

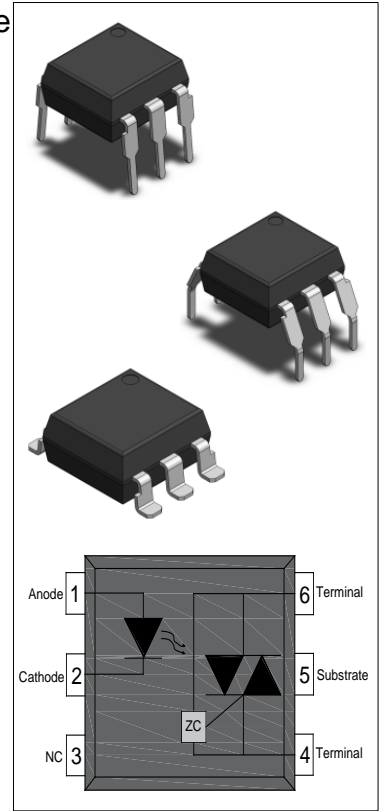


JOC306X Series

Rev.A.1.0

DESCRIPTION:

The JOC306X series combine an AlGaAs infrared emitting diode the emitter which is optically coupled to a monolithic silicon zero-cross photo triac in a plastic DIP and SMD package with different lead forming options. The products are widely used in solenoid/valve controls, lighting controls, motor controls, temperature controls, static AC power switches, solid state relays, interfacing microprocessors up to 265 V_{AC} peripherals.



MAIN FEATURES

- High isolation 5000 VRMS
- DC input with zero-cross photo triac output
- Operating temperature range -55 °C to 100 °C
- REACH & RoHS compliance
- HBM: H3A ; MM: M4
- CQC approved
- VDE approved
- UL approved

ABSOLUTE MAXIMUM RATINGS (Temperature=25°C)

| Parameter | | Symbol | Value | Unit |
|-----------|---|----------------------|-------|-------|
| Input | Forward Current | I _F | 60 | mA |
| | Reverse Voltage | V _R | 6 | V |
| | Junction Temperature | T _j | 125 | °C |
| | Input Power Dissipation | P _I | 100 | mW |
| | Power Dissipation Derating (T _a ≥ 25°C) | Δ P _D /°C | -1.33 | mW/°C |
| Output | Off-state Output Terminal Voltage | V _{OFF} | 600 | V |
| | Peak On-state Current (100μs pulse, 120 pps) | I _{TP} | 2 | A |
| | On-state RMS Current | I _{T(RMS)} | 100 | mA |
| | Peak Repetitive Surge Current (P _W =10 ms) | I _{TSM} | 1 | A |
| | Junction Temperature | T _j | 125 | °C |
| | Output Power Dissipation | P _O | 250 | mW |

| | | | | |
|-------------------------|---|-------------------------------|-------------------|----------------------|
| | Power Dissipation Derating ($T_a \geq 25^\circ\text{C}$) | $\Delta P_D / ^\circ\text{C}$ | -3.33 | mW/ $^\circ\text{C}$ |
| Total Power Dissipation | | P_{tot} | 350 | mW |
| Isolation Voltage | | V_{iso} | 5000 ^① | V _{rms} |
| Operating Temperature | | T_{opr} | -55~100 | $^\circ\text{C}$ |
| Storage Temperature | | T_{stg} | -55~125 | $^\circ\text{C}$ |
| Soldering Temperature | | T_{sol} | 260 ^② | $^\circ\text{C}$ |

NOTE1: AC for 1minute, R.H.=40~60%

NOTE2: For 10 seconds

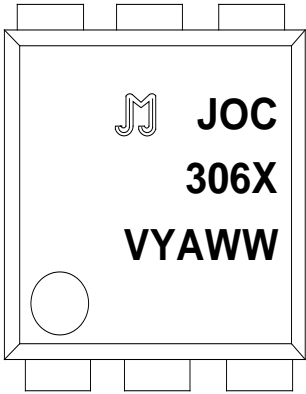
ELECTRICAL CHARACTERISTICS (Temperature=25 $^\circ\text{C}$)

| Parameter | | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-------------------------------|--|---|--|-------------------|-----------|------------------|------------------|
| Input | Forward Voltage | V_F | $I_F=10\text{mA}$ | - | 1.27 | 2.2 | V |
| | Reverse Current | I_R | $V_R=6\text{V}$ | - | - | 1 | μA |
| | Input Capacitance | C_{in} | $V=0, f=1\text{kHz}$ | - | 10 | - | pF |
| Output | Peak Off-state Current, Either Direction | I_{OFF} | $V_{\text{OFF}}=600\text{V}, I_F=0$ | - | - | 100 ^③ | nA |
| | Peak On-state Voltage, Either Direction | V_{TM} | $I_{\text{TM}}=100\text{mA}$ | - | 1.7 | 2.5 | V |
| | Critical Rate of Rise of Off-state voltage | dV/dt | $V_{\text{PEAK}}=600\text{V}, I_F=0$ | 1000 ^④ | - | - | V/ μs |
| Transfer Characteristics | LED Trigger Current | JOC3061 | Terminal Voltage=3V $I_{\text{TM}}=100\text{mA}$ | - | - | 15 | mA |
| | | JOC3062 | | - | - | 10 | |
| | | JOC3063 | | - | - | 5 | |
| | Holding Current | I_H | $I_{\text{TM}}=2\text{mA}, I_F=\text{Rated } I_{\text{FT}}$ | - | 350 | - | μA |
| | Isolation Resistance | R_{ISO} | DC500V 40~60%R.H. | 10^{12} | 10^{14} | - | Ω |
| | Floating Capacitance | C_{IO} | $V=0, f=1\text{MHz}$ | - | 10 | - | pF |
| Response Time | t_{on} | $V_D=6\text{V}, R_L=100\Omega, I_F=20\text{mA}$ | - | 15 | 50 | μs | |
| Zero-crossing Characteristics | Inhibit Voltage | V_{IH} | $I_F=\text{Rated } I_{\text{FT}}$ | - | - | 20 | V |
| | Leakage in Inhibited State | I_{OFF2} | $I_F=\text{Rated } I_{\text{FT}}, V_{\text{OFF}}=\text{Rated } V_{\text{OFF}}$ | - | - | 1.5 | mA |

