



# Photocoupler

## Product Data Sheet

### MOC3083 SERIES

Spec No.: DS70-2001-027

Effective Date: 11/30/2016

Revision: E

**LITE-ON DCC**

**RELEASE**

BNS-OD-FC001/A4

## Photocoupler MOC308X series

### 1. DESCRIPTION

#### 1.1 Features

- Isolation voltage between input and output  $V_{iso} : 5,000V_{rms}$
- 6pin DIP zero-cross optoisolators triac driver output
- High repetitive peak off-state voltage  $V_{DRM} : \text{Min. } 800V$
- High critical rate of rise of off-state voltage(  $dV/dt : \text{MIN. } 1000V / \mu s$  )
- Dual-in-line package : MOC3081 / MOC3082 / MOC3083
- Wide lead spacing package : MOC3081M / MOC3082M / MOC3083M
- Surface mounting package : MOC3081S / MOC3082S / MOC3083S
- Tape and reel packaging : MOC3081S-TA1 / MOC3082S-TA1 / MOC3083S-TA1
- Safety approval
  - UL 1577
  - cUL CA5A
  - VDE DIN EN60747-5-5 (VDE 0884-5)
- RoHS Compliance
  - All materials be used in device are followed EU RoHS directive (No.2002/95/EC).
- MSL class1

