

## Triacs and Diacs

| Order code | Manufacturer code | Description                      |
|------------|-------------------|----------------------------------|
| 47-3402    | Z0405MF           | Z0405MF 4A 600V TO-92 TRIAC (ST) |

|                                                                                                                                                                                                    |                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Triacs and Diacs                                                                                                                                                                                   | Page 1 of 7              |
| The enclosed information is believed to be correct, Information may change 'without notice' due to product improvement. Users should ensure that the product is suitable for their use. E. & O. E. | Revision A<br>04/07/2003 |



# Z04 Series

STANDARD

4A TRIACs

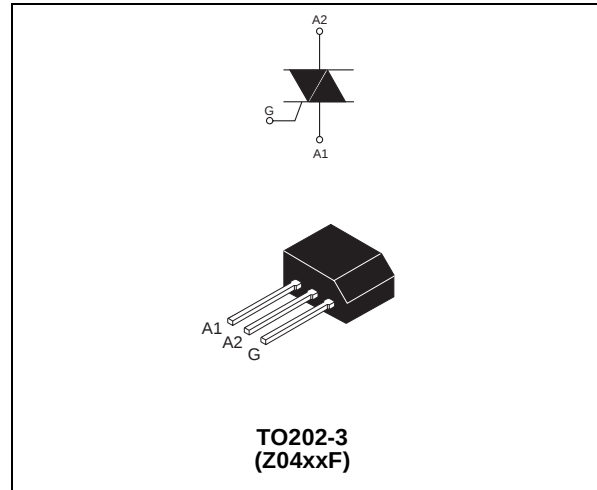
## MAIN FEATURES:

| Symbol            | Value      | Unit |
|-------------------|------------|------|
| $I_{T(RMS)}$      | 4          | A    |
| $V_{DRM}/V_{RRM}$ | 600 to 800 | V    |
| $I_{GT}(Q_1)$     | 3 to 25    | mA   |

## DESCRIPTION

The Z04 series is suitable for general purpose AC switching applications. They can be found in applications such as touch light dimmers, fan controllers, HID lamp ignitors,...

Different gate current sensitivities are available, allowing optimized performances when controlled directly from microcontrollers.



## ABSOLUTE MAXIMUM RATINGS

| Symbol             | Parameter                                                                                       |                                |                             | Value                          | Unit                   |
|--------------------|-------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------|--------------------------------|------------------------|
| $I_{T(RMS)}$       | RMS on-state current (full sine wave)                                                           | $T_I = 30^{\circ}\text{C}$     |                             | 4                              | A                      |
|                    |                                                                                                 | $T_{amb} = 25^{\circ}\text{C}$ |                             | 1                              |                        |
| $I_{TSM}$          | Non repetitive surge peak on-state current (full cycle, $T_j$ initial = $25^{\circ}\text{C}$ )  | $F = 50\text{ Hz}$             | $t = 20\text{ ms}$          | 20                             | A                      |
|                    |                                                                                                 | $F = 60\text{ Hz}$             | $t = 16.7\text{ ms}$        | 21                             |                        |
| $I^2t$             | $I^2t$ Value for fusing                                                                         | $t_p = 10\text{ ms}$           |                             | 2.2                            | $\text{A}^2\text{s}$   |
| $di/dt$            | Critical rate of rise of on-state current<br>$I_G = 2 \times I_{GT}$ , $t_r \leq 100\text{ ns}$ | $F = 120\text{ Hz}$            | $T_j = 125^{\circ}\text{C}$ | 20                             | $\text{A}/\mu\text{s}$ |
| $I_{GM}$           | Peak gate current                                                                               | $t_p = 20\text{ }\mu\text{s}$  | $T_j = 125^{\circ}\text{C}$ | 1.2                            | A                      |
| $P_{G(AV)}$        | Average gate power dissipation                                                                  | $T_j = 125^{\circ}\text{C}$    |                             | 0.2                            | W                      |
| $T_{stg}$<br>$T_j$ | Storage junction temperature range<br>Operating junction temperature range                      |                                |                             | - 40 to + 150<br>- 40 to + 125 | $^{\circ}\text{C}$     |

