



Photocoupler
Product Data Sheet
LTV-172G

Spec No. :DS70-2019-0238
Effective Date: 12/10/2019
Revision: -

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

Photocoupler LTV-172G series

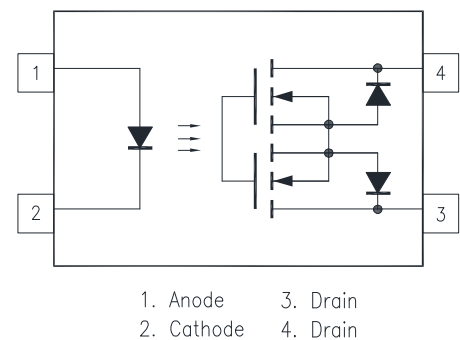
1. DESCRIPTION

The LITEON LTV-172G consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a SOP4 package, which is suitable for surface mount assembly. The LTV-172G is suitable for the battery management systems which require space savings.

1.1 Features

- Normally open (1-form-A)
- Operating temperature range: 110°C(max)
- Trigger LED current: 3 mA (max)
- Isolation voltage: 3750 Vrms (min)
- OFF-state output terminal voltage : 350V (min)
- ON-state current : 110mA (max)
- ON-state resistance : 35Ω (max)
- Safety standards
 - UL1577
 - CUL CA5A
 - VDE DIN EN60747-5-5 (VDE 0884-5)

1.2 Functional Diagram



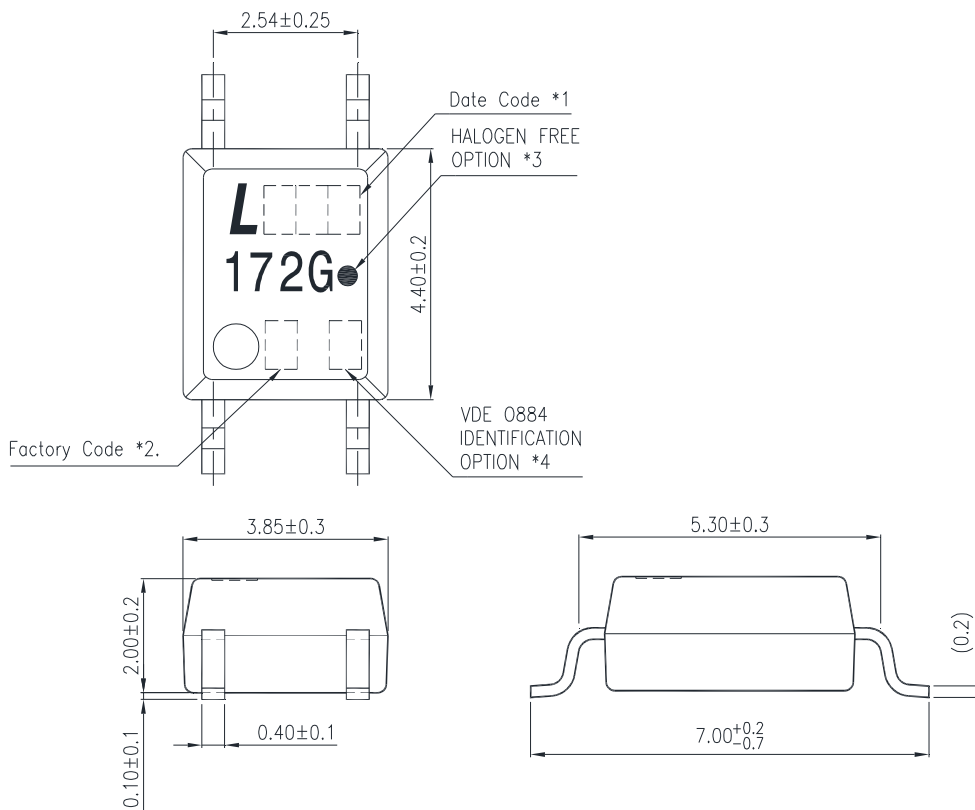
1.3 Applications

- Battery Management System (BMS)
- Factory Automation (FA)
- Security Systems
- Measuring Instruments
- Smart Meters
- Mechanical relay replacements

