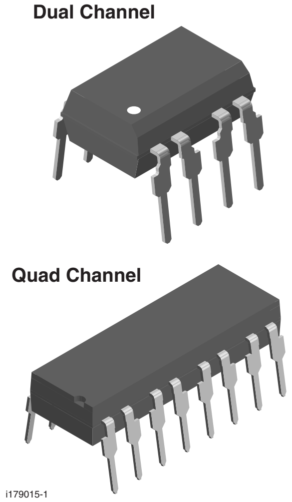
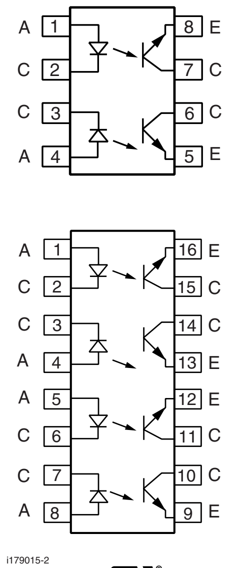
Optocoupler, Phototransistor Output (Multichannel)





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

Pb-free

e3

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 GaAIAs 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**
INPUT					
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
OUTPUT					
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
COUPLER					
Isolation test voltage	t = 1 s		V_{ISO}	5300	V_{RMS}
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C		R_{IO}	$\geq 10^{12}$	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C		R_{IO}	$\geq 10^{11}$	Ω
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				≥ 7	mm
Clearance distance				≥ 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 °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
INPUT						
Forward voltage	I_F = 20 mA	V_F		1.3	1.5	V
Reverse current	V_R = 3 V	I_R		0.1	100	µA
Capacitance	V_R = 0 V	C_O		25		pF
OUTPUT						
Collector emitter breakdown voltage	I_C = 1 mA	BV_{CEO}	70			V
Collector emitter leakage current	V_{CE} = 5 V, I_F = 0 A	I_{CEO}			100	nA
Capacitance collector emitter	V_{CE} = 0 V, f = 1 Hz	C_{CE}		10		pF
COUPLER						
Saturation voltage, collector emitter	I_C = 2 mA, I_F = 16 mA	V_{CEsat}		0.3	0.5	V
Resistance (input to output)		R_{IO}		100		GΩ
Capacitance (input to output)		C_{IO}		0.5		pF

Note

T_{amb} = 25 °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 mA, V_{CE} = 5 V	CTR	50		600	%
DC current transfer ratio	I_F = 10 mA, V_{CE} = 5 V	CTR	60			%