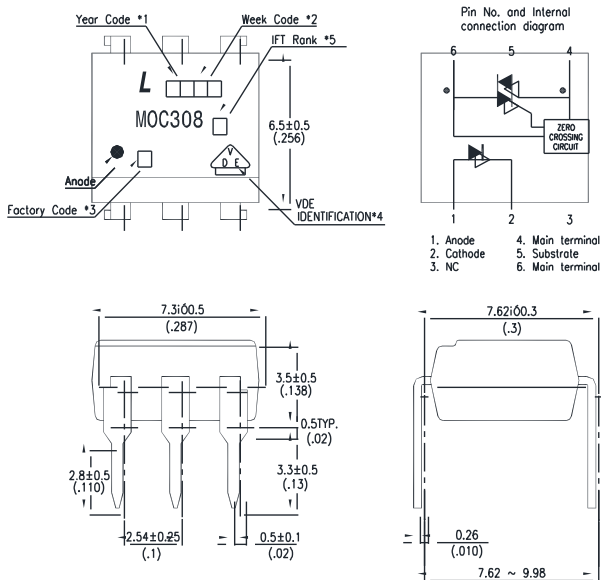
#### 1.2 Applications

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

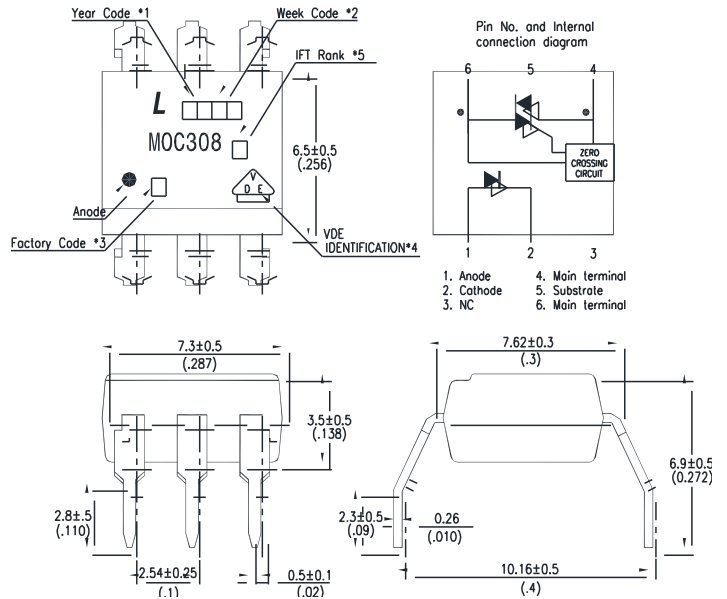
## Photocoupler MOC308X series

### 2. PACKAGE DIMENSIONS

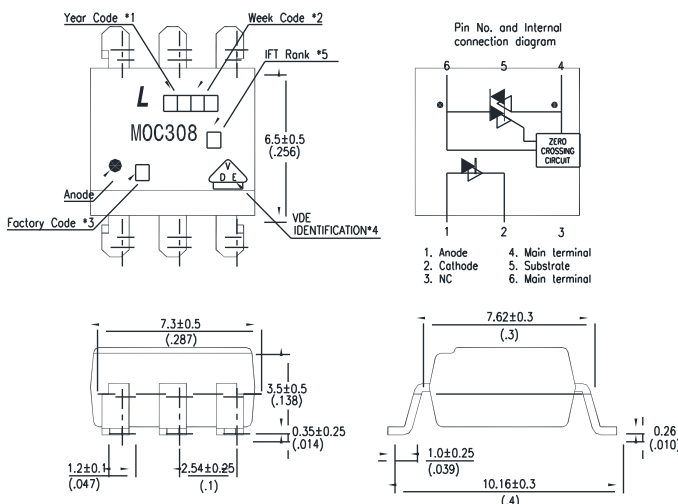
#### 2.1 MOC308X



#### 2.2 MOC308XM



#### 2.3 MOC308XS



#### Notes :

1. Year date code.
2. 2-digit work week.
3. Factory identification mark shall be marked (W: China-CZ, Y: Thailand)
4. VDE option
5. I<sub>FT</sub> rank

\* Dimensions are in Millimeters and (Inches).

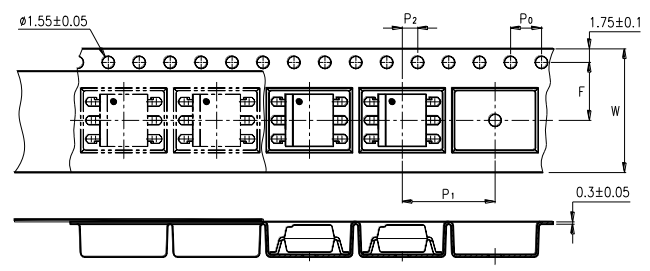
## Photocoupler MOC308X series

### 3. TAPING DIMENSIONS

#### 3.1 MOC308XS-TA



#### 3.2 MOC308XS-TA1



| Description                            | Symbol         | Dimension in mm (inch) |
|--|----------------|------------------------|
| Tape wide                              | W              | 16±0.3 (0.63)          |
| Pitch of sprocket holes                | P <sub>0</sub> | 4±0.1 (0.15)           |
| Distance of compartment                | F              | 7.5±0.1 (0.295)        |
|  | P <sub>2</sub> | 2±0.1 (0.079)          |
| Distance of compartment to compartment | P <sub>1</sub> | 12±0.1 (0.472)         |

#### 3.3 Quantities Per Reel

| Package Type     | MOC308XS series |
|------------------|-----------------|
| Quantities (pcs) | 1000            |

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### 4. RATING AND CHARACTERISTICS

#### 4.1 Absolute Maximum Ratings at Ta=25°C

|        | 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                                   | $P$          | 120        | mW        |
| Output | Off-State Output Terminal Voltage                   | $V_{DRM}$    | 800        | V         |
|        | On-State RMS Current                                | $I_{D(RMS)}$ | 100        | mA        |
|        | Peak Repetitive Surge Current<br>( PW=1ms, 120pps ) | $I_{TSM}$    | 1          | A         |
|        | Junction Temperature                                | $T_J$        | 125        | °C        |
|        | Collector Power Dissipation                         | $P_C$        | 150        | mW        |
|        | Total Power Dissipation                             | $P_{tot}$    | 250        | 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

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### 4.2 ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

| Parameter     |   | Symb       | Min. | Typ. | Max. | Unit             | Test Condition   |
|---------------|---|------------|------|------|------|------------------|--|
| Input         | Forward Voltage   | $V_F$      | —    | 1.2  | 1.4  | V                | $I_F=20\text{mA}$  |
|               | Reverse Current   | $I_R$      | —    | 0.05 | 10   | $\mu\text{A}$    | $V_R=6\text{V}$  |
| Output        | 1 Peak Blocking Current, Either Direction                                 | $I_{DRM}$  | —    | —    | 500  | nA               | $V_{DRM} = 800\text{V}$  |
|               | Peak On-State Voltage, Either Direction                                   | $V_{TM}$   | —    | —    | 3.0  | V                | $I_{TM}=100\text{ mA Peak}$  |
|               | 2 Critical rate of Rise of Off-State Voltage                              | dv/dt      | 1000 | —    | —    | V/ $\mu\text{s}$ | $V_{in}=240\text{Vrms}$  |
| Couple        | 3 Led Trigger Current, Current Required to Latch Output, Either Direction | MOC3081    | —    | —    | 15   | mA               | Main Terminal Voltage = 3V   |
|               |   | MOC3082    | —    | —    | 10   |                  |  |
|               |   | MOC3083    | —    | —    | 5    |                  |  |
|               | Holding Current, Either Direction   | $I_H$      | —    | 400  | —    | $\mu\text{A}$    |  |
| ZERO CROSSING | Inhibit Voltage   | $V_{INH}$  | —    | 5    | 20   | Volts            | $I_F=\text{Rated } I_{FT}$ , MT1-MT2<br>Voltage above which device will not trigger. |
|               | Leakage in Inhibited State  | $I_{DRM2}$ | —    | —    | 500  | $\mu\text{A}$    | $I_F = \text{Rated } I_{FT}$ , Rated $V_{DRM}$ , Off State                           |

