

## Features

**HF**

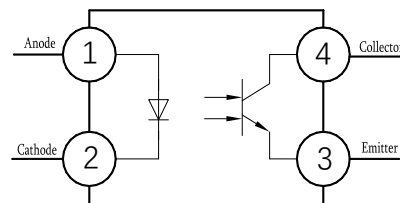
- Current transfer ratio  
(CTR: 50~600% at  $I_F = 5\text{mA}$ ,  $V_{CE} = 5\text{V}$ )  
(CTR: 63~320% at  $I_F = 10\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- High isolation voltage between input and output ( $V_{iso} = 5000\text{V rms}$ )
- Collector - emitter breakdown voltage  $BV_{CEO} \geq 80\text{V}$
- Operating Temperature:  $-55^\circ\text{C} \sim 110^\circ\text{C}$
- VDE approved
- UL approved
- CQC approved

## Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as Fan Heaters, etc
- Signal transmission between circuits of different potentials and impedances

## Mechanical Data

- Case: LSOP-4L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



## Ordering Information

BL      101      X      (G)

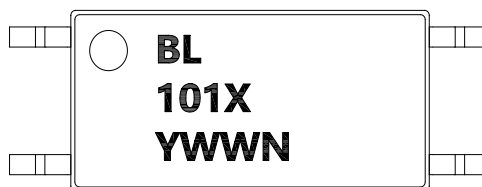
①                  ②                  ③                  ④

- ① Brand(BL)
- ② Product series(101)
- ③ CTR Bank(0、2、3、4、7、8、9)
- ④ Halogen option(None :Halogen free)

| Part Number | Package | Shipping Quantity | Marking Code |
|-------------|---------|-------------------|--------------|
| BL1017      | LSOP-4L | 3000 pcs / Reel   | BL1017       |

## Marking Information

- "BL" denotes brand
- "X" denotes CTR Rank : 0、2、3、4、7、8、9
- "Y" denotes Year : A(2024), B(2025), C(2026) .....
- "WW" denotes Week's number
- "N" denotes the day of Week.



## Maximum Ratings (@ T<sub>A</sub> = 25°C unless otherwise specified)

| Parameter |                             | Symbol           | Value | Unit |
|-----------|-----------------------------|------------------|-------|------|
| Input     | Forward Current             | I <sub>F</sub>   | 60    | mA   |
|           | Peak Forward Current *1     | I <sub>FM</sub>  | 1.5   | A    |
|           | Reverse Voltage             | V <sub>R</sub>   | 6     | V    |
|           | Power Dissipation           | P <sub>D</sub>   | 100   | mW   |
| Output    | Collector Power Dissipation | P <sub>C</sub>   | 150   | mW   |
|           | Collector Current           | I <sub>C</sub>   | 50    | mA   |
|           | Collector-Emitter Voltage   | V <sub>CEO</sub> | 80    | V    |
|           | Emitter-Collector Voltage   | V <sub>ECO</sub> | 7     | V    |

## Thermal Characteristics

| Parameter                           | Symbol    | Value      | Unit             |
|-------------------------------------|-----------|------------|------------------|
| Total Power Dissipation             | $P_{TOT}$ | 250        | mW               |
| Isolation Voltage <sup>*2</sup>     | $V_{ISO}$ | 5000       | V <sub>rms</sub> |
| Operating Temperature               | $T_{OPR}$ | -55 ~ +110 | °C               |
| Storage Temperature Range           | $T_{STG}$ | -55 ~ +125 | °C               |
| Soldering Temperature <sup>*3</sup> | $T_{SOL}$ | 260        | °C               |

Notes:

1. Pulse width ≤ 1μs, Duty ratio: 0.001
2. 40 to 60% RH, AC for 1 minute
3. For 10 seconds

## Electrical Characteristics (@ $T_A = 25^{\circ}\text{C}$ unless otherwise specified)

| Parameter                |                                      | Symbol        | Test Condition                                                 | Min.               | Typ. | Max. | Unit |
|--------------------------|--------------------------------------|---------------|----------------------------------------------------------------|--------------------|------|------|------|
| Input                    | Forward Voltage                      | $V_F$         | $I_F = 50\text{mA}$                                            | -                  | 1.3  | 1.5  | V    |
|                          | Reverse Current                      | $I_R$         | $V_R = 6\text{V}$                                              | -                  | -    | 10   | μA   |
|                          | Input Capacitance                    | $C_{in}$      | $V_R = 0\text{V}, f = 1\text{kHz}$                             | -                  | 50   | -    | pF   |
| Output                   | Collector-Emitter Dark Current       | $I_{CEO}$     | $V_{CE} = 20\text{V}, I_F = 0$                                 | -                  | -    | 100  | nA   |
|                          | Collector-Emitter Breakdown Voltage  | $BV_{CEO}$    | $I_C = 0.1\text{mA}, I_F = 0$                                  | 80                 | -    | -    | V    |
|                          | Emitter-Collector Breakdown Voltage  | $BV_{ECO}$    | $I_E = 0.1\text{mA}, I_F = 0$                                  | 7                  | -    | -    | V    |
| Transfer Characteristics | Current Transfer Ratio               | CTR           | $I_F = 5\text{mA}, V_{CE} = 5\text{V}$                         | 50                 | -    | 600  | %    |
|                          |                                      |               | $I_F = 10\text{mA}, V_{CE} = 5\text{V}$                        | 63                 | -    | 320  | %    |
|                          |                                      |               | $I_F = 1\text{mA}, V_{CE} = 5\text{V}$                         | 22                 | -    | -    | %    |
|                          | Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_F = 10\text{mA}, I_C = 1\text{mA}$                          | -                  | 0.1  | 0.3  | V    |
|                          | Isolation Resistance                 | $R_{IO}$      | $V_{IO} = 500\text{Vdc}$<br>40~60% R.H.                        | $1 \times 10^{12}$ | -    | -    | Ω    |
|                          | Floating Capacitance                 | $C_{IO}$      | $V_{IO} = 0, f = 1\text{MHz}$                                  | -                  | -    | 1.0  | pF   |
|                          | Turn On Time                         | $T_{on}$      | $V_{CE} = 5\text{V}$<br>$I_C = 5\text{mA}$<br>$RL = 100\Omega$ | 1                  | 4    | 19   | μs   |
|                          | Turn Off Time                        | $T_{off}$     |                                                                | 1                  | 3    | 19   |      |
|                          | Rise Time                            | $t_r$         |                                                                | -                  | -    | 18   |      |
|                          | Fall Time                            | $T_f$         |                                                                | -                  | -    | 18   |      |

## Rank Table of Current Transfer Ratio CTR

| Rank Mark | Min. (%) | Max. (%) | Condition                           |
|-----------|----------|----------|-------------------------------------|
| BL1010    | 50       | 600      | $I_F=5\text{mA}, V_{CE}=5\text{V}$  |
| BL1017    | 80       | 160      |                                     |
| BL1018    | 130      | 260      |                                     |
| BL1019    | 200      | 400      |                                     |
| BL1012    | 63       | 125      | $I_F=10\text{mA}, V_{CE}=5\text{V}$ |
| BL1013    | 100      | 200      |                                     |
| BL1014    | 160      | 320      |                                     |
| BL1012    | 22       | -        | $I_F=1\text{mA}, V_{CE}=5\text{V}$  |
| BL1013    | 34       | -        |                                     |
| BL1014    | 56       | -        |                                     |

Ratings and Characteristics Curves (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)

