

## INSULATED STANDARD TRIAC

|  |   |                                   |  |   |  |
|--|---|-----------------------------------|--|---|--|
| <p style="text-align: center; font-weight: bold; font-size: 1.2em;">INSULATED TO-220AB</p> <div style="text-align: center; margin-top: 20px;"> </div> <div style="text-align: center; margin-top: 20px;"> </div> | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"><b>On-State Current</b><br/>12 Amp</td> <td style="width: 50%; padding: 5px;"><b>Gate Trigger Current</b><br/>≤ 50 mA (18)<br/>≤ 100 mA (17)</td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 5px;"><b>Off-State Voltage</b><br/>400 V ÷ 800 V</td> </tr> </table> <p><b>FEATURES</b></p> <ul style="list-style-type: none"> <li>Glass/passivated die junctions</li> <li>Provides voltage insulated tab (rated at 2500V RMS)</li> <li>Medium current Triac</li> <li>Low thermal resistance</li> <li>High surge current capability</li> <li>Low forward voltage drop</li> <li>Solder dip 260°C, 10s</li> <li>Component in accordance to RoHS 2011/65/EU and WEEE 2002/96/EC</li> <li>Meets MSL level 3, per J-STD-020, LF maximum peak of 260° C</li> <li>Certified compliance of UL 1557 Standard for Electrically Isolated Semiconductors. Fille reference E320541, Vol. 3</li> </ul> <p><b>MECHANICAL DATA</b></p> <ul style="list-style-type: none"> <li><b>Case:</b> INSULATED TO-220AB. Epoxy meets UL 94V-0 flammability rating.</li> <li><b>Polarity:</b> As marked on the body.</li> <li><b>Terminals:</b> Matte tin plated leads, solderable per MIL-STD-750 Method 2026, J-STD-002 and JESD22-B102. Consumer grade, meets JESD 201 class 1A whisker test.</li> </ul> <p><b>TYPICAL APPLICATIONS</b></p> <p>Suitable for general purpose AC switching. They can be used as an ON/OFF function in applications such as static relays, heating regulation, induction motor starting circuits... or for phase control operation in light dimmers, motor speed controllers, ....</p> | <b>On-State Current</b><br>12 Amp | <b>Gate Trigger Current</b><br>≤ 50 mA (18)<br>≤ 100 mA (17) | <b>Off-State Voltage</b><br>400 V ÷ 800 V |  |
| <b>On-State Current</b><br>12 Amp  | <b>Gate Trigger Current</b><br>≤ 50 mA (18)<br>≤ 100 mA (17)  |                                   |  |   |  |
| <b>Off-State Voltage</b><br>400 V ÷ 800 V  |   |                                   |  |   |  |



### Maximun Ratings and Electrical Characteristics at 25°C

| SYMBOL       | PARAMETER   | CONDITIONS  | Value      | Unit             |
|--------------|---|---|------------|------------------|
| $I_{T(RMS)}$ | RMS On-state Current (full sine wave)                 | All Conduction Angle, $T_c = 90\text{ }^\circ\text{C}$  | 12         | A                |
| $I_{TSM}$    | Non-repetitive On-State Current                       | Full Cycle, 60 Hz ( $t = 16.7\text{ ms}$ )  | 126        | A                |
| $I_{TSM}$    | Non-repetitive On-State Current                       | Full Cycle, 50 Hz ( $t = 20\text{ ms}$ )  | 120        | A                |
| $I^2t$       | Fusing Current  | $t_p = 10\text{ ms}$ , Half Cycle   | 72         | $A^2s$           |
| $I_{GM}$     | Peak Gate Current                                     | $20\text{ }\mu\text{s max.}$ $T_j = 125\text{ }^\circ\text{C}$  | 4          | A                |
| $P_{G(AV)}$  | Average Gate Power Dissipation                        | $T_j = 125\text{ }^\circ\text{C}$   | 1          | W                |
| $di / dt$    | Critical rate of rise of on-state current             | $I_G = 2x I_{GT}$ , $t_r \leq 100\text{ ns}$<br>$f = 120\text{ Hz}$ , $T_j = 125\text{ }^\circ\text{C}$ | 50         | $A/\mu\text{s}$  |
| $T_j$        | Operating Temperature                                 |   | (-40 +125) | $^\circ\text{C}$ |
| $T_{stg}$    | Storage Temperature                                   |   | (-40 +125) | $^\circ\text{C}$ |
| $T_{sld}$    | Soldering Temperature                                 | 10s max   | 260        | $^\circ\text{C}$ |
| $V_{iso}$    | R.M.S. isolation voltage 50/60 Hz sinusoidal waveform |   | 2.500      | Vac              |

