

|           |           |      |
|-----------|-----------|------|
| IT(RMS)   |           | 1A   |
| VDRM/VRRM | BT131-600 | 600V |
|           | BT131-800 | 800V |
| VTM       |           | 1.5V |

## FEATURES

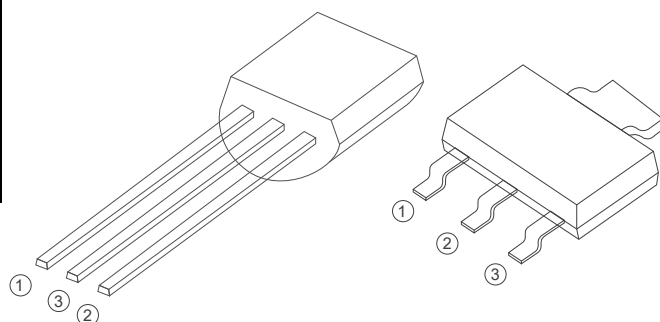
IT(RMS): 1A

VGT: 1.2V

VDRM VRRM:600V-800V

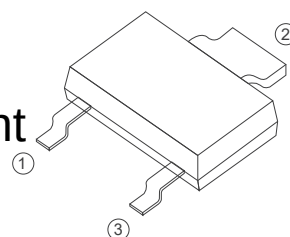
Low power gate trigger circuits

Low reverse and forward blocking current

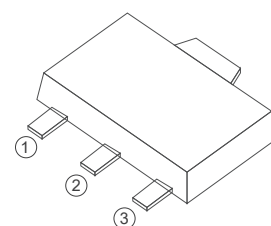


TO-92

SOT-223



SOT-223-2L



SOT-89

## APPLICATIONS

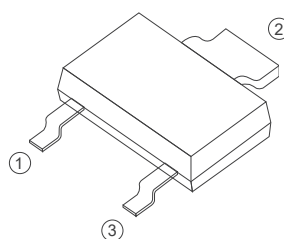
Heater Control

Motor Speed Controller

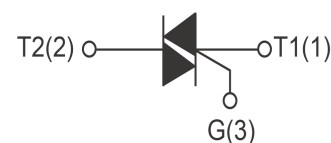
Washing machine

Vacuums

Solid state relay



SOT-89-2L



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

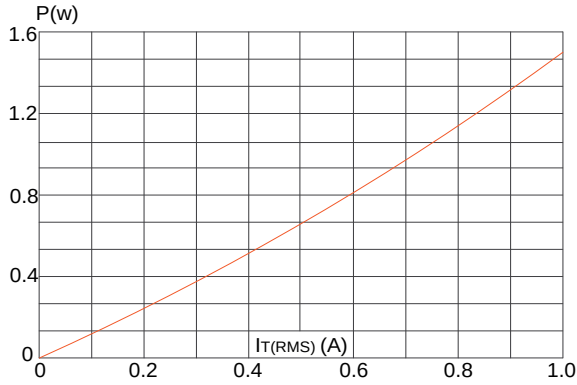
| Symbol                               | Parameter                         | Conditions                                 | Ratings | Unit             |
|--------------------------------------|-----------------------------------|--------------------------------------------|---------|------------------|
| V <sub>DRM</sub><br>V <sub>RRM</sub> | Repetitive Peak Off-State Voltage | BT131                                      | 600-800 | V                |
| I <sub>T(RMS)</sub>                  | R.M.S On-State Current            | T <sub>c</sub> =110°C                      | 1       | A                |
| I <sub>TSM</sub>                     | Surge On-State Current            | T <sub>p</sub> =10ms                       | 12      | A                |
| I <sup>2</sup> t                     | I <sup>2</sup> t for fusing       | T <sub>p</sub> =10ms                       | 0.72    | A <sup>2</sup> s |
| P <sub>G(AV)</sub>                   | Average Gate Power Dissipation    | T <sub>J</sub> =125°C                      | 0.3     | W                |
| I <sub>GM</sub>                      | Peak Gate Current                 | t <sub>p</sub> =20us T <sub>J</sub> =125°C | 1.2     | A                |
| 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  |
