

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.

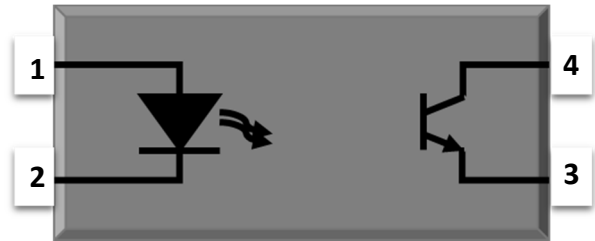
**Features**

- 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

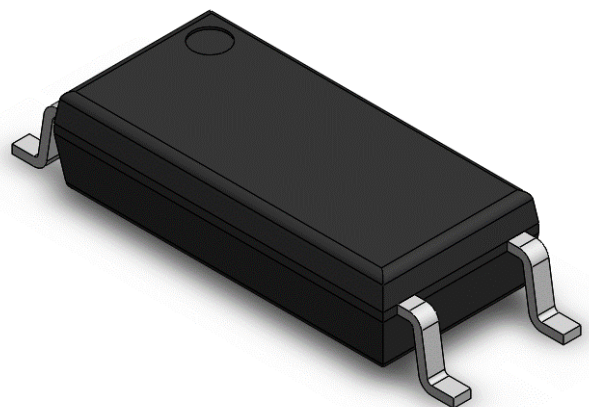
**SCHEMATIC**



**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 <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**

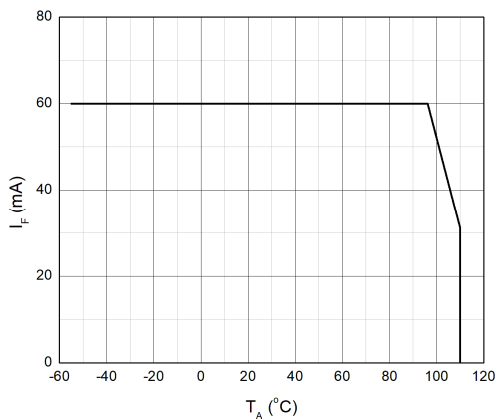
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE	
INPUT								
Forward Voltage	V <sub>F</sub>	-	1.24	1.4	V	I <sub>F</sub> =10mA		
Reverse Current	I <sub>R</sub>	-	-	10	μA	V <sub>R</sub> =6V		
Input Capacitance	C <sub>in</sub>	-	30	250	pF	V=0, f=1kHz		
OUTPUT								
Collector Dark Current	I <sub>CEO</sub>	-	-	100	nA	V <sub>CE</sub> =20V, I <sub>F</sub> =0		
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	80	-	-	V	I <sub>C</sub> =0.1mA, I <sub>F</sub> =0		
Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	7	-	-	V	I <sub>E</sub> =0.1mA, I <sub>F</sub> =0		
TRANSFER CHARACTERISTICS								
Current Transfer Ratio	UMW1007	CTR	80	-	160	%	I <sub>F</sub> =5mA, V <sub>CE</sub> =5V	
	UMW1008		130	-	260			
	UMW1009		200	-	400			
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	0.1	0.3	V	I <sub>F</sub> =10mA, I <sub>C</sub> =1mA		
Isolation Resistance	R <sub>ISO</sub>	10 <sup>12</sup>	10 <sup>14</sup>	-	Ω	DC500V, 40 ~ 60% R.H.		
Floating Capacitance	C <sub>IO</sub>	-	0.4	1	pF	V=0, f=1MHz		
Cut-off Frequency	F <sub>c</sub>	-	80	-	kHz	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA R <sub>L</sub> =100Ω, -3dB	3	
Response Time (Rise)	T <sub>r</sub>	-	5	18	μs	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA R <sub>L</sub> =100Ω	4	
Response Time (Fall)	T <sub>f</sub>	-	6	18	μs		4	