NOTE3: Test voltage must be applied within dV/dt ratings.

NOTE4: Refer to Fig.14 & Fig.15

ORDERING AND MARKING INFORMATION

| MARKING INFORMATION | | | |
|--|-----------------|--|-------------------------------------|
|  | | <p>JOC : Company Abbr. 306X : Part Number & Rank V : VDE Option Y : Fiscal Year A : Manufacturing Code WW : Work Week</p> | |
| ORDERING INFORMATION | | | |
| JOC306X(Y)(Z)-GV | | | |
| <p>JOC – Company Abbr. 306X – Part Number (1/2/3) Y – Lead Form Option (M/SL/None) Z – Tape and Reel Option (T1) G – Green Option (G or None) V – VDE Option (V or None)</p> | | | |
| Packing Quantity | | | |
| Option | Quantity | Quantity – Inner box | Quantity –Outer box |
| None | 65 Units/Tube | 32 Tubes/Inner box | 10 Inner box/Outer box =20.8k Units |
| M | 65 Units/Tube | 32 Tubes/Inner box | 10 Inner box/Outer box =20.8k Units |
| SL(T1) | 1000 Units/Reel | 3 Reels/Inner box | 5 Inner box/Outer box =15k Units |

Characteristics Curves

FIG.1: Forward Current vs. Ambient Temperature

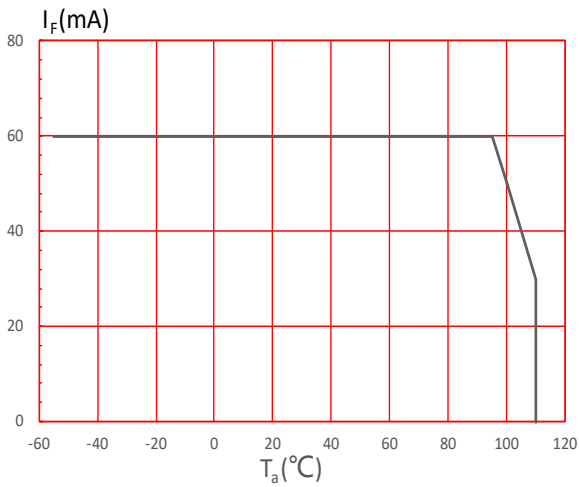


FIG.2: On-state Terminal Current vs. Ambient Temperature

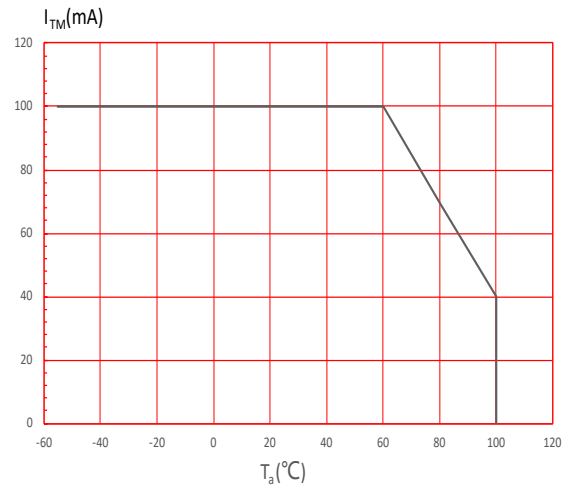


FIG.3: Forward Current vs. Forward Voltage

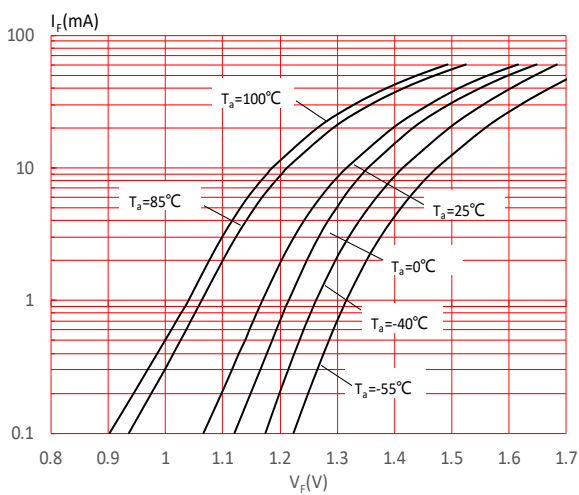


FIG.4: Normalized Off-state Terminal Current vs. Ambient Temperature

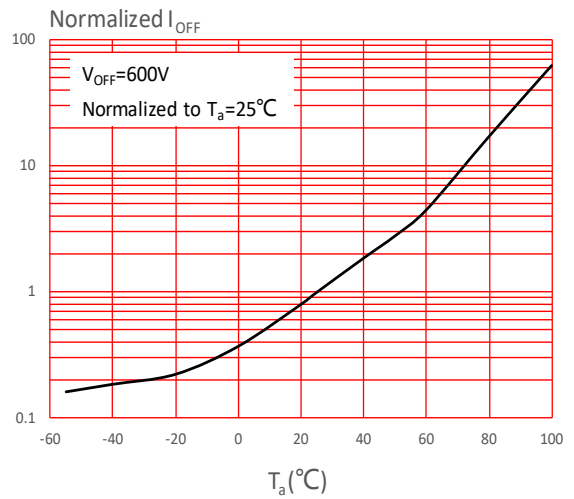


FIG.5: Normalized Off-state Terminal Voltage vs. Ambient Temperature

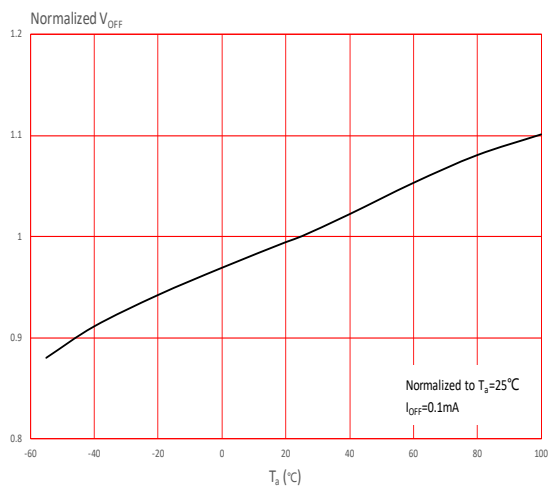


FIG.6: Normalized Trigger Current vs. Ambient Temperature

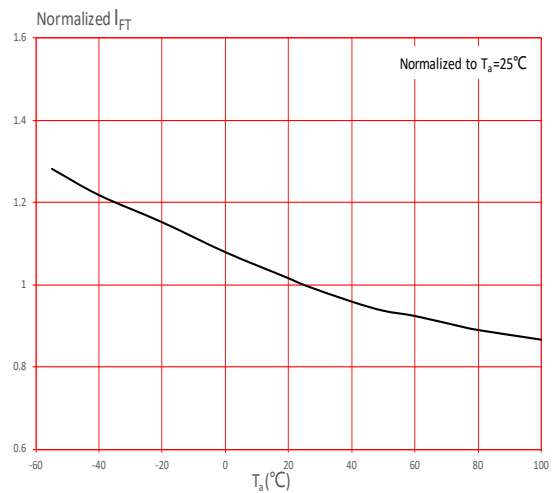


