Photocoupler
MOC302X series

1. DESCRIPTION

1.1 Features

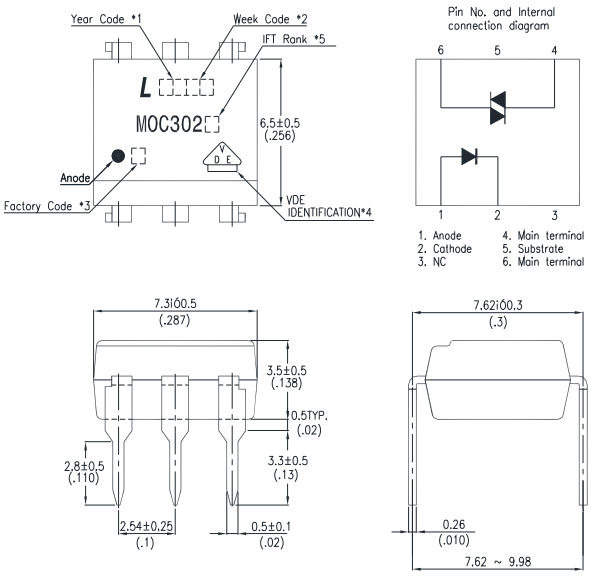
- Isolation voltage between input and output V_{iso} : 5,000V_{rms}
- 6pin DIP photocoupler, triac driver output
- High repetitive peak off-state voltage V_{DRM} : Min. 400V
- High critical rate of rise of off-state voltage(dV/dt : MIN. 1000V / μs)
- Dual-in-line package : MOC3020, MOC3021, MOC3022, MOC3023
- Wide lead spacing package : MOC3020M, MOC3021M, MOC3022M, MOC3023M
- Surface mounting package : MOC3020S, MOC3021S, MOC3022S, MOC3023S
- Tape and reel packaging : MOC3020S-TA, MOC3021S-TA, MOC3022S-TA, MOC3023S-TA
  MOC3020S-TA1, MOC3021S-TA1, MOC3022S-TA1, MOC3023S-TA1
- Safety approval
  UL 1577, Cert. No.E113898
  CSA CA5A, Cert. No. 1020087 (CA 91533-1)
  FIMKO EN/IEC 60950-1, EN/IEC 60065; Cert. No.NCS/FI 24426 M3
  VDE DIN EN60747-5-2, Cert. No. 40015248
  CQC GB4943.1-2011/ GB8898-2011
- RoHS Compliance
  All materials be used in device are followed EU RoHS directive (No.2002/95/EC).
- MSL class1
- Halogen free option

1.2 Applications

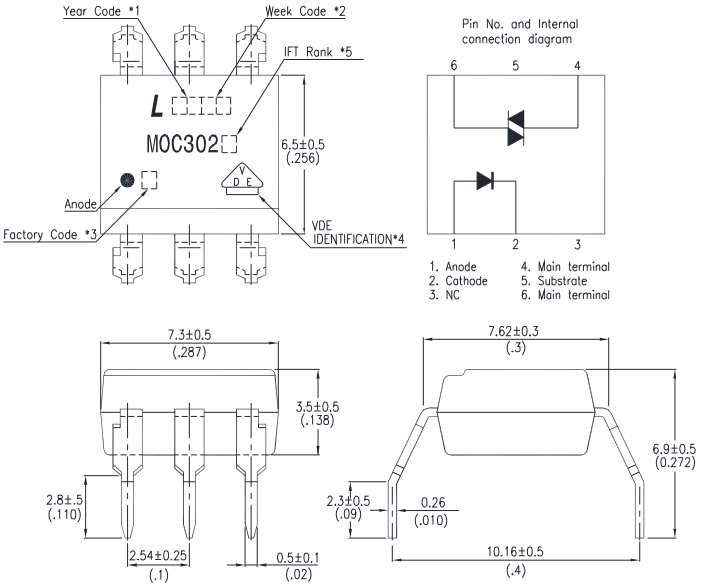
- AC Motor Drives
- AC Motor Starters
- E.M. Contactors
- Lighting Controls
- Solenoid/Valve Controls
- Solid State Relays
- Static Power Switches
- Temperature Controls

