



**Photocoupler**  
**Product Data Sheet**  
**LTV-302X**

Spec No. :DS70-2014-0035  
Effective Date: 04/13/2021  
Revision: C

**LITE-ON DCC**

**RELEASE**

**BNS-OD-FC001/A4**

## Photocoupler LTV-302X series

### DESCRIPTION

#### 1.1 Features

- Isolation voltage between input and output  $V_{iso}$  : 3,750Vrms
- 4pin MFP non zero-cross optoisolators 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 /  $\mu s$  )
- Mini-flat package :  
2.0mm profile : LTV-3021, LTV-3022, LTV-3023
- 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).
- ESD pass HBM 8000V / MM2000V
- MSL class1
- Halogen free option

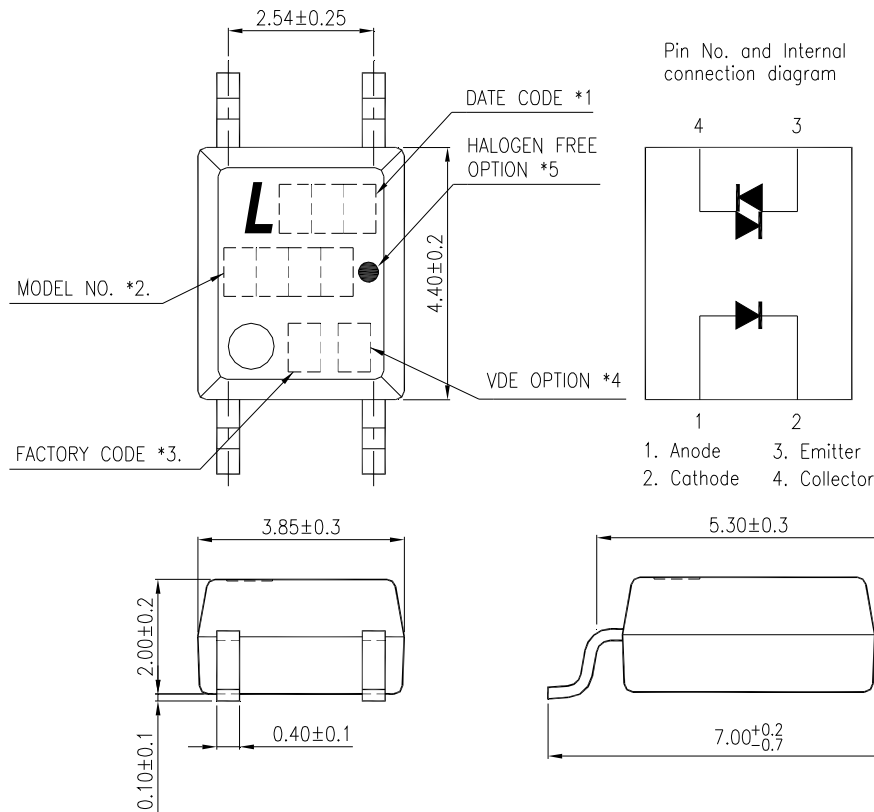
#### 1.2 Applications

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

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### 2. PACKAGE DIMENSIONS

#### 2.1 LTV-302X series



#### Notes :

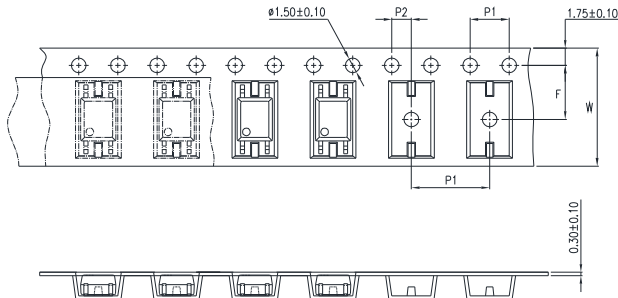
1. 1-digit year code, Example : 2010 = A  
2-digit work week ranging from '01' to '53'
2. Model No. : 3021 / 3022 / 3023
3. Factory identification mark (X: China-TJ)
4. "4" or "V" for VDE option.
5. "●" for halogen free option.

\*All dimensions in millimeters.

