

|           |  |      |
|-----------|--|------|
| IT(RMS)   |  | 4A   |
| VDRM/VRRM |  | 600V |
| VTM       |  | 1.3V |

## FEATURES

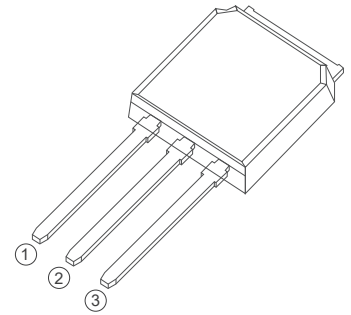
IT(RMS): 4A

VGT: 1.5V

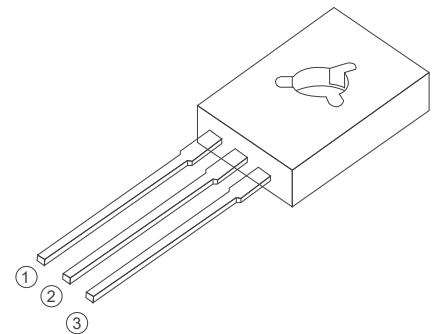
VDRM VRRM:600V

High Junction Temperature

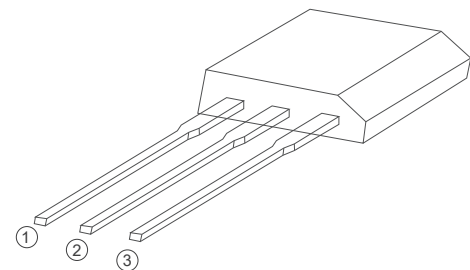
Good Commutation Performance



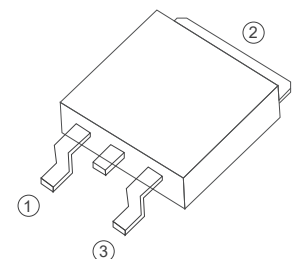
TO-251



TO-126



TO-202-3



TO-252

## APPLICATIONS

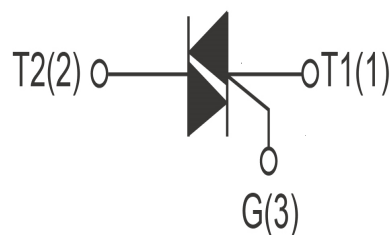
Heater Control

Motor Speed Controller

Washing machine

Vacuums

Solid state relay



**Absolute Maximum Ratings** (T<sub>j</sub>=25°C unless otherwise specified)

| Symbol                               | Parameter                         | Conditions                                  | Ratings | Unit             |
|--------------------------------------|-----------------------------------|---------------------------------------------|---------|------------------|
| V <sub>DRM</sub><br>V <sub>RRM</sub> | Repetitive Peak Off-State Voltage |                                             | 600     | V                |
| I <sub>T(RMS)</sub>                  | R.M.S On-State Current            | T <sub>c</sub> =110°C                       | 4       | A                |
| I <sub>TSM</sub>                     | Surge On-State Current            | T <sub>p</sub> =10ms/t <sub>p</sub> =16.7ms | 20/21   | A                |
| I <sup>2</sup> t                     | I <sup>2</sup> t for fusing       | T <sub>p</sub> =10ms                        | 2.2     | A <sup>2</sup> s |
| I <sub>GM</sub>                      | Peak Gate Current                 | T <sub>j</sub> =150°C                       | 1.2     | A                |
| P <sub>G(AV)</sub>                   | Average Gate Power Dissipation    | T <sub>j</sub> =125°C                       | 0.2     | W                |
| T <sub>j</sub>                       | Operating Junction Temperature    |                                             | ~40~125 | °C               |
| T <sub>STG</sub>                     | Storage Temperature               |                                             | ~40~150 | °C               |