|------------------|-----------------------------------------------|-----------------------------------------------------------|-------|-------|
| I <sub>DRM</sub> | Repetitive Peak Off-State Current             | T <sub>J</sub> =25°C                                      | ≤10   | uA    |
|                  |                                               | T <sub>J</sub> =110°C                                     | ≤200  | uA    |
| I <sub>RRM</sub> | Repetitive Peak Reverse Current               | T <sub>J</sub> =25°C                                      | ≤10   | uA    |
|                  |                                               | T <sub>J</sub> =110°C                                     | ≤200  | uA    |
| V <sub>TM</sub>  | Forward "on" voltage                          | I <sub>T</sub> =1.6A t <sub>p</sub> =380us                | ≤1.5  | V     |
| V <sub>GD</sub>  | Gate non-trigger voltage                      | V <sub>D</sub> =V <sub>DRM</sub> , T <sub>J</sub> =110°C  | ≥0.2  | V     |
| I <sub>H</sub>   | Holding current                               | I,II,III<br>V <sub>D</sub> =12V, I <sub>GT</sub> =0.1A    | ≤5    | mA    |
|                  |                                               | IV                                                        | ≤10   | mA    |
| V <sub>GT</sub>  | Gate trigger voltage                          | V <sub>D</sub> =12V                                       | ≤1.2  | V     |
| I <sub>GT</sub>  | Gate trigger current                          | I,II,III<br>V <sub>D</sub> =12V                           | ≤5    | mA    |
|                  |                                               | IV                                                        | ≤10   | mA    |
| di/dt            | Critical-rate of rise of commutation current. | I,II,III<br>I <sub>T</sub> =1A                            | ≥50   | A /us |
|                  |                                               | IV<br>I <sub>G</sub> =0.2A, dI <sub>G</sub> /dt=0.2A/us   | ≥10   | A /us |
| dv/dt            | Critical-rate of rise of commutation voltage  | T <sub>J</sub> =110°C V <sub>D</sub> =2/3V <sub>DRM</sub> | ≥30   | V/us  |

