

# Zero-Cross Triac Driver Output Optocoupler

## 1. Description

The UMW MOC306X series are optically coupled isolators consisting of a GaAs infrared emitting diode coupled with a light activated silicon detector, which functions like a zero voltage crossing bilateral triac driver.

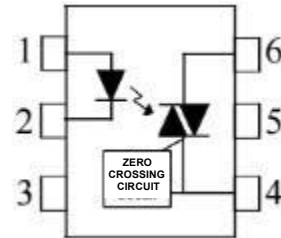
## 2. Features

- 600V peak blocking voltage
- High isolation voltage between input and output (Viso=5000Vms)
- Zero voltage crossing
- Compact dual in-line package
- Pb free and RoHS compliant
- UL approved: UL1577, file No. E492440

## 3. Applications

- Solenoid/valve controls
- Lighting controls
- Static power switches
- AC motor drives
- Electromagnetic contactors
- Solid state relays

## 4. Schematic



Pin Configuration

1. Anode
2. Cathode
3. No Connection
4. Terminal
5. Substrate (do not connect)
6. Terminal

## 5. Maximum Ratings (TA=25°C)

Parameter		Symbol	Value	Unit
Input	Forward current	$I_F$	60	mA
	Reverse voltage	$V_R$	6	V
	Power dissipation	$P_D$	100	mW
	Derating factor (above Ta=85°C)		3.8	mW/°C
Output	Off-state output terminal voltage	MOC306X $V_{DRM}$	600	V
	Peak repetitive surge current (pw=100µs,120pps)	$I_{TSM}$	1	A
	On-state R.M.S. current	$I_{T(RMS)}$	100	mA
	Power dissipation	$P_C$	300	mW
	Derating factor (above Ta=85°C)		7.6	mW/°C
Total power dissipation		$P_{tot}$	330	mW
Isolation voltage *		$V_{iso}$	5000	V
Operating temperature		$T_{opr}$	-55~+100	°C
Storage temperature		$T_{stg}$	-55~+125	°C
Welding temperature (10s)		$T_{sol}$	260	°C

\* AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1 & 2 are shorted together, and pins 3 & 4 are shorted together

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**6. Electrical characteristics (T<sub>A</sub>=25°C unless otherwise specified)**

Parameter	Description	Product	Symbol	Conditions	Min	Typ	Max	Unit
Input	Forward voltage		V <sub>F</sub>	I <sub>F</sub> =30mA	-	-	1.5	V
	Reverse current		I <sub>R</sub>	V <sub>R</sub> =6V	-	-	10	μA
Output	Peak off-state current	MOC306X	I <sub>DRM1</sub>	V <sub>DRM</sub> =rated V <sub>DRM</sub> , I <sub>F</sub> =0mA	-	-	500	nA
	On-state voltage		V <sub>TM</sub>	I <sub>TM</sub> =100mA peak I <sub>F</sub> =rated I <sub>FT</sub>	-	-	3	V
	Critical rate of rise of off-state voltage	MOC306X	dv/dt	V <sub>PEAK</sub> = rated	1000	-	-	V/μs
	Inhibit voltage (MT1-MT2 voltage above which device will not trigger)		V <sub>inh</sub>	I <sub>F</sub> =rated I <sub>FT</sub>	-	-	20	V
	Leakage in inhibited state		I <sub>DRM2</sub>	I <sub>F</sub> =rated I <sub>FT</sub> V <sub>DRM</sub> =rated V <sub>DRM</sub> off state	-	-	500	μA
Transfer characteristics	LED trigger current	MOC3061	I <sub>ft</sub>	Main terminal voltage = 3V	-	-	15	mA
		MOC3062			-	-	10	
		MOC3063			-	-	5	
	Holding current		I <sub>H</sub>		-	280	-	mA

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7. Typical Performance Curves