**Electrical Characteristics** (T<sub>j</sub>=25°C unless otherwise specified)

| Symbol               | Parameter                                     | Test Conditions                                                   | Value |    |     |     | Unit               |
|----------------------|-----------------------------------------------|-------------------------------------------------------------------|-------|----|-----|-----|--------------------|
|                      |                                               |                                                                   | 02    | 05 | 09  | 10  |                    |
| I <sub>DRM</sub>     | Repetitive Peak Off-State Current             | T <sub>j</sub> =25°C                                              | ≤5    |    |     |     | uA                 |
|                      |                                               | T <sub>j</sub> =125°C                                             | ≤0.5  |    |     |     | mA                 |
| I <sub>RRM</sub>     | Repetitive Peak Reverse Current               | T <sub>j</sub> =25°C                                              | ≤5    |    |     |     | uA                 |
|                      |                                               | T <sub>j</sub> =125°C                                             | ≤0.5  |    |     |     | mA                 |
| I <sub>GT</sub>      | Gate trigger current                          | I,II,III VD=12V I <sub>GT</sub> =0.1A                             | ≤35   | ≤5 | ≤10 | ≤25 | mA                 |
| V <sub>TM</sub>      | Forward "on" voltage                          | I <sub>T</sub> =5A t <sub>p</sub> =380us                          | ≤1.3  |    |     |     | V                  |
| V <sub>GD</sub>      | Gate non-trigger current                      | VD=V <sub>DRM</sub> , T <sub>j</sub> =125°C                       | ≥0.2  |    |     |     | V                  |
| V <sub>GT</sub>      | Gate trigger current                          | VD=12V                                                            | ≤1.5  |    |     |     | V                  |
| I <sub>H</sub>       | Holding current                               | I <sub>T</sub> =0.2A                                              | ≤35   | ≤5 | ≤10 | ≤25 | mA                 |
| di/dt                | Critical-rate of rise of commutation current. | I,II,III I <sub>T</sub> =6A, I <sub>G</sub> =0.2A, DIG/Dt=0.2A/us | ≥20   |    |     |     | A <sup>2</sup> /us |
| dv/dt                | Critical-rate of rise of commutation voltage  | T <sub>j</sub> =125°C<br>VD=2/3V <sub>DRM</sub> Gate              | 10    | 20 | 100 | 200 | V/us               |
| R <sub>th(j-c)</sub> | Thermal resistance                            | Junction to case                                                  | 15    |    |     |     | °C/W               |

