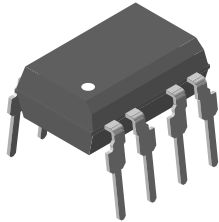
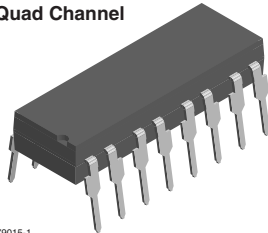


## Optocoupler, Phototransistor Output (Multichannel)

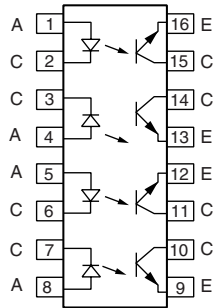
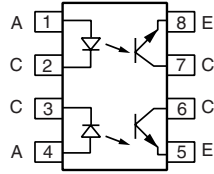
Dual Channel



Quad Channel



i179015-1



i179015-2



### FEATURES

- CNY74-2H, CNY74-4H TTL compatible
- Transfer ratio, 35 % typical
- Coupling capacitance, 0.5 pF
- Dual and quad channel
- Industry standard DIP packages
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC



**RoHS**  
COMPLIANT

### AGENCY APPROVALS

- UL1577, file no. E52744 system code H, double protection
- UL1577, file no. E52744, equivalent to CSA bulletin 5A

### DESCRIPTION

The CNY74-2H, CNY74-4H is an optically coupled pair with a GaAlAs infrared LED and a silicon NPN phototransistor. Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output.

The CNY74-2H, CNY74-4H is especially for driving medium-speed logic, where it may be used to eliminate troublesome ground loop and noise problems. Also it can be used to replace relays and transformers in many digital interface applications, as well as analog applications such as CTR modulation.

The CNY74-2H has two isolated channels in a single DIP package; the CNY74-4H has four isolated channels per package.

### ORDER INFORMATION

| PART     | REMARKS                                |
|----------|----------------------------------------|
| CNY74-2H | CTR 50 % to 600 %, dual channel DIP-8  |
| CNY74-4H | CTR 50 % to 600 %, quad channel DIP-16 |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER                  | TEST CONDITION | PART | SYMBOL     | VALUE | UNIT  |
|----------------------------|----------------|------|------------|-------|-------|
| <b>INPUT</b>               |                |      |            |       |       |
| Peak reverse voltage       |                |      | $V_R$      | 3     | V     |
| Forward continuous current |                |      | $I_F$      | 60    | mA    |
| Power dissipation          |                |      | $P_{diss}$ | 100   | mW    |
| Derate linearly from 55 %  |                |      |            | 1.33  | mW/°C |

| ABSOLUTE MAXIMUM RATINGS            |                                                    |          |            |                |           |
|-------------------------------------|----------------------------------------------------|----------|------------|----------------|-----------|
| PARAMETER                           | TEST CONDITION                                     | PART     | SYMBOL     | VALUE          | UNIT      |
| <b>OUTPUT</b>                       |                                                    |          |            |                |           |
| Collector emitter breakdown voltage |                                                    |          | $BV_{CEO}$ | 70             | V         |
| Emitter collector breakdown voltage |                                                    |          | $BV_{ECO}$ | 7              | V         |
| Power dissipation                   |                                                    |          | $P_{diss}$ | 150            | mW        |
| Derate linearly from 25 °C          |                                                    |          |            | 2              | mW/°C     |
| <b>COUPLER</b>                      |                                                    |          |            |                |           |
| Isolation test voltage              | $t = 1 \text{ s}$                                  |          | $V_{ISO}$  | 5300           | $V_{RMS}$ |
| Isolation resistance                | $V_{IO} = 500 \text{ V}, T_{amb} = 25 \text{ °C}$  |          | $R_{IO}$   | $\geq 10^{12}$ | $\Omega$  |
|                                     | $V_{IO} = 500 \text{ V}, T_{amb} = 100 \text{ °C}$ |          | $R_{IO}$   | $\geq 10^{11}$ | $\Omega$  |
| Total package dissipation           |                                                    | CNY74-2H | $P_{tot}$  | 400            | mW        |
|                                     |                                                    | CNY74-4H | $P_{tot}$  | 500            | mW        |
| Derate linearly from 25 °C          |                                                    | CNY74-2H |            | 5.33           | mW/°C     |
|                                     |                                                    | CNY74-4H |            | 6.67           | mW/°C     |
| Creepage distance                   |                                                    |          |            | $\geq 7$       | mm        |
| Clearance distance                  |                                                    |          |            | $\geq 7$       | mm        |
| Storage temperature                 |                                                    |          | $T_{stg}$  | - 55 to + 150  | °C        |
| Operating temperature               |                                                    |          | $T_{amb}$  | - 55 to + 100  | °C        |
| Lead soldering time at 260 °C       |                                                    |          |            | 10             | s         |

**Note**

$T_{amb} = 25 \text{ °C}$ , unless otherwise specified.

