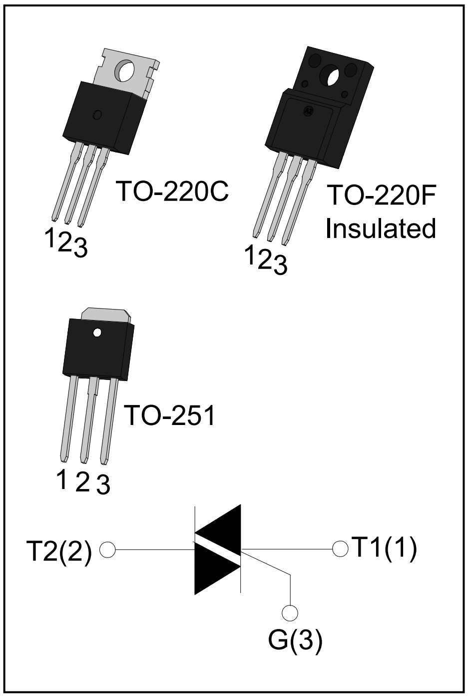
# JST138 Series 12A TRIACs

Rev.10.0

## DESCRIPTION:

JST138 series triacs with low holding and latching current are especially recommended for use on middle and small resistance type power load. JST138F provides insulation voltage rated at 2000V RMS from all three terminals to external heatsink complying with UL standards (File ref: E252906). All the packages listed are RoHS compliant. (2011/65/EU)



## MAIN FEATURES

| Symbol | Value | Unit |
|---|---|---|
| $I_{T(RMS)}$ | 12 | A |
| $V_{DRM}$ /$V_{RRM}$ | 600/800 | V |

## ABSOLUTE MAXIMUM RATINGS

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Storage junction temperature range | | $T_{stg}$ | -40-150 | ℃ |
| Operating junction temperature range | | $T_j$ | -40-125 | ℃ |
| Repetitive peak off-state voltage($T_j$=25℃) | | $V_{DRM}$ | 600/800 | V |
| Repetitive peak reverse voltage($T_j$=25℃) | | $V_{RRM}$ | 600/800 | V |
| Non repetitive surge peak Off-state voltage | | $V_{DSM}$ | $V_{DRM}$ + 100 | V |
| Non repetitive peak reverse voltage | | $V_{RSM}$ | $V_{RRM}$ + 100 | V |
| RMS on-state current | TO-251/ TO-220C($T_C$=95℃) | $I_{T(RMS)}$ | 12 | A |
| | TO-220F(Ins) ($T_C$=80℃) | | | |
| Non repetitive surge peak on-state current (full cycle, F=50Hz) | | $I_{TSM}$ | 95 | A |
| $I^2t$ value for fusing (tp=10ms) | | $I^2t$ | 45 | $A^2s$ |

| | | | | |
|---|---|---|---|---|
| Critical rate of rise of on-state current($I_G$=2×$I_{GT}$) | Ⅰ-Ⅱ-Ⅲ | dI/dt | 50 | A/μs |
| | Ⅳ | | 10 | |
| Peak gate current | | $I_{GM}$ | 2 | A |
| Average gate power dissipation | | $P_{G(AV)}$ | 0.5 | W |
| Peak gate power | | $P_{GM}$ | 5 | W |

## ELECTRICAL CHARACTERISTICS ($T_j$=25℃ unless otherwise specified)

| **Symbol** | **Test Condition** | **Quadrant** | | **Value** | | | **Unit** |
|---|---|---|---|---|---|---|---|
| | | | | **D** | **E** | **F** | |
| $I_{GT}$ | $V_D$=12V $R_L$=33Ω | Ⅰ-Ⅱ-Ⅲ | MAX | 5 | 10 | 25 | mA |
| | | Ⅳ | | 10 | 25 | 70 | |
| $V_{GT}$ | | ALL | MAX | 1.5 | | | V |
| $V_{GD}$ | $V_D$=$V_{DRM}$ $T_j$=125℃ $R_L$=3.3KΩ | ALL | MIN | 0.2 | | | V |
| $I_L$ | $I_G$=1.2$I_{GT}$ | Ⅰ- Ⅲ | MAX | 15 | 30 | 40 | mA |
| | | Ⅱ- Ⅳ | | 20 | 40 | 80 | |
| $I_H$ | $I_T$=100mA | | MAX | 10 | 25 | 30 | mA |
| dV/dt | $V_D$=2/3$V_{DRM}$ Gate Open $T_j$=125℃ | | MIN | 20 | 50 | 50 | V/μs |

