



JOC301X, JOC302X, JOC305X, JOC307X Series

DC Input, Random-Phase Photo TRIAC Coupler

Description

The JOC301X, JOC302X, JOC305X and JOC307X series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon random-phase photo triac in a plastic DIP6 package with different lead forming options.

With the robust coplanar double mold structure, JOC301X, JOC302X, JOC305X and JOC307X series provide the most stable isolation feature.

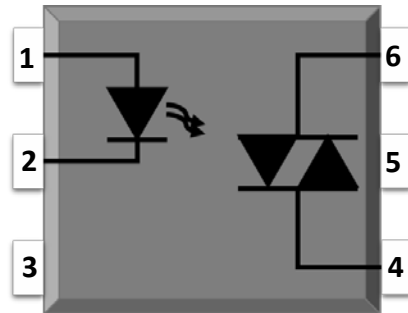
Features

- High isolation 5000 VRMS
- DC input with random-phase photo triac output
- Operating temperature range - 40 °C to 100 °C
- REACH & RoHS compliance
- MSL class 1
- Regulatory Approvals
 - UL
 - VDE
 - CQC

Applications

- Solenoid/valve controls
- Lighting controls
- Motor controls
- Temperature controls
- Static AC power switches
- Solid state relays
- Interfacing microprocessors to 115 to 240VAC peripherals

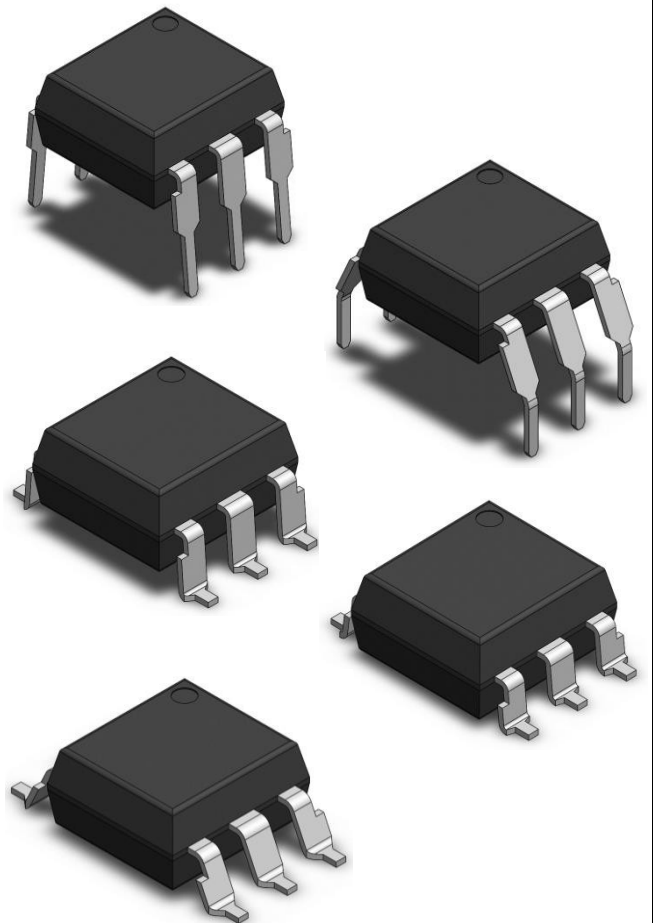
SCHEMATIC



PIN DEFINITION

- | | |
|------------|--------------|
| 1. Anode | 4. Terminal |
| 2. Cathode | 5. Substrate |
| 3. NC | 6. Terminal |

PACKAGE OUTLINE



ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | VALUE | UNIT | NOTE |
|---|--------------|---------|------------------|------|
| 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 | |
| OUTPUT | | | | |
| Off-state Output Terminal Voltage | JOC301X | 250 | V | |
| | JOC302X | 400 | | |
| | JOC305X | 600 | | |
| | JOC307X | 800 | | |
| Peak Repetitive Surge Current PW=100μs, 120pps | I_{TSM} | 1 | A | |
| On-State RMS Current | $I_{T(RMS)}$ | 100 | mA | |
| Junction Temperature | T_j | 125 | °C | |
| Output Power Dissipation | P_o | 300 | mW | |
| COMMON | | | | |
| Total Power Dissipation | P_{tot} | 400 | mW | |
| Isolation Voltage | V_{iso} | 5000 | V _{rms} | 1 |
| Operating Temperature | T_{opr} | -40~100 | °C | |
| Storage Temperature | T_{stg} | -55~125 | °C | |
| Soldering Temperature | T_{sol} | 260 | °C | 2 |

Note 1. AC For 1 Minute, R.H. = 40 ~ 60%

Note 2. For 10 seconds

ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

| PARAMETER | | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITION | NOTE |
|---|---------------------------------|-----------|-----------|-----------|------|------------------------|--|------|
| INPUT | | | | | | | | |
| Forward Voltage | | V_F | - | 1.24 | 1.4 | V | $I_F=10\text{mA}$ | |
| Reverse Current | | I_R | - | - | 10 | μA | $V_R=6\text{V}$ | |
| Input Capacitance | | C_{in} | - | 8.5 | 250 | pF | $V=0, f=1\text{kHz}$ | |
| OUTPUT | | | | | | | | |
| Peak Off-state Current, Either Direction | | I_{DRM} | - | - | 100 | nA | $V_{DRM}=\text{Rated } V_{DRM}$ $I_F=0$ | 3 |
| Peak On-state Voltage, Either Direction | | V_{TM} | - | 1.58 | 2.5 | V | $I_{TM}=100\text{mA}$ | |
| Critical Rate of Rise of Off-state Voltage | | dV/dt | 1000 | - | - | $\text{V}/\mu\text{s}$ | $V_{PEAK}=\text{Rated } V_{DRM}$ | 4 |
| TRANSFER CHARACTERISTICS | | | | | | | | |
| LED | JOC3010,JOC3021,JOC3051,JOC3071 | I_{FT} | - | - | 15 | mA | Terminal Voltage = 3V $I_{TM}=100\text{mA}$ | |
| Trigger | JOC3011,JOC3022,JOC3052,JOC3072 | | - | - | 10 | | | |
| Current | JOC3012,JOC3023,JOC3053,JOC3073 | | - | - | 5 | | | |
| Holding Current | | I_H | - | 257 | - | μA | | |
| Isolation Resistance | | R_{iso} | 10^{12} | 10^{14} | - | Ω | DC500V, 40 ~ 60% R.H. | |
| Floating Capacitance | | C_{IO} | - | 0.8 | - | pF | $V=0, f=1\text{MHz}$ | |

Note3. Test voltage must be applied within dV/dt rating.

