Photocouplers
MOC3020 THRU MOC3023 SERIES

1. DESCRIPTION

1.1 Features

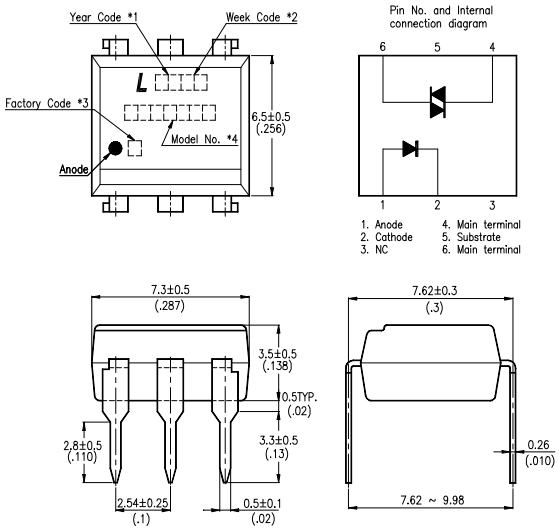
- 6 Pin DIP photocoupler, Triac driver output
- High input-output isolation voltage
  Viso = 5,000Vrms
- High repetitive peak off-state voltage
  V_{DRM}: Min. 400 V.
- High critical rate of rise of off-state voltage
  dV/dt: Min.1000V / µs
- Dual-in-line package :
  MOC3020, MOC3021, MOC3022, MOC3023
- 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 approved (No. E113898)
  * TUV approved (No. R9653630)
  * CSA approved (No. CA91533-1)
  * VDE approved (No. 40015248)
  * CQC approved (No.CQC11001061921-2)
- RoHS Compliance
  All materials be used in device are followed EU RoHS directive (No.2002/95/EC).
- ESD pass HBM 8000V/MM2000V
- MSL class1

1.2 Applications

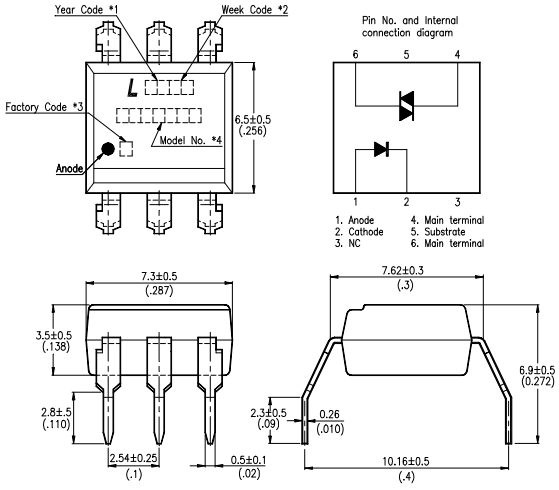
- Motor Controls.
- Solid state relays
- For triggering high power thyristor and triac
- Household use equipment

2. PACKAGE DIMENSIONS

2.1 MOC3020, MOC3021, MOC3022, MOC3023 :



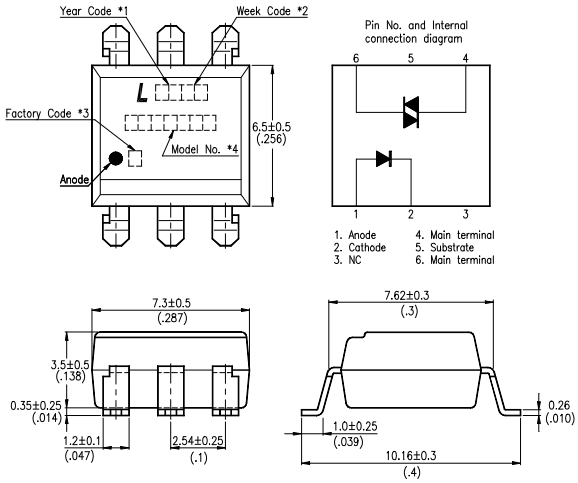
2.2 MOC3020M, MOC3021M, MOC3022M, MOC3023M :



Notes :

1. Year date code.
2. 2-digit work week.
3. Factory identification mark shall be marked (Y: Thailand, W: China-CZ, X: China-TJ).
4. Model No.MOC3020, MOC3021, MOC3022, MOC3023