2. PACKAGE DIMENSIONS

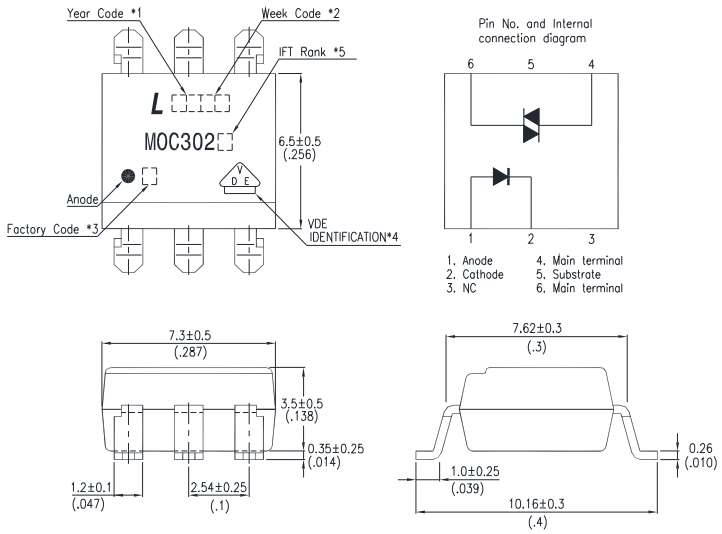
2.1 MOC302X



2.2 MOC302XM



2.3 MOC302XS



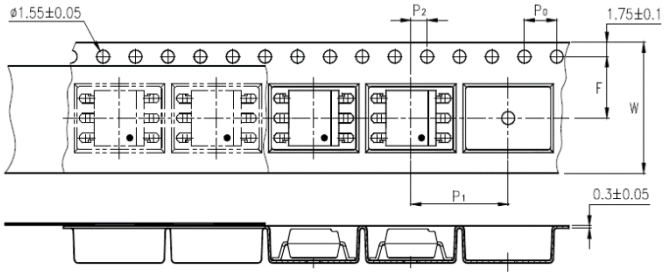
Notes :

1. 2-digit year code, example : 2016 = 16
2. 2-digit work week ranging from '01' to '53'
3. Factory identification mark shall be marked (W: China-CZ, Y: Thailand)
4. VDE option
5. I_{FT} rank

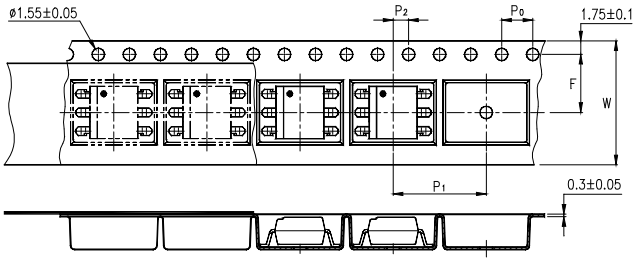
* Dimensions are in Millimeters and (Inches).

3. TAPING DIMENSIONS

3.1 MOC302XS-TA



3.2 MOC302XS-TA1



Description	Symbol	Dimension in mm (inch)
Tape wide	W	16±0.3 (0.63)
Pitch of sprocket holes	P_0	4±0.1 (0.15)
Distance of compartment	F	7.5±0.1 (0.295)
	P_2	2±0.1 (0.079)
Distance of compartment to compartment	P_1	12±0.1 (0.472)

3.3 Quantities Per Reel

Package Type	MOC302XS series
Quantities (pcs)	1000

4. RATING AND CHARACTERISTICS

4.1 Absolute Maximum Ratings at Ta=25℃

	Parameter	Symbol	Rating	Unit
Input	Forward Current	I_F	50	mA
	Reverse Voltage	V_R	6	V
	Junction Temperature	T_J	125	°C
	Power Dissipation	P	100	mW
Output	Off-State Output Terminal Voltage	V_{DRM}	400	V
	Peak Repetitive Surge Current (PW=1ms, 120pps)	I_{TSM}	1	A
	Junction Temperature	T_J	125	°C
	Collector Power Dissipation	P_C	300	mW
	Total Power Dissipation	P_{tot}	330	mW
1.	Isolation Voltage	V_{iso}	5000	V_{rms}
	Operating Temperature	T_{opr}	-40 ~ +110	°C
	Storage Temperature	T_{stg}	-55 ~ +150	°C
2.	Soldering Temperature	T_{sol}	260	°C

1. AC For 1 Minute, R.H. = 40 ~ 60%

   Isolation voltage shall be measured using the following method.

