

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.

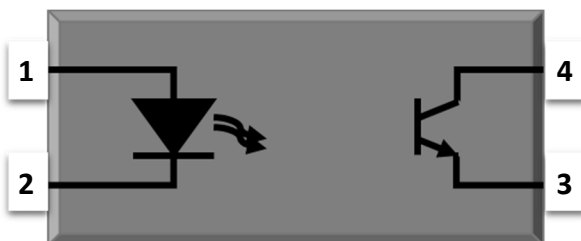
Features

- 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

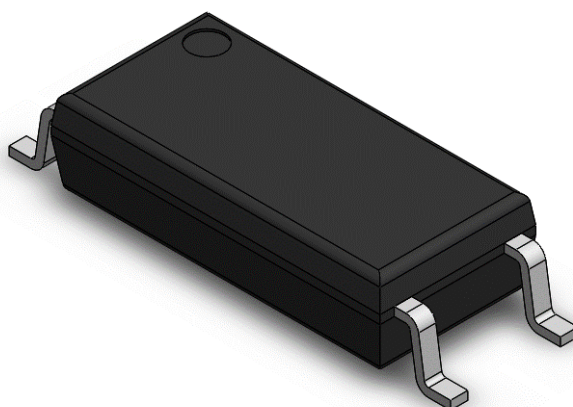
SCHEMATIC



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 _{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	UMW1017 UMW1018 UMW1019	CTR	80 130 200	- - -	160 260 400	$I_F=5mA, V_{CE}=5V$			
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	$V_{CE}=2V, I_C=2mA$ $R_L=100\Omega, -3dB$	3		
Response Time (Rise)	T_r	-	5	18	μs	$V_{CE}=2V, I_C=2mA$ $R_L=100\Omega$	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

