



Photocoupler

Product Data Sheet

LTV-100X-G series datasheet

Spec No.: DS70-2013-0012

Effective Date: 11/03/2016

Revision: G

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

Photocoupler LTV-10XX-G series

1. DESCRIPTION

1.1 Features

- Current transfer ratio (CTR : MIN. 50% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$, $T_a = 25^\circ\text{C}$)
- High input-output isolation voltage ($V_{iso} = 5,000\text{Vrms}$)
- High collector-emitter voltage ($V_{CEO} = 70\text{V}$)
- Temperature range -55°C to 110°C
- Creepage distance > 8mm
- Employs double transfer mold technology
- Long Mini-flat package : 2.3mm profile : LTV-10XX series
- Halogen Free
- 8P-Free
- Safety approval
 - UL 1577
 - Cul CA5A
 - VDE DIN EN60747-5-5 (VDE 0884-5)
 - CQC GB4943.1-2011/ GB8898-2011 (meet Altitude up to 5000m)
 - Nordic Safety (FIMKO/NEMKO/SEMKO/DEMKO)
- RoHS Compliance
 - All materials be used in device are followed EU RoHS directive (No.2002/95/EC).

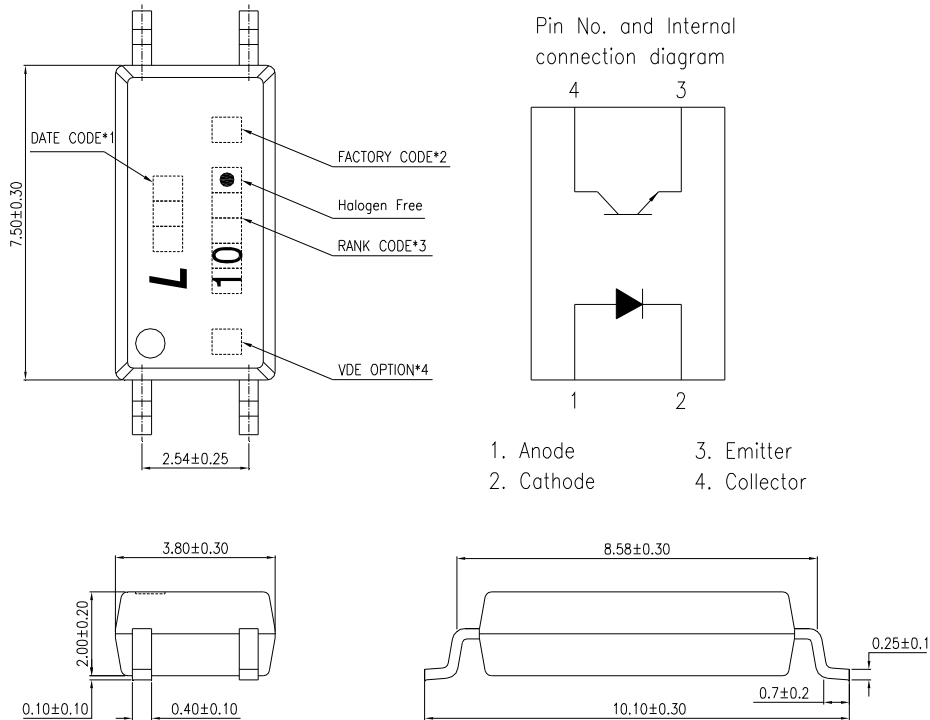
1.2 Applications

- Hybrid substrates that require high density mounting.
- Programmable controllers

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2. PACKAGE DIMENSIONS

2.1 LTV-10XX-G series



Notes :

