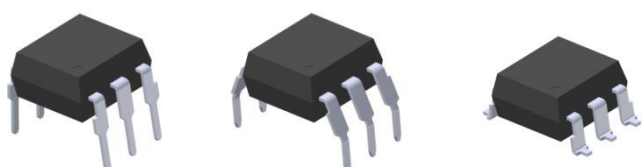


6 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER CNY17-X Series CNY17F-X Series



Features:

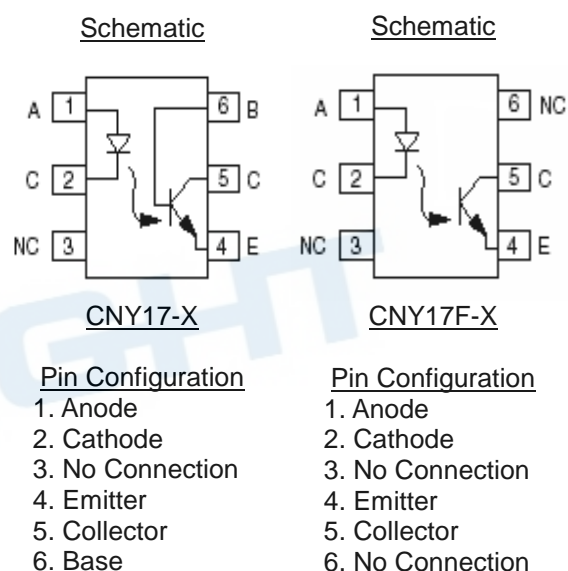
- Current transfer ratios in selected narrow range groups
CNY17-1, CNY17F-1: 40-80%
CNY17-2, CNY17F-2: 63-125%
CNY17-3, CNY17F-3: 100-200%
CNY17-4, CNY17F-4: 160-320%
- High isolation voltage between input and output
(Viso = 5000 Vrms)
- Creepage distance > 7.6 mm
- Operating temperature up to +110°C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

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°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*1 | V_{CB0} | 80 | V |
| | Emitter-Collector voltage | V_{ECO} | 7 | V |
| | Emitter-Base voltage | V_{EBO} | 7 | V |
| | Power dissipation (T _A = 25°C) | P_C | 150 | mW |
| Derating factor (above 100°C) | 9.0 | | mW/°C | |
| | Total Power Dissipation | P_{TOT} | 200 | mW |
| | Isolation voltage *2 | V_{ISO} | 5000 | V rms |
| | Operating Temperature | T_{OPR} | -55 to 110 | °C |
| | Storage Temperature | T_{STG} | -55 to 125 | °C |
| | Soldering temperature *3 | 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 | μA | $V_R = 6\text{V}$ |
| 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_{CEO} | - | - | 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 CNY17F-1 | 40 | - | 80 | % | $I_F = 10\text{mA}, V_{CE} = 5\text{V}$ | |
| | CNY17-2 CNY17F-2 | 63 | - | 125 | | | |
| | CNY17-3 CNY17F-3 | 100 | - | 200 | | | |
| | CNY17-4 CNY17F-4 | 160 | - | 320 | | | |
| | CTR | | | | | | |
| Current Transfer Ratio | CNY17-1 CNY17F-1 | 13 | - | - | % | $I_F = 1\text{mA}, V_{CE} = 5\text{V}$ | |
| | CNY17-2 CNY17F-2 | 22 | - | - | | | |
| | CNY17-3 CNY17F-3 | 34 | - | - | | | |
| | CNY17-4 CNY17F-4 | 56 | - | - | | | |
| | CTR | | | | | | |
| 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} | - | - | Ω | $V_{IO} = 500\text{Vdc}$ | |
| Input-output capacitance | C_{IO} | - | 0.5 | - | pF | $V_{IO} = 0, f = 1\text{MHz}$ | |
| Turn-on time | T_{on} | - | 10 | 12 | μs | $V_{CC} = 10\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$ 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 | | | |
| Rise time | T_r | - | 2 | 10 | | | $V_{CC} = 5\text{V}, I_F = 10\text{mA}, R_L = 75\Omega, \text{ See Fig. 11}$ |
| Fall time | T_f | - | 3 | 10 | | | |

