UMW MOC302x

Random-phase triac-driven optocoupler

1.Description

The UMW MOC302x series devices are optocouplers composed of a GaAs infra-red light emitting diode and a singlecrystal silicon chip random phase photoelectric bidirectional thyristor.

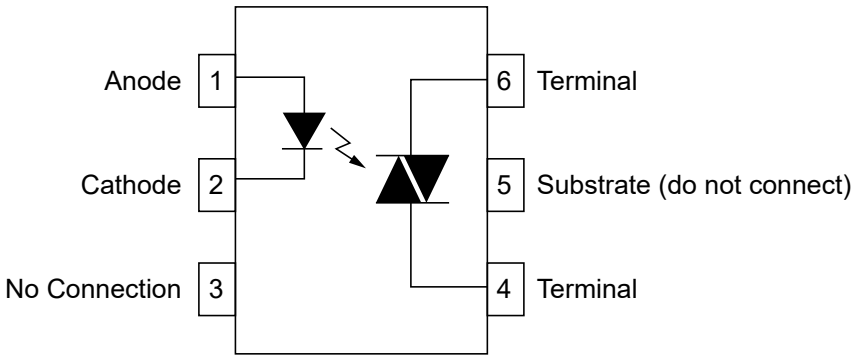
2.Features

- Peak breakdown voltage 400V
- High isolation voltage between input and output(V_{ISO}=5000 Vrms)
- Operating Temperature: -55°C ~110°C
- Meet reinforced insulation standards
- UL approved: UL1577, file No.E547318

3.Application

- Solenoid valve control
- Ballast
- Static AC power switch
- Incandescent lamp dimmer
- Microprocessor 115-240VAC peripheral interface
- Temperature control
- Motor control

4.Pinning information



DIP-6/SOP-6

5.Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Input				
Forward Current		I_F	60	mA
Backward Voltage		V_R	6	V
Power Dissipation		P_D	100	mW
Power dissipation Derating factor (above Ta=85°C)			3.8	mW/°C
Output				
Off-state output terminal voltage	UMW MOC302x	V_{DRM}	400	V
Peak repetitive surge current (pw=100μs,120pps)		I_{TSM}	1	A
On-state current (root mean square value)		$I_{T(RMS)}$	100	mA
Power Dissipation		P_C	300	mW
Power dissipation Derating factor (above Ta=85°C)			7.4	mW/°C
Total Power Dissipation		P_{TOT}	330	mW
Isolation Voltage		V_{ISO}	5000	Vrms
Operating Temperature		T_{OPR}	-55 to 110	°C
Storage Temperature		T_{STG}	-55 to 125	°C
Soldering Temperature (10s)		T_{SOL}	260	°C

Notes:

Conduct AC test at 40% ~60% relative humidity. At this time, pins 1, 2 and 3 are short-circuited, and pins 4, 5 and 6 are short-circuited.

6.Electro-optical Characteristics(T_A=25°C)

Parameter		Symbol	Conditions	Min	Typ	Max	Units
Input							
Forward Voltage		V_F	I_F=20mA		1.18	1.5	V
Back current		I_R	V_R=6V			10	μA
Output							
Off-state peak current		I_{DRM}	V_{DRM}=Rated V_{DRM}, I_F=0mA			100	nA
On-state peak voltage		V_{TM}	I_{TM}=100mA peak, I_F=Rated I_{FT}			2.5	V
Critical rise rate of off-state voltage		dv/dt	V_{PEAK}=Rated V_{DRM}, I_F=0		100		V/μs
Transfer Characteristics							
LED trigger current	UMW MOC3020	I_{FT}	Main terminal Voltage =3V			30	mA
	UMW MOC3021					15	mA
	UMW MOC3022					10	mA
	UMW MOC3023					5	mA
Maintain current		I_H			250		μA