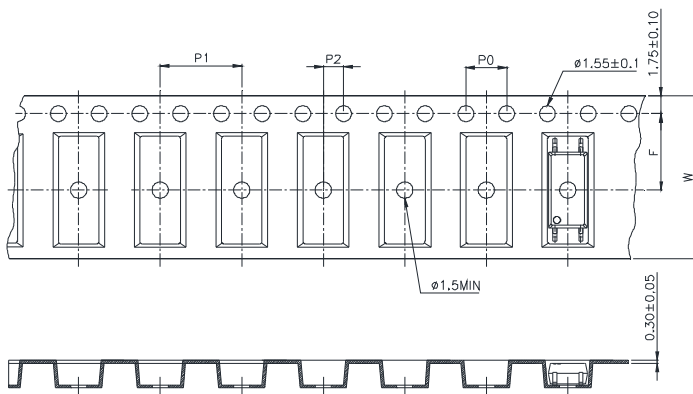
1. 1-digit year code, Example : 2010 = A
2-digit work week ranging from '01' to '53'
2. Factory identification mark shall be marked. (W : China-CZ, X: China -TJ)
3. CTR rank.
4. "4" or "V" for VDE option.

*All dimensions in millimeters.

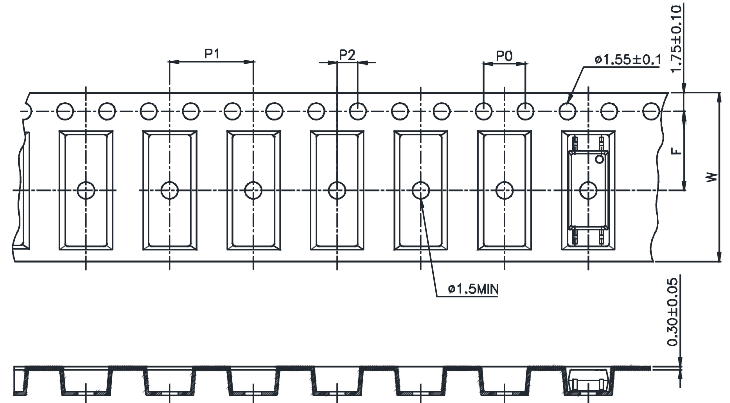
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3. TAPING DIMENSIONS

3.1 LTV-10XX-TP



3.2 LTV-10XX-TP1



| Description | Symbol | Dimension in mm (inch) |
|--|----------------|------------------------|
| Tape wide | W | 16±0.3 (.63) |
| Pitch of sprocket holes | P ₀ | 4±0.1 (.15) |
| Distance of compartment | F | 7.5±0.1 (.295) |
| | P ₂ | 2±0.1 (.079) |
| Distance of compartment to compartment | P ₁ | 8±0.1 (.315) |

3.3 Quantities Per Reel

| Package Type | LTV-10XX 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 | 60 | mA |
| | Reverse Voltage | V_R | 6 | V |
| | Power Dissipation | P | 100 | mW |
| | Junction Temperature | T_J | 125 | °C |
| | Thermal Resistance Junction to Ambient | R_{thJ-A} | 250 | °C/W |
| | Thermal Resistance Junction to Case | R_{thJ-C} | 180 | °C/W |
| Output | Collector - Emitter Voltage | V_{CEO} | 70 | V |
| | Emitter - Collector Voltage | V_{ECO} | 7 | V |
| | Collector Current | I_C | 50 | mA |
| | Collector Power Dissipation | P_C | 150 | mW |
| | Junction Temperature | T_J | 125 | °C |
| | Total Power Dissipation | P_{tot} | 250 | mW |
| 1. | Isolation Voltage | V_{iso} | 5000 | V_{rms} |
| | Operating Temperature | T_{opr} | -55 ~ +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 | | Symbol | Min. | Typ. | Max. | Unit | Test Condition |
|-----------------------------|---|---------------|-----------|------|------|---------------|---|
| Input | Forward Voltage | V_F | — | 1.25 | 1.6 | V | $I_F=50\text{mA}$ |
| | Reverse Current | I_R | — | — | 10 | μA | $V_R=4\text{V}$ |
| | Terminal Capacitance | C_t | — | 50 | — | pF | $V=0, f=1\text{MHz}$ |
| Output | Collector Dark Current | I_{CEO} | — | 10 | 100 | nA | $V_{CE}=20\text{V}, I_F=0$ |
| | Collector- Emitter Breakdown Voltage | BV_{CEO} | 70 | — | — | V | $I_C=1\text{mA}, I_F=0$ |
| | Emitter-Collector Breakdown Voltage | BV_{ECO} | 7 | — | — | V | $I_E=100\mu\text{A}, I_F=0$ |
| TRANSFER CHARACTERISTICS | Collector Current | I_C | 2.5 | — | 30 | mA | $I_F=5\text{mA}$ |
| | 1. Current Transfer Ratio | CTR | 50 | — | 600 | % | $V_{CE}=5\text{V}$ |
| | Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | — | — | 0.3 | V | $I_F=10\text{mA}$ $I_C=1\text{mA}$ |
| | Isolation Resistance | R_{iso} | 10^{12} | — | — | Ω | DC500V, 40 ~ 60% R.H. |
| | Floating Capacitance | C_f | — | 0.3 | — | pF | $V=0, f=1\text{MHz}$ |
| | Response Time (Rise) | t_r | — | 3 | 18 | μs | $V_{CC}=5\text{V},$ $I_C=2\text{mA}$ |
| | Response Time (Fall) | t_f | — | 4.7 | 18 | μs | $R_L=100\Omega,$ |

