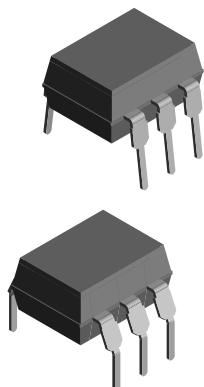




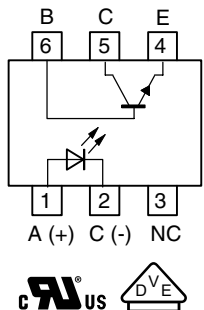
# THE DATASHEET OF CNY75A



## Optocoupler, Phototransistor Output, with Base Connection



17201\_4



18537\_5

### 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

### 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:  $CTI \geq 325$
- Thickness through insulation  $\geq 0.4 mm$
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC



RoHS COMPLIANT

### 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  $\leq 300 V$
  - for appl. class I - III at mains voltage  $\leq 600 V$  according to DIN EN 60747-5-5 (VDE 0884)

ORDER INFORMATION <sup>(1)</sup>	
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

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



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

Optocoupler, Phototransistor Output, Vishay Semiconductors  
with Base Connection

ABSOLUTE MAXIMUM RATINGS <sup>(1)</sup>				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
Reverse voltage		$V_R$	5	V
Forward current		$I_F$	60	mA
Forward surge current	$t_p \leq 10 \mu s$	$I_{FSM}$	3	A
Power dissipation		$P_{diss}$	70	mW
Junction temperature		$T_j$	125	°C
<b>OUTPUT</b>				
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
<b>COUPLER</b>				
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 <sup>(2)</sup>	2 mm from case, $t \leq 10 s$	$T_{sld}$	260	°C

## Notes

<sup>(1)</sup>  $T_{amb} = 25 \text{ }^\circ\text{C}$ , 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.

<sup>(2)</sup> Refer to wave profile for soldering conditions for through hole devices.

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

## Note

<sup>(1)</sup>  $T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified.

Minimum and maximum values were tested requirements. 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.

CURRENT TRANSFER RATIO							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
$I_C/I_F$	$V_{CE} = 5\text{ V}, I_F = 1\text{ mA}$	CNY75GA	CTR	15			%
		CNY75GB	CTR	30			%
		CNY75GC	CTR	60			%
	$V_{CE} = 5\text{ V}, I_F = 10\text{ mA}$	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	$V_{CC} = 5\text{ V}, R_L = 100\ \Omega$	CNY75GA	$I_F$		10		mA
		CNY75GB	$I_F$		10		mA
		CNY75GC	$I_F$		10		mA
Delay time	$V_{CC} = 5\text{ V}, R_L = 100\ \Omega$	CNY75GA	$t_d$		2		$\mu\text{s}$
		CNY75GB	$t_d$		2.5		$\mu\text{s}$
		CNY75GC	$t_d$		2.8		$\mu\text{s}$
Rise time	$V_{CC} = 5\text{ V}, R_L = 100\ \Omega$	CNY75GA	$t_r$		2.5		$\mu\text{s}$
		CNY75GB	$t_r$		3		$\mu\text{s}$
		CNY75GC	$t_r$		4.2		$\mu\text{s}$
Fall time	$V_{CC} = 5\text{ V}, R_L = 100\ \Omega$	CNY75GA	$t_f$		2.7		$\mu\text{s}$
		CNY75GB	$t_f$		3.7		$\mu\text{s}$
		CNY75GC	$t_f$		4.7		$\mu\text{s}$
Storage time	$V_{CC} = 5\text{ V}, R_L = 100\ \Omega$	CNY75GA	$t_s$		0.3		$\mu\text{s}$
		CNY75GB	$t_s$		0.3		$\mu\text{s}$
		CNY75GC	$t_s$		0.3		$\mu\text{s}$
Turn-on time	$V_{CC} = 5\text{ V}, R_L = 100\ \Omega$	CNY75GA	$t_{on}$		4.5		$\mu\text{s}$
		CNY75GB	$t_{on}$		5.5		$\mu\text{s}$
		CNY75GC	$t_{on}$		7		$\mu\text{s}$
Turn-off time	$V_{CC} = 5\text{ V}, R_L = 100\ \Omega$	CNY75GA	$t_{off}$		3		$\mu\text{s}$
		CNY75GB	$t_{off}$		4		$\mu\text{s}$
		CNY75GC	$t_{off}$		5		$\mu\text{s}$
Turn-on time	$V_{CC} = 5\text{ V}, R_L = 1\text{ k}\Omega$	CNY75GA	$t_{on}$		10		$\mu\text{s}$
		CNY75GB	$t_{on}$		16.5		$\mu\text{s}$
		CNY75GC	$t_{on}$		11		$\mu\text{s}$
Turn-off time	$V_{CC} = 5\text{ V}, R_L = 1\text{ k}\Omega$	CNY75GA	$t_{off}$		25		$\mu\text{s}$
		CNY75GB	$t_{off}$		20		$\mu\text{s}$
		CNY75GC	$t_{off}$		37.5		$\mu\text{s}$



