

LSOP4, DC Input, Photo Transistor Coupler

Description

The UMW100X series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic LSOP4 package.

With the robust coplanar double mold structure, UMW100X series provide the most stable isolation feature.

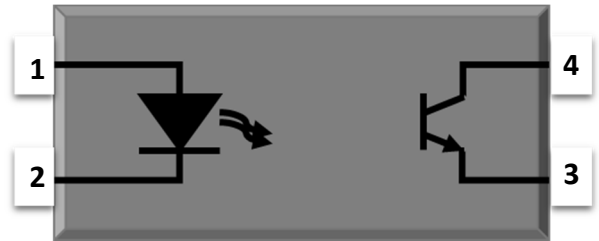
Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- RoHS & REACH Compliance
- Halogen free
- MSL class 1
- UL Recognized: UL1577, File No. E492440

Applications

- Switch mode power supplies
- Programmable controllers
- Household appliances
- Office equipment

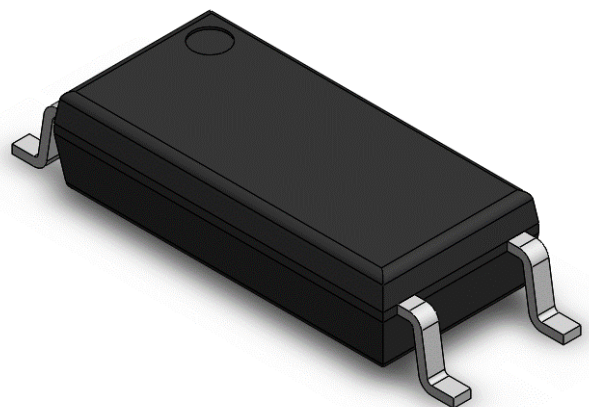
SCHEMATIC



PIN DEFINITION

1. Anode
2. Cathode
3. Emitter
4. Collector

PACKAGE OUTLINE



| ABSOLUTE MAXIMUM RATINGS | | | | |
|-----------------------------|-----------|---------|------------------|------|
| PARAMETER | SYMBOL | VALUE | UNIT | NOTE |
| INPUT | | | | |
| Forward Current | I_F | 60 | mA | |
| Peak Forward Current | I_{FP} | 1 | A | 1 |
| Reverse Voltage | V_R | 6 | V | |
| Input Power Dissipation | P_I | 100 | mW | |
| OUTPUT | | | | |
| Collector - Emitter Voltage | V_{CEO} | 80 | V | |
| Emitter - Collector Voltage | V_{ECO} | 7 | V | |
| Collector Current | I_C | 50 | mA | |
| Output Power Dissipation | P_O | 150 | mW | |
| COMMON | | | | |
| Total Power Dissipation | P_{tot} | 250 | mW | |
| Isolation Voltage | V_{iso} | 5000 | V _{rms} | 2 |
| Operating Temperature | T_{opr} | -55~110 | °C | |
| Storage Temperature | T_{stg} | -55~125 | °C | |
| Soldering Temperature | T_{sol} | 260 | °C | |

Note 1. 100μs pulse, 100Hz frequency

Note 2. AC For 1 Minute, R.H. = 40 ~ 60%

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 =10mA | |
| Reverse Current | I _R | - | - | 10 | μA | V _R =6V | |
| Input Capacitance | C _{in} | - | 30 | 250 | pF | V=0, f=1kHz | |
| OUTPUT | | | | | | | |
| Collector Dark Current | I _{CEO} | - | - | 100 | nA | V _{CE} =20V, I _F =0 | |
| Collector-Emitter Breakdown Voltage | BV _{CEO} | 80 | - | - | V | I _C =0.1mA, I _F =0 | |
| Emitter-Collector Breakdown Voltage | BV _{ECO} | 7 | - | - | V | I _E =0.1mA, I _F =0 | |
| TRANSFER CHARACTERISTICS | | | | | | | |
| Current Transfer Ratio | UMW1007 UMW1008 UMW1009 | CTR | 80 | - | 160 | % | I _F =5mA, V _{CE} =5V |
| | | | 130 | - | 260 | | |
| | | | 200 | - | 400 | | |
| Collector-Emitter Saturation Voltage | V _{CE(sat)} | - | 0.1 | 0.3 | V | I _F =10mA, I _C =1mA | |
| Isolation Resistance | R _{ISO} | 10 ¹² | 10 ¹⁴ | - | Ω | DC500V, 40 ~ 60% R.H. | |
| Floating Capacitance | C _{IO} | - | 0.4 | 1 | pF | V=0, f=1MHz | |
| Cut-off Frequency | F _c | - | 80 | - | kHz | V _{CE} =2V, I _C =2mA R _L =100Ω, -3dB | 3 |
| Response Time (Rise) | T _r | - | 5 | 18 | μs | V _{CE} =2V, I _C =2mA R _L =100Ω | 4 |
| Response Time (Fall) | T _f | - | 6 | 18 | μs | | 4 |