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

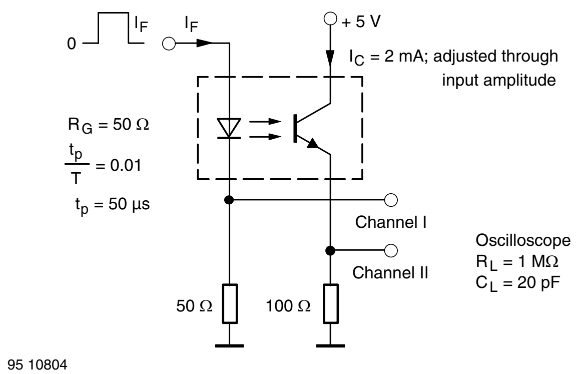


Fig. 1 - Test Circuit, Non-Saturated Operation

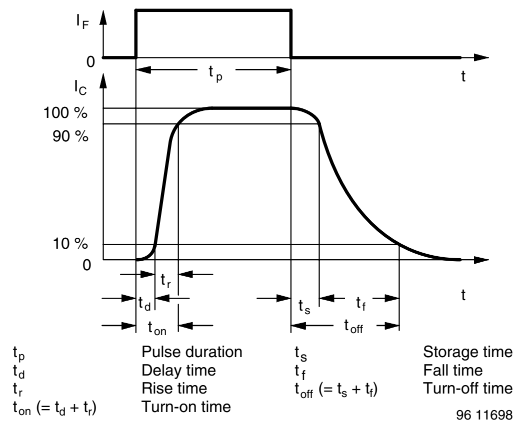


Fig. 3 - Switching Times

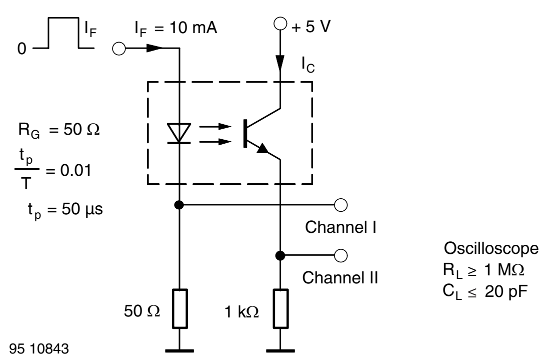


Fig. 2 - Test Circuit, Saturated Operation

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C, unless otherwise specified