Note 3. Fig.12&13

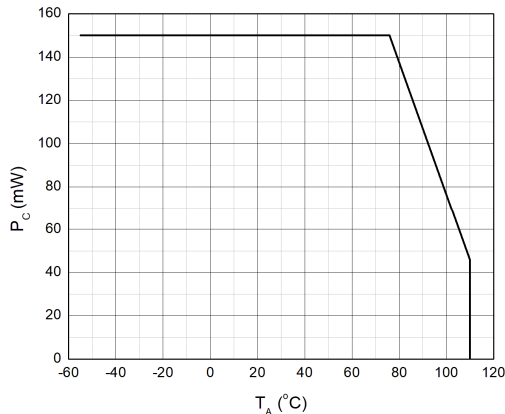
Note 4. Fig.14

**CHARACTERISTIC CURVES**

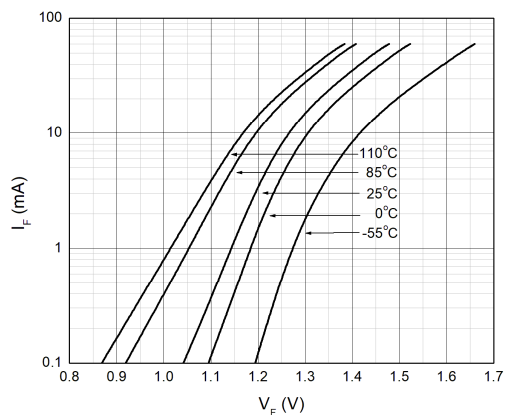
**Fig.1 Forward Current vs. Ambient Temperature**



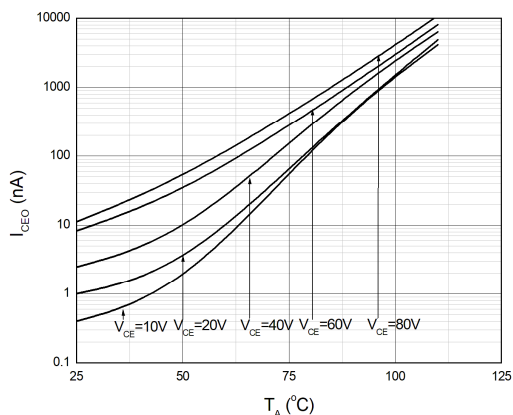
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



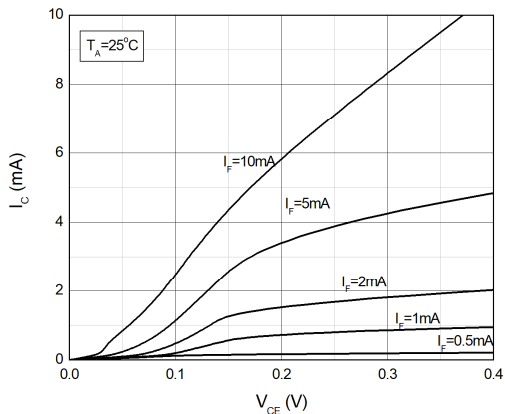
**Fig.3 Forward Current vs. Forward Voltage**



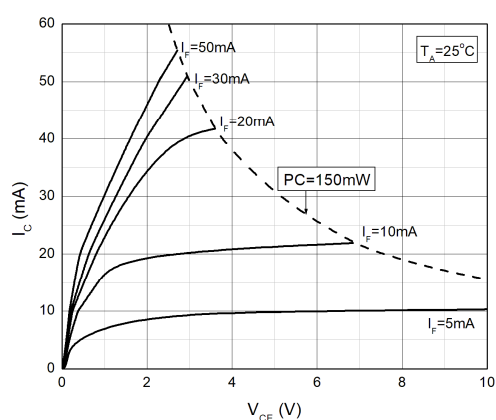
**Fig.4 Collector Dark Current vs. Ambient Temperature**