   (1) Short between anode and cathode on the primary side and between collector and emitter on the secondary side.

   (2) The isolation voltage tester with zero-cross circuit shall be used.

   (3) The waveform of applied voltage shall be a sine wave.

2. For 10 Seconds

4.2 Recommended Operating Conditions (Note)

Characteristics		Symbol	Min.	Typ.	Max.	Unit
Supply Voltage		V_{AC}	-	-	120	Vac
Forward Current	MOC3021	I_F	22.5	25	30	mA
	MOC3022		15	20	30	mA
	MOC3023		7.5	10	30	mA
Operating Temperature		T_{opr}	-25	-	85	°C

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

4.3 Electrical Optical Characteristics at Ta=25℃

Parameter			Symbol	Min.	Typ.	Max.	Unit	Test Condition
Input		Forward Voltage	V_F	—	1.15	1.4	V	I_F=20mA
		Reverse Current	I_R	—	0.05	10	μA	V_R=6V
Output	1	Peak Blocking Current, Either Direction	I_{DRM}	—	10	100	nA	V_{DRM} = 400V
		Peak On-State Voltage, Either Direction	V_{TM}	—	—	3.0	V	I_{TM}=100 mA Peak
	2	Critical rate of Rise of Off-State Voltage	dv/dt	1000	—	—	V/μs	Vin=240Vrms
Couple		Led Trigger Current, Current Required to Latch Output, Either Direction — MOC3021	I_{FT}	—	—	15	mA	Main Terminal Voltage = 3V
		Led Trigger Current, Current Required to Latch Output, Either Direction — MOC3022		—	—	10		
		Led Trigger Current, Current Required to Latch Output, Either Direction — MOC3023		—	—	5		
		Holding Current, Either Direction	I_H	—	200	—	μA	

*1. Test voltage must be applied within dv/dt rating.

*2. This is static dv/dt. Commutating dv/dt is a function of the load-driving thyristor(s) only.