## Z04 Series

### ELECTRICAL CHARACTERISTICS (T<sub>j</sub> = 25°C, unless otherwise specified)

| Symbol                   | Test Conditions                                                                     | Quadrant     |      | Z04xx |    |     |     | Unit |
|--------------------------|-------------------------------------------------------------------------------------|--------------|------|-------|----|-----|-----|------|
|                          |                                                                                     |              |      | 02    | 05 | 09  | 10  |      |
| I <sub>GT</sub> (1)      | V <sub>D</sub> = 12 V    R <sub>L</sub> = 30 Ω                                      | ALL          | MAX. | 3     | 5  | 10  | 25  | mA   |
| V <sub>GT</sub>          |                                                                                     | ALL          | MAX. | 1.3   |    |     |     | V    |
| V <sub>GD</sub>          | V <sub>D</sub> = V <sub>DRM</sub> R <sub>L</sub> = 3.3 kΩ    T <sub>j</sub> = 125°C | ALL          | MIN. | 0.2   |    |     |     | V    |
| I <sub>H</sub> (2)       | I <sub>T</sub> = 50 mA                                                              |              | MAX. | 3     | 5  | 10  | 25  | mA   |
| I <sub>L</sub>           | I <sub>G</sub> = 1.2 I <sub>GT</sub>                                                | I - III - IV | MAX. | 6     | 10 | 15  | 25  | mA   |
|                          |                                                                                     | II           |      | 12    | 15 | 25  | 50  |      |
| dV/dt (2)                | V <sub>D</sub> = 67 %V <sub>DRM</sub> gate open    T <sub>j</sub> = 110°C           |              | MIN. | 10    | 20 | 100 | 200 | V/μs |
| (dV/dt) <sub>c</sub> (2) | (dI/dt) <sub>c</sub> = 1.8 A/ms    T <sub>j</sub> = 110°C                           |              | MIN. | 0.5   | 1  | 2   | 5   | V/μs |

### STATIC CHARACTERISTICS

| Symbol              | Test Conditions                                    |                        |      | Value | Unit |
|---------------------|----------------------------------------------------|------------------------|------|-------|------|
| V <sub>TM</sub> (2) | I <sub>TM</sub> = 5.5 A    t <sub>p</sub> = 380 μs | T <sub>j</sub> = 25°C  | MAX. | 2.0   | V    |
| V <sub>to</sub> (2) | Threshold voltage                                  | T <sub>j</sub> = 125°C | MAX. | 0.95  | V    |
| R <sub>d</sub> (2)  | Dynamic resistance                                 | T <sub>j</sub> = 125°C | MAX. | 180   | mΩ   |
| I <sub>DRM</sub>    | V <sub>DRM</sub> = V <sub>RRM</sub>                | T <sub>j</sub> = 25°C  | MAX. | 5     | μA   |
| I <sub>RRM</sub>    |                                                    | T <sub>j</sub> = 125°C |      | 0.5   | mA   |

