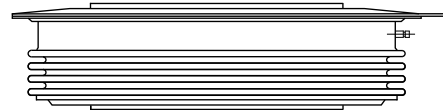


Phase Control Thyristors (Hockey PUK Version), 3370A

FEATURES

- Center amplifying gate
- Metal case with ceramic insulator
- International standard case Nell's DX-type Capsule
- Compliant to RoHS
- Low on-state and switching losses
- Designed and qualified for industrial level



Nell's DX-type Capsule

TYPICAL APPLICATIONS

- DC and AC motor controls
- Controlled DC power supplies
- AC controllers

| PRODUCT SUMMARY | |
|-----------------|-------|
| $I_{T(AV)}$ | 3370A |

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|-----------------------------------|---|--------------|-------------------|
| PARAMETER | TEST CONDITIONS | VALUES | UNIT |
| $I_{T(AV)}$ | Double side cooled, single phase, 50Hz, 180° half-sine wave $T_{hs}=70^{\circ}C$ | 3370 | A |
| | Double side cooled, single phase, 50Hz, 180° half-sine wave $T_{hs}=55^{\circ}C$ | 4070 | |
| $I_{T(RMS)}$ | $T_{hs}=70^{\circ}C$ | 5290 | A |
| | $T_{hs}=25^{\circ}C$ | 8100 | |
| I_{TSM} | 50 HZ | 49000 | A |
| | 60 HZ | 51300 | |
| I^2t | 50 HZ | 12005 | Ka ² s |
| | 60 HZ | 10922 | |
| V_{DRM}/V_{RRM} | | 1200 to 1600 | V |
| T_q | Typical | 200 | μs |
| T_J | | -40 to 125 | °C |

ELECTRICAL SPECIFICATIONS

| VOLTAGE RATINGS | | | | |
|-----------------|--------------|--|--|--|
| TYPE NUMBER | VOLTAGE CODE | V_{DRM}/V_{RRM} , MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V | V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V | I_{DRM}/I_{RRM} , MAXIMUM AT $T_J = T_J$ MAXIMUM mA |
| 3370PTxxDX0 | 12 | 1200 | 1300 | 200 |
| | 14 | 1400 | 1500 | |
| | 16 | 1600 | 1700 | |

| FORWARD CONDUCTION | | | | | |
|--|---------------|--|--------------------------|------------|--------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNIT |
| Maximum average current at heatsink temperature | $I_{T(AV)}$ | 180° conduction, half sine wave double side (single side) cooled | | 3370(2300) | A |
| | | | | 70(55) | °C |
| Maximum RMS on-state current | $I_{T(RMS)}$ | DC at 25°C heatsink temperature double side cooled | | 8100 | A |
| Maximum peak, one cycle non-repetitive surge current | I_{TSM} | t = 10ms | No voltage reapplied | 49000 | A |
| | | t = 8.3ms | | 51300 | |
| | | t = 10ms | 100% V_{RRM} reapplied | 41160 | |
| | | t = 8.3ms | | 43090 | |
| Maximum I^2t for fusing | I^2t | t = 10ms | No voltage reapplied | 12005 | kA ² s |
| | | t = 8.3ms | | 10922 | |
| | | t = 10ms | 100% V_{RRM} reapplied | 8471 | |
| | | t = 8.3ms | | 7706 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reapplied | | 120050 | kA ² √s |
| Maximum threshold voltage | $V_{T(TO)}$ | $I_T = 4200A \sim 12500A$, $T_J = T_J$ maximum | | 0.94 | V |
| Maximum on-state slope resistance | r_t | | | 0.066 | mΩ |
| Maximum on-state voltage | V_{TM} | $I_{pk} = 4000A$, $T_J = T_J$ maximum, $t_p = 10$ ms sine pulse | | 1.20 | V |
| Maximum holding current | I_H | $T_J = 25^\circ C$, anode supply 12V resistive load | | 300 | mA |
| Typical latching current | I_L | | | 1000 | |

