

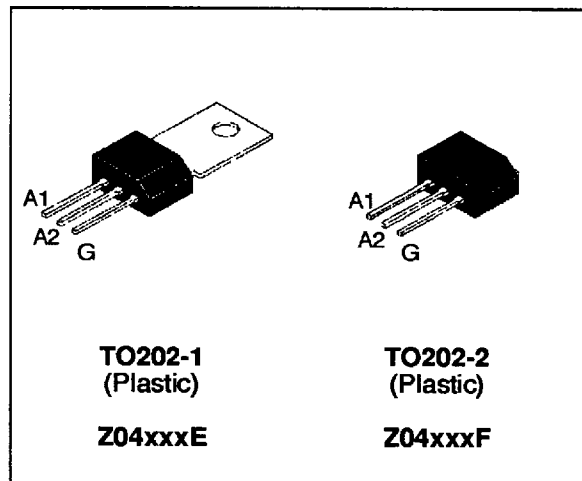
**SENSITIVE GATE TRIACS**

**FEATURES**

- $I_{T(RMS)} = 4A$
- $V_{DRM} = 400V$  to  $800V$
- $I_{GT} \leq 3mA$  to  $\leq 10mA$

**DESCRIPTION**

The Z04xxxE/F series of triacs uses a high performance TOP GLASS PNP technology. These parts are intended for general purpose applications where gate high sensitivity is required.



**ABSOLUTE RATINGS** (limiting values)

| Symbol       | Parameter                                                                        |                         |            | Value                      | Unit             |
|--------------|----------------------------------------------------------------------------------|-------------------------|------------|----------------------------|------------------|
| $I_{T(RMS)}$ | RMS on-state current<br>(360° conduction angle)                                  | Z04xxxE/F               | Tc= 75 °C  | 4                          | A                |
|              |                                                                                  | Z04xxxF                 | Ta= 25 °C  | 0.95                       |                  |
| $I_{TSM}$    | Non repetitive surge peak on-state current<br>(Tj initial = 25°C )               | tp = 8.3 ms             |            | 22                         | A                |
|              |                                                                                  | tp = 10 ms              |            | 20                         |                  |
| $I^2t$       | $I^2t$ Value for fusing                                                          |                         | tp = 10 ms | 2                          | A <sup>2</sup> s |
| di/dt        | Critical rate of rise of on-state current<br>Ig = 50 mA      diG /dt = 0.1 A/μs. | Repetitive<br>F = 50 Hz |            | 10                         | A/μs             |
|              |                                                                                  | Non<br>Repetitive       |            | 50                         |                  |
| Tstg<br>Tj   | Storage and operating junction temperature range                                 |                         |            | - 40, + 150<br>- 40, + 125 | °C               |
| TI           | Maximum lead temperature for soldering during 10s at<br>4.5mm from case          |                         |            | 260                        | °C               |

| Symbol                 | Parameter                                                | Voltage |     |     |     | Unit |
|------------------------|----------------------------------------------------------|---------|-----|-----|-----|------|
|                        |                                                          | D       | M   | S   | N   |      |
| $V_{DRM}$<br>$V_{RRM}$ | Repetitive peak off-state voltage<br>$T_j = 125^\circ C$ | 400     | 600 | 700 | 800 | V    |

**Z04xxxE/F****THERMAL RESISTANCES**

| Symbol   | Parameter                                               |         | Value | Unit |
|----------|---------------------------------------------------------|---------|-------|------|
| Rth(j-a) | Junction to ambient                                     | Z04xxxE | 80    | °C/W |
|          |                                                         | Z04xxxF | 100   |      |
| Rth(j-c) | Junction to case for D.C                                |         | 10    | °C/W |
| Rth(j-c) | Junction to case for A.C 360° conduction angle (F=50Hz) |         | 7.5   | °C/W |

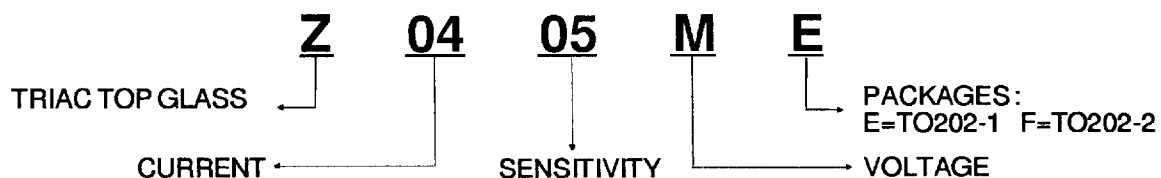
**GATE CHARACTERISTICS (maximum values)**

