

LSOP4, DC Input, Photo Transistor Coupler

**Description**

The UMW101X 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, UMW101X series provide the most stable isolation feature.

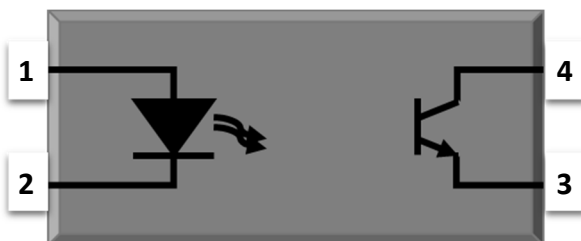
**Features**

- 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

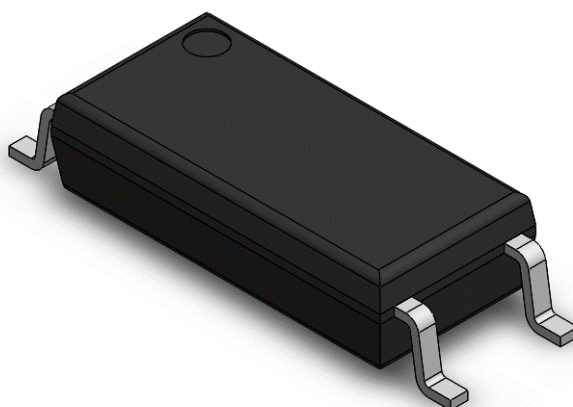
**SCHEMATIC**



**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 <sub>rms</sub>	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**

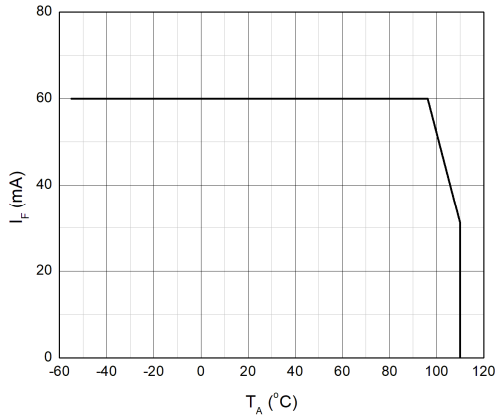
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT							
Forward Voltage	$V_F$	-	1.24	1.4	V	$I_F=10mA$	
Reverse Current	$I_R$	-	-	10	$\mu A$	$V_R=6V$	
Input Capacitance	$C_{in}$	-	30	250	pF	$V=0, f=1kHz$	
OUTPUT							
Collector Dark Current	$I_{CEO}$	-	-	100	nA	$V_{CE}=20V, I_F=0$	
Collector-Emitter 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	UMW1017	CTR	80	-	160	%	$I_F=5mA, V_{CE}=5V$
	UMW1018		130	-	260		
	UMW1019		200	-	400		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.1	0.3	V	$I_F=10mA, I_C=1mA$	
Isolation Resistance	$R_{ISO}$	$10^{12}$	$10^{14}$	-	$\Omega$	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	$C_{IO}$	-	0.4	1	pF	$V=0, f=1MHz$	
Cut-off Frequency	$F_c$	-	80	-	kHz	$V_{CE}=2V, I_C=2mA$ $R_L=100\Omega, -3dB$	3
Response Time (Rise)	$T_r$	-	5	18	$\mu s$	$V_{CE}=2V, I_C=2mA$	4
Response Time (Fall)	$T_f$	-	6	18	$\mu s$	$R_L=100\Omega$	4

Note 3. Fig.12&amp;13

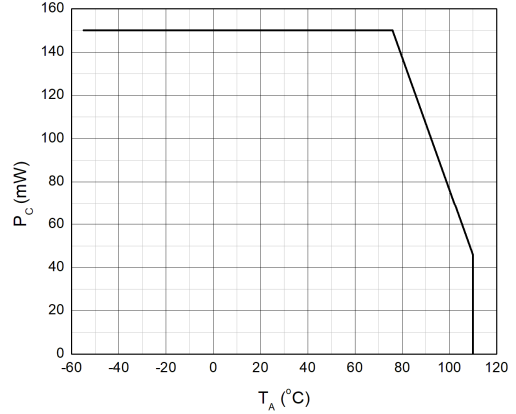
Note 4. Fig.14

**CHARACTERISTIC CURVES**

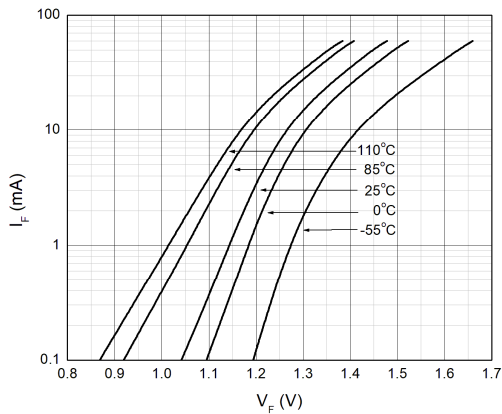
**Fig.1 Forward Current vs. Ambient Temperature**