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2. PACKAGE DIMENSIONS

2.1 LTV-172G series



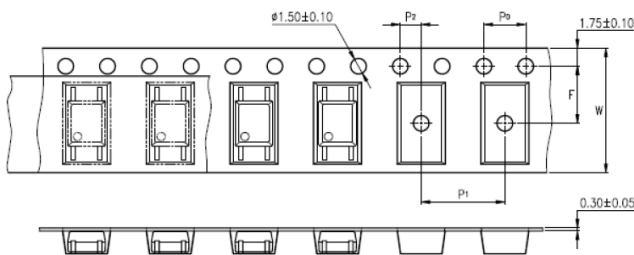
Notes:

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.

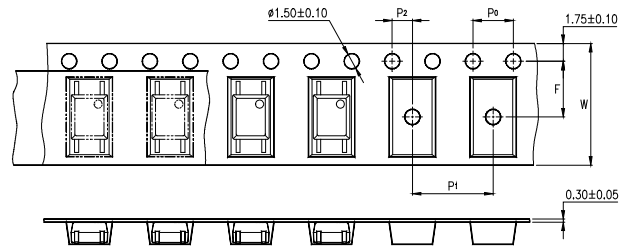
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3. TAPING DIMENSIONS

3.1 LTV-172G-TP



3.2 LTV-172G



| Description | Symbol | Dimension in mm (inch) |
|--|--------|------------------------|
| Tape wide | W | 12±0.3 (0.472) |
| Pitch of sprocket holes | P_0 | 4±0.1 (0.157) |
| Distance of compartment | F | 5.5±0.1 (0.217) |
| | P_2 | 2±0.1 (0.079) |
| Distance of compartment to compartment | P_1 | 8±0.1 (0.315) |

3.3 Quantities Per Reel

| Package Type | LTV-172G 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 |
| | Forward Current Derating ($T_A \geq 25^\circ\text{C}$) | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | Peak Forward Current (100µs pulse, 100pps) | I_{FP} | 1 | A |
| | Reverse Voltage | V_R | 6 | V |
| | Input Power Dissipation | P_D | 70 | mW |
| | Junction Temperature | T_J | 125 | °C |
| Output | OFF-State Output Terminal Voltage | V_{OFF} | 350 | V |
| | ON-State Current | I_{ON} | 110 | mA |
| | ON-State Current Derating ($T_A \geq 25^\circ\text{C}$) | $\Delta I_{ON}/^\circ\text{C}$ | -1.1 | mA/°C |
| | ON-State Current (pulsed) ($t=100\text{ms}$, Duty=1/10) | I_{ONP} | 0.33 | A |
| | Output Power dissipation | P_O | 300 | mW |
| Isolation Voltage (Note 1.) | V_{iso} | 3750 | V | |
| Operating Temperature | T_{opr} | -40 ~ +110 | °C | |
| Storage Temperature | T_{stg} | -55 ~ +125 | °C | |
| Soldering Temperature | T_{sol} | 260 (For 10 seconds) | °C | |

4.2 RECOMMENDED OPERATING CONDITIONS (Note)

| Characteristics | Symbol | Min. | Typ. | Max. | Unit |
|-----------------------|-----------|------|------|------|------|
| Supply Voltage | V_{DD} | - | - | 280 | V |
| Forward Current | I_F | 5 | 7.5 | 25 | mA |
| On-state Current | I_{ON} | - | - | 110 | |
| Operating Temperature | T_{opr} | -20 | - | 100 | °C |

Note : The recommended operating conditions are given as a design guide necessary to obtain the intended performance of the device. Each parameter is an independent value. When creating a system design using this device, the electrical characteristics specified in this datasheet should also be considered.

