

## Description

The UMW MOC302X and UMW MOC305X 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, UMW MOC302X and UMW MOC305X series provide the most stable isolation feature.

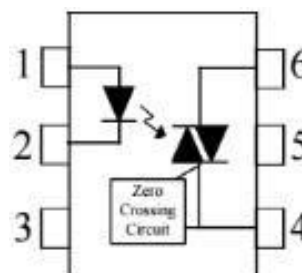
## Features

- High isolation 5000 VRMS
- DC input with random-phase photo triac output
- Operating temperature range - 40 °C to 100 °C
- REACH & RoHS compliance
- Regulatory Approvals
- UL-approved: UL1577, File No.E492440

## 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  |

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	VALUE	UNIT	NOTE
<b>INPUT</b>				
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	
<b>OUTPUT</b>				
Off-state Output Terminal Voltage	UMW MOC302X	$V_{DRM}$	400	V
	UMW MOC305X		600	
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	
<b>COMMON</b>				
Total Power Dissipation	$P_{tot}$	400	mW	
Isolation Voltage	$V_{iso}$	5000	V <sub>rms</sub>	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**

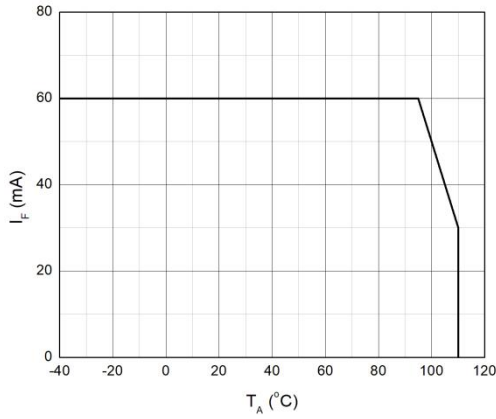
PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
<b>INPUT</b>								
Forward Voltage		$V_F$	-	1.24	1.4	V	$I_F=10\text{mA}$	
Reverse Current		$I_R$	-	-	10	$\mu\text{A}$	$V_R=6\text{V}$	
Input Capacitance		$C_{in}$	-	8.5	250	pF	$V=0, f=1\text{kHz}$	
<b>OUTPUT</b>								
Peak Off-state Current, Either Direction		$I_{DRM}$	-	-	100	nA	$V_{DRM}=\text{Rated } V_{DRM}$ $I_F=0$	3
Peak On-state Current, 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
<b>TRANSFER CHARACTERISTICS</b>								
LED Trigger Current	UMW MOC3021	$I_{FT}$	-	-	15	mA	Terminal Voltage = 3V $I_{TM}=100\text{mA}$	
	UMW MOC3051							
	UMW MOC3022		-	-	10			
	UMW MOC3052							
	UMW MOC3023 UMW MOC3053		-	-	5			
Holding Current		$I_H$	-	257	-	$\mu\text{A}$		
Isolation Resistance		$R_{iso}$	$10^{12}$	$10^{14}$	-	$\Omega$	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.

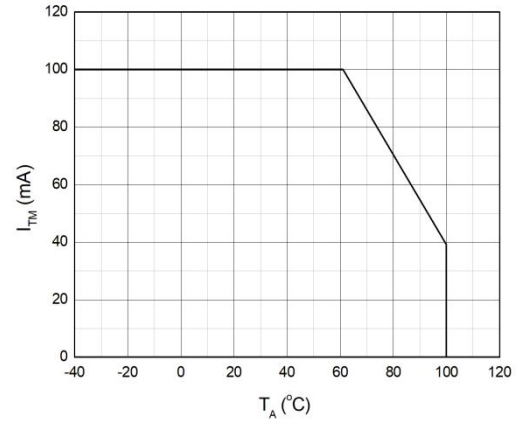
Note4. Refer to Fig.15 & Fig.16

### CHARACTERISTIC CURVES

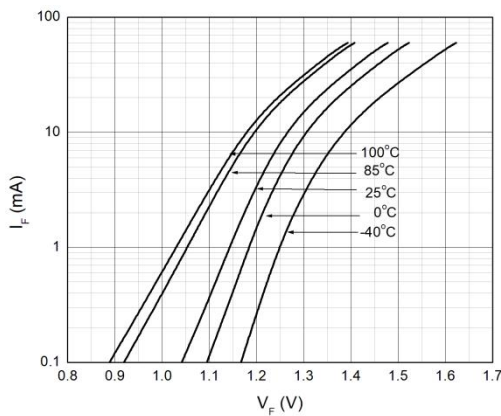
**Fig.1 Forward Current vs. Ambient Temperature**