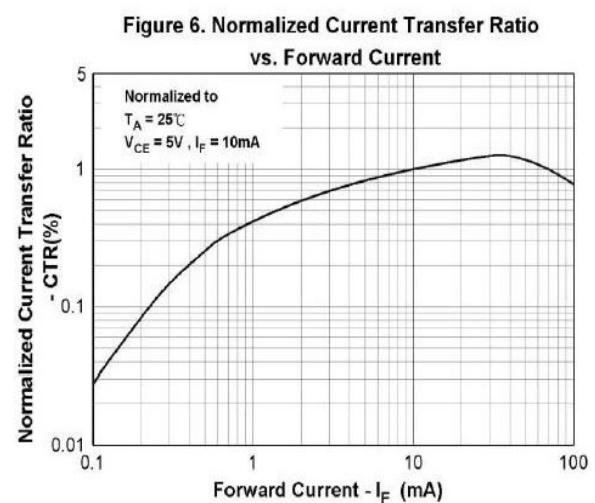
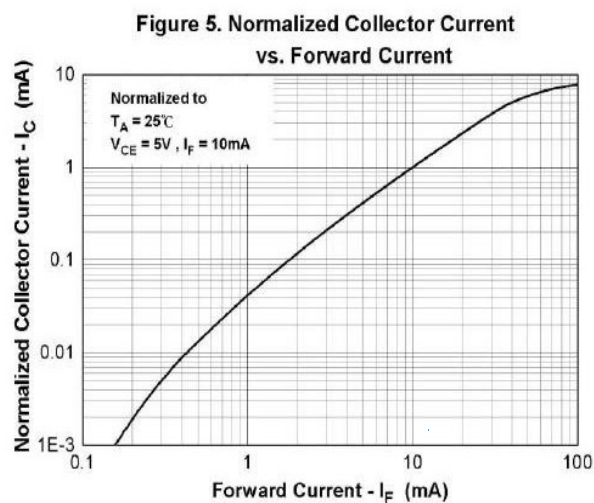
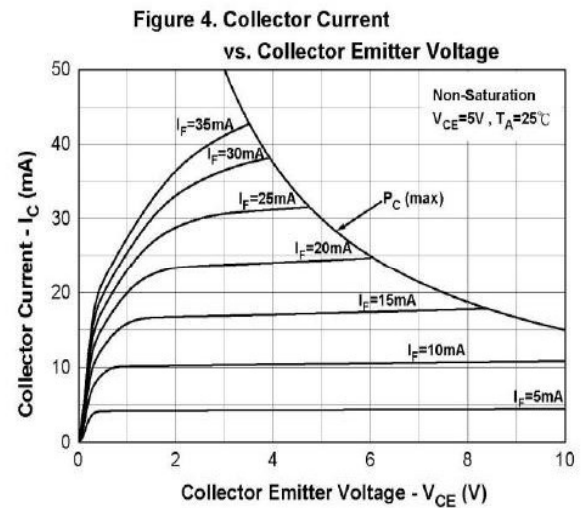
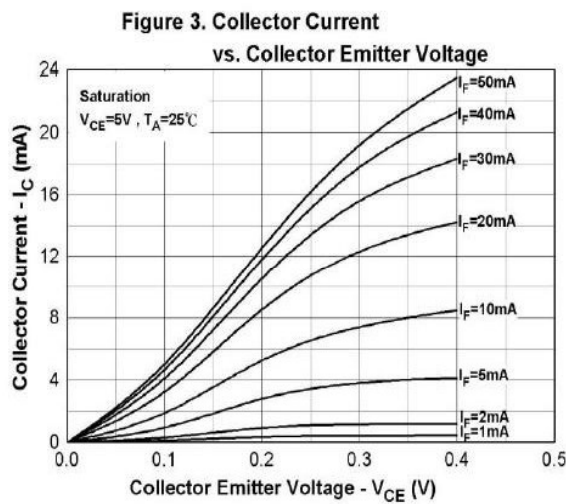
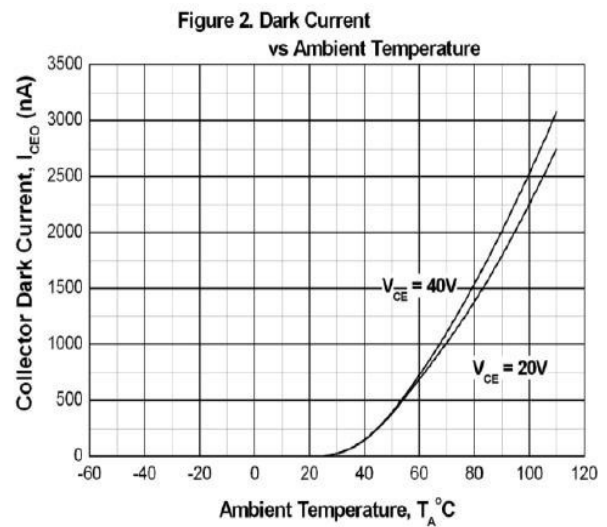
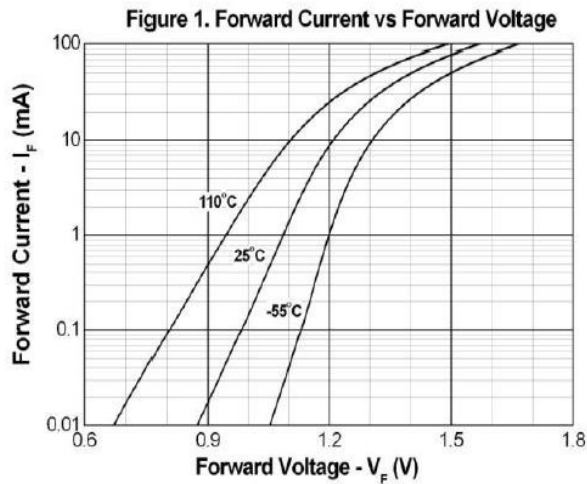


