# Technical Data :



# R216CH16 - Power Thyristor

**1600 $V_{DRM}$;**

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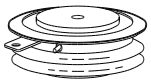
## HIGH POWER THYRISTOR FOR INVERTER AND CHOPPER APPLICATIONS

### Features:

- **All Diffused Structure**
- **Interdigitated Amplifying Gate Configuration**
- **Blocking capabilty up to 1600 volts**
- **Guaranteed Maximum Turn-Off Time**
- **High dV/dt Capability**
- **Pressure Assembled Device**

CASE 2T



## ELECTRICAL CHARACTERISTICS AND RATINGS

### Blocking - Off State

| Device Type | $V_{RRM}$ (1) | $V_{DRM}$ (1) | $V_{RSM}$ (1) |
|---|---|---|---|
| R216CH | 1600 | 1600 | 1700 |

$V_{RRM}$ = Repetitive peak reverse voltage
$V_{DRM}$ = Repetitive peak off state voltage
$V_{RSM}$ = Non repetitive peak reverse voltage (2)

| | | |
|---|---|---|
| Repetitive peak reverse leakage and off state leakage | $I_{RRM}$ / $I_{DRM}$ | 50 mA<br>50 mA (3) |
| Critical rate of voltage rise | dV/dt (4) | 500 V/μsec |

Notes:
All ratings are specified for Tj=25 °C unless otherwise stated.
(1) All voltage ratings are specified for an applied 50Hz/60zHz sinusoidal waveform over the temperature range -40 to +125 °C.
(2) 10 msec. max. pulse width
(3) Maximum value for Tj = 125 °C.
(4) Minimum value for linear and exponential waveshape to 80% rated $V_{DRM}$. Gate open. Tj = 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 thristor under test.

### Conducting - on state

| Parameter | Symbol | Min. | Max. | Typ. | Units | Conditions |
|---|---|---|---|---|---|---|
| Average value of on-state current | $I_{TAV}$ | | 633 | | A | Sinewave,180° conduction,$T_s$=55°C |
| Peak one cPSTCle surge (non repetitive) current | $I_{TSM}$ | | 6900 | | A | 10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, $T_j$ = 125 °C |
| I square t | $I^2t$ | | $2.40x10^6$ | | $A^2s$ | 10.0 msec |
| Latching current | $I_L$ | | 1000 | | mA | $V_D$ = 24 V; $R_L$= 12 ohms |
| Holding current | $I_H$ | | 500 | | mA | $V_{D=}$ 24 V; I = 2.5 A |
| Peak on-state voltage | $V_{TM}$ | | 1.90 | | V | $I_{TM}$ = 1000 A; Duty cPSTCle ≤ 0.01% $T_j$ = 125 °C |
| Critical rate of rise of on-state current (5, 6) | di/dt | | 200 | | A/μs | Switching from $V_{DRM}$ ≤ 1000 V, non-repetitive |
| Critical rate of rise of on-state current (6) | di/dt | | 100 | | A/μs | Switching from $V_{DRM}$ ≤ 1000 V |

## ELECTRICAL CHARACTERISTICS AND RATINGS R216CH16 - Power Thyristor

### Gating

| Parameter | Symbol | Min. | Max. | Typ. | Units | Conditions |
|---|---|---|---|---|---|---|
| Peak gate power dissipation | $P_{GM}$ | | 200 | | W | $t_p$ = 40 us |
| Average gate power dissipation | $P_{G(AV)}$ | | 5 | | W | |
| Peak gate current | $I_{GM}$ | | 10 | | A | |
| Gate current required to trigger all units | $I_{GT}$ | | 300<br>150<br>125 | | mA<br>mA<br>mA | $V_D$ = 6 V;$R_L$ = 3 ohms;$T_j$ = -40 °C<br>$V_D$ = 6 V;$R_L$ = 3 ohms;$T_j$ = +25 °C<br>$V_D$ = 6 V;$R_L$ = 3 ohms;$T_j$ = +125°C |
| Gate voltage required to trigger all units | $V_{GT}$ | <br><br>0.30 | 5<br>3 | | V<br>V<br>V | $V_D$ = 6 V;$R_L$ = 3 ohms;$T_j$ = -40 °C<br>$V_D$ = 6 V;$R_L$ = 3 ohms;$T_j$ = 0-125°C<br>$V_D$ = Rated $V_{DRM}$; $R_L$ = 1000 ohms; $T_j$ = + 125 °C |
| Peak negative voltage | $V_{GRM}$ | | 5 | | V | |