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

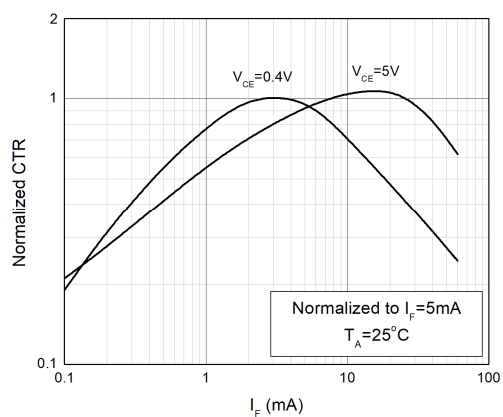


**Fig.6 Collector Current vs. Collector-emitter Voltage**

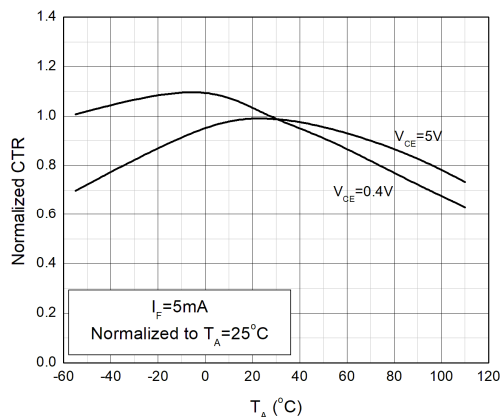


### CHARACTERISTIC CURVES

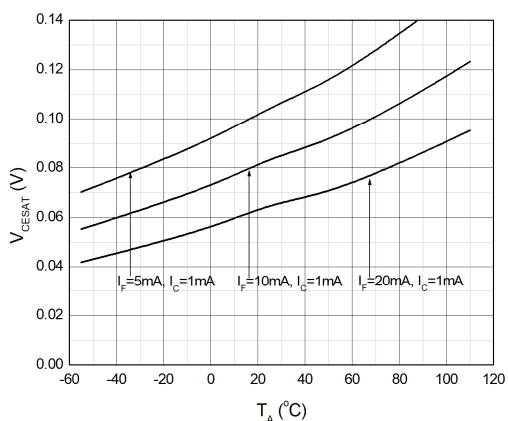
**Fig.7 Normalized Current Transfer Ratio vs. Forward Current**



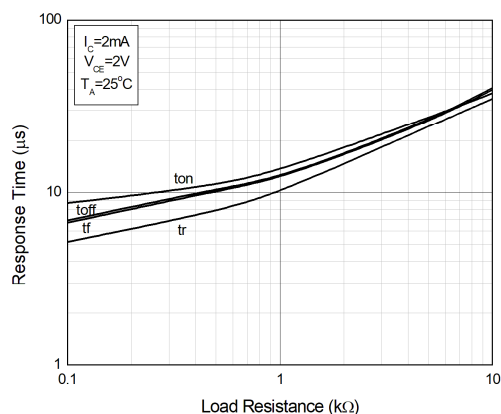
**Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature**



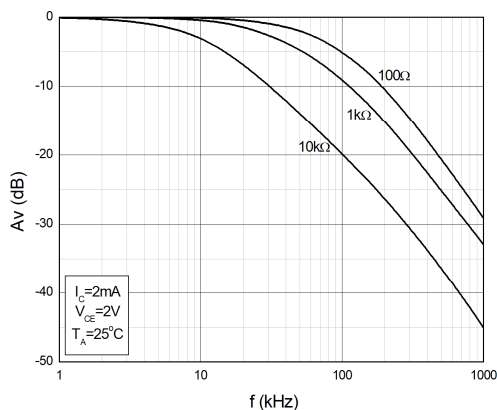
**Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature**



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

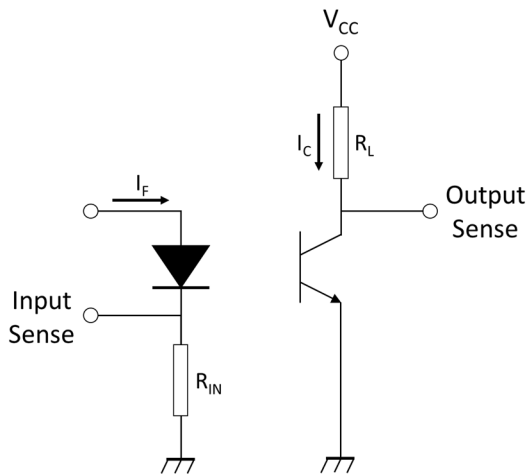


**Fig.11 Frequency Response**

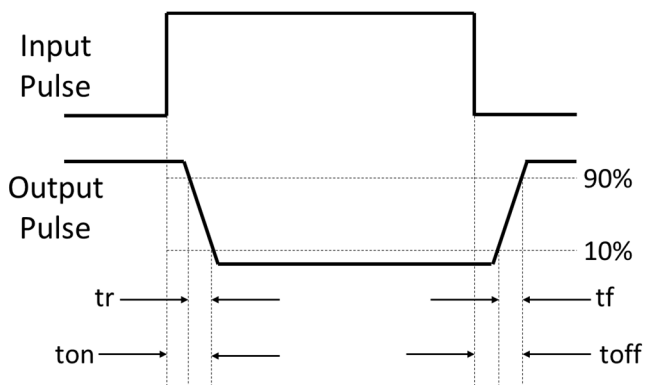


**TEST CIRCUITS**

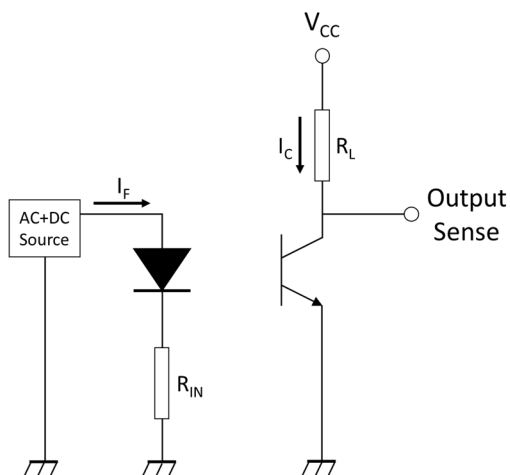
**Fig.12 Test Circuits of Response Time**