FIG.7: Normalized On-state Terminal Voltage vs. Ambient Temperature

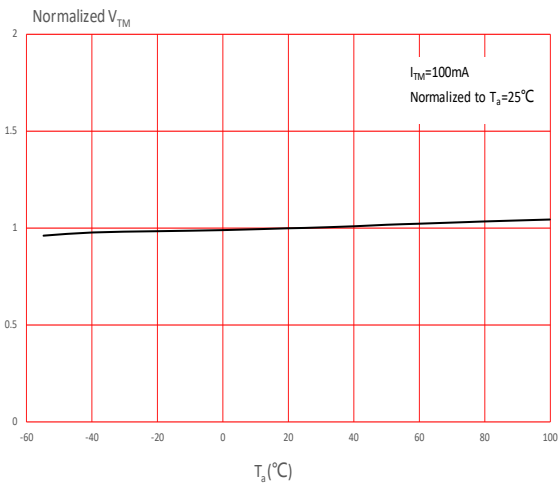


FIG.8: On-state Terminal Voltage vs. On-state Terminal Current

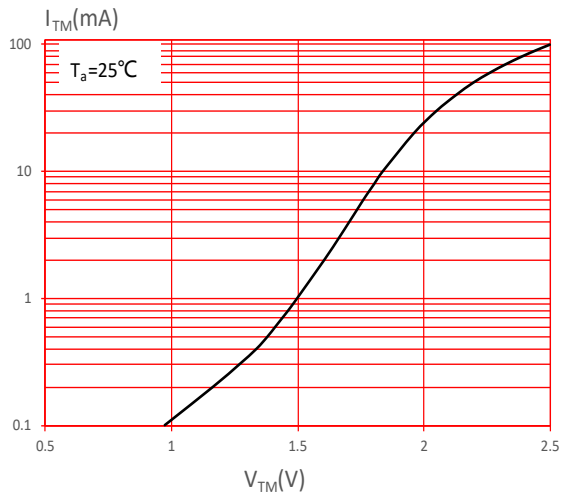


FIG.9: Normalized Holding Current vs. Ambient Temperature

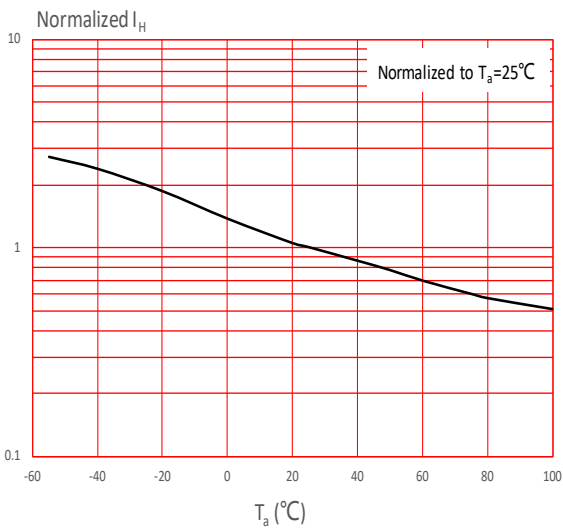


FIG.10: Normalized Leakage in Inhibit State vs. Ambient Temperature

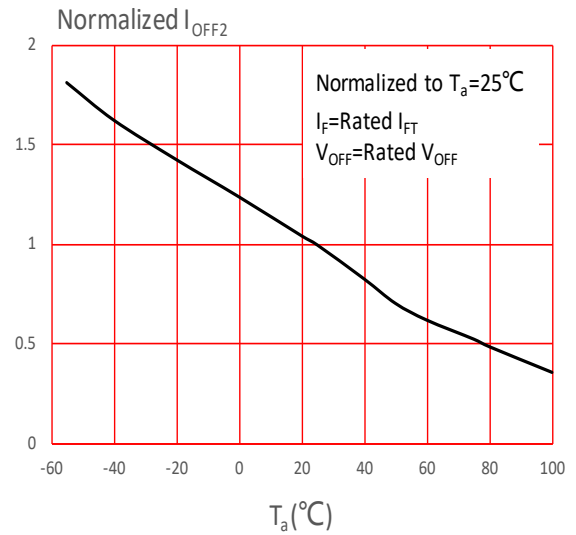
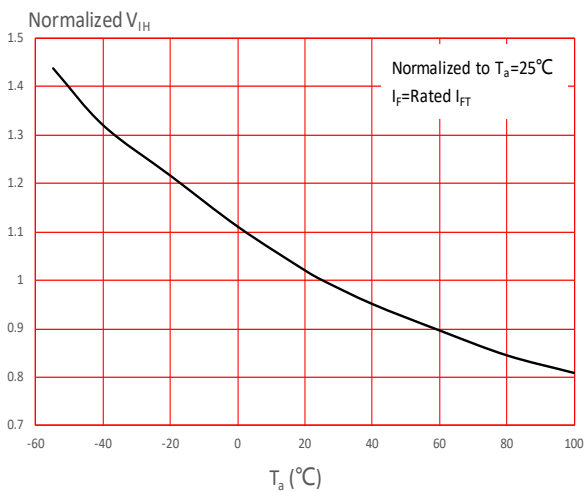


FIG.11: Normalized Inhibit Voltage vs. Ambient Temperature



TEST CIRCUITS

FIG.12: Test Circuits of Turn On Time

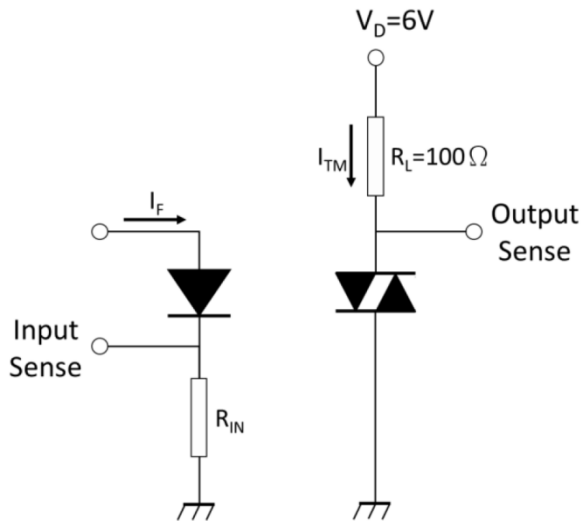


FIG.13: Waveforms of Turn On Time



Fig.14: Test Circuits of dV/dt

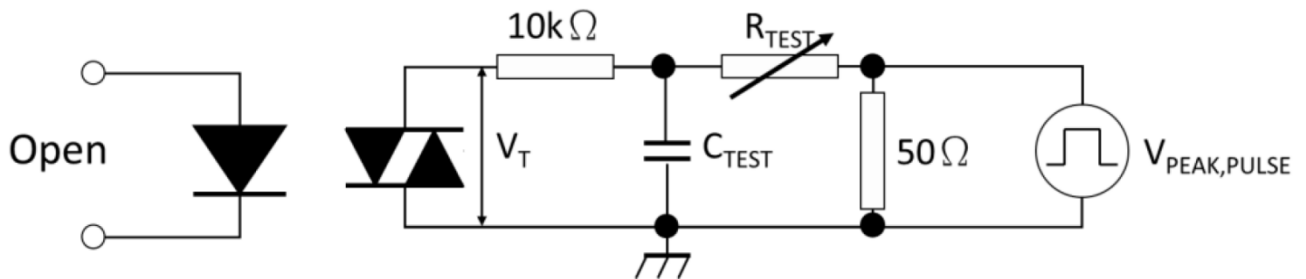
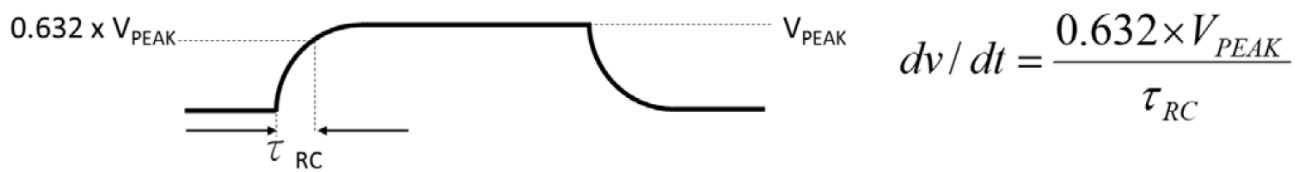
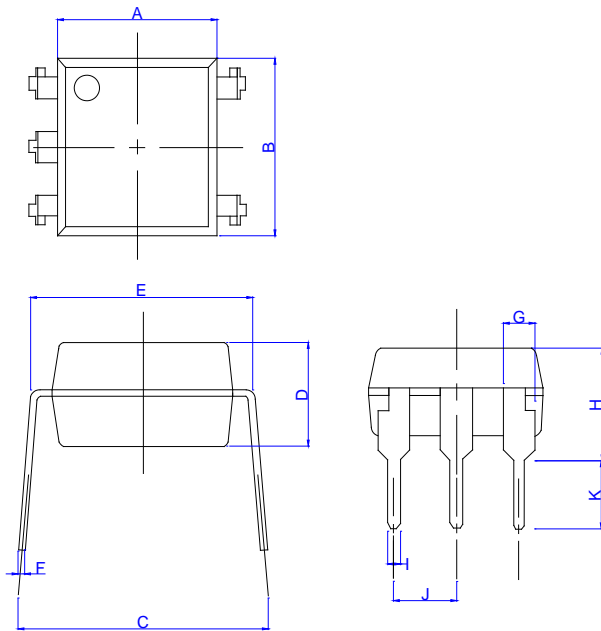