$P_G (AV) = 0.2 \text{ W}$   $P_{GM} = 3 \text{ W}$  ( $t_p = 20 \mu\text{s}$ )  $I_{GM} = 1.2 \text{ A}$  ( $t_p = 20 \mu\text{s}$ )

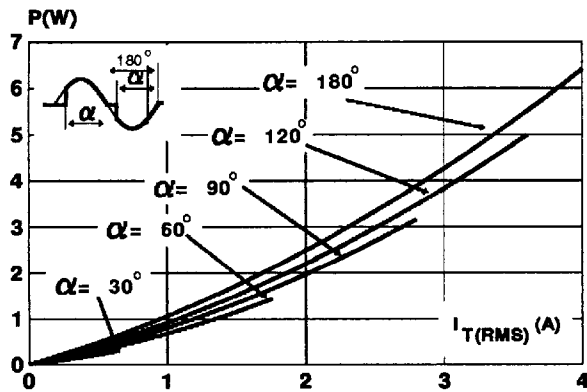
**ELECTRICAL CHARACTERISTICS**

| Symbol                               | Test Conditions                                                                                                  |                        | Quadrant    |     | Sensitivity |    |     | Unit |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------|-------------|-----|-------------|----|-----|------|
|                                      |                                                                                                                  |                        |             |     | 02          | 05 | 09  |      |
| I <sub>GT</sub>                      | V <sub>D</sub> =12V (DC) R <sub>L</sub> =33Ω                                                                     | T <sub>j</sub> = 25°C  | I-II-III-IV | MAX | 3           | 5  | 10  | mA   |
| V <sub>GT</sub>                      | V <sub>D</sub> =12V (DC) R <sub>L</sub> =33Ω                                                                     | T <sub>j</sub> = 25°C  | I-II-III-IV | MAX | 1.5         |    |     | V    |
| V <sub>GD</sub>                      | V <sub>D</sub> =V <sub>DRM</sub> R <sub>L</sub> =3.3kΩ                                                           | T <sub>j</sub> = 125°C | I-II-III-IV | MIN | 0.2         |    |     | V    |
| t <sub>gt</sub>                      | V <sub>D</sub> =V <sub>DRM</sub> I <sub>G</sub> = 40mA<br>I <sub>T</sub> = 5.5A<br>dI <sub>G</sub> /dt = 0.5A/μs | T <sub>j</sub> = 25°C  | I-II-III-IV | TYP | 2           |    |     | μs   |
| I <sub>H</sub> *                     | I <sub>T</sub> = 50 mA Gate open                                                                                 | T <sub>j</sub> = 25°C  |             | MAX | 3           | 5  | 10  | mA   |
| I <sub>L</sub>                       | I <sub>G</sub> = 1.2 I <sub>GT</sub>                                                                             | T <sub>j</sub> = 25°C  | I-III-IV    | TYP | 3           | 5  | 10  | mA   |
|                                      |                                                                                                                  |                        | II          | TYP | 6           | 10 | 20  |      |
| V <sub>TM</sub> *                    | I <sub>TM</sub> = 5.5A tp= 380μs                                                                                 | T <sub>j</sub> = 25°C  |             | MAX | 2           |    |     | V    |
| I <sub>DRM</sub><br>I <sub>RRM</sub> | V <sub>D</sub> = V <sub>DRM</sub><br>V <sub>R</sub> = V <sub>RRM</sub>                                           | T <sub>j</sub> = 25°C  |             | MAX | 5           |    |     | μA   |
|                                      |                                                                                                                  | T <sub>j</sub> = 110°C |             | MAX | 200         |    |     |      |
| dV/dt *                              | V <sub>D</sub> =67%V <sub>DRM</sub><br>Gate open                                                                 | T <sub>j</sub> = 110°C |             | MIN | 10          | 20 | 100 | V/μs |
|                                      |                                                                                                                  |                        |             | TYP | 20          | 50 | 150 |      |
| (dV/dt)c *                           | (dI/dt)c = 0.55 A/ms                                                                                             | T <sub>j</sub> = 110°C |             | MIN | 1           | 1  | 2   | V/μs |
|                                      | (dI/dt)c = 1.8 A/ms                                                                                              |                        |             | TYP | 1           | 1  | 2   |      |

