



Triac Driver Output (400 Volts) Type Photocoupler

MOC3020 / MOC3021 / MOC3022 / MOC3023
Series

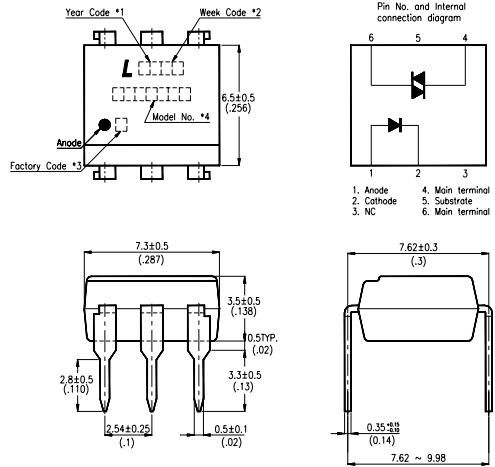
Features

- Isolation voltage between input and output
Viso : 5,000Vrms
- 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. 100V / μs)
- UL approved (No. E113898)
- VDE approve in progress
- FIMKO approved (No. 209049)
- SEMKO approved (No. 9943380/01-20)
- NEMKO approved (No. P99102464)
- DEMKO approved (No. 99-04182)
- CSA approve in progress
- Options Available :
 - Leads with 0.4" (10.16mm) Spacing (M Type)
 - Lead Bends for Surface Mounting (S Type)
 - Tape and Reel of Type I for SMD (Add "-TA" Suffix)
 - Tape and Reel of Type II for SMD (Add "-TA1" Suffix)
 - VDE 0884 Approvals (Add "-V" Suffix)

Applications

1. Solenoid / Valve Controls
2. Lamp Ballasts
3. Interfacing Microprocessors to 115Vac Peripherals
4. Motor Controls
5. Static ac Power Switch
6. Solid State Relays
7. Incandescent Lamp Dimmers

Package Dimensions



NOTES :

1. Year date code.
2. 2-digit work week.
3. Factory code shall be marked
(Z : Taiwan, Y : Thailand).
4. Model No.: MOC3020 ; MOC3021 ;
MOC3022 ; MOC3023
5. All dimensions are in millimeters (inches).
6. Tolerance is $\pm 0.25\text{mm}$ (.010") unless otherwise noted.
7. Specifications are subject to change without notice.

Ordering Information

| Part Number | Package | Safety Standard Approval | Application part number | |
|--|---|--|---|---------|
| MOC3020 MOC3020M MOC3020S MOC3020-TA MOC3020S-TA1 | 6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II) | <ul style="list-style-type: none"> • UL approved • FIMKO approved • SEMKO approved • NEMKO approved • DEMKO approved • CSA approve in progress | MOC3020 | |
| MOC3021 MOC3021M MOC3021S MOC3021S-TA MOC3021S-TA1 | 6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II) | | MOC3021 | |
| MOC3022 MOC3022M MOC3022S MOC3022S-TA MOC3022S-TA1 | 6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II) | | MOC3022 | |
| MOC3023 MOC3023M MOC3023S MOC3023S-TA MOC3023S-TA1 | 6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II) | | MOC3023 | |
| MOC3020-V MOC3020M-V MOC3020S-V MOC3020STA-V MOC3020STA1-V | 6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II) | | <ul style="list-style-type: none"> • VDE approve in progress | MOC3020 |
| MOC3021-V MOC3021M-V MOC3021S-V MOC3021STA-V MOC3021STA1-V | 6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II) | | | MOC3021 |
| MOC3022-V MOC3022M-V MOC3022S-V MOC3022STA-V MOC3022STA1-V | 6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II) | | | MOC3022 |
| MOC3023-V MOC3023M-V MOC3023S-V MOC3023STA-V MOC3023STA1-V | 6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II) | | | MOC3023 |

Ratings and Characteristics Absolute Maximum Ratings

(Ta=25°C)

| Parameter | | Symbol | Rating | Unit |
|--------------------------|---|------------------|----------|------------------|
| Input | Forward Current | I _F | 50 | mA |
| | Reverse Voltage | V _R | 6 | V |
| | Power Dissipation | P _D | 70 | mW |
| Output | Collector-Emitter Voltage | V _{DRM} | 400 | V |
| | Peak Repetitive Surge current (PW=1ms, 120pps) | V _{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} |
| Operating Temperature | | T _{opr} | -40~+100 | °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

Electrical / Optical Characteristics

(Ta=25°C)

| Parameter | | Symbol | Min. | Typ. | Max. | Unit. | Conditions |
|--------------|--|------------------|------|------|------|---|--|
| Input | Forward Voltage | V _F | — | 1.15 | 1.5 | V | I _F =10mA |
| | Reverse Current | I _R | — | — | 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} | — | 1.7 | 3 | V | I _C =0.1mA I _F =0 |
| | *2 Critical rate of Rise of Off-State Voltage | dv/dt | 100 | — | — | V/μS | I _E =10 μA I _F =0 |
| Coupled | *3 Led Trigger Current, Current Required to Latch Output, Either Direction | MOC3020 | — | 15 | 30 | mA | Main Terminal Voltage = 3V |
| | | MOC3021 | — | 8 | 15 | | |
| | | MOC3022 | — | — | 10 | | |
| | | MOC3023 | — | — | 5 | | |
| | Holding Current, Either Direction | I _H | 100 | — | — | μA | |
| Turn-On time | t _{on} | — | 80 | 200 | μS | V _D =6V, I _F =20mA R _L =100 Ω | |