Note 3. Fig.12&13

Note 4. Fig.14

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

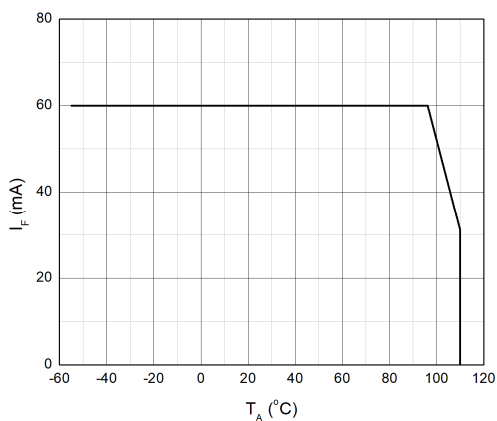


Fig.2 Collector Power Dissipation vs. Ambient Temperature

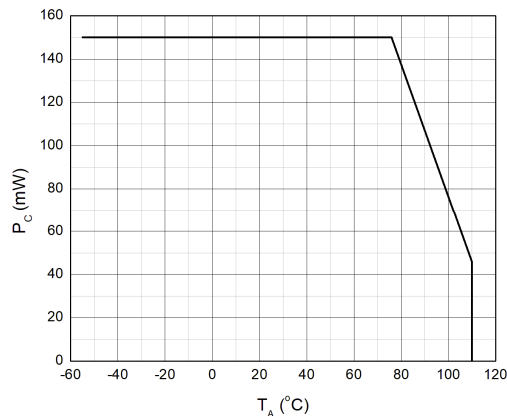


Fig.3 Forward Current vs. Forward Voltage

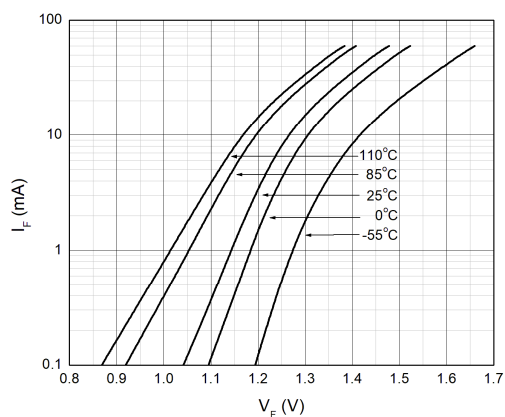


Fig.4 Collector Dark Current vs. Ambient Temperature

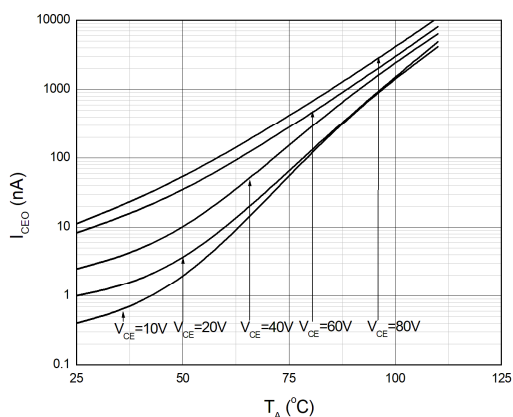


Fig.5 Collector Current vs. Collector-emitter Voltage

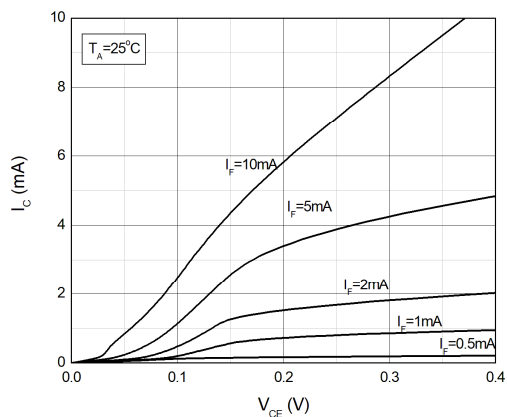
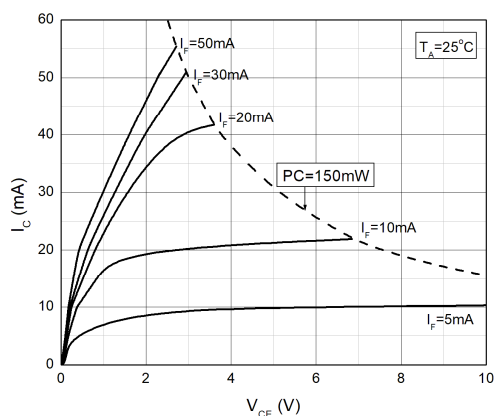