Figure 1 LED forward voltage vs forward current

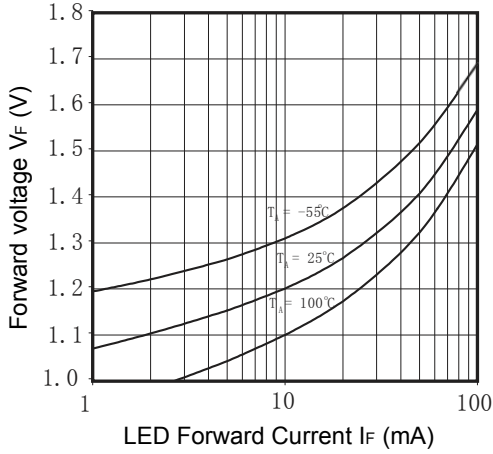


Figure 2 On-state characteristics

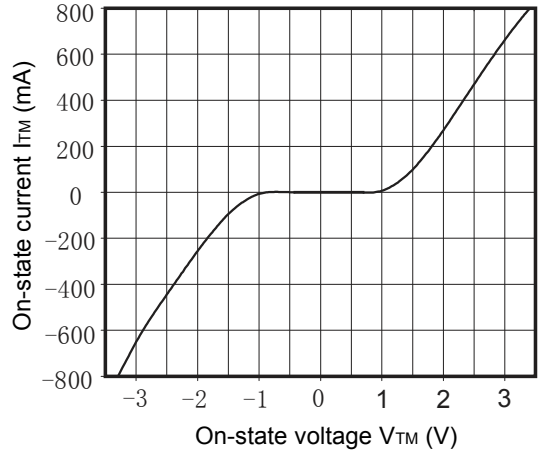


Figure 3 LED trigger current vs ambient temperature

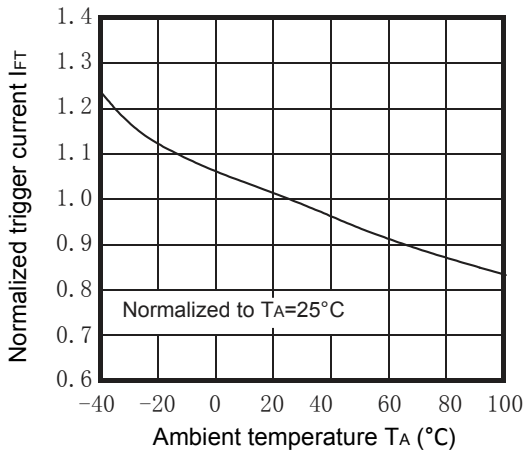


Figure 4 LED trigger current vs. LED pulse width

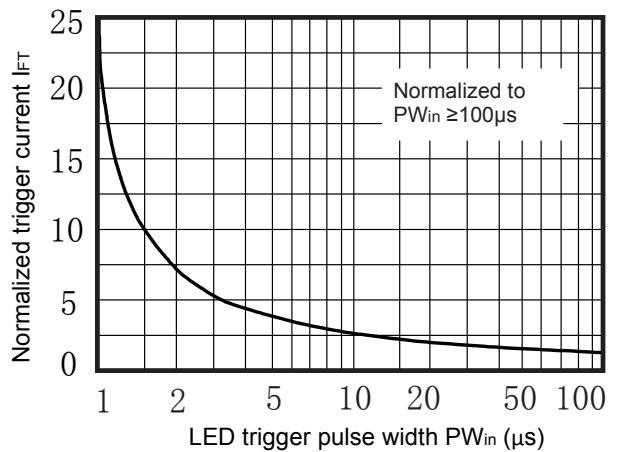


Figure 5 Holding current vs ambient temperature

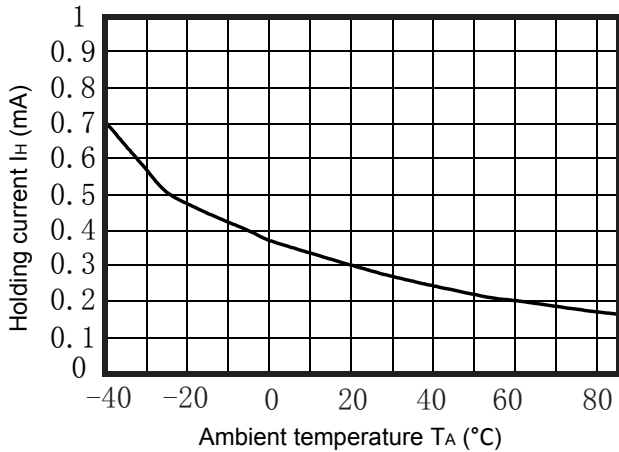
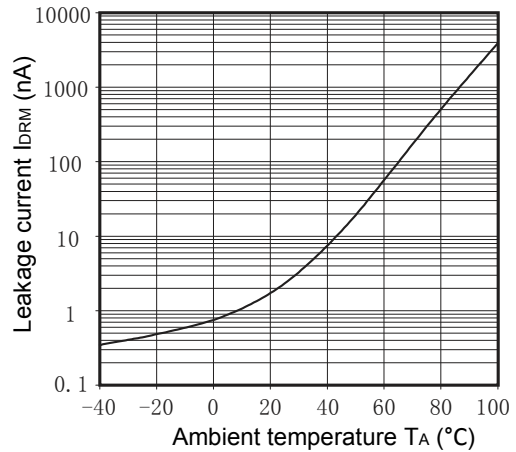