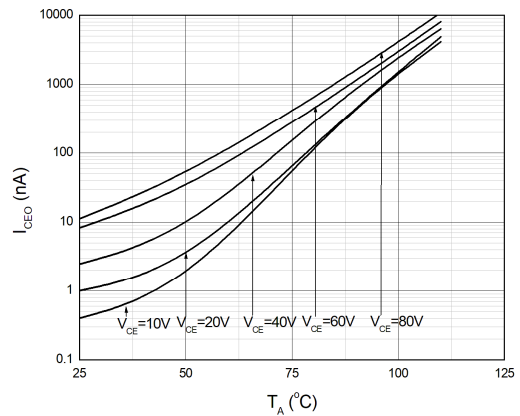
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



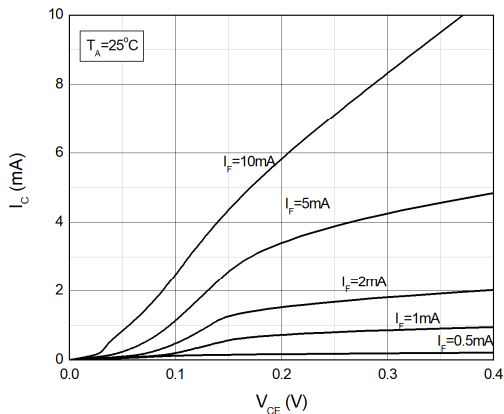
**Fig.3 Forward Current vs. Forward Voltage**



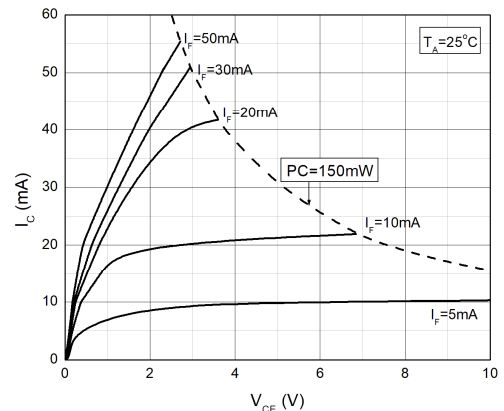
**Fig.4 Collector Dark Current vs. Ambient Temperature**



**Fig.5 Collector Current vs. Collector-emitter Voltage**

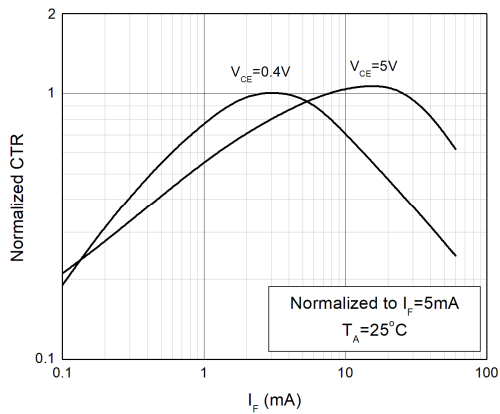


**Fig.6 Collector Current vs. Collector-emitter Voltage**

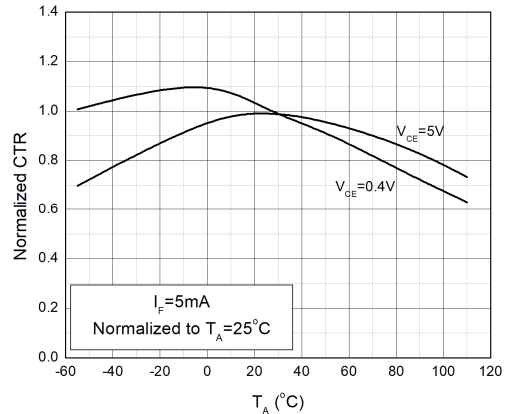


**CHARACTERISTIC CURVES**

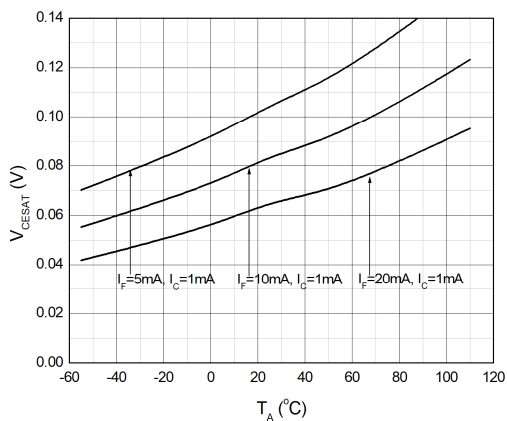
**Fig.7 Normalized Current Transfer Ratio vs. Forward Current**