FIG1

Maximum power dissipation versus RMS on-state current

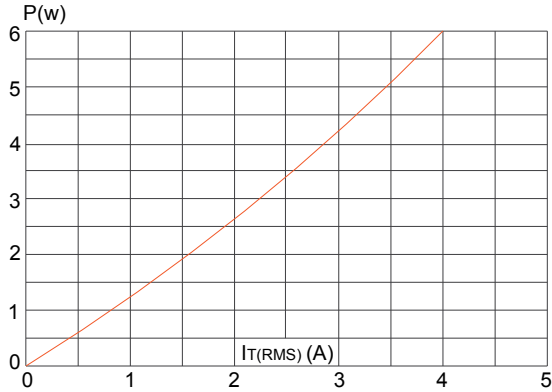


FIG2

RMS on-state current versus case temperature

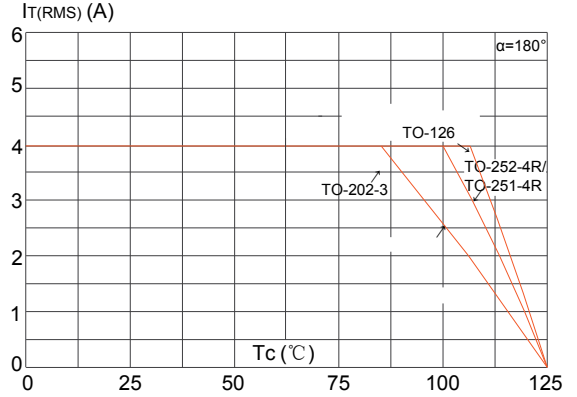


FIG3

Surge peak on-state current versus number of cycles

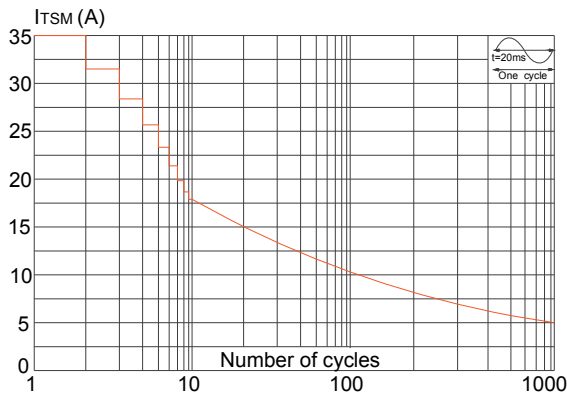


FIG4

On-state characteristics (maximum values)

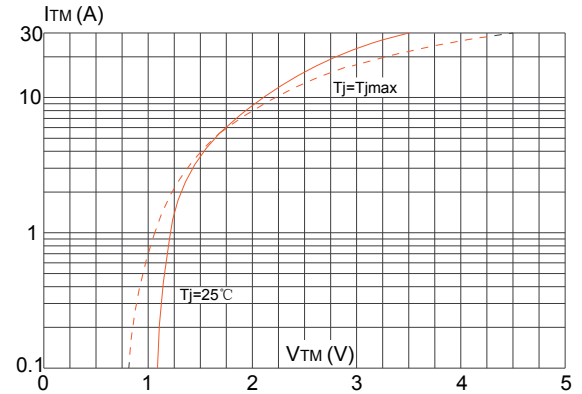


FIG5

Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20\text{ms}$ , and corresponding value of  $I^2t$  ( $dI/dt < 100\text{A}/\mu\text{s}$ )

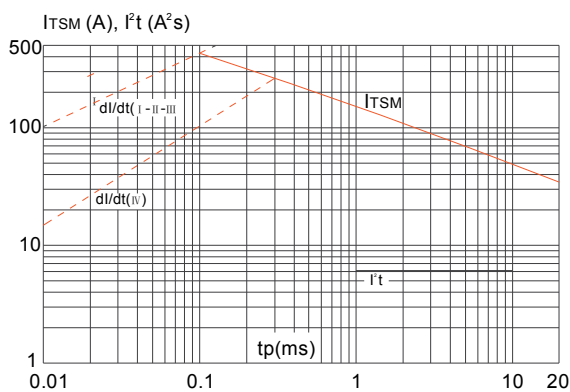
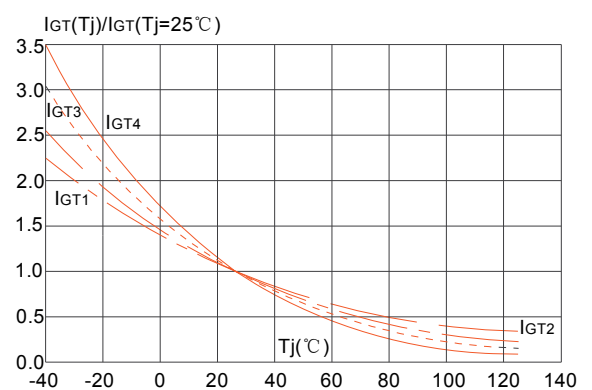
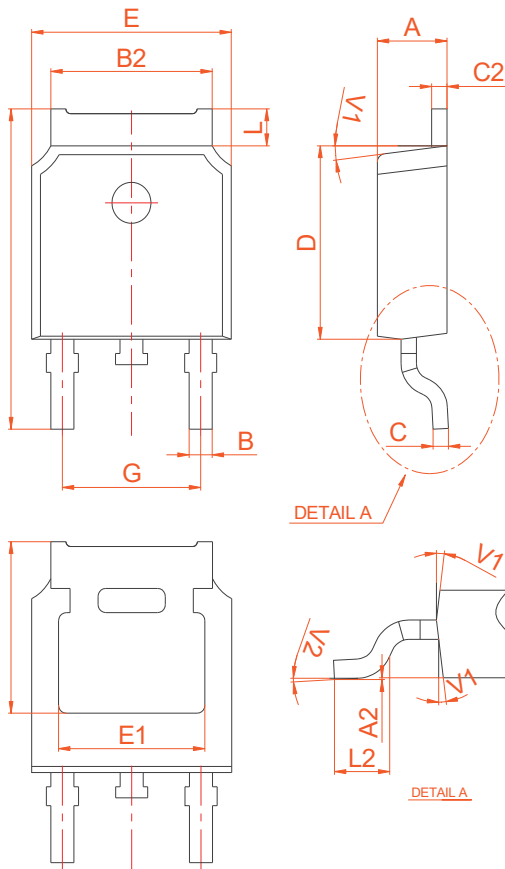