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

Typical Electro-Optical Characteristics Curves

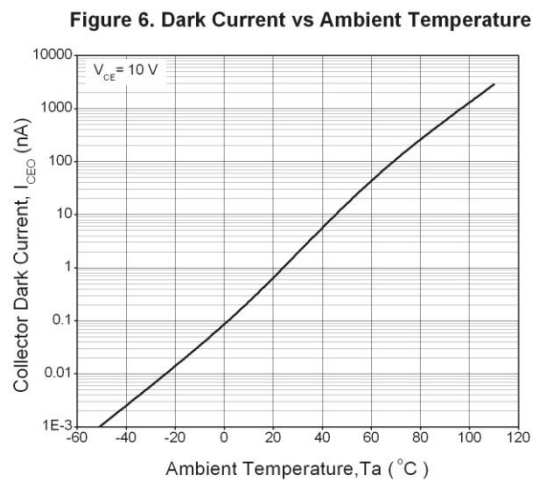
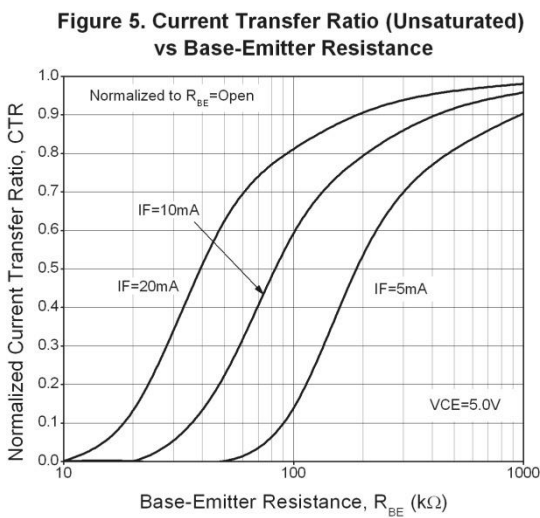
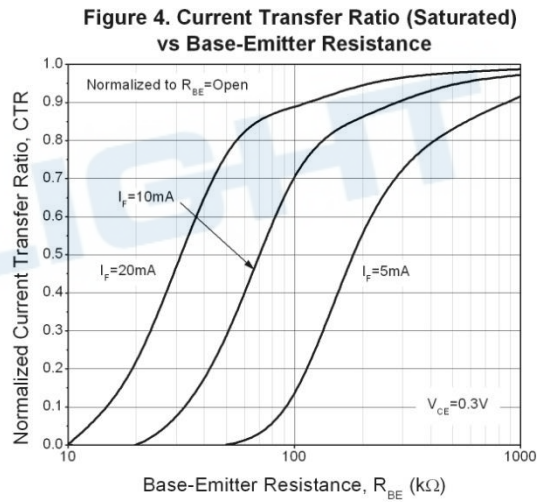
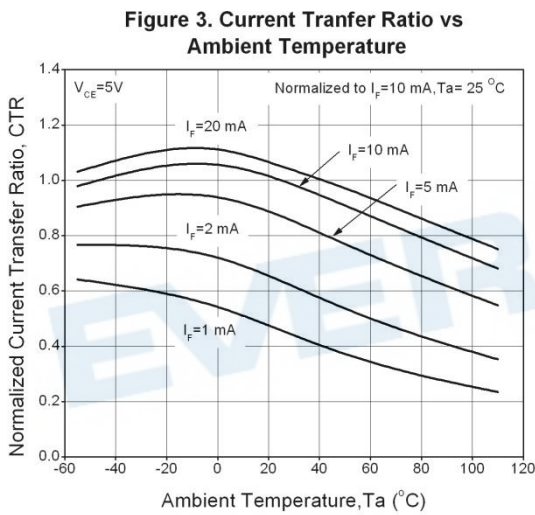
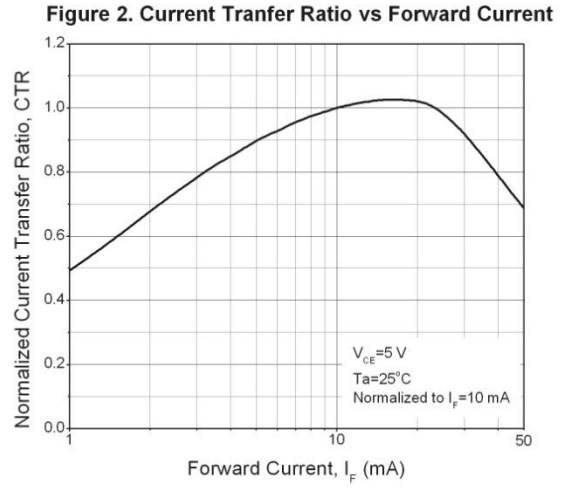
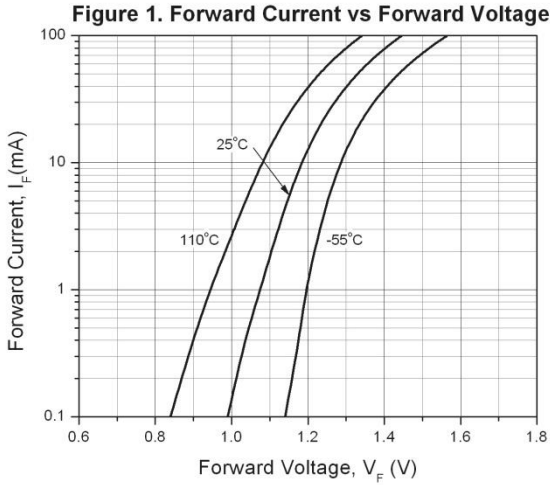