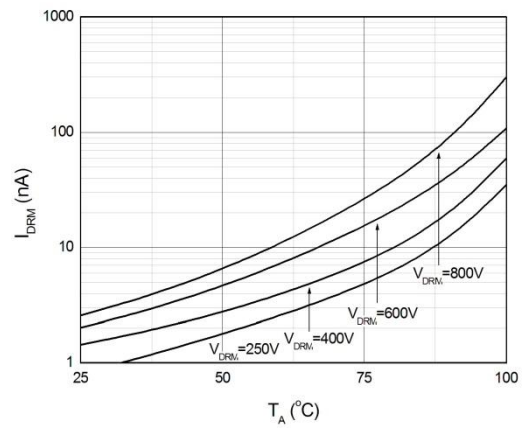
**Fig.2 On-state Terminal Current vs. Ambient Temperature**



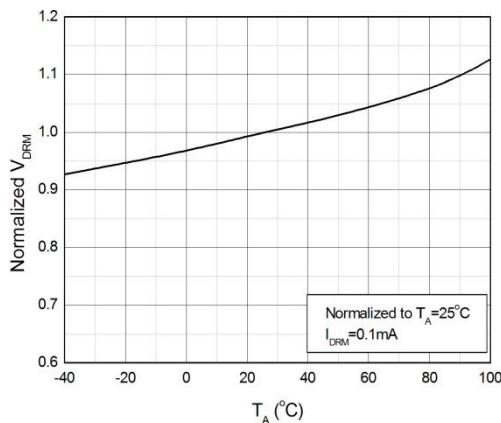
**Fig.3 Forward Current vs. Forward Voltage**



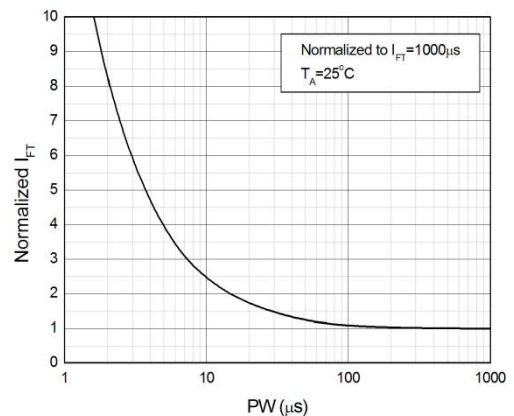
**Fig.4 Off-state Terminal Current vs. Ambient Temperature**