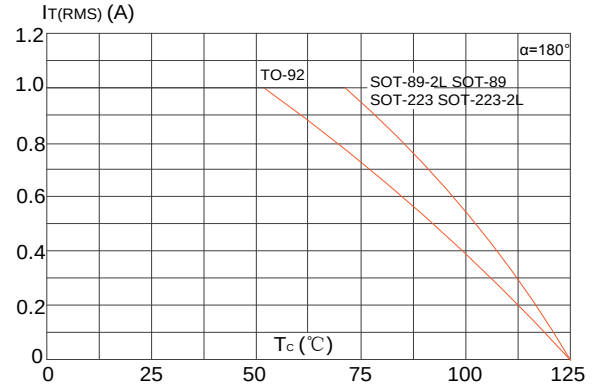
**FIG1**

Maximum power dissipation versus RMS on-state current



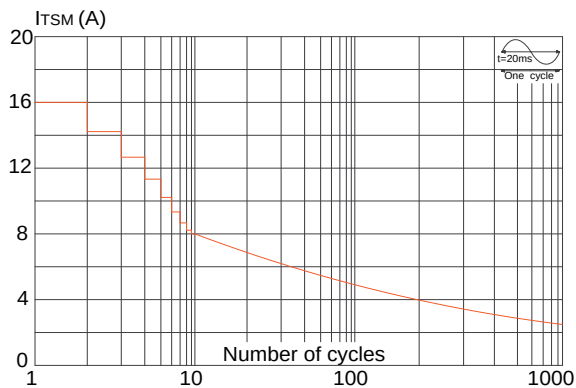
**FIG2**

RMS on-state current versus case temperature



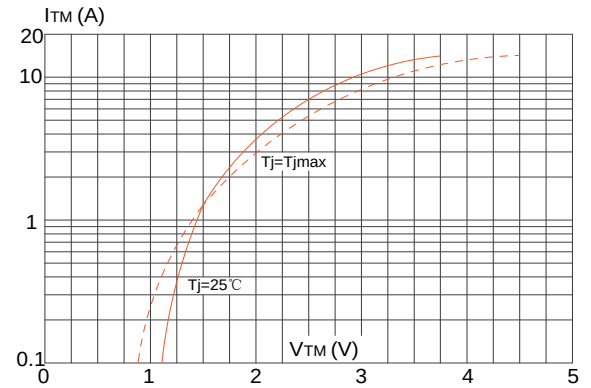
**FIG3**

Surge peak on-state current versus number of cycles



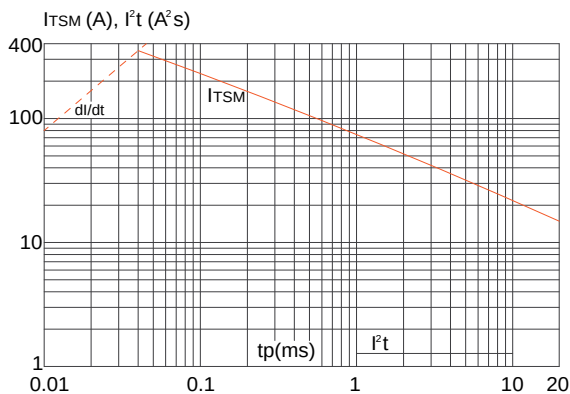
**FIG4**

On-state characteristics (maximum values)



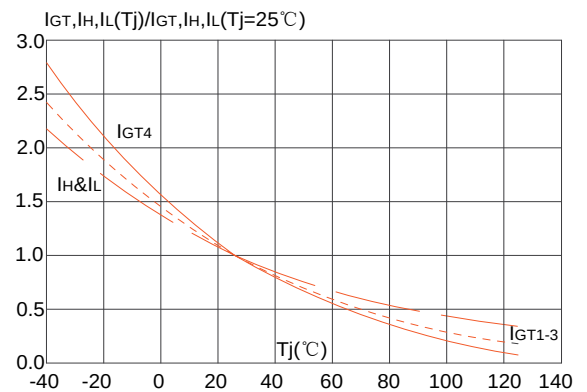
**FIG5**

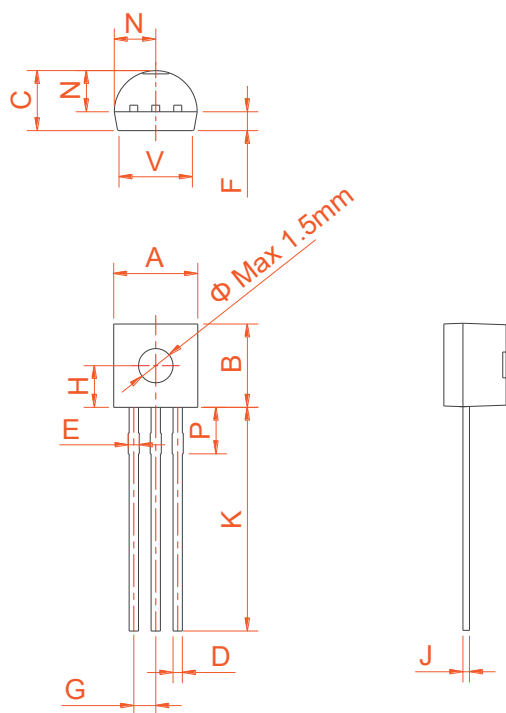
Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20ms$ , and corresponding value of  $I^2t$  ( $di/dt < 100A/\mu s$ )



