



# T65P1500S Series

1600 – 3000 V<sub>RMS</sub>, 1500 A<sub>AVG</sub>  
Standard Recovery Thyristor

## Features:

- All Diffused Structure
- Spoke Amplifying Gate Configuration
- Blocking capability up to 3000 volts
- Guaranteed Maximum Turn-Off Time
- High dV/dt Capability
- Pressure Assembled Device



## ELECTRICAL CHARACTERISTICS AND RATINGS

### Blocking - Off State

| Device Type   | V <sub>RRM</sub> <sup>(1)</sup> | V <sub>DRM</sub> <sup>(1)</sup> | V <sub>RSM</sub> <sup>(1)</sup> |
|---------------|---------------------------------|---------------------------------|---------------------------------|
| T65P1500S1600 | 1600                            | 1600                            | 1700                            |
| T65P1500S1800 | 1800                            | 1800                            | 1900                            |
| T65P1500S2000 | 2000                            | 2000                            | 2100                            |
| T65P1500S2200 | 2200                            | 2200                            | 2300                            |
| T65P1500S2600 | 2600                            | 2600                            | 2700                            |
| T65P1500S3000 | 3000                            | 3000                            | 3100                            |

V<sub>RRM</sub> = Repetitive peak reverse voltage

V<sub>DRM</sub> = Repetitive peak off state voltage

V<sub>RSM</sub> = Non repetitive peak reverse voltage<sup>(2)</sup>

|   |                                     |                               |
|---|-------------------------------------|-------------------------------|
| Repetitive peak reverse leakage and off state leakage | I <sub>RRM</sub> / I <sub>DRM</sub> | 20 mA<br>90 mA <sup>(3)</sup> |
| Critical rate of voltage rise                         | dV/dt <sup>(4)</sup>                | 500 V/μsec                    |

### Conducting - On State

| Parameter                                     | Symbol             | Min. | Max.                | Typ. | Units            | Conditions   |
|---|--------------------|------|---------------------|------|------------------|--|
| Average value of on-state current             | I <sub>T(AV)</sub> |      | 1500                |      | A                | Sinewave, 180° conduction, T <sub>C</sub> =65°C                                  |
| RMS value of on-state current                 | I <sub>TRMS</sub>  |      | 2350                |      | A                | Nominal value  |
| Peak one cycle surge (non-repetitive) current | I <sub>TSM</sub>   |      | 22500               |      | A                | 8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, T <sub>J</sub> = 125°C  |
|   |                    |      | 20300               |      | A                | 10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, T <sub>J</sub> = 125°C |
| I square t                                    | I <sup>2</sup> t   |      | 2.3x10 <sup>6</sup> |      | A <sup>2</sup> s | 8.3 msec   |
| Latching current                              | I <sub>L</sub>     |      | 500                 |      | mA               | V <sub>D</sub> = 24 V; R <sub>L</sub> = 12 ohms                                  |
| Holding current                               | I <sub>H</sub>     |      | 500                 |      | mA               | V <sub>D</sub> = 24 V; I = 2.5 A   |
| Peak on-state voltage                         | V <sub>TM</sub>    |      | 1.90                |      | V                | I <sub>TM</sub> = 2000 A; T <sub>J</sub> = 125°C                                 |

### Notes:

All ratings are specified for T<sub>J</sub>=25°C unless otherwise stated.

(1) All voltage ratings are specified for an applied 50Hz/60Hz sinusoidal waveform over the temperature range -40 to +125°C.

(2) 10 msec. max. pulse width

(3) Maximum value for T<sub>J</sub> = 125°C.