| SYMBOL            | PARAMETER                         | VOLTAGE |     |     | Unit |
|-------------------|-----------------------------------|---------|-----|-----|------|
|                   |                                   | D       | M   | N   |      |
| $V_{DRM}/V_{RRM}$ | Repetitive Peak Off State Voltage | 400     | 600 | 800 | V    |

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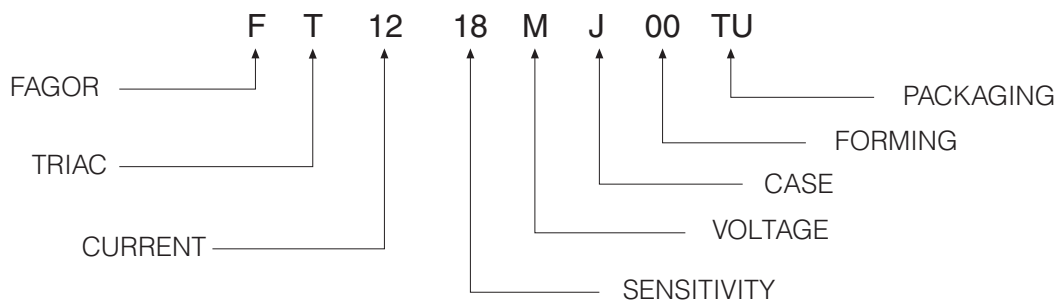
## Electrical Characteristics at Tamb = 25 °C

| SYMBOL                              | PARAMETER   | CONDITIONS   | Quadrant |     | SENSITIVITY |     | Unit |
|-------------------------------------|---|--|----------|-----|-------------|-----|------|
|                                     |   |  |          |     | 18          | 17  |      |
| I <sub>GT</sub> <sup>(1)</sup>      | Gate Trigger Current                                | V <sub>D</sub> = 12 V <sub>DC</sub> , R <sub>L</sub> = 33Ω, T <sub>j</sub> = 25 °C   | Q1÷Q3    | MAX | 25          | 50  | mA   |
|                                     |   |  | Q4       | MAX | 50          | 100 | mA   |
| V <sub>GT</sub>                     | Gate Trigger Voltage                                | V <sub>D</sub> = 12 V <sub>DC</sub> , R <sub>L</sub> = 33Ω, T <sub>j</sub> = 25 °C   | Q1÷Q4    | MAX | 1.3         |     | V    |
| V <sub>GD</sub>                     | Gate Non Trigger Voltage                            | V <sub>D</sub> = V <sub>DRM</sub> , R <sub>L</sub> = 3.3 KΩ, T <sub>j</sub> = 125 °C | Q1÷Q4    | MIN | 0.2         |     | V    |
| I <sub>H</sub> <sup>(2)</sup>       | Holding Current                                     | I <sub>T</sub> = 100 mA, Gate open, T <sub>j</sub> = 25 °C                           |          | MAX | 25          | 50  | mA   |
| I <sub>L</sub>                      | Latching Current                                    | I <sub>G</sub> = 1.2 I <sub>GT</sub> , T <sub>j</sub> = 25 °C                        | Q1,Q3,Q4 | MAX | 40          | 70  | mA   |
|                                     |   |  | Q2       | MAX | 80          | 100 | mA   |
| dV/dt <sup>(2)</sup>                | Critical Rate of Voltage Rise                       | V <sub>D</sub> = 0.67 x V <sub>DRM</sub> , Gate open<br>T <sub>j</sub> = 125 °C      |          | MIN | 200         | 400 | V/μs |
| (dV/dt) <sub>c</sub> <sup>(2)</sup> | Critical rise rate of Commutating off-state voltage | (dI/dt) <sub>c</sub> = 2.7 A/ms T <sub>j</sub> = 125 °C                              |          | MIN | 5           | 10  | V/μs |
| V <sub>TM</sub> <sup>(2)</sup>      | On-state Voltage                                    | I <sub>T</sub> = 17 Amp, t <sub>p</sub> = 380 μs, T <sub>j</sub> = 25 °C             |          | MAX | 1.55        |     | V    |
| V <sub>t(o)</sub> <sup>(2)</sup>    | Threshold Voltage                                   | T <sub>j</sub> = 125 °C  |          | MAX | 0.85        |     | V    |
| r <sub>d</sub> <sup>(2)</sup>       | Dynamic resistance                                  | T <sub>j</sub> = 125 °C  |          | MAX | 35          |     | mΩ   |
| I <sub>DRM</sub> /I <sub>RRM</sub>  | Off-State Leakage Current                           | V <sub>D</sub> = V <sub>DRM</sub> , T <sub>j</sub> = 125 °C                          |          | MAX | 1           |     | mA   |
|                                     |   | V <sub>R</sub> = V <sub>RRM</sub> , T <sub>j</sub> = 25 °C                           |          | MAX | 5           |     | μA   |
| R <sub>th(j-c)</sub>                | Thermal Resistance Junction-Case                    | for AC 360° conduction angle   |          |     | 2.3         |     | °C/W |
| R <sub>th(j-a)</sub>                | Thermal Resistance Junction-Ambient                 |  |          |     | 50          |     | °C/W |