Figure 7. Collector-Emitter Saturation Voltage vs Collector Current

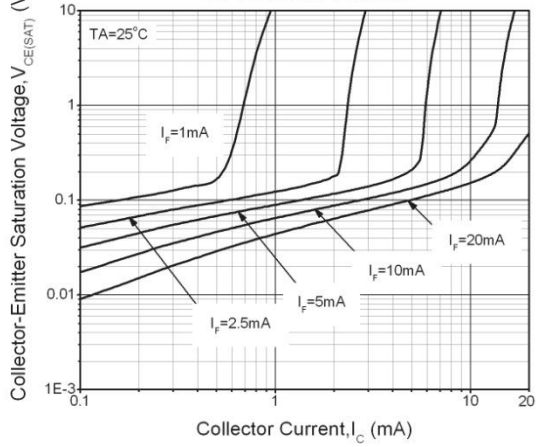


Figure 8. Switching Time vs Load Resistance

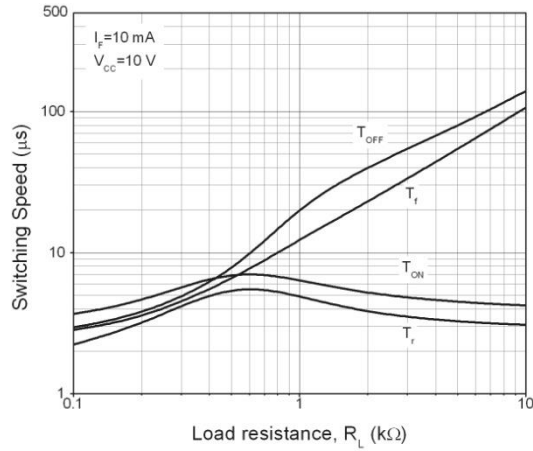


Figure 9. Turn-on Time vs Base-Emitter Resistance

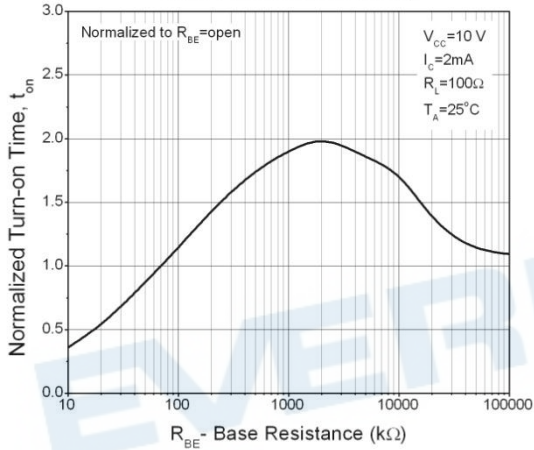


Figure 10. Turn-off Time vs Base-Emitter Resistance