Fig.6 Collector Current vs. Collector-emitter Voltage



CHARACTERISTIC CURVES

Fig.7 Normalized Current Transfer Ratio vs. Forward Current

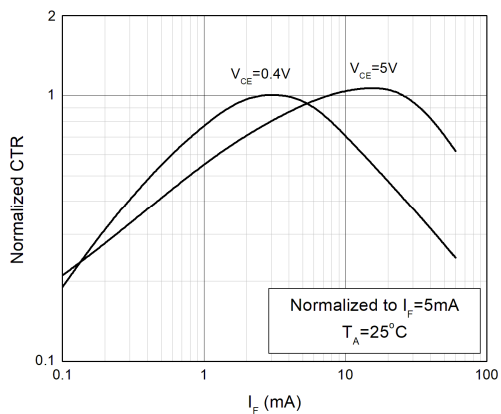


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

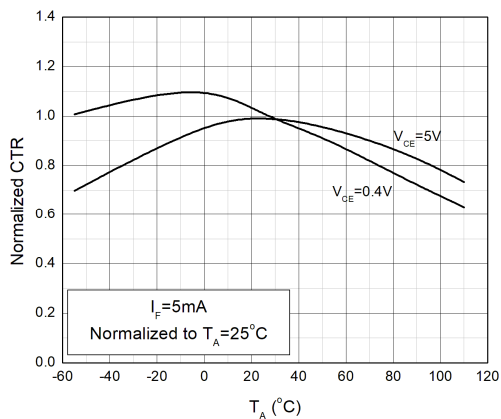


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

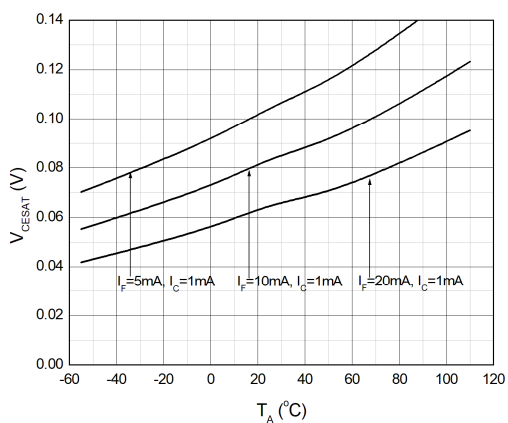


Fig.10 Switching Time vs. Load Resistance

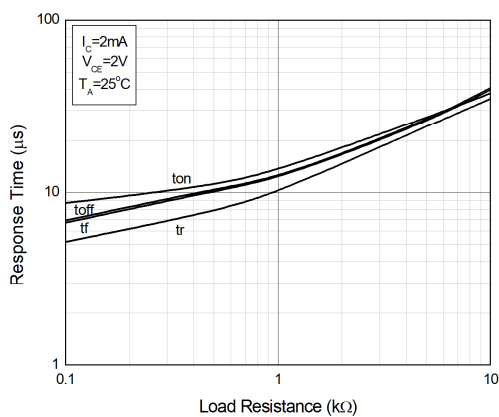
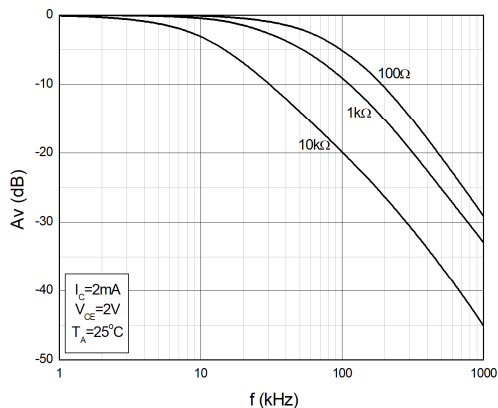