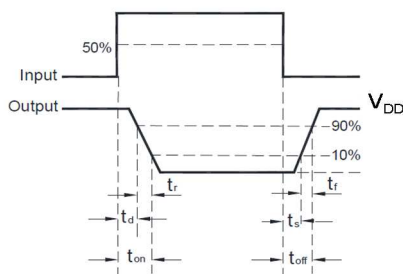
4.3 ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

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Note :

| Parameter | | Sym bol | Min. | Typ. | Max. | Unit | Test Condition |
|-----------------------------|-------------------------|------------|--------------------|------|----------|---------------------------------------|--|
| Input | Forward Voltage | V_F | 1.0 | 1.18 | 1.3 | V | $I_F=10\text{mA}$ |
| | Reverse Current | I_R | - | - | 10 | μA | $V_R=5\text{V}$ |
| Out -put | OFF-State Current | I_{OFF} | - | - | 100 | nA | $V_{OFF}=350\text{V}$ |
| Coupled | Trigger LED Current | I_{FT} | - | 0.8 | 3 | mA | $I_{ON}=110\text{mA}$ |
| | Return LED Current | I_{FC} | 0.1 | 0.6 | - | mA | $I_{OFF}=100\mu\text{A}$ |
| | On Resistance | R_{on} | - | 25 | 35 | Ω | $I_F=5\text{mA}, I_{ON}=110\text{mA}, t<1\text{s}$ |
| - | | | 35 | 50 | Ω | $I_F=5\text{mA}, I_{ON}=110\text{mA}$ | |
| Transfer characteristics | Turn on time (Note 2.) | T_{on} | - | 0.15 | 1 | ms | $R_L=200\Omega, V_{DD}=20\text{V}$ $I_F=5\text{mA}$ |
| | Turn off time (Note 2.) | T_{off} | - | 0.1 | 0.5 | ms | |
| | Isolation Resistance | R_{iso} | 5×10^{10} | - | - | Ω | DC500V, R.H.40 ~ 60% |

- AC For 1 Minute, R.H. = 40 ~ 60%. Isolation voltage shall be measured using the following method.
 - Short between anode and cathode on the primary side and between collector and emitter on the secondary side.
 - The isolation voltage tester with zero-cross circuit shall be used.
 - The waveform of applied voltage shall be a sine wave.
- Turn on / turn off time



5. CHARACTERISTICS CURVES

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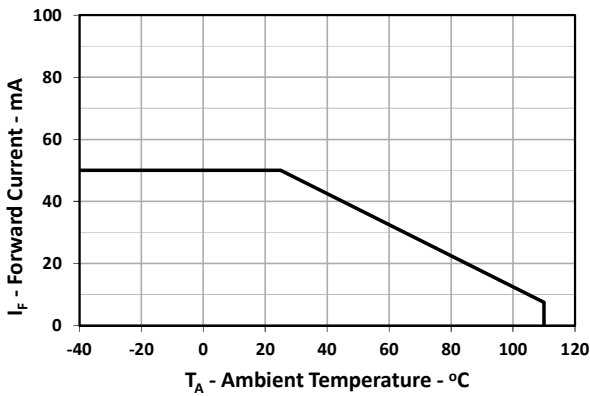