**FIG6**

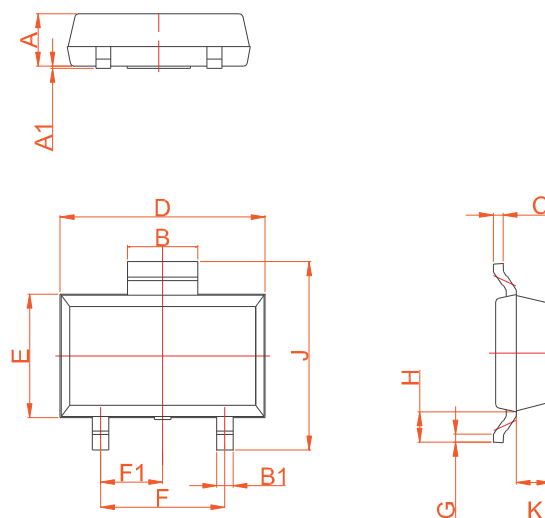
**FIG.6:** Relative variations of gate trigger current, holding current and latching current versus junction temperature

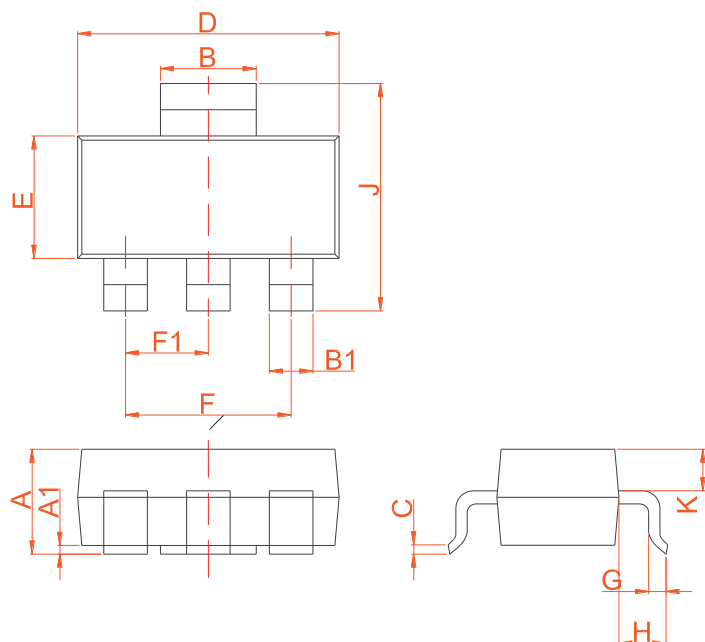


**PACKAGE MECHANICAL DATA**

**TO-92**

| Ref. | Dimensions  |      |       |        |       |       |
|------|-------------|------|-------|--------|-------|-------|
|      | Millimeters |      |       | Inches |       |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A    | 4.45        |      | 5.20  | 0.175  |       | 0.205 |
| B    | 4.32        |      | 5.33  | 0.170  |       | 0.210 |
| C    | 3.18        |      | 4.19  | 0.125  |       | 0.165 |
| D    | 0.407       |      | 0.533 | 0.016  |       | 0.021 |
| E    | 0.60        |      | 0.80  | 0.024  |       | 0.031 |
| F    | -           | 1.1  | -     | -      | 0.043 | -     |
| G    | -           | 1.27 | -     | -      | 0.050 | -     |
| H    | -           | 2.30 | -     | -      | 0.091 | -     |
| J    | 0.36        |      | 0.50  | 0.014  |       | 0.020 |
| K    | 12.70       |      | 15.0  | 0.500  |       | 0.591 |
| N    | 2.04        |      | 2.66  | 0.080  |       | 0.105 |
| P    | 1.86        |      | 2.06  | 0.073  |       | 0.081 |
| V    | -           |      | 4.3   | -      |       | 0.169 |