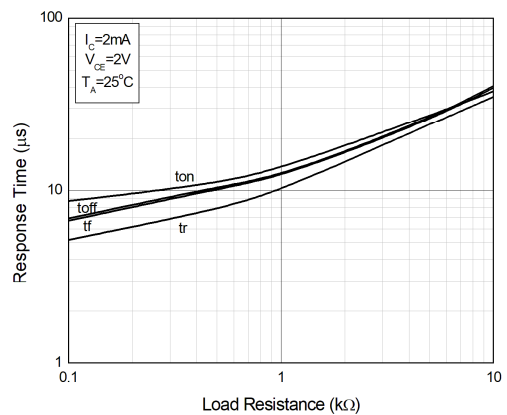
**Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature**



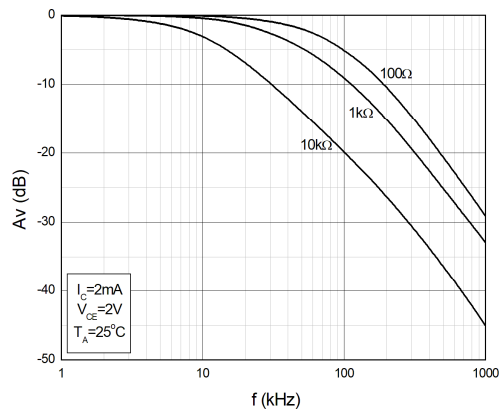
**Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature**



**Fig.10 Switching Time vs. Load Resistance**

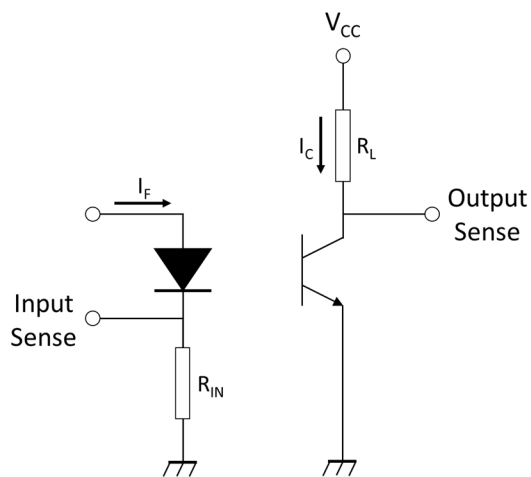


**Fig.11 Frequency Response**

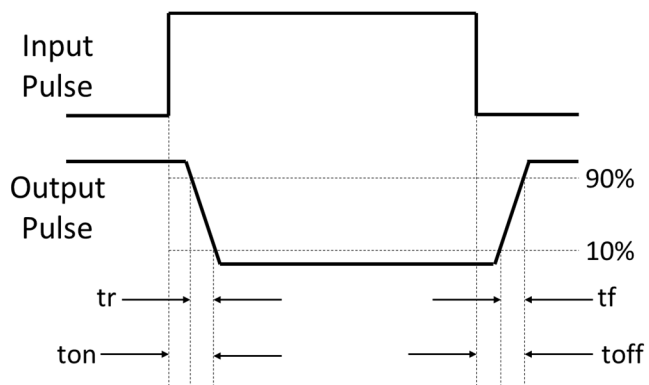


**TEST CIRCUITS**

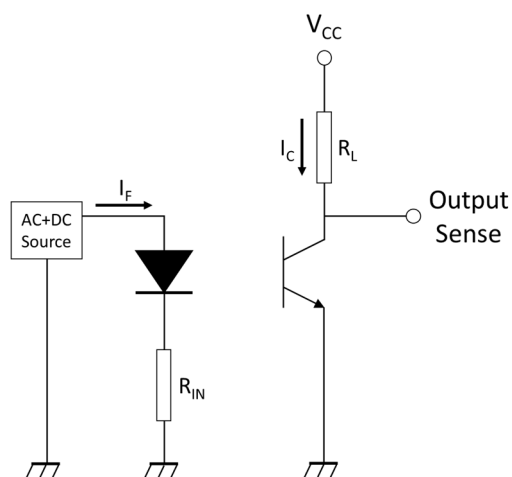
**Fig.12 Test Circuits of Response Time**