Fig.15: Waveforms of dV/dt



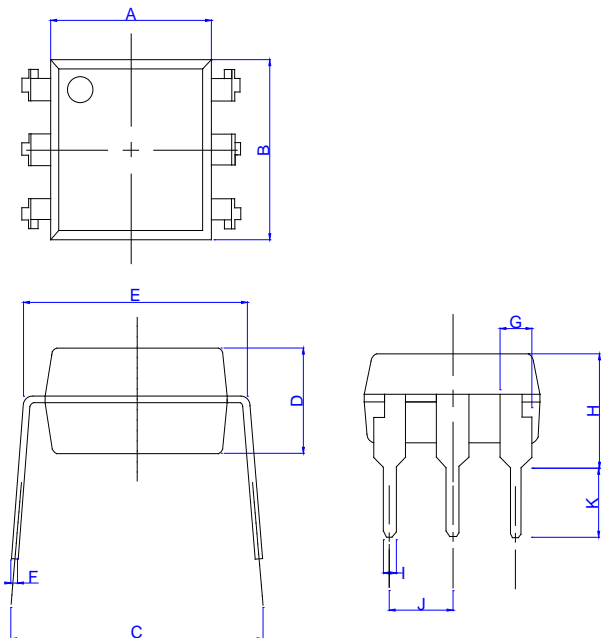
Package Dimension (Unit: mm)

Standard DIP5 Type:



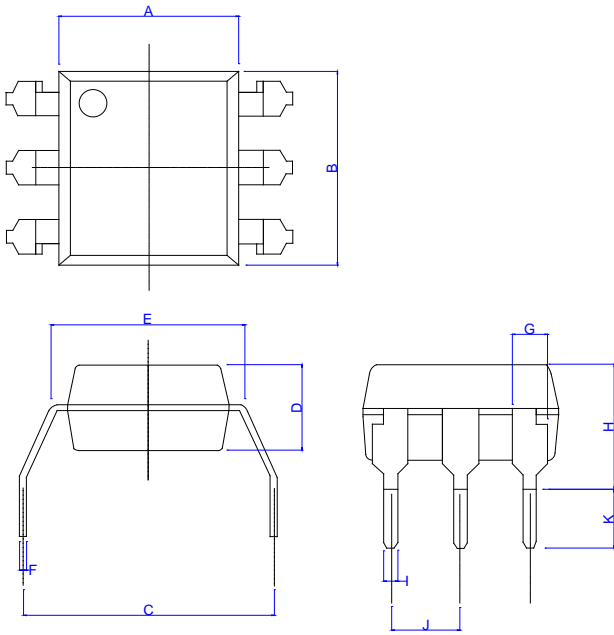
| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 6.30 | | 6.70 | 0.249 | | 0.265 |
| B | 6.92 | | 7.32 | 0.274 | | 0.289 |
| C | 7.62 | | 9.50 | 0.301 | | 0.375 |
| D | 3.30 | | 3.70 | 0.130 | | 0.146 |
| E | 7.32 | | 7.92 | 0.289 | | 0.313 |
| F | | 0.25 | | | 0.010 | |
| G | 1.20 | | 1.40 | 0.047 | | 0.055 |
| H | 4.20 | | 4.80 | 0.166 | | 0.190 |
| I | | 0.50 | | | 0.020 | |
| J | | 2.54 | | | 0.100 | |
| K | | 2.80 | | | 0.111 | |

Standard DIP6 Type:



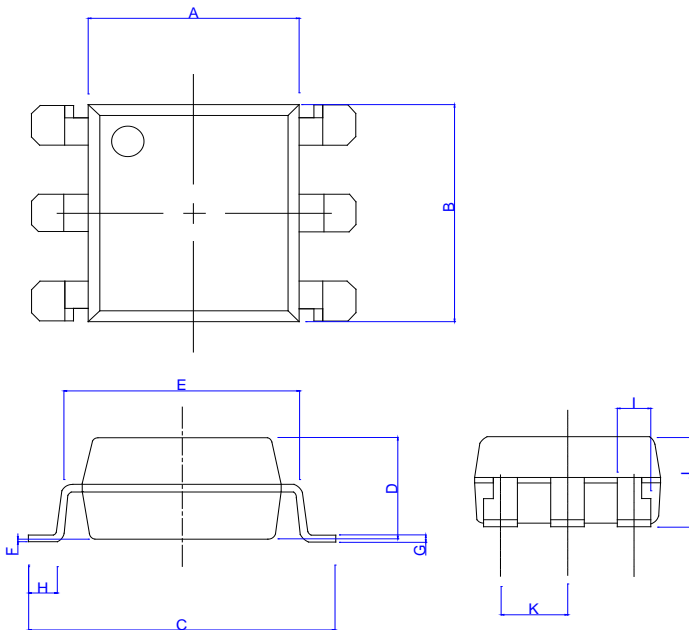
| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 6.30 | | 6.70 | 0.249 | | 0.265 |
| B | 6.92 | | 7.32 | 0.274 | | 0.289 |
| C | 7.62 | | 9.50 | 0.301 | | 0.375 |
| D | 3.30 | | 3.70 | 0.130 | | 0.146 |
| E | 7.32 | | 7.92 | 0.289 | | 0.313 |
| F | | 0.25 | | | 0.010 | |
| G | 1.20 | | 1.40 | 0.047 | | 0.055 |
| H | 4.20 | | 4.80 | 0.166 | | 0.190 |
| I | | 0.50 | | | 0.020 | |
| J | | 2.54 | | | 0.100 | |
| K | 2.50 | | 3.10 | 0.099 | | 0.123 |

Option M Type:



| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 6.30 | | 6.70 | 0.249 | | 0.265 |
| B | 6.92 | | 7.32 | 0.274 | | 0.289 |
| C | 9.86 | | 10.46 | 0.390 | | 0.413 |
| D | 3.30 | | 3.70 | 0.130 | | 0.146 |
| E | 7.32 | | 7.92 | 0.289 | | 0.313 |
| F | | 0.25 | | | 0.010 | |
| G | 1.20 | | 1.40 | 0.047 | | 0.055 |
| H | 4.28 | | 4.88 | 0.169 | | 0.193 |
| I | | 0.50 | | | 0.020 | |
| J | | 2.54 | | | 0.100 | |
| K | 2.20 | | | 0.087 | | |

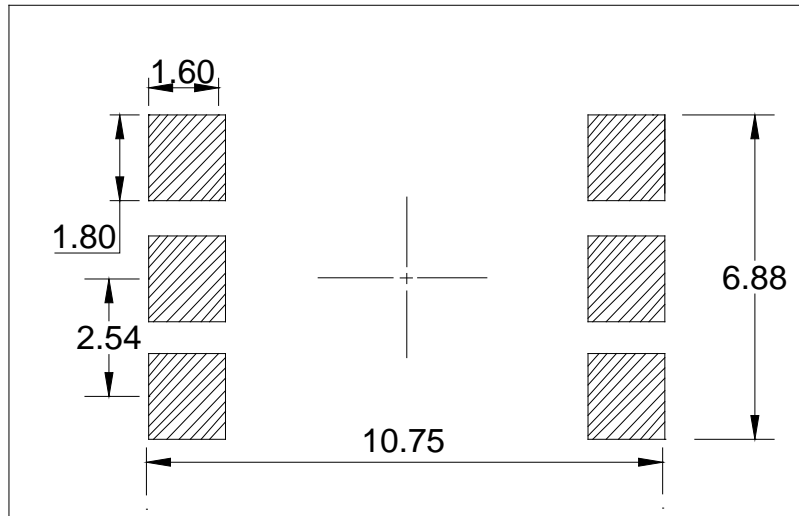
Option SL Type:



| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 6.30 | | 6.70 | 0.249 | | 0.265 |
| B | 6.92 | | 7.32 | 0.274 | | 0.289 |
| C | 9.85 | | 10.45 | 0.389 | | 0.413 |
| D | 3.30 | | 3.70 | 0.130 | | 0.146 |
| E | 7.32 | | 7.92 | 0.289 | | 0.313 |
| F | | 0.10 | | | 0.004 | |
| G | | 0.25 | | | 0.010 | |
| H | | 0.80 | | | 0.032 | |
| I | 1.20 | | 1.40 | 0.047 | | 0.055 |
| J | 3.30 | | 3.90 | 0.130 | | 0.154 |
| K | | 2.54 | | | 0.100 | |

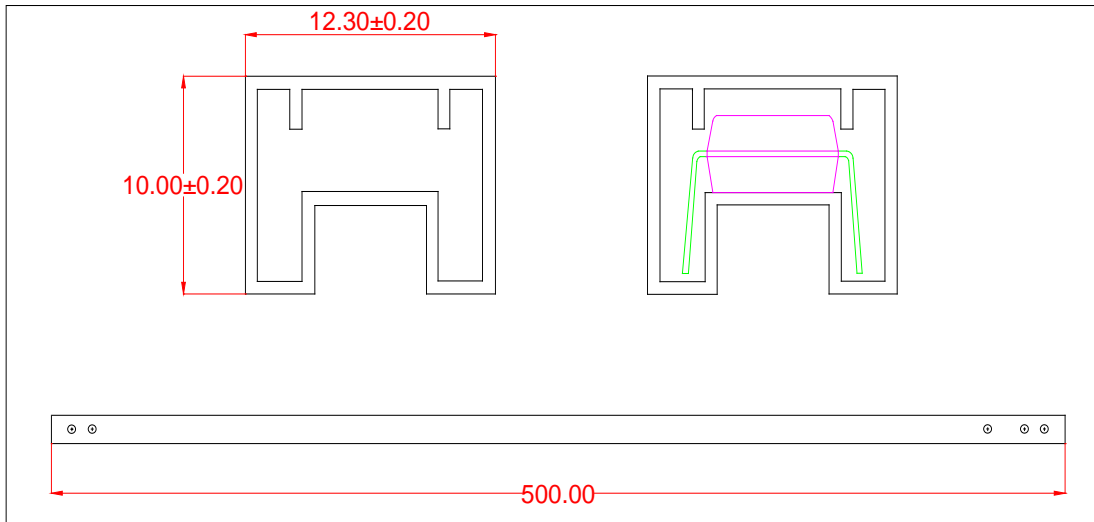
RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming & Surface Mount (Low Profile) Lead Forming:

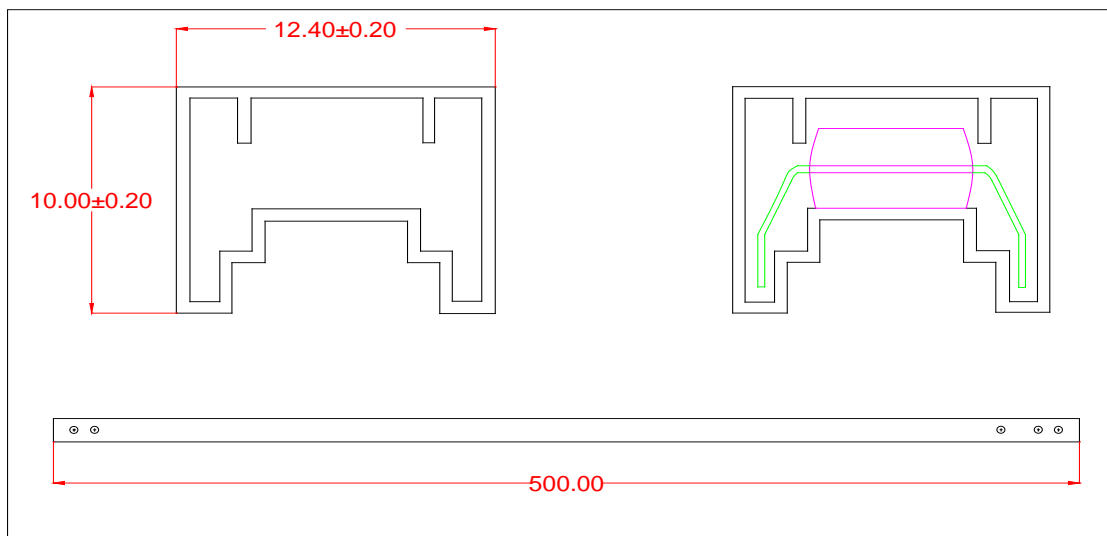


TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Standard DIP

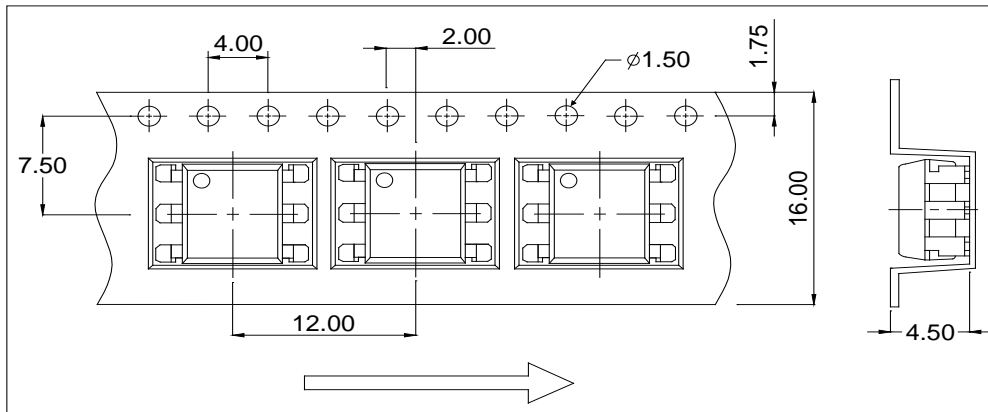


Option M



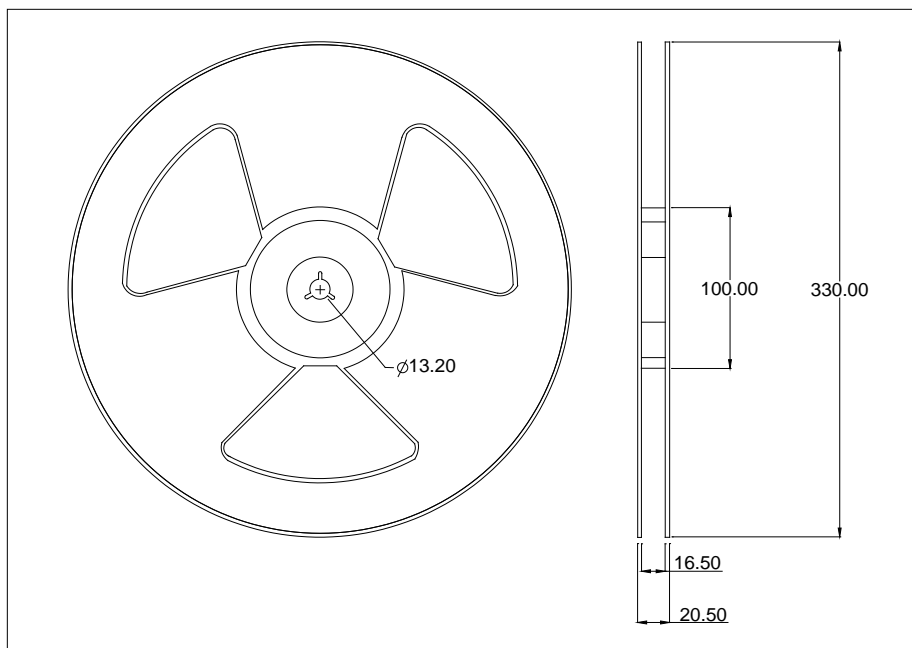
CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SL(T1)

