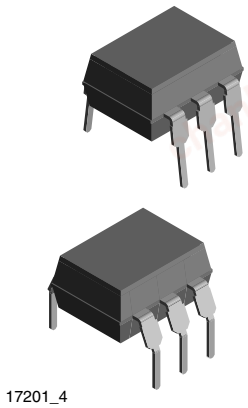
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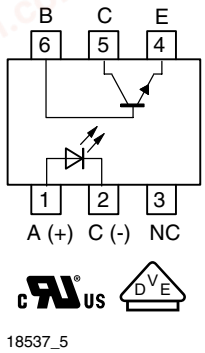
# CNY75A, CNY75B, CNY75C, CNY75GA, CNY75GB, CNY75GC

Vishay Semiconductors

## Optocoupler, Phototransistor Output, with Base Connection



17201_4




18537_5

### FEATURES

- Isolation materials according to UL 94-VO
- Pollution degree 2 (DIN/VDE 0110/resp. IEC 60664)
- Climatic classification 55/110/21 (IEC 60068 part 1)
- Low temperature coefficient of CTR
- CTR offered in 3 groups
- Rated isolation voltage (RMS includes DC) $V_{IOWM}$ = 600 $V_{RMS}$ (848 V peak)
- Rated recurring peak voltage (repetitive) $V_{IORM}$ = 600 $V_{RMS}$
- Rated impulse voltage (transient overvoltage) $V_{IOTM}$ = 6 $kV_{peak}$
- Isolation test voltage (partial discharge test voltage) $V_{pd}$ = 1.6 kV
- Creepage current resistance according to VDE 0303/ IEC 60112 comparative tracking index: CTI ≥ 325
- Thickness through insulation ≥ 0.4 mm
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC

### DESCRIPTION

The CNY75A, CNY75B, CNY75C, CNY75GA, CNY75GB, CNY75GC consists of a phototransistor optically coupled to a gallium arsenide infrared-emitting diode in a 6 pin plastic dual inline package.

### AGENCY APPROVALS

- UL1577, file no. E52744, double protection
- BSI: BS EN 41003, BS EN 60095 (BS 415), BS EN 60950 (BS 7002), pending
- DIN EN 60747-5-5 (VDE 0884)
- FIMKO (SETI): EN 60950, certificate no. FI25155

### APPLICATIONS

- Switch-mode power supplies
- Line receiver
- Computer peripheral interface
- Microprocessor system interface
- Circuits for safe protective separation against electrical shock according to safety class II (reinforced isolation):
  - for appl. class I - IV at mains voltage ≤ 300 V
  - for appl. class I - III at mains voltage ≤ 600 V
  according to DIN EN 60747-5-5 (VDE 0884)

| ORDER INFORMATION (1) | |
|---|---|
| **PART** | **REMARKS** |
| CNY75A | CTR 63 % to 125 %, DIP-6 |
| CNY75B | CTR 100 % to 200 %, DIP-6 |
| CNY75C | CTR 160 % to 320 %, DIP-6 |
| CNY75GA | CTR 63 % to 125 %, DIP-6, 400 mil |
| CNY75GB | CTR 100 % to 200 %, DIP-6, 400 mil |
| CNY75GC | CTR 160 % to 320 %, DIP-6, 400 mil |

**Note**

(1) G = leadform 10.16 mm; G is not marked on the body.

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## ABSOLUTE MAXIMUM RATINGS (1)

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|---|---|---|---|---|
| **INPUT** | | | | |
| Reverse voltage | | $V_R$ | 5 | V |
| Forward current | | $I_F$ | 60 | mA |
| Forward surge current | $t_p \leq 10$ µs | $I_{FSM}$ | 3 | A |
| Power dissipation | | $P_{diss}$ | 70 | mW |
| Junction temperature | | $T_j$ | 125 | °C |
| **OUTPUT** | | | | |
| Collector base voltage | | $V_{CBO}$ | 70 | V |
| Collector emitter voltage | | $V_{CEO}$ | 70 | V |
| Emitter collector voltage | | $V_{ECO}$ | 7 | V |
| Collector current | | $I_C$ | 50 | mA |
| Collector peak current | $t_p/T = 0.5$, $t_p \leq 10$ ms | $I_{CM}$ | 100 | mA |
| Power dissipation | | $P_{diss}$ | 70 | mW |
| Junction temperature | | $T_j$ | 125 | °C |
| **COUPLER** | | | | |
| AC isolation test voltage (RMS) | | $V_{ISO}$ | 5000 | $V_{RMS}$ |
| Total power dissipation | | $P_{tot}$ | 200 | mW |
| Ambient temperature range | | $T_{amb}$ | - 55 to + 110 | °C |
| Storage temperature range | | $T_{stg}$ | - 55 to + 125 | °C |
| Soldering temperature (2) | 2 mm from case, t ≤ 10 s | $T_{sld}$ | 260 | °C |

**Notes**

(1) $T_{amb}$ = 25 °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.

(2) Refer to wave profile for soldering conditions for through hole devices.

