

STUD TYPETHYRISTOR**Features**

- Hermetic ceramic -metal seal
- high dv/dt
- tested according to IEC standards
- High surge capability
- Compression Bonded Encapsulation for heavy duty operations such as severe thermal cycling

50A**Typical Applications**

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

Major Ratings and Characteristics

| Parameters | | KP50A | Units |
|---------------------|---------|-------------|-------------------|
| $I_{T(AV)}$ | | 50 | A |
| | @ T_c | 85 | °C |
| $I_{T(RMS)}$ | | 72 | A |
| I_{TSM} | @ 50Hz | 900 | A |
| | @ 60Hz | 1050 | A |
| $I^2 t$ | @ 50Hz | 5 | KA ² s |
| | @ 60Hz | 4 | KA ² s |
| V_{DRM} / V_{RRM} | MAX | 1600 | V |
| T_q | typical | 200 | µs |
| T_J | range | - 40 to 125 | °C |

ELECTRICAL SPECIFICATIONS

Voltage Ratings

| Type number | Voltage Code | V_{RRM}/V_{DRM} , maximum repetitive peak reverse voltage V | V_{RSM} , maximum non-repetitive peak rev. voltage V | I_{RRM}/I_{DRM} max. @ $T_J = T_J$ max. mA |
|-------------|--------------|--|---|--|
| KP50A | 02 | 200 | 300 | 15 |
| | 06 | 600 | 700 | |
| | 10 | 1000 | 1100 | |
| | 12 | 1200 | 1300 | |
| | 16 | 1600 | 1700 | |

On-state Conduction

| Parameter | KP50A | Units | Conditions | | |
|--|-------|--------------------|---|----------------|--|
| $I_{T(AV)}$ Maximum average on-state current @ Case temperature | 45 | A | 180° conduction, half sine wave | | |
| | 90 | °C | | | |
| $I_{(RMS)}$ Maximum RMS on-state current | 72 | A | 180° conduction, half sine wave @ $T_C = 80^\circ\text{C}$ | | |
| I_{TSM} Maximum peak, one-cycle non-repetitive surge current | 900 | A | t = 10ms | No voltage | Sinusoidal half wave, Initial $T = T_{max}$. |
| | 1050 | | t = 8.3ms | reapplied | |
| | 800 | | t = 10ms | 100% V_{RRM} | |
| | 850 | | t = 8.3ms | reapplied | |
| $I^2 t$ Maximum $I^2 t$ for fusing | 5 | KA ² s | t = 10ms | No voltage | |
| | 4 | | t = 8.3ms | reapplied | |
| | 3.5 | | t = 10ms | 100% V_{RRM} | |
| | 3 | | t = 8.3ms | reapplied | |
| $I^2 \sqrt{t}$ Maximum $I^2 \sqrt{t}$ for fusing | 364 | KA ² √s | t = 0.1 to 10ms, no voltage reapplied | | |
| V_{TM} Maximum on-state or forward | 1.30 | V | pk = 600A, $T_J = 25^\circ\text{C}$, t p = 10ms sine pulse | | |
| I_H Maximum holding current | 100 | mA | $T_J = 25^\circ\text{C}$, anode supply 12V resistive load | | |
| I_L Typical latching current | 300 | | | | |

Switching

| Parameter | KP50A | Units | Conditions |
|---|-------|-------|--|
| di/dt Max. non-repetitive rate of rise of turned-on current | 50 | A/μs | Gate drive 20V, 20Ω, tr ≤ 1μs $T_J = T_J$ max, anode voltage ≤ 80% V_{DRM} |
| td ical delay time | 2.0 | μs | Gate current 1A, dig/dt = 1A/μs $V_d = 0.67\% V_{DRM}$, $T_J = 25^\circ\text{C}$ |
| Tq ical turn-off time | 200 | μs | $I_{TM} = 300\text{A}$, $T_J = T_J$ max, di/dt = 20A/μs, $V_R = 50\text{V}$ dv/dt = 20V/μs, Gate 0V 100Ω, tp = 500μs |

Blocking

| Parameter | KP50A | Units | Conditions |
|---|-------|------------|---|
| dv/dt Maximum critical rate of rise of off-state voltage | 1000 | V/ μ s | T _J = T _J max linear to 80% rated V _{DRM} |
| I _{DRM} Max. peak reverse and off-state leakage current | 20 | mA | T _J = T _J max, rated V _{DRM} /V _{RRM} applied |

Triggering

| Parameter | KP50A | | Units | Conditions |
|--|-------|------|-------|--|
| P _{GM} Maximum peak gate power | 5 | | W | T _J = T _J max, t _p ≤ 5ms |
| P _{G(AV)} Maximum average gate power | 1.0 | | | T _J = T _J max, f = 50Hz, d% = 50 |
| I _{GM} Max. peak positive gate current | 2.0 | | A | T _J = T _J max, t _p ≤ 5ms |
| +V _{GM} Maximum peak positive gate voltage | 20 | | V | T _J = T _J max, t _p ≤ 5ms |
| -V _{GM} Maximum peak negative gate voltage | 5.0 | | | |
| I _{GT} DC gate current required to trigger | TYP. | MAX. | mA | T _J = -40°C T _J = 25°C T _J = 125°C Max. required gate trigger/ current/ voltage are the lowest value which will trigger all units 12V anode-to-cathode applied |
| | 180 | - | | |
| | 90 | 150 | | |
| V _{GT} DC gate voltage required to trigger | 2.9 | - | V | T _J = -40°C T _J = 25°C T _J = 125°C |
| | 1.8 | 30 | | |
| | 1.2 | - | | |
| I _{GD} DC gate current not to trigger | 8 | | mA | T _J = T _J max Max. gate current/ voltage not to trigger is the max. value which will not trigger any unit with rated V anode-to-cathode applied |
| V _{GD} DC gate voltage not to trigger | 0.25 | | V | |

Thermal and Mechanical Specification

| Parameter | KP50A | Units | Conditions |
|--|------------|----------|--|
| T _J Max. operating temperature range | -40 to 125 | °C | |
| T _{stg} Max. storage temperature range | -40 to 150 | | |
| R _{thJC} Max. thermal resistance, junction to case | 0.195 | K/W | DC operation |
| R _{thCS} Max. thermal resistance, case to heatsink | 0.08 | | Mounting surface, smooth, flat and greased |
| T Mounting torque, ± 10% | 6 | Nm | Non lubricated threads |
| | 4 | (lbf-in) | Lubricated threads |
| wt Approximate weight | 26 | g | |

Outline Table

