $I_{TSM}$    |      | 20              |      | KA                   | 10.0 msec (50Hz), sinusoidal wave-shape, $180^\circ$ conduction, $T_j = 125^\circ\text{C}$ |
| I square t                                       | $I^2t$       |      | $2 \times 10^6$ |      | $\text{A}^2\text{s}$ | 10.0 msec                                                                                  |
| Latching current                                 | $I_L$        |      | -               |      | mA                   | $V_D = 24\text{ V}$ ; $R_L = 12\text{ ohms}$                                               |
| Holding current                                  | $I_H$        |      | 1000            |      | mA                   | $V_D = 24\text{ V}$ ; $I = 2.5\text{ A}$                                                   |
| Peak on-state voltage                            | $V_{TM}$     |      | 2.42            |      | V                    | $I_{TM} = 2000\text{ A}$ ; $T_j = 125^\circ\text{C}$                                       |
| Critical rate of rise of on-state current (5, 6) | $di/dt$      |      | -               |      | A/ $\mu$ s           | Switching from $V_{DRM} \leq 1000\text{ V}$ , non-repetitive                               |
| Critical rate of rise of on-state current (6)    | $di/dt$      |      | 800             |      | A/ $\mu$ s           | Switching from $V_{DRM} \leq 1000\text{ V}$                                                |

## ELECTRICAL CHARACTERISTICS AND RATINGS

### Gating

| Parameter                                  | Symbol      | Min. | Max.          | Typ. | Units          | Conditions                                                                                                                                                                                   |
|--------------------------------------------|-------------|------|---------------|------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Peak gate power dissipation                | $P_{GM}$    |      | 30            |      | W              | $t_p = 40 \mu s$                                                                                                                                                                             |
| Average gate power dissipation             | $P_{G(AV)}$ |      | 5             |      | W              |                                                                                                                                                                                              |
| Peak gate current                          | $I_{GM}$    |      | -             |      | A              |                                                                                                                                                                                              |
| Gate current required to trigger all units | $I_{GT}$    |      | -<br>300<br>- |      | mA<br>mA<br>mA | $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = -40^\circ C$<br>$V_D = 6 V; R_L = 3 \text{ ohms}; T_j = +25^\circ C$<br>$V_D = 6 V; R_L = 3 \text{ ohms}; T_j = +125^\circ C$                        |
| Gate voltage required to trigger all units | $V_{GT}$    |      | -<br>3.0<br>- |      | V<br>V<br>V    | $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = -40^\circ C$<br>$V_D = 6 V; R_L = 3 \text{ ohms}; T_j = 0-125^\circ C$<br>$V_D = \text{Rated } V_{DRM}; R_L = 1000 \text{ ohms}; T_j = +125^\circ C$ |
| Peak negative voltage                      | $V_{GRM}$   |      | 5             |      | V              |                                                                                                                                                                                              |

### Dynamic

| Parameter                           | Symbol   | Min. | Max. | Typ. | Units   | Conditions                                                                                                                                                                                        |
|-------------------------------------|----------|------|------|------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Delay time                          | $t_d$    |      | 1.6  | 0.8  | $\mu s$ | $I_{TM} = 500 A; V_D = \text{Rated } V_{DRM}$<br>Gate pulse: $V_G = 20 V; R_G = 20 \text{ ohms}; t_r = 0.1 \mu s; t_p = 20 \mu s$                                                                 |
| Turn-off time (with $V_R = -50 V$ ) | $t_q$    |      | -    | 20   | $\mu s$ | $I_{TM} = 1000 A; di/dt = 25 A/\mu s;$<br>$V_R \geq -50 V; \text{Re-applied } dV/dt = 20 V/\mu s \text{ linear to } 80\% V_{DRM}; V_G = 0;$<br>$T_j = 125^\circ C; \text{Duty cPSTC} \geq 0.01\%$ |
| Reverse recovery charge             | $Q_{rr}$ |      | -    | -    | $\mu C$ | $I_{TM} = 1000 A; di/dt = 25 A/\mu s;$<br>$V_R \geq -50 V$                                                                                                                                        |

\* For guaranteed max. value, contact factory.

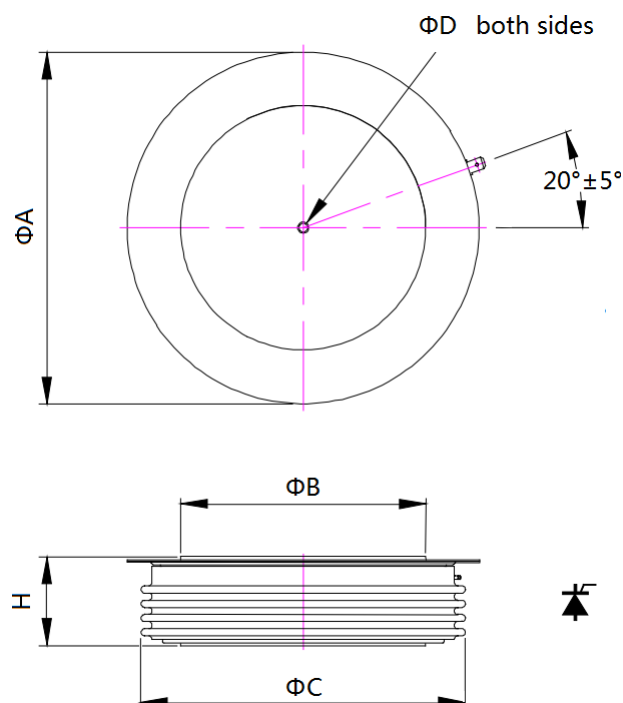
## THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS

| Parameter                                 | Symbol            | Min. | Max.         | Typ. | Units      | Conditions                                 |
|-------------------------------------------|-------------------|------|--------------|------|------------|--------------------------------------------|
| Operating temperature                     | $T_j$             | -40  | +125         |      | $^\circ C$ |                                            |
| Storage temperature                       | $T_{stg}$         | -40  | +150         |      | $^\circ C$ |                                            |
| Thermal resistance - junction to case     | $R_{\Theta(j-c)}$ |      | -<br>-       |      | K/W        | Double sided cooled<br>Single sided cooled |
| Thermal resistance - case to heatsink     | $R_{\Theta(c-s)}$ |      | -<br>-       |      | K/W        | Double sided cooled<br>Single sided cooled |
| Thermal resistance - junction to heatsink | $R_{\Theta(j-s)}$ |      | 0.02<br>0.04 |      | K/W        | Double sided cooled<br>Single sided cooled |
| Mounting force                            | P                 | 19   | 26           |      | kN         |                                            |
| Weight                                    | W                 |      |              | -    | g          | about                                      |

\* Mounting surfaces smooth, flat and greased

Note : for case outline and dimensions, see case outline drawing in last page of this Technical Data

CASE OUTLINE AND DIMENSIONS.



| Sym | A  | B  | C  | D     | H    |
|-----|----|----|----|-------|------|
| mm  | 75 | 47 | 66 | 3.5×3 | 26±1 |