## ELECTRICAL CHARACTERISTCS (1)

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| **INPUT** | | | | | | | |
| Forward voltage | $I_F$ = 50 mA | | $V_F$ | | 1.25 | 1.6 | V |
| Reverse current | $V_R$ = 6 V | | $I_R$ | | | 10 | µA |
| Junction capacitance | $V_R$ = 0 V, f = 1 MHz | | $C_j$ | | 50 | | pF |
| **OUTPUT** | | | | | | | |
| Collector base voltage | $I_C$ = 100 µA | | $V_{CBO}$ | 70 | | | V |
| Collector emitter voltage | $I_C$ = 1 mA | | $V_{CEO}$ | 70 | | | V |
| Emitter collector voltage | $I_E$ = 100 µA | | $V_{ECO}$ | 7 | | | V |
| Collector emitter leakage current | $V_{CE}$ = 20 V, $I_F$ = 0 A | | $I_{CEO}$ | | | 150 | nA |
| **COUPLER** | | | | | | | |
| Collector emitter saturation voltage | $I_F$ = 10 mA, $I_C$ = 1 mA | | $V_{CEsat}$ | | | 0.3 | V |
| Cut-off frequency | $V_{CE}$ = 5 V, $I_F$ = 10 mA, $R_L$ = 100 Ω | | $f_c$ | | 110 | | kHz |
| Coupling capacitance | f = 1 MHz | | $C_k$ | | 0.6 | | pF |

**Note**

(1) $T_{amb}$ = 25 °C, unless otherwise specified.
Minimum and maximum values were tested requierements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information only and are not part of the testing requirements.

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## CURRENT TRANSFER RATIO

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| $I_C/I_F$ | $V_{CE}$ = 5 V, $I_F$ = 1 mA | CNY75GA | CTR | 15 | | | % |
| | | CNY75GB | CTR | 30 | | | % |
| | | CNY75GC | CTR | 60 | | | % |
| | $V_{CE}$ = 5 V, $I_F$ = 10 mA | CNY75GA | CTR | 63 | | 125 | % |
| | | CNY75GB | CTR | 100 | | 200 | % |
| | | CNY75GC | CTR | 160 | | 320 | % |

## SWITCHING CHARACTERISTICS

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Current time | $V_{CC}$ = 5 V, $R_L$ = 100 Ω | CNY75GA | $I_F$ | | 10 | | mA |
| | | CNY75GB | $I_F$ | | 10 | | mA |
| | | CNY75GC | $I_F$ | | 10 | | mA |
| Delay time | $V_{CC}$ = 5 V, $R_L$ = 100 Ω | CNY75GA | $t_d$ | | 2 | | µs |
| | | CNY75GB | $t_d$ | | 2.5 | | µs |
| | | CNY75GC | $t_d$ | | 2.8 | | µs |
| Rise time | $V_{CC}$ = 5 V, $R_L$ = 100 Ω | CNY75GA | $t_r$ | | 2.5 | | µs |
| | | CNY75GB | $t_r$ | | 3 | | µs |
| | | CNY75GC | $t_r$ | | 4.2 | | µs |
| Fall time | $V_{CC}$ = 5 V, $R_L$ = 100 Ω | CNY75GA | $t_f$ | | 2.7 | | µs |
| | | CNY75GB | $t_f$ | | 3.7 | | µs |
| | | CNY75GC | $t_f$ | | 4.7 | | µs |
| Storage time | $V_{CC}$ = 5 V, $R_L$ = 100 Ω | CNY75GA | $t_s$ | | 0.3 | | µs |
| | | CNY75GB | $t_s$ | | 0.3 | | µs |
| | | CNY75GC | $t_s$ | | 0.3 | | µs |
| Turn-on time | $V_{CC}$ = 5 V, $R_L$ = 100 Ω | CNY75GA | $t_{on}$ | | 4.5 | | µs |
| | | CNY75GB | $t_{on}$ | | 5.5 | | µs |
| | | CNY75GC | $t_{on}$ | | 7 | | µs |
| Turn-off time | $V_{CC}$ = 5 V, $R_L$ = 100 Ω | CNY75GA | $t_{off}$ | | 3 | | µs |
| | | CNY75GB | $t_{off}$ | | 4 | | µs |
| | | CNY75GC | $t_{off}$ | | 5 | | µs |
| Turn-on time | $V_{CC}$ = 5 V, $R_L$ = 1 kΩ | CNY75GA | $t_{on}$ | | 10 | | µs |
| | | CNY75GB | $t_{on}$ | | 16.5 | | µs |
| | | CNY75GC | $t_{on}$ | | 11 | | µs |
| Turn-off time | $V_{CC}$ = 5 V, $R_L$ = 1 kΩ | CNY75GA | $t_{off}$ | | 25 | | µs |
| | | CNY75GB | $t_{off}$ | | 20 | | µs |
| | | CNY75GC | $t_{off}$ | | 37.5 | | µs |

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| MAXIMUM SAFETY RATINGS (1) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| **INPUT** | | | | | | |
| Forward current | | $I_F$ | | | 130 | mA |
| **OUTPUT** | | | | | | |
| Power dissipation | | $P_{diss}$ | | | 265 | mW |
| **COUPLER** | | | | | | |
| Rated impulse voltage | | $V_{IOTM}$ | | | 6 | kV |
| Safety temperature | | $T_{si}$ | | | 150 | °C |