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

Optocoupler, Phototransistor Output, Vishay Semiconductors  
with Base Connection

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

**Note**

(1) According to 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	$R_{IO}$	$10^{12}$			$\Omega$
	$V_{IO} = 500$ V, $T_{amb} \leq 100$ °C	$R_{IO}$	$10^{11}$			$\Omega$
	$V_{IO} = 500$ V, $T_{amb} \leq 150$ °C (construction test only)	$R_{IO}$	$10^9$			$\Omega$

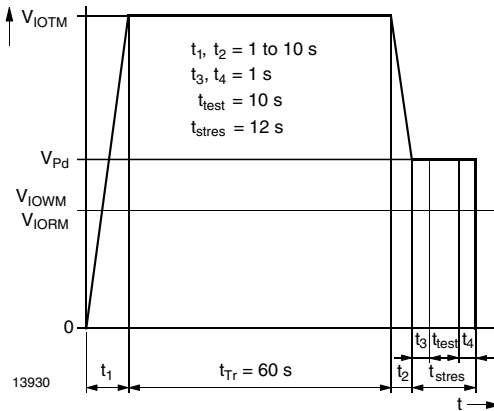


Fig. 1 - Test Pulse Diagram for Sample Test according to DIN EN 60747-5-5 (VDE 0884)/DIN EN 60747-; IEC60747

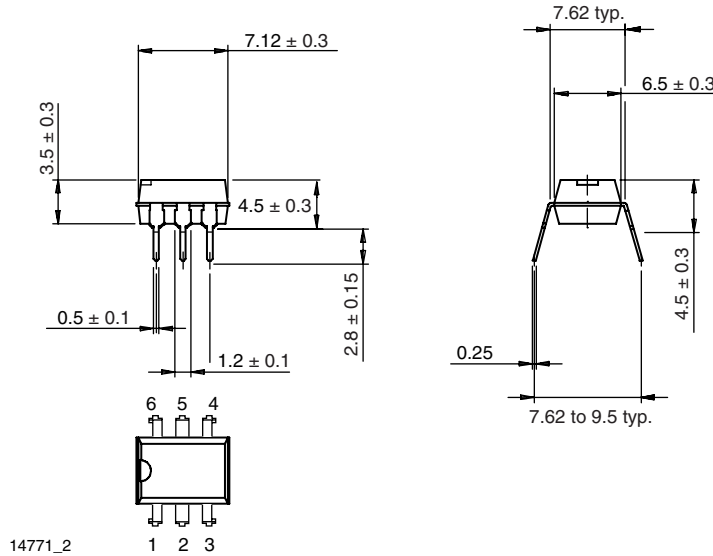
# CNY75A, CNY75B, CNY75C, CNY75GA, CNY75GB, CNY75GC



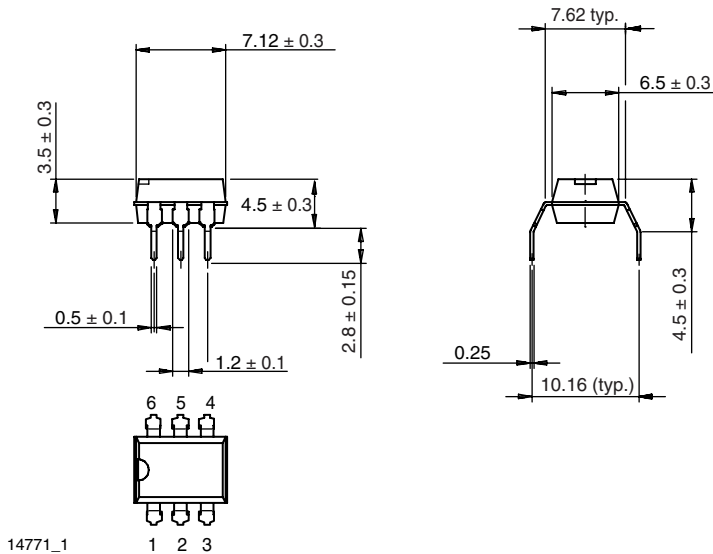
Vishay Semiconductors Optocoupler, Phototransistor Output,  
with Base Connection

## PACKAGE DIMENSIONS in millimeters

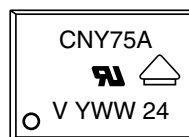
DIP-6



DIP-6, 400 mil



## PACKAGE MARKING





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