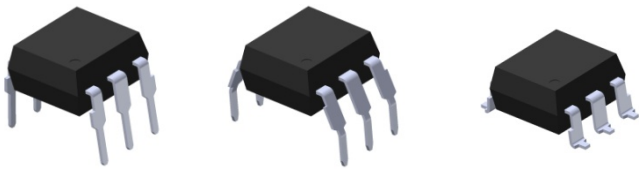


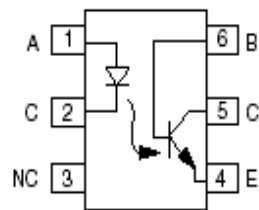
### 6 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER CNY17-X Series CNY17F-X Series



#### Features:

- Current transfer ratios in selected narrow range groups  
CNY17-1, CNY17F-1: 40-80%  
CNY17-2, CNY17F-2: 63-125%  
CNY17-3, CNY17F-3: 100-200%  
CNY17-4, CNY17F-4: 160-320%
- High isolation voltage between input and output  
(Viso = 5000 Vrms)
- Creepage distance > 7.6 mm
- Operating temperature up to +110°C
- The CNY17F-X series offers no external base connection for minimum noise susceptibility
- Compact dual-in-line package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved

Schematic

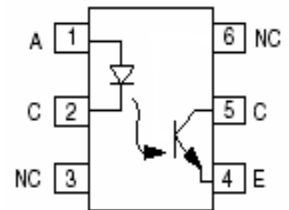


CNY17-X

#### Pin Configuration

1. Anode
2. Cathode
3. No Connection
4. Emitter
5. Collector
6. Base

Schematic



CNY17F-X

#### Pin Configuration

1. Anode
2. Cathode
3. No Connection
4. Emitter
5. Collector
6. No Connection

#### Description

The CNY17-X and CNY17F-X series of devices each consist of an infrared emitting diode optically coupled to a phototransistor. They are packaged in a 6-pin DIP package and available in wide-lead spacing and SMD option.

#### Applications

- Power supply regulators
- Digital logic inputs
- Microprocessor inputs

## Absolute Maximum Ratings (Ta=25°C)

|                                     | Parameter                                      | Symbol    | Rating     | Unit  |
|-------------------------------------|------------------------------------------------|-----------|------------|-------|
| Input                               | Forward current                                | $I_F$     | 60         | mA    |
|                                     | Peak forward current (t = 10μs)                | $I_{FM}$  | 1          | A     |
|                                     | Reverse voltage                                | $V_R$     | 6          | V     |
|                                     | Power dissipation ( $T_A = 25^\circ\text{C}$ ) | $P_D$     | 100        | mW    |
|                                     | Derating factor (above 100°C)                  |           | 3.8        | mW/°C |
| Output                              | Collector-Emitter voltage                      | $V_{CEO}$ | 80         | V     |
|                                     | Collector-Base voltage <sup>*1</sup>           | $V_{CBO}$ | 80         | V     |
|                                     | Emitter-Collector voltage                      | $V_{ECO}$ | 7          | V     |
|                                     | Emitter-Base voltage                           | $V_{EBO}$ | 7          | V     |
|                                     | Power dissipation ( $T_A = 25^\circ\text{C}$ ) | $P_C$     | 150        | mW    |
|                                     | Derating factor (above 100°C)                  |           | 9.0        | mW/°C |
| Total Power Dissipation             |                                                | $P_{TOT}$ | 200        | mW    |
| Isolation voltage <sup>*2</sup>     |                                                | $V_{ISO}$ | 5000       | V rms |
| Operating Temperature               |                                                | $T_{OPR}$ | -55 to 110 | °C    |
| Storage Temperature                 |                                                | $T_{STG}$ | -55 to 125 | °C    |
| Soldering temperature <sup>*3</sup> |                                                | $T_{SOL}$ | 260        | °C    |

Notes:

\*1 Only for CNY17-X series.

\*2 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 & 3 are shorted together, and pins 4, 5 & 6 are shorted together.

\*3 For 10 seconds.