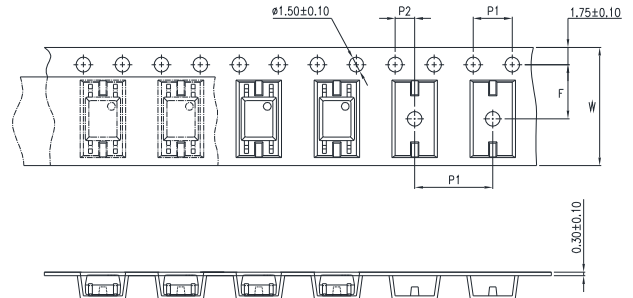
## Photocoupler LTV-302X series

### 3. TAPING DIMENSIONS

#### 3.1 LTV-302X-TP



#### 3.2 LTV-302X(no suffix)



Description	Symbol	Dimension in mm (inch)
Tape wide	W	12±0.3 (0.472)
Pitch of sprocket holes	P <sub>0</sub>	4±0.1 (0.157)
Distance of compartment	F	5.5±0.1 (0.217)
	P <sub>2</sub>	2±0.1 (0.079)
Distance of compartment to compartment	P <sub>1</sub>	8±0.1 (0.315)

#### 3.3 Quantities Per Reel

Package Type	LTV-302X series
Quantities (pcs)	3000

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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
	Power Dissipation	$P_D$	70	mW
	Junction Temperature	$T_J$	125	°C
Output	Off-State Output Terminal Voltage	$V_{DRM}$	400	V
	Peak Repetitive Surge Current ( PW=1ms, 120pps )	$V_{TSM}$	1	A
	Collector Power Dissipation	$P_C$	300	mW
	Junction Temperature	$T_J$	125	°C
	Total Power Dissipation	$P_{tot}$	330	mW
*1.	Isolation Voltage	$V_{iso}$	3750	$V_{rms}$
	Ambient Operating Temperature Range	$T_A$	-55 ~ +115	°C
	Storage Temperature	$T_{stg}$	-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

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### 4.2 Recommended Operating Conditions (Note)

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	$V_{AC}$	-	-	120	Vac
Forward Current	LTV-3021	22.5	25	30	mA
	LTV-3022	15	20	30	mA
	LTV-3023	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.

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

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Condition
Input	Forward Voltage	$V_F$	—	1.15	1.5	V	$I_F=20\text{mA}$
	Reverse Current	$I_R$	—	—	10	$\mu\text{A}$	$V_R=6\text{V}$
Output	*1 Peak Blocking Current, Either Direction	$I_{DRM}$	—	10	100	nA	$V_{DRM}=400\text{V}$
	Peak On-State Voltage, Either Direction	$V_{TM}$	—	—	3	V	$I_{TM}=100\text{ mA Peak}$
	*2 Critical Rate of Rise of Off-State Voltage	dv/dt	1000	—	—	V/ $\mu\text{s}$	
COUPLED	Led Trigger Current, Current Required to Latch Output, Either Direction	LTV-3021	—	—	15	mA	Main Terminal Voltage = 3V
		LTV-3022	—	—	10		
		LTV-3023	—	—	5		
	Holding Current, Either Direction	$I_H$	—	250	—	$\mu\text{A}$	

\*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.

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5. CHARACTERISTICS CURVES (TYPICAL PERFORMANCE)