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

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5. RANK TABLE OF CURRENT TRANSFER RATIO CTR

| CTR Rank | Min. | Typ. | Max. | Unit | Condition |
|----------|------|------|------|------|---|
| LTV-1000 | 50 | — | 600 | % | $I_F=5\text{mA}$, $V_{CE}=5\text{V}$, $T_a=25^\circ\text{C}$ |
| LTV-1001 | 100 | — | 160 | | |
| LTV-1004 | 100 | — | 200 | | |
| LTV-1005 | 50 | — | 150 | | |
| LTV-1006 | 100 | — | 300 | | |
| LTV-1007 | 80 | — | 160 | | |
| LTV-1008 | 130 | — | 260 | | |
| LTV-1009 | 200 | — | 400 | | |
| LTV-1010 | 150 | — | 300 | | |
| LTV-1019 | 250 | — | 500 | | |
| LTV-1020 | 300 | — | 450 | | |
| LTV-1002 | 22 | — | — | % | $I_F=1\text{mA}$, $V_{CE}=5\text{V}$, $T_a=25^\circ\text{C}$ |
| LTV-1003 | 34 | — | — | | |
| LTV-1014 | 56 | — | — | | |
| LTV-1015 | 63 | — | 125 | | |
| LTV-1018 | 100 | — | 200 | % | $I_F=10\text{mA}$, $V_{CE}=5\text{V}$, $T_a=25^\circ\text{C}$ |
| LTV-1002 | 63 | — | 125 | | |
| LTV-1003 | 100 | — | 200 | | |
| LTV-1014 | 160 | — | 320 | | |

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6. CHARACTERISTICS CURVES (TYPICAL PERFORMANCE)