**Electro-Optical Characteristics (Ta=25°C unless specified otherwise)**

**Input**

| Parameter         | Symbol   | Min. | Typ. | Max. | Unit          | Condition                |
|-------------------|----------|------|------|------|---------------|--------------------------|
| Forward voltage   | $V_F$    | -    | -    | 1.65 | V             | $I_F = 60\text{mA}$      |
| Reverse current   | $I_R$    | -    | -    | 10   | $\mu\text{A}$ | $V_R = 6\text{V}$        |
| Input capacitance | $C_{in}$ | -    | 18   | -    | pF            | $V = 0, f = 1\text{MHz}$ |

**Output**

| Parameter                           | Symbol     | Min | Typ. | Max. | Unit | Condition                               |
|-------------------------------------|------------|-----|------|------|------|-----------------------------------------|
| Collector-Base dark current         | $I_{CBO}$  | -   | -    | 20   | nA   | $V_{CB} = 10\text{V}, I_F = 0\text{mA}$ |
| Collector-Emitter dark current      | $I_{CBO}$  | -   | -    | 50   | nA   | $V_{CE} = 10\text{V}, I_F = 0\text{mA}$ |
| Collector-Emitter breakdown voltage | $BV_{CEO}$ | 80  | -    | -    | V    | $I_C = 1\text{mA}, I_F = 0\text{mA}$    |
| Collector-Base breakdown voltage    | $BV_{CBO}$ | 80  | -    | -    | V    | $I_C = 0.1\text{mA}, I_F = 0\text{mA}$  |
| Emitter-Collector breakdown voltage | $BV_{ECO}$ | 7   | -    | -    | V    | $I_E = 0.1\text{mA}, I_F = 0\text{mA}$  |
| Collector-Emitter capacitance       | $C_{CE}$   | -   | 8    | -    | pF   | $V_{CE} = 0\text{V}, f = 1\text{MHz}$   |

\* Typical values at  $T_a = 25^\circ\text{C}$

### Transfer Characteristics

| Parameter                            |                     | Symbol        | Min       | Typ. | Max. | Unit          | Condition                                                                        |
|--------------------------------------|---------------------|---------------|-----------|------|------|---------------|----------------------------------------------------------------------------------|
| Current Transfer Ratio               | CNY17-1<br>CNY17F-1 | CTR           | 40        | -    | 80   | %             | $I_F = 10\text{mA}$ , $V_{CE} = 5\text{V}$                                       |
|                                      | CNY17-2<br>CNY17F-2 |               | 63        | -    | 125  |               |                                                                                  |
|                                      | CNY17-3<br>CNY17F-3 |               | 100       | -    | 200  |               |                                                                                  |
|                                      | CNY17-4<br>CNY17F-4 |               | 160       | -    | 320  |               |                                                                                  |
|                                      | CNY17-1<br>CNY17F-1 |               | 13        | -    | -    |               |                                                                                  |
| Current Transfer Ratio               | CNY17-2<br>CNY17F-2 | CTR           | 22        | -    | -    | %             | $I_F = 1\text{mA}$ , $V_{CE} = 5\text{V}$                                        |
|                                      | CNY17-3<br>CNY17F-3 |               | 34        | -    | -    |               |                                                                                  |
|                                      | CNY17-4<br>CNY17F-4 |               | 56        | -    | -    |               |                                                                                  |
| Collector-Emitter saturation voltage |                     | $V_{CE(sat)}$ | -         | -    | 0.3  | V             | $I_F = 10\text{mA}$ , $I_C = 2.5\text{mA}$                                       |
| Isolation resistance                 |                     | $R_{IO}$      | $10^{11}$ | -    | -    | $\Omega$      | $V_{IO} = 500\text{Vdc}$                                                         |
| Input-output capacitance             |                     | $C_{IO}$      | -         | 0.5  | -    | pF            | $V_{IO} = 0$ , $f = 1\text{MHz}$                                                 |
| Turn-on time                         |                     | $T_{on}$      | -         | 10   | 12   | $\mu\text{s}$ | $V_{CC} = 10\text{V}$ ,<br>$I_C = 2\text{mA}$ , $R_L = 100\Omega$<br>See Fig. 11 |
| Turn-off time                        |                     | $T_{off}$     | -         | 9    | 12   |               |                                                                                  |
| Rise time                            |                     | $T_r$         | -         | 6    | 10   |               |                                                                                  |
| Fall time                            |                     | $T_f$         | -         | 8    | 10   |               |                                                                                  |
| Rise time                            |                     | $T_r$         | -         | 2    | 10   |               |                                                                                  |
| Fall time                            |                     | $T_f$         | -         | 3    | 10   |               | $V_{CC} = 5\text{V}$ , $I_F = 10\text{mA}$ ,<br>$R_L = 75\Omega$ , See Fig. 11   |