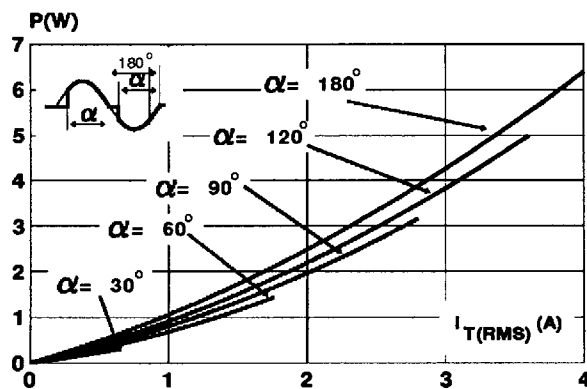
\* For either polarity of electrode A<sub>2</sub> voltage with reference to electrode A<sub>1</sub>

**ORDERING INFORMATION**

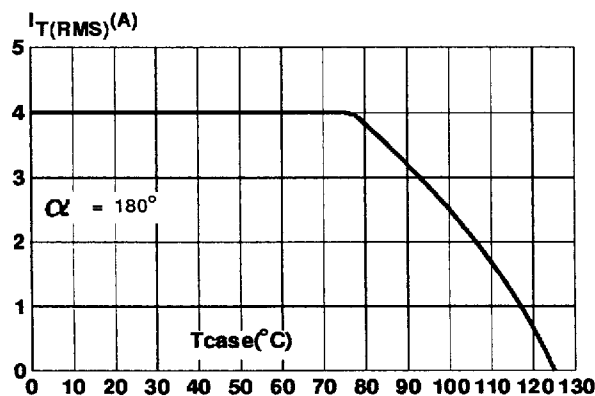
**Fig.1 :** Maximum RMS power dissipation versus RMS on-state current.



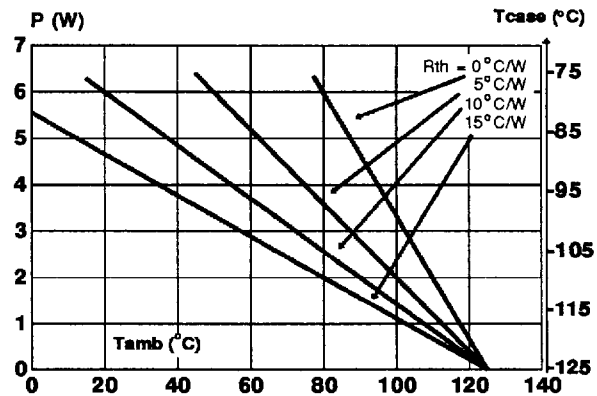
**Fig.3 :** Maximum RMS power dissipation versus RMS on-state current.



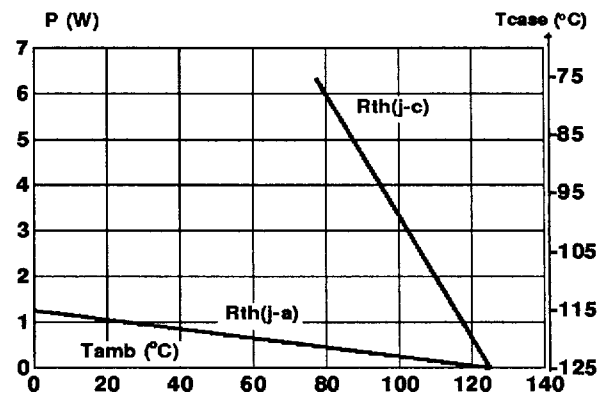
**Fig.5 :** RMS on-state current versus case temperature (TO202-1).



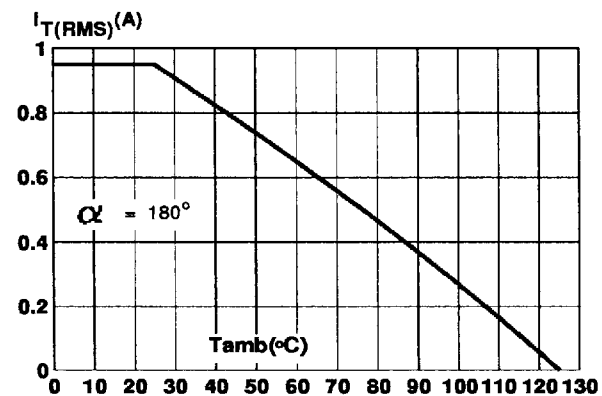
**Fig.2 :** Correlation between maximum RMS power dissipation and maximum allowable temperature ( $T_{amb}$  and  $T_{case}$ ) for different thermal resistances heatsink + contact (TO202-1).