2.3 MOC3020S, MOC3021S, MOC3022S, MOC3023S :

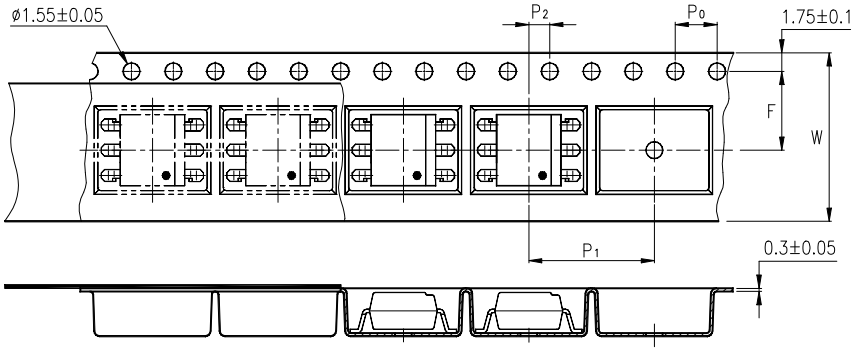


Notes :

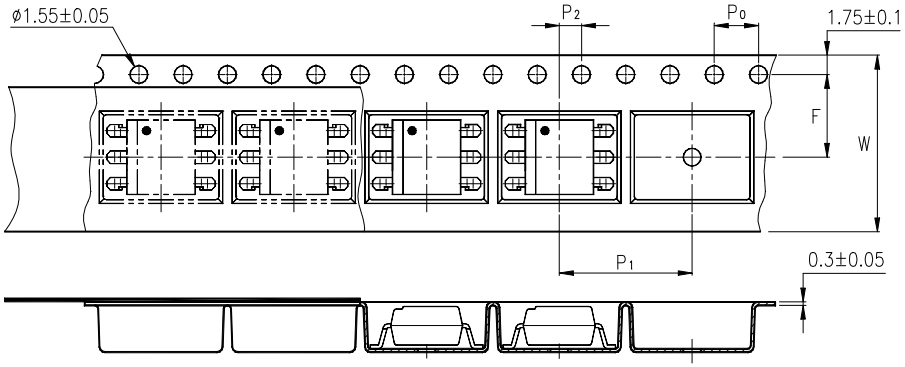
1. Year date code.
2. 2-digit work week.
3. Factory identification mark shall be marked (Y: Thailand, W: China-CZ, X: China-TJ).
4. Model No.MOC3020, MOC3021, MOC3022, MOC3023

3. TAPING DIMENSIONS

3.1 MOC3020S-TA, MOC3021S-TA, MOC3022S-TA, MOC3023S-TA :



3.2 MOC3020S-TA1, MOC3021S-TA1, MOC3022S-TA1, MOC3023S-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)

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
	Power Dissipation	P_D	70	mW
Output	Off-State Output Terminal Voltage	V_{DRM}	400	V
	Peak Repetitive Surge Current (PW=100μs, 120pps)	I_{TSM}	1	A
	Collector Power Dissipation	P_C	300	mW
Total Power Dissipation		P_{tot}	330	mW
*1 Isolation Voltage		V_{iso}	5,000	V_{rms}
Ambient Operating Temperature Range		T_A	-40 ~ +100	°C
Storage Temperature Range		T_{stg}	-55 ~ +150	°C
*2 Soldering Temperature		T_L	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 ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25℃

PARAMETER			SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
INPUT	Forward Voltage		VF	—	1.15	1.5	V	IF=20mA
	Reverse Current		IR	—	—	10	μA	VR=6V
OUTPUT	*1 Peak Blocking Current, Either Direction		I_{DRM}	—	10	100	nA	V_{DRM} = 400V
	Peak On-State Voltage, Either Direction		V_{TM}	—	1.7	3	V	I_{TM}=100 mA Peak
	*2 Critical rate of Rise of Off-State Voltage		dv/dt	1000	—	—	V/μs	
COUPLED	*3 Led Trigger Current, Current Required to Latch Output, Either Direction	MOC3020	I_{FT}	—	15	30	mA	Main Terminal Voltage = 3V
		MOC3021		—	8	15		
		MOC3022		—	—	10		
		MOC3023		—	—	5		
	Holding Current, Either Direction		I_H	—	250	—	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.

*3 All devices are guaranteed to trigger at an I_F value less than or equal to max I_{FT}. Therefore, recommended operating I_F lies between max I_{FT}, 30 mA for MOC3020, 15 mA for MOC3021, 10 mA for MOC3022, 5 mA for MOC3023, and absolute max I_F (50mA)