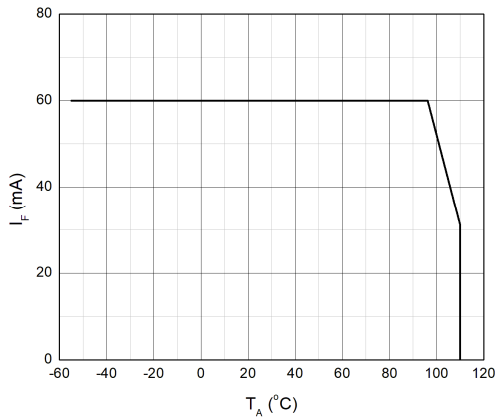


Fig.2 Collector Power Dissipation vs. Ambient Temperature

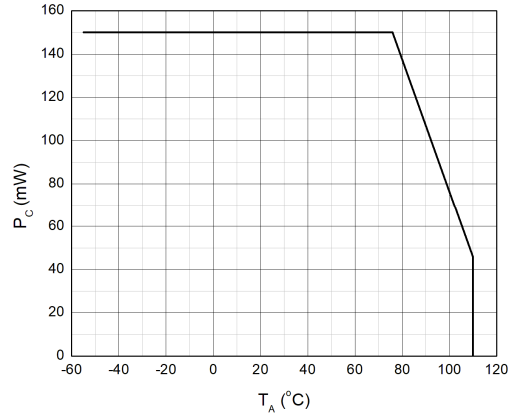


Fig.3 Forward Current vs. Forward Voltage

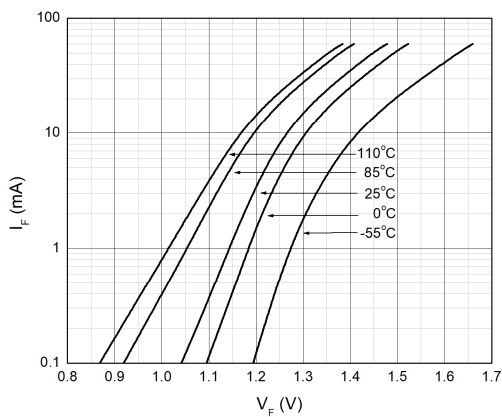


Fig.4 Collector Dark Current vs. Ambient Temperature

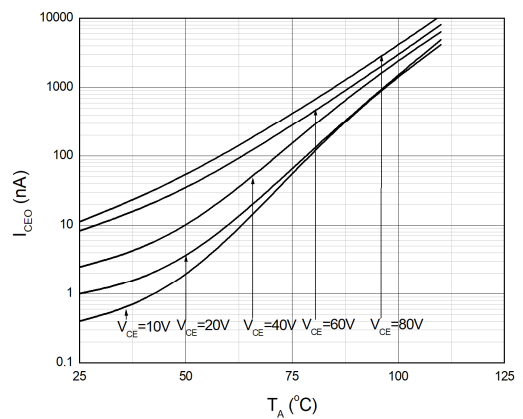


Fig.5 Collector Current vs. Collector-emitter Voltage

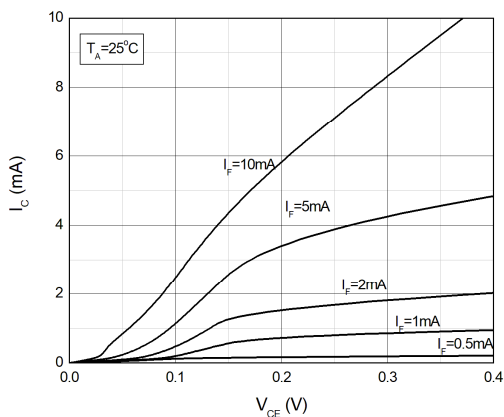
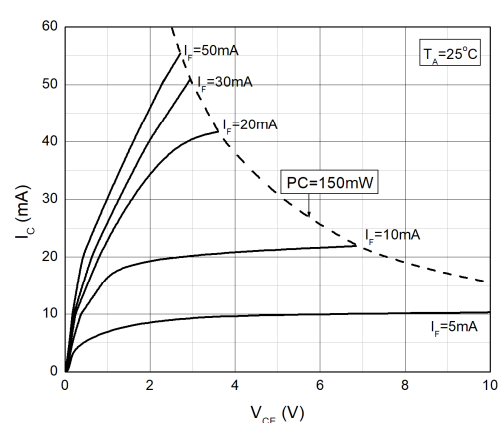