Figure 6 Leakage current vs ambient temperature



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Figure 7 Leakage in inhibited state vs ambient temperature

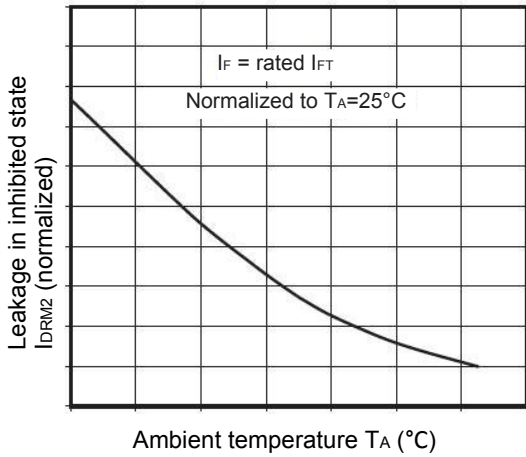


Figure 8 Inhibit voltage vs ambient temperature

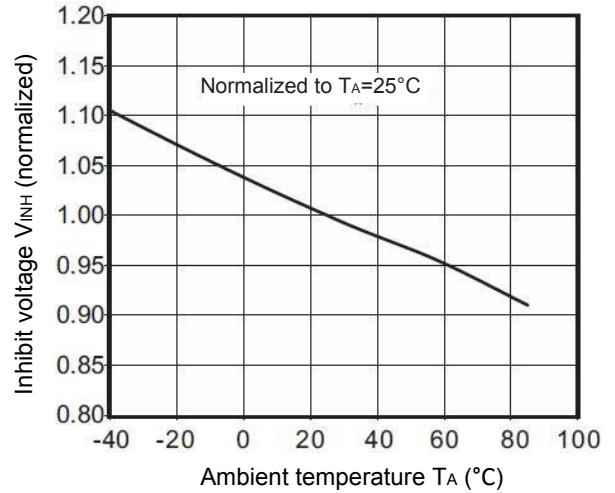
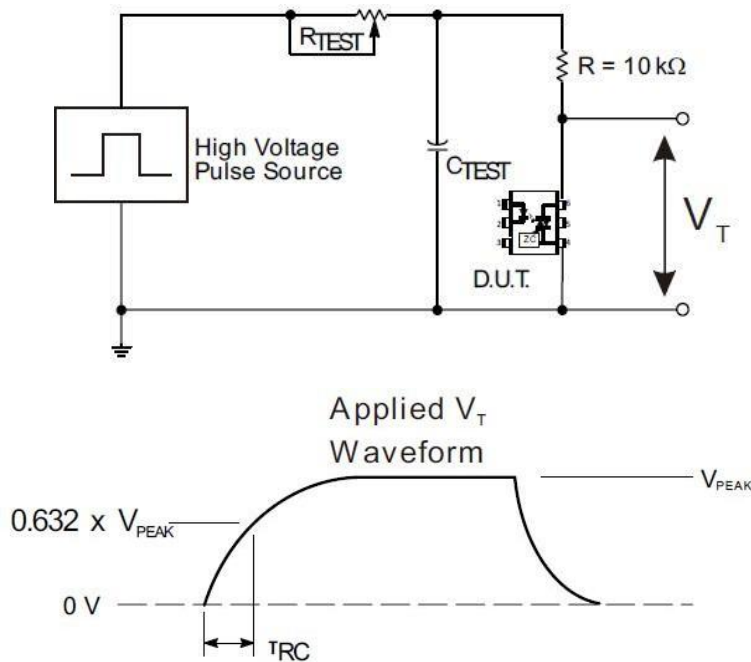


Figure 9 LED Static dv/dt test circuit & waveform



The high voltage pulse is set to the required  $V_{PEAK}$  value and applied to the output terminal of the device under test through the RC circuit above. LED current is not applied. The waveform  $V_T$  is monitored using a x100 scope probe. By varying  $R_{TEST}$ , the  $dv/dt$  (slope) is increased, until the device under test is observed to trigger (waveform collapses). The  $dv/dt$  is then decreased until the device under test stops triggering. At this point  $\tau_{RC}$  is recorded and the  $dv/dt$  calculated.