5. CHARACTERISTICS CURVES (TYPICAL PERFORMANCE)

Fig.1 Forward Current vs. Ambient Temperature

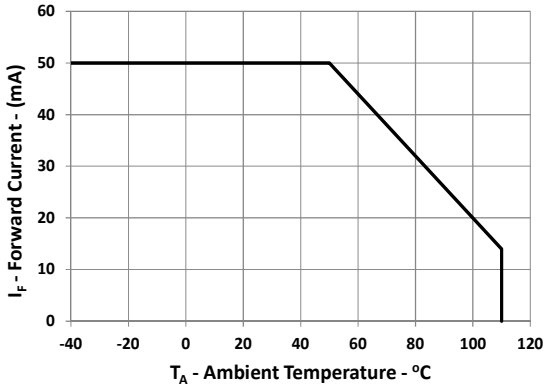


Fig.2 On-state Current vs. Ambient Temperature

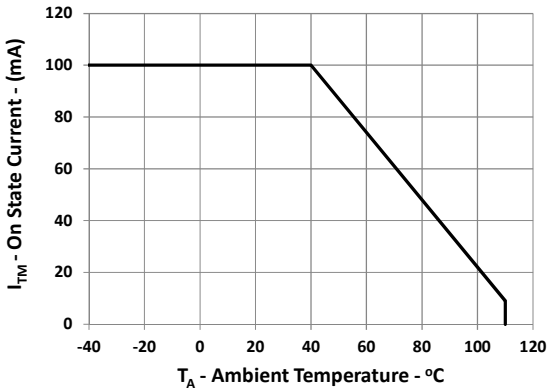


Fig.3 Normalized Trigger Current vs Ambient Temperature

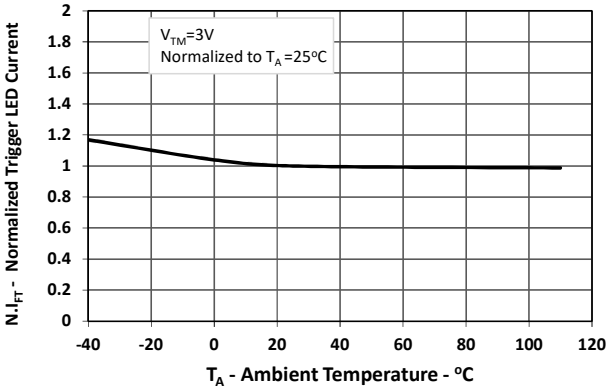


Fig.4 Forward Current vs. Forward Voltage

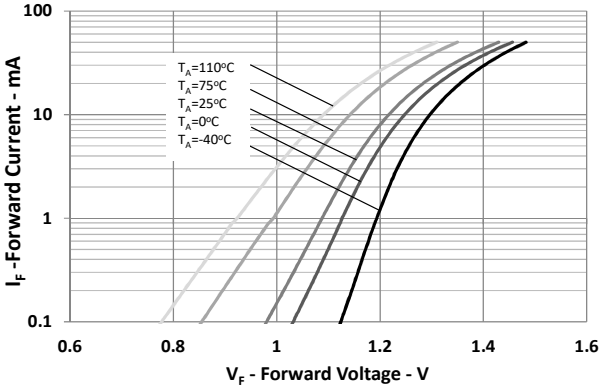


Fig.5 Normalized On-state Voltage vs Ambient Temperature

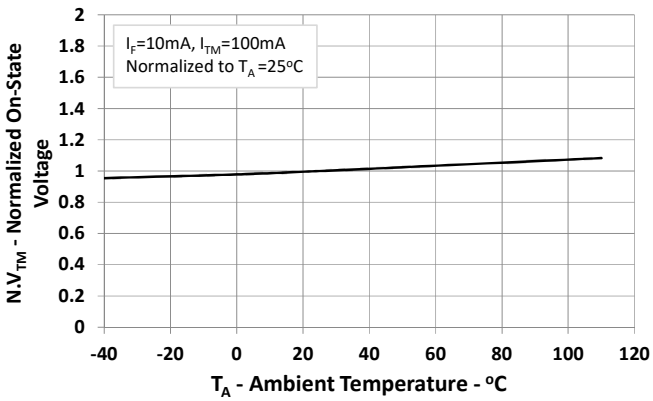


Fig.6 Normalized Holding Current vs Ambient Temperature

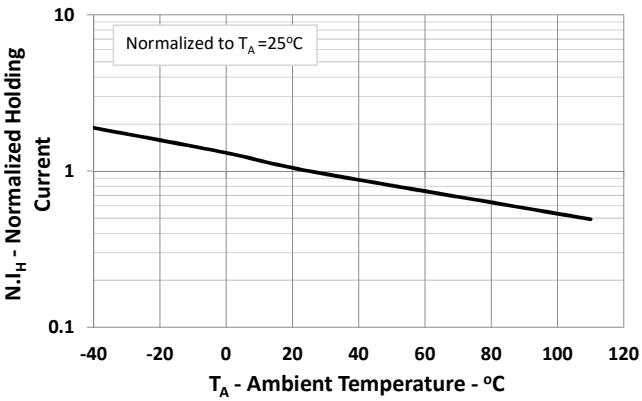


Fig.7 Off-state Current vs Ambient Temperature

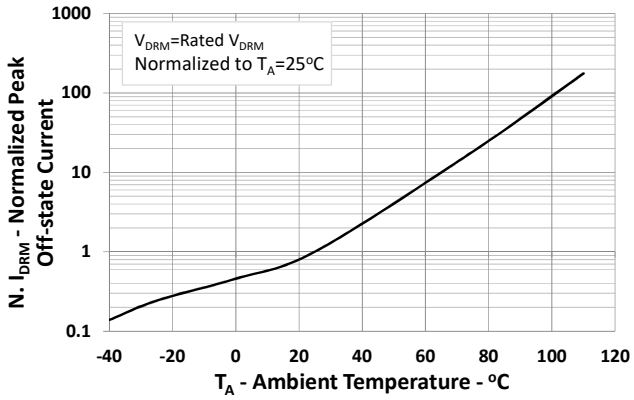