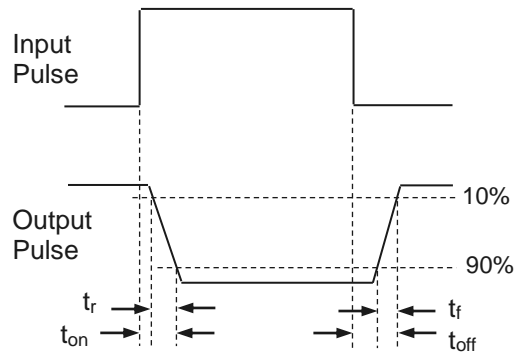
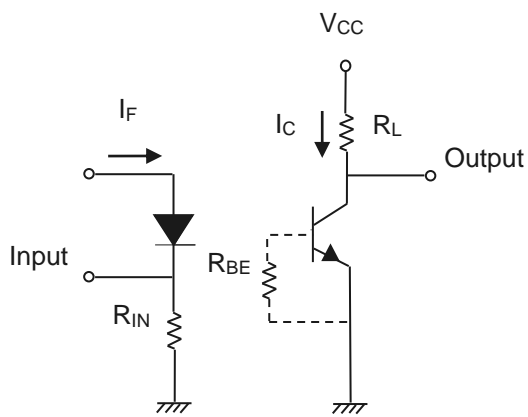
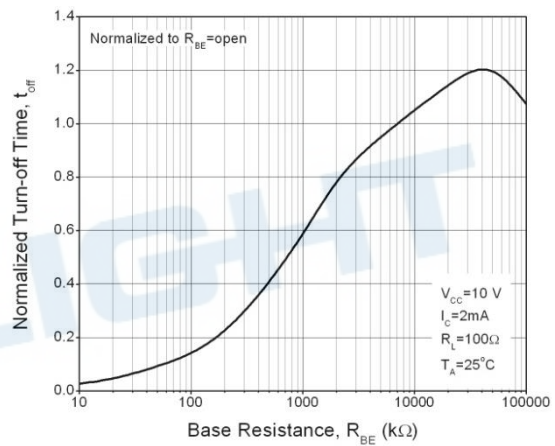


Figure 11. Switching Time Test Circuit & Waveforms

Order Information

Part Number

CNY17-XY(Z)-V

or

CNY17F-XY(Z)-V

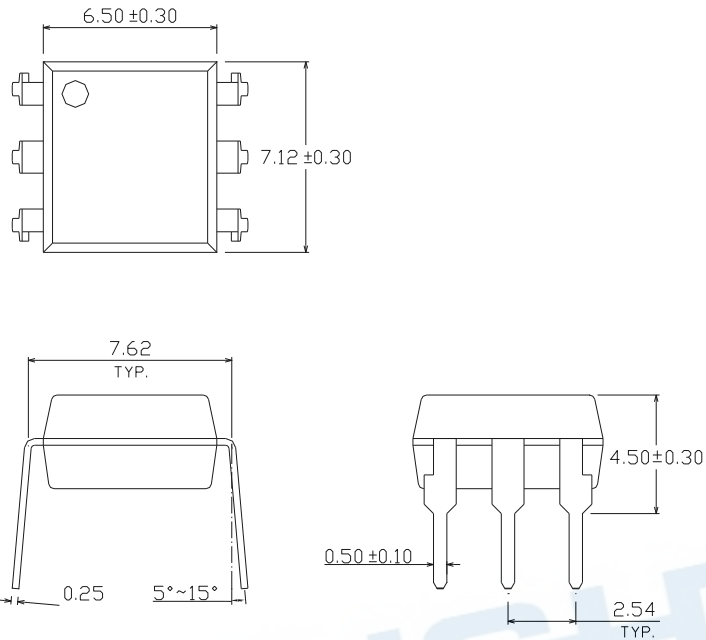
Note

- 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)