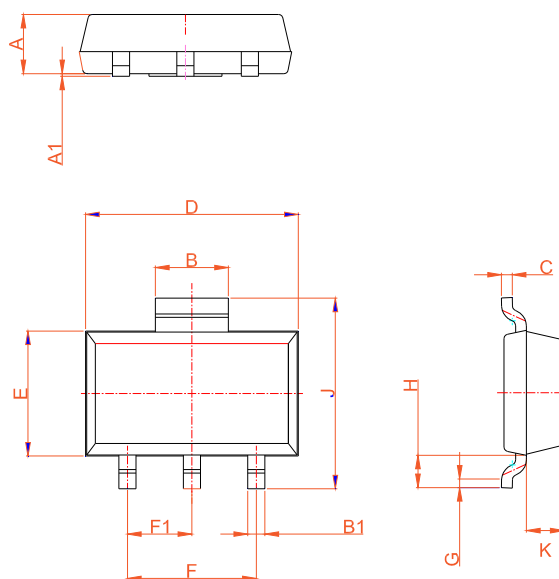
| Ref. | Dimensions  |       |      |        |       |       |
|------|-------------|-------|------|--------|-------|-------|
|      | Millimeters |       |      | Inches |       |       |
|      | Min.        | Typ.  | Max. | Min.   | Typ.  | Max.  |
| A    | 1.3         | 1.4   | 1.5  | 0.051  | 0.055 | 0.059 |
| A1   | 0.01        | 0.06  | 0.10 | 0.001  | 0.002 | 0.004 |
| B    | 1.6         | 1.7   | 1.8  | 0.063  | 0.067 | 0.071 |
| B1   | 0.3         | 0.4   | 0.5  | 0.012  | 0.016 | 0.020 |
| C    | 0.22        | 0.254 | 0.32 | 0.009  | 0.010 | 0.013 |
| D    | 4.75        | 4.95  | 5.15 | 0.187  | 0.195 | 0.203 |
| E    | 2.75        | 2.95  | 3.15 | 0.108  | 0.116 | 0.124 |
| F    |             | 3.0   |      |        | 0.118 |       |
| F1   |             | 1.5   |      |        | 0.059 |       |
| G    | 0.2         | 0.3   | 0.4  | 0.008  | 0.012 | 0.016 |
| H    | 0.58        | 0.78  | 0.98 | 0.023  | 0.031 | 0.039 |
| J    | 4.3         | 4.5   | 4.7  | 0.169  | 0.177 | 0.185 |
| K    |             | 0.88  |      |        | 0.035 |       |

