



# Photocoupler Product Data Sheet

## LTV-355T

Spec No.: DS70-2001-006

Effective Date: 10/27/2016

Revision: L

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

## Photocoupler LTV-355T series

### 1. DESCRIPTION

#### 1.1 Features

- Current transfer ratio ( CTR : MIN. 600% at  $I_F = 1\text{mA}$ ,  $V_{CE} = 2\text{V}$  )
- High input-output isolation voltage (  $V_{iso} = 3,750\text{Vrms}$  )
- Employs double transfer mold technology
- Mini-flat package : 2.0mm profile : LTV-355T
- Safety approval
  - UL 1577 & cUL
  - VDE DIN EN60747-5-5 (VDE 0884-5) ,
  - CSA CA5A
  - FIMKO/DEMKO/SEMKO/NEMKO
- RoHS Compliance
  - All materials be used in device are followed EU RoHS directive (No.2002/95/EC).
- ESD pass HBM 8000V/ MM2000V/ CDM2000V
- MSL class1

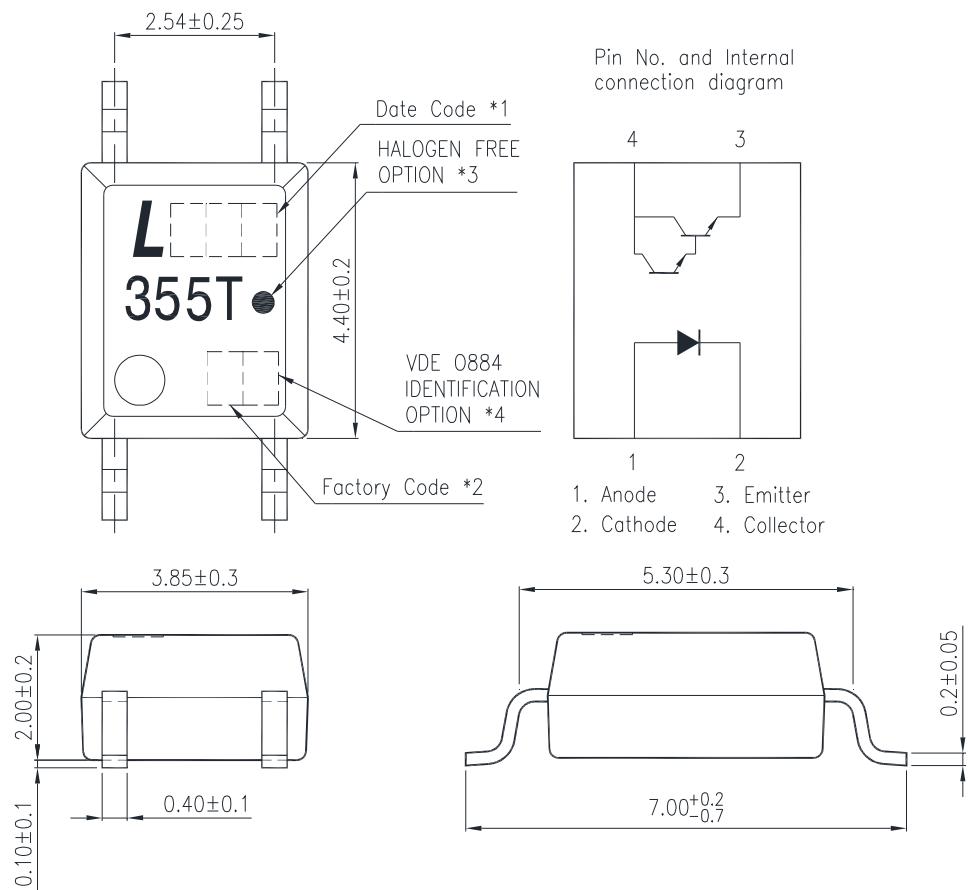
#### 1.2 Applications

- Hybrid substrates that require high density mounting.
- Programmable controllers
- System appliance, measuring instruments

# Photocoupler LTV-355T series

## 2. PACKAGE DIMENSIONS

### 2.1 LTV-355T series



#### Notes :

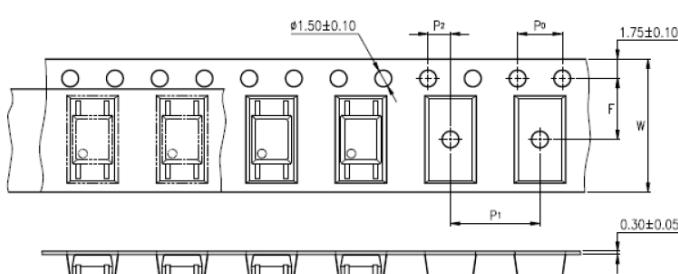
1. 1-digit year code, Example : 2010 = A  
2-digit work week ranging from '01' to '53'
2. Factory identification mark shall be marked (W: China -CZ, X: China -TJ)
3. "●" indicates halogen free option.
4. "4"or"V" for VDE option.

