

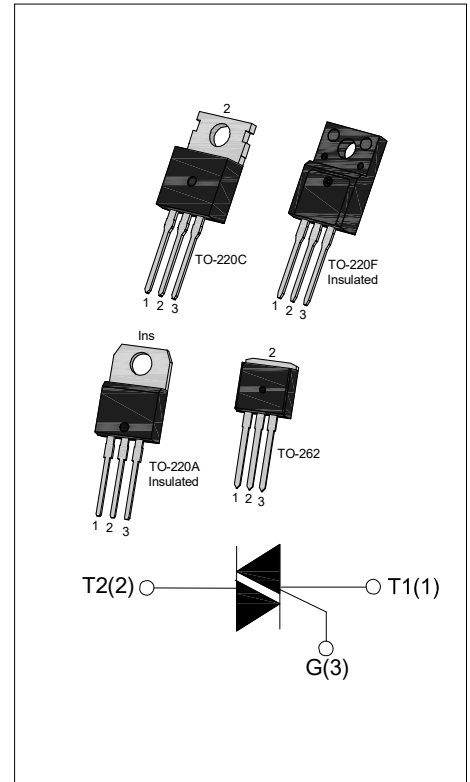


JST12 Series 12A TRIACs

Rev.11.0

DESCRIPTION:

With high ability to withstand the shock loading of large current, JST12 series triacs provide high dv/dt rate with strong resistance to electromagnetic interface. With high commutation performances, 3 quadrants products especially recommended for use on inductive load. From all three terminals to external heatsink, JST12A provides a rated insulation voltage of 2500 V_{RMS}, and JST12F provides a rated insulation voltage of 2000 V_{RMS}, complying with UL standards (File ref: E252906). All the packages above are RoHS compliant. (2011/65/EU)



MAIN FEATURES

| Symbol | Value | Unit |
|---------------------|-------------------|------|
| $I_{T(RMS)}$ | 12 | A |
| V_{DRM} / V_{RRM} | 600/800/1000/1200 | V |

ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Value | Unit |
|---|---|-------------------|------------------|
| Storage junction temperature range | T_{stg} | -40-150 | °C |
| Operating junction temperature range | T_j | -40-125 | °C |
| Repetitive peak off-state voltage ($T_j=25^\circ\text{C}$) | V_{DRM} | 600/800/1000/1200 | V |
| Repetitive peak reverse voltage ($T_j=25^\circ\text{C}$) | V_{RRM} | 600/800/1000/1200 | V |
| RMS on-state current | TO-220A(Ins) | 12 | A |
| | TO-220F(Ins) ($T_c=80^\circ\text{C}$) | | |
| | TO-262 | | |
| | TO-220C($T_c=100^\circ\text{C}$) | | |
| Non repetitive surge peak on-state current (full cycle, F=50Hz) | I_{TSM} | 120 | A |
| I^2t value for fusing ($t_p=10\text{ms}$) | I^2t | 78 | A ² s |
| Peak pulse voltage ($T_j=25^\circ\text{C}$; non-repetitive, off-state; FIG.7) | V_{PP} | 3 | kV |

| | | | | |
|---|--------------|-------------|----|------------|
| Critical rate of rise of on-state current ($I_G = 2 \times I_{GT}$) | I - II - III | di/dt | 50 | A/ μ s |
| Peak gate current | | I_{GM} | 4 | A |
| Average gate power dissipation | | $P_{G(AV)}$ | 1 | W |
| Peak gate power | | P_{GM} | 5 | W |

ELECTRICAL CHARACTERISTICS ($T_j = 25^\circ\text{C}$ unless otherwise specified)

3 Quadrants

| Symbol | Test Condition | Quadrant | | Value | | | | Unit |
|----------------------|--|--------------|-----|-------|------|-----|-----|------------|
| | | | | BW | CW | SW | TW | |
| I_{GT} | $V_D = 12\text{V}$ $R_L = 33\Omega$ | I - II - III | MAX | 50 | 35 | 10 | 5 | mA |
| V_{GT} | | I - II - III | MAX | 1.3 | | | | V |
| V_{GD} | $V_D = V_{DRM}$ $T_j = 125^\circ\text{C}$ $R_L = 3.3\text{K}\Omega$ | I - II - III | MIN | 0.2 | | | | V |
| I_L | $I_G = 1.2I_{GT}$ | I - III | MAX | 80 | 50 | 30 | 20 | mA |
| | | II | | 90 | 60 | 40 | 30 | |
| I_H | $I_T = 100\text{mA}$ | | MAX | 60 | 40 | 20 | 15 | mA |
| dV/dt | $V_D = 2/3V_{DRM}$ Gate Open $T_j = 125^\circ\text{C}$ | | MIN | 1200 | 1000 | 200 | 100 | V/ μ s |
| (di/dt) _c | Without snubber $T_j = 125^\circ\text{C}$ | | MIN | 12 | 6.5 | - | - | A/ms |