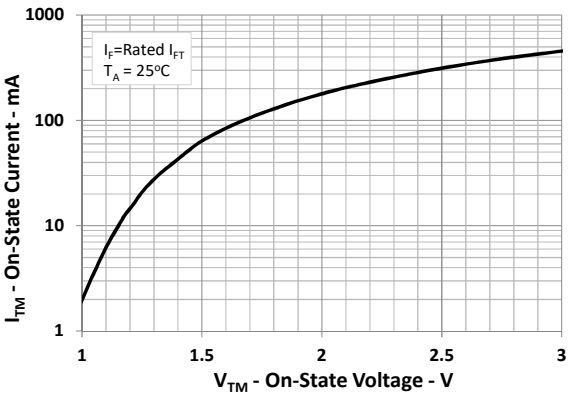
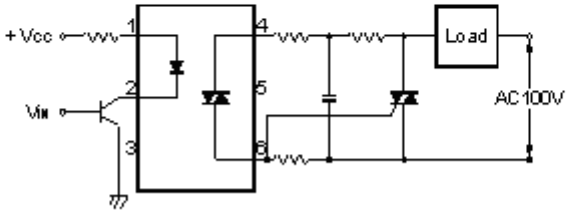


Fig.8 On-state Current vs On-state Voltage



Basic Operation Circuit
Medium/High Power Triac Drive Circuit

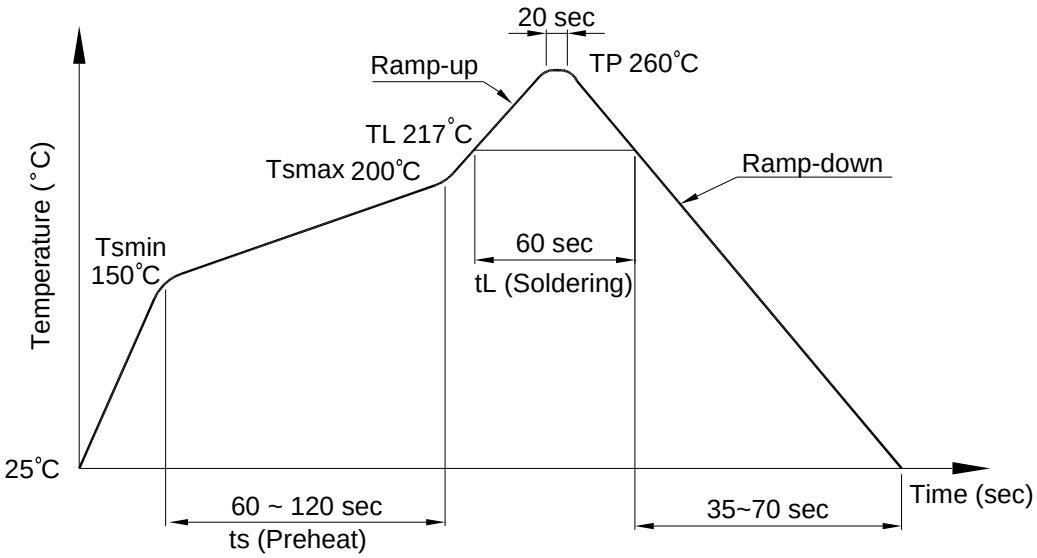


6. TEMPERATURE PROFILE OF SOLDERING

6.1 IR Reflow soldering (JEDEC-STD-020E compliant)

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

Profile item	Conditions
Preheat	
- Temperature Min (T_{Smin})	150˚C
- Temperature Max (T_{Smax})	200˚C
- Time (min to max) (ts)	90±30 sec
Soldering zone	
- Temperature (T_L)	217˚C
- Time (t_L)	60 sec
Peak Temperature (T_P)	260˚C
Ramp-up rate	3˚C / sec max.
Ramp-down rate	3~6˚C / sec