7.Typical Characteristic

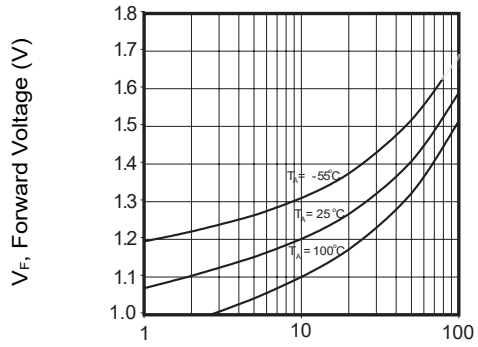


Figure 1: LED Forward Voltage vs. Forward Current

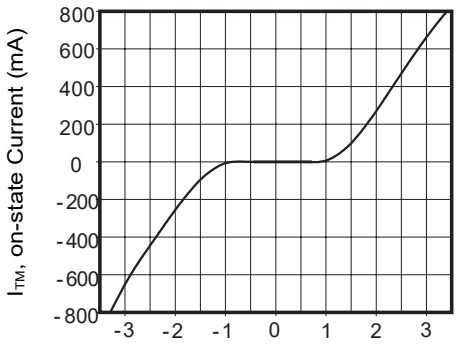


Figure 2: On-State Characteristics

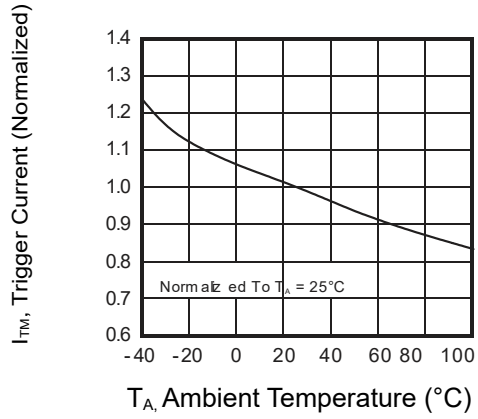


Figure 3: Trigger Current vs. Ambient Temperature

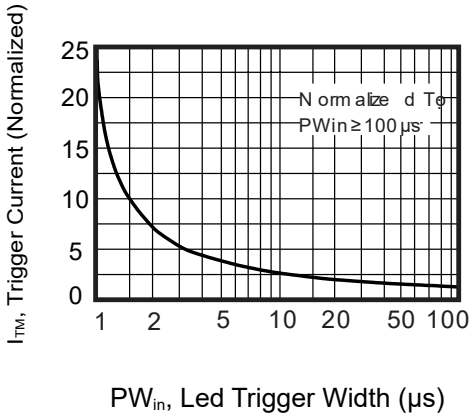


Figure 4: LED Current Required to Trigger vs. LED Pulse Width

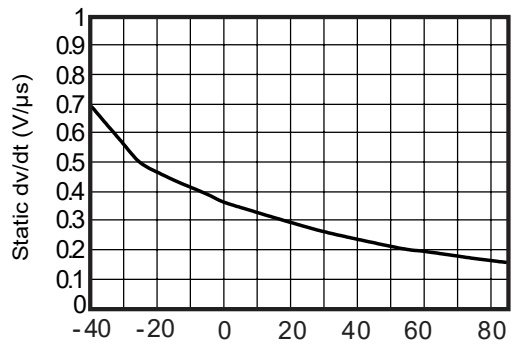


Figure 5: dv/dt vs.Temperature

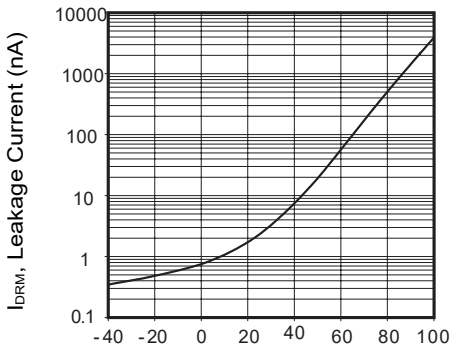
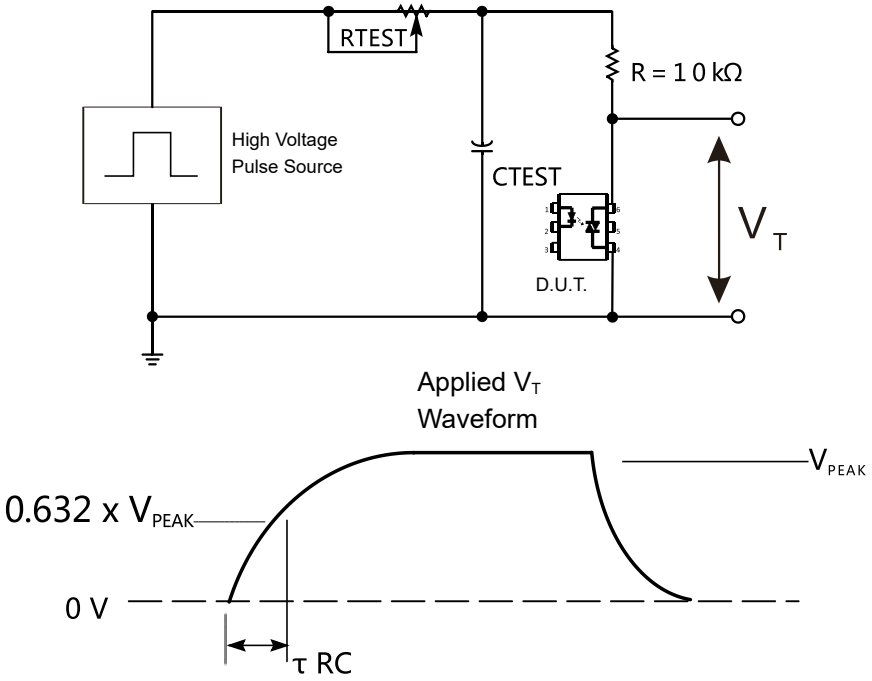