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

| ELECTRICAL CHARACTERISTICS            |                                           |             |      |      |      |               |
|---------------------------------------|-------------------------------------------|-------------|------|------|------|---------------|
| PARAMETER                             | TEST CONDITION                            | SYMBOL      | MIN. | TYP. | MAX. | UNIT          |
| <b>INPUT</b>                          |                                           |             |      |      |      |               |
| Forward voltage                       | $I_F = 20 \text{ mA}$                     | $V_F$       |      | 1.3  | 1.5  | V             |
| Reverse current                       | $V_R = 3 \text{ V}$                       | $I_R$       |      | 0.1  | 100  | $\mu\text{A}$ |
| Capacitance                           | $V_R = 0 \text{ V}$                       | $C_O$       |      | 25   |      | pF            |
| <b>OUTPUT</b>                         |                                           |             |      |      |      |               |
| Collector emitter breakdown voltage   | $I_C = 1 \text{ mA}$                      | $BV_{CEO}$  | 70   |      |      | V             |
| Collector emitter leakage current     | $V_{CE} = 5 \text{ V}, I_F = 0 \text{ A}$ | $I_{CEO}$   |      |      | 100  | nA            |
| Capacitance collector emitter         | $V_{CE} = 0 \text{ V}, f = 1 \text{ Hz}$  | $C_{CE}$    |      | 10   |      | pF            |
| <b>COUPLER</b>                        |                                           |             |      |      |      |               |
| Saturation voltage, collector emitter | $I_C = 2 \text{ mA}, I_F = 16 \text{ mA}$ | $V_{CEsat}$ |      | 0.3  | 0.5  | V             |
| Resistance (input to output)          |                                           | $R_{IO}$    |      | 100  |      | $G\Omega$     |
| Capacitance (input to output)         |                                           | $C_{IO}$    |      | 0.5  |      | pF            |

**Note**

$T_{amb} = 25 \text{ °C}$ , unless otherwise specified.

Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

| CURRENT TRANSFER RATIO    |                                             |        |      |      |      |      |
|---------------------------|---------------------------------------------|--------|------|------|------|------|
| PARAMETER                 | TEST CONDITION                              | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| DC current transfer ratio | $I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}$  | CTR    | 50   |      | 600  | %    |
| DC current transfer ratio | $I_F = 10 \text{ mA}, V_{CE} = 5 \text{ V}$ | CTR    | 60   |      |      | %    |

| SWITCHING CHARACTERISTICS |                                                                                     |           |      |      |      |               |
|---------------------------|-------------------------------------------------------------------------------------|-----------|------|------|------|---------------|
| PARAMETER                 | TEST CONDITION                                                                      | SYMBOL    | MIN. | TYP. | MAX. | UNIT          |
| Delay time                | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ (see figure 1)       | $t_d$     |      | 3    |      | $\mu\text{s}$ |
| Rise time                 | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ (see figure 1)       | $t_r$     |      | 3    |      | $\mu\text{s}$ |
| Fall time                 | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ (see figure 1)       | $t_f$     |      | 4.7  |      | $\mu\text{s}$ |
| Storage time              | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ (see figure 1)       | $t_s$     |      | 0.3  |      | $\mu\text{s}$ |
| Turn-on time              | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ (see figure 1)       | $t_{on}$  |      | 6    |      | $\mu\text{s}$ |
| Turn-off time             | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ (see figure 1)       | $t_{off}$ |      | 5    |      | $\mu\text{s}$ |
| Turn-on time              | $V_S = 5\text{ V}$ , $I_C = 10\text{ mA}$ , $R_L = 1\text{ k}\Omega$ (see figure 2) | $t_{on}$  |      | 9    |      | $\mu\text{s}$ |
| Turn-off time             | $V_S = 5\text{ V}$ , $I_C = 10\text{ mA}$ , $R_L = 1\text{ k}\Omega$ (see figure 2) | $t_{off}$ |      | 18   |      | $\mu\text{s}$ |