*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} and absolute max I_F (50mA)

Typical Electrical/Optical Characteristic Curves (25°C Ambient Temperature Unless Otherwise Noted)

Fig.1 Forward Current vs. Ambient Temperature

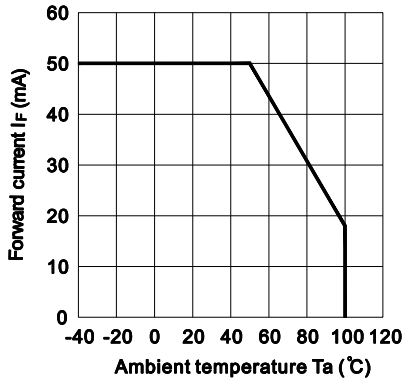


Fig.2 On-state Current vs. Ambient Temperature

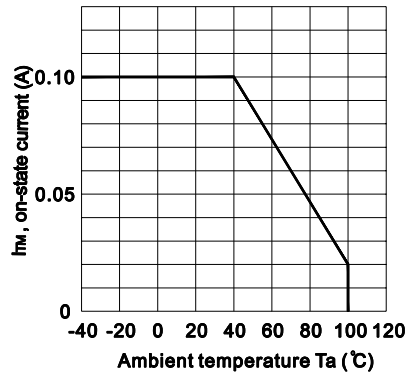


Fig.3 Minimum Trigger Current vs. Ambient Temperature

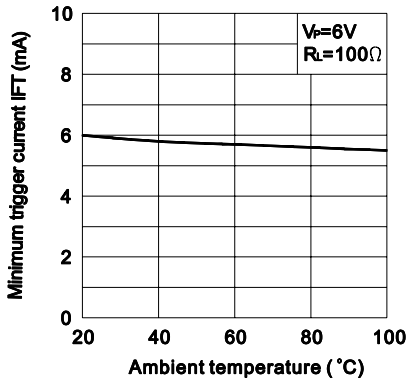


Fig.4 Forward Current vs. Forward Voltage

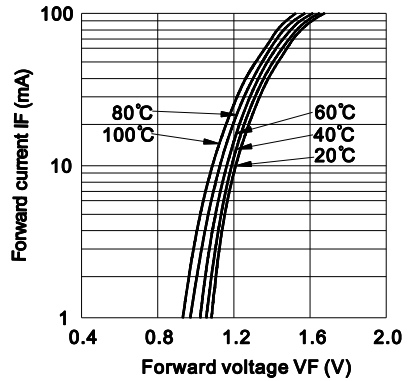


Fig.5 On-state Voltage vs. Ambient Temperature

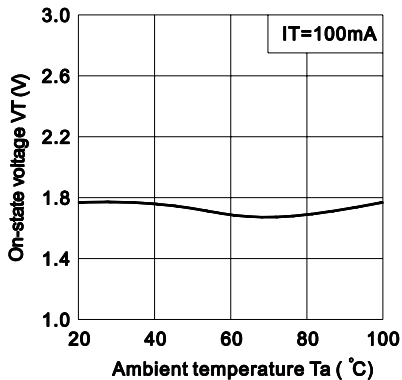
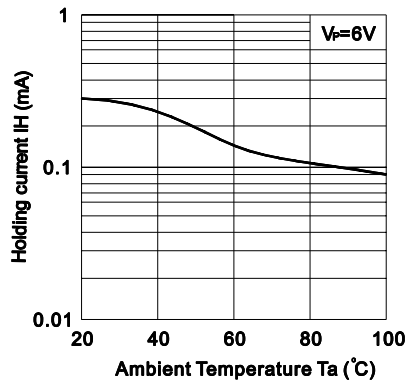


Fig.6 Holding Current vs. Ambient Temperature



PHOTOCOUPLER

Fig.7 Turn-on Time vs. Forward Current

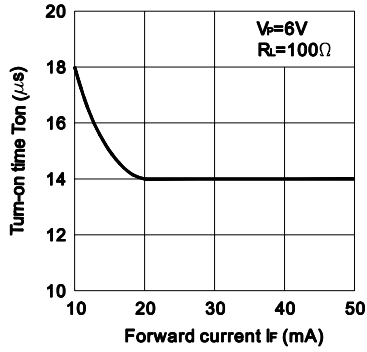


Fig.8 Repetitive Peak Off-state Current vs. Temperature

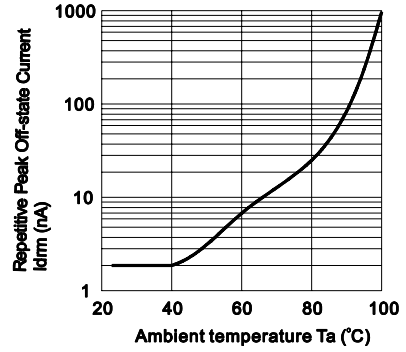
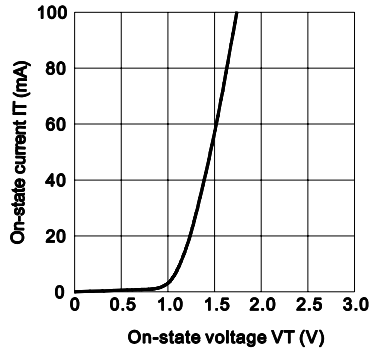


Fig.9 On-state Current vs. On-state Voltage



**Basic Operation Circuit
Medium/High Power Triac Drive Circuit**