Fig.6 Collector Current vs. Collector-emitter Voltage



CHARACTERISTIC CURVES

Fig.7 Normalized Current Transfer Ratio vs. Forward Current

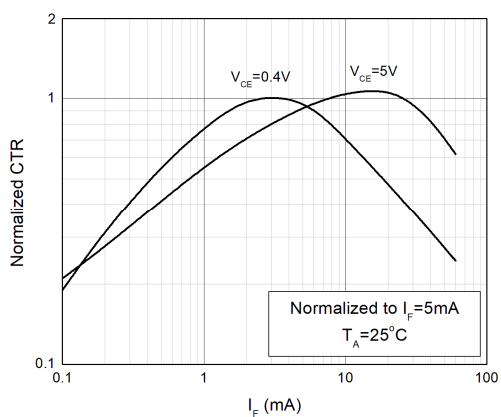


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

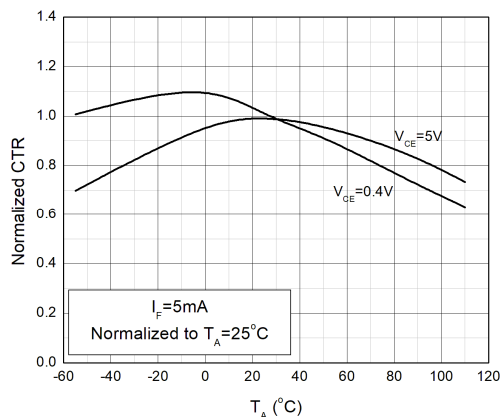


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

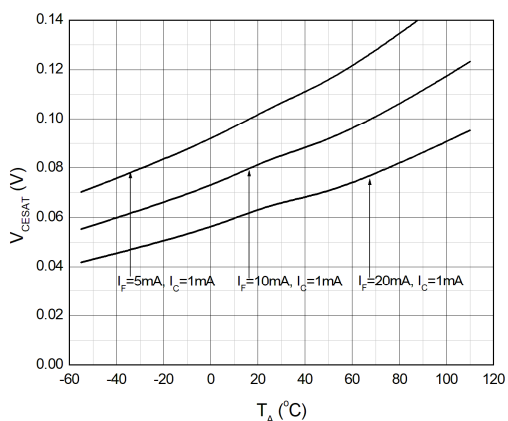


Fig.10 Switching Time vs. Load Resistance

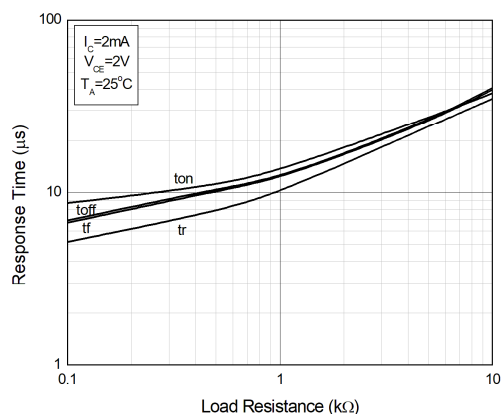
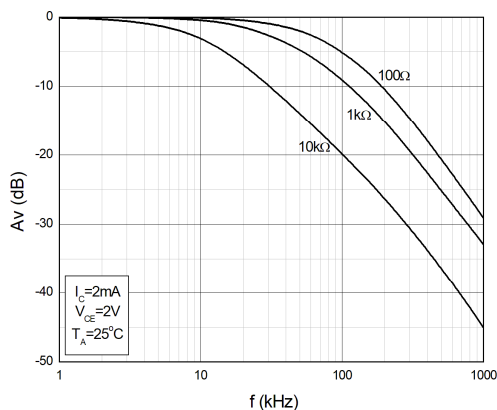