4 Quadrants

| Symbol | Test Condition | Quadrant | | Value | | Unit |
|----------------------|--|--------------|-----|-------|-----|------------|
| | | | | B | C | |
| I_{GT} | $V_D = 12\text{V}$ $R_L = 33\Omega$ | I - II - III | MAX | 50 | 25 | mA |
| | | IV | | 70 | 50 | |
| V_{GT} | | ALL | MAX | 1.3 | | V |
| V_{GD} | $V_D = V_{DRM}$ $T_j = 125^\circ\text{C}$ $R_L = 3.3\text{K}\Omega$ | ALL | MIN | 0.2 | | V |
| I_L | $I_G = 1.2I_{GT}$ | I - III - IV | MAX | 50 | 40 | mA |
| | | II | | 100 | 80 | |
| I_H | $I_T = 100\text{mA}$ | | MAX | 50 | 25 | mA |
| dV/dt | $V_D = 2/3V_{DRM}$ Gate Open $T_j = 125^\circ\text{C}$ | | MIN | 500 | 200 | V/ μ s |
| (dV/dt) _c | (di/dt) _c = 5.3A/ms $T_j = 125^\circ\text{C}$ | | MIN | 10 | 5 | V/ μ s |

STATIC CHARACTERISTICS

| Symbol | Parameter | | Value(MAX) | Unit |
|------------------|---|-----------------------|------------|------|
| V _{TM} | I _{TM} =17A tp=380μs | T _j =25°C | 1.5 | V |
| V _{TO} | Threshold voltage | T _j =125°C | 0.95 | V |
| R _d | Dynamic resistance | T _j =125°C | 26 | mΩ |
| I _{DRM} | V _D =V _{DRM} V _R =V _{RRM} | T _j =25°C | 5 | μA |
| I _{RRM} | | T _j =125°C | 1 | mA |

THERMAL RESISTANCES

| Symbol | Parameter | | Value | Unit |
|----------------------|----------------------|------------------------------|-------|------|
| R _{th(j-c)} | junction to case(AC) | TO-220A(Ins) TO-220F(Ins) | 2.5 | °C/W |
| | | TO-262 TO-220C | 1.4 | |

ORDERING INFORMATION

| | | | | | | | |
|--|-------------------------------|--|------------------|---|---|--|-------------------------------------|
| <p>JieJie Microelectronics Co.,Ltd</p> | <p>J</p> <p>Triacs</p> | <p>ST</p> <p>I_{T(RMS)}:12A</p> | <p>12</p> | <p>A</p> <p>A:TO-220A(Ins) F:TO-220F(Ins) C:TO-220C D:TO-262</p> | <p>-600</p> <p>600:V_{DRM} /V_{RRM}≥600V 800:V_{DRM} /V_{RRM}≥800V 1000:V_{DRM} /V_{RRM}≥1000V 1200:V_{DRM} /V_{RRM}≥1200V</p> | <p>BW</p> <p>BW: I_{GT1-3}≤50mA CW: I_{GT1-3}≤35mA SW: I_{GT1-3}≤10mA TW: I_{GT1-3}≤5mA B: I_{GT1-3}≤50mA I_{GT4}≤70mA C: I_{GT1-3}≤25mA I_{GT4}≤50mA</p> | <p>-/</p> <p>Blank: Tube</p> |
|--|-------------------------------|--|------------------|---|---|--|-------------------------------------|