Figure 7. Normalized Current Transfer Ratio vs. Ambient Temperature

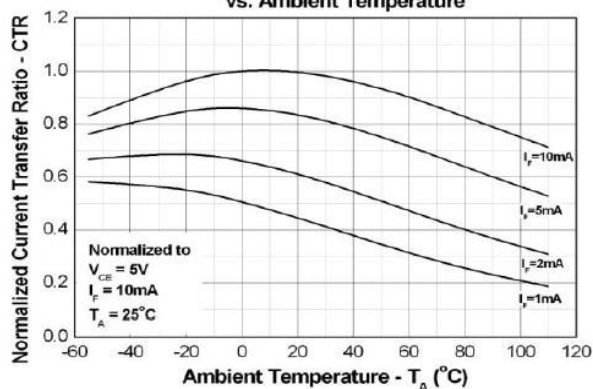


Figure 8. Normalized Current Transfer Ratio vs. Ambient Temperature

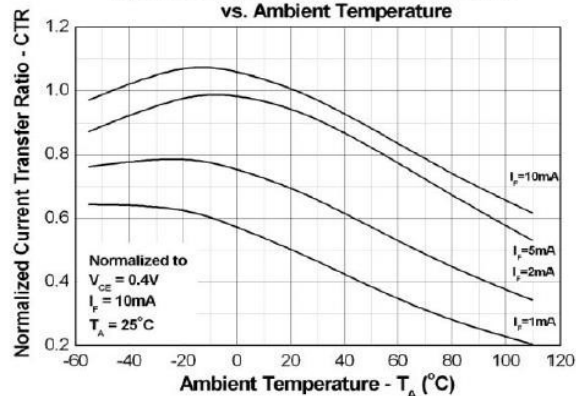


Figure 9. Turn on/off Time vs. Collector Current

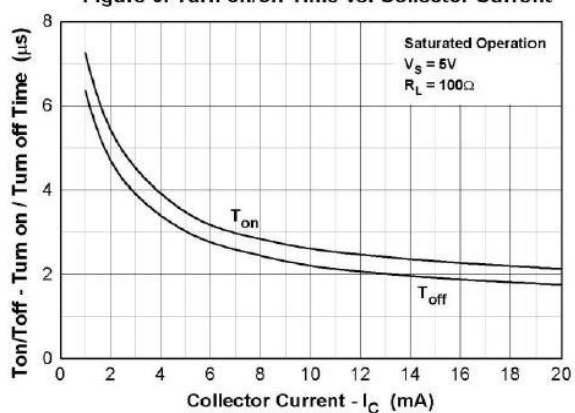
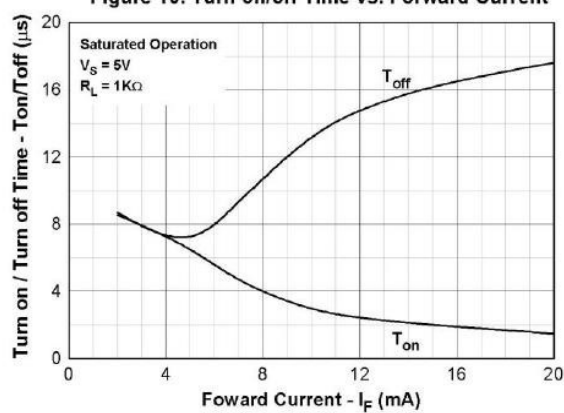
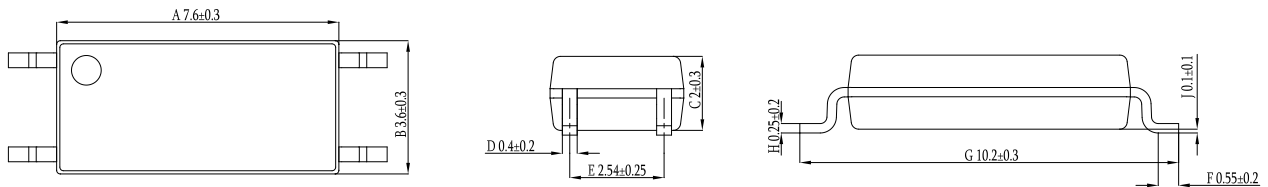