**Note 1:** minimum I<sub>GT</sub> is guaranteed at 5% of I<sub>GT</sub> max.

**Note 2:** for both polarities of A2 referenced to A1

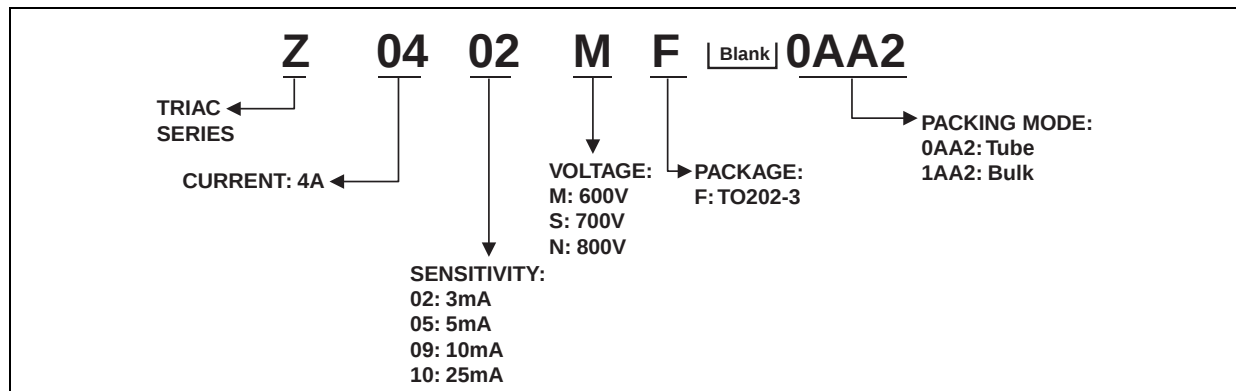
### THERMAL RESISTANCES

| Symbol               | Parameter             | Value | Unit |
|----------------------|-----------------------|-------|------|
| R <sub>th(j-l)</sub> | Junction to lead (AC) | 15    | °C/W |
| R <sub>th(j-a)</sub> | Junction to ambient   | 100   | °C/W |

## PRODUCT SELECTOR

| Part Number | Voltage |       |       | Sensitivity | Type     | Package |
|-------------|---------|-------|-------|-------------|----------|---------|
|             | 600 V   | 700 V | 800 V |             |          |         |
| Z0402MF     | X       |       |       | 3 mA        | Standard | TO202-3 |
| Z0402SF     |         | X     |       | 3 mA        | Standard | TO202-3 |
| Z0402NF     |         |       | X     | 3 mA        | Standard | TO202-3 |
| Z0405MF     | X       |       |       | 5 mA        | Standard | TO202-3 |
| Z0405SF     |         | X     |       | 5 mA        | Standard | TO202-3 |
| Z0405NF     |         |       | X     | 5 mA        | Standard | TO202-3 |
| Z0409MF     | X       |       |       | 10 mA       | Standard | TO202-3 |
| Z0409SF     |         | X     |       | 10 mA       | Standard | TO202-3 |
| Z0409NF     |         |       | X     | 10 mA       | Standard | TO202-3 |
| Z0410MF     | X       |       |       | 25 mA       | Standard | TO202-3 |
| Z0410SF     |         | X     |       | 25 mA       | Standard | TO202-3 |
| Z0410NF     |         |       | X     | 25 mA       | Standard | TO202-3 |

## ORDERING INFORMATION

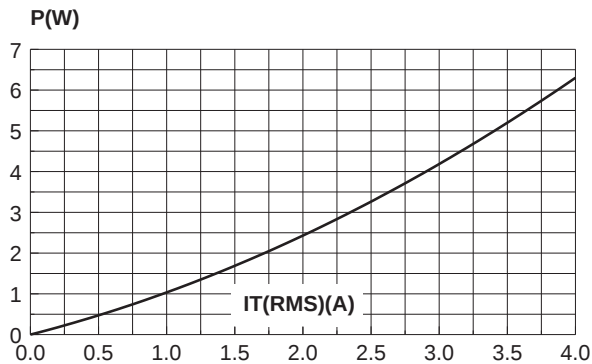


## OTHER INFORMATION

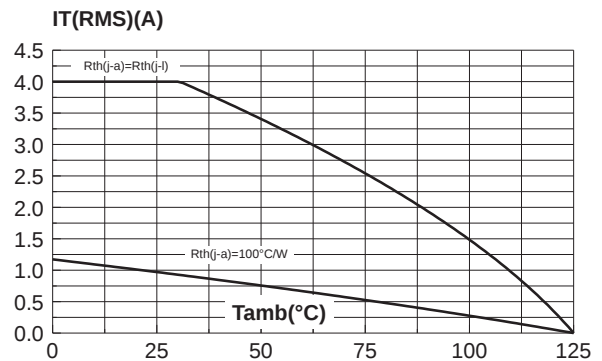
| Part Number  | Marking | Weight | Base quantity | Packing mode |
|--------------|---------|--------|---------------|--------------|
| Z04xxyF 0AA2 | Z04xxyF | 0.8 g  | 50            | Tube         |
| Z04xxyF 1AA2 | Z04xxyF | 0.8 g  | 250           | Bulk         |