FIG6

FIG.6: Relative variations of gate trigger current, holding current and latching current versus junction temperature



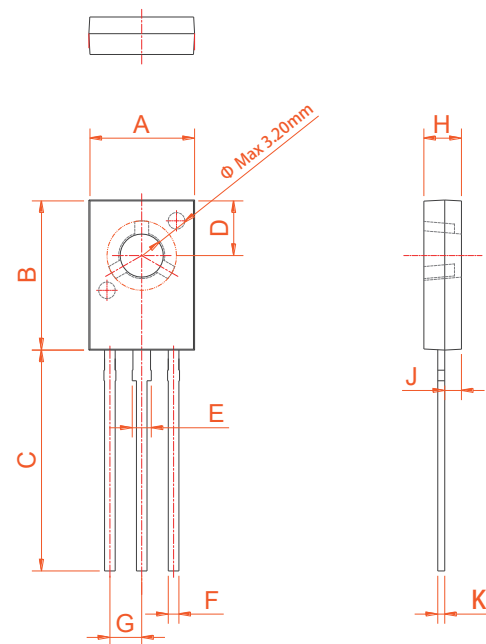
# PACKAGE MECHANICAL DATA



TO-252

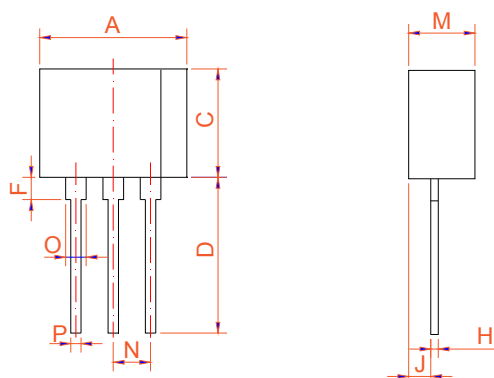
| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 2.20        |      | 2.40 | 0.086  |       | 0.095 |
| A2   | 0.03        |      | 0.23 | 0.001  |       | 0.009 |
| B    | 0.55        |      | 0.65 | 0.022  |       | 0.026 |
| B2   | 5.10        |      | 5.40 | 0.200  |       | 0.213 |
| C    | 0.45        |      | 0.55 | 0.018  |       | 0.022 |
| C2   | 2.70        |      | 2.90 | 0.106  |       | 0.114 |
| D    | 6.00        |      | 6.20 | 0.236  |       | 0.244 |
| E    | 6.40        |      | 6.70 | 0.252  |       | 0.264 |
| G    | 4.40        |      | 4.70 | 0.173  |       | 0.185 |
| H    | 9.35        |      | 10.6 | 0.368  |       | 0.417 |
| L1   | 1.30        |      | 1.70 | 0.051  |       | 0.067 |
| L2   | 1.37        |      | 1.50 | 0.054  |       | 0.059 |
| L3   |             | 0.8  |      |        | 0.031 |       |
| L4   |             | 0.8  |      |        | 0.031 |       |
| V1   |             | 4°   |      |        | 4°    |       |
| V2   | 0°          |      | 8°   | 0°     |       | 8°    |

