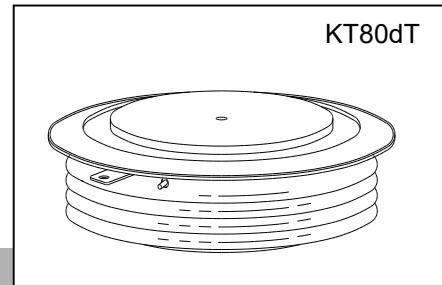




HIGH POWER THYRISTOR FOR PHASE CONTROL APPLICATIONS

Features:

- . All Diffused Structure
- . Interdigitated Amplifying Gate Configuration
- . Blocking capability up to 4400 volts
- . Guaranteed Maximum Turn-Off Time
- . High dV/dt Capability
- . Pressure Assembled Device



ELECTRICAL CHARACTERISTICS AND RATINGS

Blocking - Off State

| Device Type | V _{RRM} (1) | V _{DRM} (1) | V _{RSM} (1) |
|-------------|----------------------|----------------------|----------------------|
| YC784CM | 3600 | 3600 | 3700 |
| YC784CN | 3800 | 3800 | 3900 |
| YC784CT | 3900 | 3900 | 4000 |
| YC784DP | 4000 | 4000 | 4100 |
| YC784DA | 4100 | 4100 | 4200 |
| YC784DB | 4200 | 4200 | 4300 |
| YC784DD | 4400 | 4400 | 4500 |

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} | 10 mA 150 mA (3) |
| Critical rate of voltage rise | dV/dt (4) | 500 V/μsec |

Notes:

All ratings are specified for T_j=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_j = 125 °C.
- (4) Minimum value for linear and exponential waveshape to 80% rated V_{DRM}. Gate open. T_j = 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 _{T(AV)} | | 1650 | | A | Sinewave, 180° conduction, T _c =70°C |
| RMS value of on-state current | I _{TRMS} | | 2590 | | A | Nominal value |
| Peak one cycle surge (non repetitive) current | I _{TSM} | | 26000 | | A | 8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, T _j = 125 °C |
| | | | 24000 | | A | 10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, T _j = 125 °C |
| I square t | I ² t | | 5x10 ⁶ | | A ² s | 8.3 msec |
| Latching current | I _L | | 400 | | mA | V _D = 24 V; R _L = 12 ohms |
| Holding current | I _H | | 100 | | mA | V _D = 24 V; I = 2.5 A |
| Peak on-state voltage | V _{TM} | | 1.85 | | V | I _{TM} = 2000 A; T _j = 25 °C |
| Critical rate of rise of on-state current (5, 6) | di/dt | | 300 | | A/μs | Switching from V _{DRM} ≤ 1500 V, non-repetitive |
| Critical rate of rise of on-state current (6) | di/dt | | 100 | | A/μs | Switching from V _{DRM} ≤ 1500 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} | | 15 | | A | |
| Gate current required to trigger all units | I_{GT} | | 300 200 125 | | mA mA mA | $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = -40 \text{ }^\circ\text{C}$ $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = +25 \text{ }^\circ\text{C}$ $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = +125 \text{ }^\circ\text{C}$ |
| Gate voltage required to trigger all units | V_{GT} | 0.30 | 5 4 | | V V V | $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = -40 \text{ }^\circ\text{C}$ $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = 0-125 \text{ }^\circ\text{C}$ $V_D = \text{Rated } V_{DRM}; R_L = 1000 \text{ ohms}; T_j = +125 \text{ }^\circ\text{C}$ |
| Peak negative voltage | V_{GRM} | | 15 | | V | |

Dynamic

| Parameter | Symbol | Min. | Max. | Typ. | Units | Conditions |
|--|----------|------|------|------|---------|--|
| Delay time | t_d | | 3.0 | 2.5 | μs | $I_{TM} = 50 \text{ A}; V_D = 67\% V_{DRM}$ Gate pulse: $V_G = 30 \text{ V}; R_G = 10 \text{ ohms}; t_r = 0.1 \mu s; t_p = 20 \mu s$ |
| Turn-off time (with $V_R = -5 \text{ V}$) | t_q | | 400 | 250 | μs | $I_{TM} > 2000 \text{ A}; di/dt = 5 \text{ A}/\mu s;$ $V_R \geq -5 \text{ V};$ Re-applied $dV/dt = 1000 \text{ V}/\mu s$ linear to $1000 V_{DRM}$; $T_j = 125 \text{ }^\circ\text{C};$ Duty cycle $\geq 0.01\%$ |
| Reverse recovery current | I_{rr} | | | | A | $I_{TM} > 2000 \text{ A}; di/dt = 25 \text{ A}/\mu s;$ $V_R \geq -50 \text{ V}; T_j = 125 \text{ }^\circ\text{C}$ |

THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS

| Parameter | Symbol | Min. | Max. | Typ. | Units | Conditions |
|---------------------------------------|-------------------|--------------|---------------|-------------|---------------------------|-----------------------|
| Operating temperature | T_j | -40 | +125 | | $^\circ\text{C}$ | |
| Storage temperature | T_{stg} | -40 | +150 | | $^\circ\text{C}$ | |
| Thermal resistance - junction to case | $R_{\theta(j-c)}$ | | 0.011 | | $^\circ\text{C}/\text{W}$ | Double sided cooled |
| Thermal resistance - case to sink | $R_{\theta(c-s)}$ | | 0.003 | | $^\circ\text{C}/\text{W}$ | Double sided cooled * |
| Mounting force | P | 8000 35.5 | 10000 44.4 | 35 | lb. kN | |
| Weight | W | | | 3.5 1.50 | Lb. Kg. | |

* Mounting surfaces smooth, flat and greased