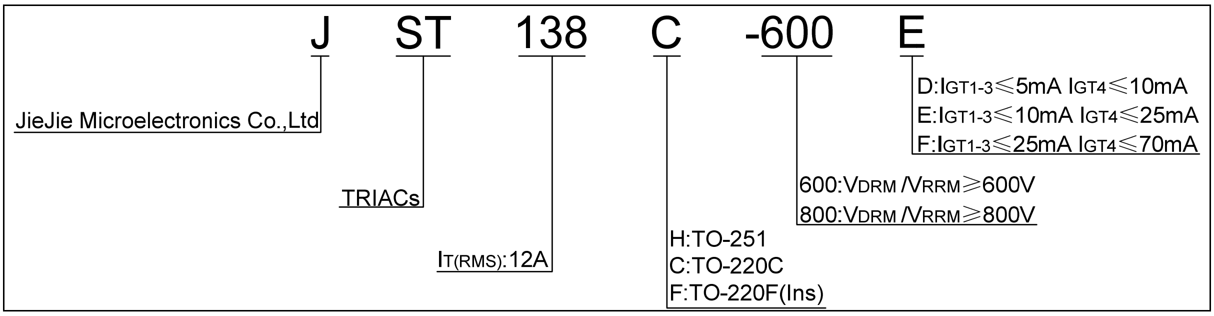
## STATIC CHARACTERISTICS

| **Symbol** | **Parameter** | | **Value(MAX)** | **Unit** |
|---|---|---|---|---|
| $V_{TM}$ | $I_{TM}$=15A tp=380μs | $T_j$=25℃ | 1.6 | V |
| $I_{DRM}$ | $V_D$=$V_{DRM}$ $V_R$=$V_{RRM}$ | $T_j$=25℃ | 5 | μA |
| $I_{RRM}$ | | $T_j$=125℃ | 1 | mA |

## THERMAL RESISTANCES

| **Symbol** | **Parameter** | | **Value** | **Unit** |
|---|---|---|---|---|
| $R_{th(j-c)}$ | junction to case(AC) | TO-220C | 1.4 | ℃/W |
| | | TO-220F(Ins) | 2.5 | |
| | | TO-251 | 1.7 | |

## ORDERING INFORMATION


J ST 138 C -600 E

J: JieJie Microelectronics Co.,Ltd

ST: TRIACs

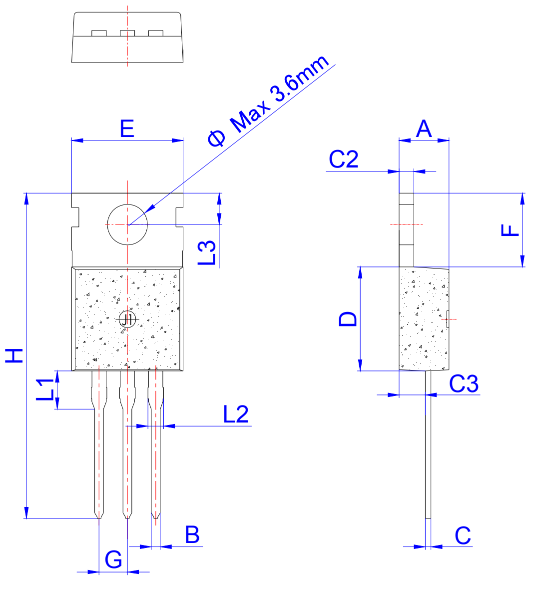
138: $I_{T(RMS)}$:12A

C:
H:TO-251
C:TO-220C
F:TO-220F(Ins)

-600:
600:$V_{DRM}$/$V_{RRM}$$\geq$600V
800:$V_{DRM}$/$V_{RRM}$$\geq$800V

E:
D:$I_{GT1-3}$$\leq$5mA $I_{GT4}$$\leq$10mA
E:$I_{GT1-3}$$\leq$10mA $I_{GT4}$$\leq$25mA
F:$I_{GT1-3}$$\leq$25mA $I_{GT4}$$\leq$70mA