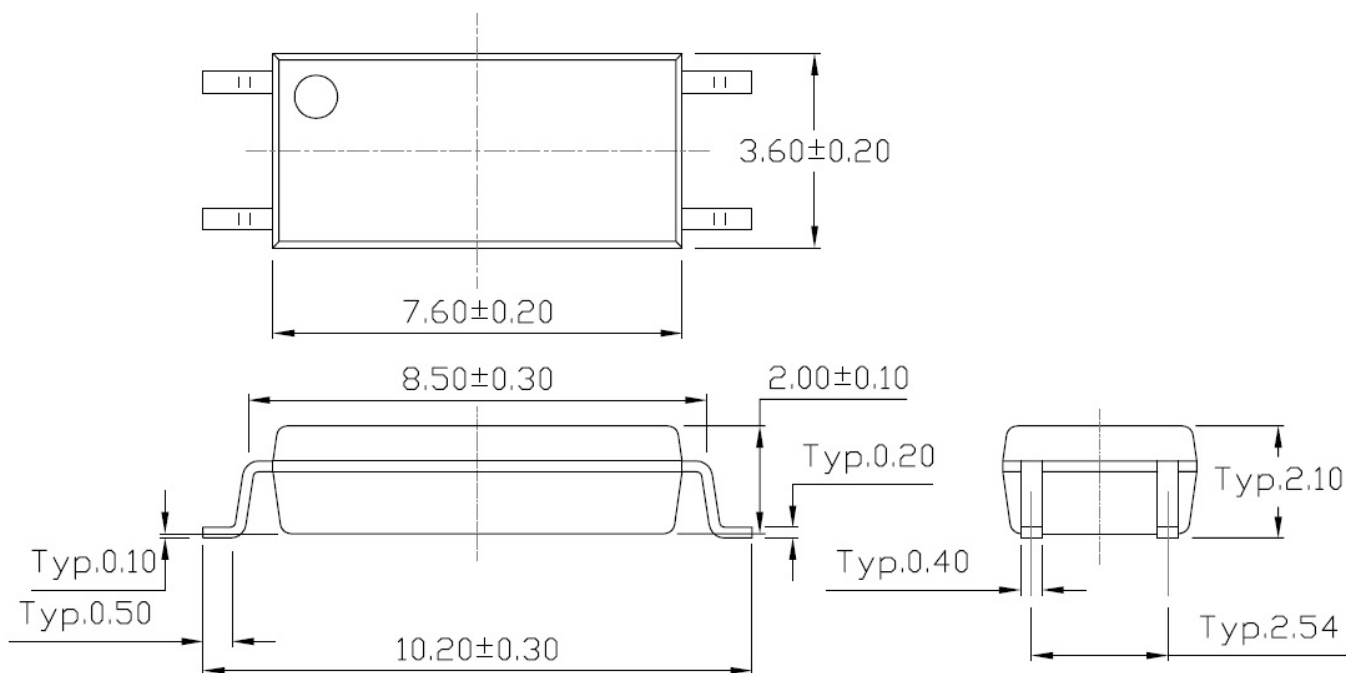
**Fig.13 Curves of Response Time**



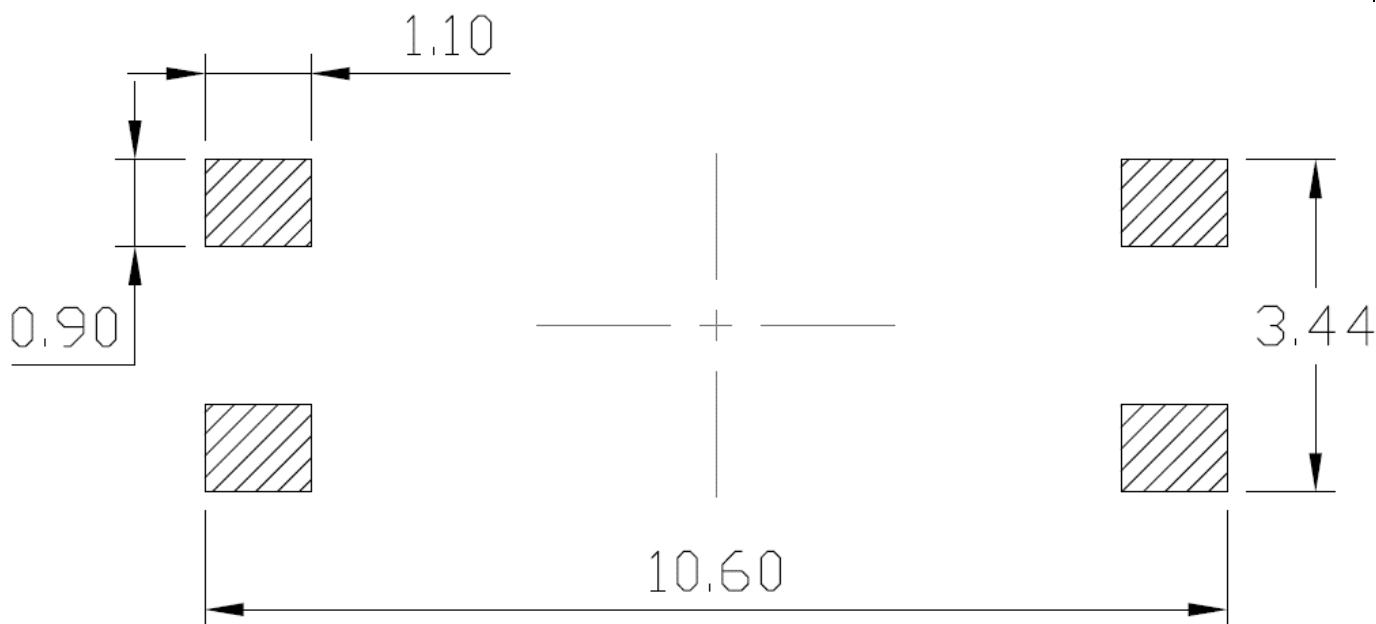
**Fig.14 Test Circuits of Frequency Response**