MARKING

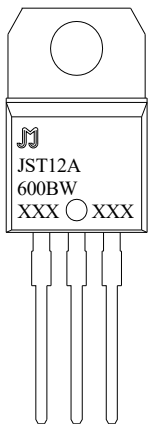
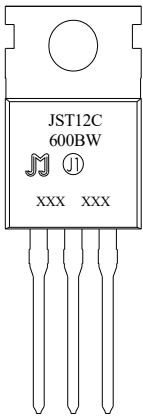
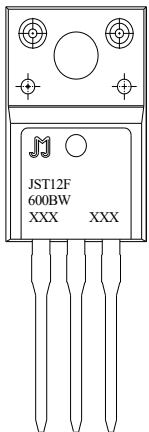
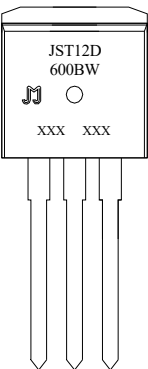
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|--|--|
|  <p>JST12A 600BW XXX ○ XXX</p> |  <p>JST12C 600BW J J XXX XXX</p> |
|  <p>JST12F 600BW XXX XXX</p> |  <p>JST12D 600BW J ○ XXX XXX</p> |
| <p style="text-align: center;"><u>XXX</u> <u>XXX</u></p> <p>Year ———— Month ————</p> <p style="text-align: right;">Production Code</p> | |

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

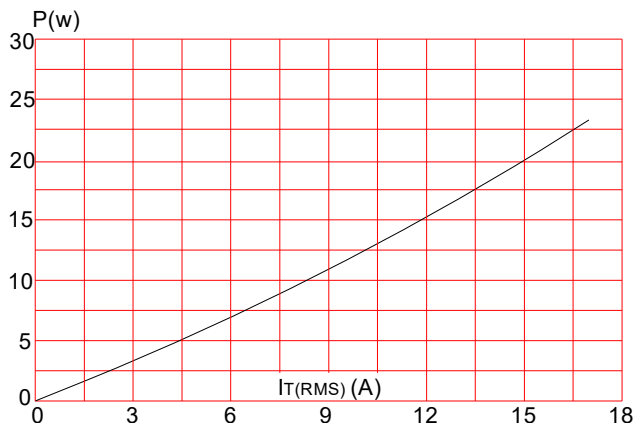


FIG.2: RMS on-state current versus case temperature

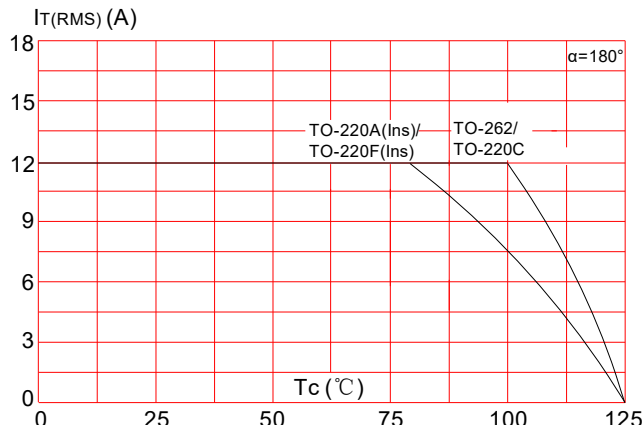


FIG.3: Surge peak on-state current versus number of cycles

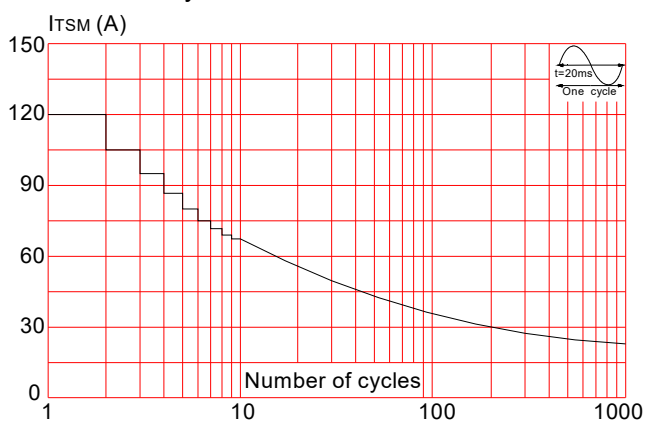


FIG.4: On-state characteristics (maximum values)

