

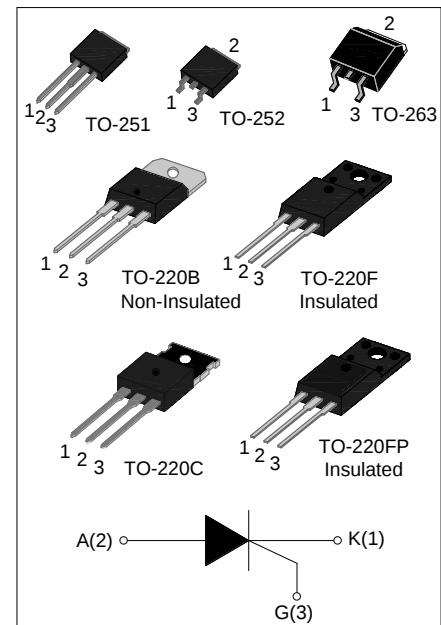


## JCT151 Series 12A SCRs

Rev.5.0

### DESCRIPTION:

JCT151 series of silicon controlled rectifiers, with high ability to withstand the shock loading of large current, provide high dv/dt rate with strong resistance to electromagnetic interference. They are especially recommended for use on solid state relay, motorcycle, power charger, T-tools etc. JCT151F/JCT151FP provides insulation voltage rated at 2000V RMS from all three terminals to external heatsink complying with UL standards (File ref: E252906).



### MAIN FEATURES

| Symbol            | JCT151-650R | JCT151-800R |
|-------------------|-------------|-------------|
| $V_{DRM}/V_{RRM}$ | 650V        | 800V        |
| $I_{T(RMS)}$      | 12A         |             |
| $I_{GT}$          | $\leq 15mA$ |             |

### ABSOLUTE MAXIMUM RATINGS

| Parameter                                               |                                                           | Symbol       | Value     | Unit        |
|---------------------------------------------------------|-----------------------------------------------------------|--------------|-----------|-------------|
| Storage junction temperature range                      |                                                           | $T_{stg}$    | -40 - 150 | $^{\circ}C$ |
| Operating junction temperature range                    |                                                           | $T_j$        | -40 - 125 | $^{\circ}C$ |
| Repetitive peak off-state voltage ( $T_j=25^{\circ}C$ ) |                                                           | $V_{DRM}$    | 650/800   | V           |
| Repetitive peak reverse voltage ( $T_j=25^{\circ}C$ )   |                                                           | $V_{RRM}$    | 650/800   | V           |
| RMS on-state current                                    | TO-251/ TO-252 ( $T_C=98^{\circ}C$ )                      | $I_{T(RMS)}$ | 12        | A           |
|                                                         | TO-220B (Non-Ins)/ TO-220C/ TO-263 ( $T_C=100^{\circ}C$ ) |              |           |             |
|                                                         | TO-220F (Ins) / TO-220FP(Ins) ( $T_C=85^{\circ}C$ )       |              |           |             |
| Non repetitive surge peak on-state current (tp=10ms)    |                                                           | $I_{TSM}$    | 120       | A           |

|                                                                       |             |     |           |
|-----------------------------------------------------------------------|-------------|-----|-----------|
| $I^2t$ value for fusing ( $t_p=10ms$ )                                | $I^2t$      | 72  | $A^2s$    |
| Repetitive rate of rise of on-state current ( $I_G=2 \times I_{GT}$ ) | $di_T/dt$   | 50  | $A/\mu s$ |
| Peak gate current                                                     | $I_{GM}$    | 2   | A         |
| Peak gate power                                                       | $P_{GM}$    | 5   | W         |
| Average gate power dissipation                                        | $P_{G(AV)}$ | 0.5 | W         |

**ELECTRICAL CHARACTERISTICS** ( $T_j=25^\circ C$  unless otherwise specified)

| Symbol   | Test Condition                                   | Value |      |      | Unit      |
|----------|--------------------------------------------------|-------|------|------|-----------|
|          |                                                  | MIN.  | TYP. | MAX. |           |
| $I_{GT}$ | $V_D=12V$ $R_L=33\Omega$                         | -     | 4    | 15   | mA        |
| $V_{GT}$ |                                                  | -     | 0.75 | 1.5  | V         |
| $V_{GD}$ | $V_D=V_{DRM}$ $T_j=125^\circ C$ $R_L=3.3K\Omega$ | 0.2   | -    | -    | V         |
| $I_L$    | $I_G=1.2I_{GT}$                                  | -     | 12   | 40   | mA        |
| $I_H$    | $I_T=500mA$                                      | -     | 12   | 30   | mA        |
| $dV/dt$  | $V_D=2/3V_{DRM}$ Gate Open $T_j=125^\circ C$     | 200   | 400  | -    | $V/\mu s$ |