\*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  $I_{FT}$ , 15 mA for MOC3081, 10 mA for MOC3082, 5 mA for MOC3083, and absolute max  $I_F$  (50mA).

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## 5. CHARACTERISTICS CURVES (TYPICAL PERFORMANCE)

Fig.1 Forward Current vs. Ambient Temperature

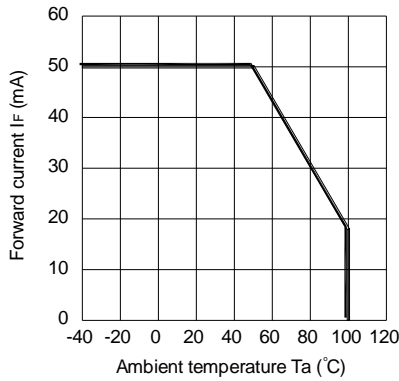


Fig.2 On-state Current vs. Ambient Temperature

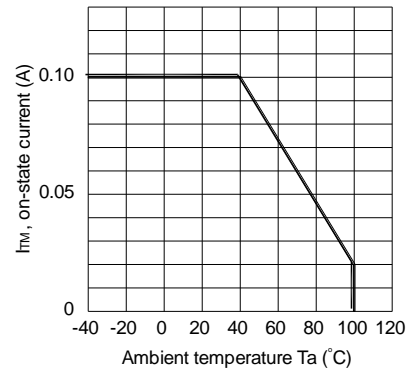


Fig.3 Minimum Trigger Current vs. Ambient Temperature

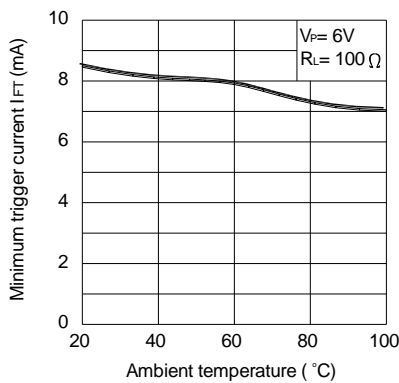


Fig.4 Forward Current vs. Forward Voltage

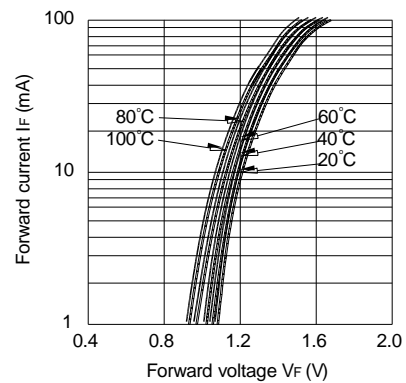


Fig.5 On-state Voltage vs. Ambient Temperature

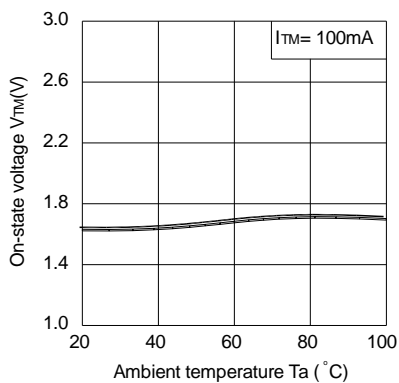
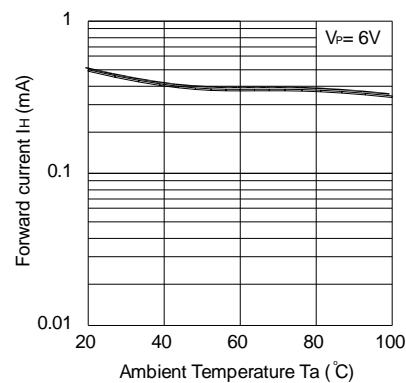