(4) Minimum value for linear and exponential waveshape to 80% rated V<sub>DRM</sub>. Gate open. T<sub>J</sub> = 125°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 μF capacitor and 20 ohms resistance in parallel with the thyristor under test.



|   |       |  |     |  |            |  |
|---|-------|--|-----|--|------------|--|
| Critical rate of rise of on-state current <sup>(5, 6)</sup> | di/dt |  | 250 |  | A/ $\mu$ s | Switching from $V_{DRM} \leq 1000$ V, non-repetitive |
| Critical rate of rise of on-state current <sup>(6)</sup>    | di/dt |  | 150 |  | A/ $\mu$ s | Switching from $V_{DRM} \leq 1000$ V                 |

**Gating**

| Parameter                                  | Symbol      | Min. | Max. | Typ. | Units | Conditions  |
|--|-------------|------|------|------|-------|---|
| Peak gate power dissipation                | $P_{GM}$    |      | 200  |      | W     | $t_p = 40$ $\mu$ s  |
| Average gate power dissipation             | $P_{G(AV)}$ |      | 5    |      | W     |   |
| Peak gate current                          | $I_{GM}$    |      | 20   |      | A     |   |
| Gate current required to trigger all units | $I_{GT}$    |      | 300  |      | mA    | $V_D = 6$ V; $R_L = 3$ ohms; $T_J = -40^\circ$ C                        |
|  |             |      | 200  |      | mA    | $V_D = 6$ V; $R_L = 3$ ohms; $T_J = +25^\circ$ C                        |
|  |             |      | 125  |      | mA    | $V_D = 6$ V; $R_L = 3$ ohms; $T_J = +125^\circ$ C                       |
| Gate voltage required to trigger all units | $V_{GT}$    | 0.30 | 5    |      | V     | $V_D = 6$ V; $R_L = 3$ ohms; $T_J = -40^\circ$ C                        |
|  |             |      | 4    |      | V     | $V_D = 6$ V; $R_L = 3$ ohms; $T_J = 0-125^\circ$ C                      |
|  |             |      |      |      | V     | $V_D = \text{Rated } V_{DRM}$ ; $R_L = 1000$ ohms; $T_J = +125^\circ$ C |
| Peak negative voltage                      | $V_{GRM}$   |      | 20   |      | V     |   |

**Dynamic**

| Parameter                          | Symbol   | Min. | Max. | Typ. | Units   | Conditions  |
|------------------------------------|----------|------|------|------|---------|---|
| Delay time                         | $t_d$    |      | 2.0  |      | $\mu$ s | $I_{TM} = 50$ A; $V_D = 67\% V_{DRM}$<br>Gate pulse: $V_G = 30$ V; $R_G = 10$ ohms;<br>$t_r = 0.1$ $\mu$ s; $t_p = 20$ $\mu$ s  |
| Turn-off time (with $V_R = -50$ V) | $t_q$    |      | 250  |      | $\mu$ s | $I_{TM} > 2000$ A; $di/dt = 10$ A/ $\mu$ s;<br>$V_R \geq -50$ V; Re-applied $dV/dt = 20$ V/ $\mu$ s linear to $67\% V_{DRM}$ ;<br>$T_J = 125^\circ$ C; Duty cycle $\geq 0.01\%$ |
| Reverse recovery current           | $I_{rr}$ |      | 150  |      | A       | $I_{TM} > 2000$ A; $di/dt = 10$ A/ $\mu$ s;<br>$V_R \geq -50$ V   |



**THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS**

| Parameter                             | Symbol            | Min.         | Max.          | Typ.       | Units     | Conditions            |
|---------------------------------------|-------------------|--------------|---------------|------------|-----------|-----------------------|
| Operating temperature                 | $T_J$             | -40          | +125          |            | °C        |                       |
| Storage temperature                   | $T_{STG}$         | -40          | +150          |            | °C        |                       |
| Thermal resistance – junction to case | $R_{\Theta(j-c)}$ |              | 0.017         |            | °C/W      | Double sided cooled   |
| Thermal resistance – case to sink     | $R_{\Theta(c-s)}$ |              | 0.003         |            | °C/W      | Double sided cooled * |
| Mounting force                        | P                 | 8000<br>35.5 | 10000<br>44.4 |            | lb.<br>kN |                       |
| Weight                                | W                 |              |               | 2.1<br>953 | Lb.<br>g. |                       |

\* Mounting surfaces smooth, flat and greased

**CASE OUTLINE AND DIMENSIONS**