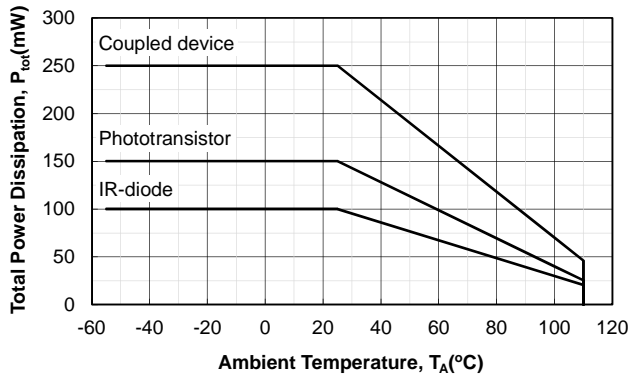


Figure 1. P_{tot} vs. T_A

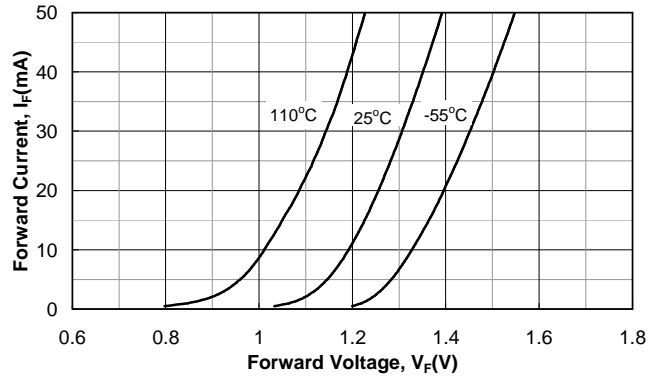


Figure 4. I_F vs. V_F

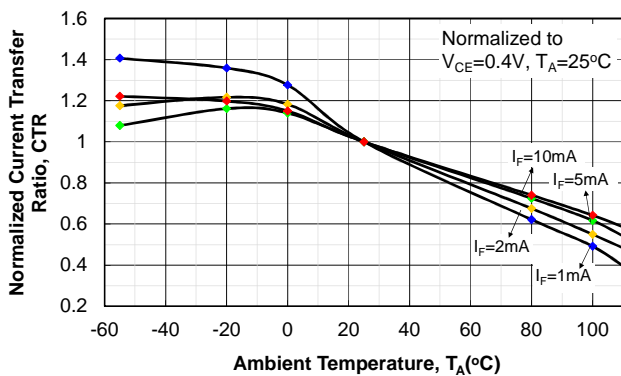


Figure 2. Saturated Normalized CTR vs. T_A

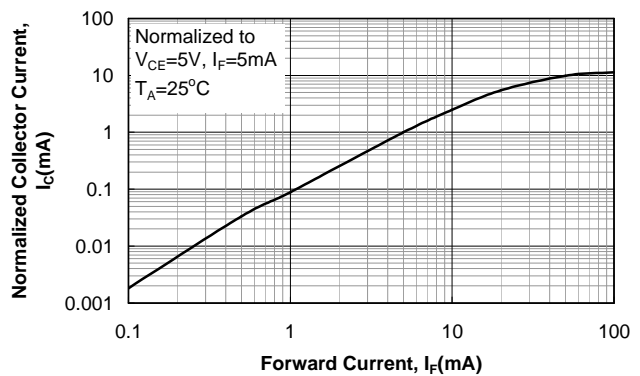