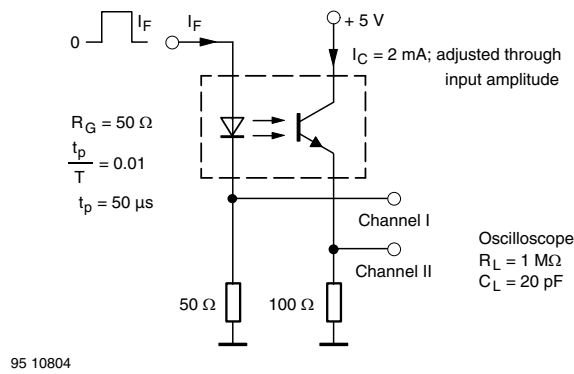


Fig. 1 - Test Circuit, Non-Saturated Operation

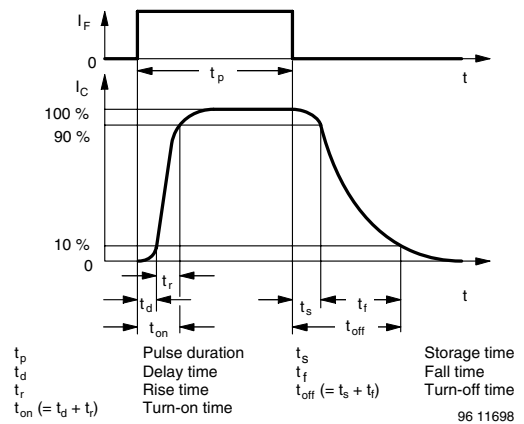


Fig. 3 - Switching Times

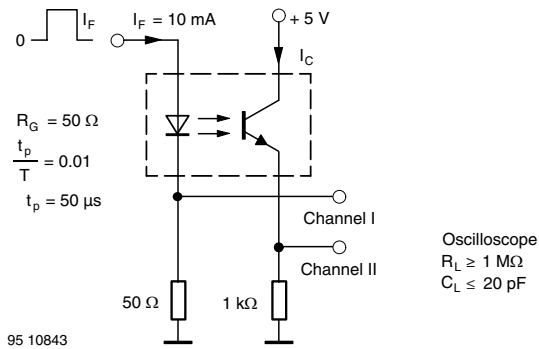


Fig. 2 - Test Circuit, Saturated Operation

## TYPICAL CHARACTERISTICS

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

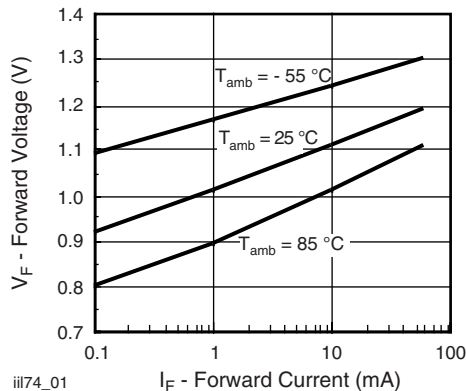


Fig. 4 - Forward Voltage vs. Forward Current

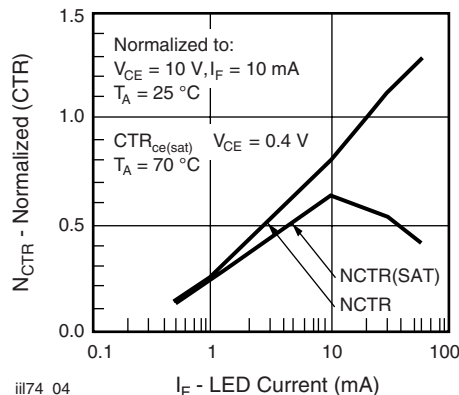


Fig. 7 - Normalized Non-Saturated and Saturated CTR vs. LED Current

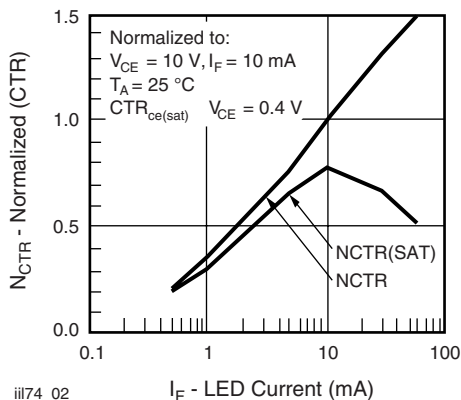