Figure 10. Turn on/off Time vs. Forward Current

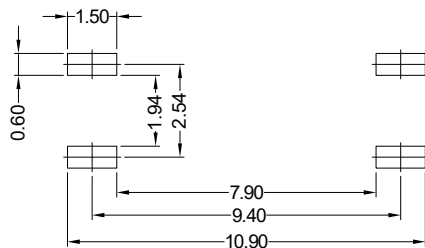


## Package Outline Dimensions (unit: mm)

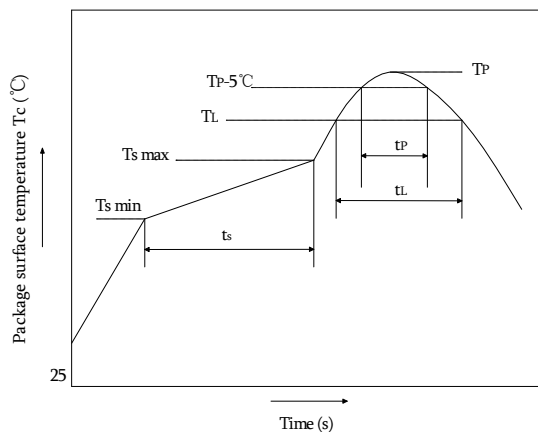
### LSOP-4L



## SOLDERING FOOTPRINT (unit: mm)



## Reflow soldering

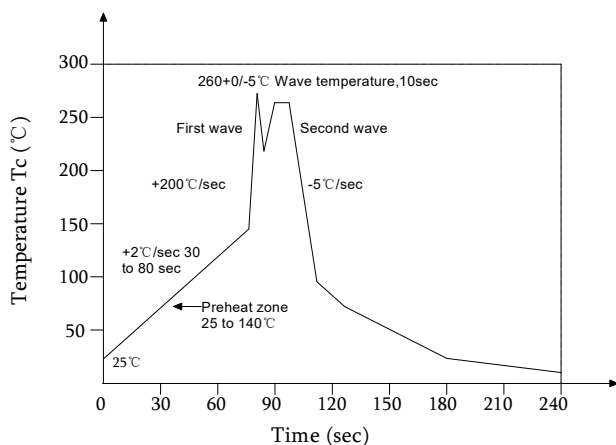


|                                                                                    | Symbol         | Min | Max | Unit |
|------------------------------------------------------------------------------------|----------------|-----|-----|------|
| Preheat temperayure                                                                | Ts             | 150 | 200 | °C   |
| Preheat time                                                                       | ts             | 60  | 120 | s    |
| Ramp-up rate(T <sub>L</sub> to T <sub>P</sub> )                                    |                |     | 3   | °C/s |
| Liquidus temperature                                                               | T <sub>L</sub> | 217 |     | °C   |
| Time above T <sub>L</sub>                                                          | t <sub>L</sub> | 60  | 150 | s    |
| Peak temperature                                                                   | T <sub>p</sub> |     | 260 | °C   |
| Time during which T <sub>c</sub> is between (T <sub>P</sub> -5) and T <sub>P</sub> | t <sub>p</sub> |     | 30  | s    |
| Ramp-down rate(T <sub>P</sub> to T <sub>L</sub> )                                  |                |     | 6   | °C/s |

Note:

Reflow soldering is recommended at the temperatures and times shown, no more than three times.