(1) Minimum I<sub>GT</sub> is guaranteed at 5% of I<sub>GT</sub> max.

(2) For either polarity of electrode MT2 voltage with reference to electrode MT1.

## Part Number Information



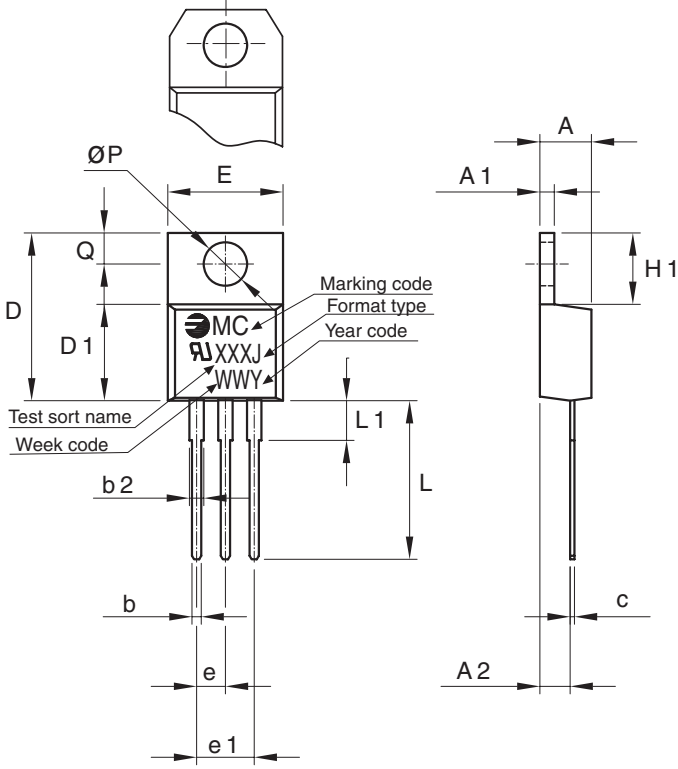
**INSULATED STANDARD TRIAC**

**Ordering information**

| PREFERRED P/N | PACKAGE CODE | DELIVERY MODE | BASE QUANTITY | UNIT WEIGHT (g) |
|---------------|--------------|---------------|---------------|-----------------|
| FT1218MJ 00TU | TU           | TUBE          | 1000          | 2.30            |

**Package Outline Dimensions: (mm) INSULATED TO-220AB**

Optional with chamfer



The drawing shows a top view and a side view of the triac package. The top view includes dimensions:  $\varnothing P$ ,  $E$ ,  $D$ ,  $Q$ ,  $D1$ ,  $L1$ ,  $L$ ,  $b2$ ,  $b$ ,  $e$ , and  $e1$ . The side view includes dimensions:  $A$ ,  $A1$ ,  $A2$ ,  $H1$ , and  $c$ . Marking details include: MC (Fagor logo), XXXJ (Test sort name), WWY (Week code), and a field for Marking code (Format type and Year code).