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

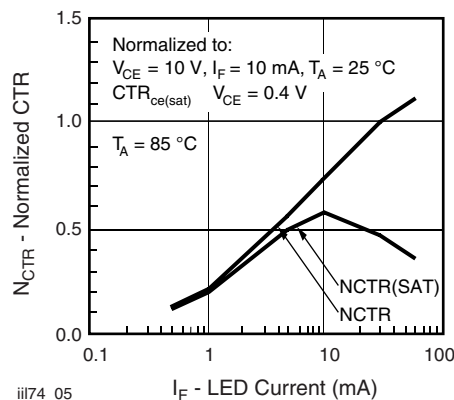


Fig. 8 - Normalized Non-Saturated and Saturated CTR vs. LED Current

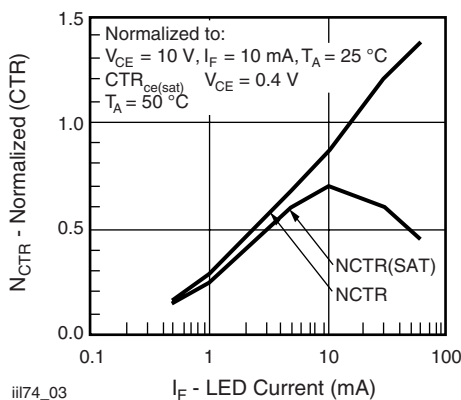


Fig. 6 - Normalized Non-Saturated and Saturated CTR vs. LED Current

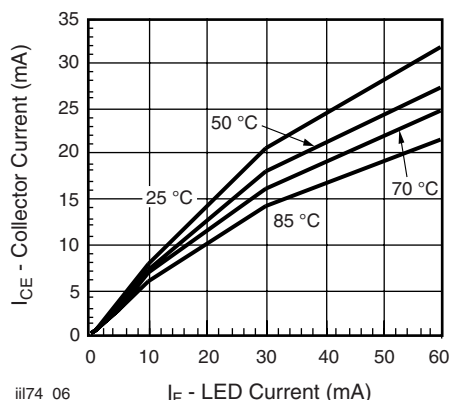


Fig. 9 - Collector Emitter Current vs. Temperature and LED Current

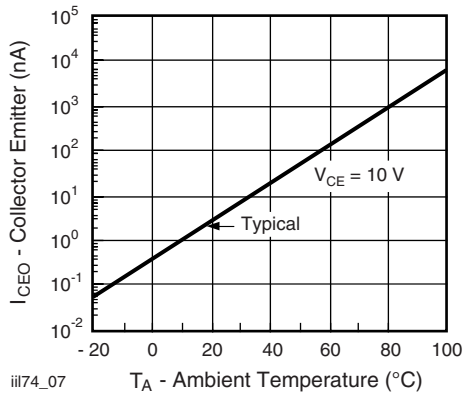


Fig. 10 - Collector Emitter Leakage Current vs. Temperature

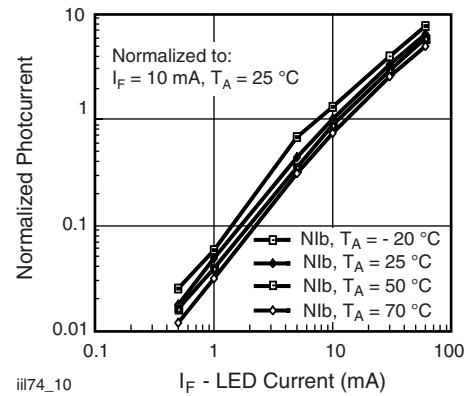


Fig. 13 - Normalized Photocurrent vs.  $I_F$  and Temperature