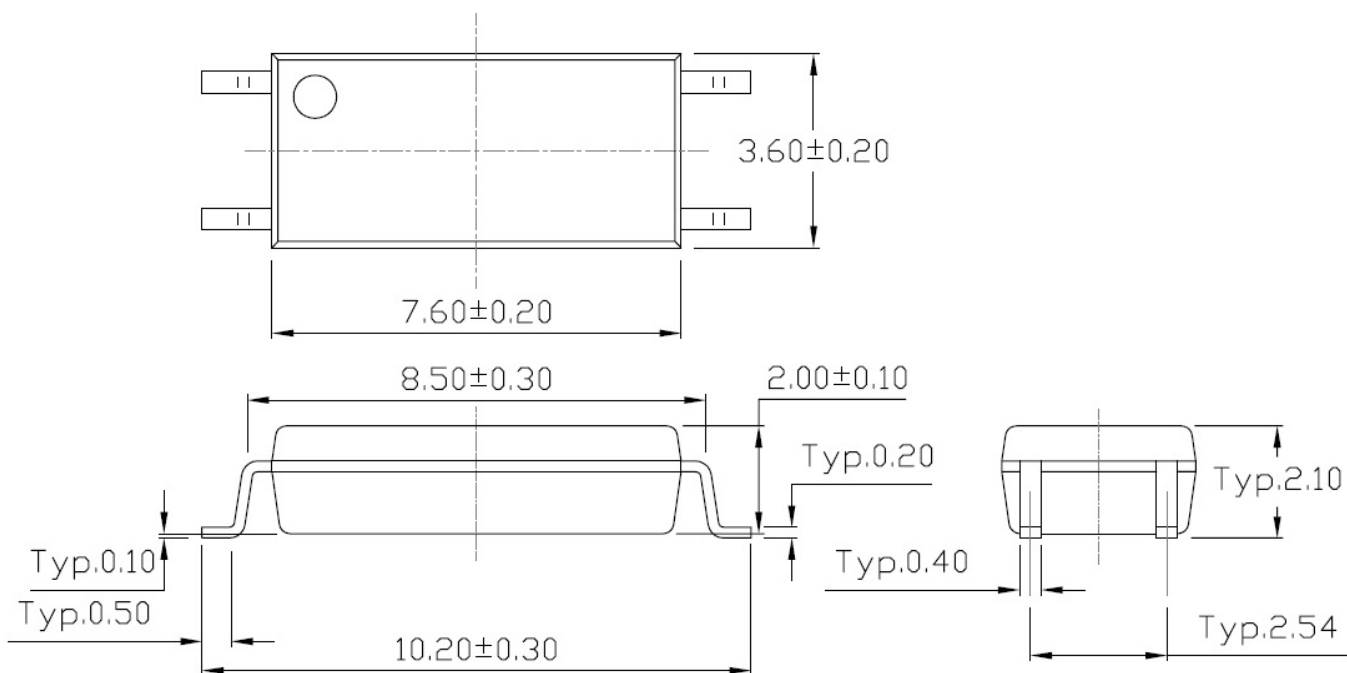
**Fig.13 Curves of Response Time**



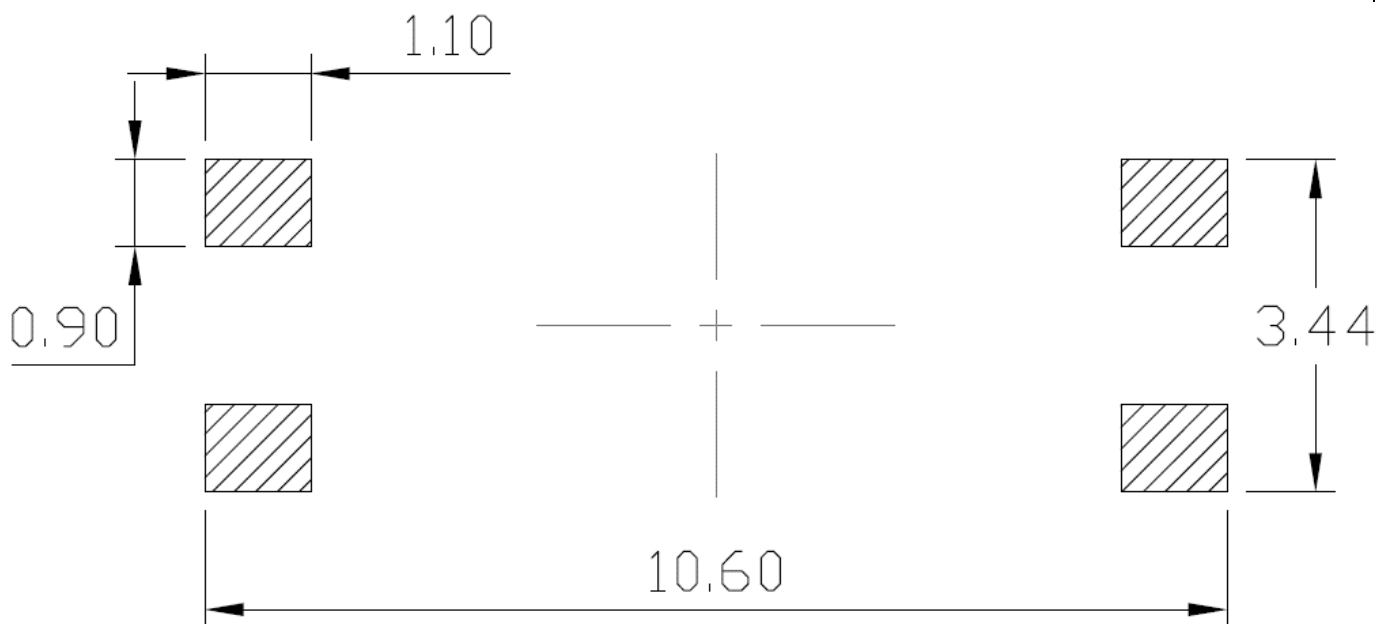
**Fig.14 Test Circuits of Frequency Response**