Fig.6 Holding Current vs. Ambient Temperature



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

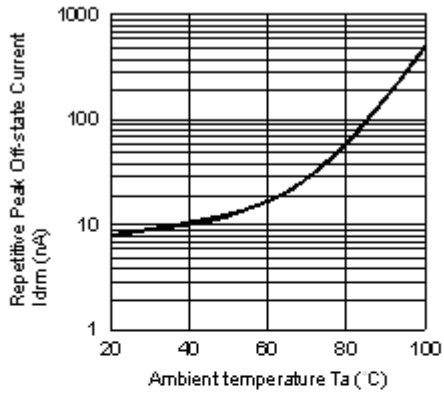
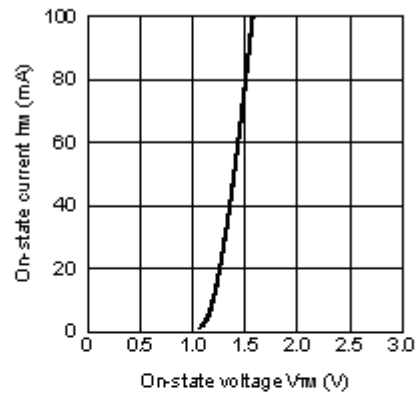
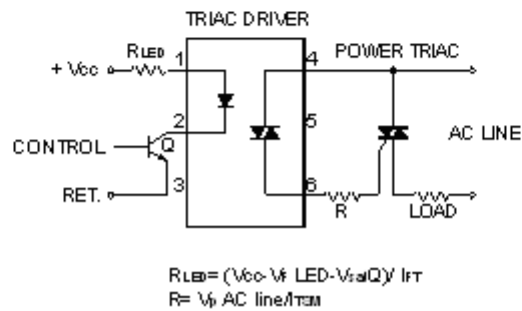


Fig. 8 On-state Current vs. On-state Voltage



### Basic Driver Circuit





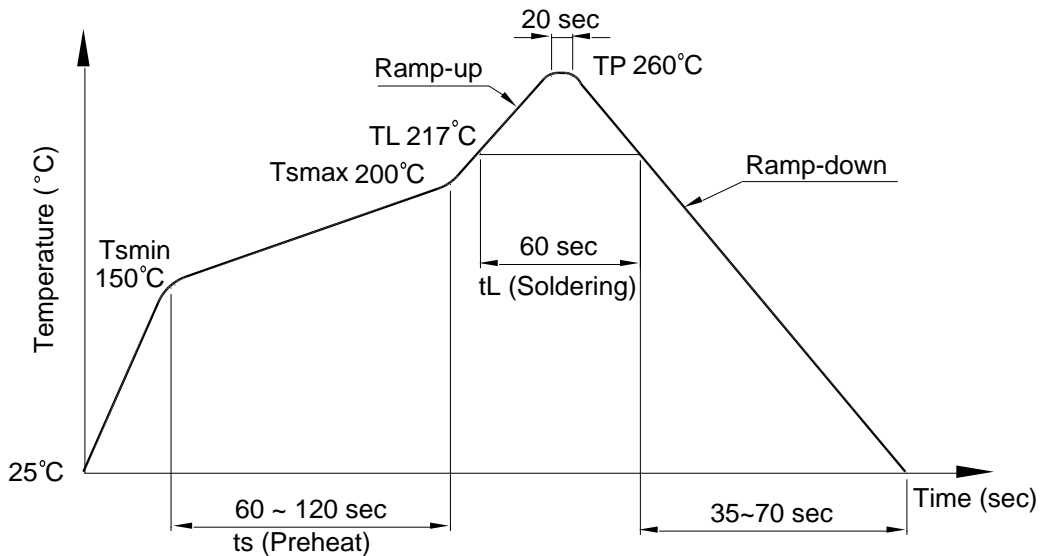
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## 6. TEMPERATURE PROFILE OF SOLDERING

### 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    |



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## 6.2 Wave soldering (JEDEC22A111 compliant)