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

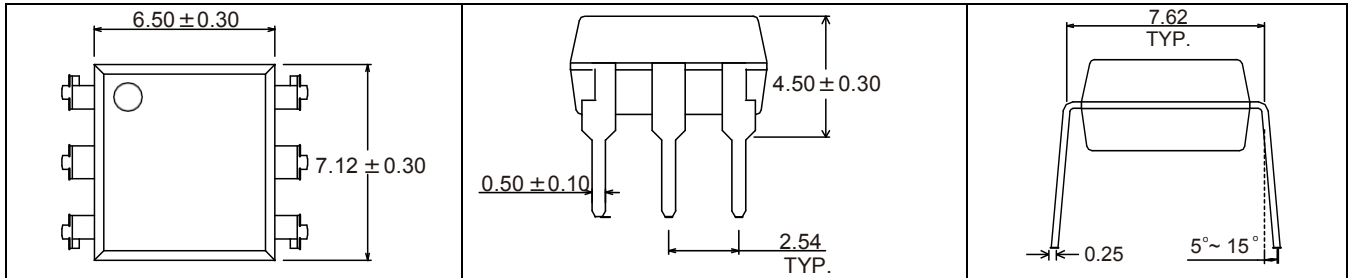
For example,  $V_{PEAK} = 600V$  for MOC306X series. The  $dv/dt$  value is calculated as follows:

$$dv/dt = \frac{0.632 \times 600}{\tau_{RC}} = \frac{379}{\tau_{RC}}$$

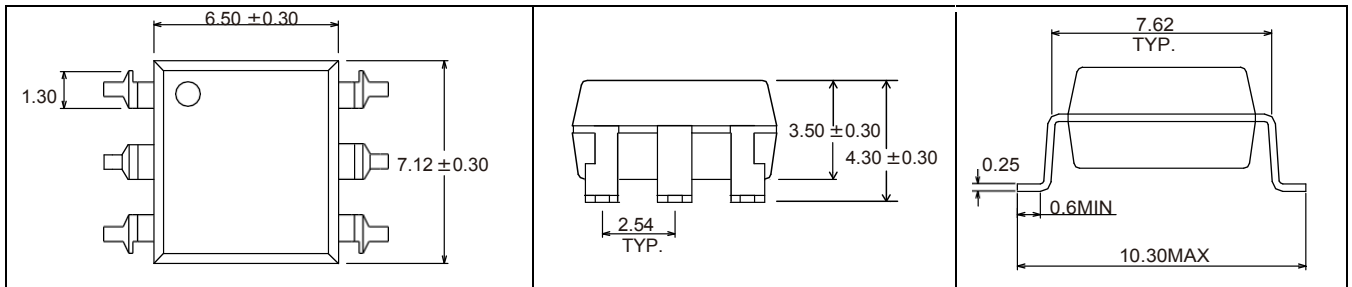
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8. Package dimensions

Unit: mm

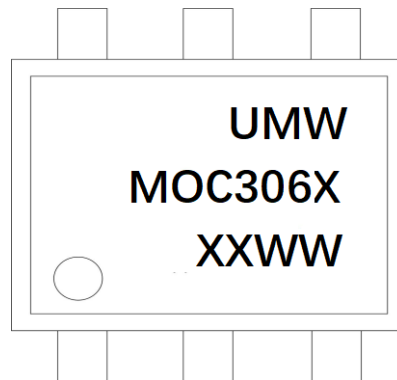


6-pin DIP



6-pin SOP

9. Marking information



- "X" in the second line represents I<sub>FT</sub>: 0/1/2/3
- "XX" in the third line represents year code
- "WW" in the third line represents week code

10. Ordering information

Part number	Package	Minimum packing quantity	Packing
UMW MOC306XM	DIP-6	3250	box
UMW MOC306XS	SOP-6	1000	reel

# Zero-Cross Triac Driver Output Optocoupler

■ SOP-6 Tape & Reel Packing Specifications

1) Schematic diagram