**STATIC CHARACTERISTICS**

| Symbol    | Parameter                   |                   | Value(MAX) | Unit    |
|-----------|-----------------------------|-------------------|------------|---------|
| $V_{TM}$  | $I_{TM}=23A$ $t_p=380\mu s$ | $T_j=25^\circ C$  | 1.7        | V       |
| $I_{DRM}$ | $V_D=V_{DRM}$ $V_R=V_{RRM}$ | $T_j=25^\circ C$  | 10         | $\mu A$ |
| $I_{RRM}$ |                             | $T_j=125^\circ C$ | 1          | mA      |

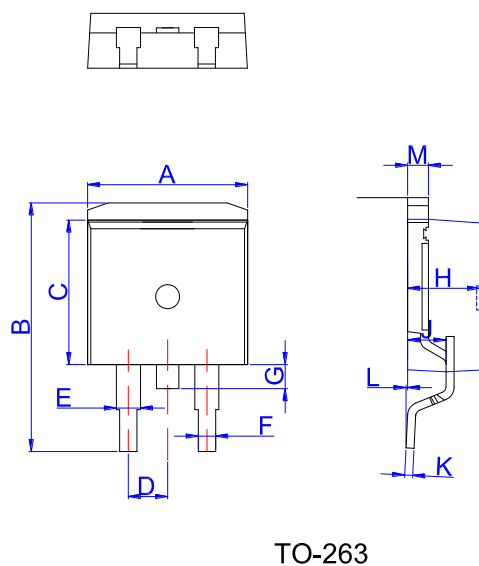
**THERMAL RESISTANCES**

| Symbol         | Parameter                 |                               | Value | Unit         |
|----------------|---------------------------|-------------------------------|-------|--------------|
| $R_{th(j-mb)}$ | Junction to mounting base | TO-251/ TO-252                | 2.0   | $^\circ C/W$ |
|                |                           | TO-220B (Non-Ins)/ TO-220C    | 1.7   |              |
|                |                           | TO-220F (Ins)/ TO-220FP (Ins) | 4.5   |              |
|                |                           | TO-263                        | 1.5   |              |

## ORDERING INFORMATION

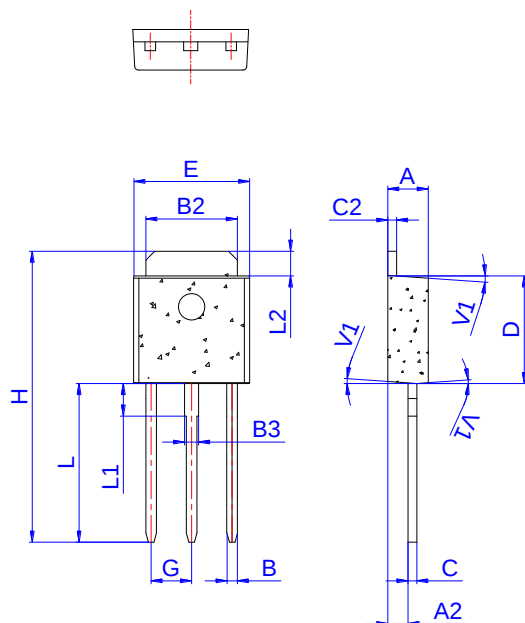
|                                                 |                       |                               |                                                                                                                 |                                                                                                                   |
|-------------------------------------------------|-----------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <p>J</p> <p>JieJie Microelectronics Co.,Ltd</p> | <p>CT</p> <p>SCRs</p> | <p>151</p> <p>IT(RMS):12A</p> | <p>B</p> <p>H:TO-251 K:TO-252 E:TO-263<br/>F:TO-220F(Ins) FP:TO-220FP(Ins)<br/>B:TO-220B(Non-Ins) C:TO-220C</p> | <p>-650R</p> <p>650R: <math>V_{DRM}/V_{RRM} \geq 650V</math><br/>800R: <math>V_{DRM}/V_{RRM} \geq 800V</math></p> |
|-------------------------------------------------|-----------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|

