

FEATURES

- High Surge Capability

APPLICATIONS

- High Power Drives
- High Voltage Power Supplies
- DC Motor Control
- Welding
- Battery Chargers

VOLTAGE RATINGS

| Type Number | Repetitive Peak Voltages V_{DRM} V_{RRM} V | Conditions |
|----------------|--|--|
| TK36 12 M or K | 1200 | $T_{vj} = 0^\circ \text{ to } 125^\circ \text{C}$, $I_{DRM} = I_{RRM} = 100\text{mA}$, $V_{DRM}^* V_{RRM} t_p = 10\text{ms}$, $V_{DSM} \text{ \& } V_{RSM} =$ $V_{DRM} \text{ \& } V_{RRM} + 100\text{V}$ respectively |
| TK36 10 M or K | 1000 | |
| TK36 08 M or K | 800 | |

Lower voltage grades available.

ORDERING INFORMATION

When ordering, select the required part number shown in the Voltage Ratings selection table, then:-

Add K to type number for 3/4" 16 UNF thread, e.g. **TK36 12K**.

or

Add M to type number for M16 thread, e.g. **TK36 12M**.

Note: Please use the complete part number when ordering and quote this number in any future correspondence relating to your order.

KEY PARAMETERS

V_{DRM} **1200V**

$I_{T(AV)}$ **245A**

I_{TSM} **5500A**

$dVdt^*$ **200V/ μ s**

dI/dt **500A/ μ s**

*Higher dV/dt selections available

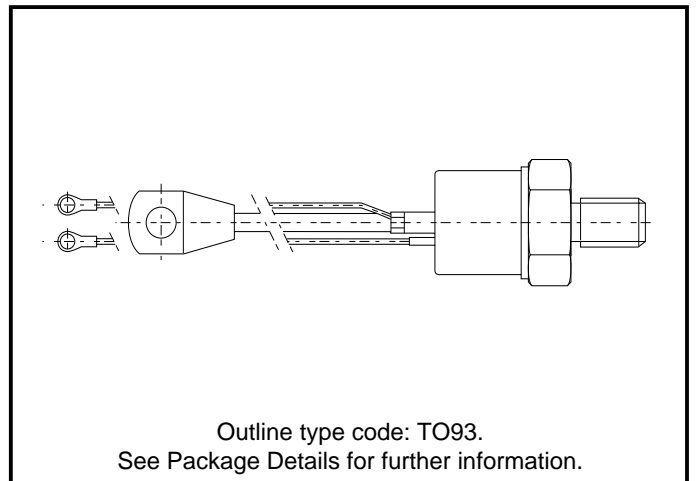


Fig. 1 Package outline

CURRENT RATINGS

$T_{case} = 60^{\circ}\text{C}$ unless stated otherwise.

| Symbol | Parameter | Conditions | Max. | Units |
|--------------|--------------------------------------|--------------------------|------|-------|
| $I_{T(AV)}$ | Mean on-state current | Half wave resistive load | 323 | A |
| $I_{T(RMS)}$ | RMS value | - | 507 | A |
| I_T | Continuous (direct) on-state current | - | 425 | A |

$T_{case} = 80^{\circ}\text{C}$ unless stated otherwise.

| Symbol | Parameter | Conditions | Max. | Units |
|--------------|--------------------------------------|--------------------------|------|-------|
| $I_{T(AV)}$ | Mean on-state current | Half wave resistive load | 245 | A |
| $I_{T(RMS)}$ | RMS value | - | 385 | A |
| I_T | Continuous (direct) on-state current | - | 315 | A |

SURGE RATINGS

| Symbol | Parameter | Conditions | Max. | Units |
|-----------|---|--|----------------------|----------------------|
| I_{TSM} | Surge (non-repetitive) on-state current | 10ms half sine; $T_{case} = 125^{\circ}\text{C}$ | 4.4 | kA |
| I^2t | I^2t for fusing | $V_R = 50\% V_{RRM}$ - 1/4 sine | 96.8×10^3 | A^2s |
| I_{TSM} | Surge (non-repetitive) on-state current | 10ms half sine; $T_{case} = 125^{\circ}\text{C}$ | 5.5 | kA |
| I^2t | I^2t for fusing | $V_R = 0$ | 151.25×10^3 | A^2s |