Fig.11 Frequency Response



TEST CIRCUITS

Fig.12 Test Circuits of Response Time

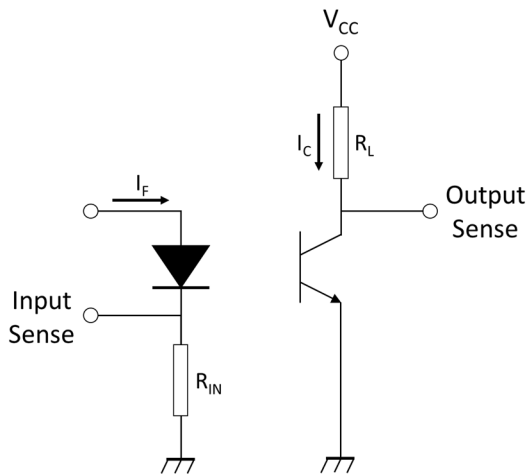


Fig.13 Curves of Response Time

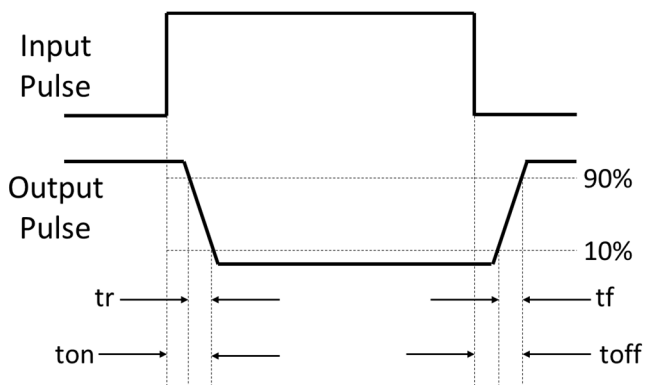
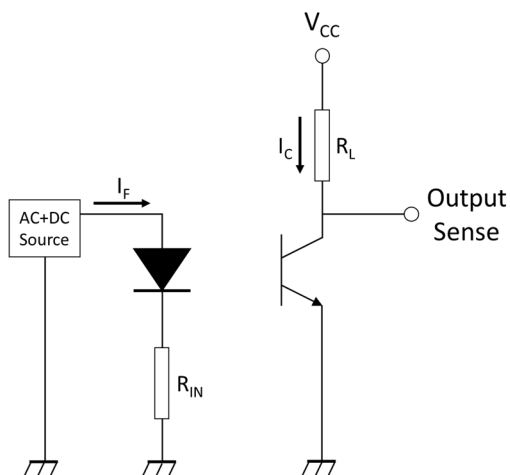
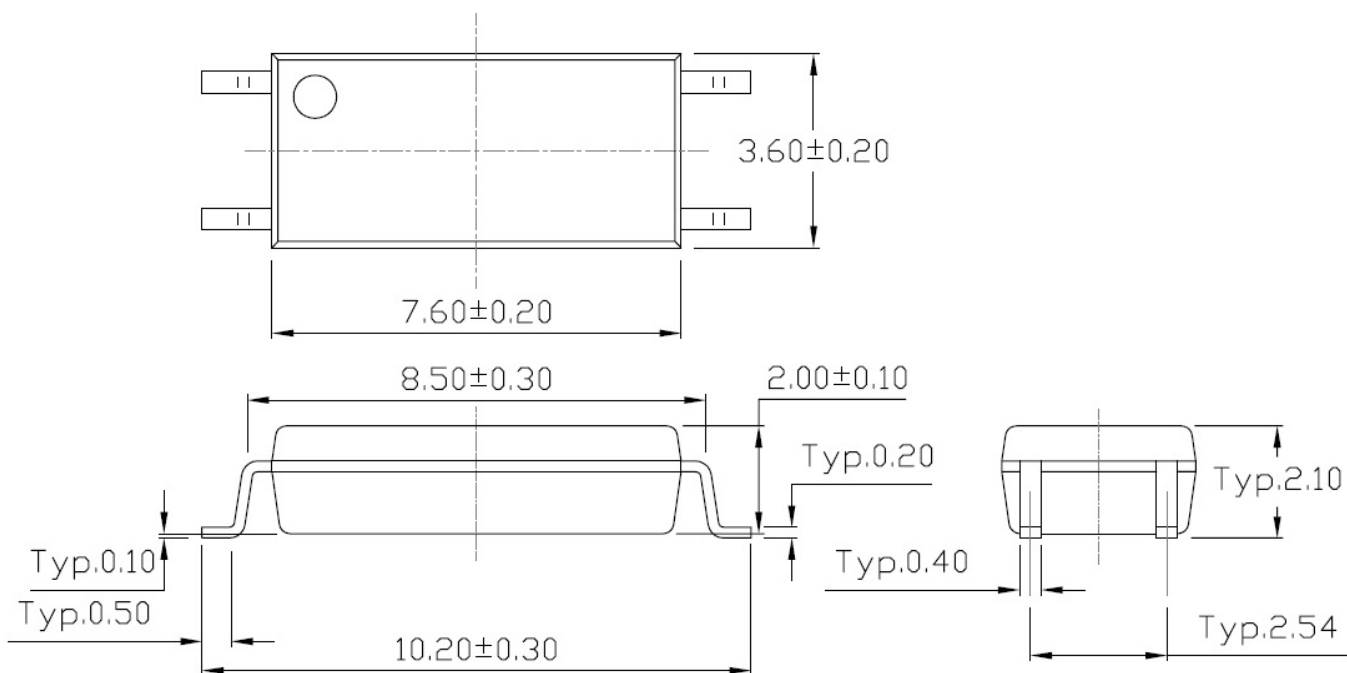