| REF. | DIMENSIONS  |       |
|------|-------------|-------|
|      | Millimeters |       |
|      | Min.        | Max.  |
| A    | 4.32        | 4.62  |
| A1   | 1.21        | 1.29  |
| A2   | 2.40        | 2.70  |
| b    | 0.80        | 0.83  |
| b2   | 1.40        | --    |
| c    | 0.42        | 0.48  |
| D    | 15.5        | 15.68 |
| D1   | 9.26        | 9.42  |
| E    | 10.08       | 10.24 |
| e    | 2.54        | 2.54  |
| e1   | 5.08        | 5.08  |
| H1   | 6.24        | 6.26  |
| L    | 12.81       | 13.81 |
| L1   | 3.28        | 4.17  |
| P    | 3.70        | 3.80  |
| Q    | 2.75        | 2.85  |

|                        |                |
|------------------------|----------------|
| <b>Mounting Torque</b> | <b>0.8 N.m</b> |
|------------------------|----------------|

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## Ratings and Characteristics (Ta 25 °C unless otherwise noted)

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

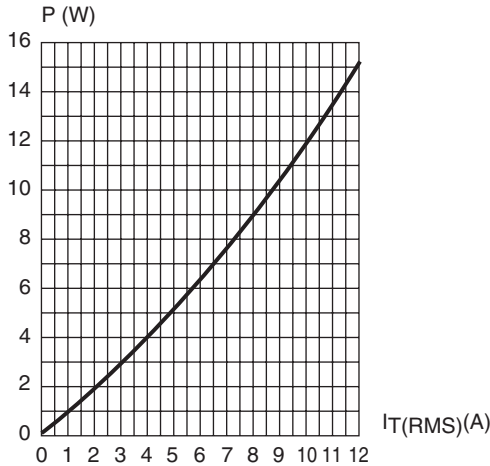


Fig. 2: RMS on-state current versus case temperature (full cycle).

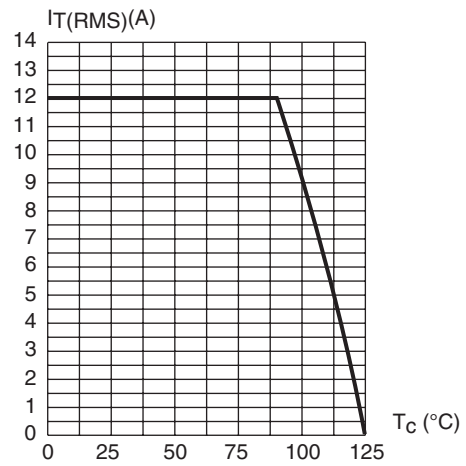


Fig. 3: Relative variation of thermal impedance versus pulse duration.

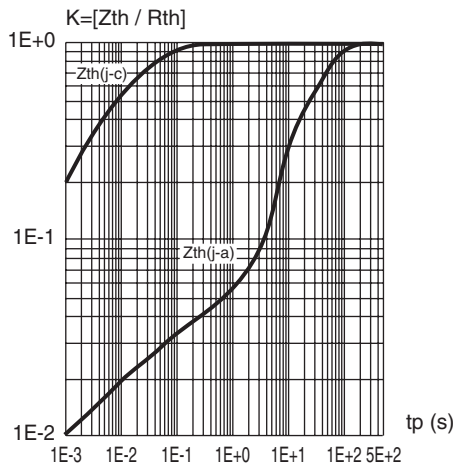


Fig. 4: On-state characteristics (maximum values)