THERMAL AND MECHANICAL DATA

| Symbol | Parameter | Conditions | Min. | Max. | Units |
|---------------|---------------------------------------|---|------|------|-----------------------------|
| $R_{th(j-c)}$ | Thermal resistance - junction to case | dc | - | 0.13 | $^{\circ}\text{C}/\text{W}$ |
| $R_{th(c-h)}$ | Thermal resistance - case to heatsink | Mounting torque 35.0Nm with mounting compound | - | 0.06 | $^{\circ}\text{C}/\text{W}$ |
| T_{vj} | Virtual junction temperature | On-state (conducting) | - | 125 | $^{\circ}\text{C}$ |
| | | Reverse (blocking) | - | 125 | $^{\circ}\text{C}$ |
| T_{stg} | Storage temperature range | | -40 | 150 | $^{\circ}\text{C}$ |
| - | Mounting torque | | 30.0 | 35.0 | Nm |

DYNAMIC CHARACTERISTICS

| Symbol | Parameter | Conditions | Min. | Max. | Units | |
|-------------------|--|---|-----------------|------|------------|------------|
| V_{TM} | Maximum on-state voltage | At 600A peak, $T_{case} = 25^{\circ}C$ | - | 1.3 | V | |
| I_{RRM}/I_{DRM} | Peak reverse and off-state current | At V_{RRM}/V_{DRM} , $T_{case} = 125^{\circ}C$ | - | 25 | mA | |
| dV/dt | Maximum linear rate of rise of off-state voltage | To 60% V_{DRM} , $T_j = 125^{\circ}C$, Gate open circuit | - | 200 | V/ μs | |
| dI/dt | Rate of rise of on-state current | Gate source 20V, 20Ω $t_r \leq 0.5\mu s$, $T_j = 125^{\circ}C$ | Repetitive 50Hz | - | 500 | A/ μs |
| | | | Non-repetitive | - | 800 | A/ μs |
| $V_{T(To)}$ | Threshold voltage | At $T_{vj} = 125^{\circ}C$ | - | 0.88 | V | |
| r_T | On-state slope resistance | At $T_{vj} = 125^{\circ}C$ | - | 0.7 | m Ω | |
| t_{gd} | Delay time | $V_D = 300V$, $I_G = 1A$, $I_T = 50A$, dI/dt = 50A/ μs , dI _G /dt = 1A/ μs , $T_j = 25^{\circ}C$ | - | 1.5 | μs | |
| I_L | Latching current | $T_j = 25^{\circ}C$, $V_D = 12V$ | - | - | mA | |
| I_H | Holding current | $T_j = 25^{\circ}C$, $V_D = 12V$, $I_{TM} = 1A$ | - | 50 | mA | |

GATE TRIGGER CHARACTERISTICS AND RATINGS

| Symbol | Parameter | Conditions | Typ. | Max. | Units |
|-------------|---------------------------|--|------|------|-------|
| V_{GT} | Gate trigger voltage | $V_{DRM} = 12V$, $T_{case} = 25^{\circ}C$, $R_L = 6\Omega$ | - | 3.0 | V |
| I_{GT} | Gate trigger current | $V_{DRM} = 12V$, $T_{case} = 25^{\circ}C$, $R_L = 6\Omega$ | - | 200 | mA |
| V_{GD} | Gate non-trigger voltage | At V_{DRM} , $T_{case} = 125^{\circ}C$, $R_L = 1k\Omega$ | - | 0.2 | V |
| V_{FGM} | Peak forward gate voltage | Anode positive with respect to cathode | - | 30 | V |
| V_{FGN} | Peak forward gate voltage | Anode negative with respect to cathode | - | 0.25 | V |
| V_{RGM} | Peak reverse gate voltage | | - | 5 | V |
| I_{FGM} | Peak forward gate current | Anode positive with respect to cathode | - | 4 | A |
| P_{GM} | Peak gate power | - | - | 16 | W |
| $P_{G(AV)}$ | Mean gate power | | - | 3 | W |