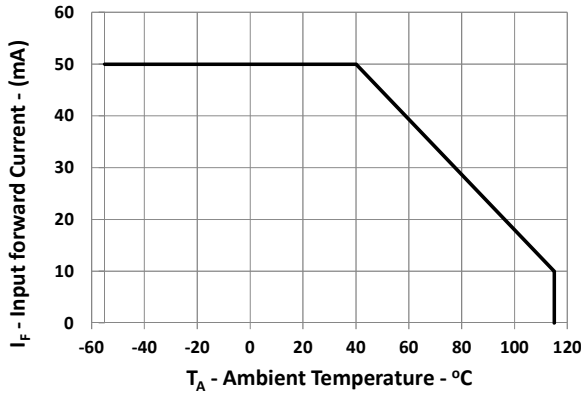


Fig.1 Forward current vs.  $T_A$

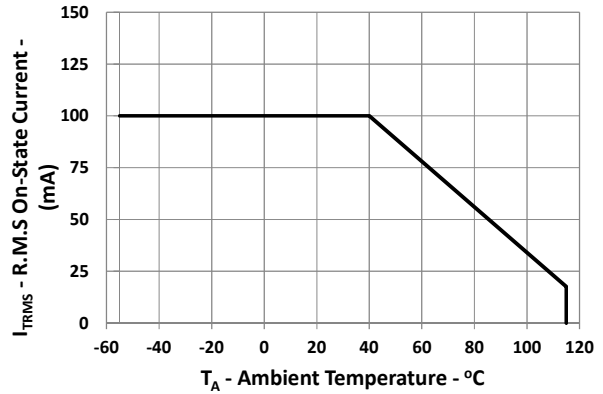


Fig 2 On-state current vs.  $T_A$

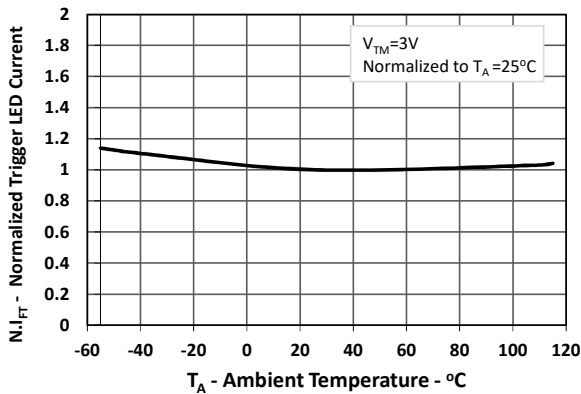


Fig 3. Normalized  $I_{FT}$  vs.  $T_A$

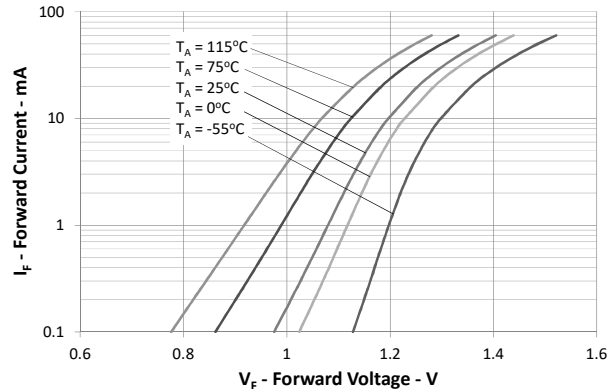


Fig 4.  $I_F$  vs.  $V_F$

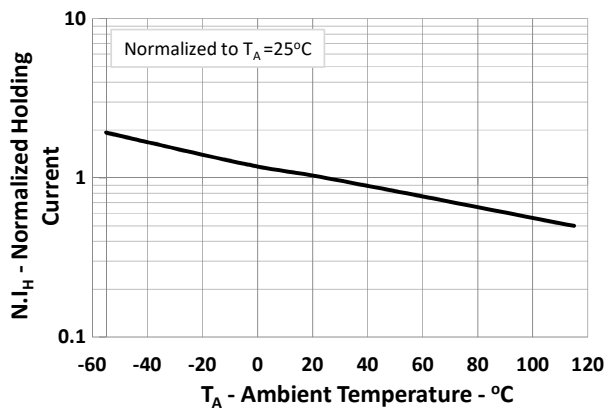


Fig 5. Normalized  $I_H$  vs.  $T_A$

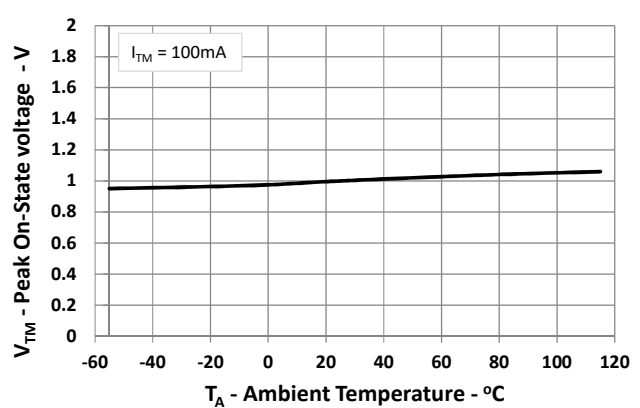


Fig 6. Normalized  $V_{TM}$  vs.  $T_A$