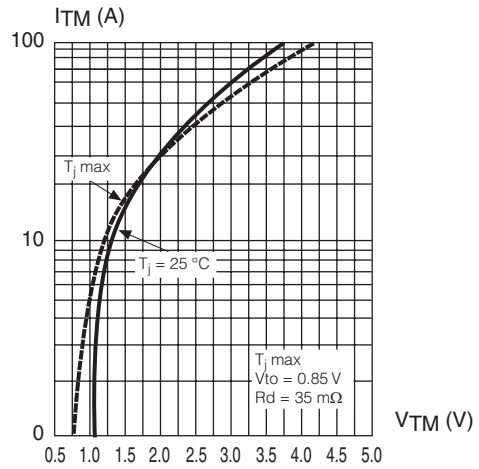


Fig. 5: Surge peak on-state current versus number of cycles

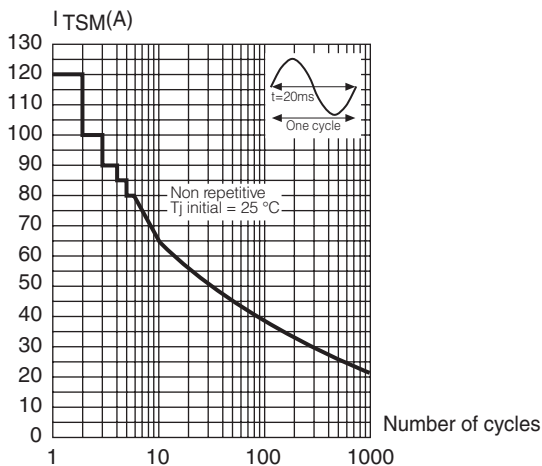
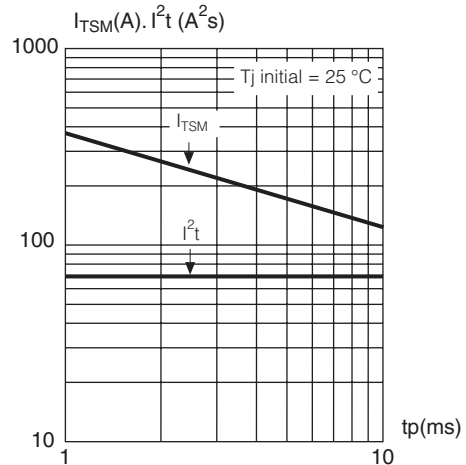


Fig. 6: Non repetitive surge peak on-state current for a sinusoidal pulse with width: tp < 10 ms, and corresponding value of I<sup>2</sup>t.



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**Ratings and Characteristics (Ta 25 °C unless otherwise noted)**

Fig. 7: Relative variation of gate trigger current, holding current and latching versus junction temperature (typical values)

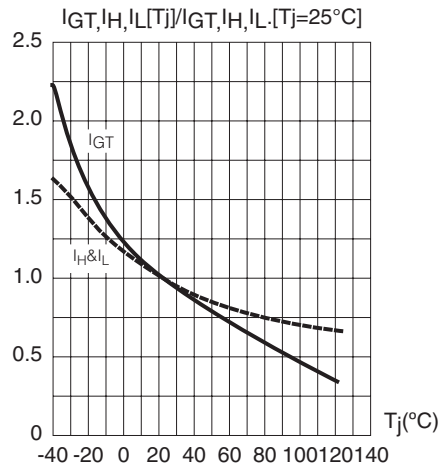


Fig. 8: Relative variation of critical rate of decrease of main current versus junction temperature

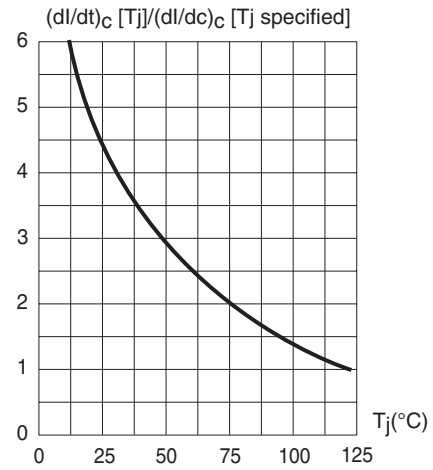
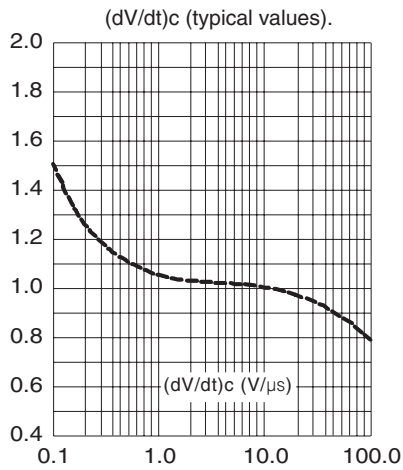


Fig. 9: Relative variation of critical rate of decrease of main current versus



**INSULATED STANDARD TRIAC****Revision History**

| <b>Date</b> | <b>Revision</b> | <b>Description of Changes</b> |
|-------------|-----------------|-------------------------------|
| 12-Oct-2012 | 0               | Original Data Sheet           |
| 28-Aug-2017 | 1               | 200V eliminated.              |

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