Note4. Refer to Fig.15 & Fig.16

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

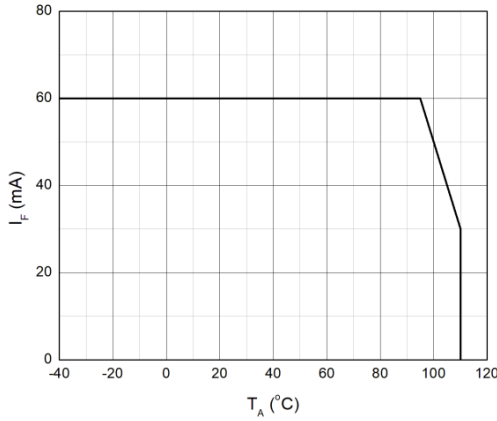


Fig.2 On-state Terminal Current vs. Ambient Temperature

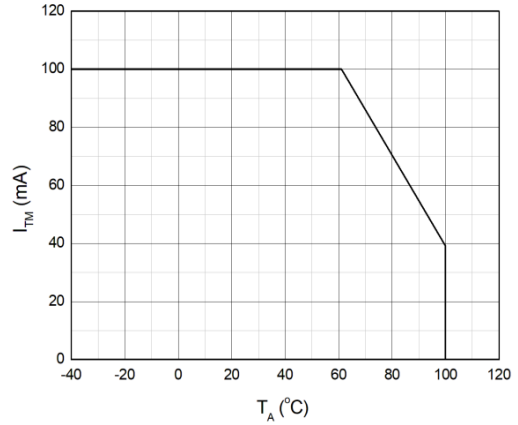


Fig.3 Forward Current vs. Forward Voltage

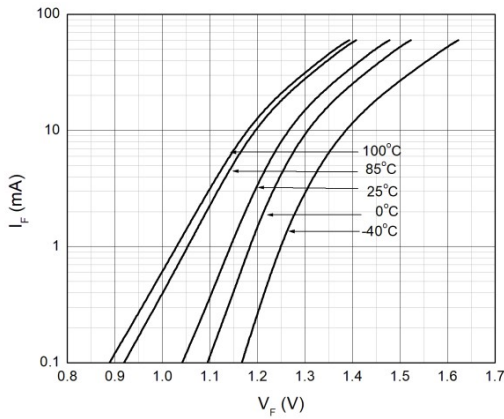


Fig.4 Off-state Terminal Current vs. Ambient Temperature

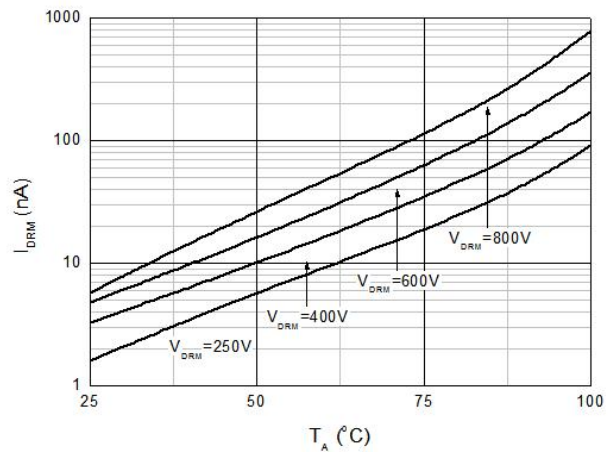


Fig.5 Normalized Off-state Terminal Voltage vs. Ambient Temperature

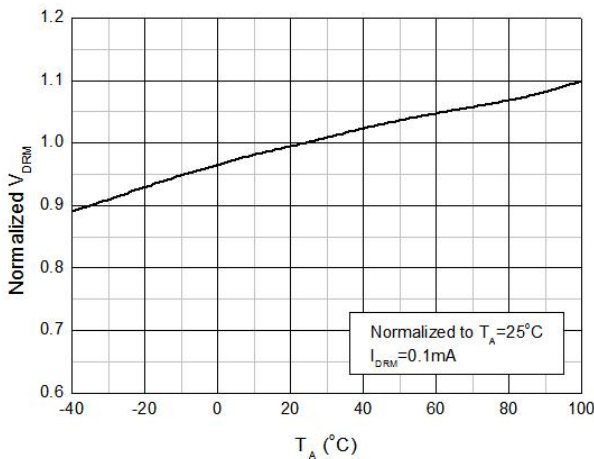
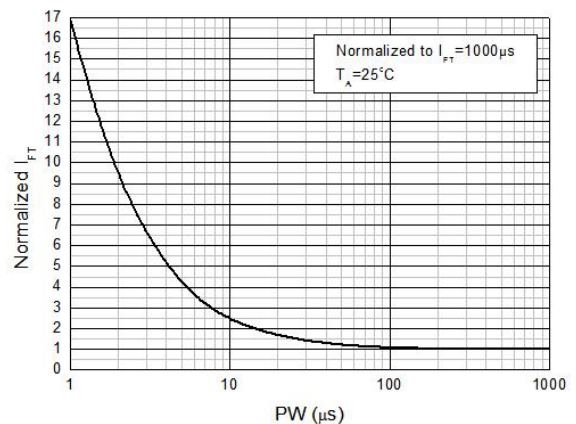