\*All dimensions in millimeters.

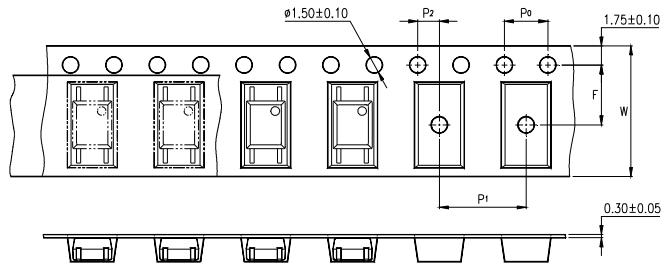
## Photocoupler LTV-355T series

### 3. TAPING DIMENSIONS

#### 3.1 LTV-355T-TP



#### 3.2 LTV-355T-TP1



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-355T series
Quantities (pcs)	3000

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**LTV-355T series**

## 4. RATING AND CHARACTERISTICS

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

	Parameter	Symbol	Rating	Unit
Input	Forward Current	I <sub>F</sub>	50	mA
	Reverse Voltage	V <sub>R</sub>	6	V
	Power Dissipation	P	70	mW
	Junction Temperature	T <sub>J</sub>	125	°C
Output	Collector - Emitter Voltage	V <sub>CEO</sub>	35	V
	Emitter - Collector Voltage	V <sub>ECD</sub>	6	V
	Collector Current	I <sub>C</sub>	80	mA
	Collector Power Dissipation	P <sub>C</sub>	150	mW
	Junction Temperature	T <sub>J</sub>	125	°C
	Total Power Dissipation	P <sub>tot</sub>	170	mW
1.	Isolation Voltage	V <sub>iso</sub>	3750	V <sub>rms</sub>
	Operating Temperature	T <sub>opr</sub>	-55 ~ +110	°C
	Storage Temperature	T <sub>stg</sub>	-55 ~ +150	°C
2.	Soldering Temperature	T <sub>sol</sub>	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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**LTV-355T series**

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

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Condition
Input	Forward Voltage	V <sub>F</sub>	—	1.2	1.4	V	I <sub>F</sub> =20mA
	Reverse Current	I <sub>R</sub>	—	—	10	μA	V <sub>R</sub> =4V
	Terminal Capacitance	C <sub>t</sub>	—	30	250	pF	V=0, f=1KHz
Output	Collector Dark Current	I <sub>CEO</sub>	—	—	1	uA	V <sub>CE</sub> =10V, I <sub>F</sub> =0
	Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	35	—	—	V	I <sub>C</sub> =0.1mA, I <sub>F</sub> =0
	Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	6	—	—	V	I <sub>E</sub> =10μA, I <sub>F</sub> =0
TRANSFER CHARACTERISTICS	Collector Current	I <sub>C</sub>	6	—	75	mA	I <sub>F</sub> =1mA
	1. Current Transfer Ratio	CTR	600	—	7500	%	V <sub>CE</sub> =2V
	Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	0.8	1	V	I <sub>F</sub> =20mA I <sub>C</sub> =5mA
	Isolation Resistance	R <sub>iso</sub>	5×10 <sup>10</sup>	1×10 <sup>11</sup>	—	Ω	DC500V, 40 ~ 60% R.H.
	Floating Capacitance	C <sub>f</sub>	—	0.6	1	pF	V=0, f=1MHz
	Cut-Off Frequency	f <sub>c</sub>	1	6	—	kHz	V <sub>CE</sub> =5V, I <sub>C</sub> =2mA R <sub>L</sub> =100Ω, -3dB
	Response Time (Rise)	tr	—	60	300	μs	V <sub>CE</sub> =2V, I <sub>C</sub> =10mA
	Response Time (Fall)	tf	—	53	250	μs	R <sub>L</sub> =100Ω,