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 7.40        |      | 7.80 | 0.291  |       | 0.307 |
| B    | 10.6        |      | 11.2 | 0.417  |       | 0.441 |
| C    | 15.3        |      | 16.3 | 0.602  |       | 0.642 |
| D    | 3.90        |      | 4.10 | 0.154  |       | 0.161 |
| E    | 1.17        |      | 1.47 | 0.046  |       | 0.058 |
| F    | 0.66        |      | 0.86 | 0.026  |       | 0.034 |
| G    |             | 2.29 |      |        | 0.090 |       |
| H    | 2.50        |      | 2.90 | 0.098  |       | 0.114 |
| J    | 1.10        |      | 1.50 | 0.043  |       | 0.059 |
| K    | 0.45        |      | 0.60 | 0.018  |       | 0.024 |



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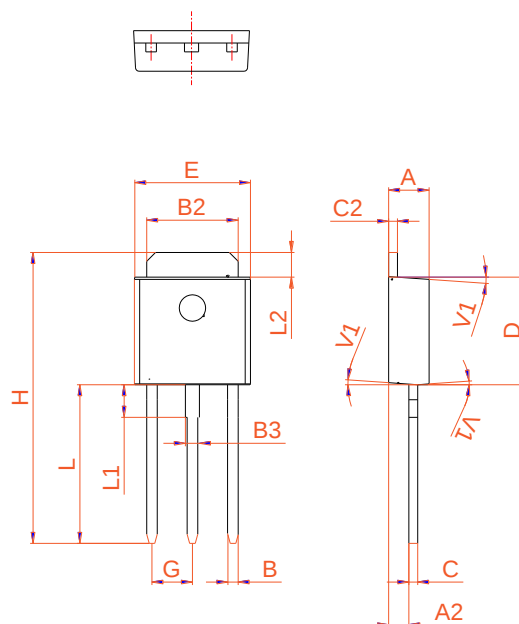
# PACKAGE MECHANICAL DATA



TO-202-3

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 9.30        |      | 9.90 | 0.366  |       | 0.390 |
| C    | 7.0         |      | 7.6  | 0.276  |       | 0.299 |
| D    | 10.5        |      | 11.5 | 0.413  |       | 0.453 |
| F    | 1.50        |      | 2.50 | 0.059  |       | 0.098 |
| H    | 0.45        |      | 0.55 | 0.018  |       | 0.022 |
| J    | 1.50        |      | 1.90 | 0.059  |       | 0.075 |
| M    | 4.40        |      | 4.70 | 0.173  |       | 0.185 |
| N    |             | 2.54 |      |        | 0.100 |       |
| O    | 1.20        |      | 1.50 | 0.047  |       | 0.059 |
| P    | 0.60        |      | 0.80 | 0.024  |       | 0.031 |

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 2.20        |      | 2.40 | 0.086  |       | 0.095 |
| A2   | 0.90        |      | 1.20 | 0.035  |       | 0.047 |
| B    | 0.55        |      | 0.65 | 0.022  |       | 0.026 |
| B2   | 5.10        |      | 5.40 | 0.200  |       | 0.213 |
| B3   | 0.76        |      | 0.85 | 0.030  |       | 0.033 |
| C    | 0.45        |      | 0.62 | 0.018  |       | 0.024 |
| C2   | 0.48        |      | 0.62 | 0.019  |       | 0.024 |
| D    | 6.00        |      | 6.20 | 0.236  |       | 0.244 |
| E    | 6.40        |      | 6.70 | 0.252  |       | 0.264 |
| G    |             | 2.30 |      |        | 0.091 |       |
| H    | 16.0        |      | 17.0 | 0.630  |       | 0.669 |
| L    | 8.90        |      | 9.40 | 0.350  |       | 0.370 |
| L1   | 1.80        |      | 1.90 | 0.071  |       | 0.075 |
| L2   | 1.37        |      | 1.50 | 0.054  |       | 0.059 |
| V1   |             | 4°   |      |        | 4°    |       |



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