Fig.6 Normalized Trigger Current vs. LED Trigger Pulse Width



CHARACTERISTIC CURVES

Fig.7 Normalized Trigger Current vs. Ambient Temperature

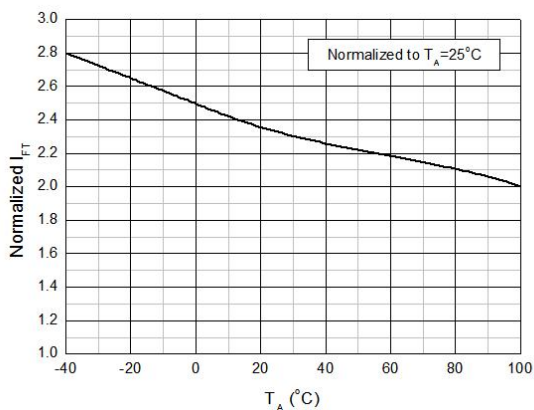


Fig.8 On-state Terminal Voltage vs. Ambient Temperature

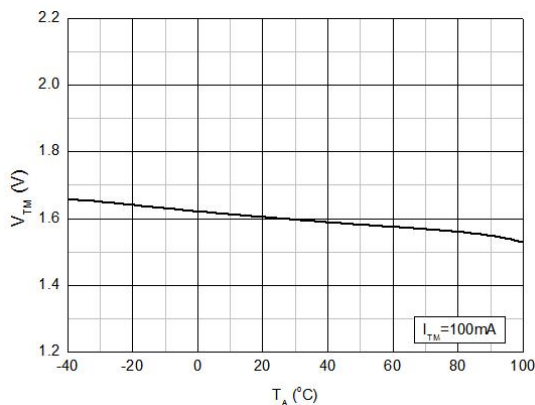


Fig.9 On-state Terminal Voltage vs. On-state Terminal Current

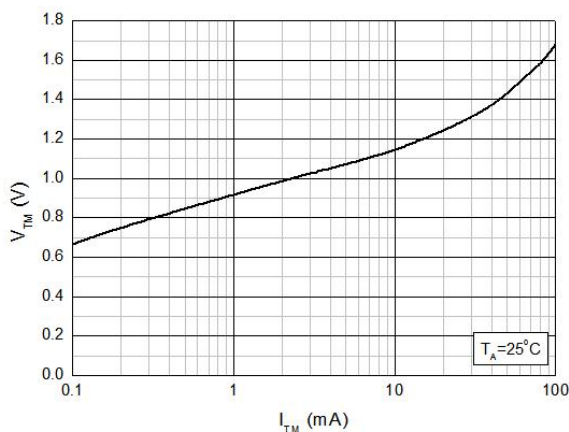


Fig.10 Holding Current vs. Ambient Temperature

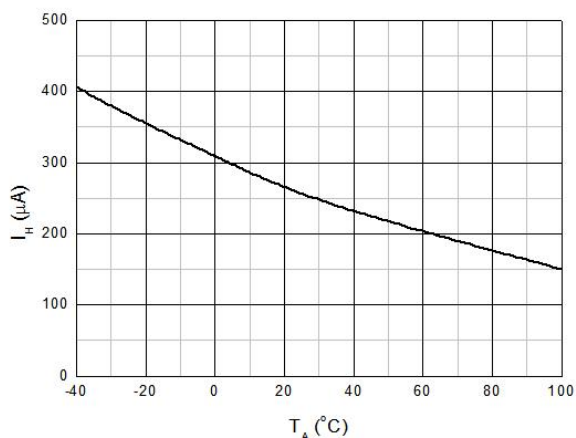


Fig.11 Turn On Time vs. Forward Current

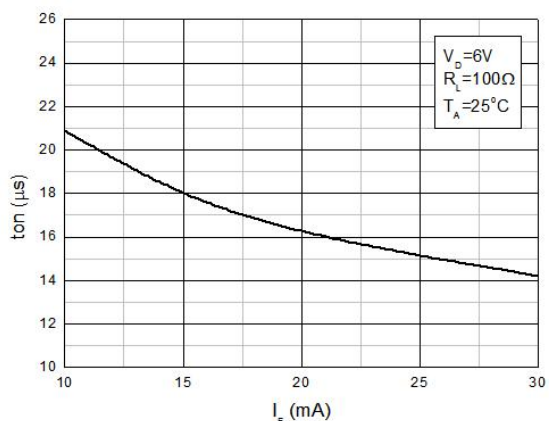
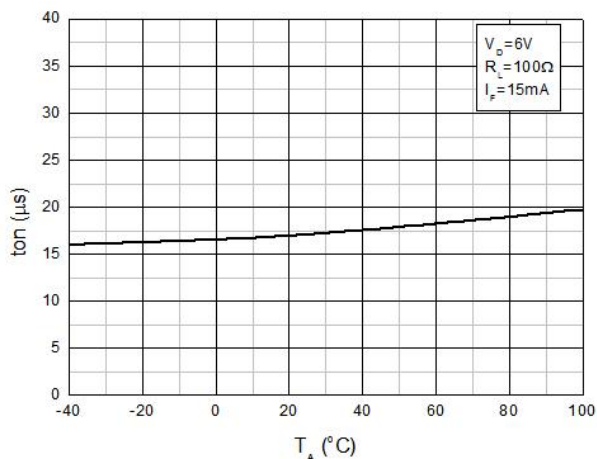


Fig.12 Turn On Time vs. Ambient Temperature



TEST CIRCUITS

Fig.13 Test Circuits of Turn On Time

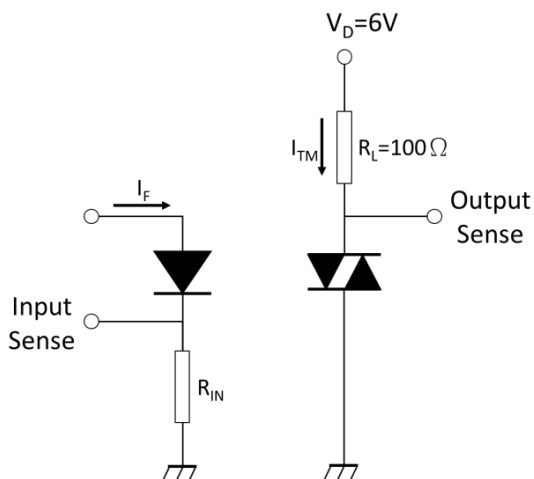


Fig.14 Waveforms of Turn On Time

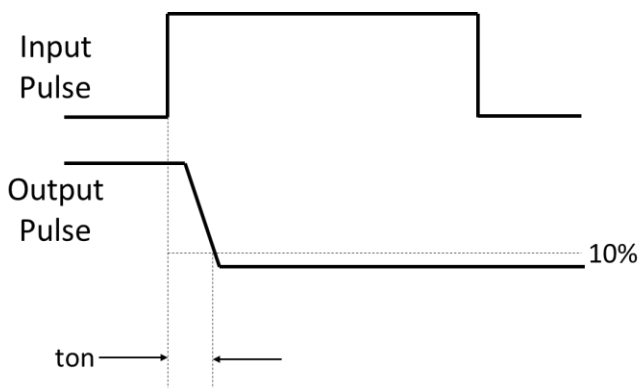


Fig.15 Test Circuits of dV/dt

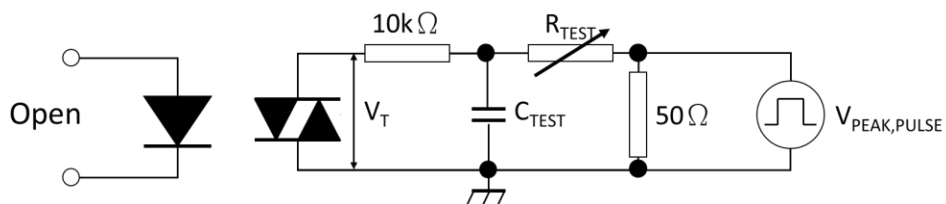
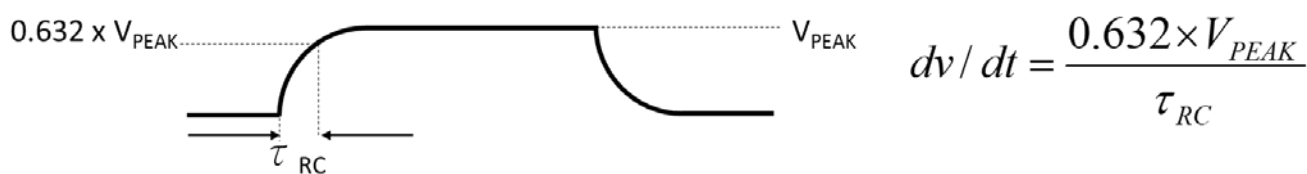
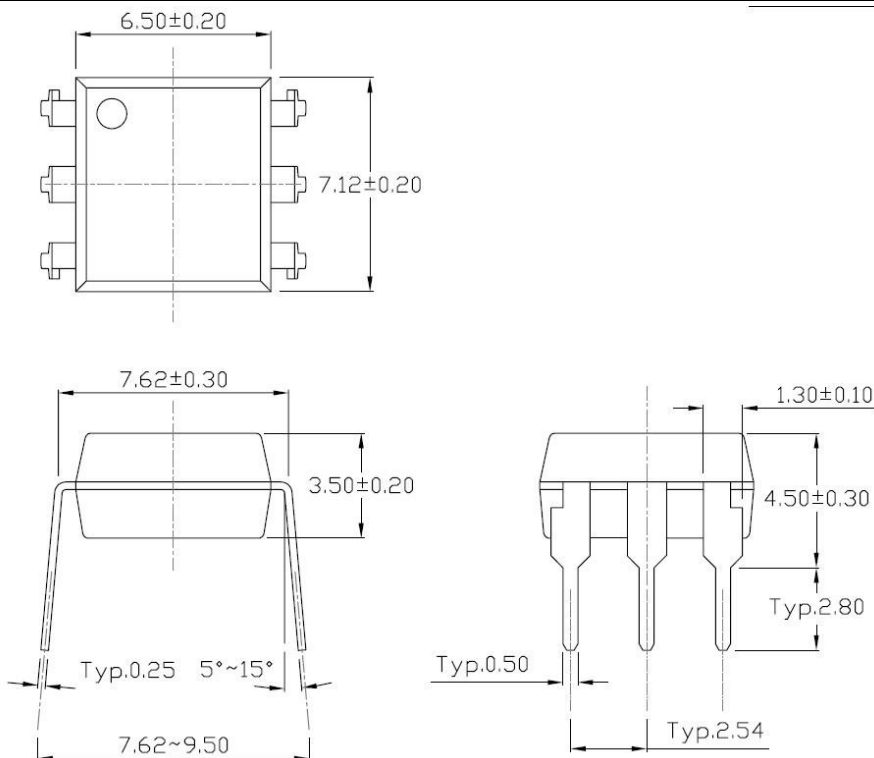