\* Typical values at  $T_a = 25^\circ\text{C}$

## Typical Electro-Optical Characteristics Curves

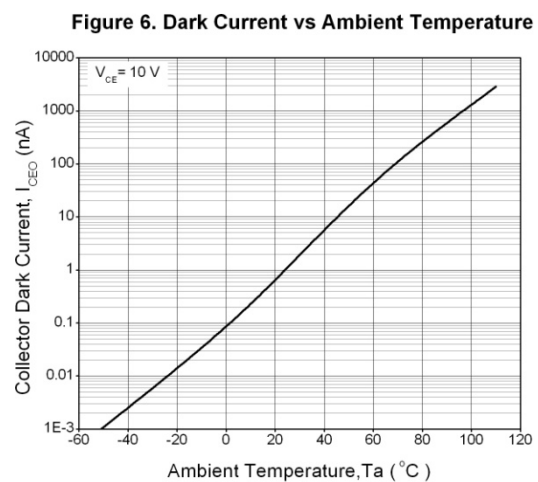
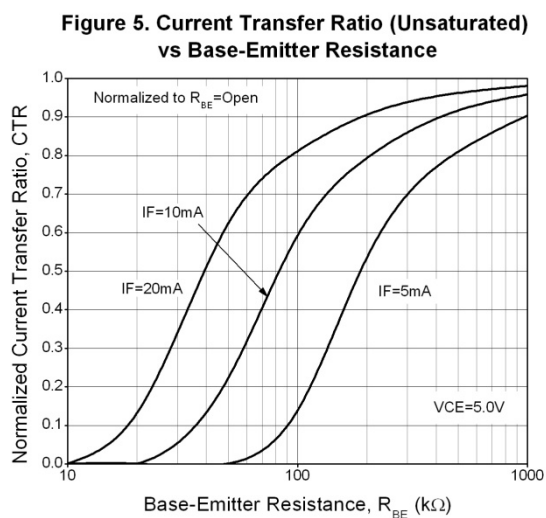
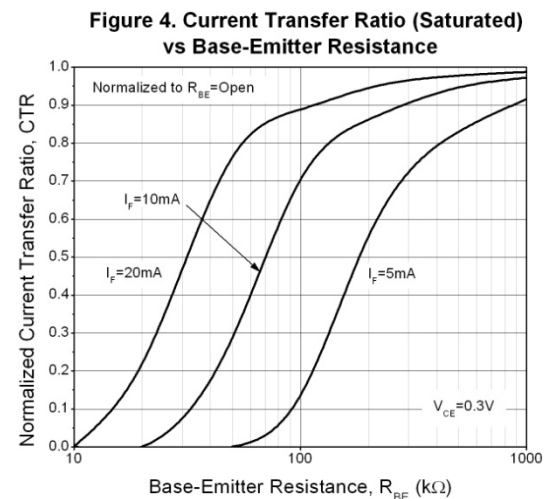
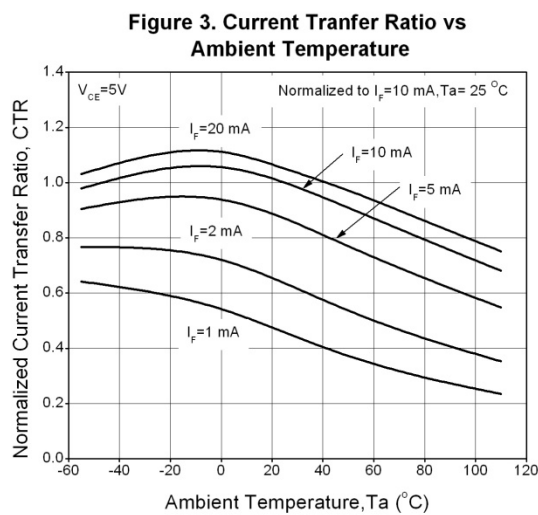
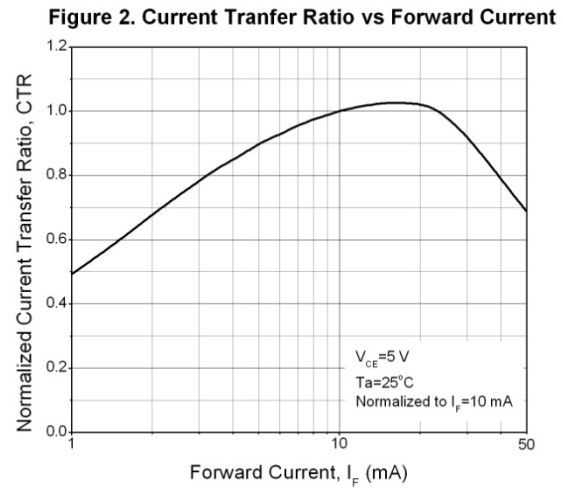
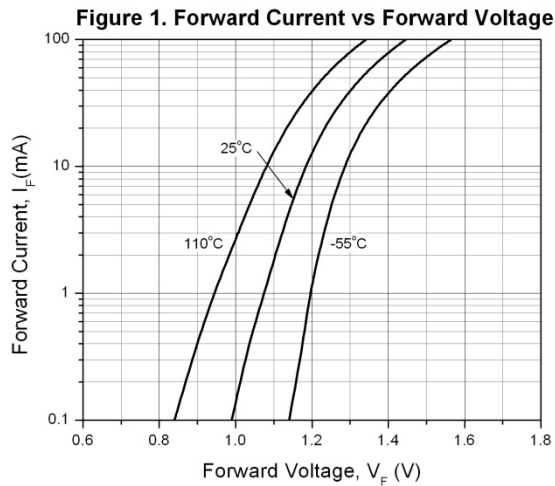