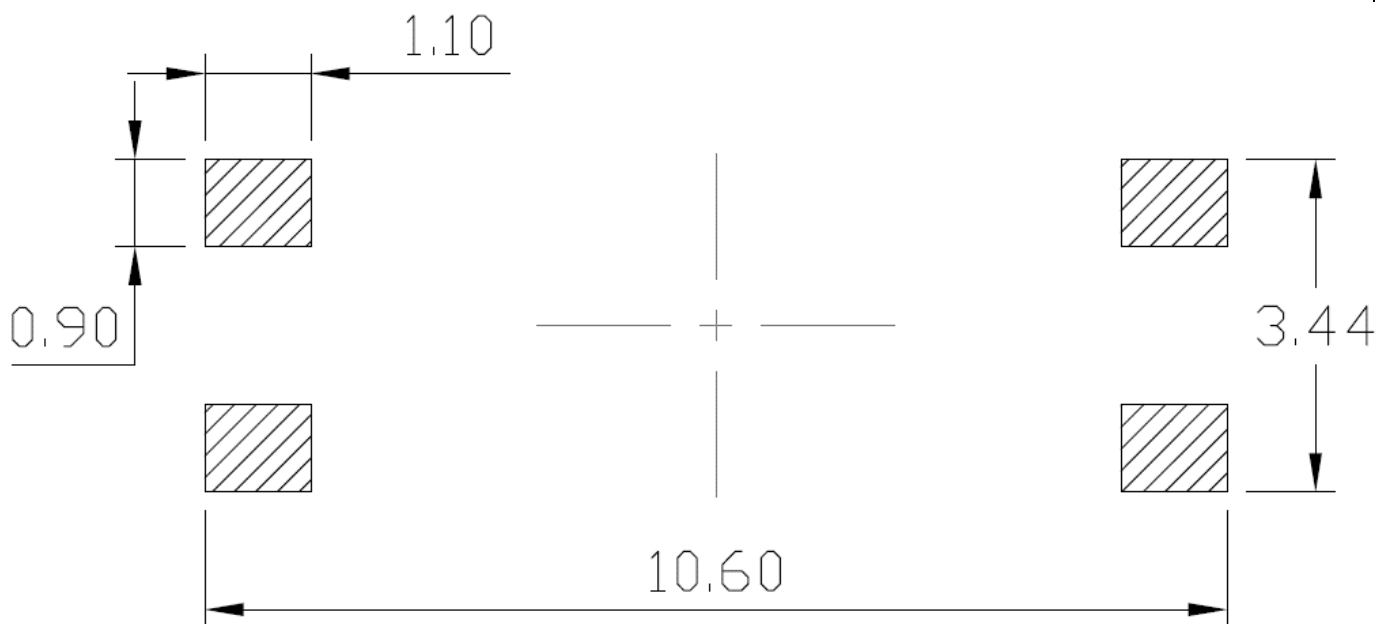
Fig.14 Test Circuits of Frequency Response



PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

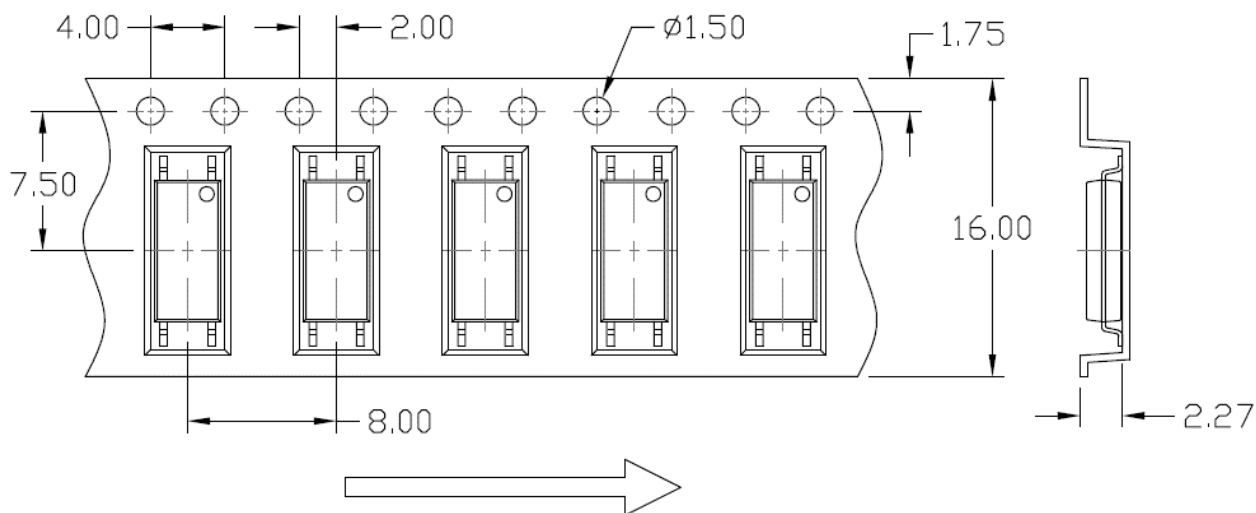


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

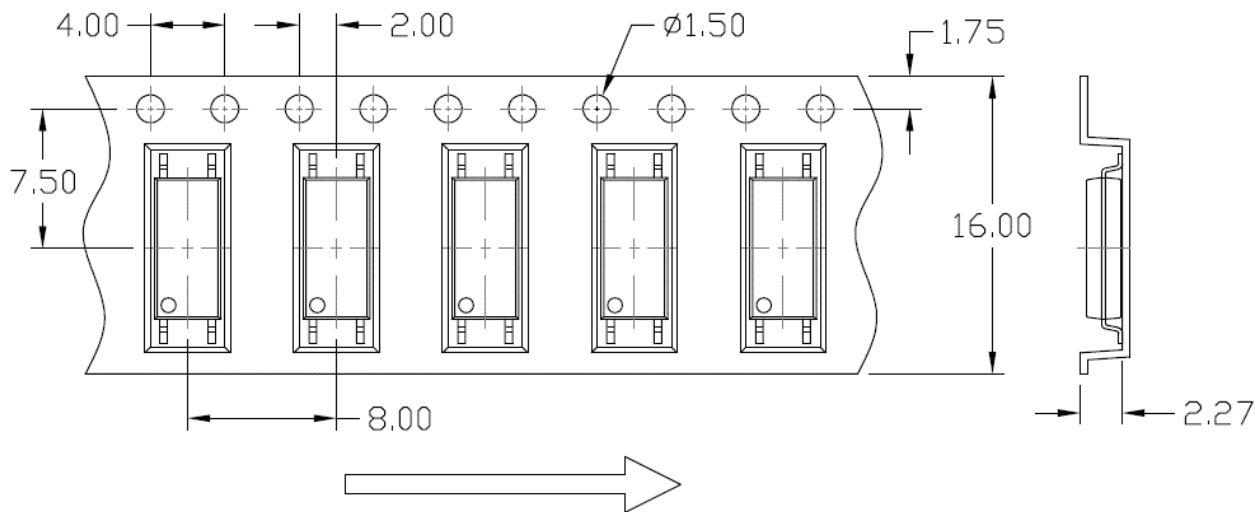


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1

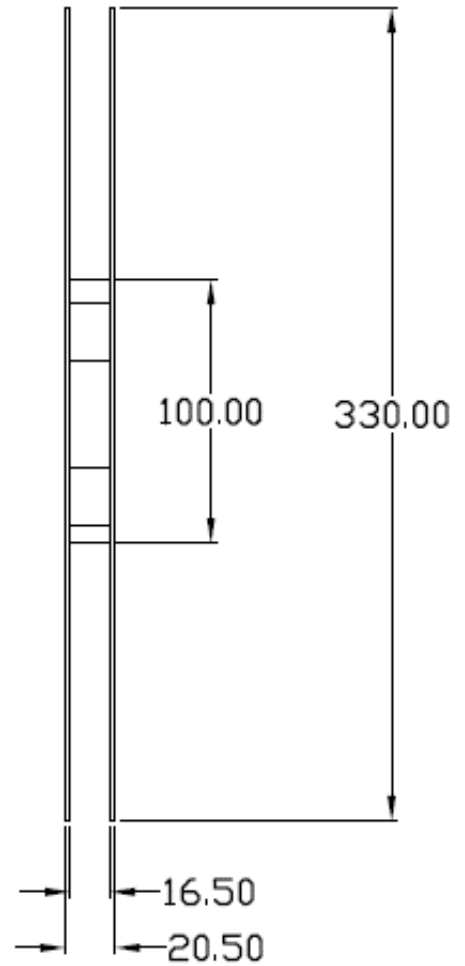
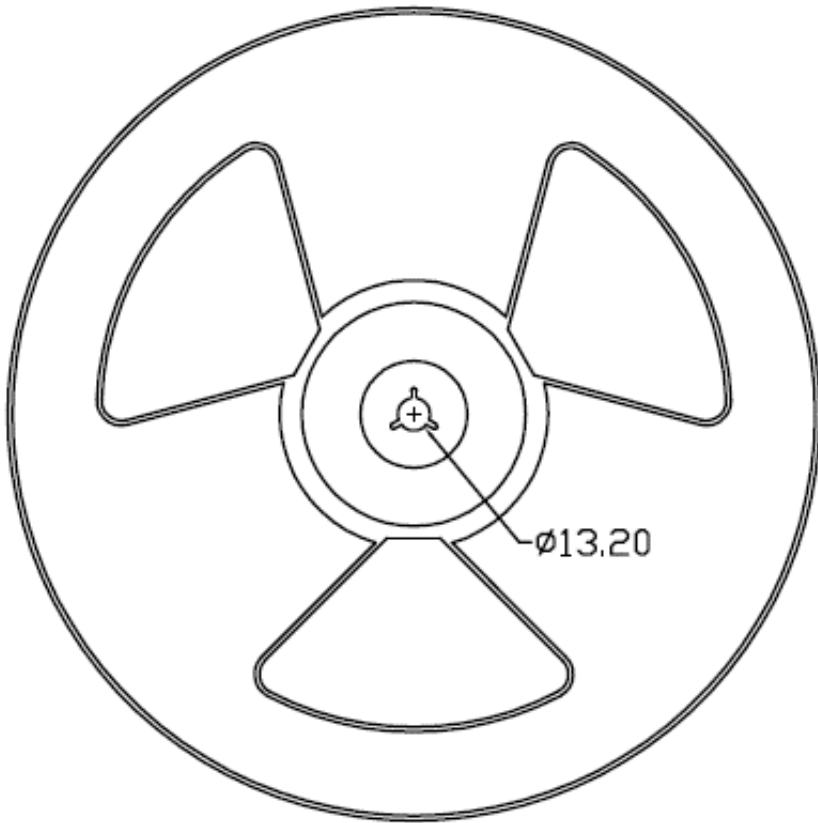