Fig.16 Waveforms of dV/dt

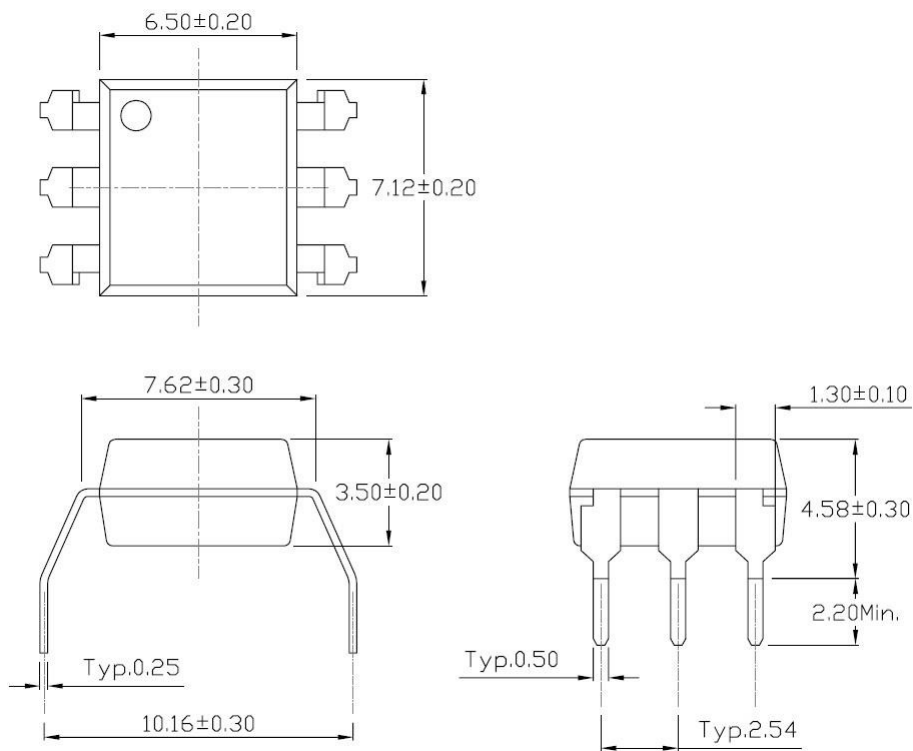


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP – Through Hole (DIP Type)

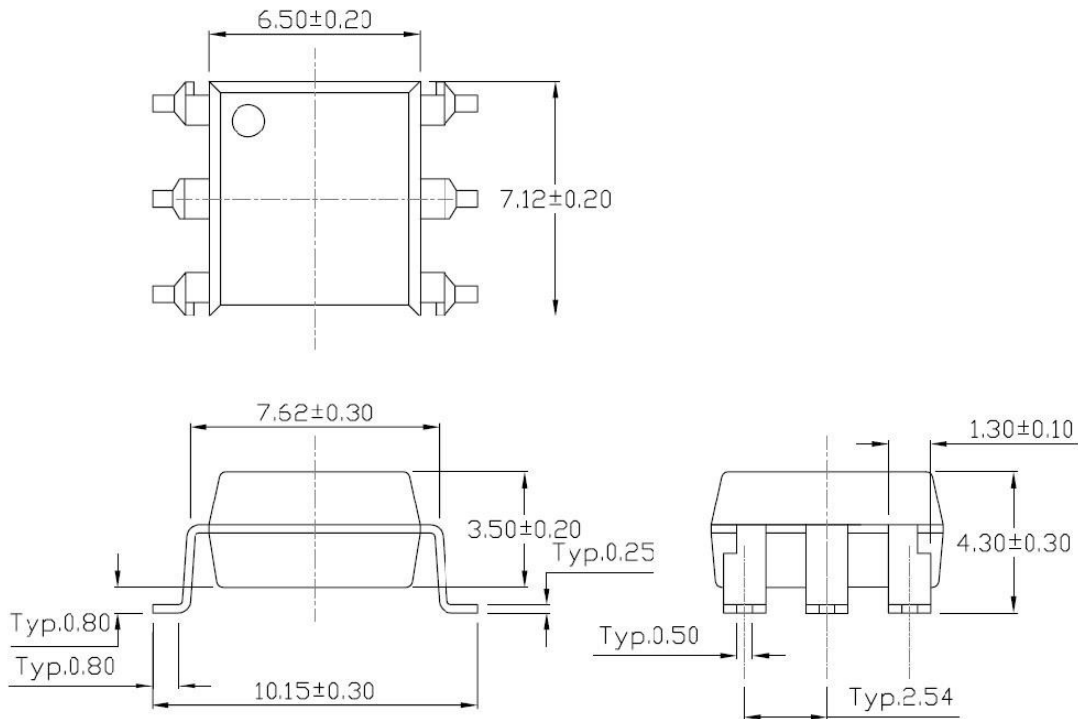


Gullwing (400mil) Lead Forming – Through Hole (M Type)

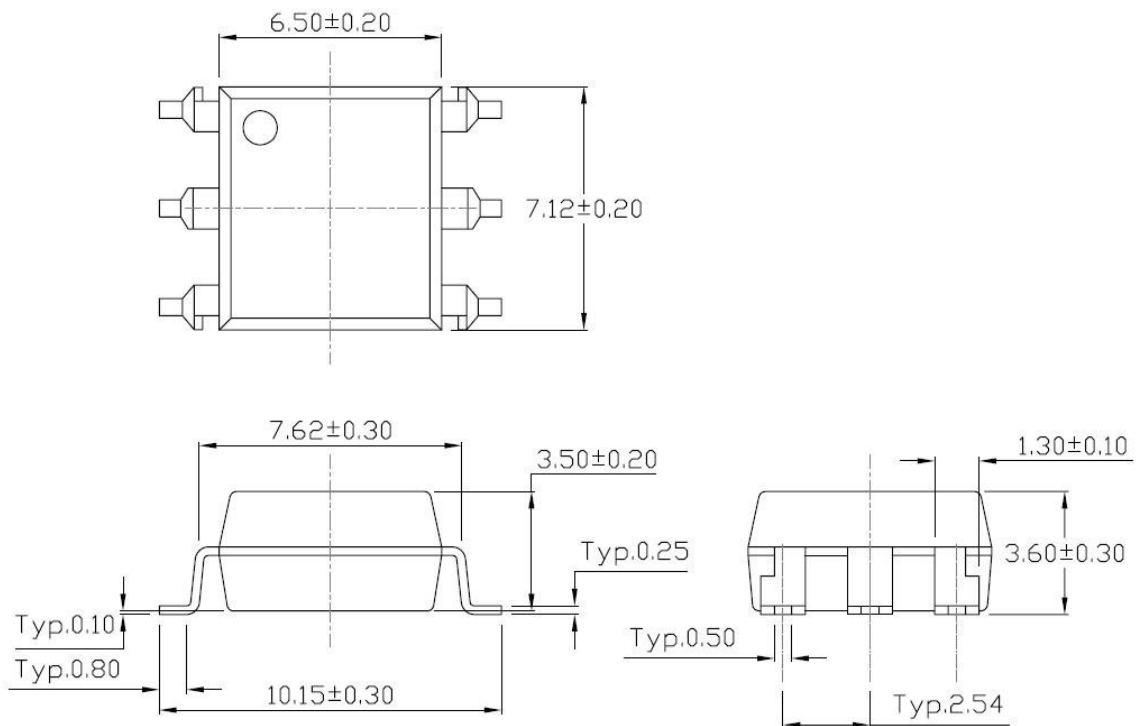


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming (S Type)

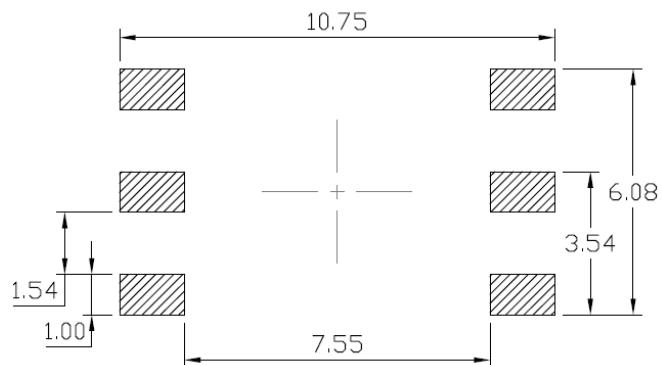


Surface Mount (Low Profile) Lead Forming (SL Type)