**PACKAGE DIMENSIONS** (Dimensions in mm unless otherwise stated)

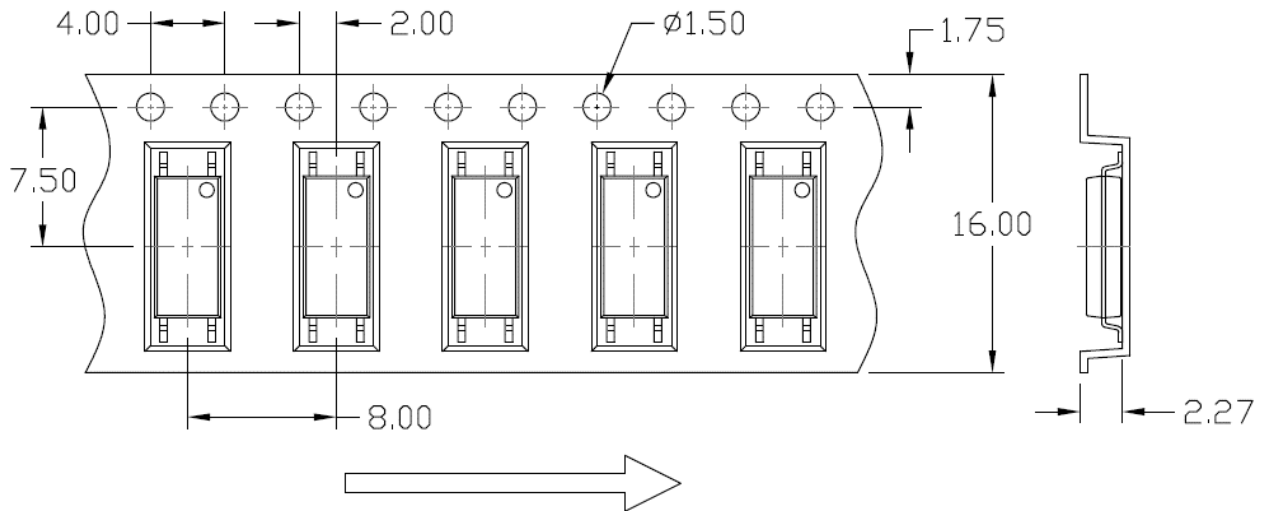


**RECOMMENDED SOLDER MASK** (Dimensions in mm unless otherwise stated)

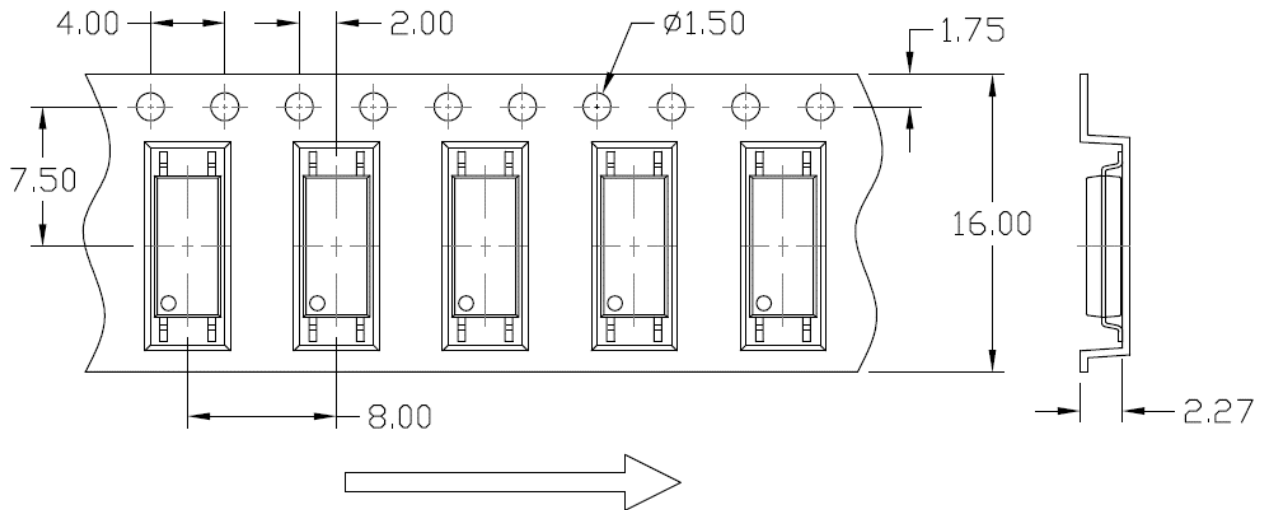