**Note**

(1) According DIN EN 60747-5-5. This optocoupler is suitable for safe electrical isolation only within the safety ratings. Compliance with the safety ratings shall be ensured by means of suitable protective circuits.

| INSULATION RATED PARAMETERS | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| Partial discharge test voltage - routine test | 100 %, $t_{test}$ = 1 s | $V_{pd}$ | 1.6 | | | kV |
| Partial discharge test voltage - lot test (sample test) | $t_{Tr}$ = 60 s, $t_{test}$ = 10 s, (see figure 1) | $V_{IOTM}$ | 6 | | | kV |
| | | $V_{pd}$ | 1.3 | | | kV |
| Insulation resistance | $V_{IO}$ = 500 V | $R_{IO}$ | $10^{12}$ | | | Ω |
| | $V_{IO}$ = 500 V, $T_{amb} \leq$ 100 °C | $R_{IO}$ | $10^{11}$ | | | Ω |
| | $V_{IO}$ = 500 V, $T_{amb} \leq$ 150 °C (construction test only) | $R_{IO}$ | $10^{9}$ | | | Ω |

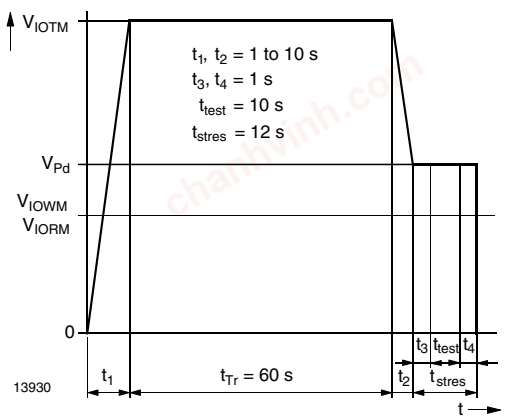


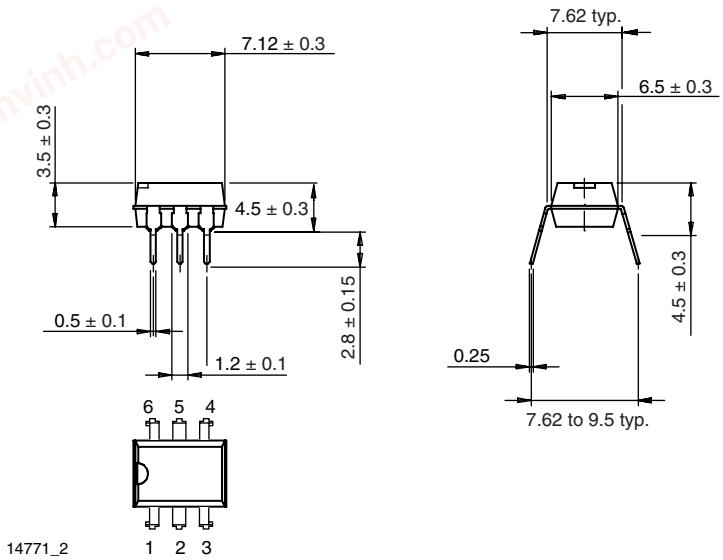

Fig. 1 - Test Pulse Diagram for Sample Test according to DIN EN 60747-5-5 (VDE 0884)/DIN EN 60747-; IEC60747

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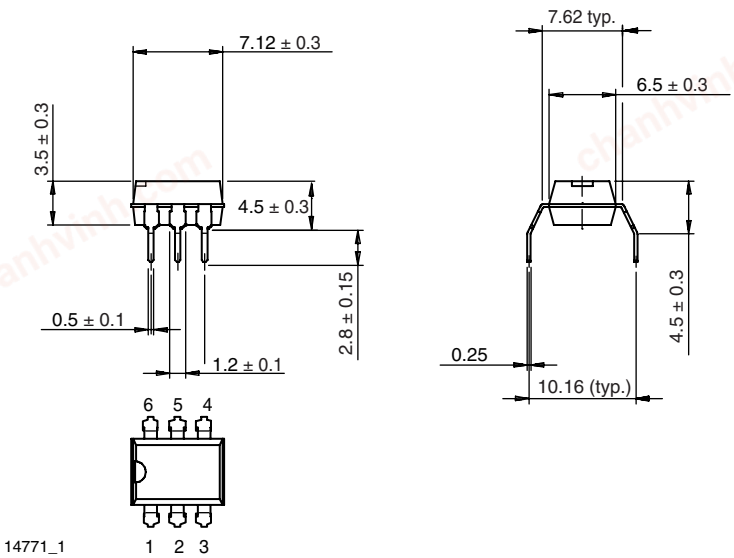


## PACKAGE DIMENSIONS in millimeters

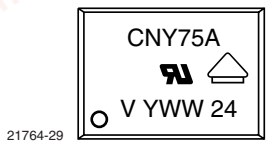
### DIP-6




### DIP-6, 400 mil




## PACKAGE MARKING



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