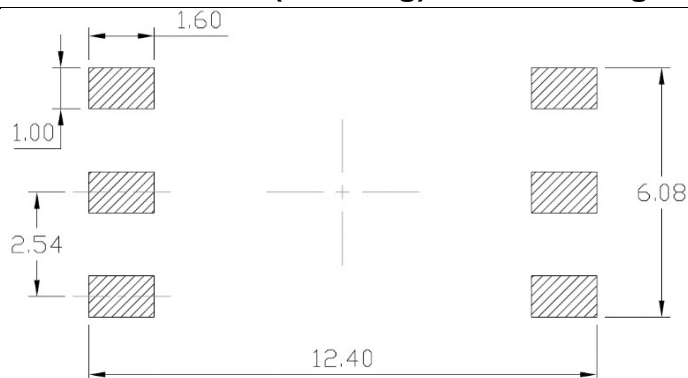


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

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

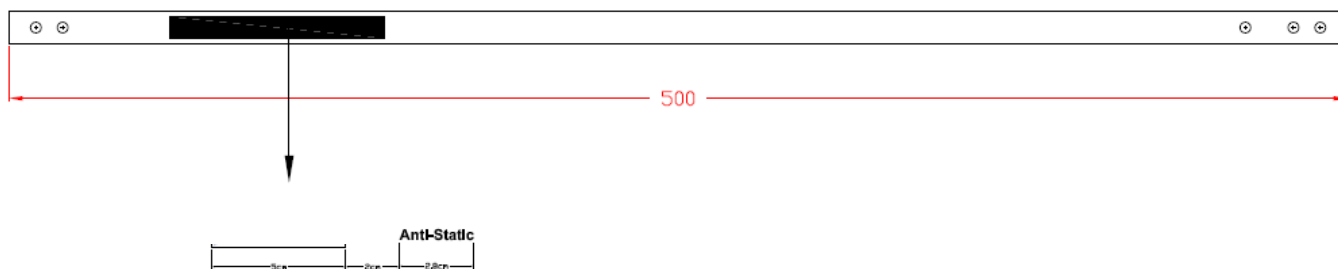
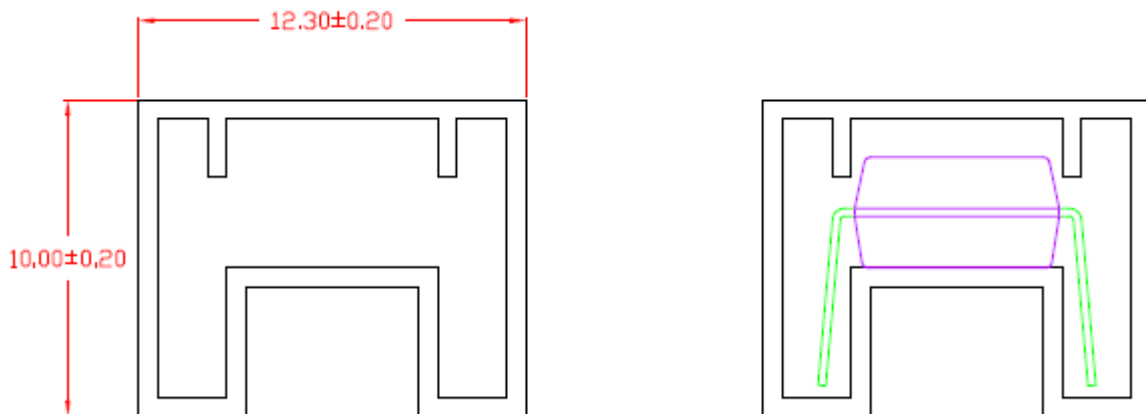


Surface Mount (Gullwing) Lead Forming

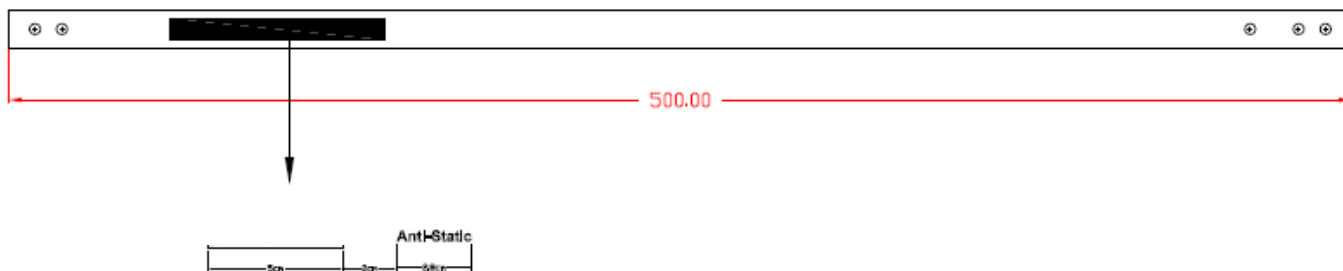
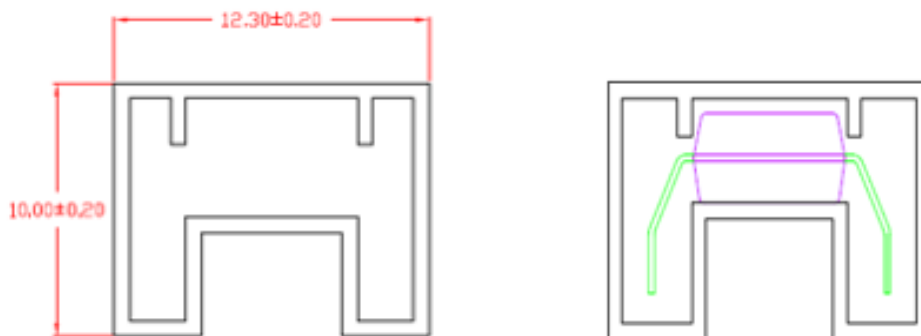


TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Standard DIP



Option M



BOX SPECIFICATIONS (Tube Type)