Fig.11 Frequency Response



TEST CIRCUITS

Fig.12 Test Circuits of Response Time

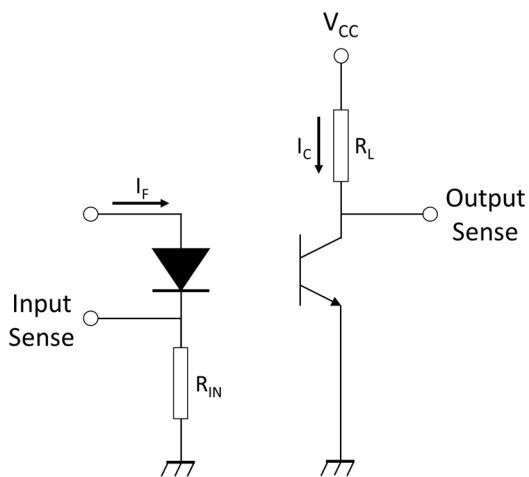


Fig.13 Curves of Response Time

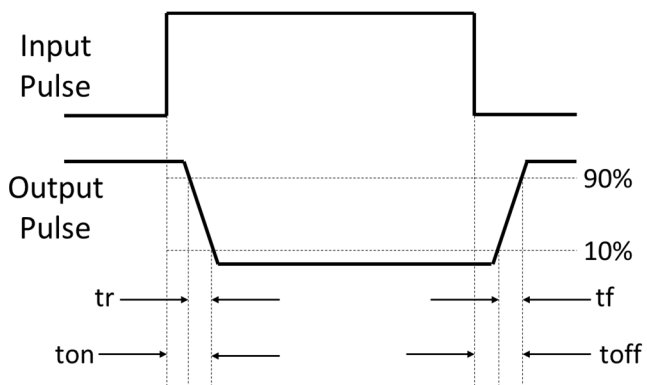