| SWITCHING | | | | | |
|--|----------|---|--|--------|------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNIT |
| Maximum non-repetitive rate of rise of turned-on current | di/dt | $I_{TM} = I_{T(AV)}$, $V_D \leq 66.7\% V_{DRM}$, $I_{FG} = 2A$, $t_r = 0.3\mu s$, $T_J = T_J$ maximum, $f = 50Hz$ | | 200 | A/μs |
| Maximum delay time (Gate turn-on delay time) | t_d | $V_D = 0.4 V_{DRM}$, $I_{FG} = 2A$, $t_r = 0.3\mu s$, $T_J = 25^\circ C$ | | 2.0 | μs |
| Typical turn-off time | t_q | $I_{TM} = 2000A$, $T_J = T_J$ maximum, di/dt = -12.5 A/μs. $V_R = 100V$, dV/dt = 50 V/μs, $V_D \leq 0.67 V_{DRM}$ | | 200 | |
| Reverse recovery charge (Typical) | Q_{rr} | $I_{TM} = 2000A$, $T_J = T_J$ maximum, $V_R = 100V$, di/dt = -12.5 A/μs | | 2800 | μC |

| BLOCKING | | | | | |
|--|-----------------------|--|--|--------|------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNIT |
| Minimum critical rate of rise of off-state voltage | dV/dt | $T_J = T_J$ maximum, linear to 67% rated V_{DRM} | | 1000 | V/μs |
| Maximum peak reverse and off-state leakage current | I_{RRM} , I_{DRM} | $T_J = T_J$ maximum, rated V_{DRM}/V_{RRM} applied | | 200 | mA |

| TRIGGERING | | | | | | |
|-------------------------------------|-------------|--|--|------|------|----|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | | UNIT | |
| | | | TYP. | MAX. | | |
| Maximum peak gate power | P_{GM} | $T_J = T_J$ maximum, $t_p \leq 5$ ms | 25 | | W | |
| Maximum average gate power | $P_{G(AV)}$ | $T_J = T_J$ maximum, $f = 50$ Hz, $d\% = 50$ | 5 | | | |
| Maximum peak positive gate current | I_{GM} | $T_J = T_J$ maximum, $t_p \leq 5$ ms | 10 | | A | |
| Maximum peak positive gate voltage | $+V_{GM}$ | $T_J = T_J$ maximum, $t_p \leq 5$ ms | 12 | | V | |
| Maximum peak negative gate voltage | $-V_{GM}$ | | 10 | | | |
| DC gate current required to trigger | I_{GT} | $T_J = -40^\circ\text{C}$ | Maximum required gate current/voltage are the lowest value which will trigger all units 12V anode to cathode applied | 200 | 500 | mA |
| | | $T_J = 25^\circ\text{C}$ | | 100 | 250 | |
| | | $T_J = 125^\circ\text{C}$ | | 50 | 150 | |
| DC gate voltage required to trigger | V_{GT} | $T_J = -40^\circ\text{C}$ | | 2.5 | 4 | V |
| | | $T_J = 25^\circ\text{C}$ | | 1.8 | 3 | |
| | | $T_J = 125^\circ\text{C}$ | | 1.1 | 2 | |
| DC gate current not to trigger | I_{GD} | $T_J = T_J$ maximum | Maximum gate current/voltage not to trigger is the maximum value which will not trigger any unit with rated V_{DRM} anode to cathode applied | 10 | | mA |
| DC gate voltage not to trigger | V_{GD} | | | 0.25 | | V |

| THERMAL AND MECHANICAL SPECIFICATIONS | | | | | |
|--|----------------|---------------------------------|-----------------|-----------|--|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNIT | |
| Maximum operating junction temperature range | T_J | | -40 to 125 | °C | |
| Maximum storage temperature range | T_{stg} | | -40 to 150 | | |
| Maximum thermal resistance, junction to heatsink | $R_{th(J-hs)}$ | DC operation single side cooled | 0.020 | K/W | |
| | | DC operation double side cooled | 0.010 | | |
| Maximum thermal resistance, case to heatsink | $R_{th(C-hs)}$ | DC operation single side cooled | 0.006 | | |
| | | DC operation double side cooled | 0.003 | | |
| Mounting force, $\pm 10\%$ | | | 50000 (5100) | N (kg) | |
| Approximate weight | | | 930 | g | |
| Case style | | Nell's DX-type Capsule | | | |