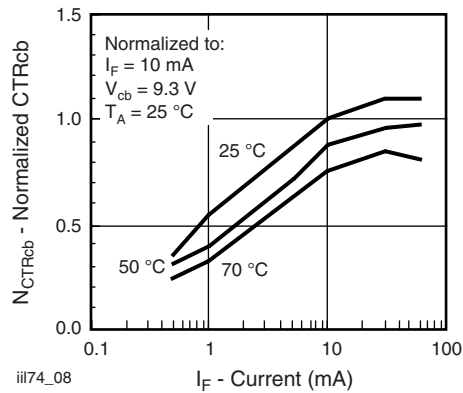


Fig. 11 - Normalized CTR<sub>cb</sub> vs. LED Current and Temperature

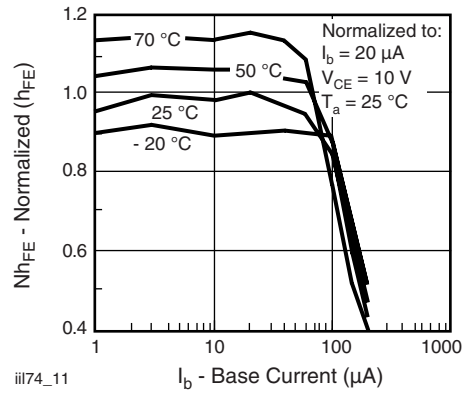


Fig. 14 - Normalized Non-Saturated  $h_{FE}$  vs. Base Current and Temperature

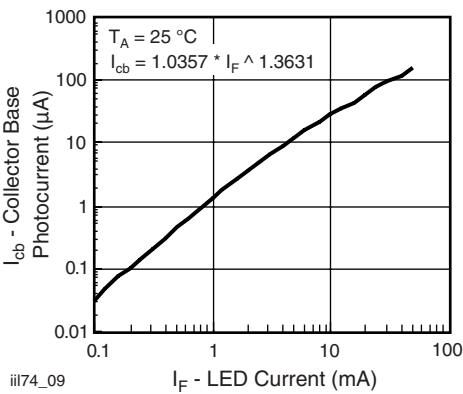


Fig. 12 - Collector Base Photocurrent vs. LED Current

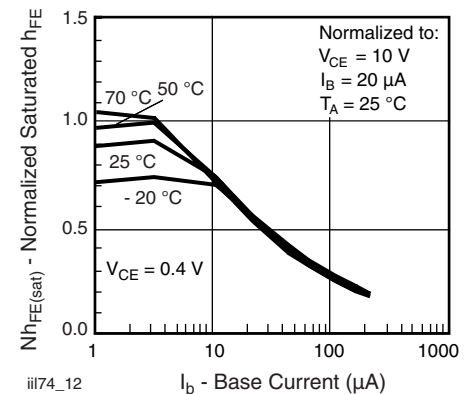


Fig. 15 - Normalized Saturated  $h_{FE}$  vs. Base Current and Temperature

# CNY74-2H, CNY74-4H

Vishay Semiconductors Optocoupler, Phototransistor Output  
(Multichannel)