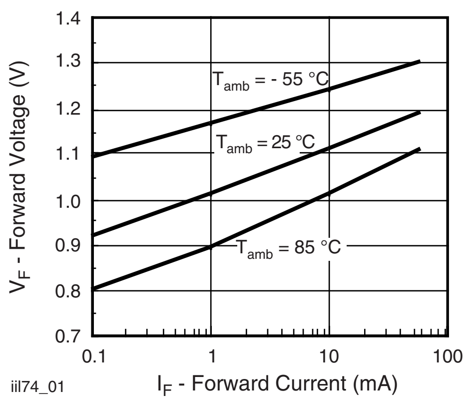


Fig. 4 - Forward Voltage vs. Forward Current

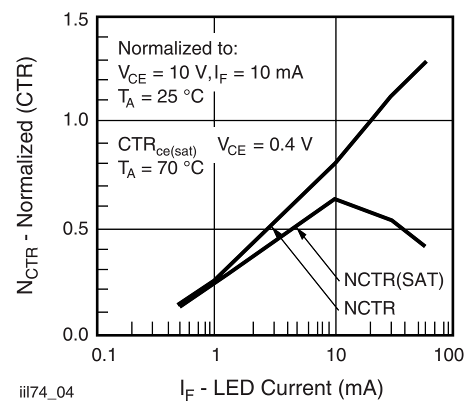


Fig. 7 - Normalized Non-Saturated and Saturated CTR vs. LED Current

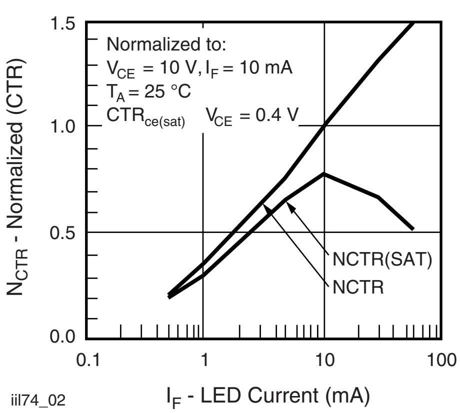


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

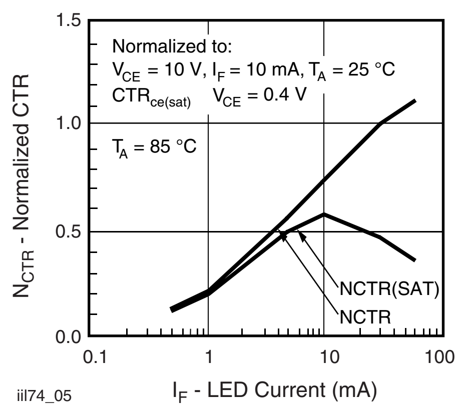


Fig. 8 - Normalized Non-Saturated and Saturated CTR vs. LED Current

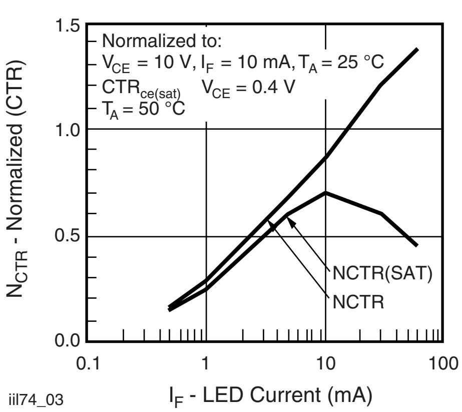


Fig. 6 - Normalized Non-Saturated and Saturated CTR vs. LED Current

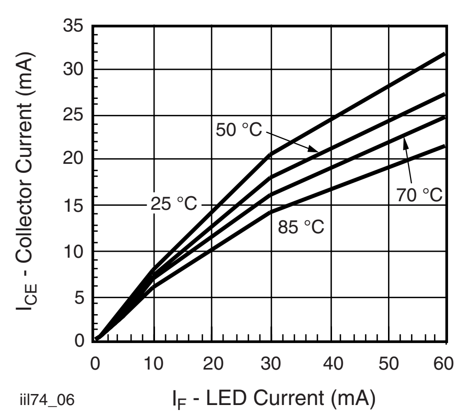


Fig. 9 - Collector Emitter Current vs. Temperature and LED Current