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

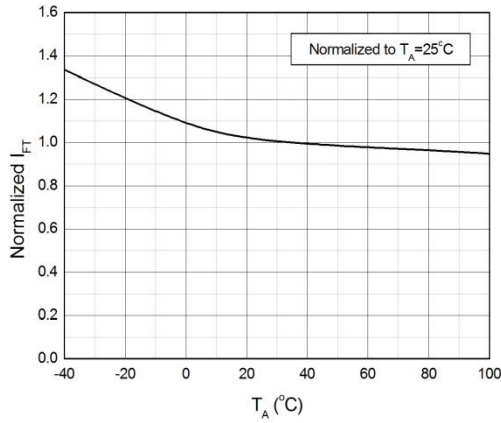


**Fig.6 Normalized Trigger Current vs. LED Trigger Pulse Width**

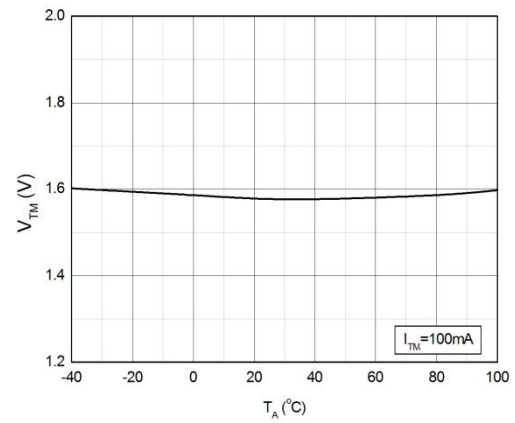


## CHARACTERISTIC CURVES

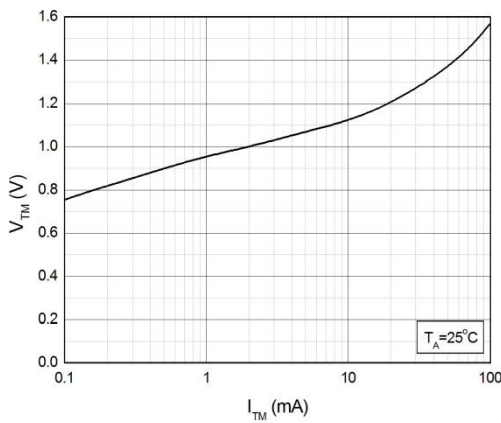
**Fig.7 Normalized Trigger Current vs. Ambient Temperature**



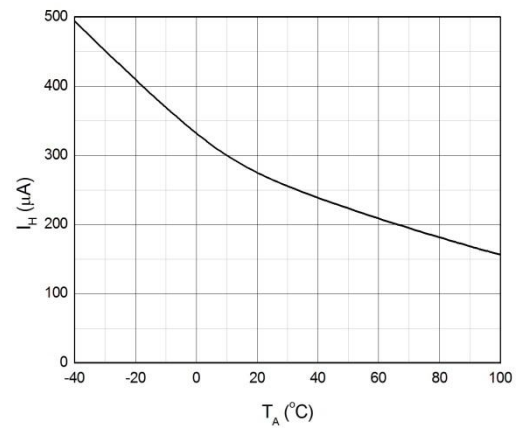
**Fig.8 On-state Terminal Voltage vs. Ambient Temperature**



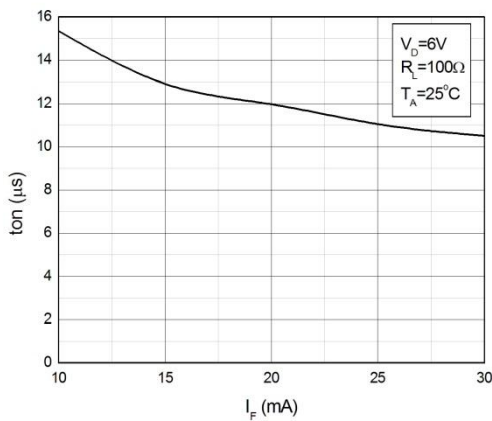
**Fig.9 On-state Terminal Voltage vs. On-state Terminal Current**



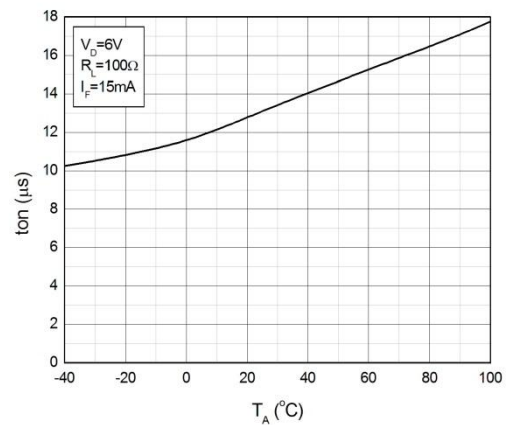
**Fig.10 Holding Current vs. Ambient Temperature**