Fig. 1-1 Forward Current vs. Ambient Temperature

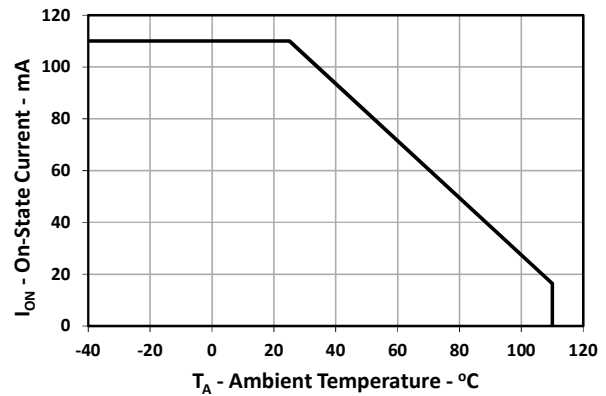


Fig. 1-2 On-State Current vs. Ambient Temperature

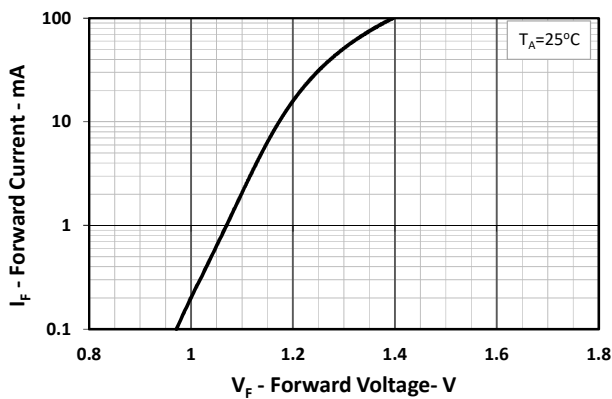


Fig. 2 Forward Current vs. Forward Voltage

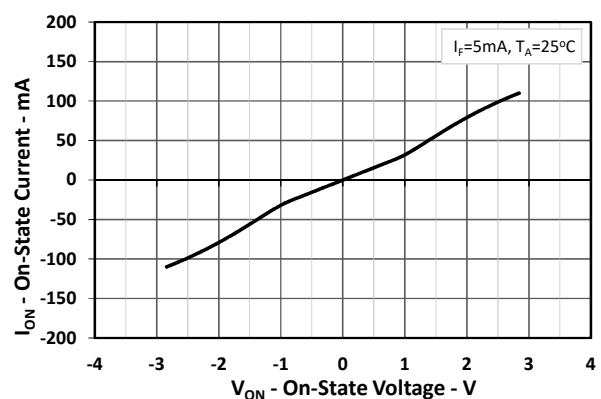


Fig. 3 On-State Current vs. On-State Voltage

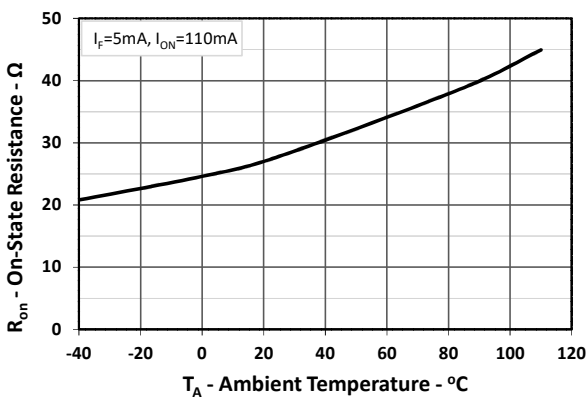


Fig. 4 On-State Resistance vs. Ambient Temperature

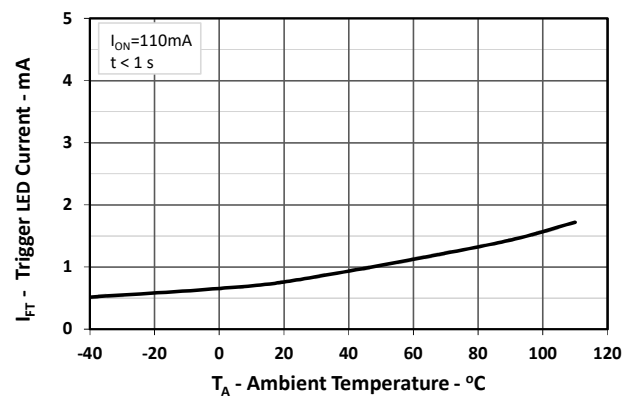