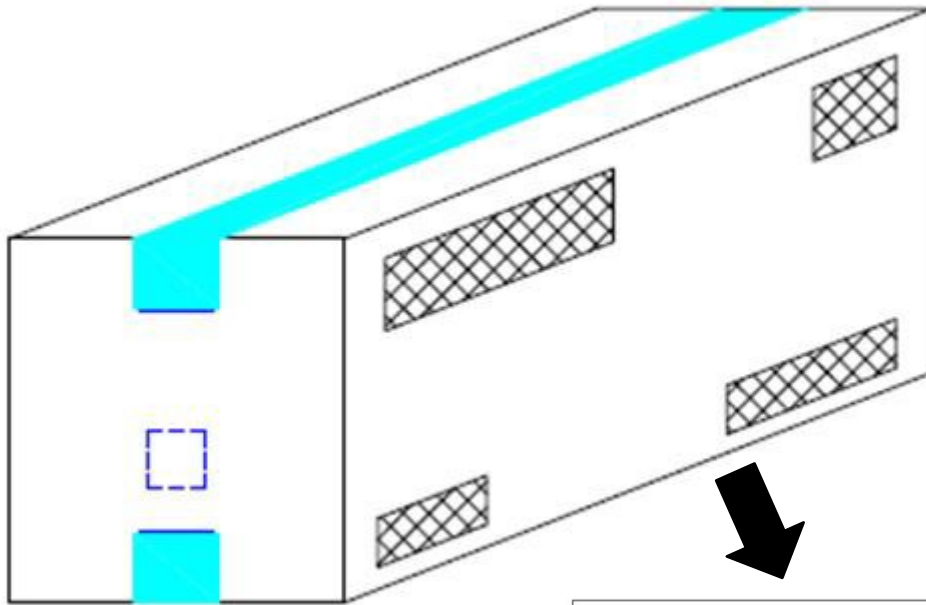
Inner Box

Label



- L x W x H = 52.5cm x 10.7cm x 4.7cm

Outer Box



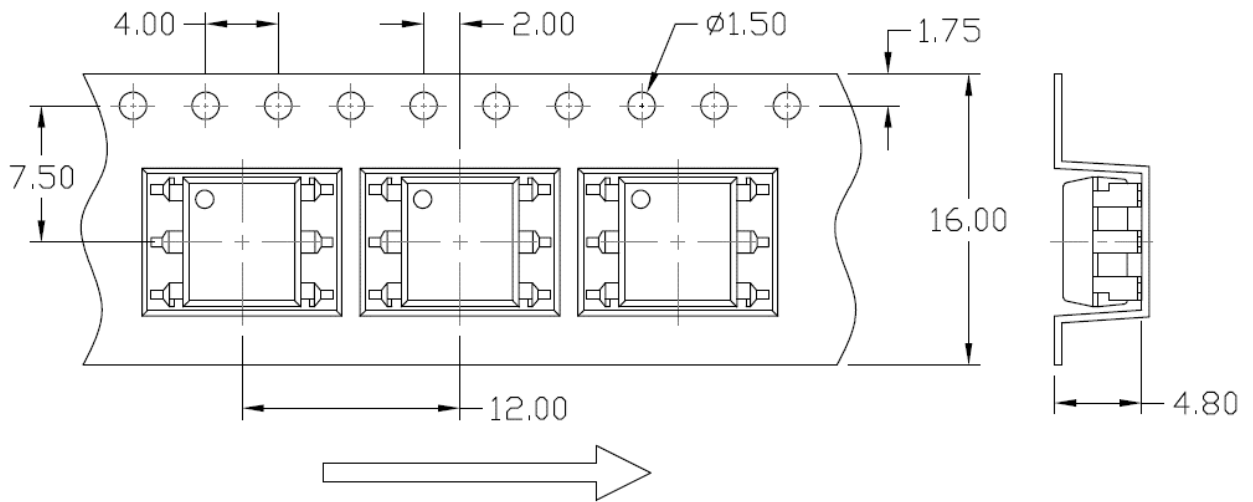
Label



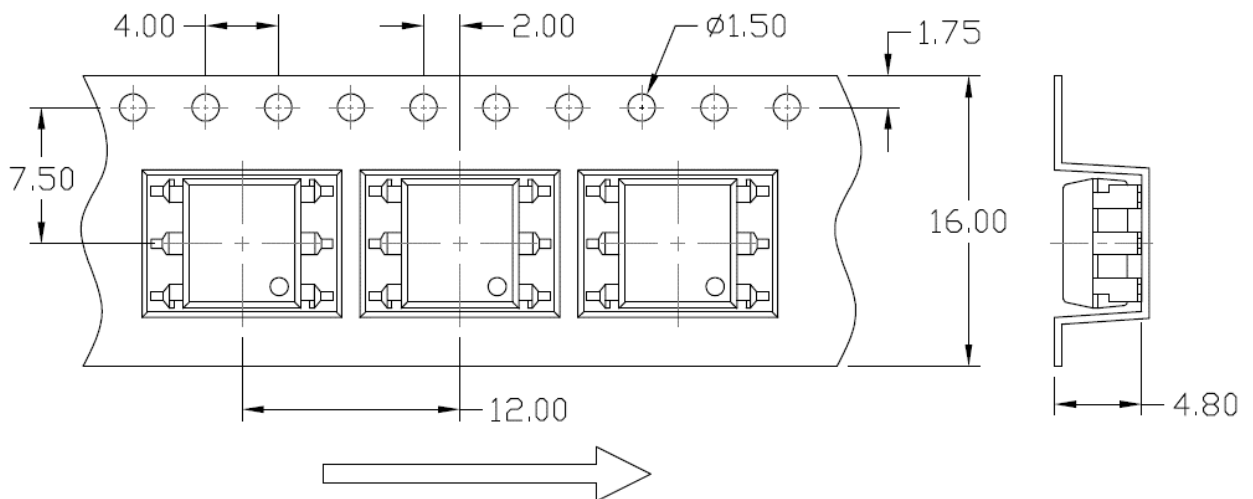
- L x W x H = 53.5cm x 23.5cm x 25.5cm

CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1) & SL(T1)

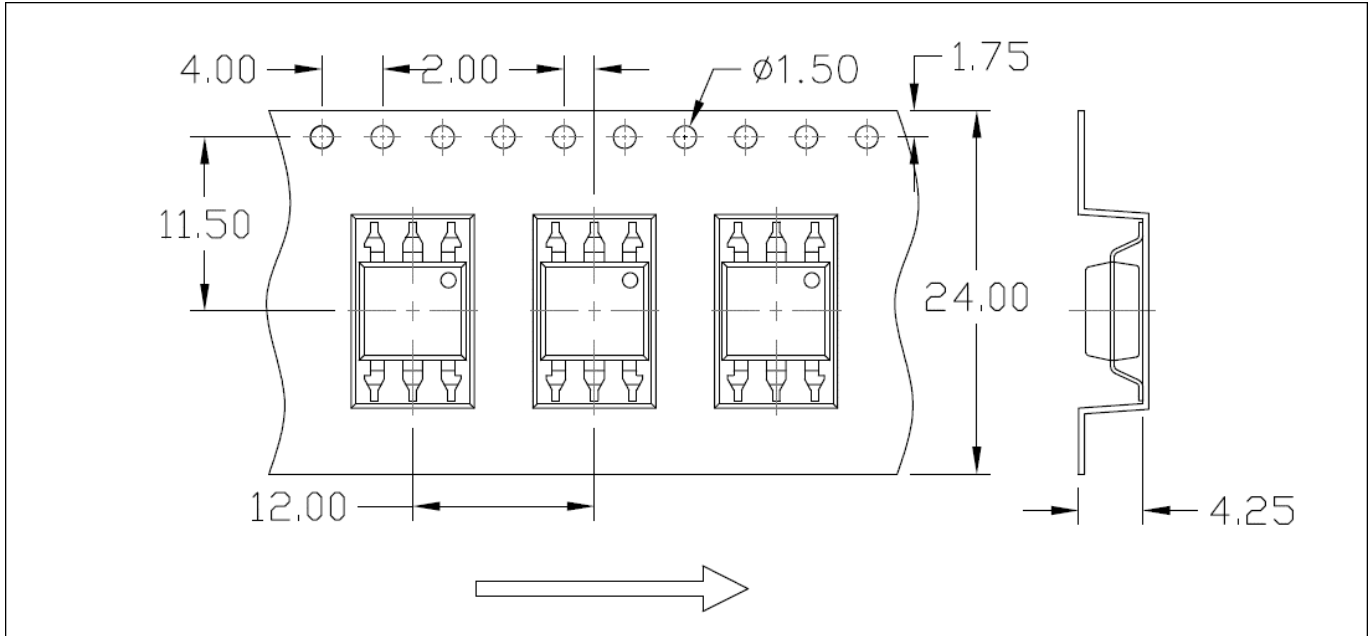


Option S(T2) & SL(T2)