5. CHARACTERISTICS CURVES

Fig.1 Forward Current vs. Ambient Temperature

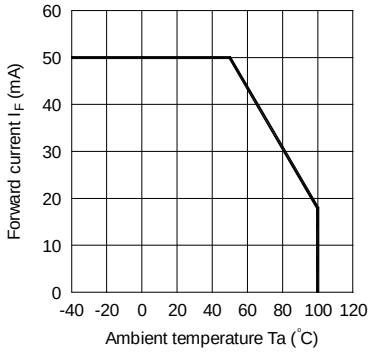


Fig.2 On-state Current vs. Ambient Temperature

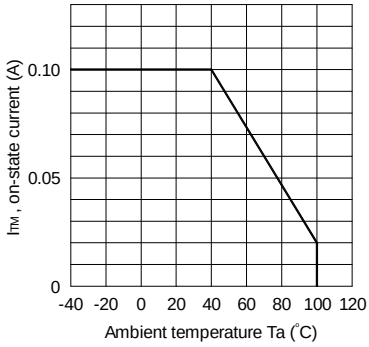


Fig.3 Minimum Trigger Current vs. Ambient Temperature

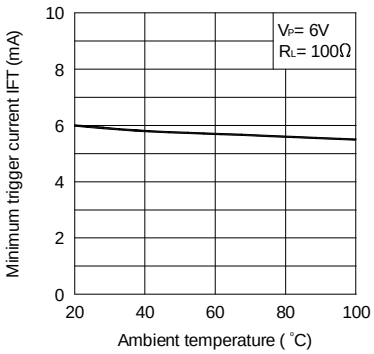


Fig.4 Forward Current vs. Forward Voltage

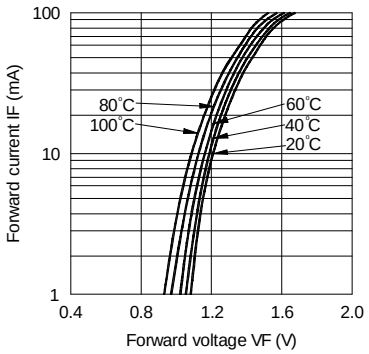


Fig.5 On-state Voltage vs. Ambient Temperature

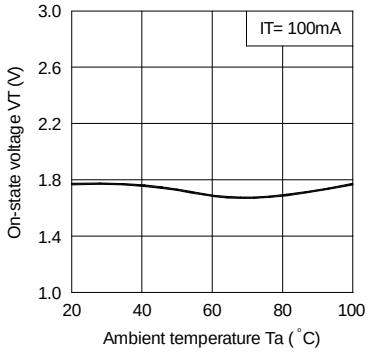


Fig.6 Holding Current vs. Ambient Temperature

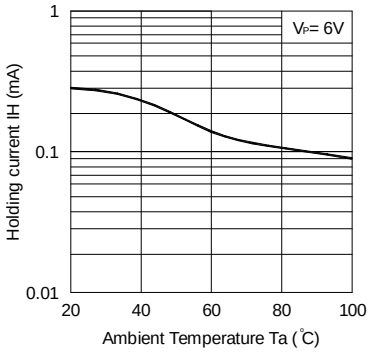


Fig.7 Repetitive Peak Off-state Current vs. Temperature

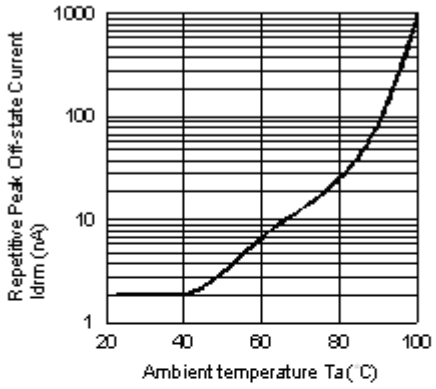
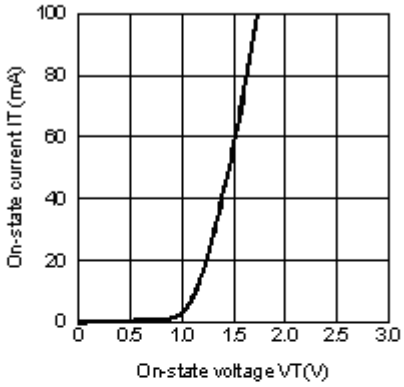
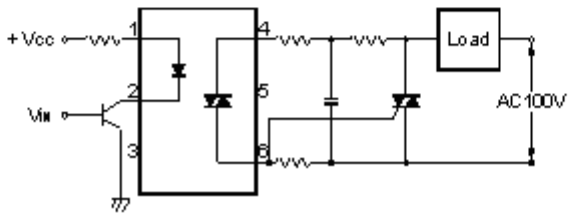