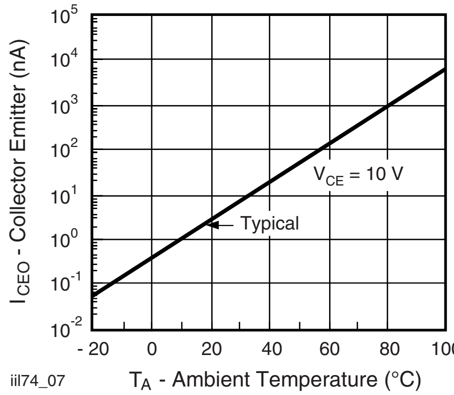


Fig. 10 - Collector Emitter Leakage Current vs.Temperature

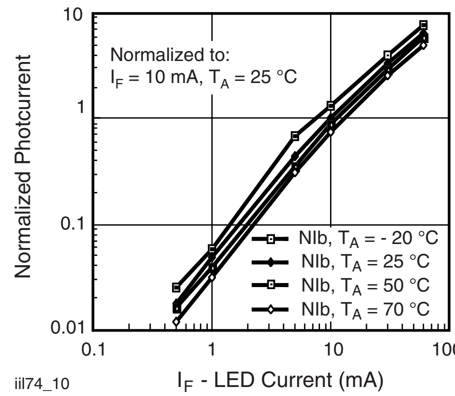


Fig. 13 - Normalized Photocurrent vs. I_F and Temperature

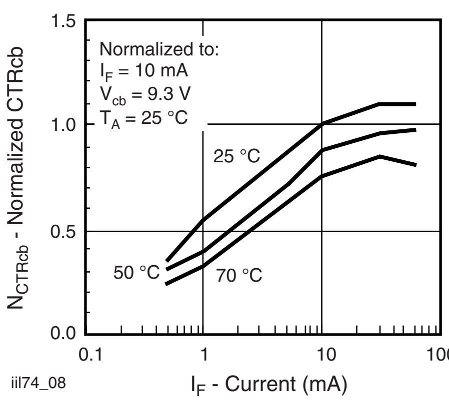


Fig. 11 - Normalized CTR_{cb} vs. LED Current and Temperature

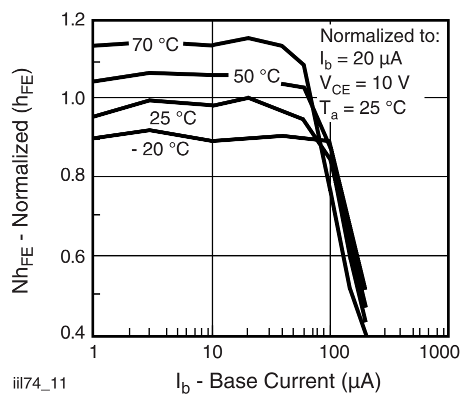


Fig. 14 - Normalized Non-Saturated h_{FE} vs. Base Current and Temperature

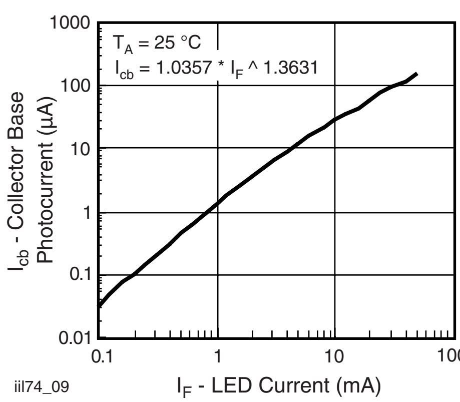


Fig. 12 - Collector Base Photocurrent vs. LED Current

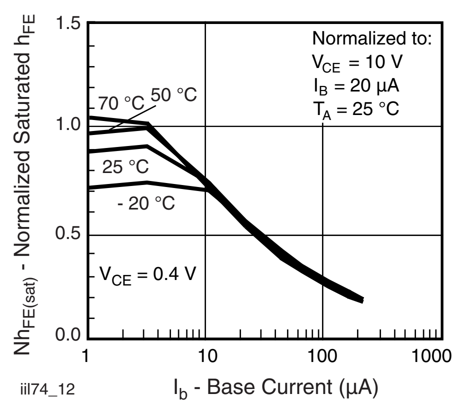