## Wave soldering



|                                 |                                             |
|---------------------------------|---------------------------------------------|
| Profile feature                 |                                             |
| Average ramp-up rate            | ~200°C/s                                    |
| Heating rate during preheat     | 1°C/s to 2°C/s<br>typical; 4°C/s<br>maximum |
| Final preheat temperature Ts    | ~130°C                                      |
| Preheat time (25°C to Ts)       | >60s                                        |
| Peak temperature Tp             | 260°C                                       |
| Time within peak temperature tp | 10s                                         |
| Ramp-down rate                  | 5°C/s maximum                               |

## Soldering with hand soldering iron

Hand soldering iron is only used for product rework or sample testing.

Hand soldering iron requirements: Temperature:  $360\text{ }^{\circ}\text{C} \pm 5^{\circ}\text{C}$  within 3s.

## Pcaking

| Package Type | Packing Form         | Quantity per Tube &Reel | Quantity per Box | Quantity per Carton | Antistatic Bag Specification | Box Specification | Carton Specification | Note                  |
|--------------|----------------------|-------------------------|------------------|---------------------|------------------------------|-------------------|----------------------|-----------------------|
| LSOP-4L      | Reel( $\phi 330$ mm) | 3000 pcs/reel           | 2 reels /box     | 5 boxes /ctn        | 380*420mm                    | 350*340*60mm      | 365*330*370mm        | Guard band 200mm/min. |

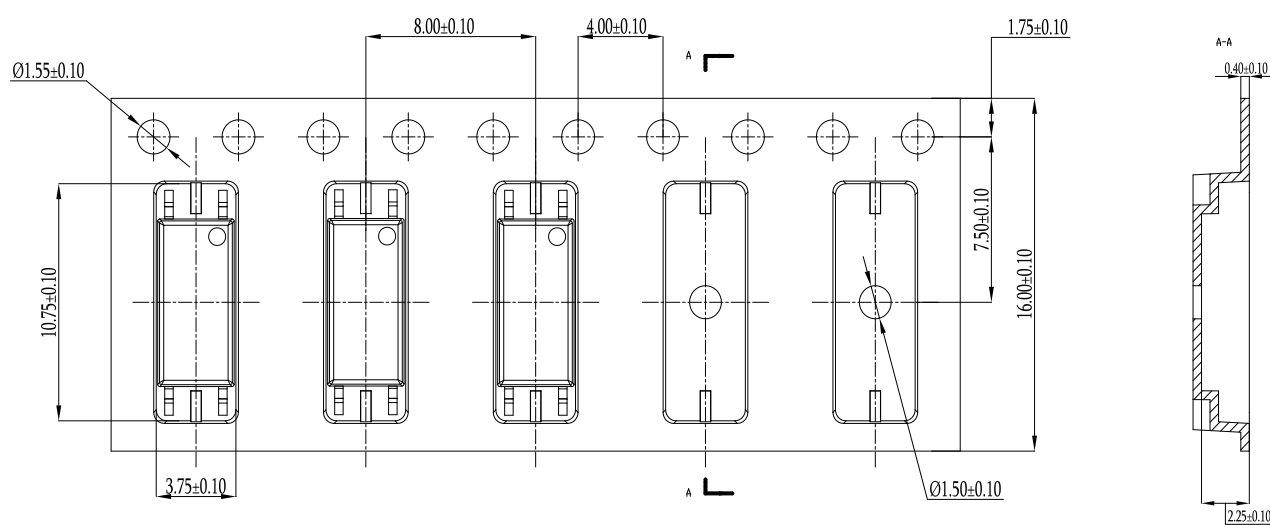
### ■Summary table

#### ■LSOP-4L (Reel)

Qty/reel: 3000 pcs. Qty/box: 6000 pcs.

Qty/ctn : 30000 pcs.

Schematic: (unit:mm)



## IMPORTANT NOTICE

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