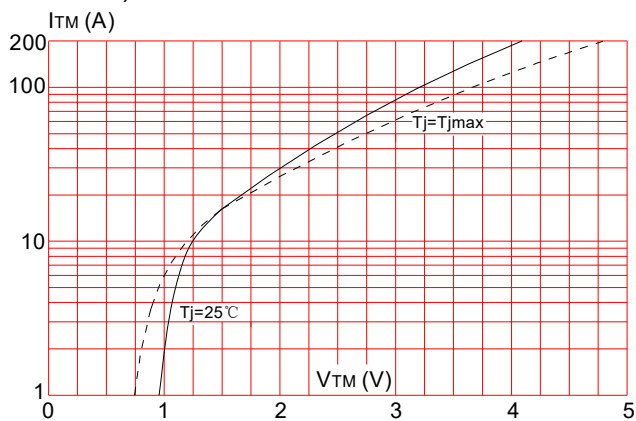


FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 20\text{ms}$, and corresponding value of I^2t (dI/dt (I-II-III) $< 50\text{A}/\mu\text{s}$)

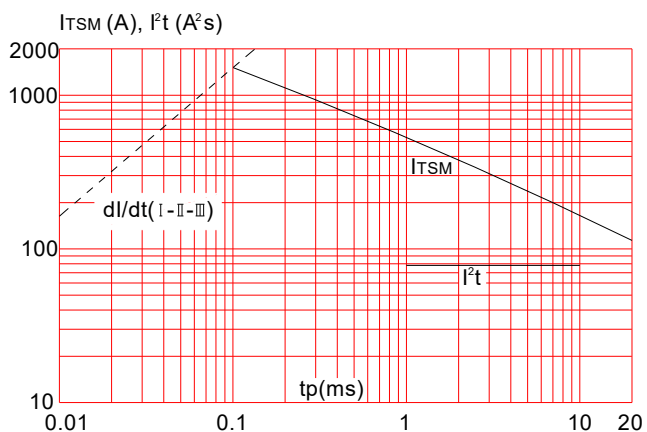


FIG.6: Relative variations of gate trigger current, holding current and latching current versus junction temperature

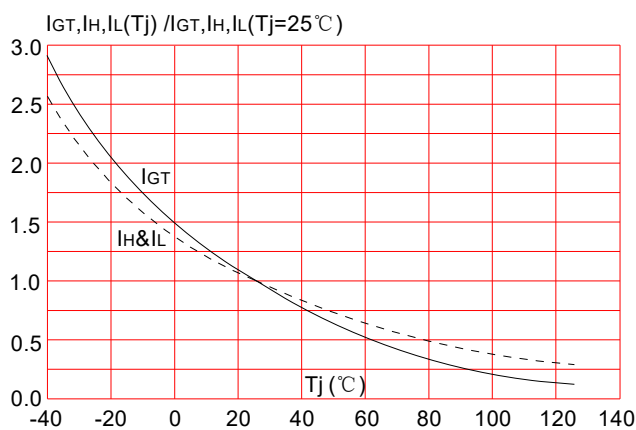
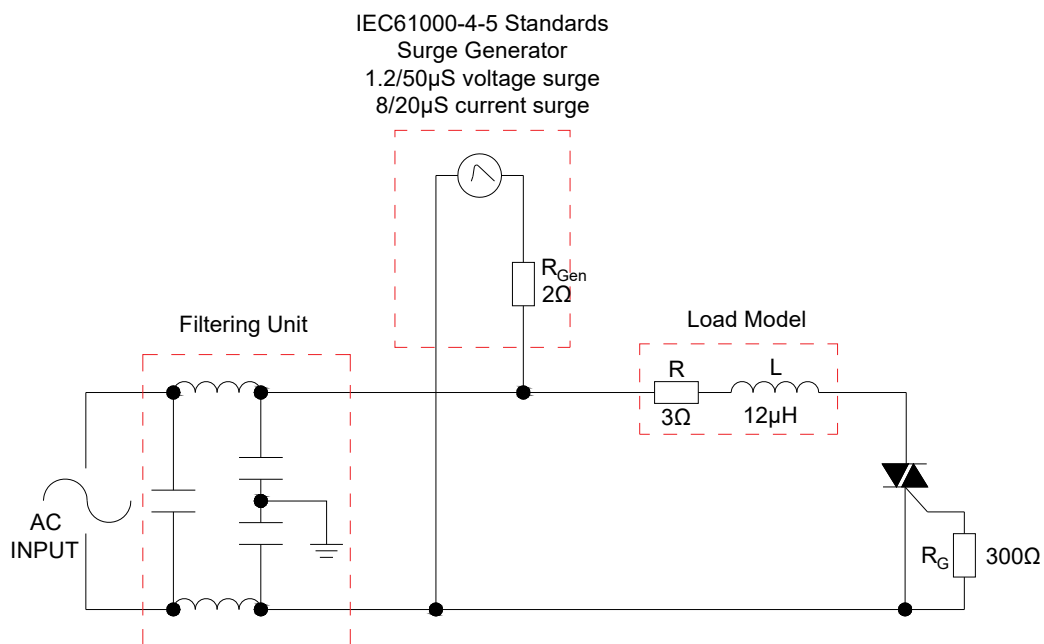