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

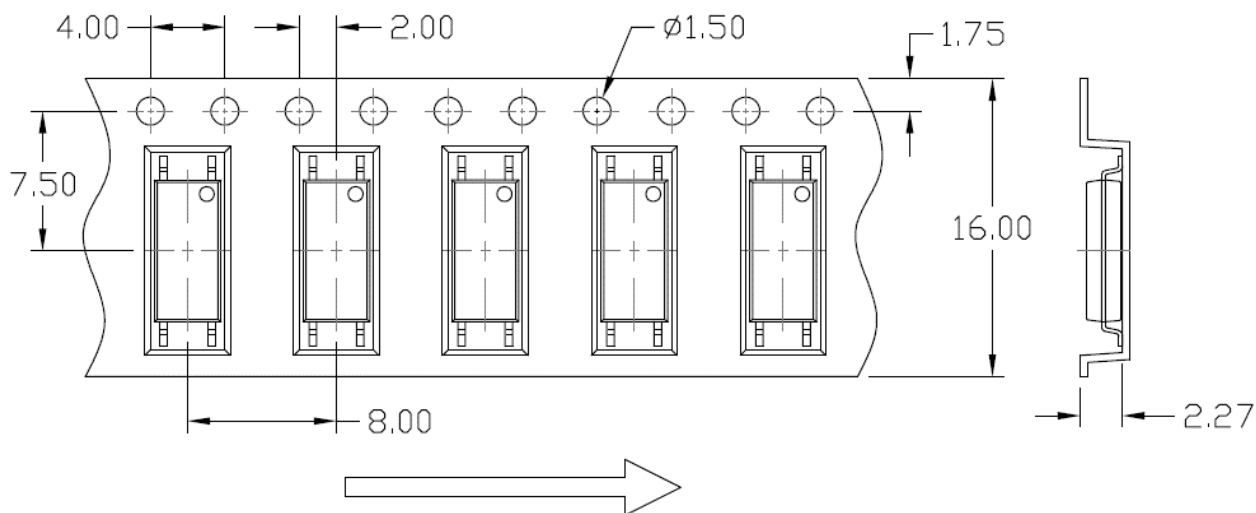


**RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)**

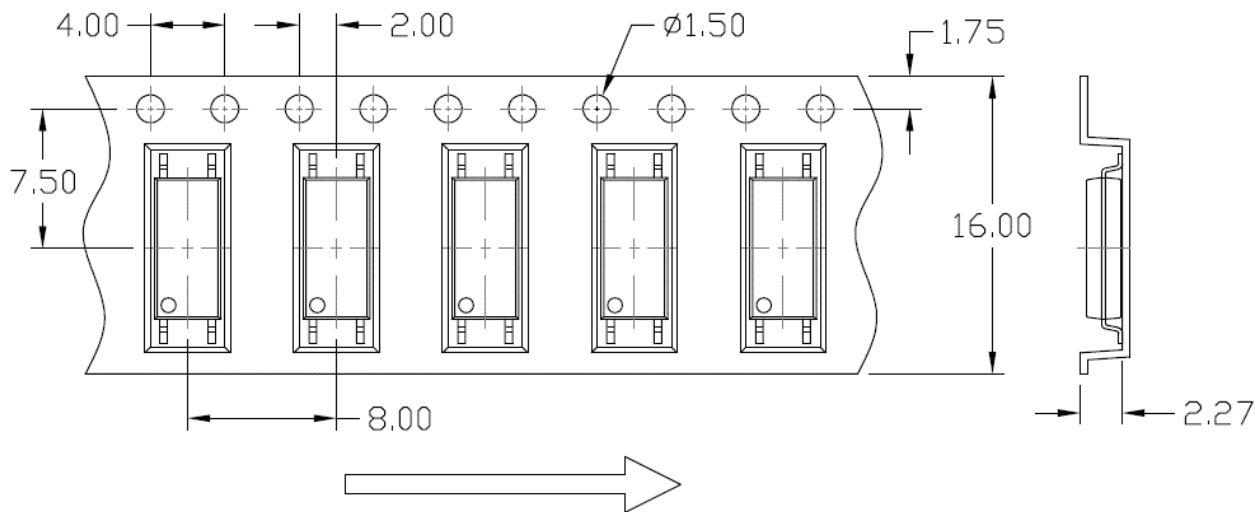