**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option T1**



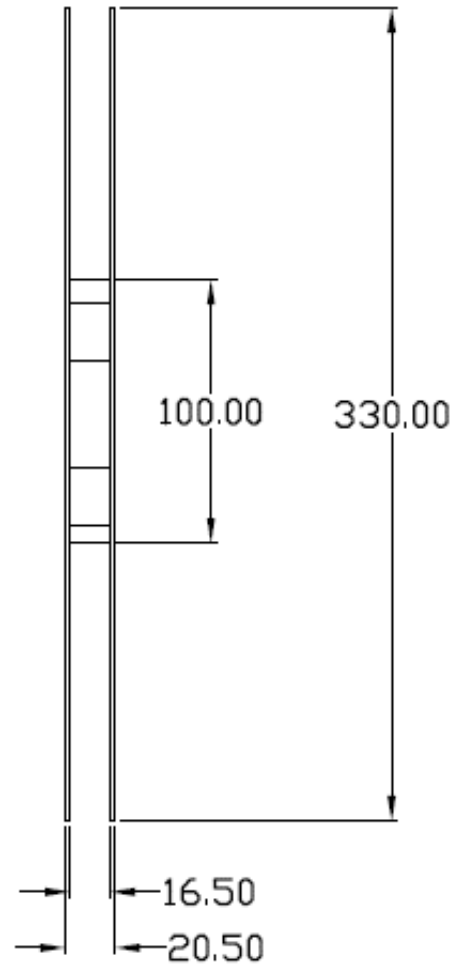
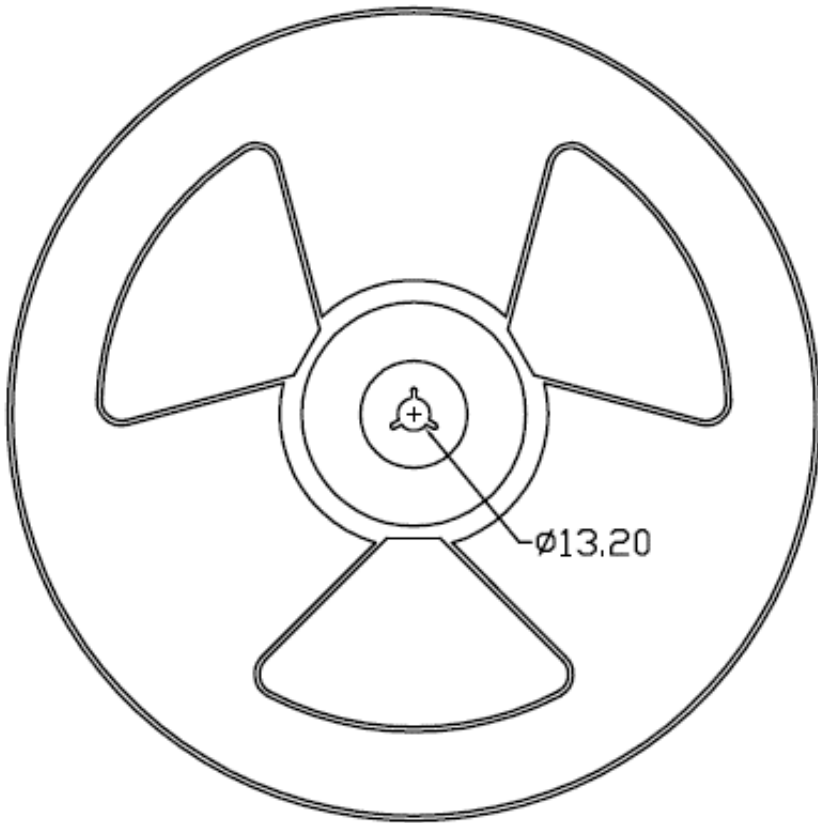
**Option T2**