FIG.7: Test circuit for inductive and resistive loads to IEC-61000-4-5 standards.



ORDERING INFORMATION

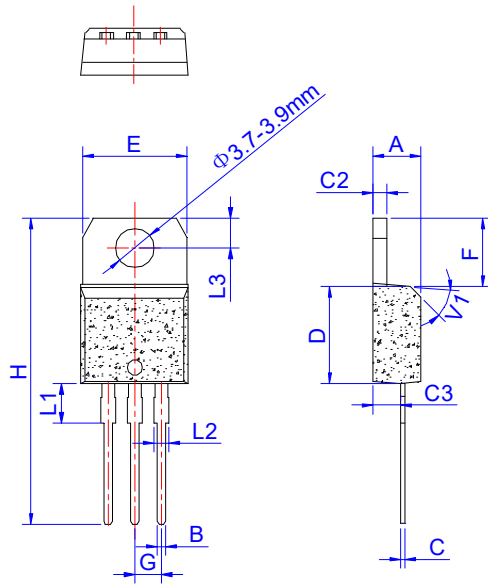
| Order code | Voltage V_{DRM}/V_{RRM} (V) | IGT(mA) | Package | Base qty. (pcs) | Delive ry mode |
|----------------------------|----------------------------------|---------|--------------|-----------------------|----------------------|
| JST12A-600/800/1000/1200CW | 600/800/1000/1200 | 5 | TO-220A(Ins) | 50 | Tube |
| JST12A-600/800/1000/1200CW | | 10 | | | |
| JST12A-600/800/1000/1200CW | | 35 | | | |
| JST12A-600/800/1000/1200CW | | 50 | | | |
| JST12A-600/800/1000/1200CW | | 5 | TO-220C | | |
| JST12A-600/800/1000/1200CW | | 10 | | | |
| JST12A-600/800/1000/1200CW | | 35 | | | |
| JST12A-600/800/1000/1200CW | | 50 | | | |
| JST12A-600/800/1000/1200CW | | 5 | TO-220F(Ins) | | |
| JST12A-600/800/1000/1200CW | | 10 | | | |
| JST12A-600/800/1000/1200CW | | 35 | | | |
| JST12A-600/800/1000/1200CW | | 50 | | | |
| JST12A-600/800/1000/1200CW | | 5 | TO-262 | | |
| JST12A-600/800/1000/1200CW | | 10 | | | |
| JST12A-600/800/1000/1200CW | | 35 | | | |
| JST12A-600/800/1000/1200CW | | 50 | | | |

| Order code | Voltage V_{DRM}/V_{RRM} (V) | IGT(mA) | | Package | Base qty. (pcs) | Delivery mode |
|----------------------|----------------------------------|-------------|----|--------------|--------------------|------------------|
| | | I - II -III | IV | | | |
| JST12A-600/800/1200B | 600/800/1200 | 50 | 70 | TO-220A(Ins) | 50 | Tube |
| JST12A-600/800/1200C | | 25 | 50 | | | |
| JST12C-600/800/1200B | | 50 | 70 | TO-220C | | |
| JST12C-600/800/1200C | | 25 | 50 | | | |
| JST12F-600/800/1200B | | 50 | 70 | TO-220F(Ins) | | |
| JST12F-600/800/1200C | | 25 | 50 | | | |
| JST12D-600/800/1200B | | 50 | 70 | TO-262 | | |
| JST12D-600/800/1200C | | 25 | 50 | | | |