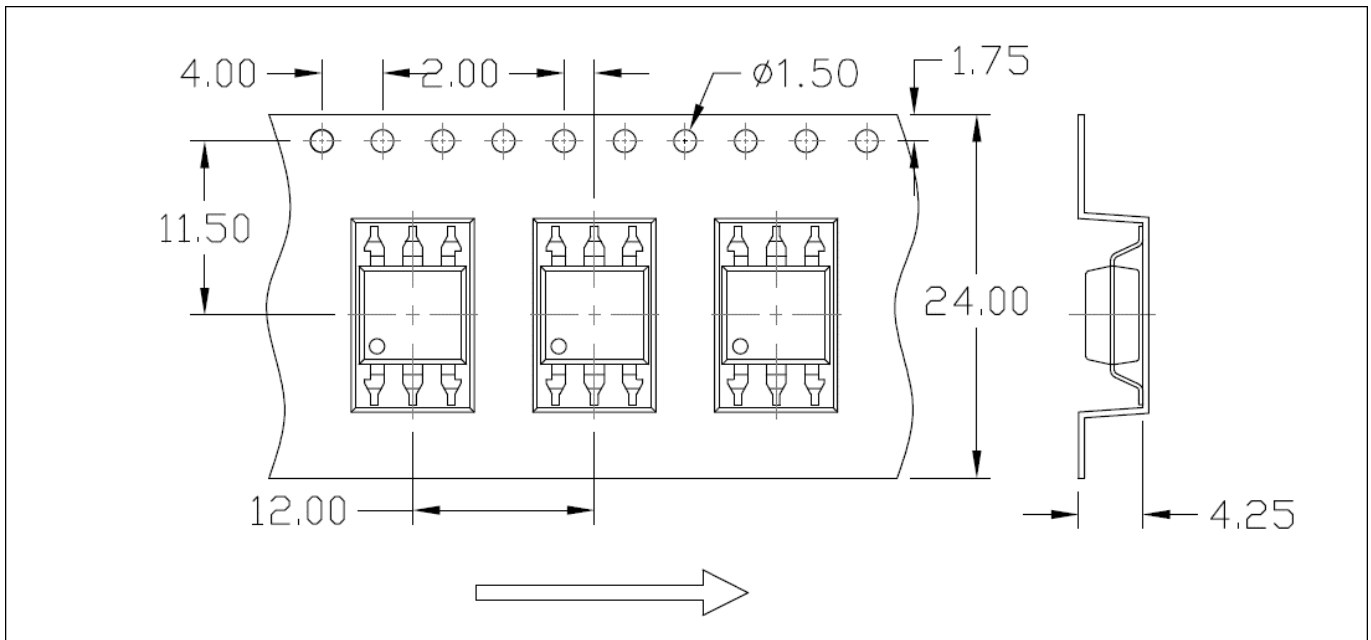


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SLM(T1)

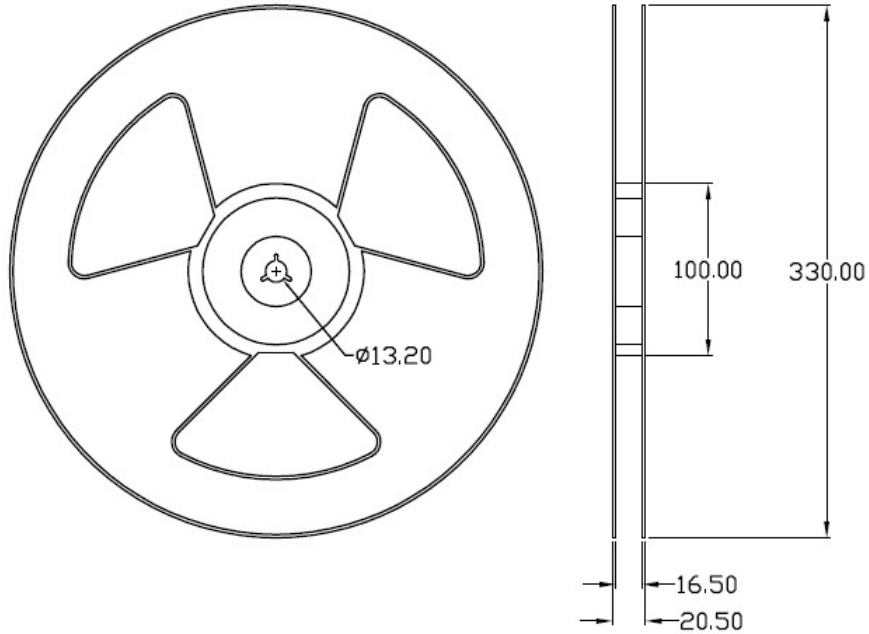


Option SLM(T2)

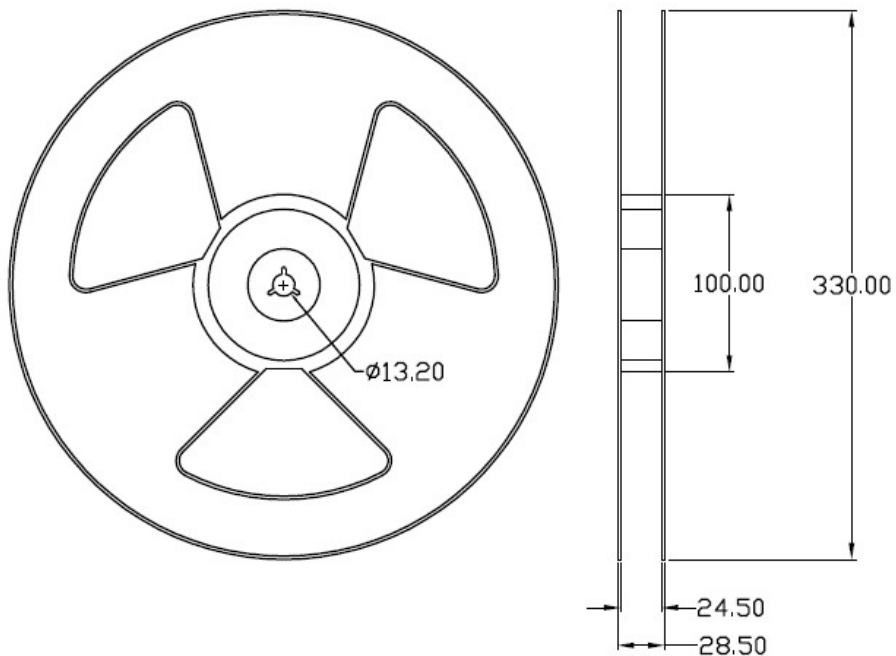


REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S & Option SL

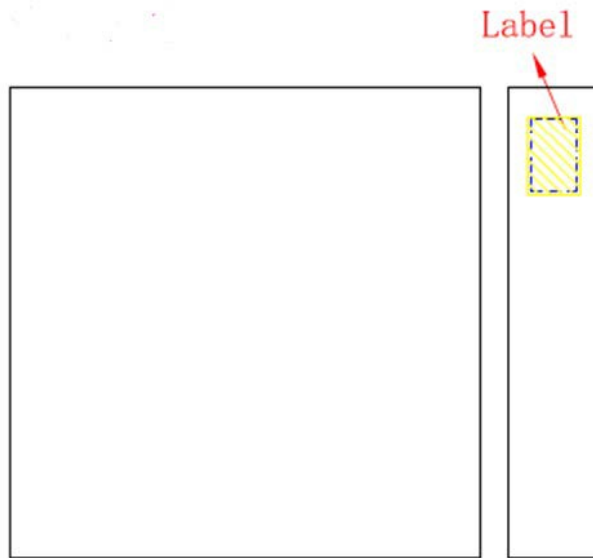


Option SLM



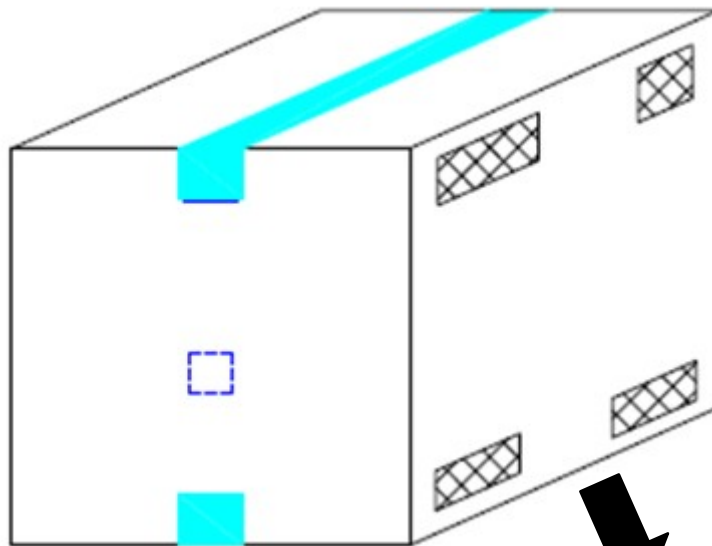
BOX SPECIFICATIONS (Reel Type)