CURVES

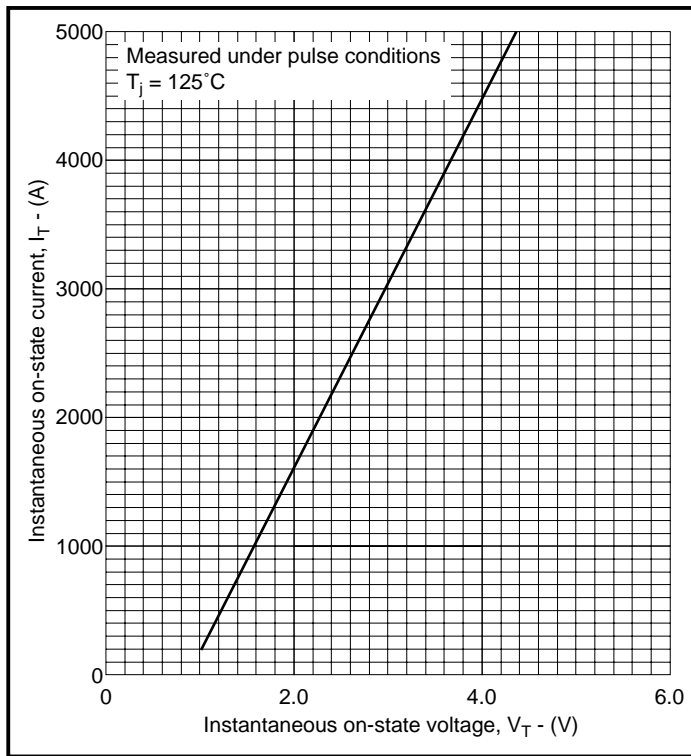
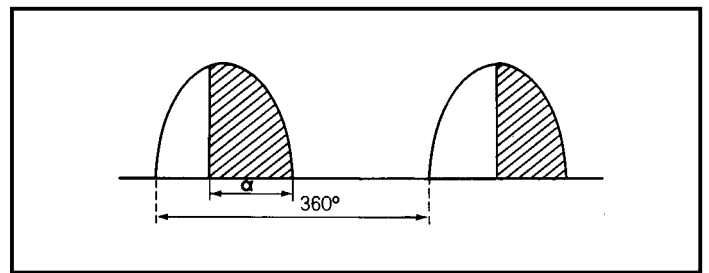


Fig.2 Maximum (limit) on-state characteristics

SINUSOIDAL CURRENT WAVEFORM



RECTANGULAR CURRENT WAVEFORM

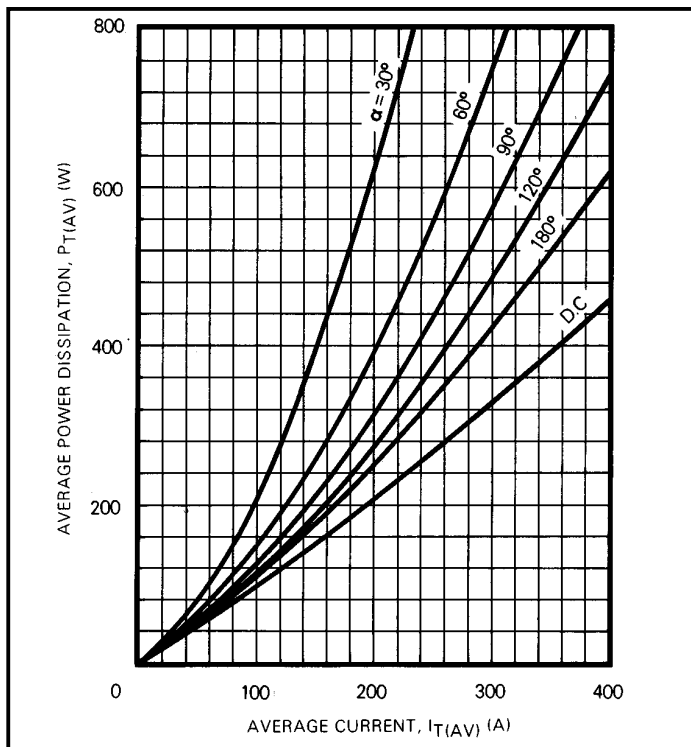
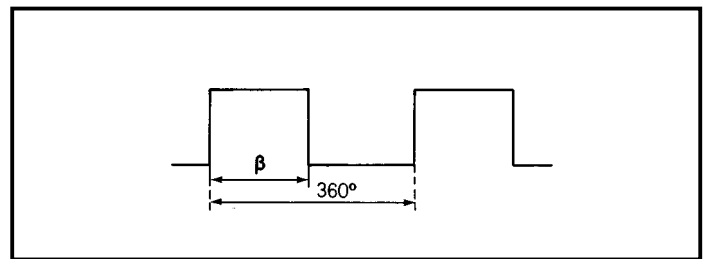