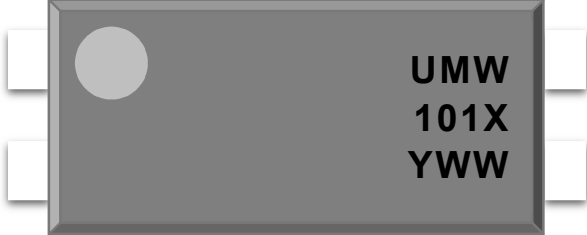




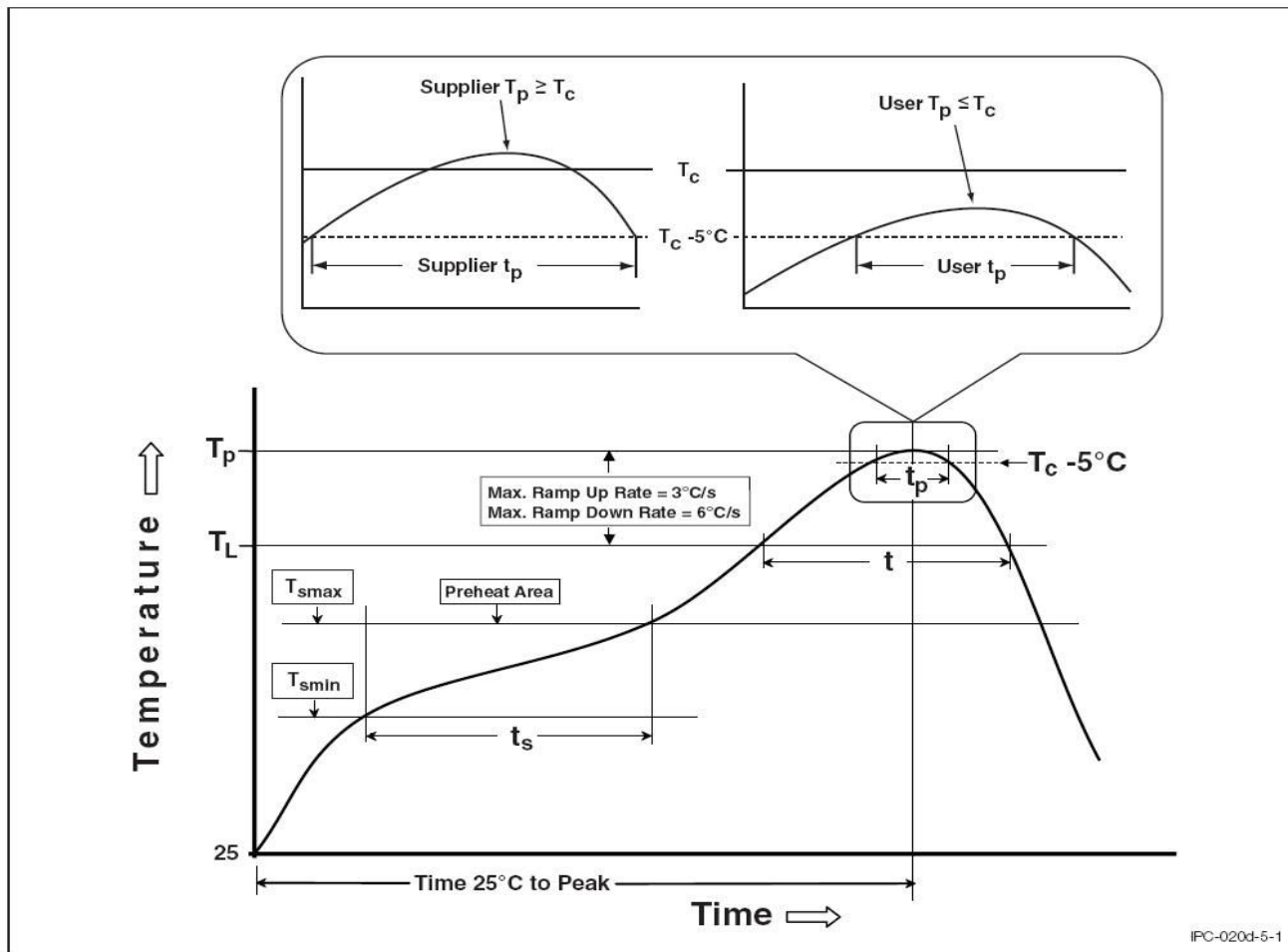
**REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option T1 & T2**