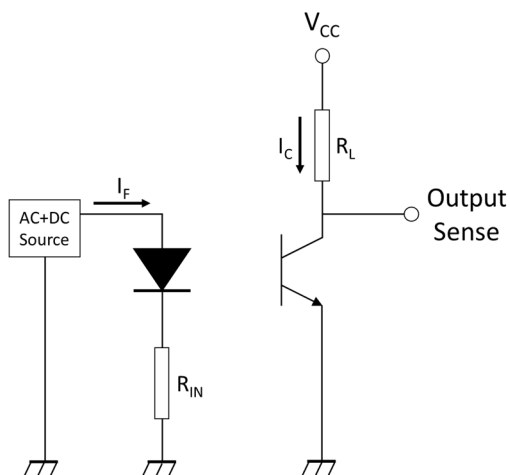
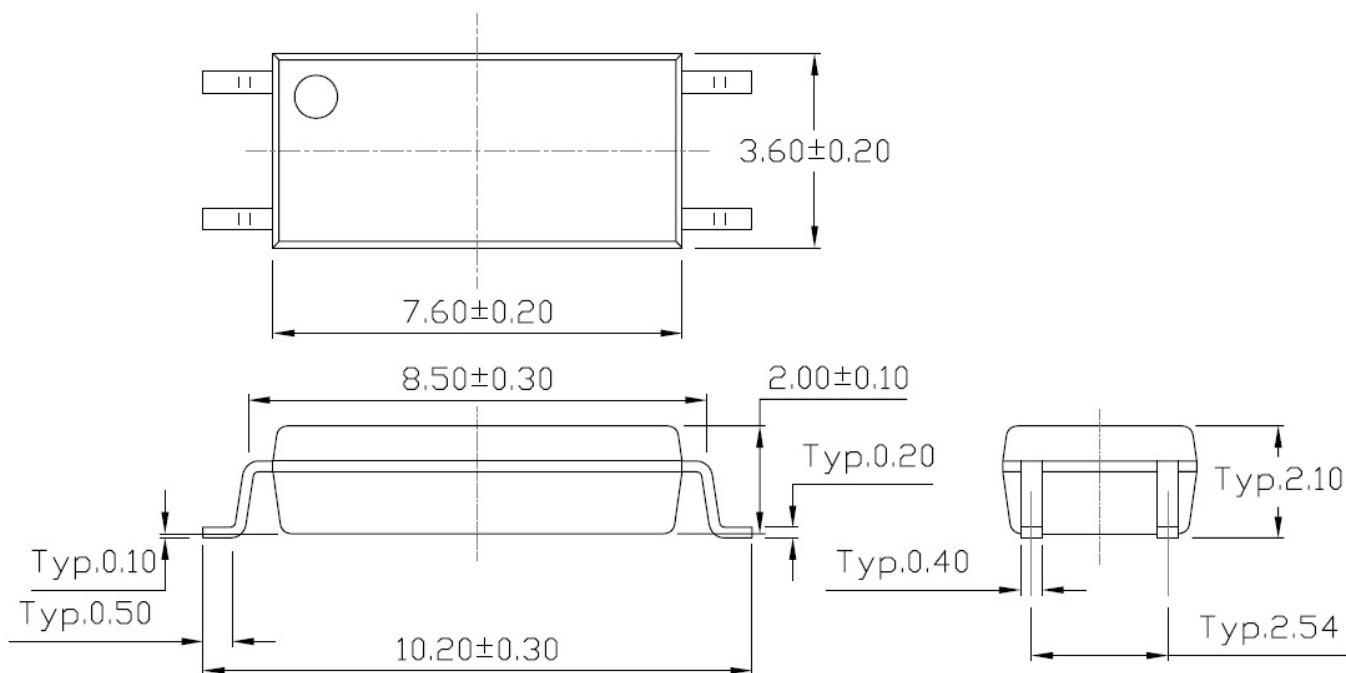


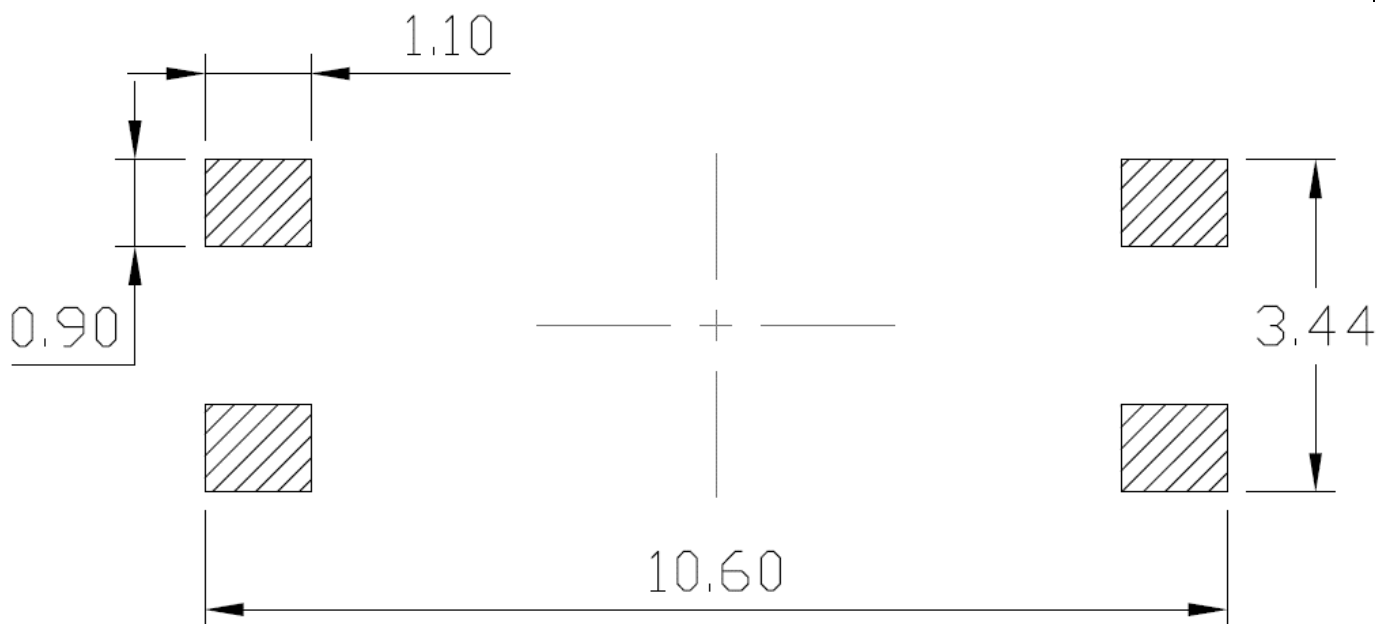
Fig.14 Test Circuits of Frequency Response



PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

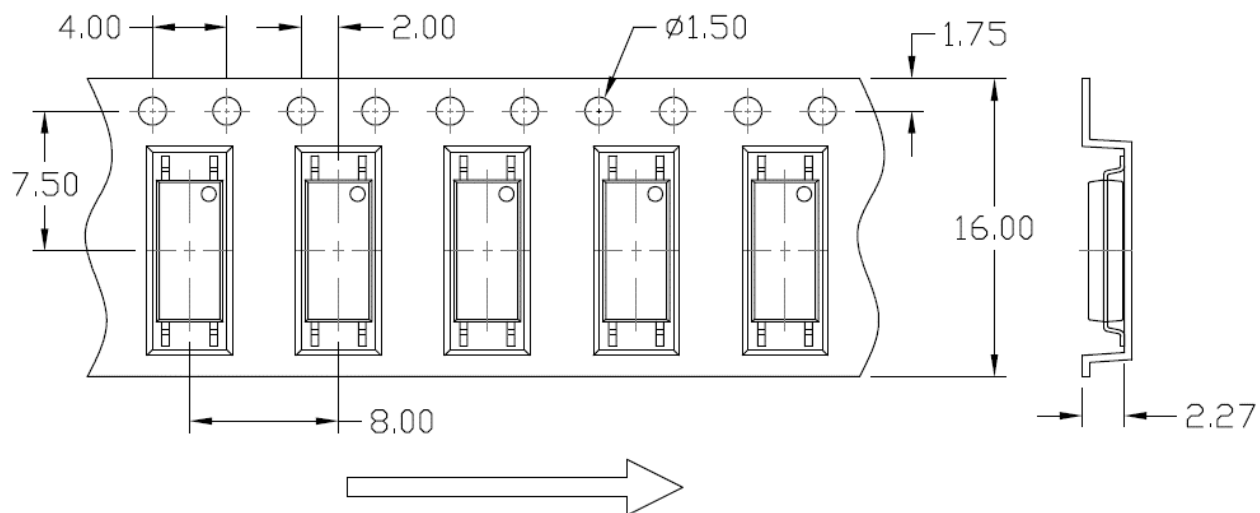


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

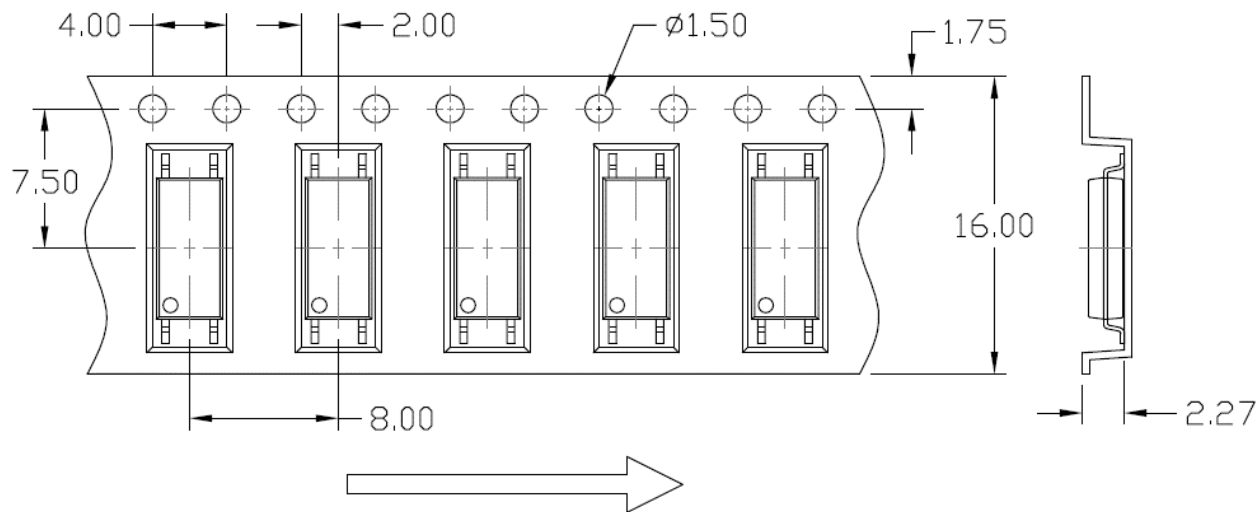


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1

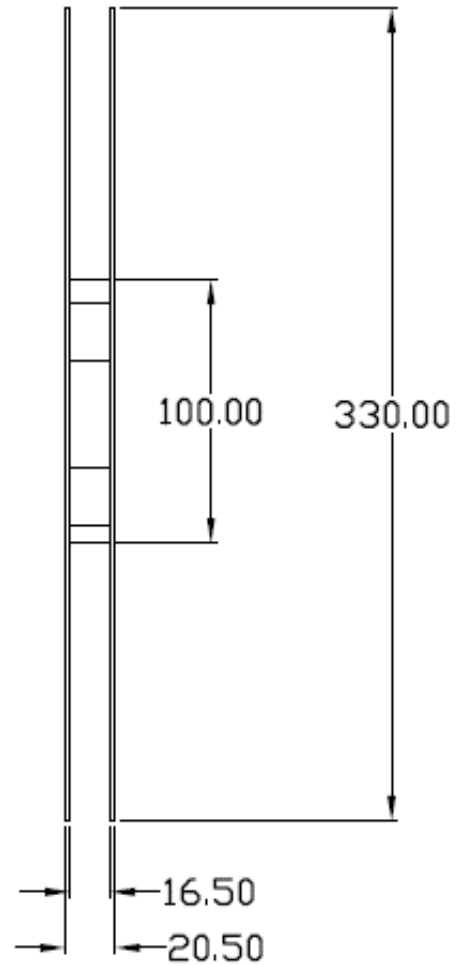
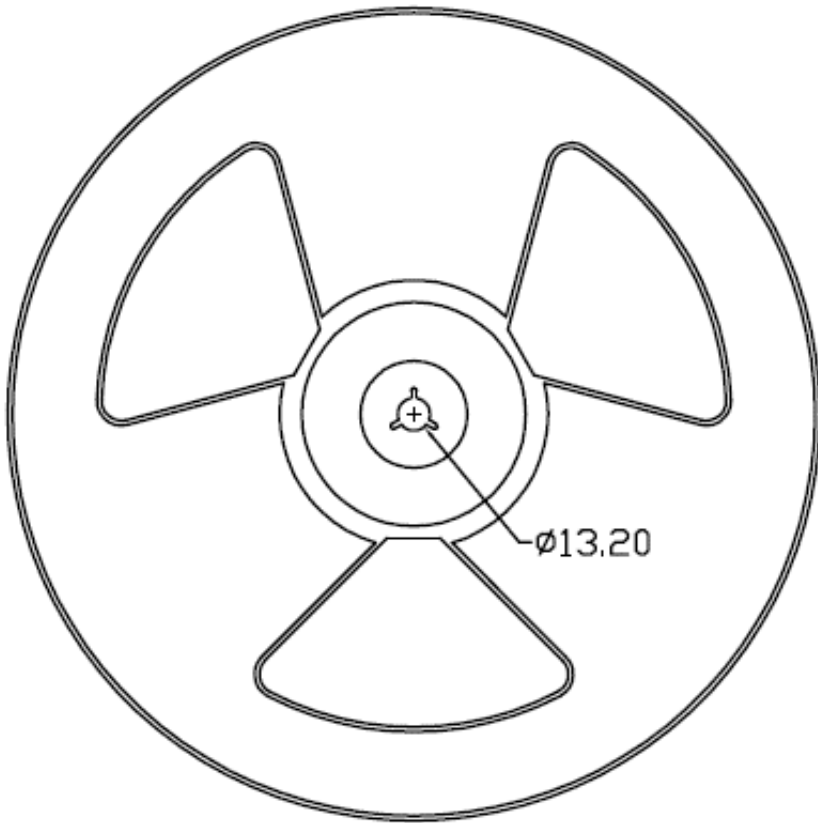