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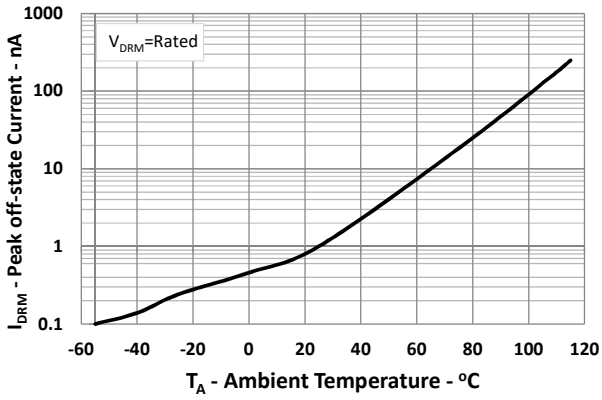


Fig.7 Normalized  $I_{DRM}$  vs.  $T_A$

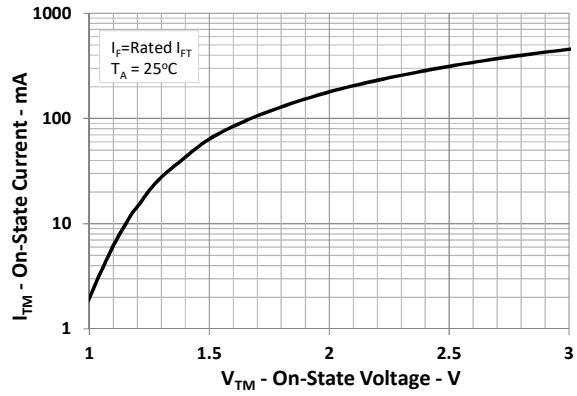


Fig.8 Normalized  $I_{TM}$  vs.  $V_{TM}$

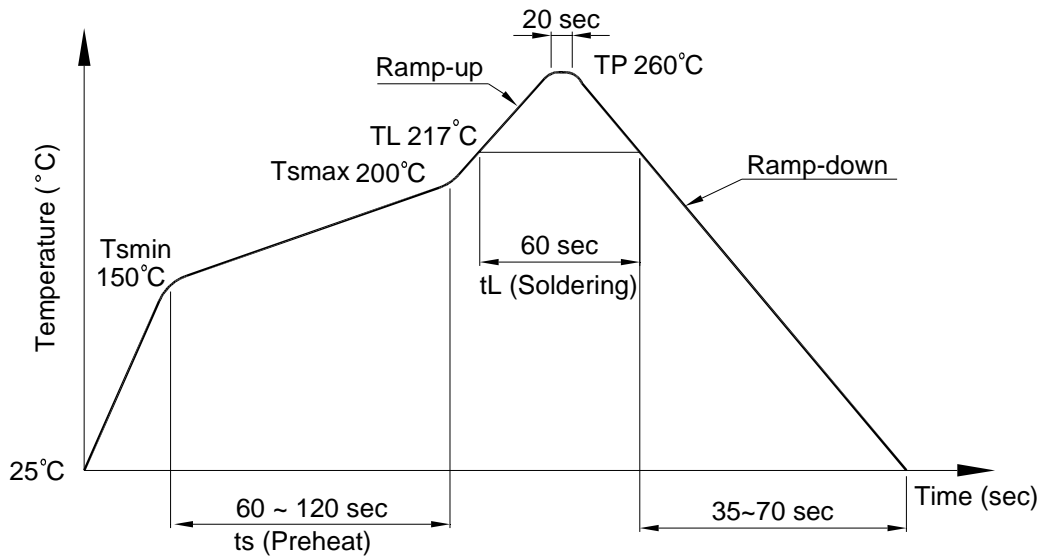
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## 6. TEMPERATURE PROFILE OF SOLDERING

### 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



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### 6.2 Wave soldering (JEDEC22A111 compliant)