Fig. 15 - Normalized Saturated h_{FE} vs. Base Current and Temperature

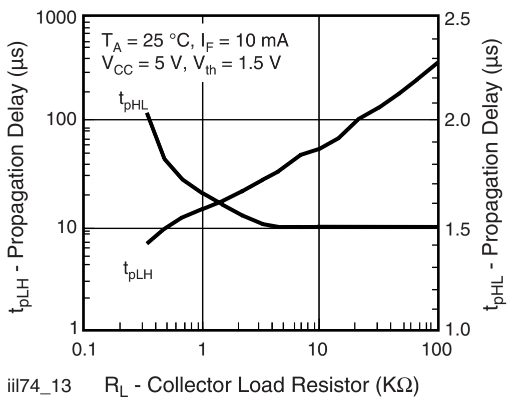
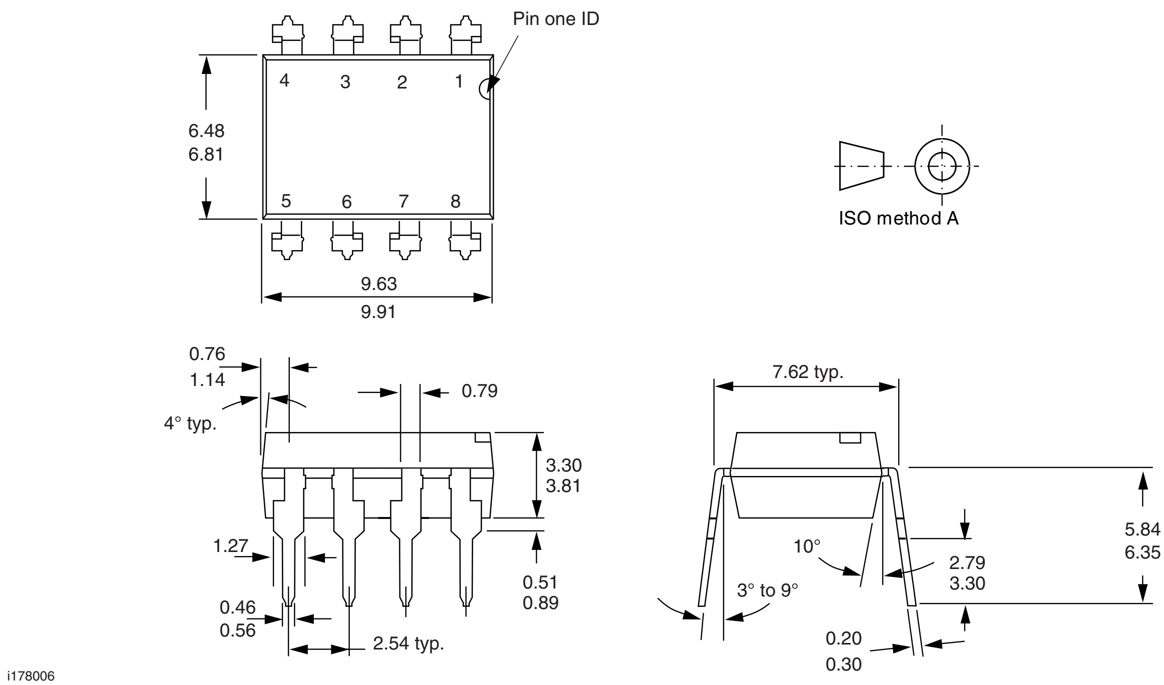
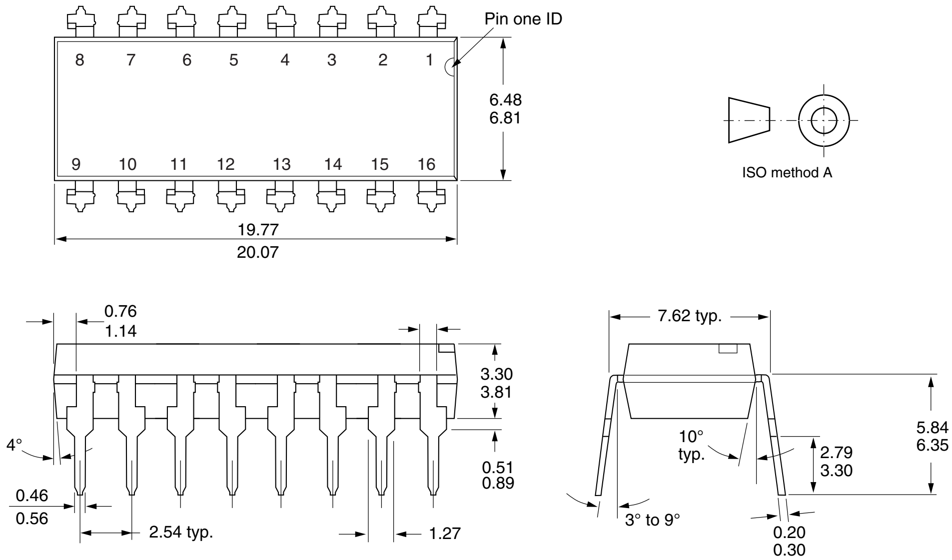


Fig. 16 - Propagation Delay vs. Collector Load Resistor

PACKAGE DIMENSIONS in millimeters

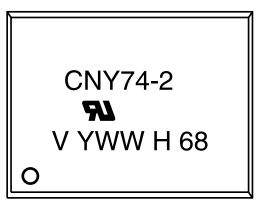


PACKAGE DIMENSIONS in millimeters

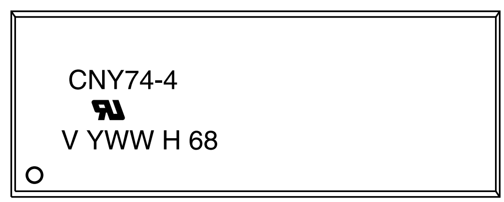


i178007

PACKAGE MARKING



21764-19



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Note

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

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