| ΔR_{thJC} CONDUCTION | | | | | | |
|------------------------------|-----------------------|-------------|------------------------|-------------|---------------------|-------|
| CONDUCTION ANGEL | SINUSOIDAL CONDUCTION | | RECTANGULAR CONDUCTION | | TEST CONDUCTIONS | UNITS |
| | SINGLE SIDE | DOUBLE SIDE | SINGLE SIDE | DOUBLE SIDE | | |
| 180° | 0.003 | 0.003 | 0.002 | 0.002 | $T_J = T_J$ maximum | K/W |
| 120° | 0.004 | 0.004 | 0.004 | 0.004 | | |
| 90° | 0.005 | 0.005 | 0.005 | 0.005 | | |
| 60° | 0.007 | 0.007 | 0.007 | 0.007 | | |
| 30° | 0.012 | 0.012 | 0.012 | 0.012 | | |

Note

- The table above shows the increment of thermal resistance R_{thJ-hs} when devices operate at different conduction angles than DC

Fig.1 Current ratings characteristics

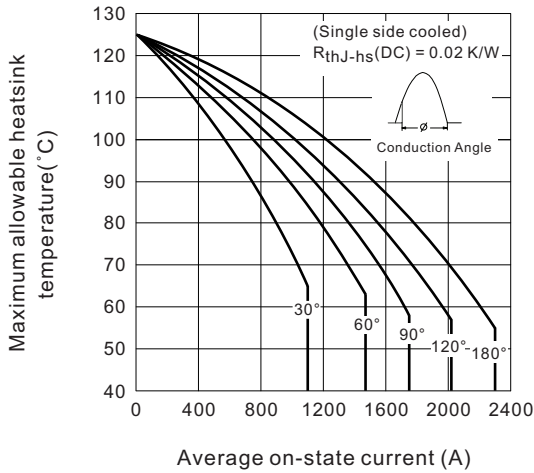


Fig.2 Current ratings characteristics

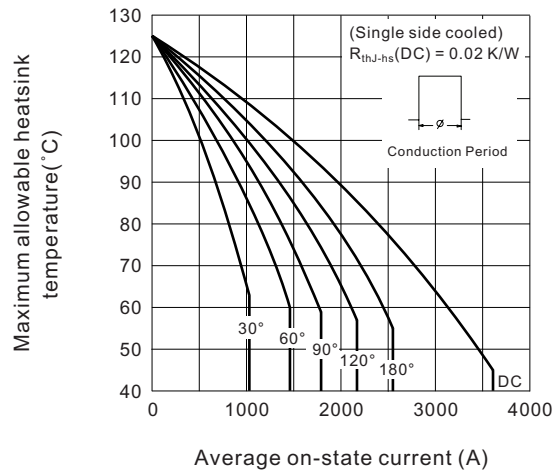


Fig.3 Current ratings characteristics

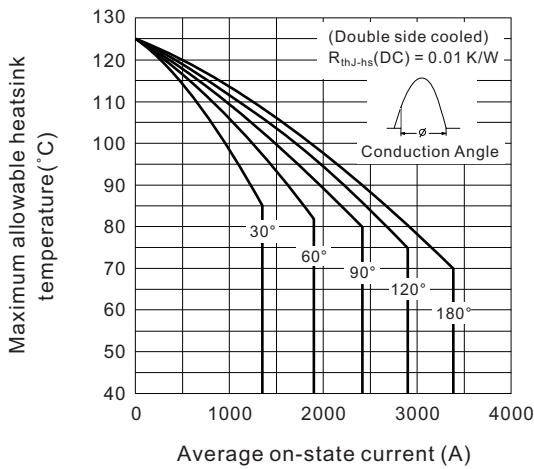


Fig.4 Current ratings characteristics

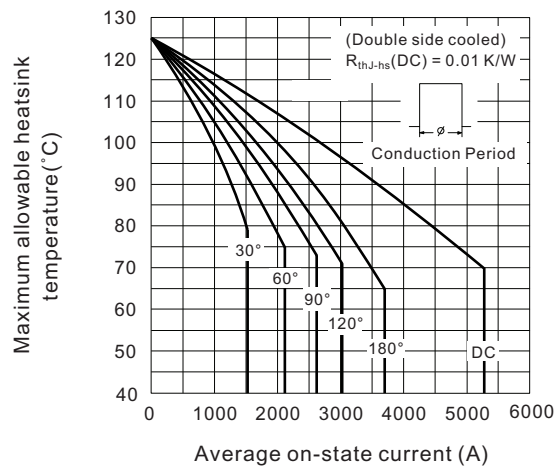


Fig.5 On-state power loss characteristics

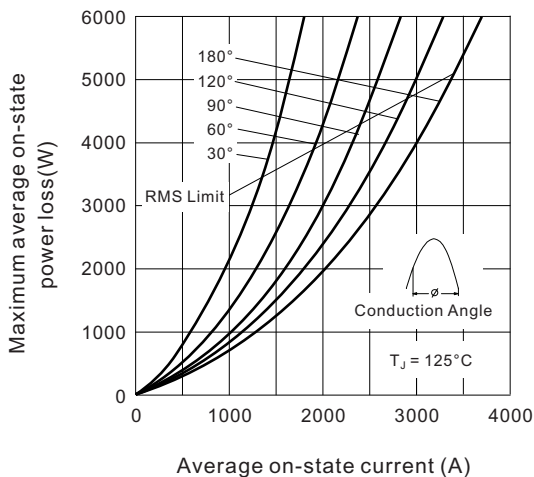


Fig.6 On-state power loss characteristics