Figure 7. Collector-Emitter Saturation Voltage vs Collector Current

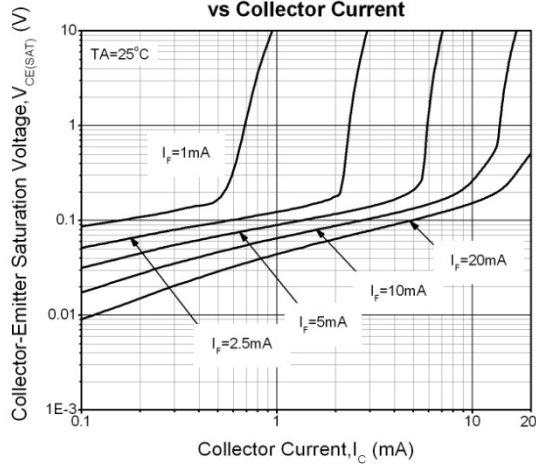


Figure 8. Switching Time vs Load Resistance

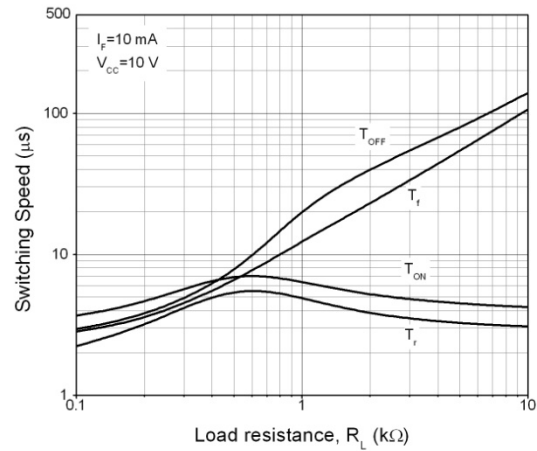


Figure 9. Turn-on Time vs Base-Emitter Resistance

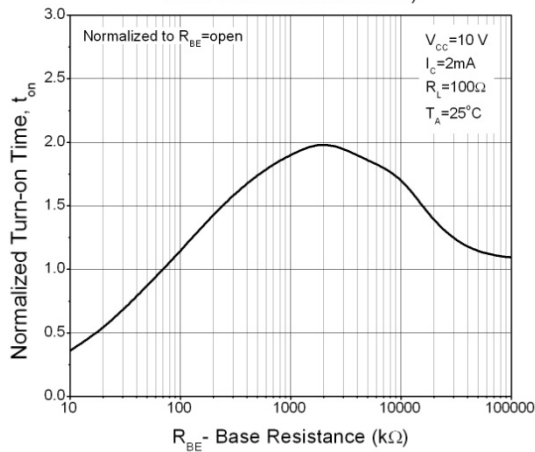


Figure 10. Turn-off Time vs Base-Emitter Resistance

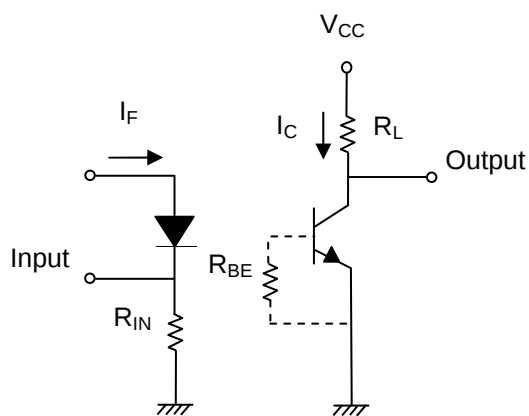
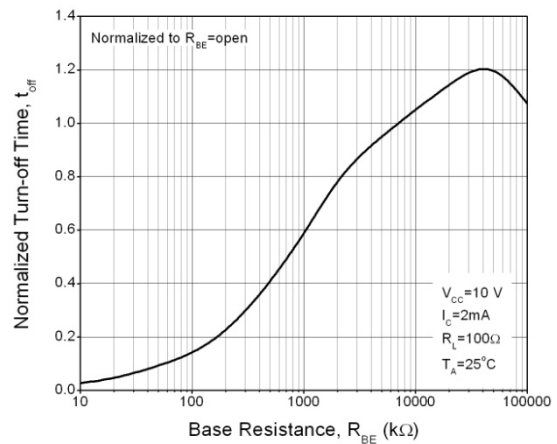


Figure 11. Switching Time Test Circuit & Waveforms

## Order Information

### Part Number

**CNY17-XY(Z)-V**

or

**CNY17F-XY(Z)-V**

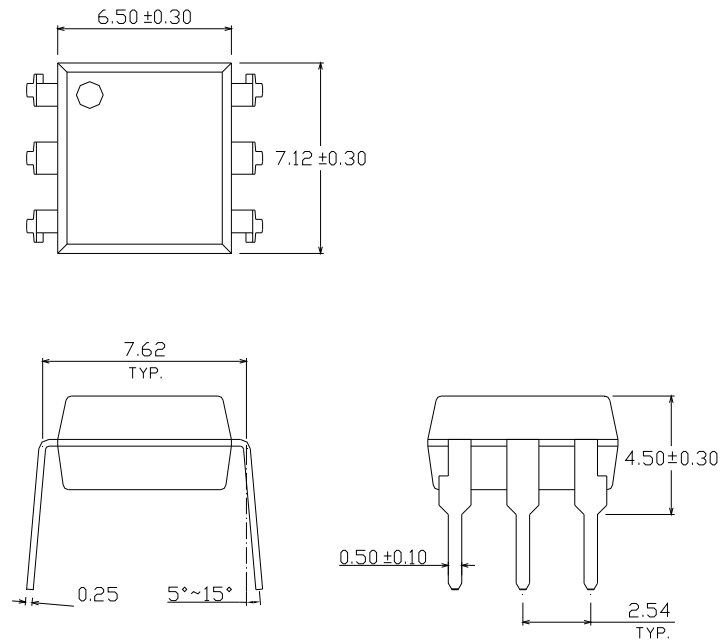
### Note

- X = Part no. (1, 2, 3 or 4)  
Y = Lead form option (S, S1, M or none)  
Z = Tape and reel option (TA, TB or none).  
V = VDE (optional)