Figure 5. Normalized I_C vs. I_F

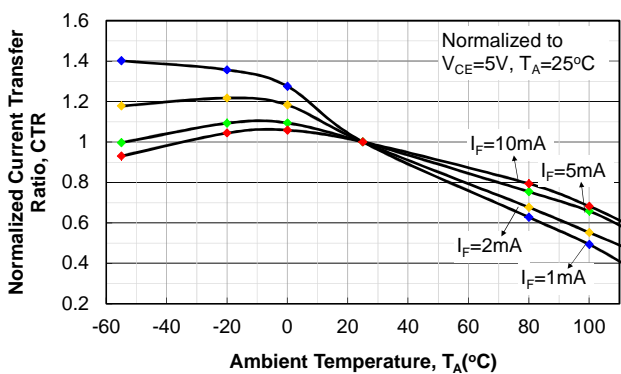


Figure 3. Non-saturated Normalized CTR vs. T_A

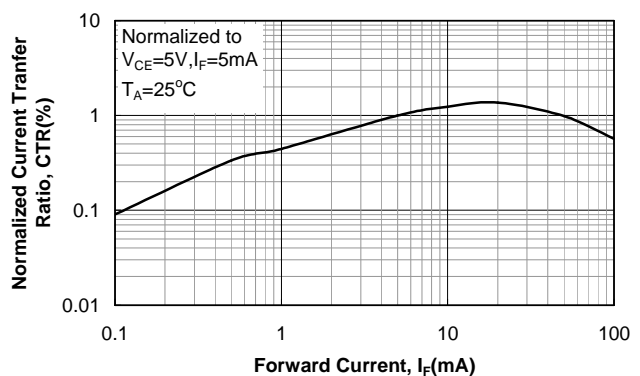


Figure 6. Normalized CTR vs. I_F

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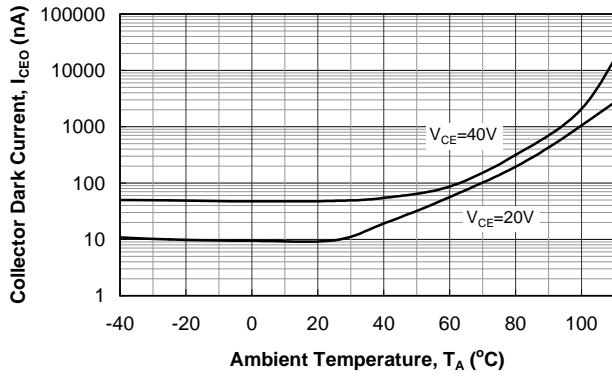