## PACKAGE MECHANICAL DATA



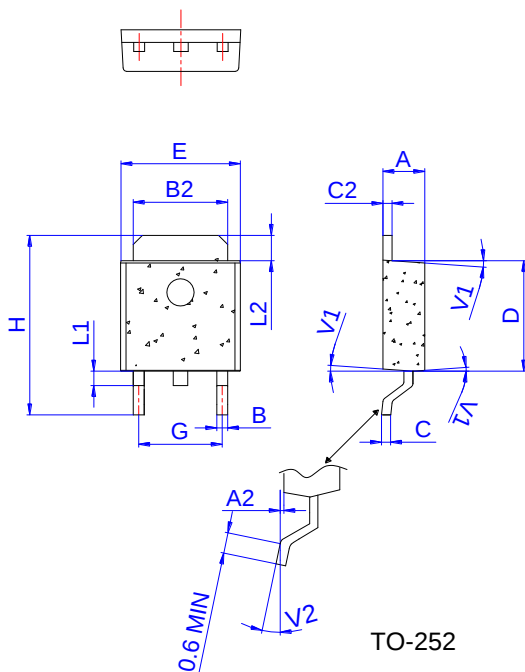
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|------|-------------|------|-------|--------|-------|-------|
|      | Millimeters |      |       | Inches |       |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A    | 9.90        |      | 10.20 | 0.390  |       | 0.402 |
| B    | 14.70       |      | 15.80 | 0.579  |       | 0.622 |
| C    | 9.4         |      | 9.6   | 0.37   |       | 0.378 |
| D    |             | 2.54 |       |        | 0.100 |       |
| E    | 1.20        |      | 1.40  | 0.047  |       | 0.055 |
| F    | 0.75        |      | 0.85  | 0.029  |       | 0.033 |
| G    |             |      | 1.75  |        |       | 0.069 |
| H    | 4.40        |      | 4.70  | 0.173  |       | 0.185 |
| J    | 2.30        |      | 2.70  | 0.091  |       | 0.106 |
| K    | 0.38        |      | 0.55  | 0.015  |       | 0.022 |
| L    | 0           | 0.10 | 0.25  | 0      | 0.004 | 0.010 |
| M    | 1.25        |      | 1.35  | 0.049  |       | 0.053 |

## PACKAGE MECHANICAL DATA



TO-251

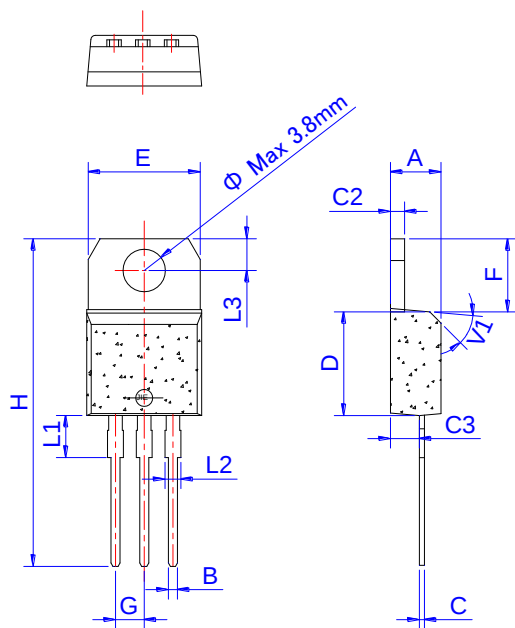
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|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 2.20        |      | 2.40 | 0.086  |       | 0.095 |
| 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°    |       |