Note: xx = sensitivity, y = voltage

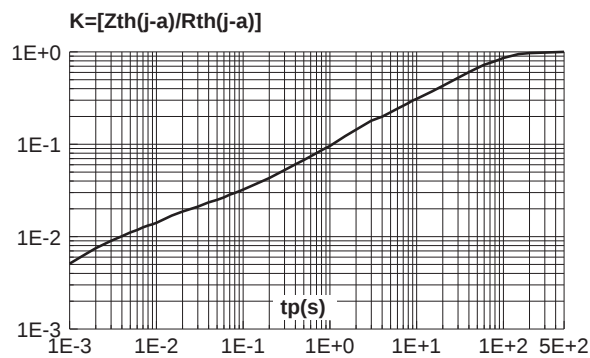
**Fig. 1:** Maximum power dissipation versus RMS on-state current (full cycle).



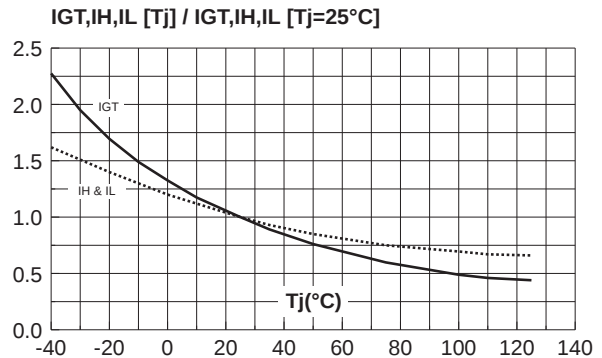
**Fig. 2:** RMS on-state current versus ambient temperature (full cycle).



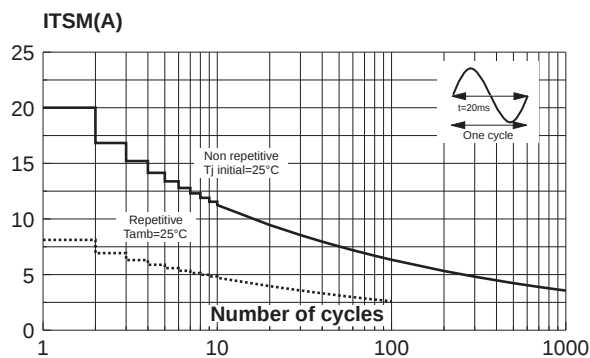
**Fig. 3:** Relative variation of thermal impedance junction to ambient versus pulse duration.



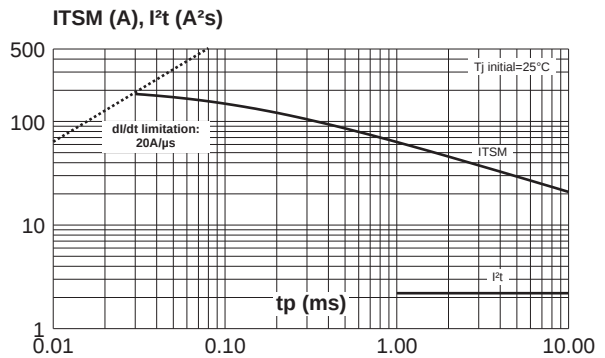
**Fig. 4:** Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values).



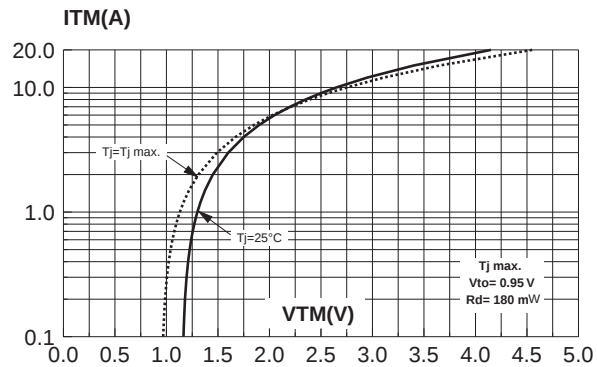
**Fig. 5:** Surge peak on-state current versus number of cycles.