**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option T1**



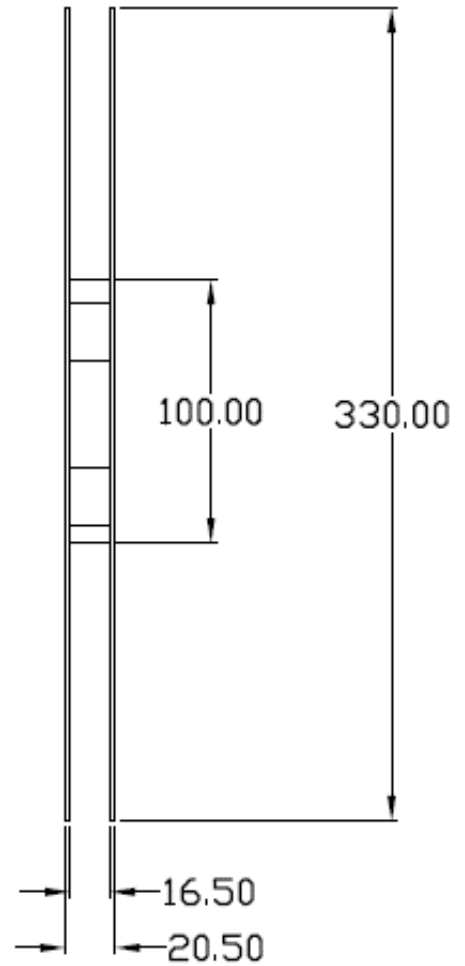
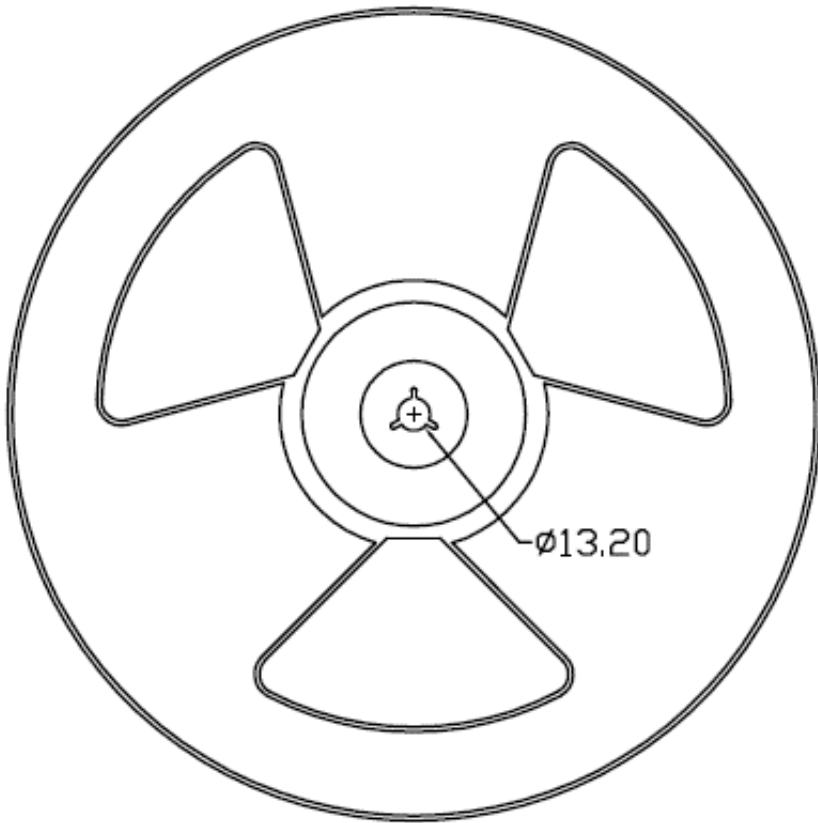
**Option T2**