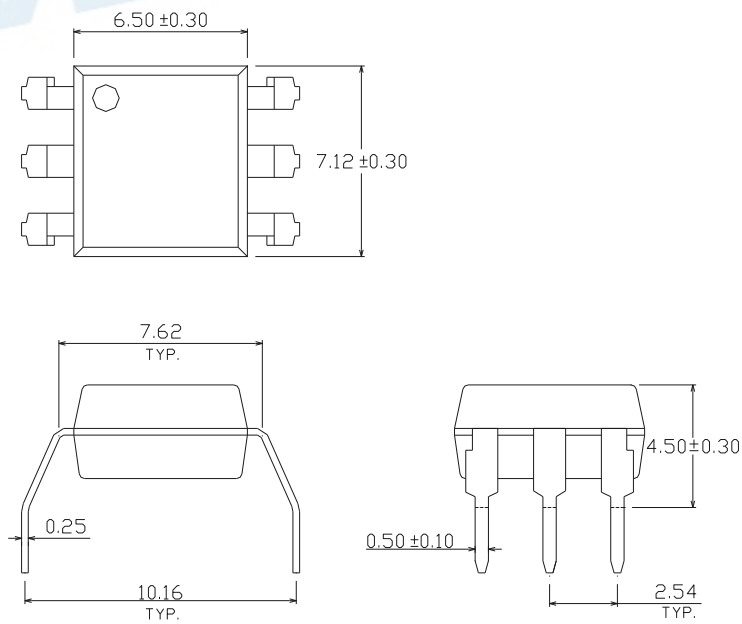
| Option | Description | Packing quantity |
|---------|---|---------------------|
| None | Standard DIP-6 | 65 units per tube |
| M | Wide lead bend (0.4 inch spacing) | 65 units per tube |
| S (TA) | Surface mount lead form + TA tape & reel option | 1000 units per reel |
| S (TB) | Surface mount lead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