Fig. 5 Trigger LED Current vs. Ambient Temperature

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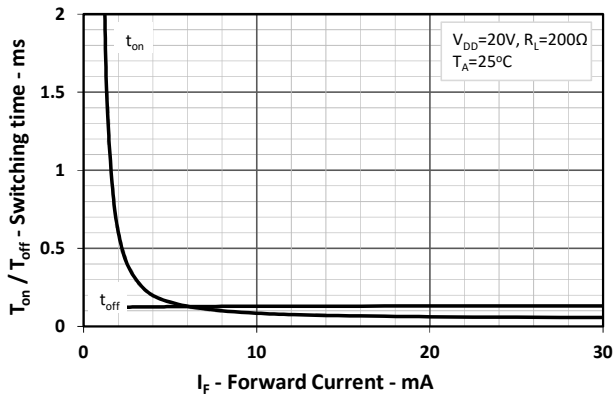


Fig. 6 Switching time vs. Forward Current

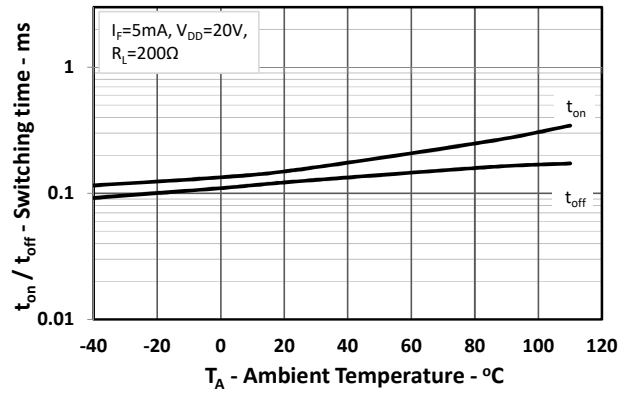


Fig. 7 Switching time vs. Ambient Temperature

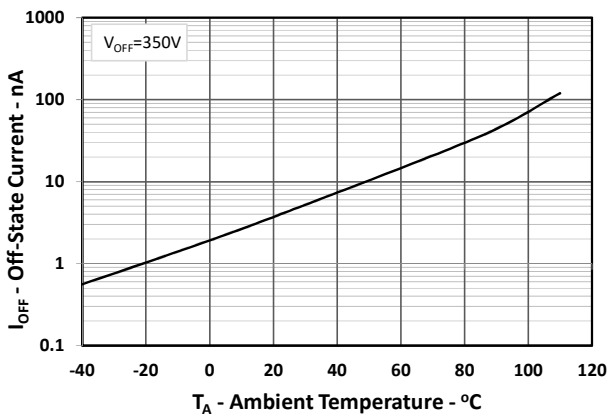


Fig. 8 Off-State Current vs. Ambient Temperature

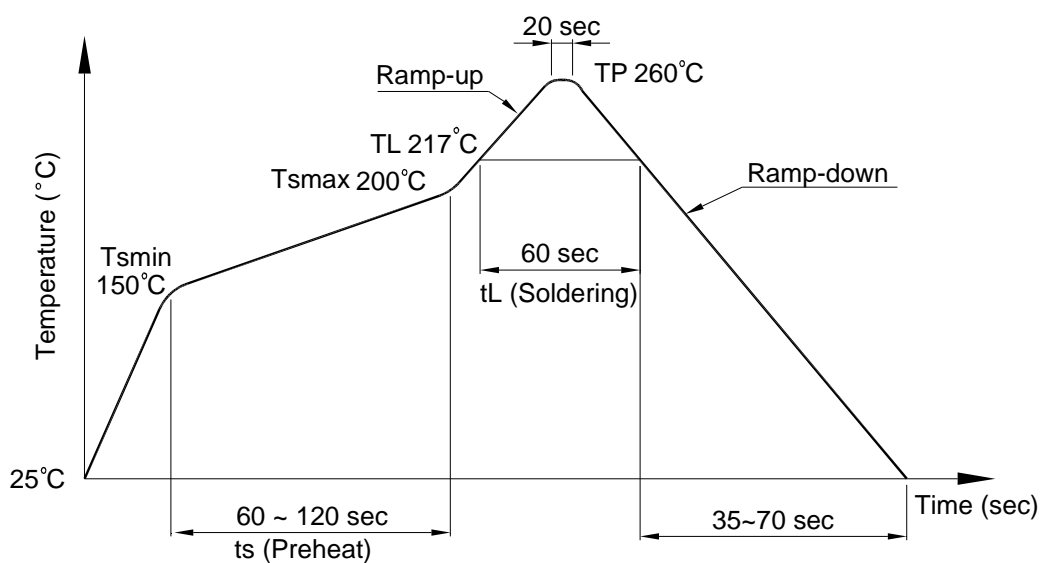
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6. TEMPERATURE PROFILE OF SOLDERING