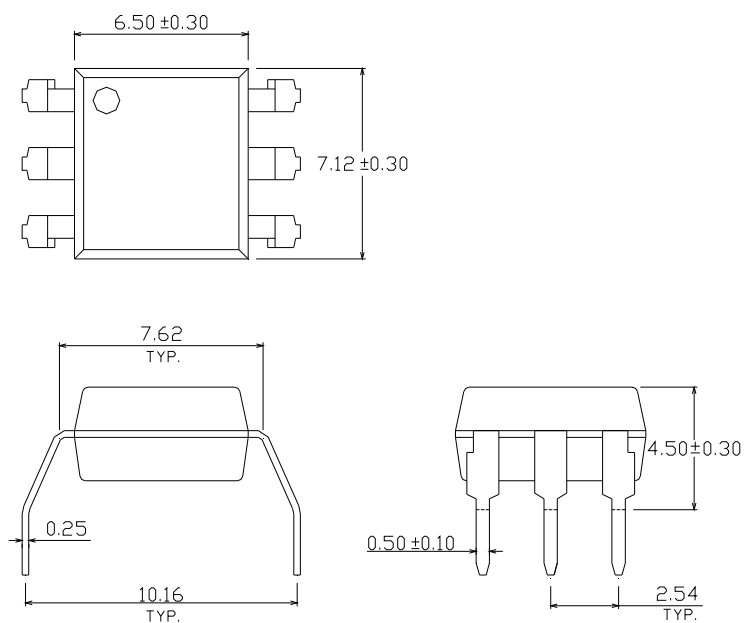
| Option  | Description                                                   | Packing quantity    |
|---------|---------------------------------------------------------------|---------------------|
| None    | Standard DIP-6                                                | 65 units per tube   |
| M       | Wide lead bend (0.4 inch spacing)                             | 65 units per tube   |
| S (TA)  | Surface mount lead form + TA tape & reel option               | 1000 units per reel |
| S (TB)  | Surface mount lead form + TB tape & reel option               | 1000 units per reel |
| S1 (TA) | Surface mount lead form (low profile) + TA tape & reel option | 1000 units per reel |
| S1 (TB) | Surface mount lead form (low profile) + TB tape & reel option | 1000 units per reel |