TO-252

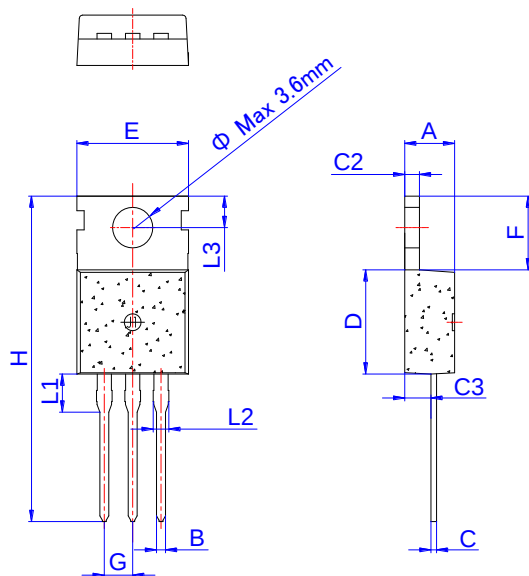
| Ref. | Dimensions  |      |      |        |      |       |
|------|-------------|------|------|--------|------|-------|
|      | Millimeters |      |      | Inches |      |       |
|      | Min.        | Typ. | Max. | Min.   | Typ. | Max.  |
| A    | 2.20        |      | 2.40 | 0.086  |      | 0.095 |
| 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        |      | 0.62 | 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    | 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 |
| V1   |             | 4°   |      |        | 4°   |       |
| V2   | 0°          |      | 8°   | 0°     |      | 8°    |

## PACKAGE MECHANICAL DATA



TO-220B Non-Ins

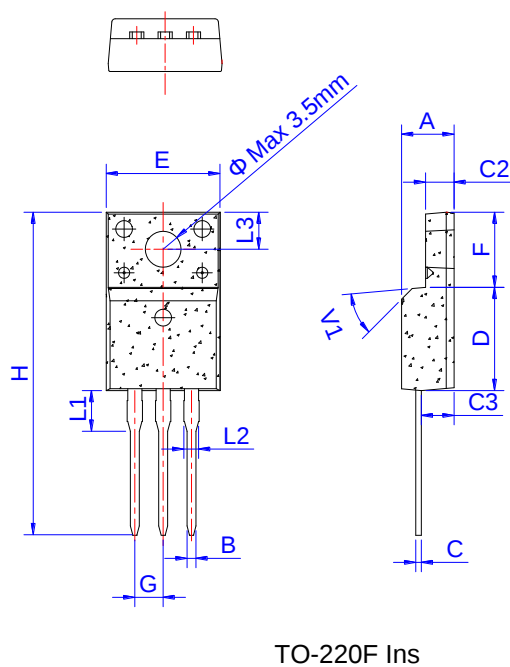
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|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.40        |      | 4.60 | 0.173  |       | 0.181 |
| B    | 0.61        |      | 0.88 | 0.024  |       | 0.035 |
| C    | 0.46        |      | 0.70 | 0.018  |       | 0.028 |
| C2   | 1.21        |      | 1.32 | 0.048  |       | 0.052 |
| C3   | 2.40        |      | 2.72 | 0.094  |       | 0.107 |
| D    | 8.60        |      | 9.70 | 0.339  |       | 0.382 |
| E    | 9.60        |      | 10.4 | 0.378  |       | 0.409 |
| F    | 6.20        |      | 6.60 | 0.244  |       | 0.260 |
| G    |             | 2.54 |      |        | 0.1   |       |
| H    | 28.0        |      | 29.8 | 1.102  |       | 1.173 |
| L1   |             | 3.75 |      |        | 0.148 |       |
| L2   | 1.14        |      | 1.70 | 0.045  |       | 0.067 |
| L3   | 2.65        |      | 2.95 | 0.104  |       | 0.116 |
| V1   |             | 45°  |      |        | 45°   |       |