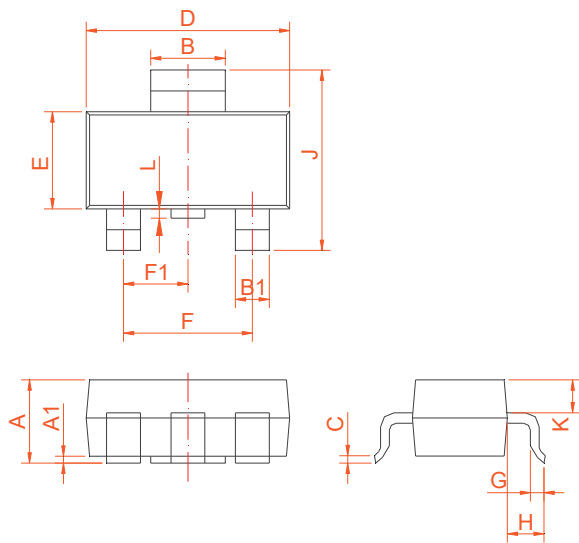

**SOT-89-2L**

**PACKAGE MECHANICAL DATA**

**SOT-223**

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 1.5         | 1.6  | 1.8  | 0.059  | 0.063 | 0.071 |
| A1   | 0           | 0.06 | 0.10 | 0      | 0.002 | 0.004 |
| B    | 2.9         | 3.0  | 3.1  | 0.114  | 0.118 | 0.122 |
| B1   | 0.6         | 0.7  | 0.8  | 0.024  | 0.028 | 0.031 |
| C    | 0.22        | 0.26 | 0.32 | 0.009  | 0.010 | 0.013 |
| D    | 6.3         | 6.5  | 6.7  | 0.248  | 0.256 | 0.264 |
| E    | 3.3         | 3.5  | 3.7  | 0.130  | 0.138 | 0.146 |
| F    |             | 4.6  |      |        | 0.181 |       |
| F1   |             | 2.3  |      |        | 0.091 |       |
| G    | 0.7         | 0.9  | 1.1  | 0.028  | 0.035 | 0.043 |
| H    | 1.5         | 1.75 | 2.0  | 0.059  | 0.069 | 0.079 |
| J    | 6.7         | 7.0  | 7.3  | 0.264  | 0.276 | 0.287 |
| K    | 0.8         | 0.9  | 1.0  | 0.031  | 0.035 | 0.039 |

| Ref. | Dimensions  |       |      |        |       |       |
|------|-------------|-------|------|--------|-------|-------|
|      | Millimeters |       |      | Inches |       |       |
|      | Min.        | Typ.  | Max. | Min.   | Typ.  | Max.  |
| A    | 1.3         | 1.4   | 1.5  | 0.051  | 0.055 | 0.059 |
| A1   | 0.01        | 0.06  | 0.10 | 0.001  | 0.002 | 0.004 |
| B    | 1.6         | 1.7   | 1.8  | 0.063  | 0.067 | 0.071 |
| B1   | 0.3         | 0.4   | 0.5  | 0.012  | 0.016 | 0.020 |
| C    | 0.22        | 0.254 | 0.32 | 0.009  | 0.010 | 0.013 |
| D    | 4.75        | 4.95  | 5.15 | 0.187  | 0.195 | 0.203 |
| E    | 2.75        | 2.95  | 3.15 | 0.108  | 0.116 | 0.124 |
| F    |             | 3.0   |      |        | 0.118 |       |
| F1   |             | 1.5   |      |        | 0.059 |       |
| G    | 0.2         | 0.3   | 0.4  | 0.008  | 0.012 | 0.016 |
| H    | 0.58        | 0.78  | 0.98 | 0.023  | 0.031 | 0.039 |
| J    | 4.3         | 4.5   | 4.7  | 0.169  | 0.177 | 0.185 |
| K    |             | 0.88  |      |        | 0.035 |       |


**SOT-89**

**PACKAGE MECHANICAL DATA**

**SOT-223-2L**

| Ref. | Dimensions  |       |      |        |       |       |
|------|-------------|-------|------|--------|-------|-------|
|      | Millimeters |       |      | Inches |       |       |
|      | Min.        | Typ.  | Max. | Min.   | Typ.  | Max.  |
| A    | 1.50        | 1.60  | 1.80 | 0.059  | 0.063 | 0.071 |
| A1   | 0.01        | 0.06  | 0.10 | 0.001  | 0.002 | 0.004 |
| B    | 2.90        | 3.00  | 3.10 | 0.114  | 0.118 | 0.122 |
| B1   | 0.60        | 0.70  | 0.80 | 0.024  | 0.028 | 0.031 |
| C    | 0.22        | 0.254 | 0.32 | 0.009  | 0.010 | 0.013 |
| D    | 6.30        | 6.50  | 6.70 | 0.248  | 0.256 | 0.264 |
| E    | 3.30        | 3.50  | 3.70 | 0.130  | 0.138 | 0.146 |
| F    |             | 4.60  |      |        | 0.181 |       |
| F1   |             | 2.30  |      |        | 0.091 |       |
| G    | 0.70        | 0.90  | 1.10 | 0.028  | 0.035 | 0.043 |
| H    | 1.50        | 1.75  | 2.00 | 0.059  | 0.069 | 0.079 |
| J    | 6.70        | 7.00  | 7.30 | 0.264  | 0.276 | 0.287 |
| K    |             | 0.90  |      |        | 0.035 |       |
| L    | 0           | 0.10  | 0.20 | 0      | 0.004 | 0.008 |