$$1. \text{ CTR} = \frac{I_C}{I_F} \times 100\%$$

## Photocoupler LTV-355T series

### 5. CHARACTERISTICS CURVES (TYPICAL PERFORMANCE)

Fig.1 Forward Current vs.  
Ambient Temperature

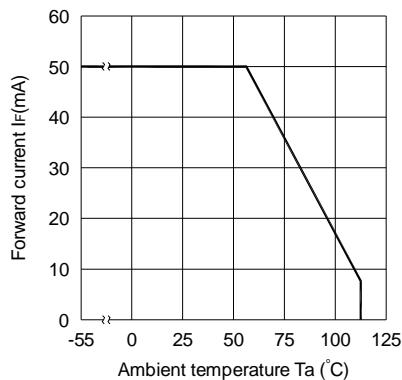


Fig.2 Collector Power Dissipation vs.  
Ambient Temperature

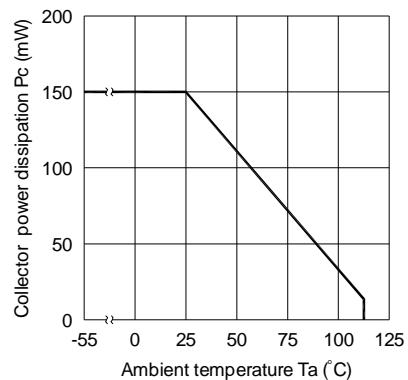


Fig.3 Collector-emitter Saturation  
Voltage vs. Forward Current

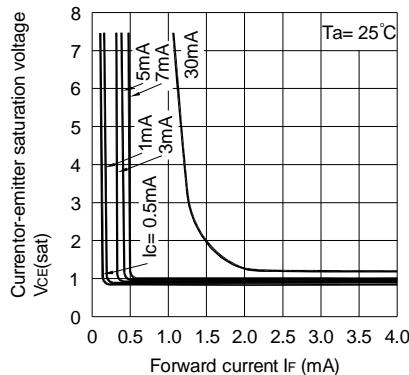


Fig.4 Forward Current vs. Forward  
Voltage

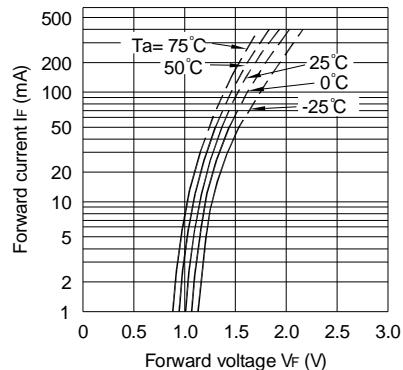


Fig.5 Current Transfer Ratio vs. Forward  
Current

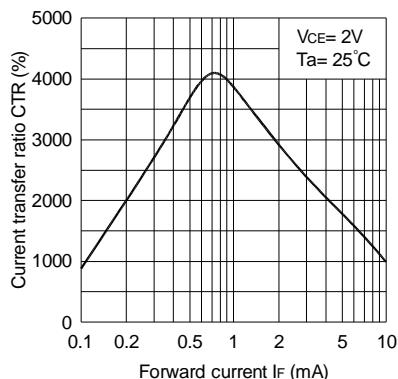
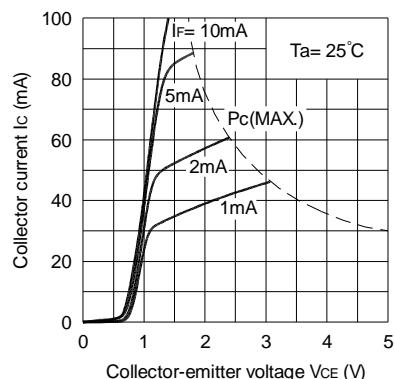