Figure 7. I_{CEO} vs. T_A

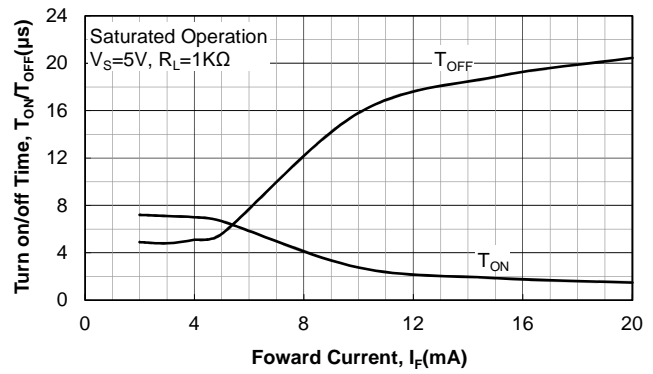


Figure 10. T_{ON} / T_{OFF} vs. I_F

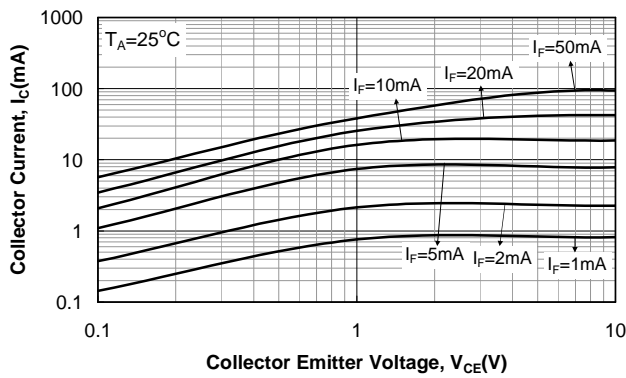


Figure 8. I_C vs. V_{CE}

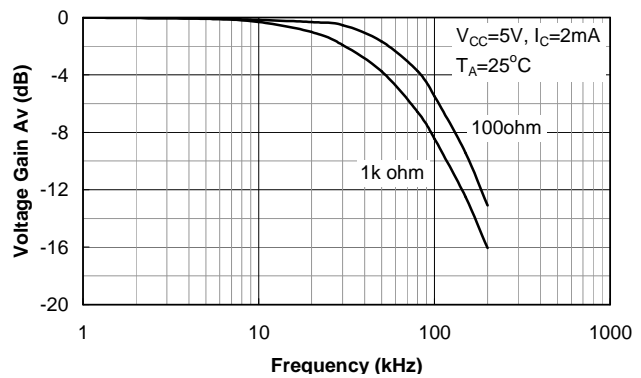


Figure 11. Frequency Response

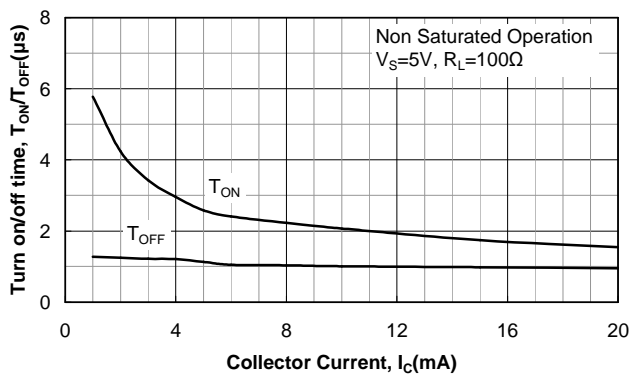


Figure 9. T_{ON} / T_{OFF} vs. I_C

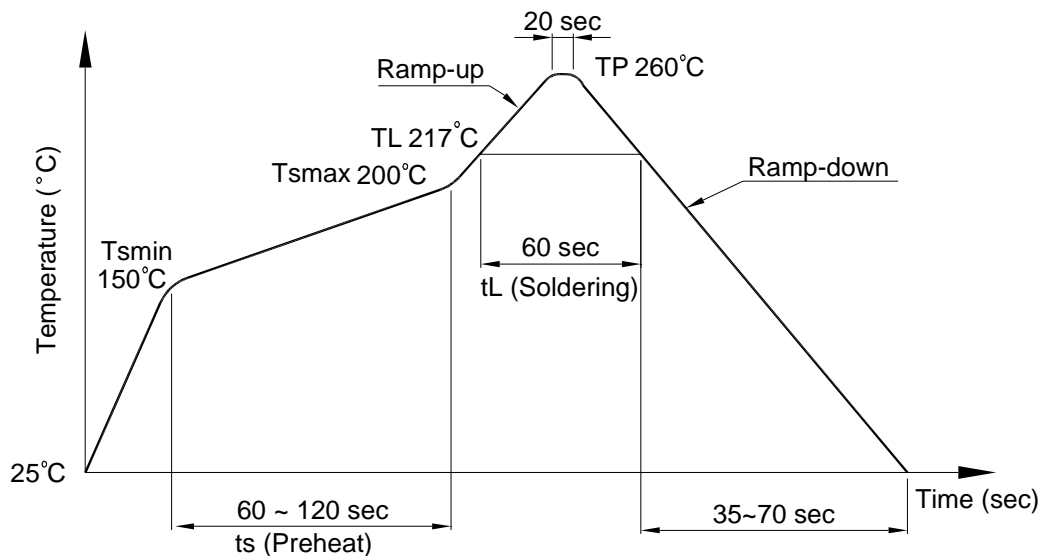
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7. TEMPERATURE PROFILE OF SOLDERING

7.1 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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7.2 Wave soldering (JEDEC22A111 compliant)