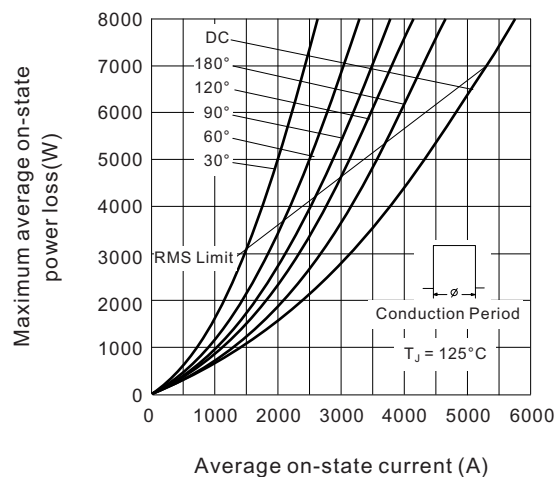


Fig.7 Maximum non-repetitive surge current single and double side cooled

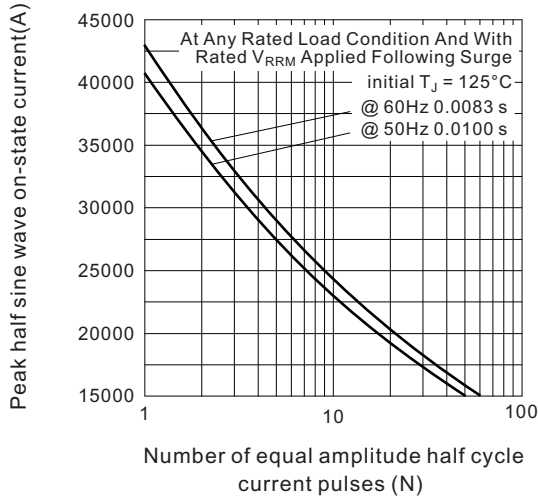


Fig.8 Maximum non-repetitive surge current single and double side cooled

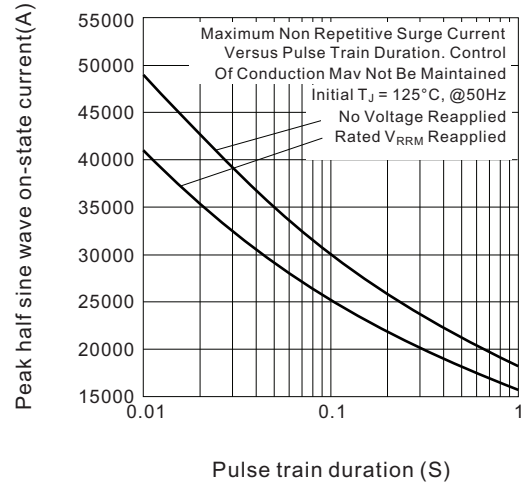


Fig.9 Maximum on-state voltage drop characteristics

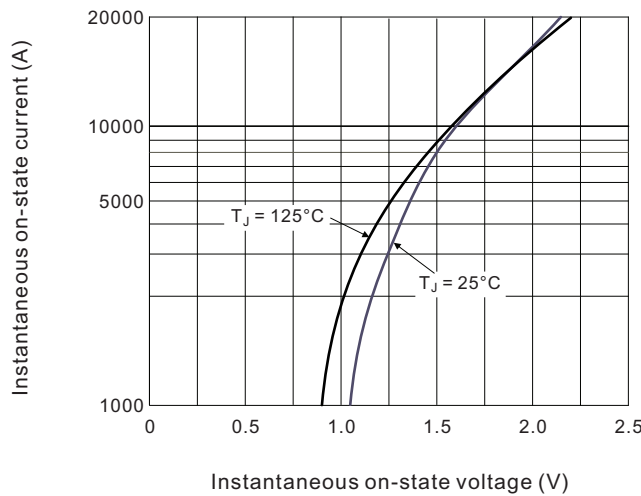


Fig.10 Thermal Impedance $Z_{th(J-hs)}$ characteristics

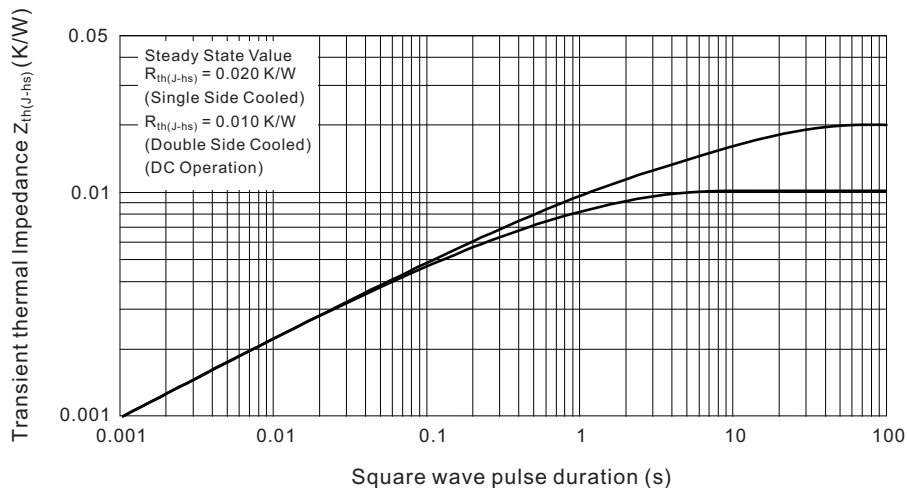


Fig.11 Gate trigger characteristics

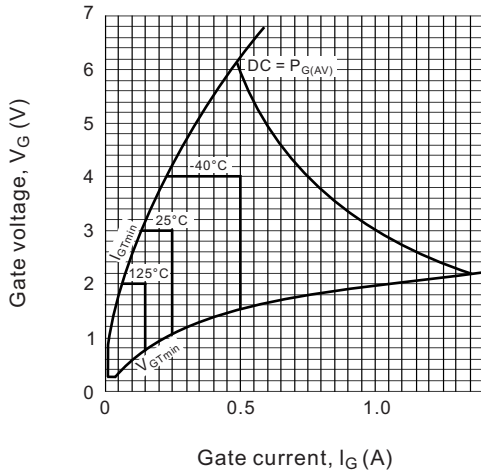
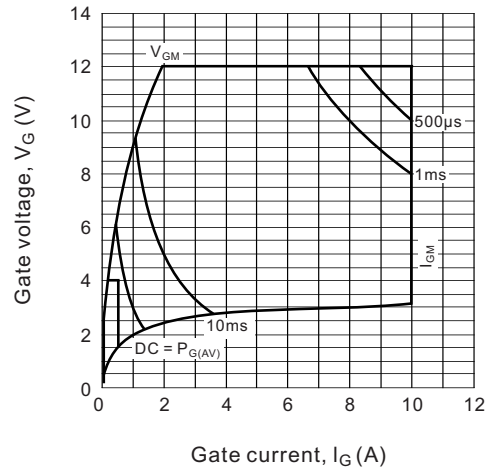