**Fig.11 Turn On Time vs. Forward Current**

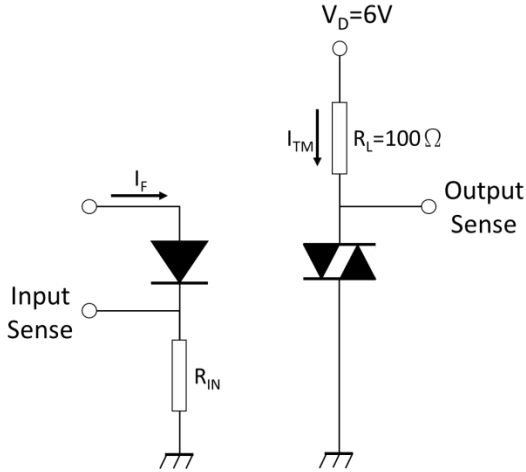


**Fig.12 Turn On Time vs. Ambient Temperature**

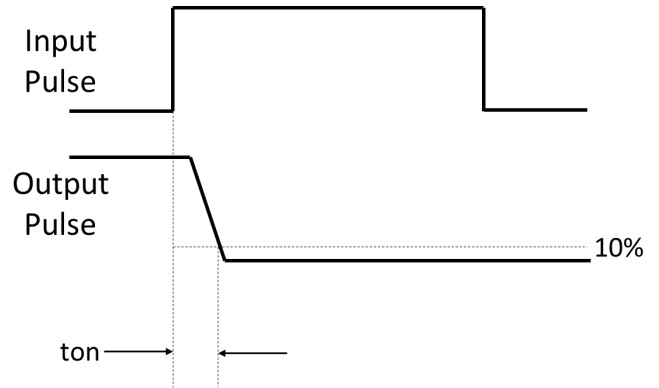


**TEST CIRCUITS**

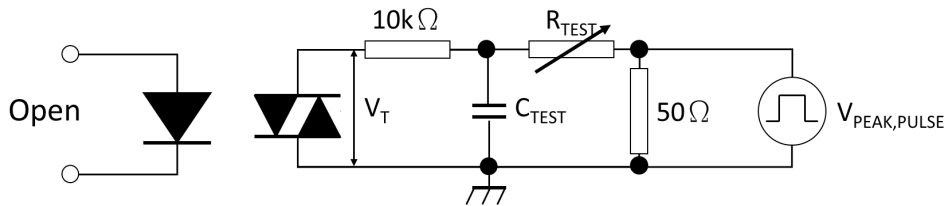
**Fig.13 Test Circuits of Turn On Time**