Fig.3 Maximum on-state power dissipation for sinusoidal current waveform

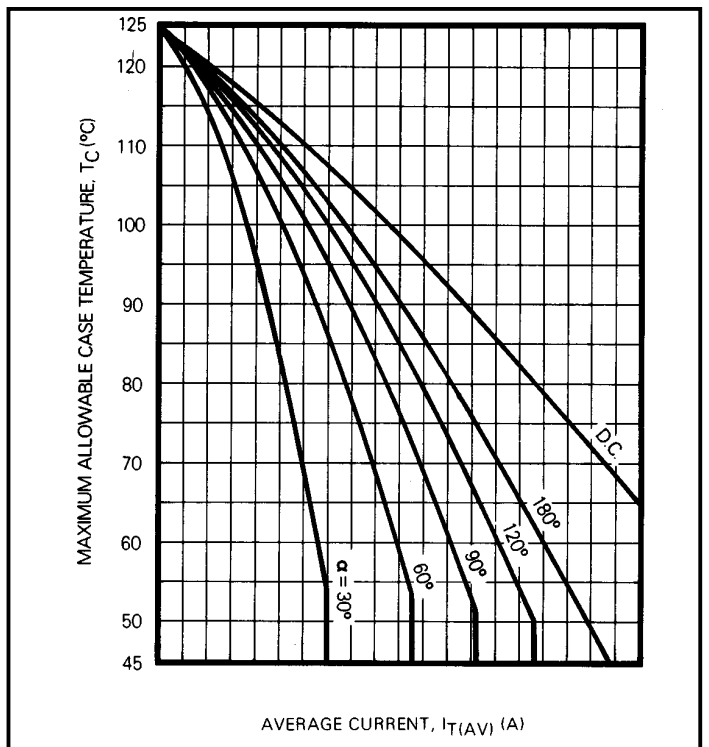


Fig.4 Maximum allowable case temperature for sinusoidal current waveform

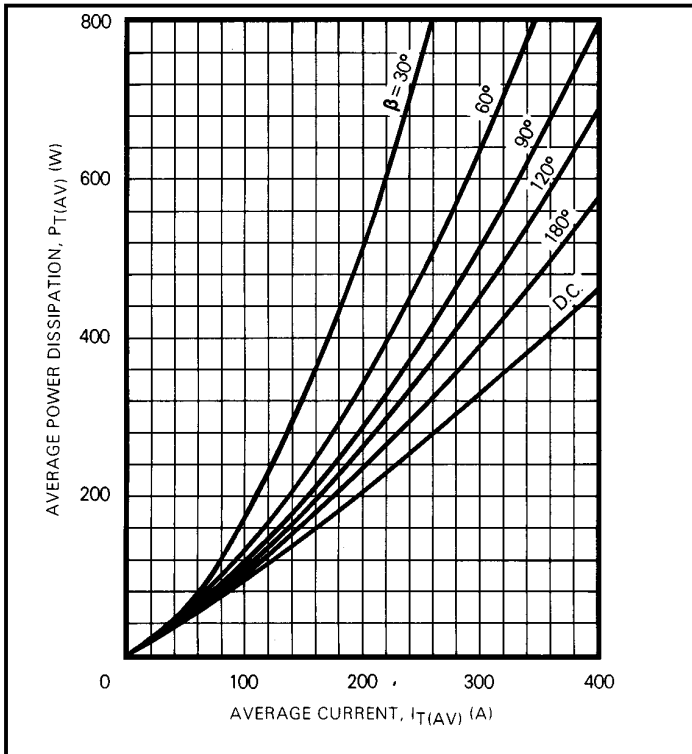