Fig.8 On-state Current vs. On-state Voltage



Basic Operation Circuit
Medium/High Power Triac Drive Circuit

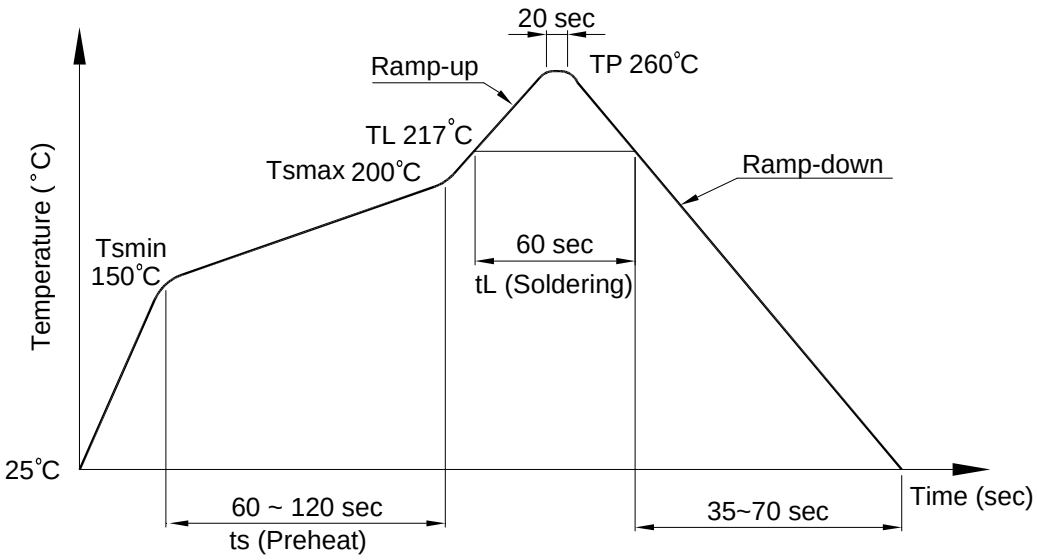


6. TEMPERATURE PROFILE OF SOLDERING

6.1 IR Reflow soldering (JEDEC-STD-020C 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)

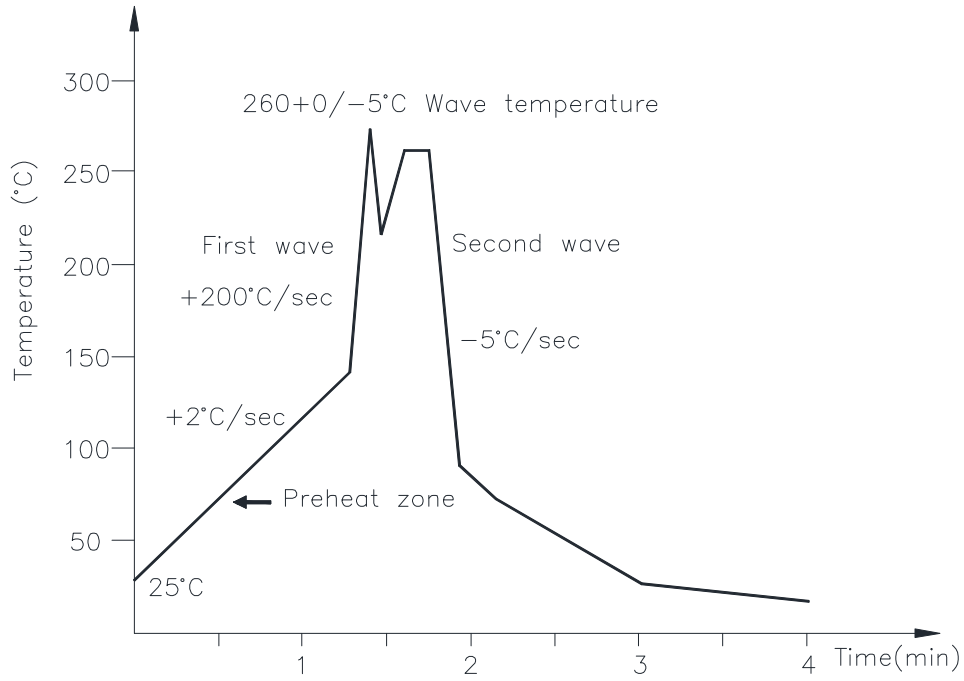
One time soldering is recommended within the condition of temperature.

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

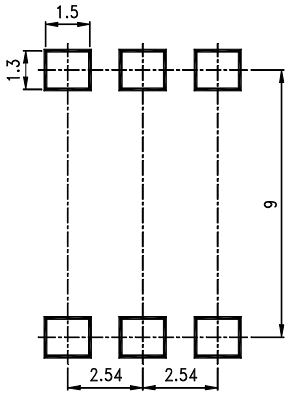
Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: 380+0/-5˚C

Time: 3 sec max.

7. RRECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit: mm



8. NAMING RULE

MOC302X(1)-(2)

DEVICE PART NUMBER
(1)= FORM TYPE (S, M or none)
(2)= TAPING TYPE (TA, TA1 or none)

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.