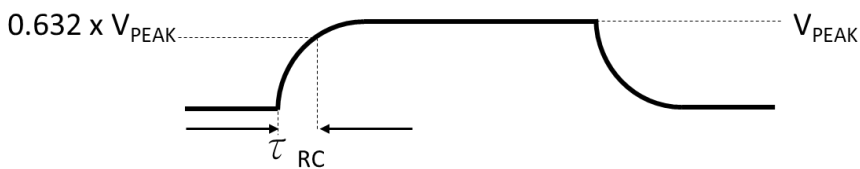
**Fig.14 Waveforms of Turn On Time**



**Fig.15 Test Circuits of dV/dt**



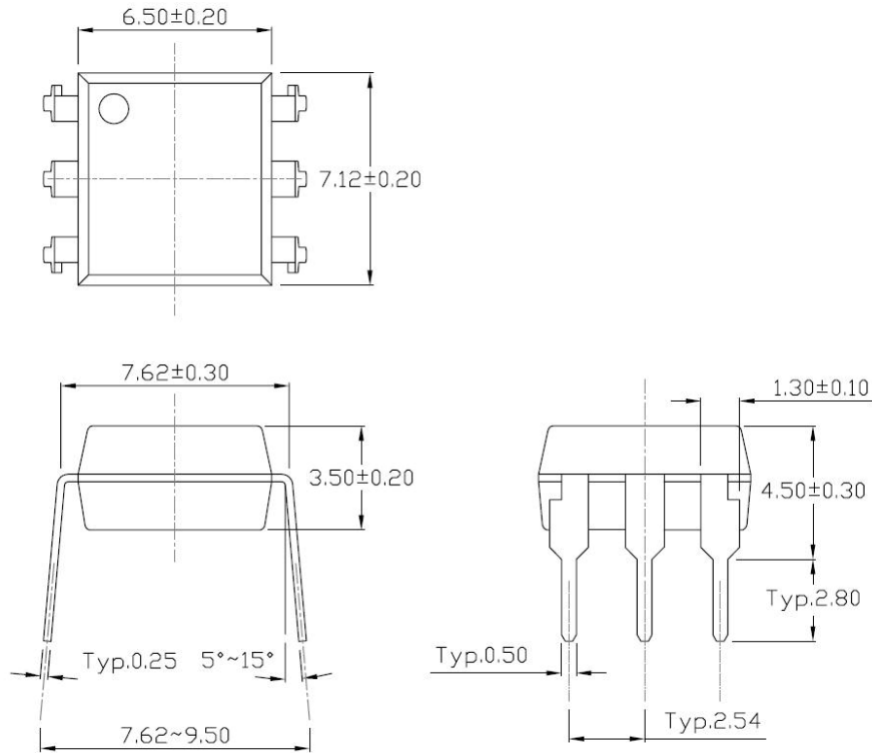
**Fig.16 Waveforms of dV/dt**



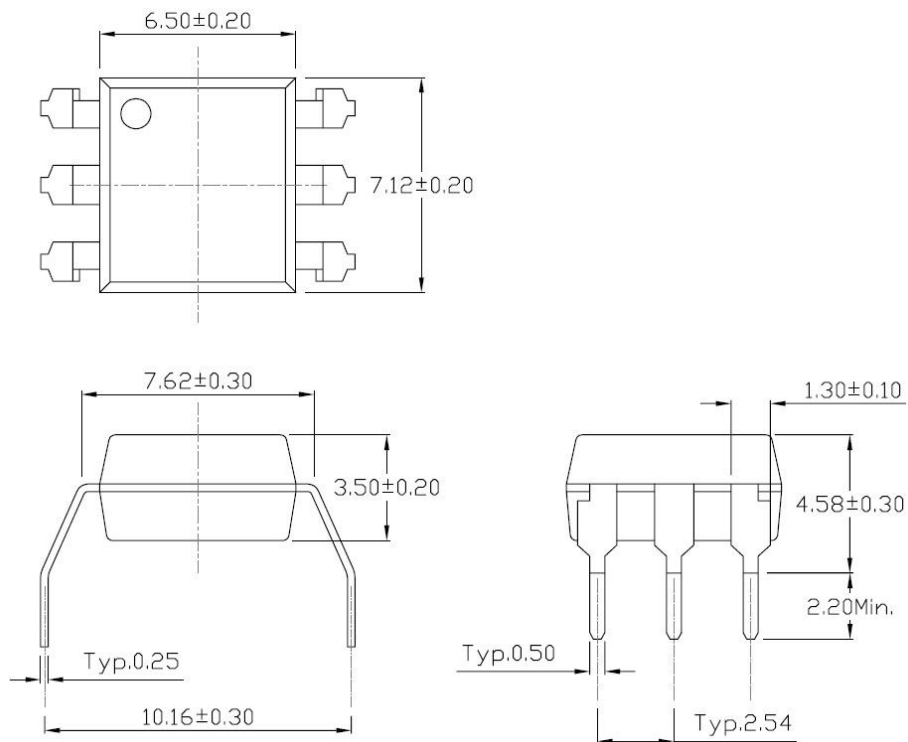
$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