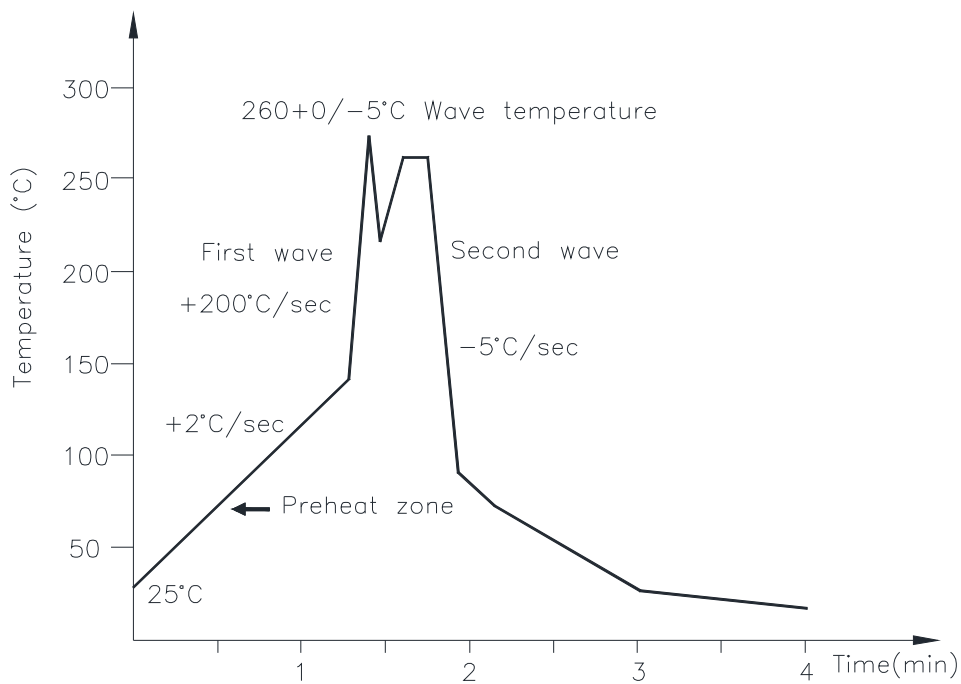
One time soldering is recommended within the condition of temperature.

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

Time: 10 sec.

Preheat temperature: 25 to 140°C

Preheat time: 30 to 80 sec.



7.3 Hand soldering by soldering iron

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

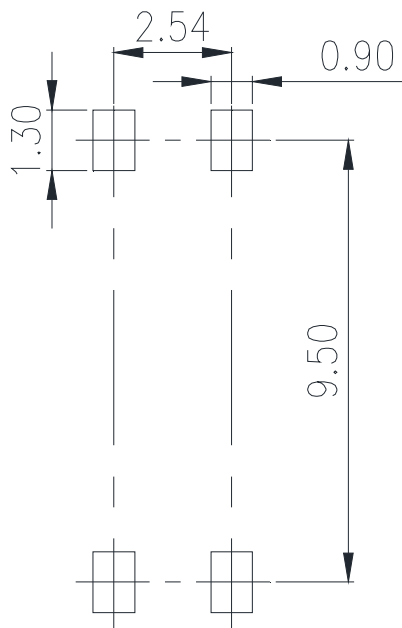
Temperature: $380+0/-5^{\circ}\text{C}$

Time: 3 sec max.

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8. RRECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

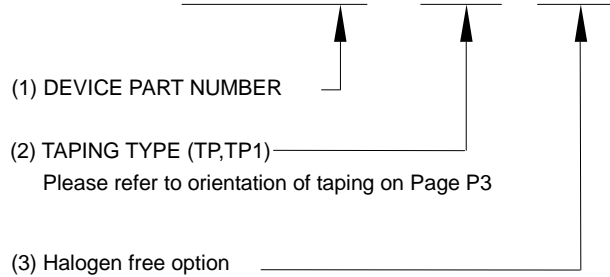
Unit: mm



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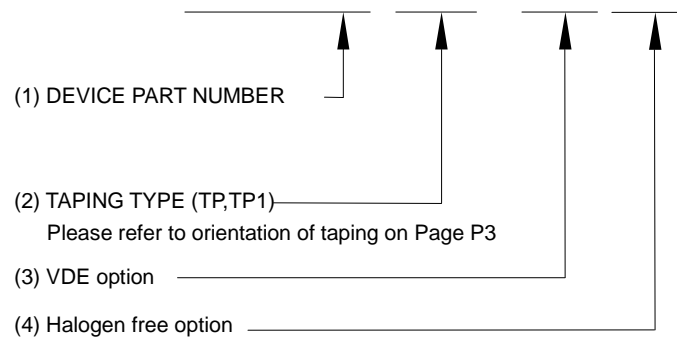
9. NAMING RULE

LTV-10XX-(2)-G



Example : LTV-1008-TP-G

LTV 10XX (2) -V-G



Example : LTV1008TP-V-G

10. 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.