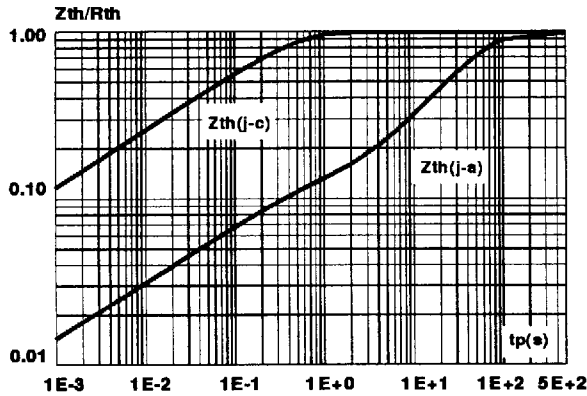
**Fig.4 :** Correlation between maximum RMS power dissipation and maximum allowable temperature ( $T_{amb}$  and  $T_{case}$ ) (TO202-2).



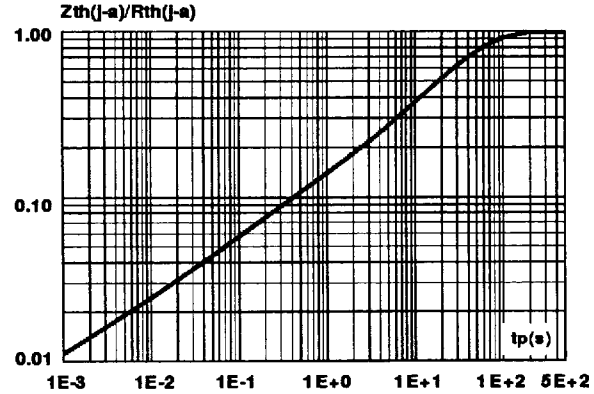
**Fig.6 :** RMS on-state current versus case temperature (TO202-2).



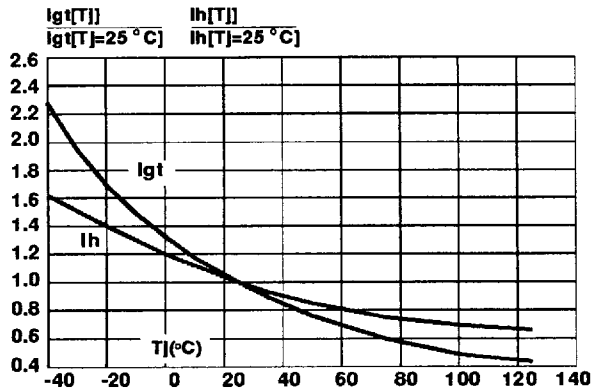
**Fig.7** : Relative variation of thermal impedance versus pulse duration (TO202-1).



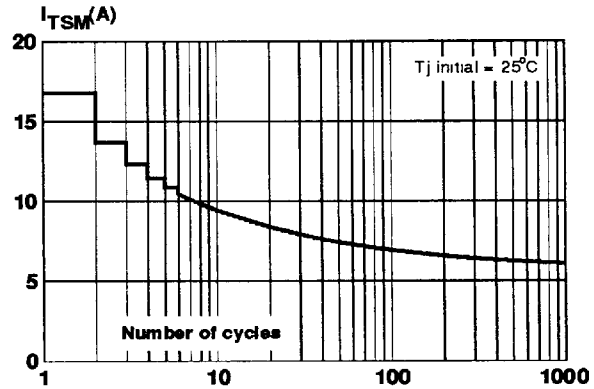
**Fig.8** : Relative variation of thermal impedance junction to ambient versus pulse duration (TO202-2).



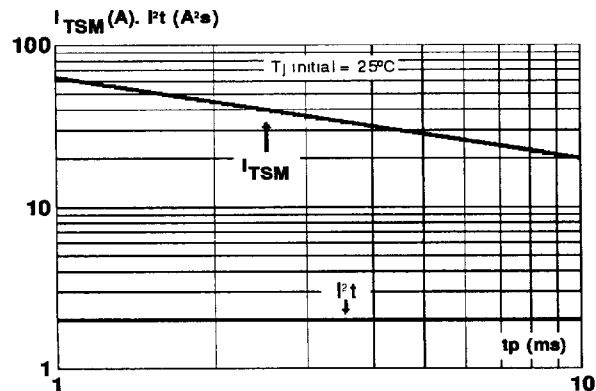
**Fig.9** : Relative variation of gate trigger current and holding current versus junction temperature.