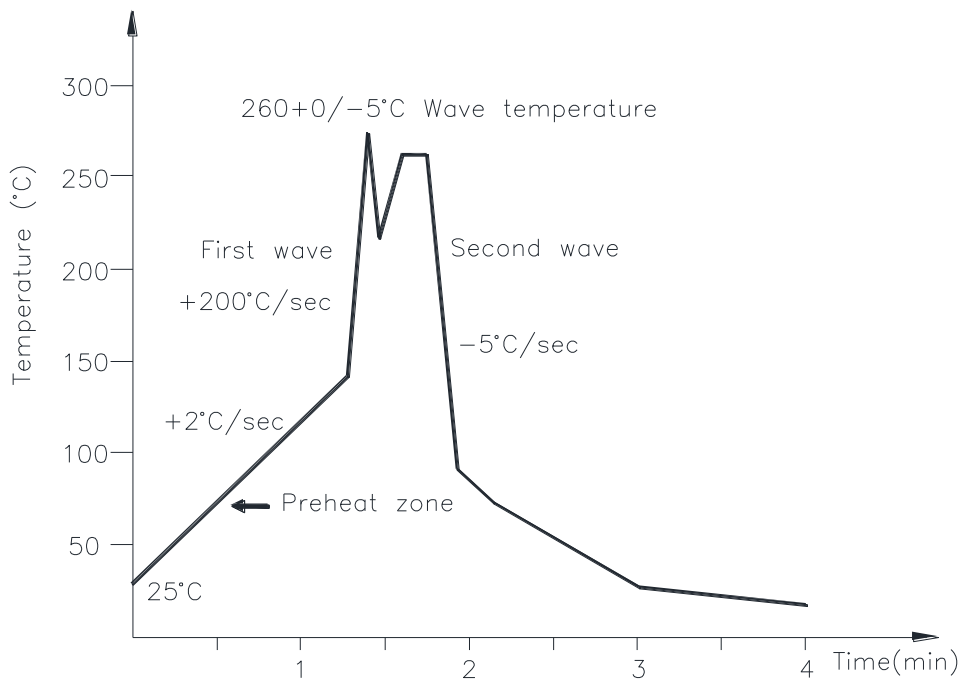
One time soldering is recommended within the condition of temperature.

Temperature:  $260 \pm 0 / -5^\circ\text{C}$

Time: 10 sec.

Preheat temperature: 25 to  $140^\circ\text{C}$

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.

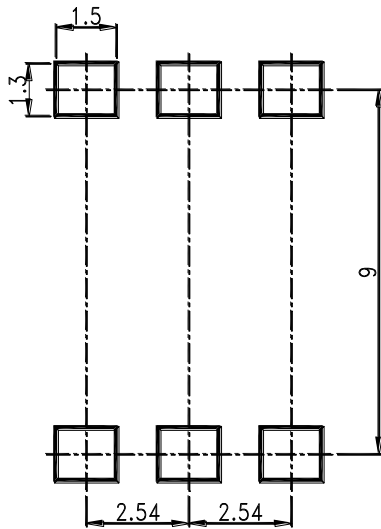
Temperature:  $380 \pm 0 / -5^\circ\text{C}$

Time: 3 sec max.

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**7. RRECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)**

Unit: mm



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8. NAMING RULE

# MOC308(X)(1)-(2)

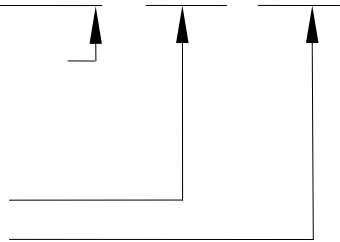
DEVICE PART NUMBER (MOC308X)

Please refer to Electrical Optical Characteristics Table on Page P5

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

(2) TAPING TYPE (TA, TA1)

Example : MOC3081S-TA1



# MOC308(X)(1)(2)-V

DEVICE PART NUMBER (MOC308X)

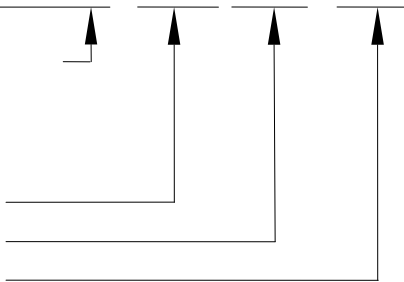
Please refer to Electrical Optical Characteristics Table on Page P5

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

(2) TAPING TYPE (TA, TA1)

(3) VDE option

Example : MOC3081STA1-V



9. NOTES

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- 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.

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