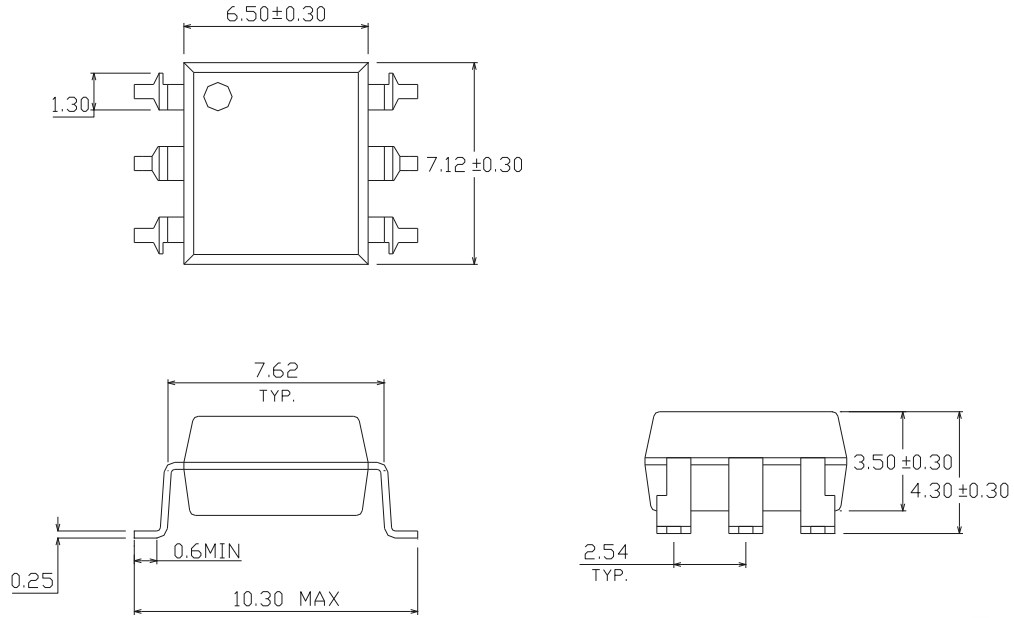
Standard DIP Type



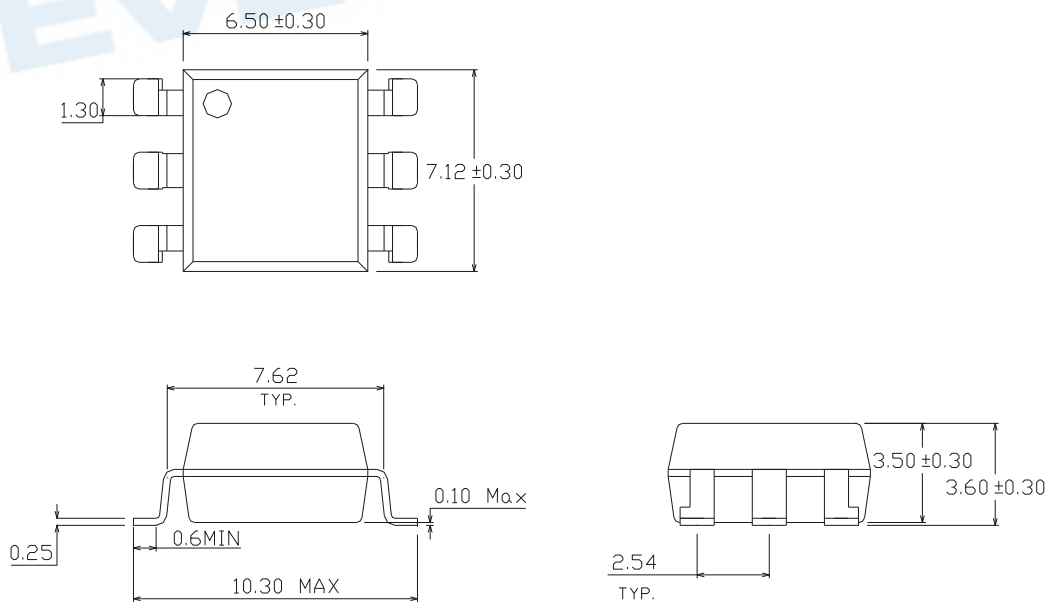
Option M Type



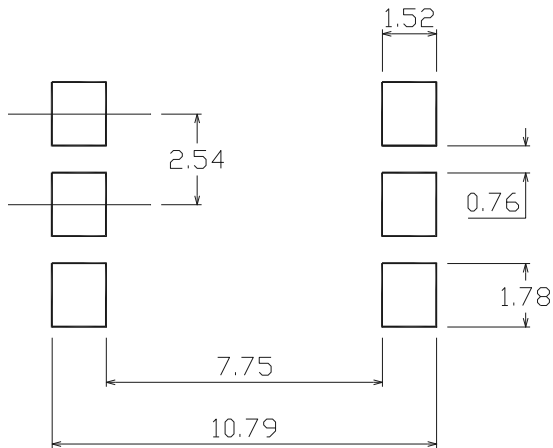
Option S Type



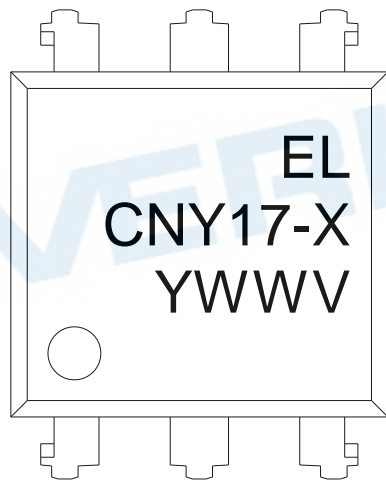
Option S1 Type



Recommended pad layout for surface mount leadform



Device Marking

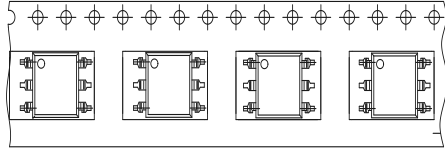


Notes

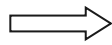
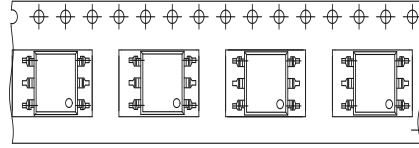
- EL denotes Everlight
- CNY17-X denotes Device Number (X: 1, 2, 3 or 4)
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE (optional)

Tape & Reel Packing Specifications