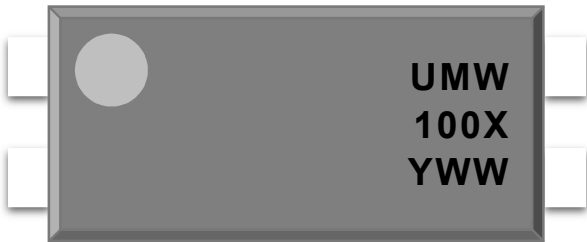




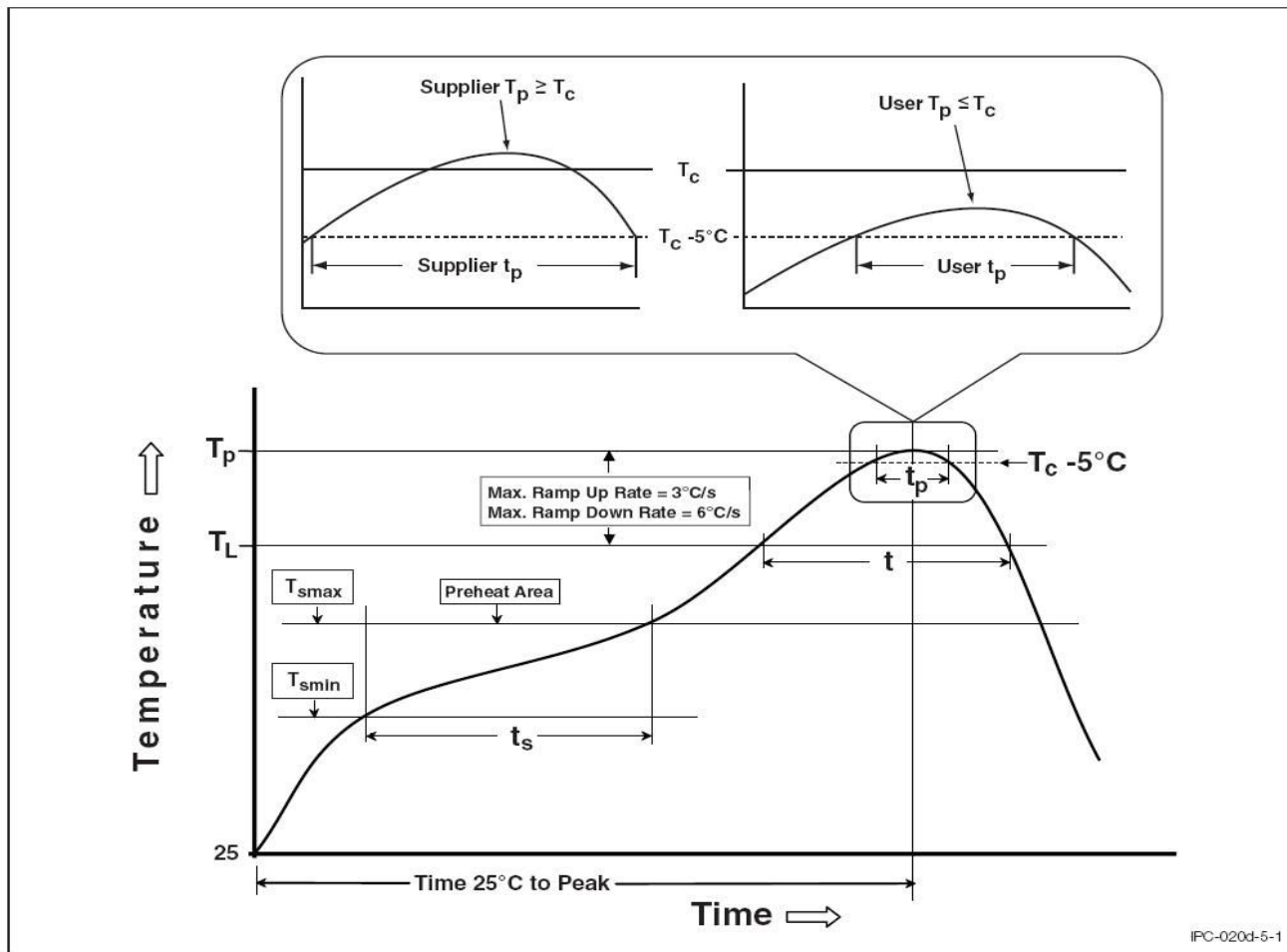
**REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option T1 & T2**