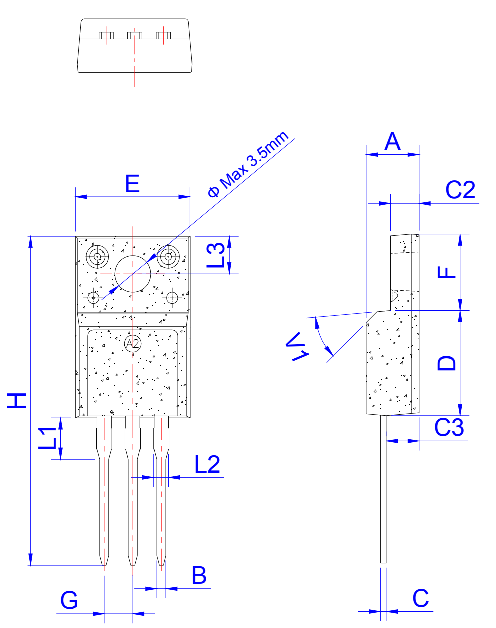
## PACKAGE MECHANICAL DATA



TO-220C

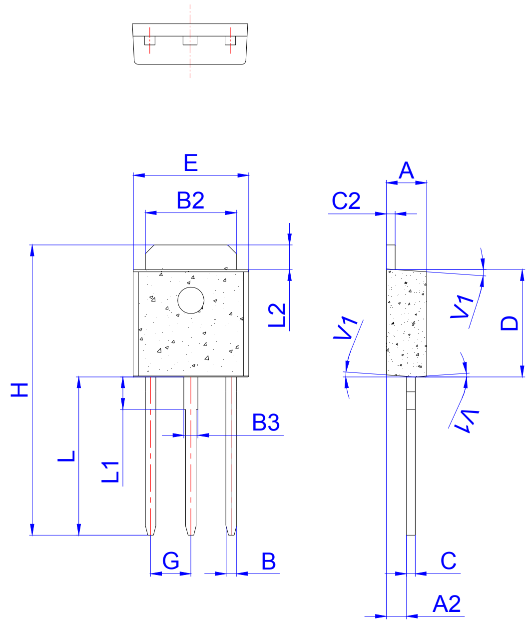
| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| B | 0.70 | | 0.90 | 0.028 | | 0.035 |
| C | 0.45 | | 0.60 | 0.018 | | 0.024 |
| C2 | 1.23 | | 1.32 | 0.048 | | 0.052 |
| 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



TO-220F Ins

| 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° | |



TO-251

| 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° | |

## PACKAGE INFORMATION

| PACKAGE | OUTLINE | TUBE (PCS) | INNER BOX (PCS) | PER CARTON |
|---|---|---|---|---|
| TO-220C | TUBE | 50 | 1,000 | 8,000 |
| TO-220F | TUBE | 50 | 1,000 | 8,000 |
| TO-251 | TUBE | 80 | 4,000 | 32,000 |