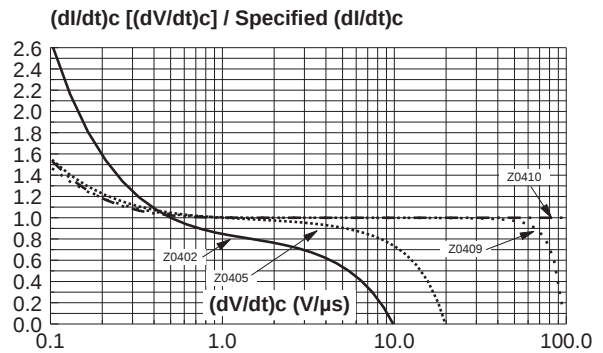
**Fig. 6:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10ms$ , and corresponding value of  $I^2t$ .



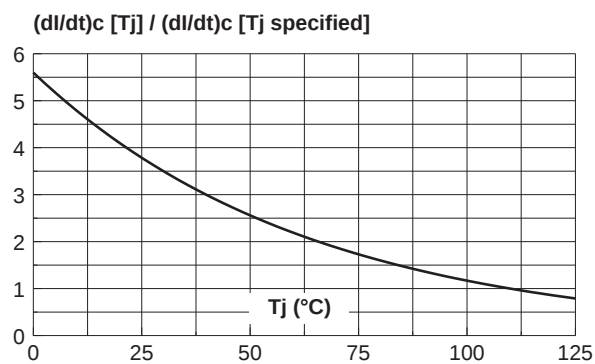
**Fig. 7:** On-state characteristics (maximum values).



**Fig. 8:** Relative variation of critical rate of decrease of main current versus  $(dV/dt)_c$  (typical values).



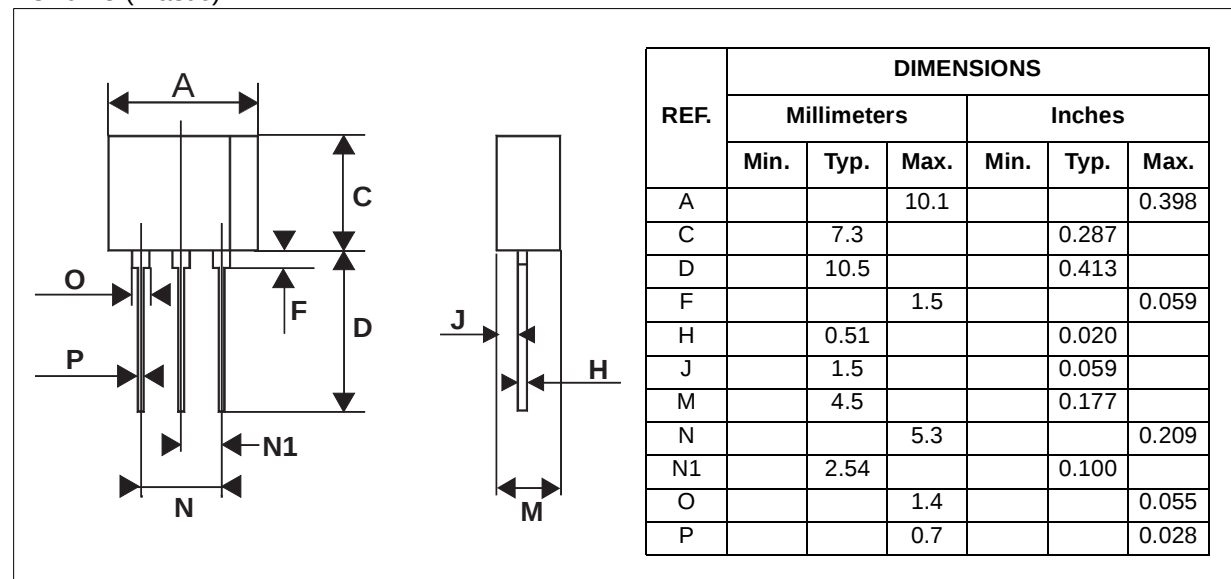
**Fig. 9:** Relative variation of critical rate of decrease of main current versus junction temperature.



## Z04 Series

### PACKAGE MECHANICAL DATA

#### TO202-3 (Plastic)



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