### Dynamic

| Parameter | Symbol | Min. | Max. | Typ. | Units | Conditions |
|---|---|---|---|---|---|---|
| Delay time | $t_d$ | | 1.5 | 0.7 | μs | $I_{TM}$ = 50 A; $V_D$ = Rated $V_{DRM}$<br>Gate pulse: $V_G$ = 20 V; $R_G$ = 20 ohms; $t_r$ = 0.1 μs; $t_p$ = 20 μs |
| Turn-off time (with $V_R$ = -50 V) | $t_q$ | **20** | 30 | | μs | $I_{TM}$ = 550 A; di/dt = 40 A/μs; $V_R$ ≥ -50 V; Re-applied dV/dt = 20 V/μs linear to 80% $V_{DRM}$; $V_G$ = 0; $T_j$ = 125 °C; Duty cPSTCle ≥ 0.01% |
| Reverse recovery charge | $Q_{rr}$ | | * | 200 | μC | $I_{TM}$ = 550 A; di/dt = 40 A/μs; $V_R$ ≥ -50 V |

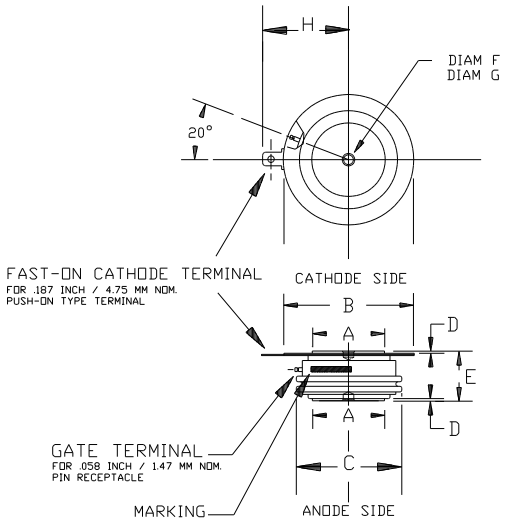
* For guaranteed max. value, contact factory.

## THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS

| Parameter | Symbol | Min. | Max. | Typ. | Units | Conditions |
|---|---|---|---|---|---|---|
| Operating temperature | $T_j$ | -40 | +125 | | °C | |
| Storage temperature | $T_{stg}$ | -40 | +150 | | °C | |
| Thermal resistance - junction to case | $R_{\theta(j-c)}$ | 0.045<br>0.090 | 0.055<br>0.110 | | °C/W | Double sided cooled<br>Single sided cooled |
| Thermal resistamce - case to sink | $R_{\theta(c-s)}$ | | 0.030<br>0.060 | | °C/W | Double sided cooled *<br>Single sided cooled * |
| Mounting force | P | 800<br>3.6 | 2500<br>11.1 | | lb.<br>kN | |
| Weight | W | | | 2.5<br>70 | oz.<br>g | |

* Mounting surfaces smooth, flat and greased

Note : for case outline and dimensions, see case outline drawing in page 4 of this Technical Data




STRIKE DISTANCE = .23 INCH / 5.8 MM MIN.
CREEPAGE DISTANCE = .40 INCH / 10.2 MM MIN.

OUTLINE DIMENSIONS - CASE 2T

| DIMENSIONS | Min. mm | Max. mm | Min. In. | Max. In. |
|---|---|---|---|---|
| DIAM A | 24.89 | 25.40 | 0.98 | 1.00 |
| DIAM B | 40.64 | 42.16 | 1.60 | 1.65 |
| DIAM C | -- | 40.39 | -- | 1.59 |
| D | 0.76 | -- | 0.03 | -- |
| E | 13.72 | 15.24 | 0.54 | 0.60 |
| F | 3.30 | 3.81 | 0.13 | 0.15 |
| G | 1.78 | 2.03 | 0.07 | 0.08 |
| H | 27.69 | 28.70 | 1.09 | 1.13 |