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 twice

| 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)

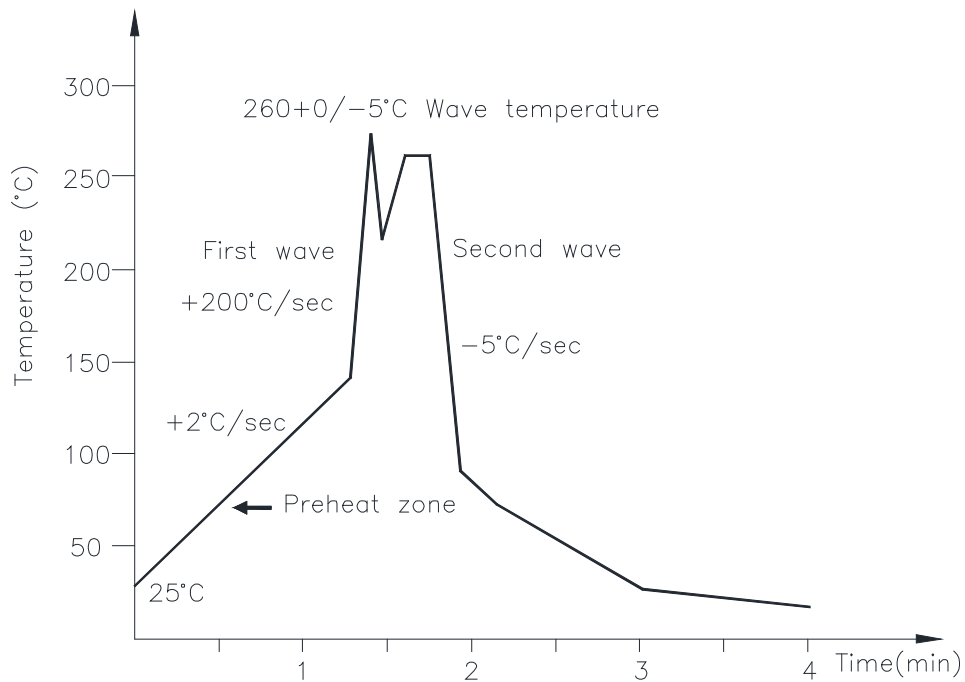
One time soldering is recommended within the condition of temperature.

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

Time: 10 sec.

Preheat temperature: 25 to 140°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. NAMING RULE

LTV-172G-(1)-G

DEVICE PART NUMBER

(1) TAPING TYPE (TP, no suffix)

LTV-172G has tape and reel solution.

Please refer to orientation of taping on Page.3

(2) Halogen free option

Example : LTV-172G-TP-G

LTV 172G(1)-V-G

DEVICE PART NUMBER

(1) TAPING TYPE (TP, no suffix)

LTV-172G has tape and reel solution.

Please refer to orientation of taping on Page.3

(2) VDE option

(3) Halogen free option

Example : LTV172GTP-V-G

8. 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.