Fig.5 Maximum on-state power dissipation for rectangular current waveform

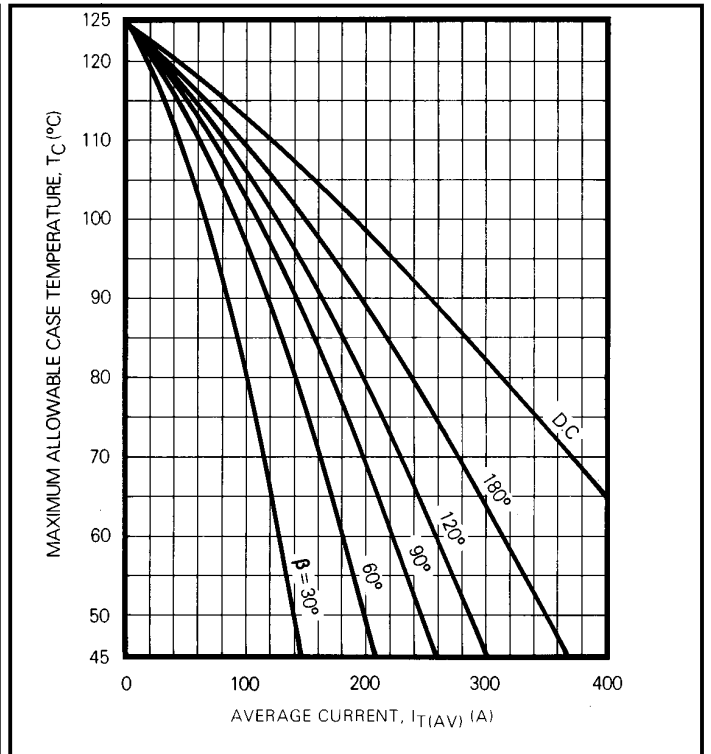


Fig.6 Maximum allowable case temperature for rectangular current waveform

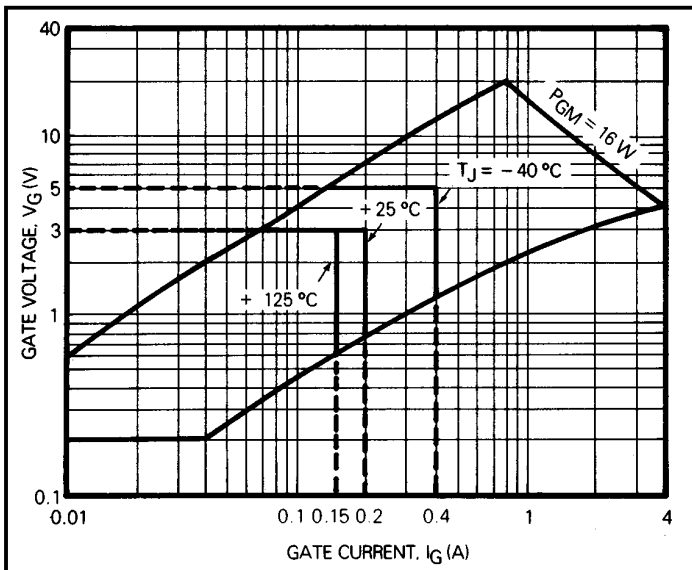


Fig.7 Gate trigger characteristics