## Package Dimension (Dimensions in mm)

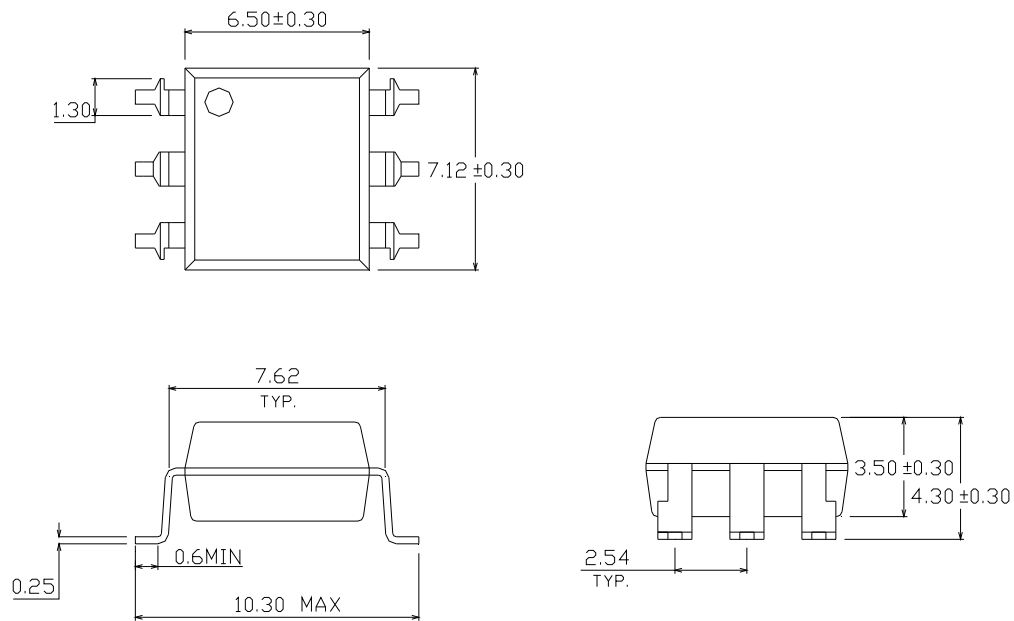
### Standard DIP Type



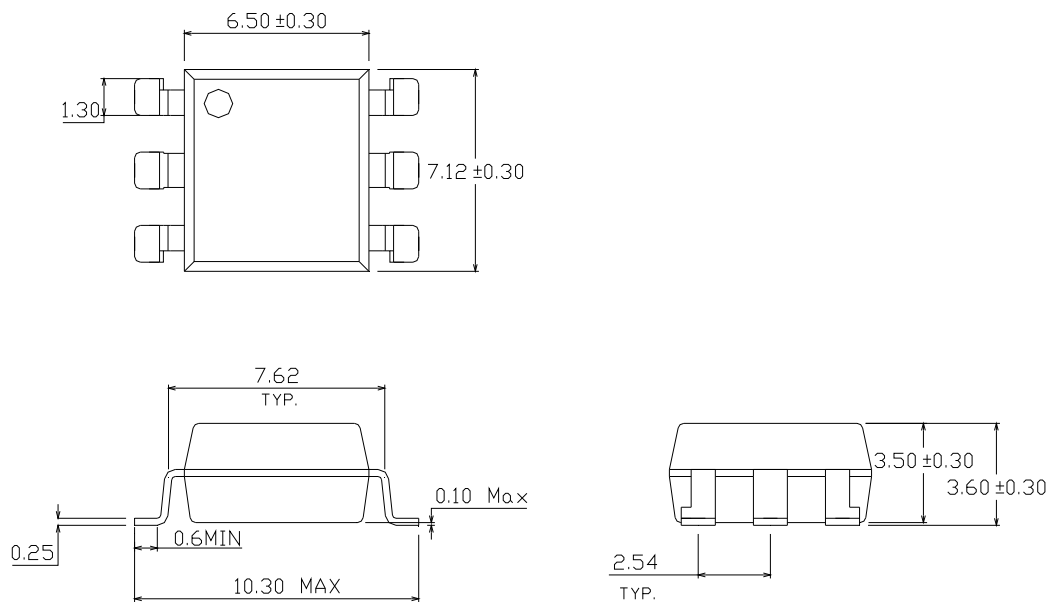
### Option M Type



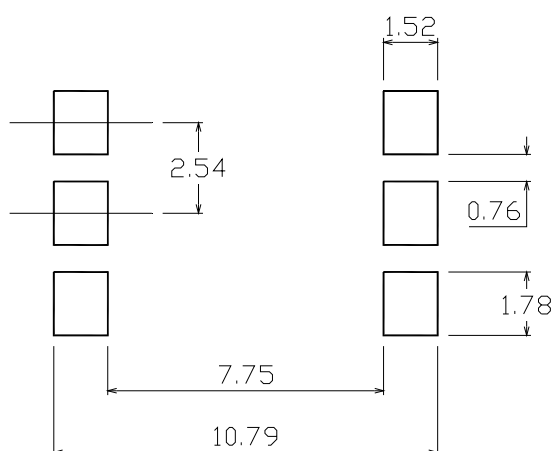
### Option S Type



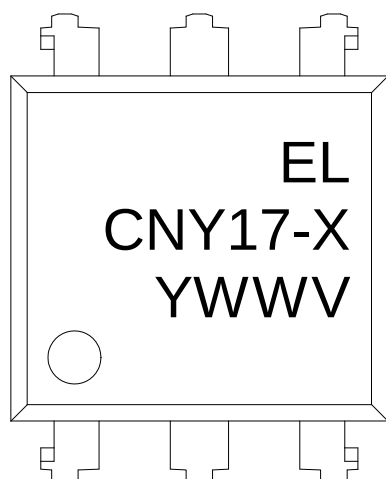
### Option S1 Type



## Recommended pad layout for surface mount leadform



## Device Marking

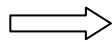
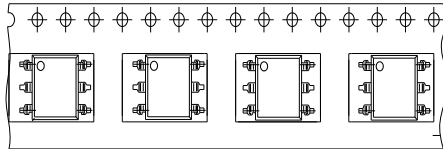


## Notes

- EL denotes Everlight
- CNY17-X denotes Device Number (X: 1, 2, 3 or 4)
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE (optional)

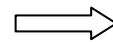
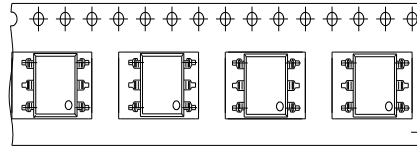
## Tape & Reel Packing Specifications