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

**Standard DIP – Through Hole (DIP Type)**

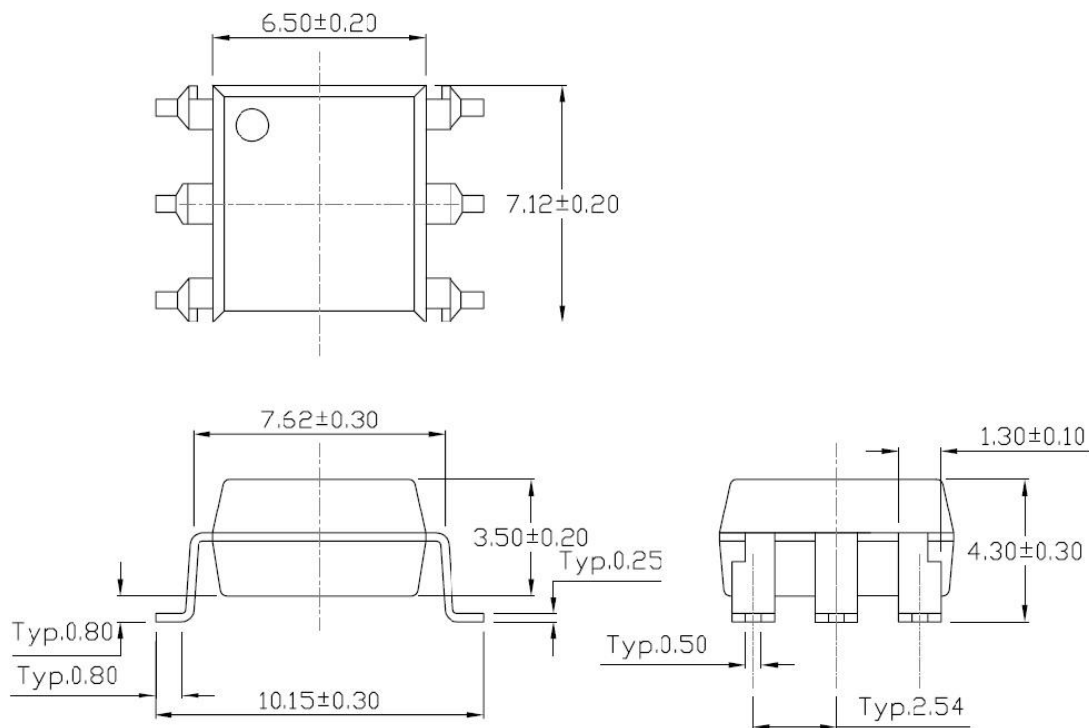


**Gullwing (400mil) Lead Forming – Through Hole (M Type)**

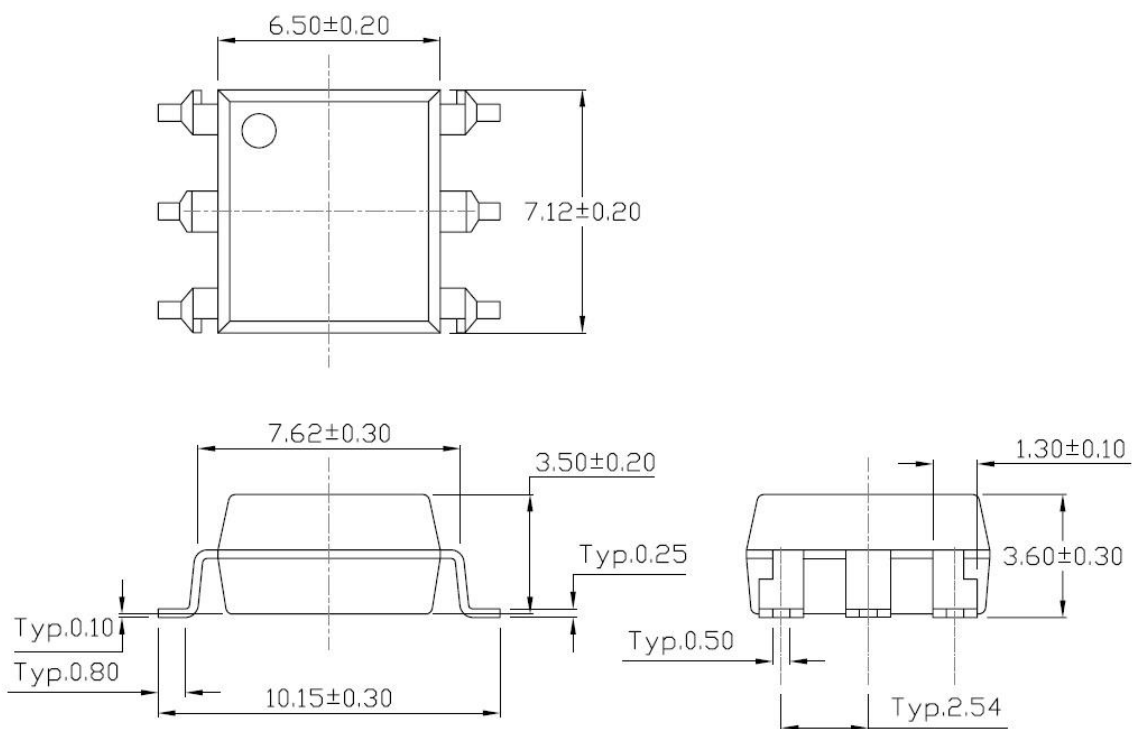


**PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)**

**Surface Mount Lead Forming (S Type)**



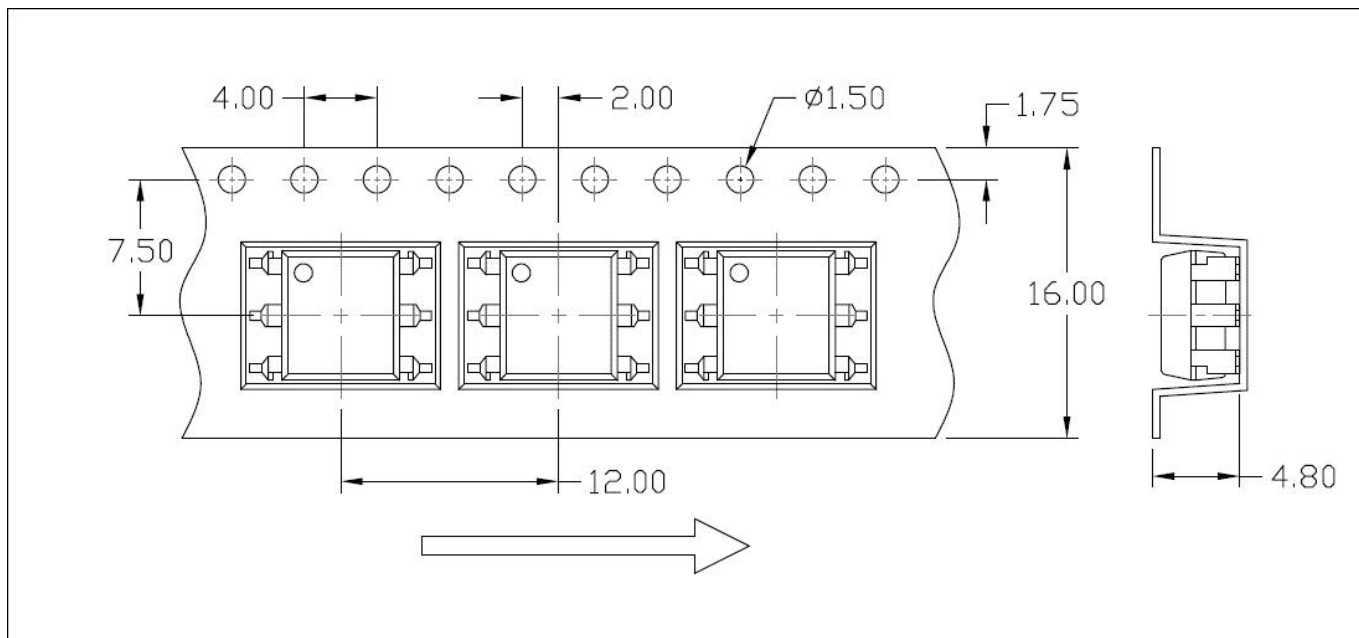
**Surface Mount (Low Profile) Lead Forming (SL Type)**



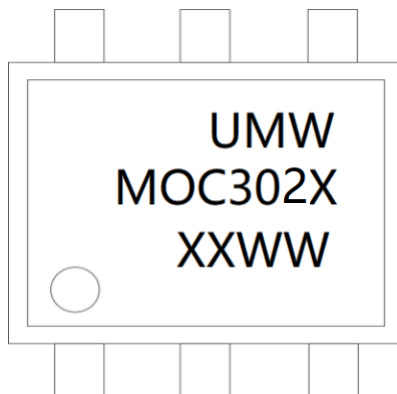


**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option S(T1) & SL(T1)**



**Printing**



- The "X" in the second line of printing stands for IFT digits: 0 / 1 / 2 / 3
- In the third line, the word "XX" stands for the year
- In the third line, WW stands for period

**Order information**

Order Code	Package	Baseqty	Deliverymode
UMW MOC302XM	DIP-6	3250	Tube and box
UMW MOC302XSM	SOP-6	1000	Tape and reel
UMW MOC305XM	DIP-6	3250	Tube and box
UMW MOC305XSM	SOP-6	1000	Tape and reel