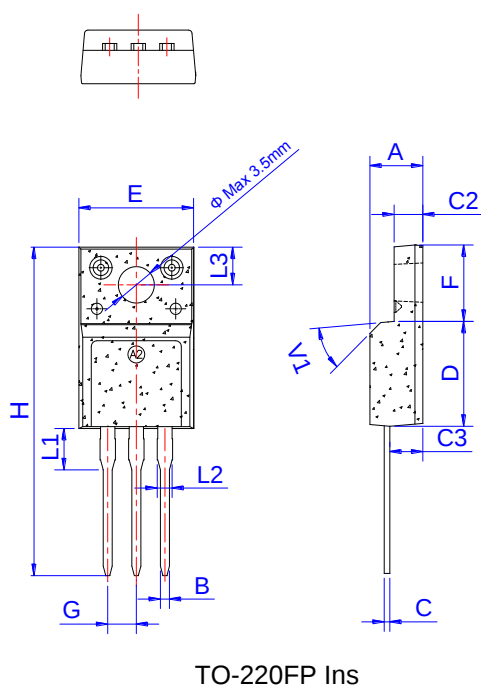
TO-220C

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.40        |      | 4.60 | 0.173  |       | 0.181 |
| B    | 0.70        |      | 0.90 | 0.028  |       | 0.035 |
| C    | 0.45        |      | 0.60 | 0.018  |       | 0.024 |
| C2   | 1.23        |      | 1.32 | 0.048  |       | 0.052 |
| C3   | 2.20        |      | 2.60 | 0.087  |       | 0.102 |
| D    | 8.90        |      | 9.90 | 0.350  |       | 0.390 |
| E    | 9.90        |      | 10.3 | 0.390  |       | 0.406 |
| F    | 6.30        |      | 6.90 | 0.248  |       | 0.272 |
| G    |             | 2.54 |      |        | 0.1   |       |
| H    | 28.0        |      | 29.8 | 1.102  |       | 1.173 |
| L1   |             | 3.39 |      |        | 0.133 |       |
| L2   | 1.14        |      | 1.70 | 0.045  |       | 0.067 |
| L3   | 2.65        |      | 2.95 | 0.104  |       | 0.116 |
| Φ    |             | 3.6  |      |        | 0.142 |       |

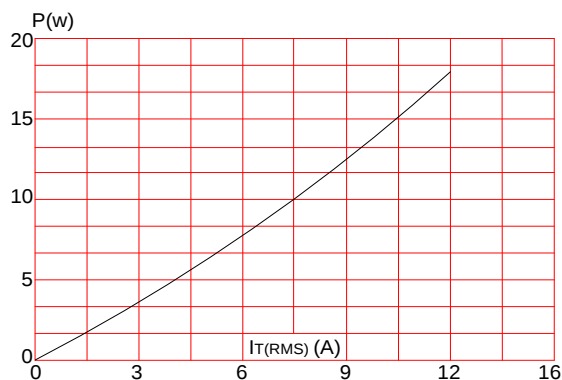
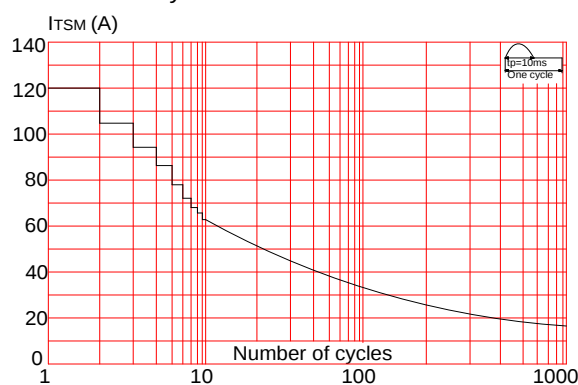
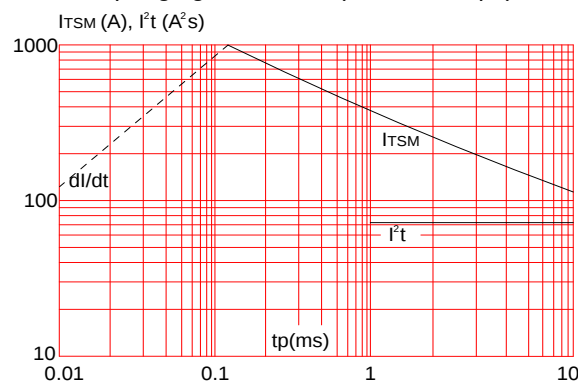
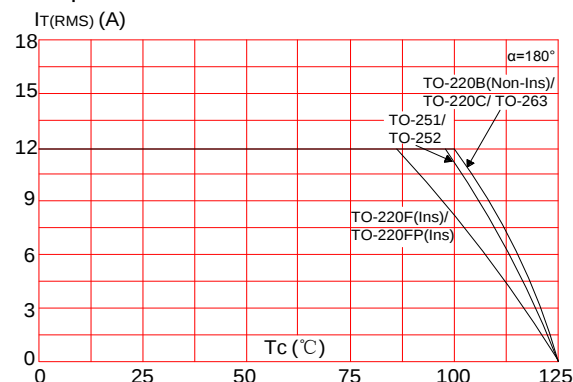
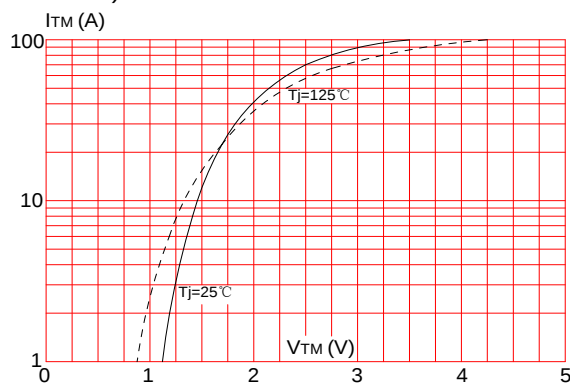
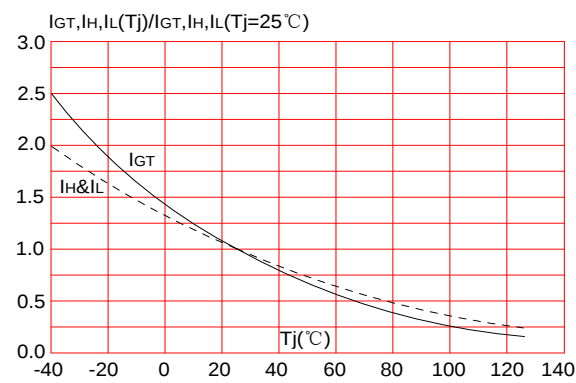
## PACKAGE MECHANICAL DATA



| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.40        |      | 4.80 | 0.173  |       | 0.189 |
| B    | 0.74        | 0.80 | 0.83 | 0.029  | 0.031 | 0.033 |
| C    | 0.48        |      | 0.75 | 0.019  |       | 0.030 |
| C2   | 2.40        |      | 2.70 | 0.094  |       | 0.106 |
| C3   | 2.60        |      | 3.00 | 0.102  |       | 0.118 |
| D    | 8.80        |      | 9.30 | 0.346  |       | 0.366 |
| E    | 9.70        |      | 10.3 | 0.382  |       | 0.406 |
| F    | 6.40        |      | 7.00 | 0.252  |       | 0.276 |
| G    |             | 2.54 |      |        | 0.1   |       |
| H    | 28.0        |      | 29.8 | 1.102  |       | 1.173 |
| L1   |             | 3.63 |      |        | 0.143 |       |
| L2   | 1.14        |      | 1.70 | 0.045  |       | 0.067 |
| L3   |             | 3.30 |      |        | 0.130 |       |
| V1   |             | 45°  |      |        | 45°   |       |



| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.50        |      | 4.90 | 0.177  |       | 0.193 |
| B    | 0.74        | 0.80 | 0.83 | 0.029  | 0.031 | 0.033 |
| C    | 0.47        |      | 0.65 | 0.019  |       | 0.026 |
| C2   | 2.45        |      | 2.75 | 0.096  |       | 0.108 |
| C3   | 2.60        |      | 3.00 | 0.102  |       | 0.118 |
| D    | 8.80        |      | 9.30 | 0.346  |       | 0.366 |
| E    | 9.80        |      | 10.4 | 0.386  |       | 0.410 |
| F    | 6.40        |      | 6.80 | 0.252  |       | 0.268 |
| G    |             | 2.54 |      |        | 0.1   |       |
| H    | 28.0        |      | 29.8 | 1.102  |       | 1.173 |
| L1   |             | 3.63 |      |        | 0.143 |       |
| L2   | 1.14        |      | 1.70 | 0.045  |       | 0.067 |
| L3   |             | 3.30 |      |        | 0.130 |       |
| V1   |             | 45°  |      |        | 45°   |       |

**FIG.1:** Maximum power dissipation versus RMS on-state current**FIG.3:** Surge peak on-state current versus number of cycles**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10\text{ms}$ , and corresponding value of  $I^2t$  ( $di/dt < 50\text{A}/\mu\text{s}$ )**FIG.2:** RMS on-state current versus case temperature**FIG.4:** On-state characteristics (maximum values)**FIG.6:** Relative variations of gate trigger current, holding current and latching current versus junction temperature

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