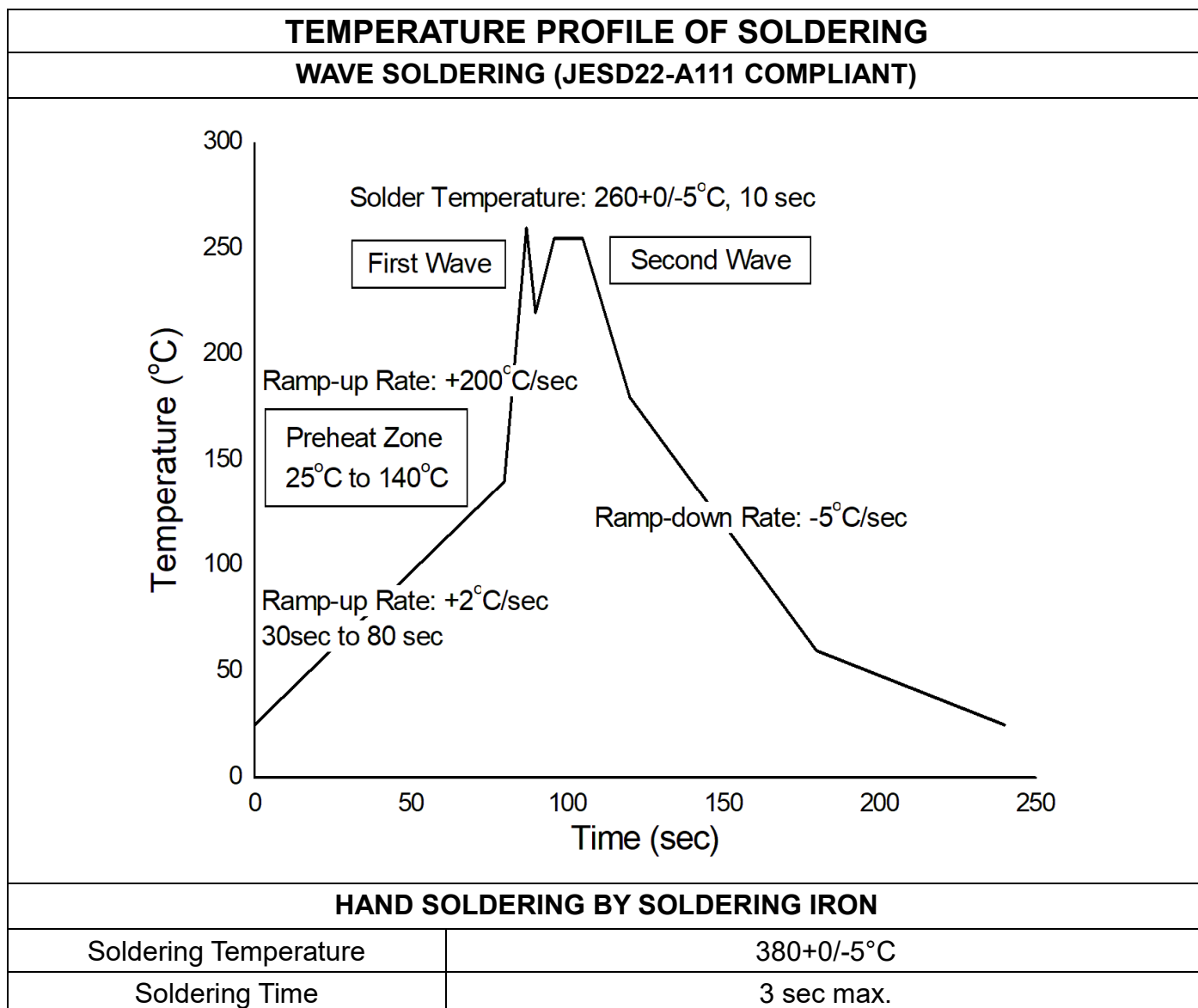


<b>ORDERING AND MARKING INFORMATION</b>	
<b>MARKING INFORMATION</b>	
	<p><b>UMW</b> : Company Abbr.  <b>100X</b> : Part Number &amp; Rank  <b>Y</b> : Fiscal Year  <b>WW</b> : Work Week</p>
<b>ORDERING INFORMATION</b>	
<b>UMW LTV-100X-S</b>	
<p>UMW – Company Abbr.                      LTV-100X – Rank (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 <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.