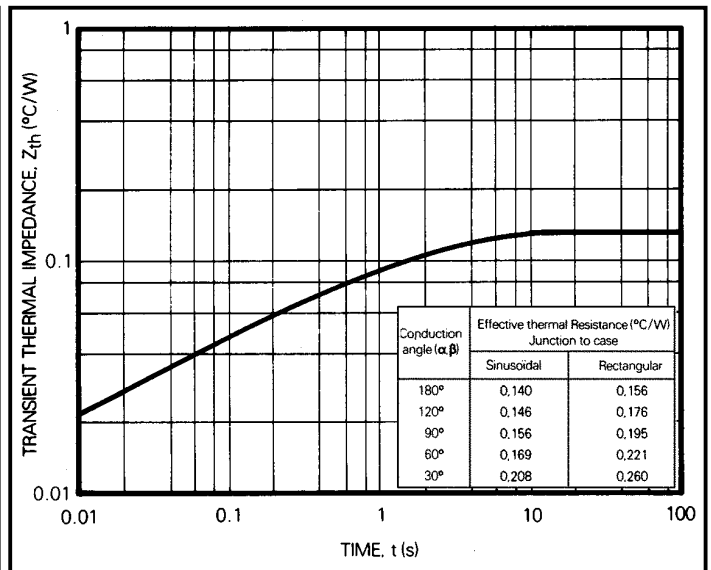


Fig.8 Transient thermal impedance - junction to case

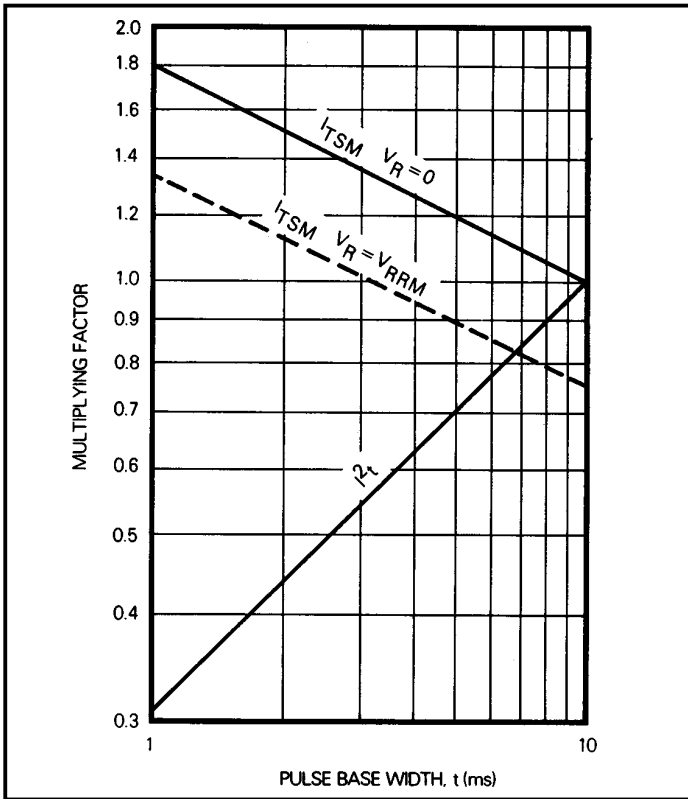


Fig.9 Multiplying factor for non-repetitive sub-cycle surge on-state current and I^2t rating