Document Revision History

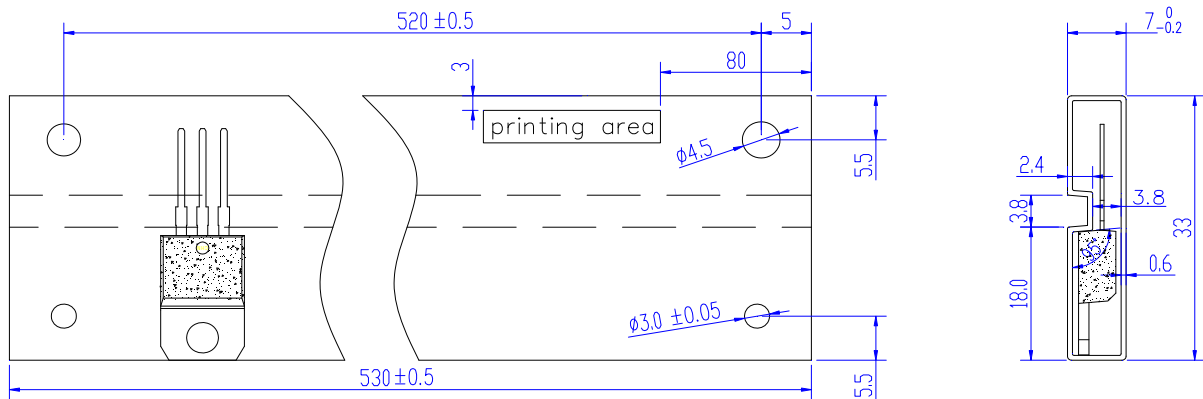
| Date | Revision | Changes |
|--------------|----------|------------------------|
| Jul 12, 2021 | 10 | Last update |
| Jul 07, 2022 | 11 | Delete Package TO-220B |

PACKAGE MECHANICAL DATA



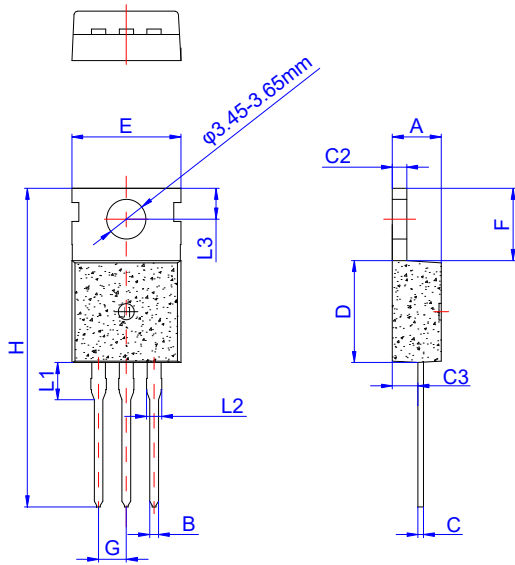
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|------|-------------|------|------|--------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| B | 0.61 | | 0.88 | 0.024 | | 0.035 |
| C | 0.46 | | 0.70 | 0.018 | | 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 | 9.80 | | 10.4 | 0.386 | | 0.409 |
| F | 6.25 | | 6.85 | 0.246 | | 0.270 |
| G | 2.40 | | 2.70 | 0.094 | | 0.106 |
| H | 28.0 | | 29.8 | 1.102 | | 1.173 |
| L1 | 3.45 | | 4.05 | 0.136 | | 0.159 |
| L2 | 1.14 | | 1.70 | 0.045 | | 0.067 |
| L3 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| V1 | | 45° | | | 45° | |