Fig.6 Collector Current vs.  
Collector-emitter Voltage



## Photocoupler LTV-355T series

Fig.7 Relative Current Transfer Ratio  
vs. Ambient Temperature

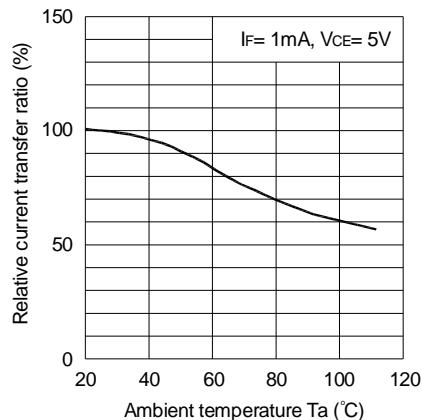


Fig.9 Collector Dark Current vs.  
Ambient Temperature

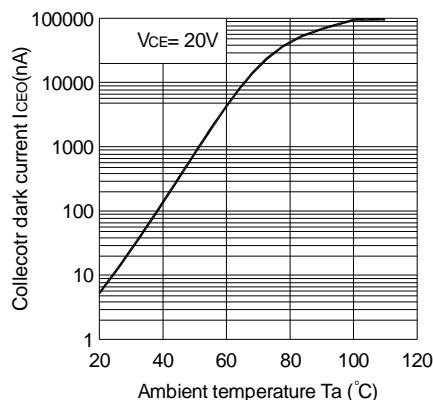


Fig.11 Frequency Response

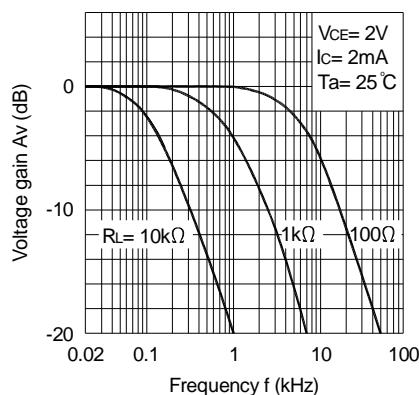


Fig.8 Collector-emitter Saturation Voltage  
vs. Ambient Temperature

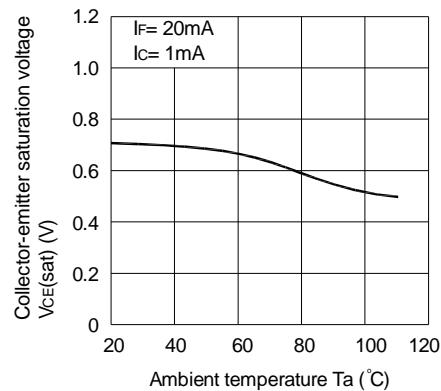
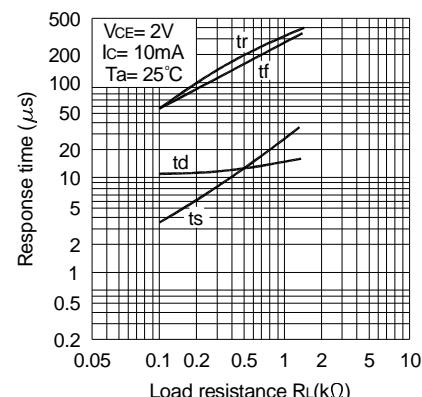
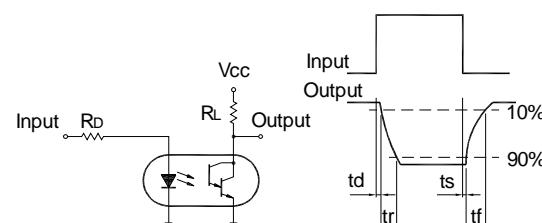


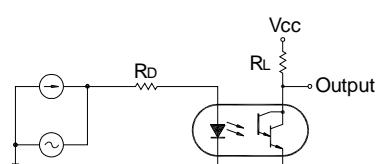
Fig.10 Response Time vs. Load  
Resistance



Test Circuit for Response Time



Test Circuit for Frequency Response



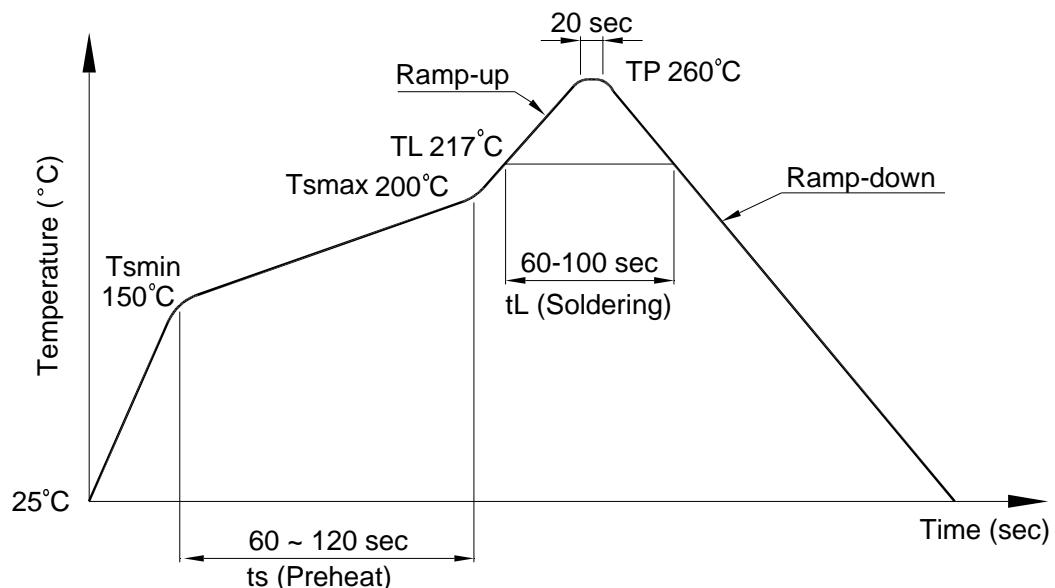
## Photocoupler LTV-355T series

### 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) ( $t_s$ )	90±30 sec
Soldering zone	
- Temperature ( $T_L$ )	217°C
- Time ( $t_L$ )	60 ~ 100 sec
Peak Temperature ( $T_P$ )	260°C
Ramp-up rate	3°C / sec max.
Ramp-down rate	3~6°C / sec