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

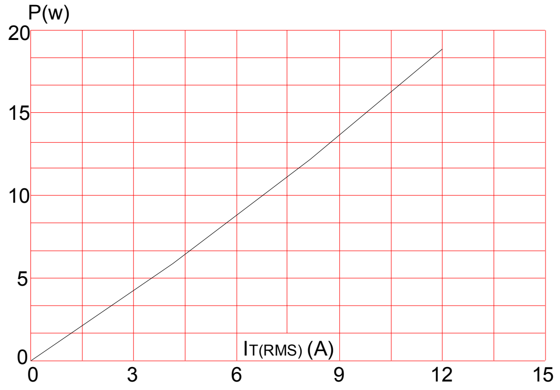


**FIG.2:** RMS on-state current versus case temperature

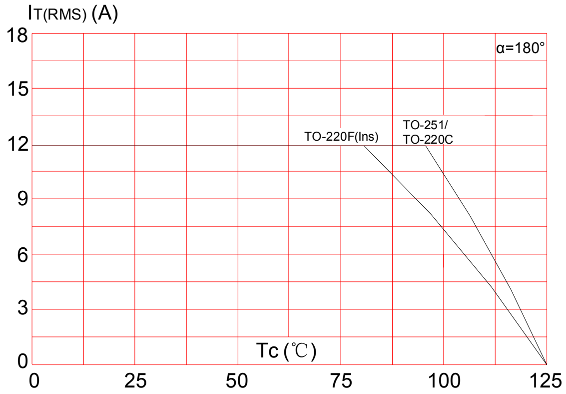


**FIG.3:** Surge peak on-state current versus number of cycles

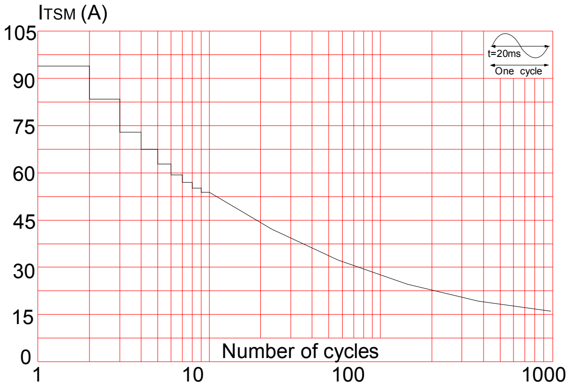


**FIG.4:** On-state characteristics (maximum values)

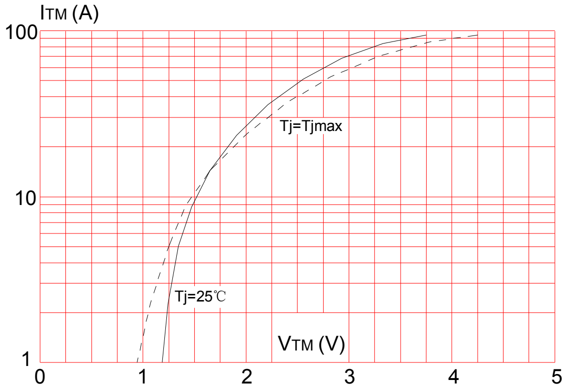


**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp<20ms, and corresponging value of $I^2t$( Ⅰ-Ⅱ-Ⅲ:dI/dt < 50A/μs; Ⅳ:dI/dt < 10A/μs)

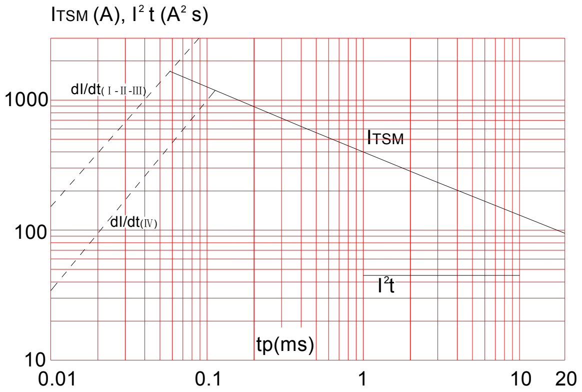


**FIG.6:** Relative variations of gate trigger current versus junction temperature

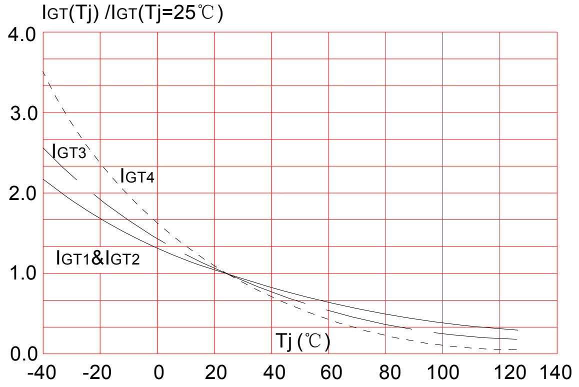


**FIG.7:** Relative variations of holding current versus junction temperature

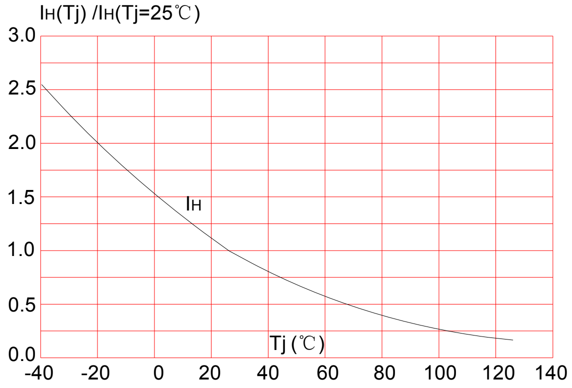
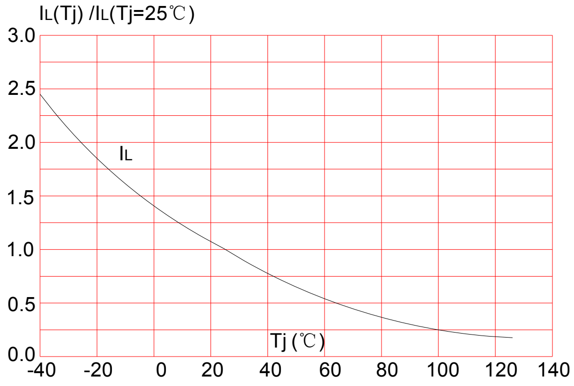


**FIG.8:** Relative variations of latching current versus junction temperature



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