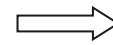
Option TA



Option TB

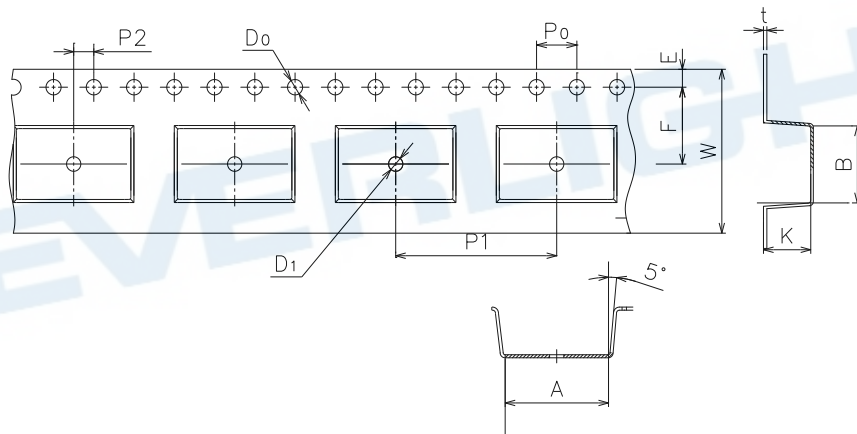


Direction of feed from reel



Direction of feed from reel

Tape dimensions

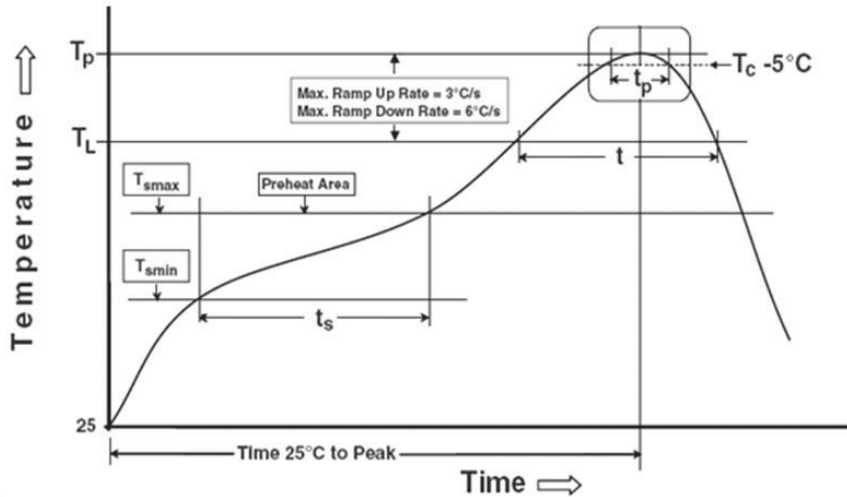


| | | | | | | |
|----------------|-----------|-----------|-----------|------------|----------|----------|
| Dimension No. | A | B | Do | D1 | E | F |
| Dimension (mm) | 10.8±0.1 | 7.5±0.1 | 1.5±0.1 | 1.5+0.1/-0 | 1.75±0.1 | 7.5±0.1 |
| Dimension No. | Po | P1 | P2 | t | W | K |
| Dimension (mm) | 4.0±0.15 | 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 |