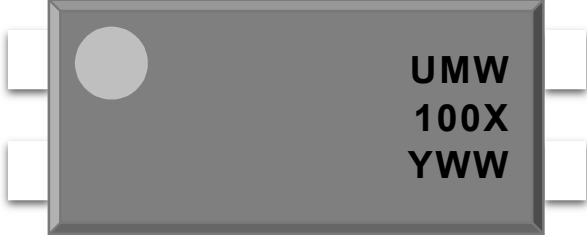
Option T2



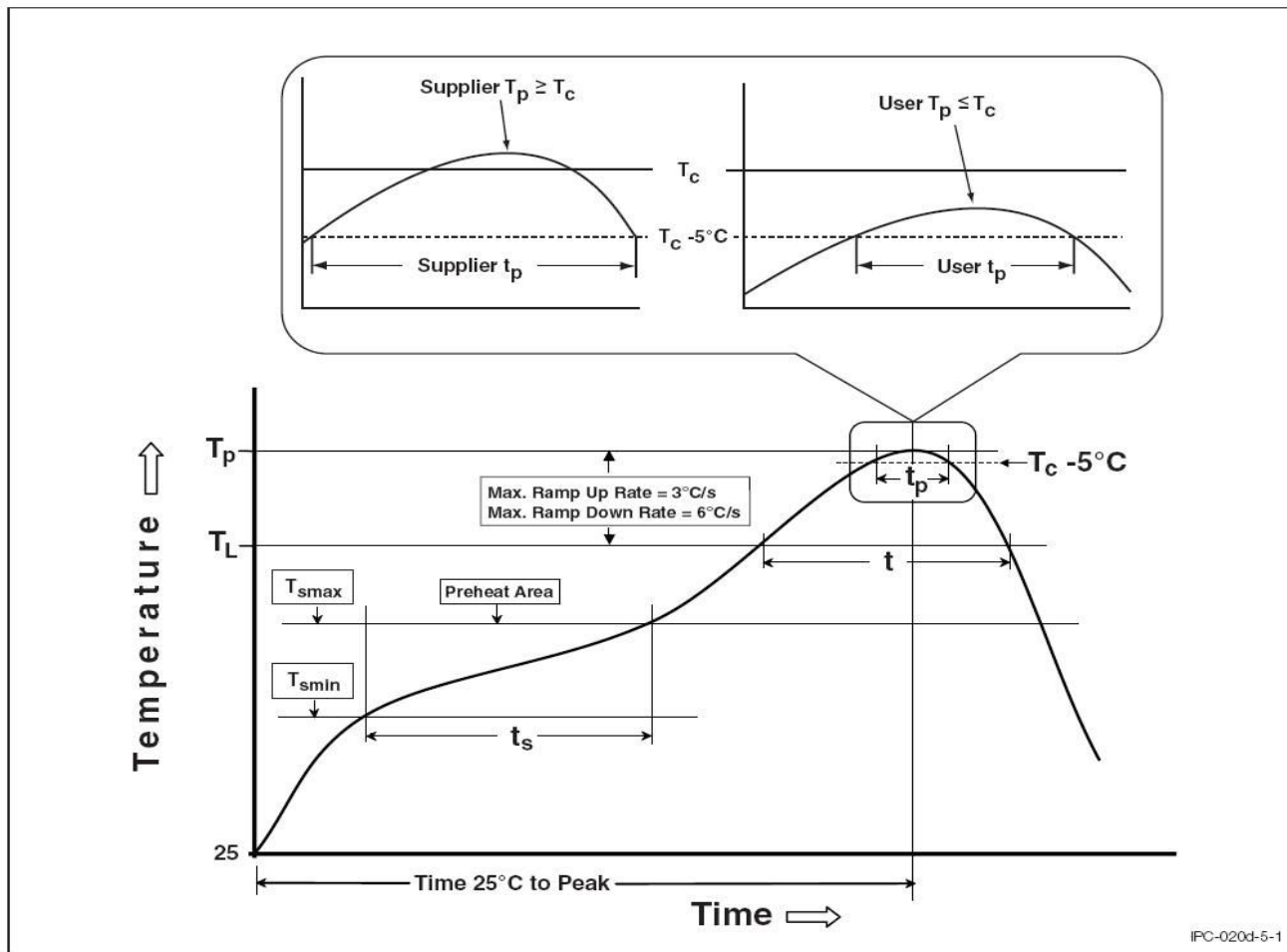
REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1 & T2