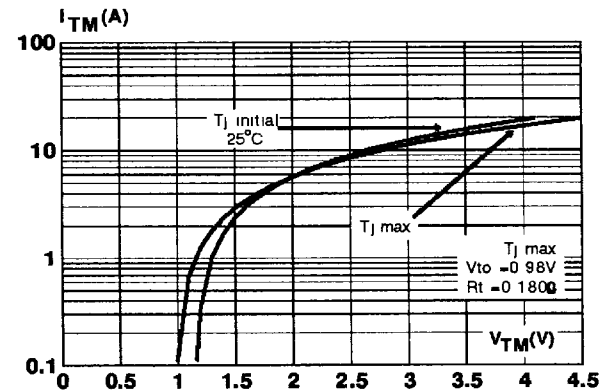
**Fig.10** : Non repetitive surge peak on-state current versus number of cycles.

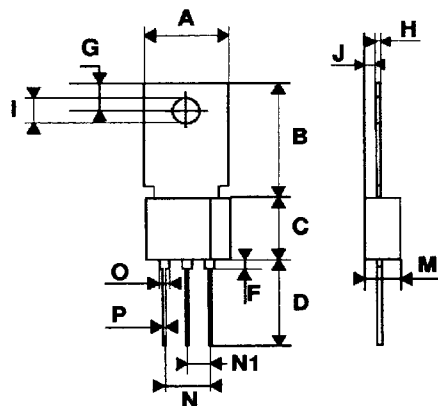


**Fig.11** : Non repetitive surge peak on-state current for a sinusoidal pulse with width :  $t_p \leq 10$ ms, and corresponding value of  $I^2 t$ .



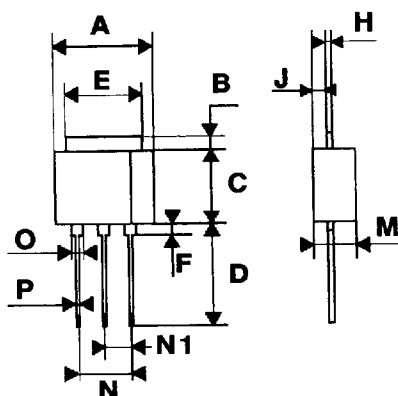
**Fig.12** : On-state characteristics (maximum values).



**PACKAGE MECHANICAL DATA**  
 TO202-1 (Plastic)


| REF. | DIMENSIONS  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Typ.        | Min. | Max. | Typ.   | Min.  | Max.  |
| A    |             |      | 10.1 |        |       | 0.398 |
| B    | 13.7        |      |      | 0.540  |       |       |
| C    | 7.3         |      |      | 0.287  |       |       |
| D    | 10.5        |      |      | 0.413  |       |       |
| F    |             |      | 1.5  |        |       | 0.059 |
| G    | 3.2         |      |      | 0.126  |       |       |
| H    | 0.51        |      |      | 0.020  |       |       |
| I    |             | 3.16 | 3.20 |        | 0.124 | 0.126 |
| J    | 1.5         |      |      | 0.059  |       |       |
| M    | 4.5         |      |      | 0.177  |       |       |
| N    |             |      | 5.3  |        |       | 0.209 |
| N1   | 2.54        |      |      | 0.100  |       |       |
| O    |             |      | 1.4  |        |       | 0.055 |
| P    |             |      | 0.7  |        |       | 0.028 |

Marking : type number  
 Weight : 1.4 g

**PACKAGE MECHANICAL DATA**  
 TO202-2 (Plastic)


| REF. | DIMENSIONS  |      |      |        |      |       |
|------|-------------|------|------|--------|------|-------|
|      | Millimeters |      |      | Inches |      |       |
|      | Typ.        | Min. | Max. | Typ.   | Min. | Max.  |
| A    |             |      | 10.1 |        |      | 0.398 |
| B    | 1.2         |      |      | 0.047  |      |       |
| C    | 7.3         |      |      | 0.287  |      |       |
| D    | 10.5        |      |      | 0.413  |      |       |
| E    | 7.4         |      |      | 0.290  |      |       |
| F    |             |      | 1.5  |        |      | 0.059 |
| H    | 0.51        |      |      | 0.020  |      |       |
| J    | 1.5         |      |      | 0.059  |      |       |
| M    | 4.5         |      |      | 0.177  |      |       |
| N    |             |      | 5.3  |        |      | 0.209 |
| N1   | 2.54        |      |      | 0.100  |      |       |
| O    |             |      | 1.4  |        |      | 0.055 |
| P    |             |      | 0.7  |        |      | 0.028 |

Marking : type number  
 Weight : 1.0 g

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