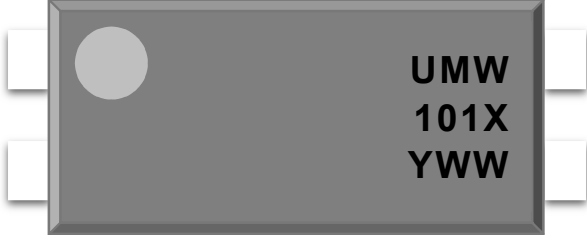
Option T2



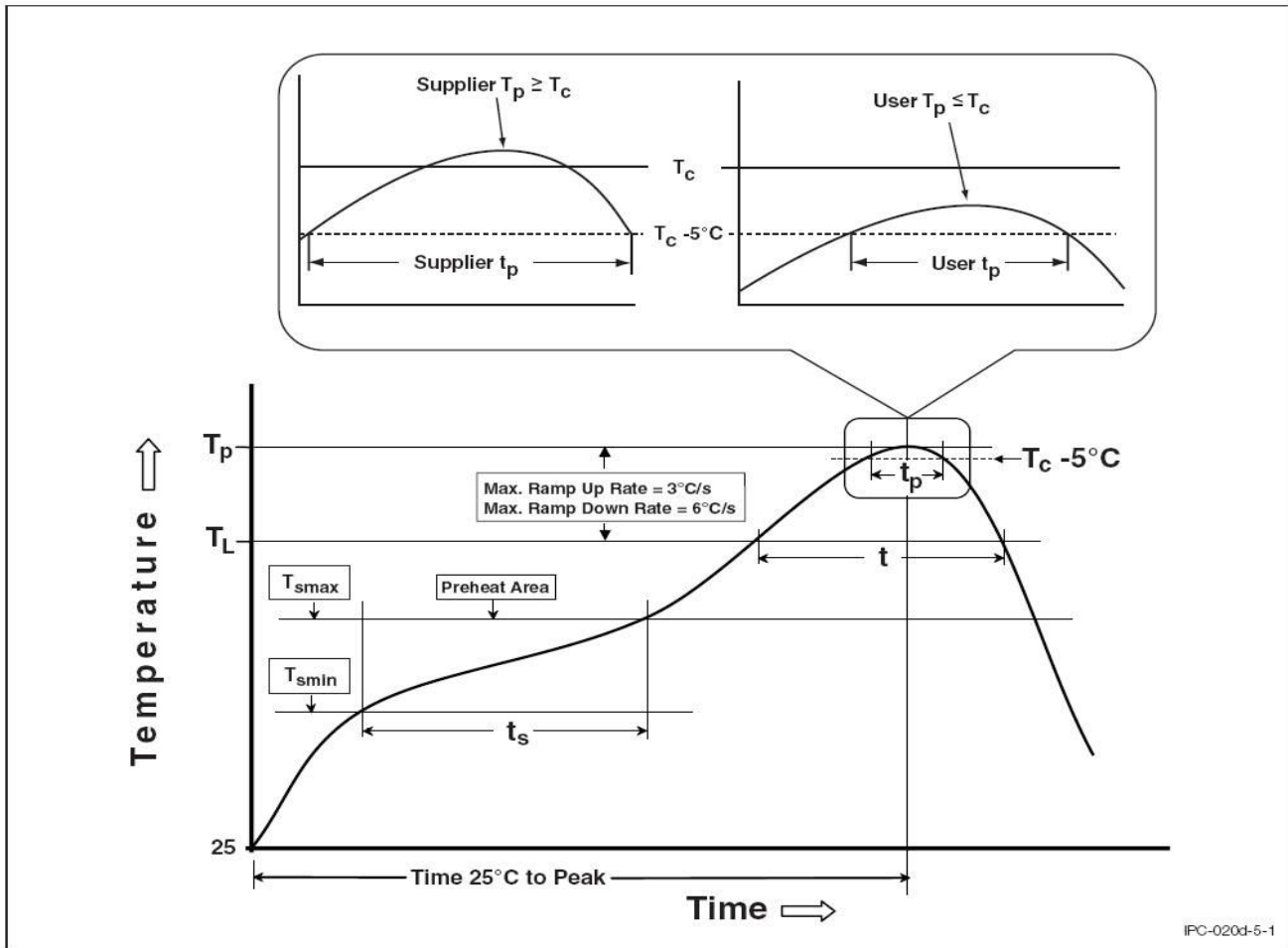
REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1 & T2