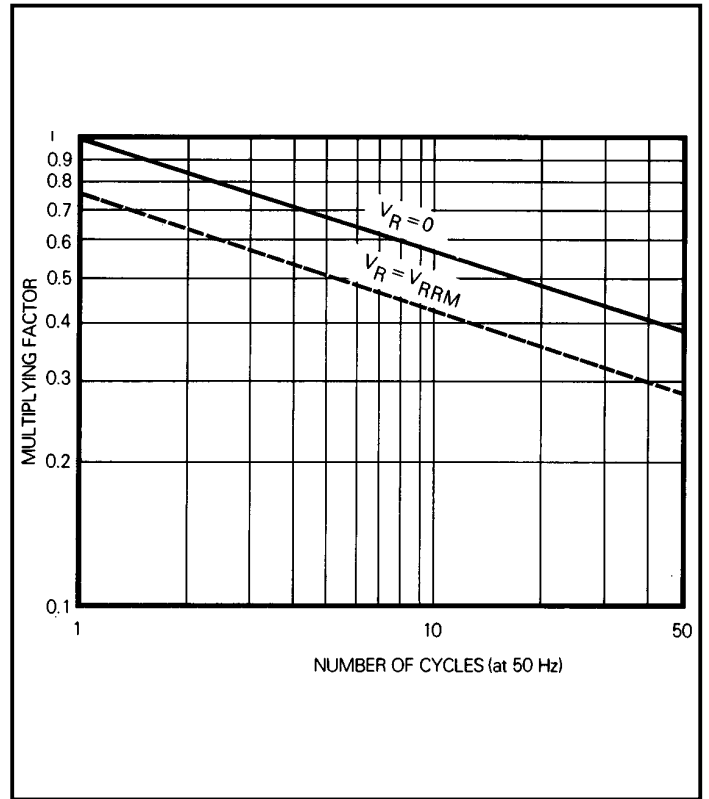
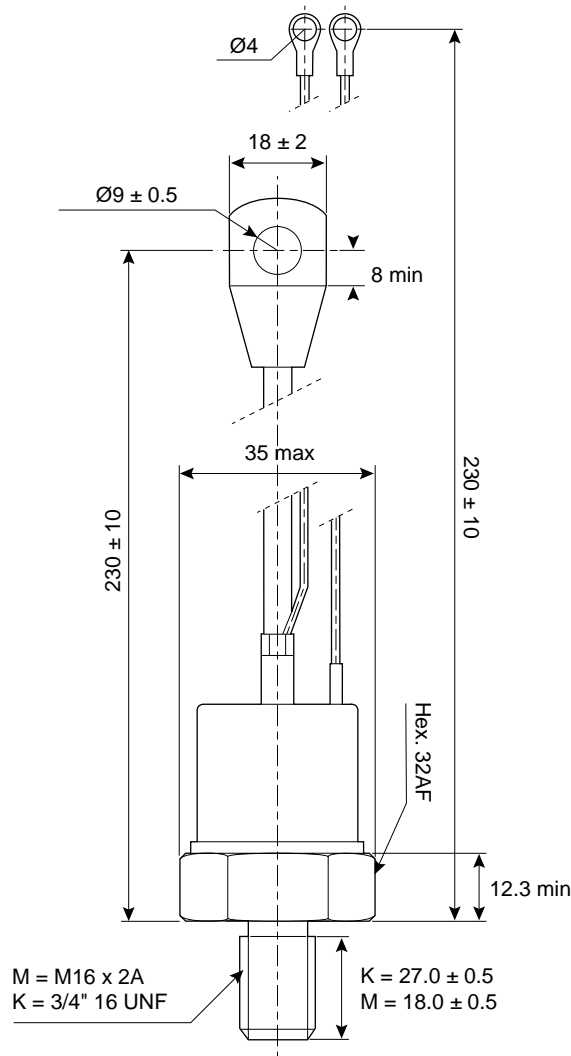


Fig.10 Multiplying factor for non-repetitive surge on-state current

PACKAGE DETAILS

For further package information, please contact Customer Services. All dimensions in mm, unless stated otherwise. DO NOT SCALE.



Nominal weight: 290g
 Mounting torque: $35 \text{ Nm} \pm 10\%$
 Gate lead colour: White
 Cathode lead colour: Red

Package outline type code: TO93

POWER ASSEMBLY CAPABILITY

The Power Assembly group was set up to provide a support service for those customers requiring more than the basic semiconductor, and has developed a flexible range of heatsink and clamping systems in line with advances in device voltages and current capability of our semiconductors.

We offer an extensive range of air and liquid cooled assemblies covering the full range of circuit designs in general use today. The Assembly group offers high quality engineering support dedicated to designing new units to satisfy the growing needs of our customers.

Using the latest CAD methods our team of design and applications engineers aim to provide the Power Assembly Complete Solution (PACs).

HEATSINKS

The Power Assembly group has its own proprietary range of extruded aluminium heatsinks which have been designed to optimise the performance of Dynex semiconductors. Data with respect to air natural, forced air and liquid cooling (with flow rates) is available on request.

For further information on device clamps, heatsinks and assemblies, please contact your nearest sales representative or Customer Services.



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Preliminary Information: The product is in design and development. The datasheet represents the product as it is understood but details may change.

Advance Information: The product design is complete and final characterisation for volume production is well in hand.

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