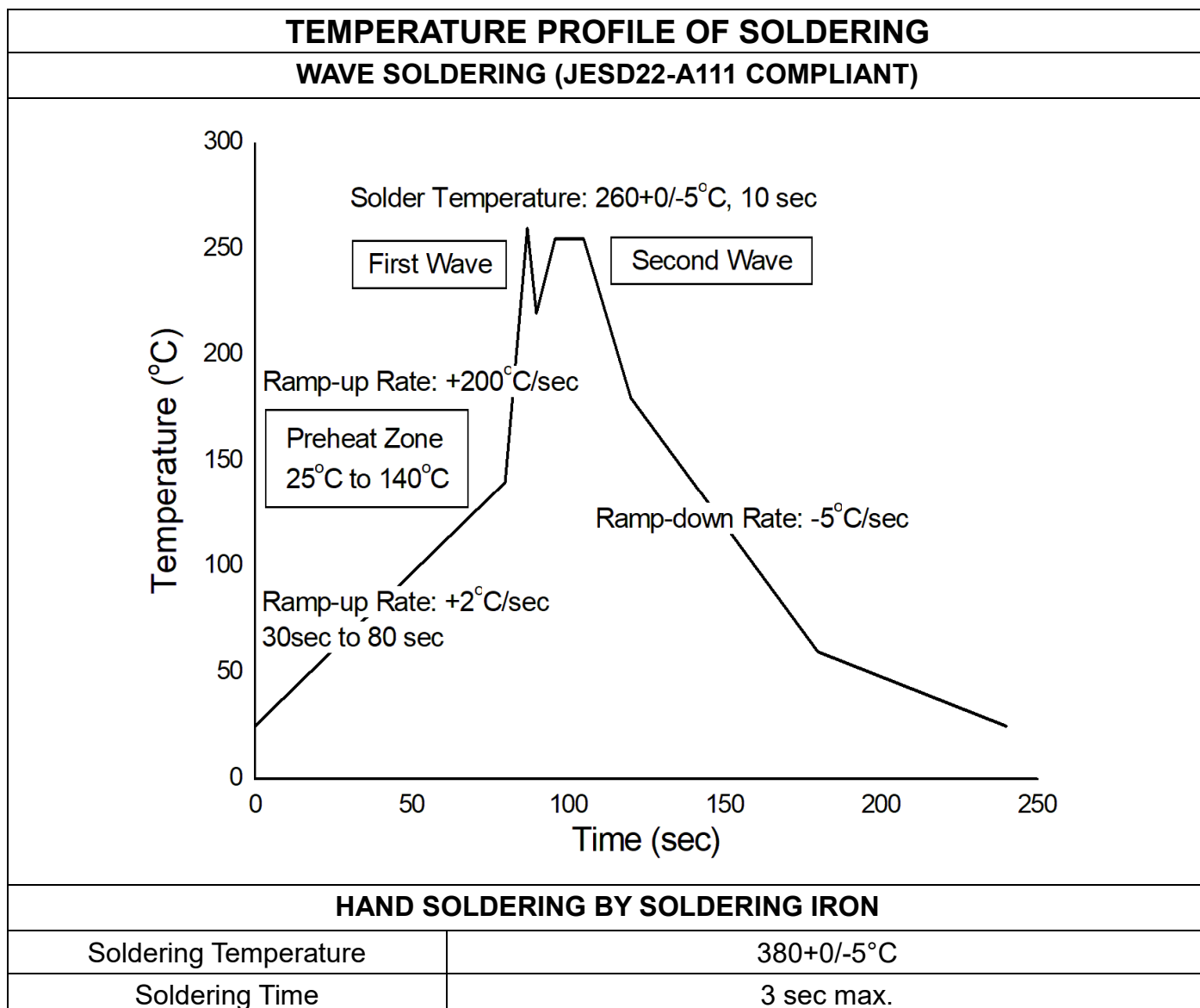
<b>ORDERING AND MARKING INFORMATION</b>	
<b>MARKING INFORMATION</b>	
	<p><b>UMW</b> : Company Abbr.  <b>101X</b> : Part Number &amp; Rank  <b>Y</b> : Fiscal Year  <b>WW</b> : Work Week</p>
<b>ORDERING INFORMATION</b>	
<b>UMW EL101X-S</b>	
<p>UMW – Company Abbr.            EL101X – Rank (0/1/2/3/4/5/6/7/8/9)            S – Tape and Reel Option</p>	

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



IPC-020d-5-1

Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	100	150°C
Temperature Max. (T <sub>smax</sub> )	150	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds	60-120 seconds
Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.	3°C/second max.
Liquidous Temperature (T <sub>L</sub> )	183°C	217°C
Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t <sub>P</sub> ) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )	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.