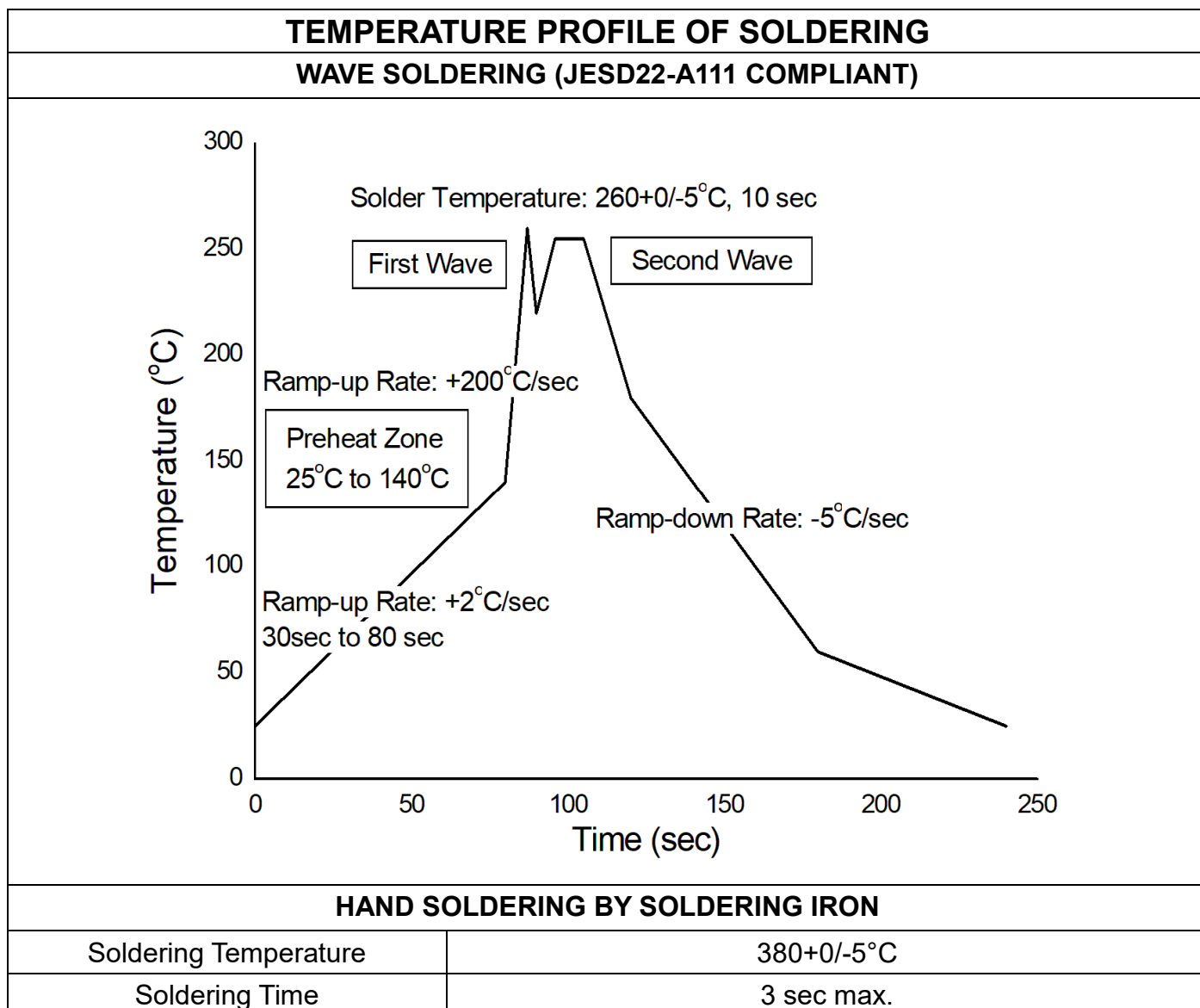


ORDERING AND MARKING INFORMATION	
MARKING INFORMATION	
	<p>UMW : Company Abbr. 101X : Part Number & Rank Y : Fiscal Year WW : Work Week</p>
ORDERING INFORMATION	
UMW EL101X-S	
<p>UMW – Company Abbr. EL101X – Rank (0/1/2/3/4/5/6/7/8/9) S – Tape and Reel Option</p>	

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



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.