Fig.12 Gate trigger characteristics

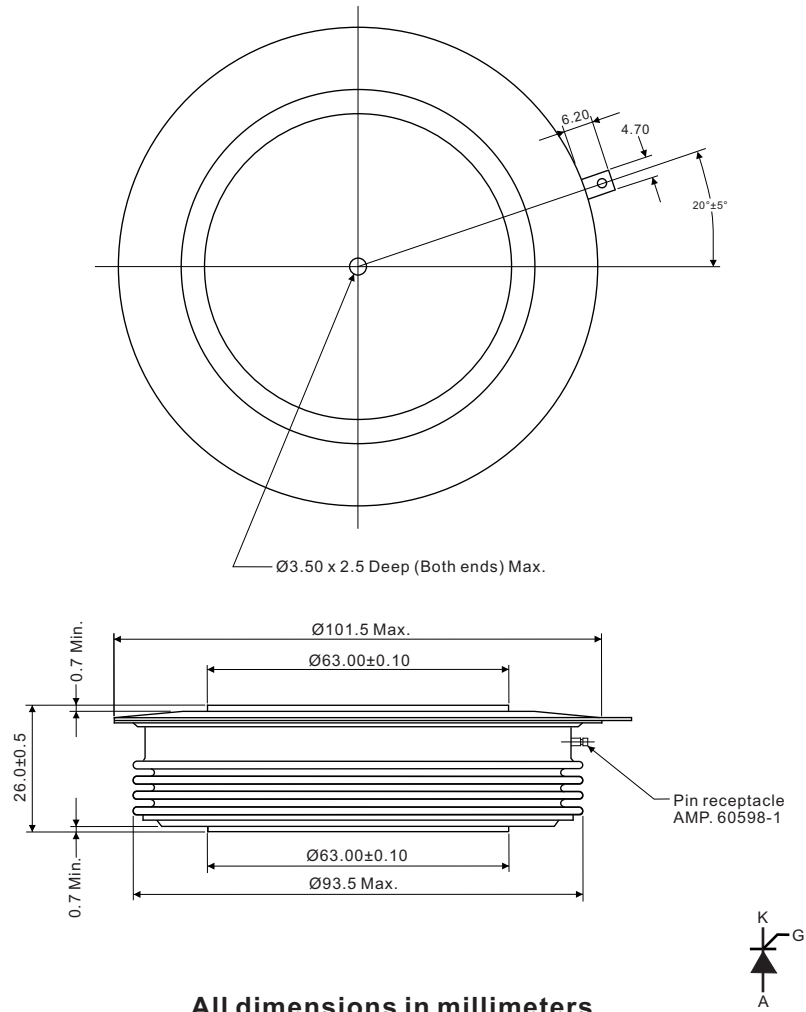


ORDERING INFORMATION TABLE

| | | | | | |
|-------------|-------------|-----------|-----------|-----------|----------|
| Device code | 3370 | PT | 16 | DX | 0 |
| | ① | ② | ③ | ④ | ⑤ |

- ① - Maximum average on-state current $I_{T(AV)}$, 3370 for 3370A
- ② - PT = Phase control thyristor
- ③ - Voltage code, cold $\times 100 = V_{RRM}/V_{RRM}$
- ④ - DX = Nell's DX-type Capsule
- ⑤ - Terminal type, "0" for eyelet

NELL'S DX-type Capsule



All dimensions in millimeters