## Photocoupler LTV-355T series

### 6.2 Wave soldering (JEDEC22A111 compliant)

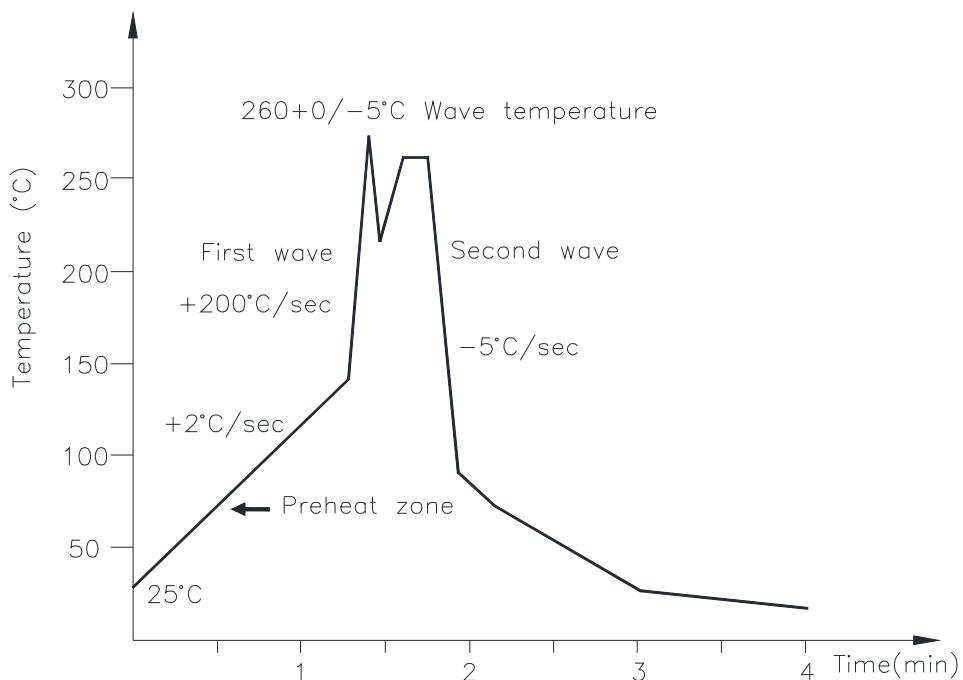
One time soldering is recommended within the condition of temperature.

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

Time: 10 sec.

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

Preheat time: 30 to 80 sec.



### 6.3 Hand soldering by soldering iron

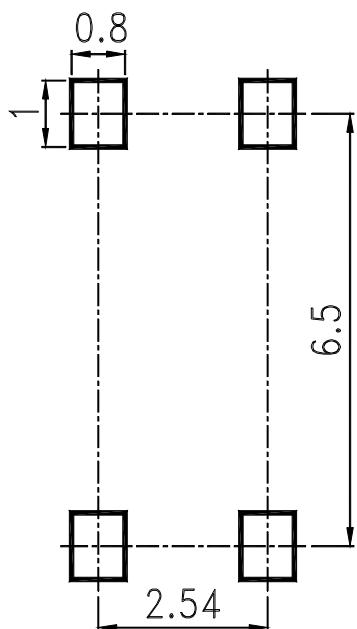
Allow single lead soldering in every single process. One time soldering is recommended.

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

Time: 3 sec max.

## 7. RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit: mm



## 8. NAMING RULE

**LTV-355T-(1)-G**

DEVICE PART NUMBER

(1) TAPING TYPE (TP,TP1)

LTV-355T has tape and reel solution.

Please refer to orientation of taping on Page P3

(2) Halogen free option

Example : LTV-355T-TP-G

**LTV 355T(1)-V-G**

DEVICE PART NUMBER

(1) TAPING TYPE (TP,TP1)

LTV-355T has tape and reel solution.

Please refer to orientation of taping on Page P3

(2) VDE option

(3) Halogen free option

Example : LTV355TTP-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.