Inner Box

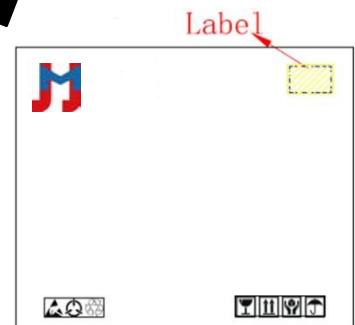


- L x W x H = 36cm x 36cm x 6.9cm

Outer Box

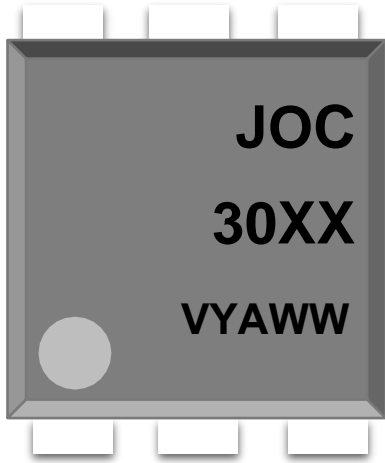


- L x W x H = 45cm x 38cm x 38cm



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



JOC : Company Abbr.
30XX : Part Number & Rank
V : VDE Option
Y : Fiscal Year
A : Manufacturing Code
WW : Work Week

ORDERING INFORMATION

JOC30XX(Y)(Z)-GV

JOC – Company Abbr.
 30XX – Part Number
 (10/11/12/21/22/23/51/52/53/71/72/73)
 Y – Lead Form Option (M/S/SL/None)
 Z – Tape and Reel Option (T1/T2)
 G –Green Option (G or None)
 V – VDE Option (V or None)

LABEL INFORMATION

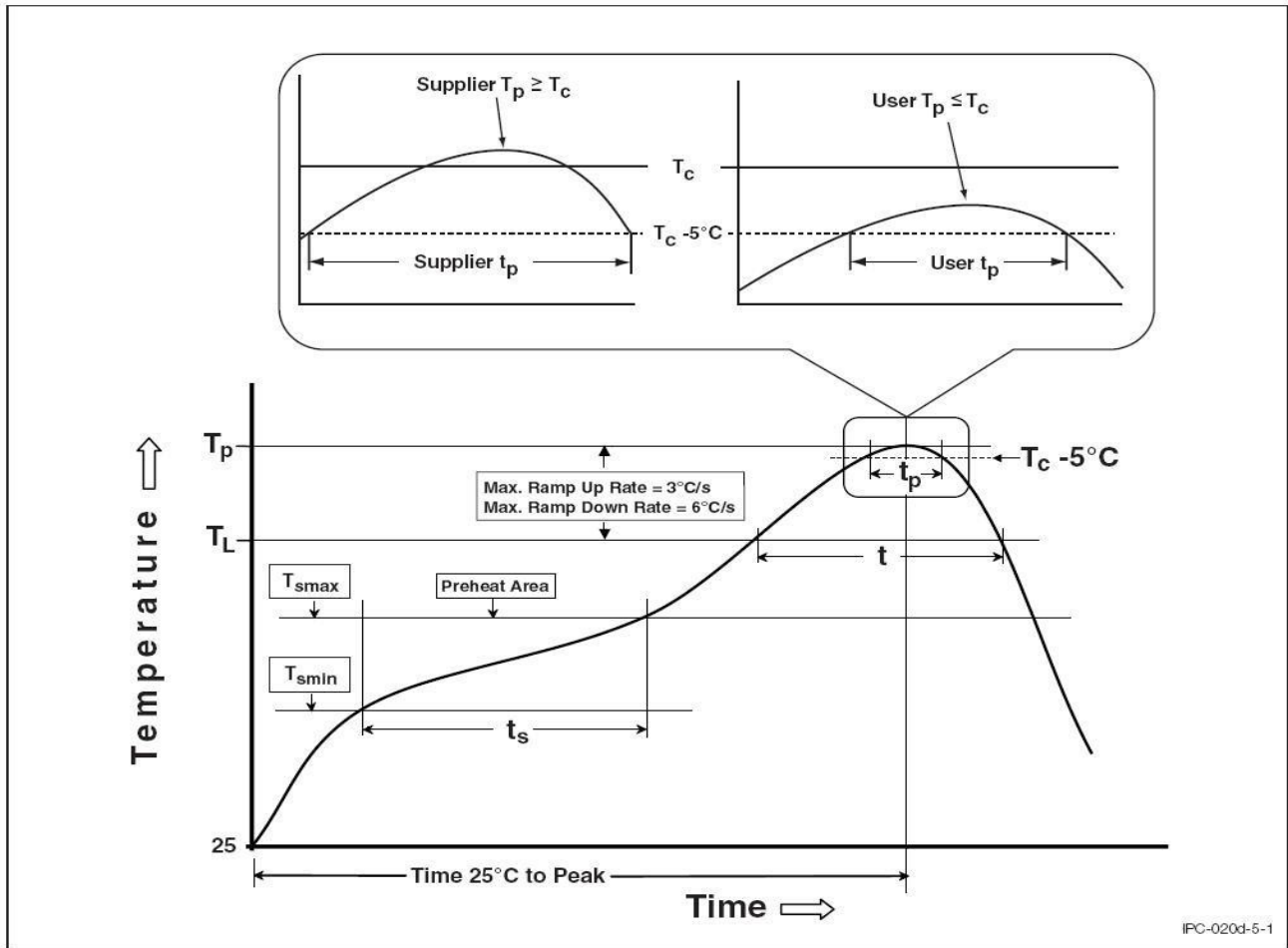


Packing Quantity

| 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 | 65Units/Tube | 32 Tubes/Inner box | 10 Inner box/Outer box = 20.8k Units |
| S(T1) | 1000 Units/Reel | 3 Reels/Inner box | 5 Inner box/Outer box = 15k Units |
| S(T2) | 1000 Units/Reel | 3 Reels/Inner box | 5 Inner box/Outer box = 15k Units |
| SL(T1) | 1000 Units/Reel | 3 Reels/Inner box | 5 Inner box/Outer box = 15k Units |
| SL(T2) | 1000 Units/Reel | 3 Reels/Inner box | 5 Inner box/Outer box = 15k Units |

REFLOW INFORMATION

REFLOW PROFILE



| 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. |

DISCLAIMER

- JIEJIE is continually improving the quality, reliability, function and design. JIEJIE reserves the right to make changes without further notices.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
- JIEJIE makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, JIEJIE disclaims (a) any and all liability arising out of the application or use of any product, (b) any and all liability, including without limitation special, consequential or incidental damages, and (c) any and all implied warranties, including warranties of fitness for particular
- The products shown in this publication are designed for the general use in electronic applications such as office automation, equipment, communications devices, audio/visual equipment, electrical application and instrumentation purpose, non-infringement and merchantability.
- This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or lifesaving applications or any other application which can result in human injury or death.
- Please contact JIEJIE sales agent for special application request.
- Immerge unit's body in solder paste is not recommended.
- Parameters provided in datasheets may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated in each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify JIEJIE's terms and conditions of purchase, including but not limited to the warranty expressed therein.
- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.