Figure 6: Leakage Current, I_{DRM} vs.Temperature

8.Static dv/dt test circuit and waveform



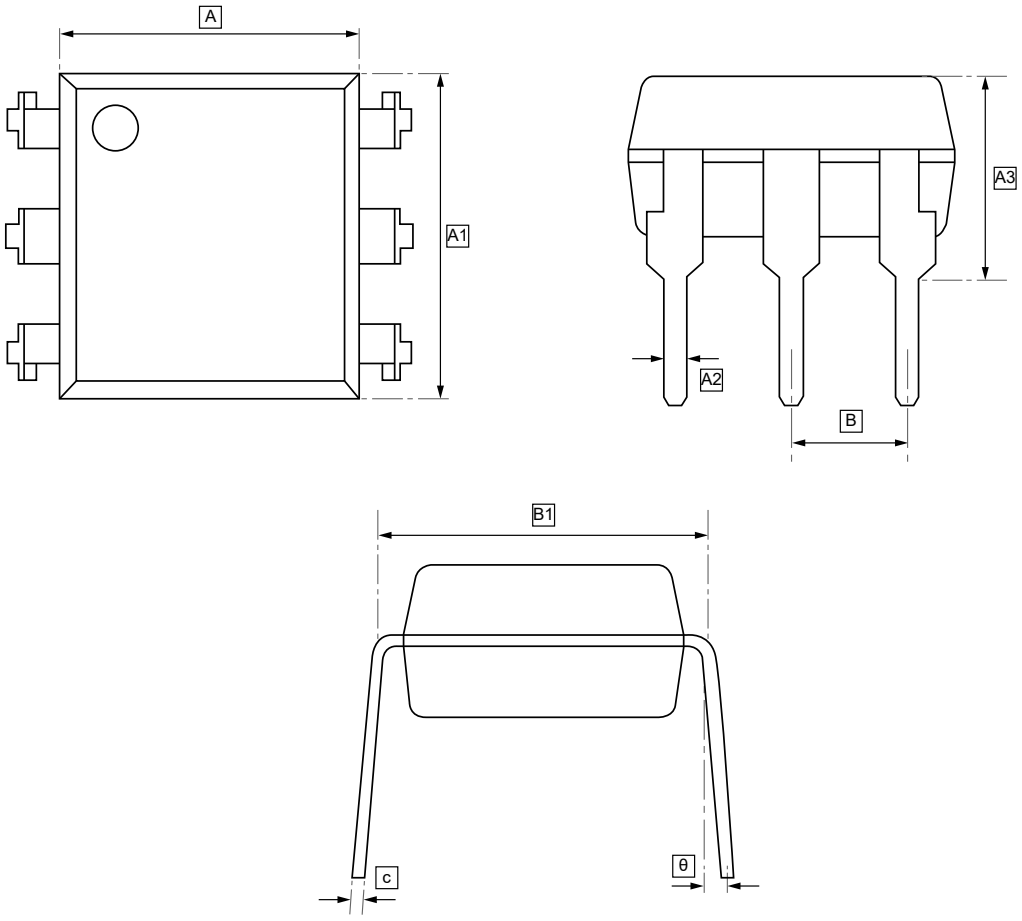
The high voltage pulse applied to the output end of the device under test through the RC circuit is set to the desired V_{PEAK} value. LED current does not need to be added. Waveform VT is monitored with X100 probe. By adjusting the RTEST value, dv/dt (slope) increases until the device under testis observed to be triggered (waveform collapse). Dv/dt then drops until the device under test stops being triggered. At this time, dv/dt can be calculated by recording the value of τRC.

$$dv/dt = \frac{0.632x400}{\tau RC} = \frac{252}{\tau RC}$$

For example, the voltage peak of UMW MOC302x series V_{PEAK}=400V. Then the dv/dt value can be calculated as follows:

$$dv/dt = \frac{0.632x400}{\tau RC} = \frac{252}{\tau RC}$$

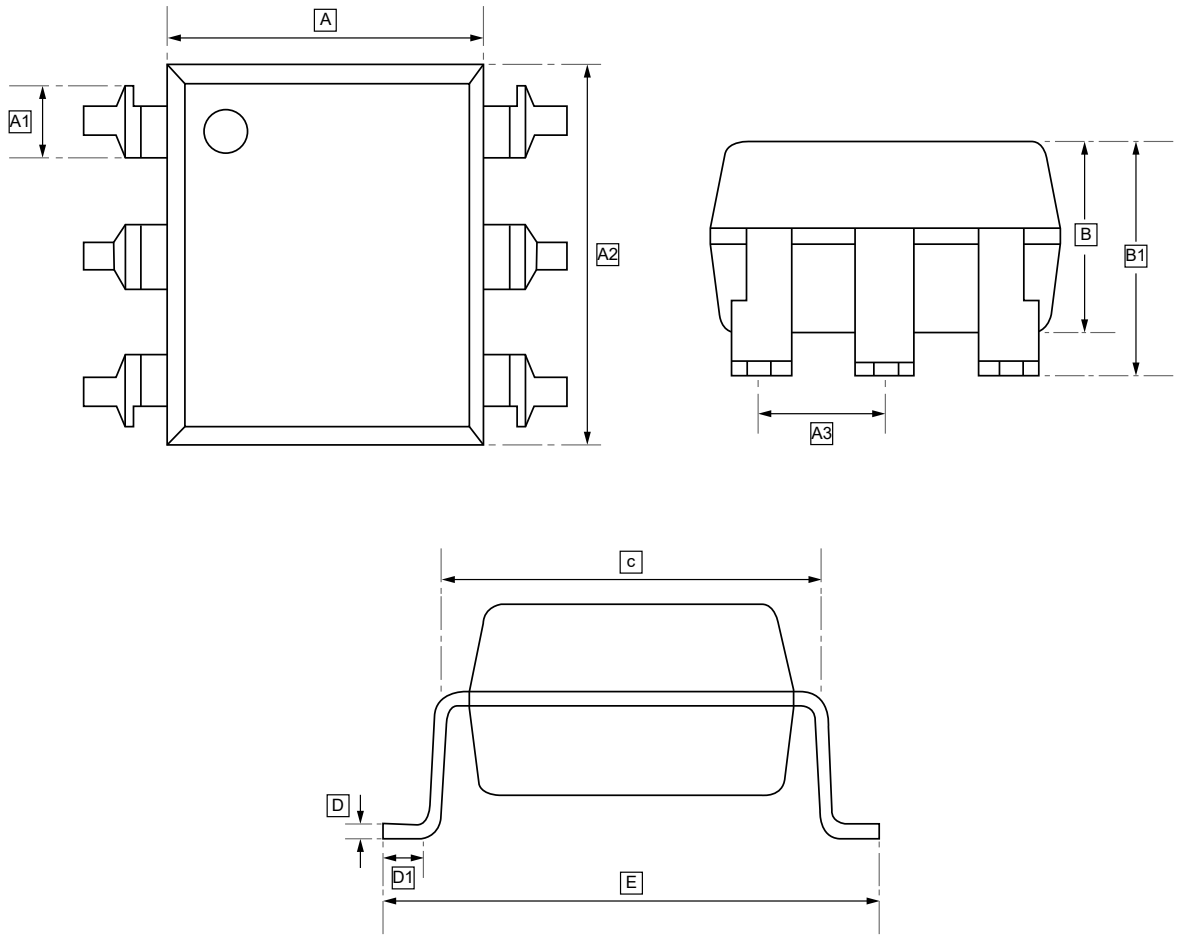
9.1DIP-6 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	B	B1	c	θ
Min	6.20	6.82	0.40	4.20	2.54	7.62	0.25	5°
Max	6.80	7.42	0.60	4.80	TYP	TYP		15°

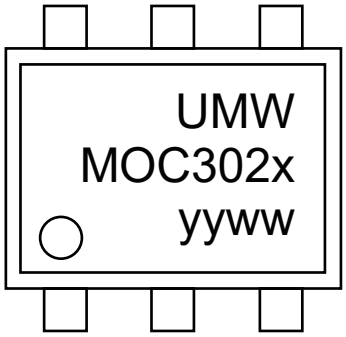
9.2SOP-6 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	B	B1	c	D	D1	E
Min	6.20	1.30	6.82	2.54	3.20	4.00	7.62	0.25	0.60	-
Max	6.80		7.42	TYP	3.80	4.60	TYP		-	10.30

10.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW MOC3020M	DIP-6	3250	Tube and box
UMW MOC3020SM	SOP-6	1000	Tape and reel
UMW MOC3021M	DIP-6	3250	Tube and box
UMW MOC3021SM	SOP-6	1000	Tape and reel
UMW MOC3022M	DIP-6	3250	Tube and box
UMW MOC3022SM	SOP-6	1000	Tape and reel
UMW MOC3023M	DIP-6	3250	Tube and box
UMW MOC3023SM	SOP-6	1000	Tape and reel

11.Disclaimer

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