### Option TA



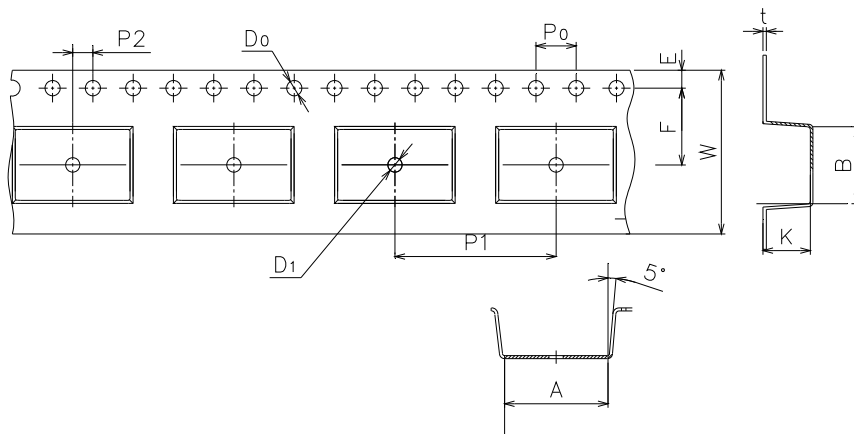
Direction of feed from reel

### Option TB



Direction of feed from reel

## Tape dimensions

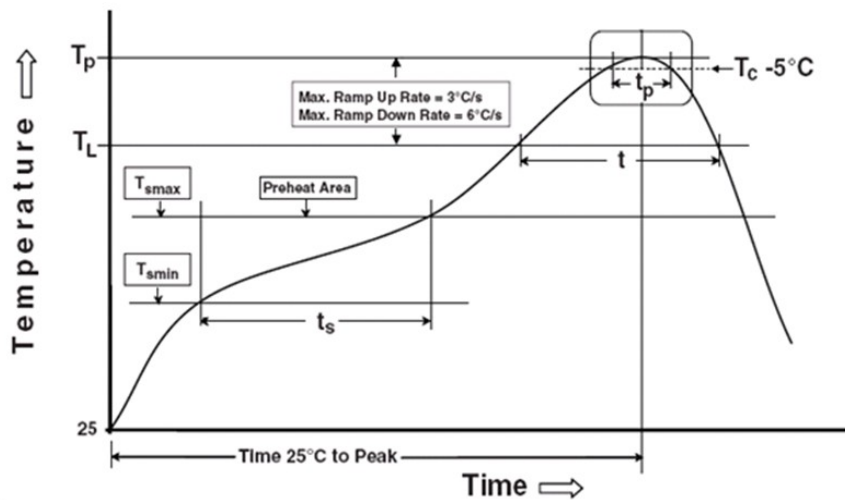


| Dimension No.  | A        | B       | D0      | D1         | E        | F       |
|----------------|----------|---------|---------|------------|----------|---------|
| Dimension (mm) | 10.4±0.1 | 7.5±0.1 | 1.5±0.1 | 1.5±0.1/-0 | 1.75±0.1 | 7.5±0.1 |
| Dimension No.  | P0       | P1      | P2      | t          | W        | K       |
| Dimension (mm) | 4.0±0.15 | 12±0.1  | 2.0±0.1 | 0.35±0.03  | 16.0±0.2 | 4.5±0.1 |

## Precautions for Use

### 1. Soldering Condition

#### 1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note:

Reference: IPC/JEDEC J-STD-020D

#### Preheat

|                                              |                 |
|----------------------------------------------|-----------------|
| Temperature min ( $T_{smin}$ )               | 150 °C          |
| Temperature max ( $T_{smax}$ )               | 200°C           |
| Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )  | 60-120 seconds  |
| Average ramp-up rate ( $T_{smax}$ to $T_P$ ) | 3 °C/second max |

#### Other

|                                                                      |                  |
|----------------------------------------------------------------------|------------------|
| Liquidus Temperature ( $T_L$ )                                       | 217 °C           |
| Time above Liquidus Temperature ( $t_L$ )                            | 60-100 sec       |
| Peak Temperature ( $T_P$ )                                           | 260°C            |
| Time within 5 °C of Actual Peak Temperature: $T_P - 5^\circ\text{C}$ | 30 s             |
| Ramp- Down Rate from Peak Temperature                                | 6°C /second max. |
| Time 25°C to peak temperature                                        | 8 minutes max.   |
| Reflow times                                                         | 3 times          |

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