DELIVERY MODE



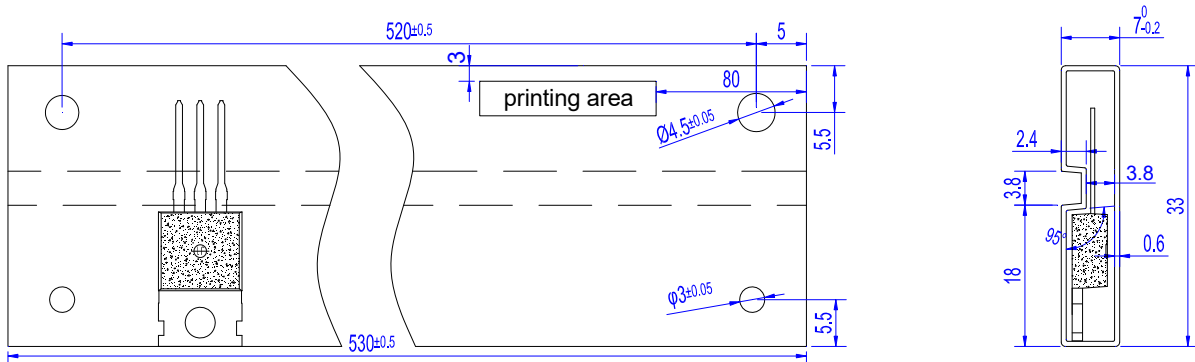
| PACKAGE | OUTLINE | TUBE (PCS) | INNER BOX (PCS) | PER CARTON |
|---------|---------|------------|-----------------|------------|
| TO-220A | TUBE | 50 | 1,000 | 5,000 |

PACKAGE MECHANICAL DATA



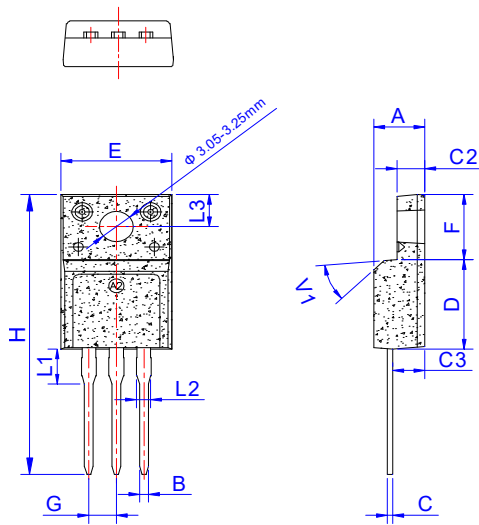
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|------|-------------|------|------|--------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| B | 0.70 | | 0.90 | 0.028 | | 0.035 |
| C | 0.45 | | 0.60 | 0.018 | | 0.024 |
| C2 | 1.25 | | 1.35 | 0.049 | | 0.053 |
| 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 | 2.40 | | 2.70 | 0.094 | | 0.106 |
| H | 28.0 | | 29.8 | 1.102 | | 1.173 |
| L1 | 2.70 | | 3.30 | 0.106 | | 0.130 |
| L2 | 1.14 | | 1.70 | 0.045 | | 0.067 |
| L3 | 2.65 | | 2.95 | 0.104 | | 0.116 |

DELIVERY MODE



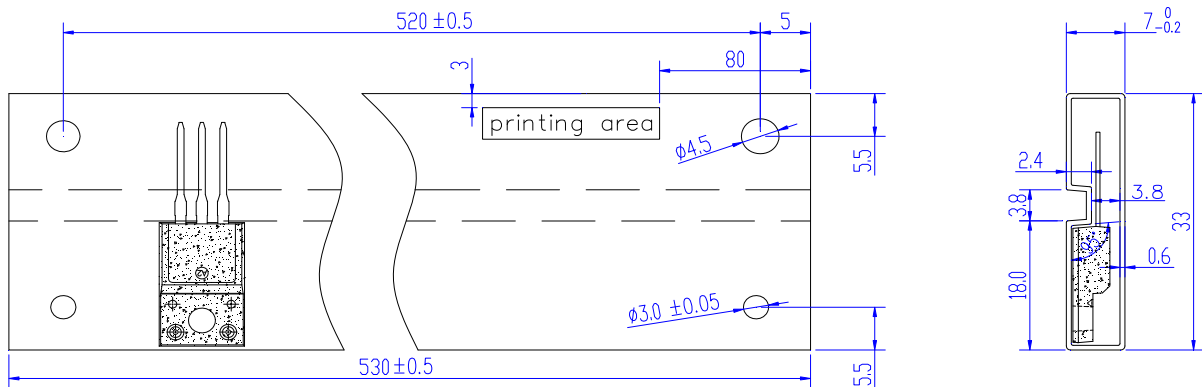
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| TO-220C | TUBE | 50 | 1,000 | 5,000 |