6.2 Wave soldering (JEDEC22A111 compliant)

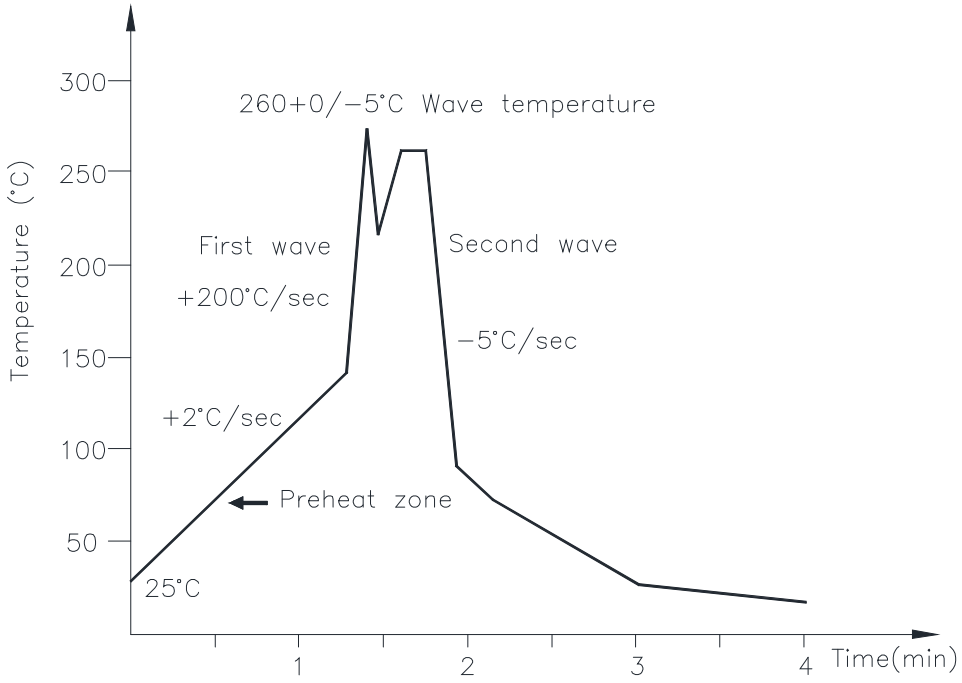
One time soldering is recommended within the condition of temperature.

Temperature: 260+0/-5˚C

Time: 10 sec.

Preheat temperature:25 to 140˚C

Preheat time: 30 to 80 sec.



6.3 Hand soldering by soldering iron

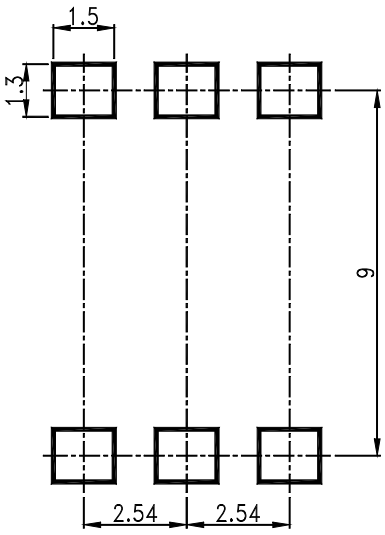
Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: 380+0/-5˚C

Time: 3 sec max.

7. RRECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit: mm



8. NAMING RULE

MOC302(X)(1)-(2)-G

DEVICE PART NUMBER (MOC302X)

Please refer to Electrical Optical Characteristics Table on Page 6

(1) FORM TYPE (S, M or none)

(2) TAPING TYPE (TA, TA1)

(3) Halogen free

Example : MOC3021S-TA1-G

MOC302(X)(1)(2)-V-G

DEVICE PART NUMBER (MOC302X)

Please refer to Electrical Optical Characteristics Table on Page 6

(1) FORM TYPE (S, M or none)

(2) TAPING TYPE (TA, TA1)

(3) VDE option

(4) Halogen free

Example : MOC3021STA1-V-G

9. NOTES

- LiteOn is continually improving the quality, reliability, function or design and LiteOn reserves the right to make changes without further notices.
- The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
- For equipment/devices where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc, please contact our sales representatives.
- When requiring a device for any ”specific” application, please contact our sales in advice.
- If there are any questions about the contents of this publication, please contact us at your convenience.
- The contents described herein are subject to change without prior notice.
- Immerge unit’s body in solder paste is not recommended.