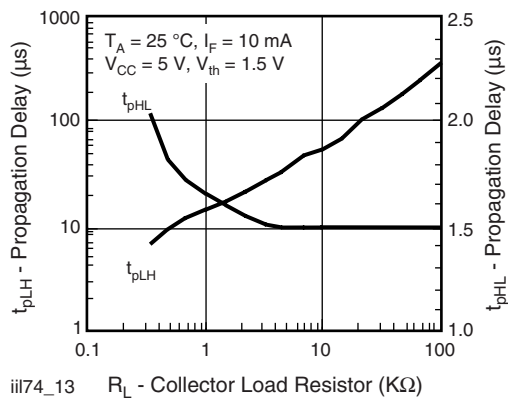
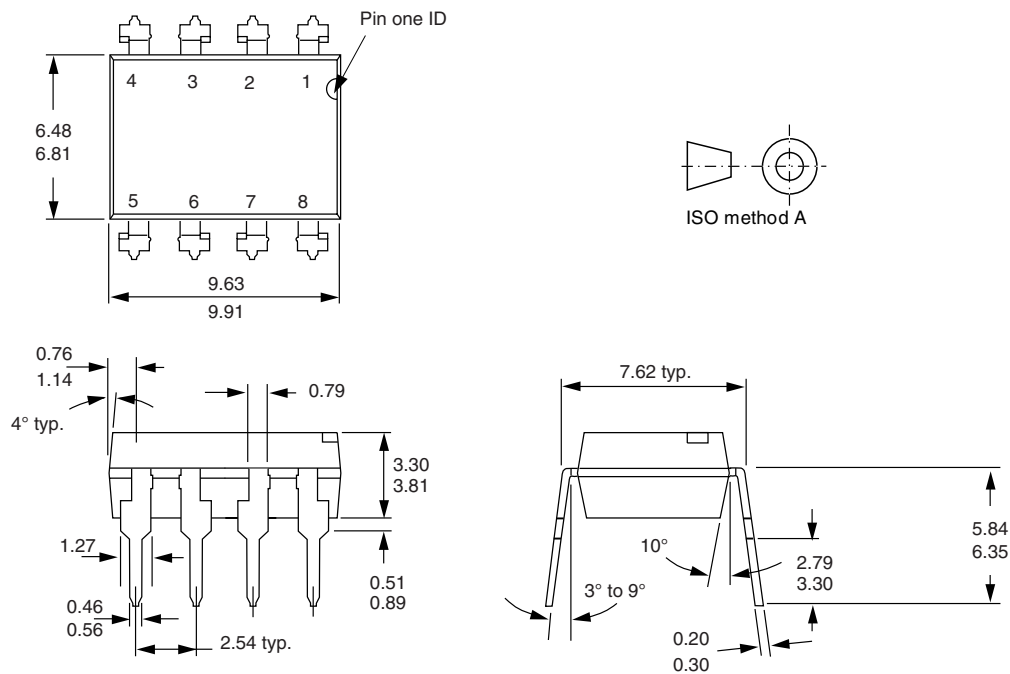


Fig. 16 - Propagation Delay vs. Collector Load Resistor

## PACKAGE DIMENSIONS in millimeters



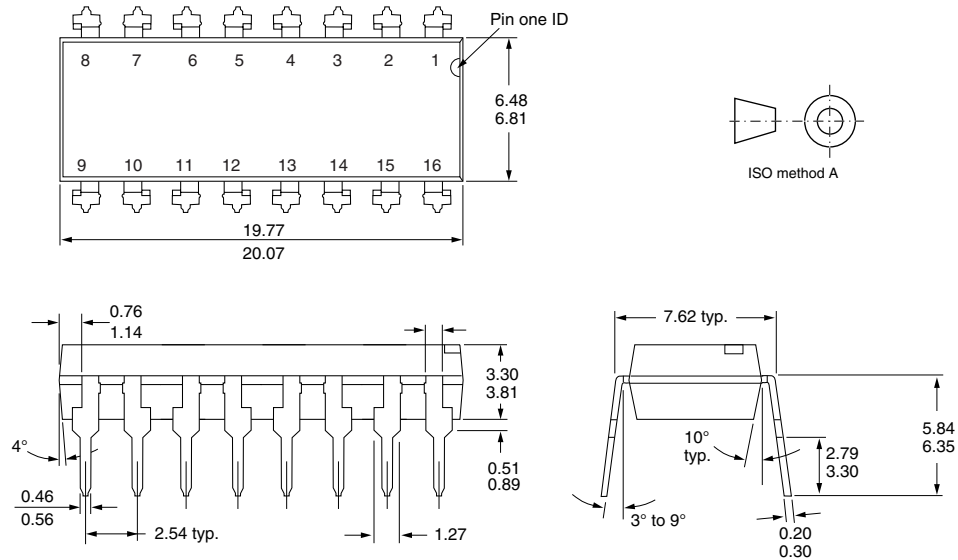
i178006



# CNY74-2H, CNY74-4H

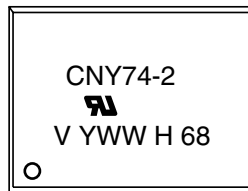
Optocoupler, Phototransistor Output Vishay Semiconductors  
(Multichannel)

## PACKAGE DIMENSIONS in millimeters

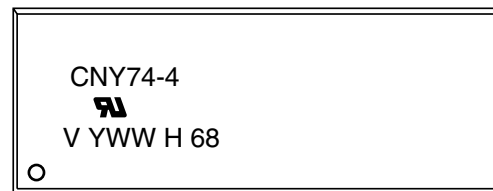


i178007

## PACKAGE MARKING



21764-19



21764-20

### Note

CNY74-2H and CNY74-4H are marked as CNY74-2 and CNY74-4 respectively.



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