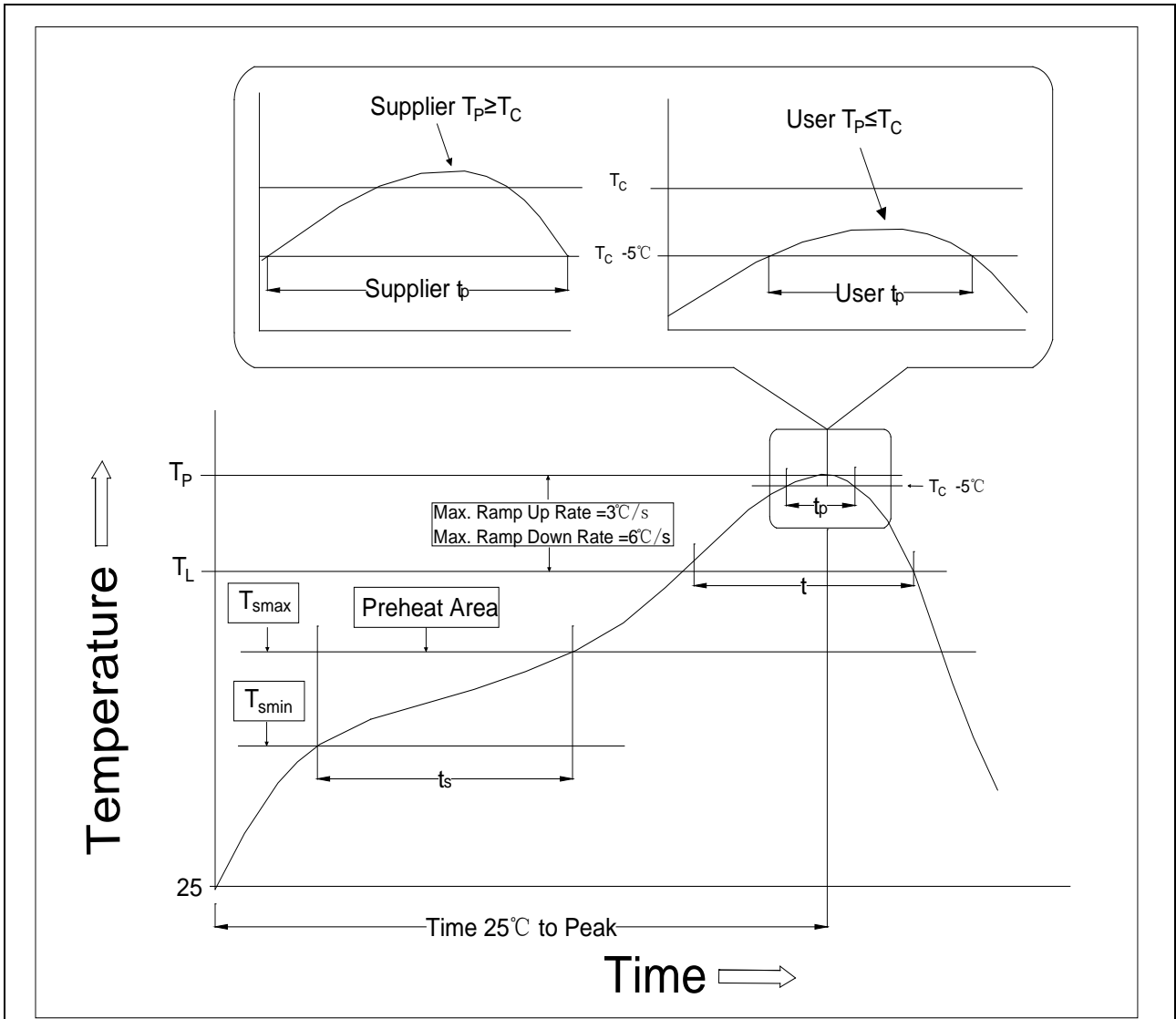


REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SL




REFLOW INFORMATION



| Profile Feature | Sn-Pb Assembly Profile | Pb-Free Assembly Profile |
|---|------------------------|--------------------------|
| Temperature Min. (T _{smin}) | 100 | 150°C |
| Temperature Max. (T _{smax}) | 150 | 200°C |
| Time (t _s) from (T _{smin} to T _{smax}) | 60-120 seconds | 60-120 seconds |
| Ramp-up Rate (t _L to t _P) | 3°C/second max. | 3°C/second max. |
| Liquidous Temperature (T _L) | 183°C | 217°C |
| Time (t _L) Maintained Above (T _L) | 60-150 seconds | 60-150 seconds |
| Peak Body Package Temperature | 235°C+0°C/-5°C | 260°C+0°C/-5°C |
| Time (t _P) within 5°C of 260°C | 20 seconds | 30 seconds |
| Ramp-down Rate (T _P to T _L) | 6°C/second max. | 6°C/second max. |
| Time 25°C to Peak Temperature | 6 minutes max. | 8 minutes max. |

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