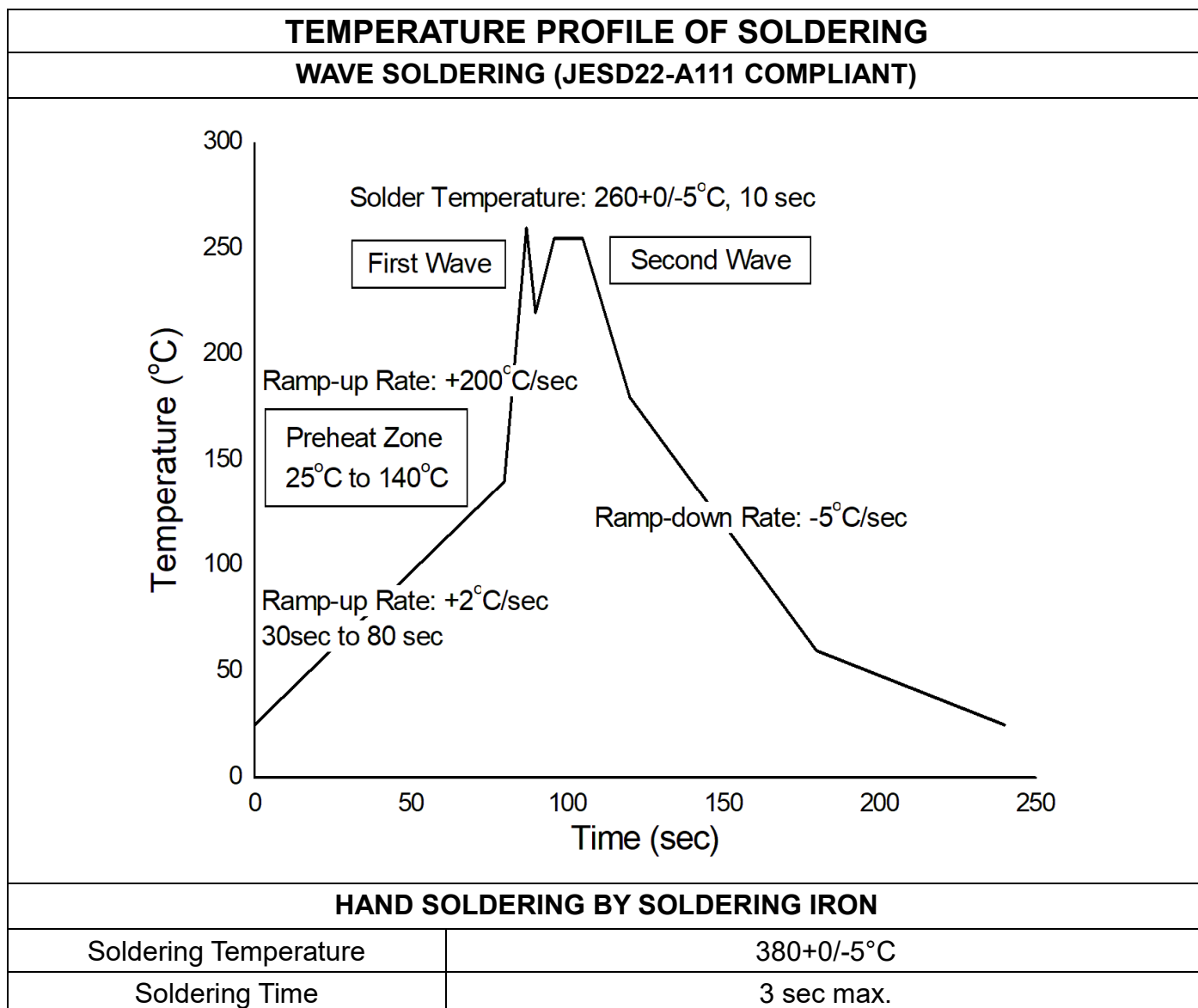


| ORDERING AND MARKING INFORMATION | |
|---|--|
| MARKING INFORMATION | |
|  | <p>UMW : Company Abbr. 100X : Part Number & Rank Y : Fiscal Year WW : Work Week</p> |
| ORDERING INFORMATION | |
| UMW LTV-100X-S | |
| <p>UMW – Company Abbr. LTV-100X – Rank (0/1/2/3/4/5/6/7/8/9) S – Tape and Reel Option</p> | |

TEMPERATURE PROFILE OF SOLDERING
IR REFLOW SOLDERING (J-SUMW-020D COMPLIANT)



| 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. |



Note 5. One time soldering is recommended for all soldering method.

Note 6. Do not solder more than three times for IR reflow soldering.