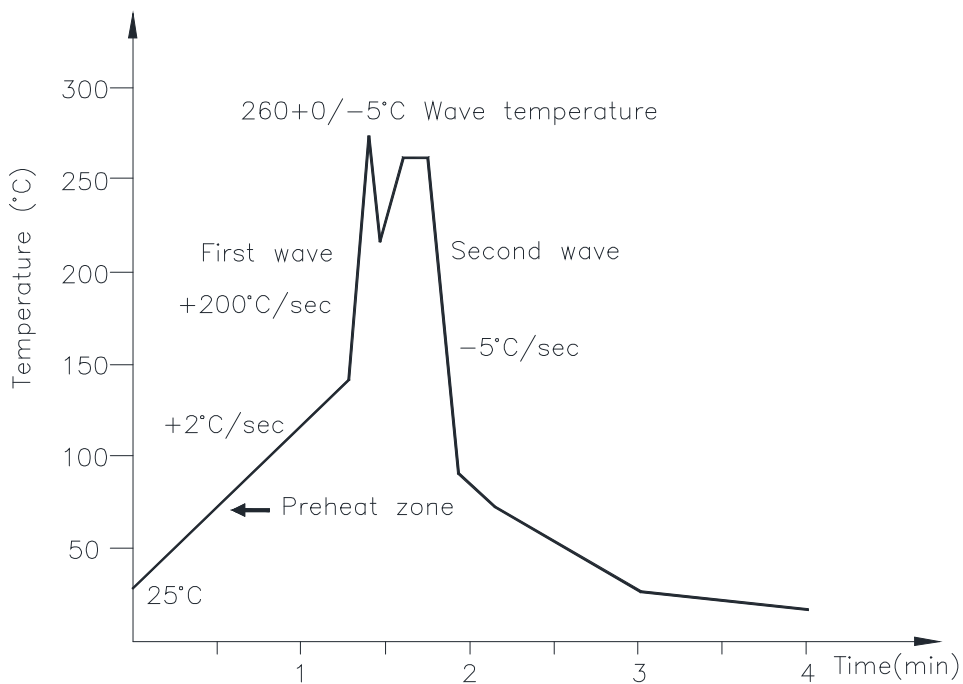
One time soldering is recommended within the condition of temperature.

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.

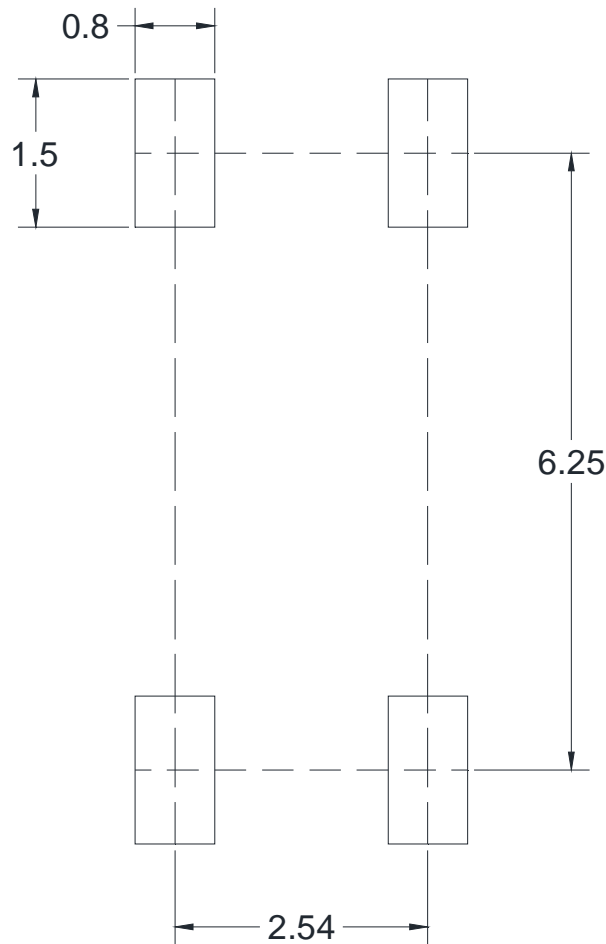
Temperature:  $380 \pm 0 / -5^{\circ}\text{C}$

Time: 3 sec max.

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

Unit: mm



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**8. NAMING RULE**

**LTV-302(X)(1)-G**

DEVICE PART NUMBER

Please refer to Electrical Optical  
Characteristics Table on Page 5

(1) TAPING TYPE (TP, no suffix)

(2) Halogen free

Example : LTV-3021-TP1-G

**LTV302(X)(1)-V-G**

DEVICE PART NUMBER

Please refer to Electrical Optical  
Characteristics Table on Page 5

(1) TAPING TYPE (TP, no suffix)

(2) VDE option

(3) Halogen free

Example : LTV3021TP1-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.