PACKAGE MECHANICAL DATA



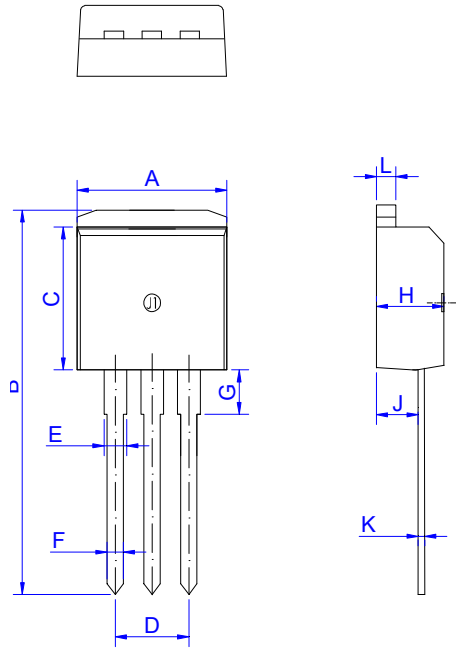
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|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.50 | | 4.90 | 0.177 | | 0.193 |
| B | 0.74 | 0.80 | 0.83 | 0.029 | 0.031 | 0.033 |
| C | 0.47 | | 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 | 2.40 | | 2.70 | 0.094 | | 0.106 |
| H | 28.0 | | 29.8 | 1.102 | | 1.173 |
| L1 | 3.20 | | 3.80 | 0.126 | | 0.150 |
| L2 | 1.14 | | 1.70 | 0.045 | | 0.067 |
| L3 | 3.20 | | 3.60 | 0.126 | | 0.142 |
| V1 | | 45° | | | 45° | |

DELIVERY MODE



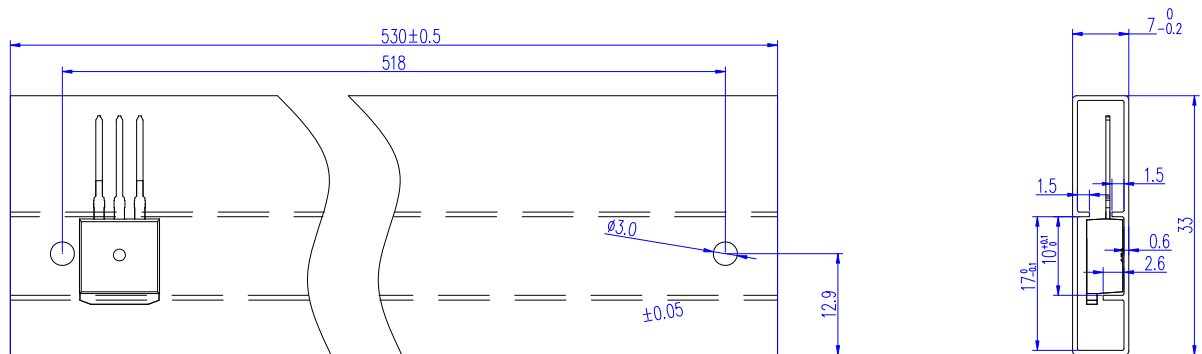
| PACKAGE | OUTLINE | TUBE (PCS) | INNER BOX (PCS) | PER CARTON |
|---------|---------|------------|-----------------|------------|
| TO-220F | TUBE | 50 | 1,000 | 5,000 |

PACKAGE MECHANICAL DATA



| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 9.95 | | 10.20 | 0.392 | | 0.402 |
| B | 23.85 | | 24.05 | 0.939 | | 0.947 |
| C | 9.40 | | 9.60 | 0.370 | | 0.378 |
| D | 4.95 | | 5.25 | 0.195 | | 0.207 |
| E | 1.35 | | 1.40 | 0.053 | | 0.055 |
| F | 0.80 | | 0.85 | 0.031 | | 0.033 |
| G | 2.70 | | 3.40 | 0.106 | | 0.134 |
| H | 4.45 | | 4.55 | 0.175 | | 0.179 |
| J | 2.20 | | 2.60 | 0.087 | | 0.102 |
| K | 0.48 | | 0.52 | 0.019 | | 0.020 |
| L | 1.30 | | 1.35 | 0.051 | | 0.053 |

DELIVERY MODE



| PACKAGE | OUTLINE | TUBE (PCS) | INNER BOX (PCS) | PER CARTON |
|---------|---------|------------|-----------------|------------|
| TO-262 | TUBE | 50 | 1,000 | 5,000 |



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