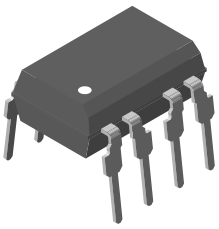
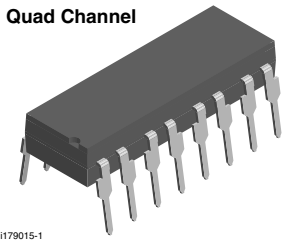
Optocoupler, Phototransistor Output (Multichannel)

Dual Channel



Quad Channel



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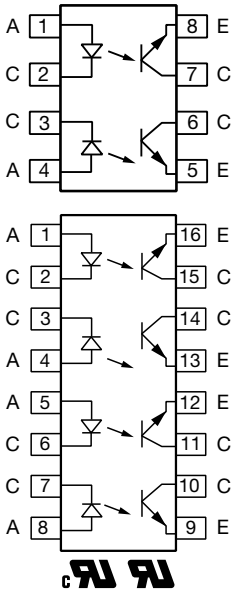


DESCRIPTION

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.

FEATURES

- CNY74-2H, CNY74-4H TTL compatible
- Transfer ratio, 35 % typical
- Coupling capacitance, 0.5 pF
- Dual and quad channel
- Industry standard DIP packages
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

LINKS TO ADDITIONAL RESOURCES

Product Page

AGENCY APPROVALS

- UL
- cUL

ORDERING INFORMATION

C	N	Y	7	4	-	#	H

PART NUMBER

DIP-6, DIP-8

AGENCY CERTIFIED/PACKAGE	CTR (%)
UL	**50 to 600**
DIP-8, dual channel	CNY74-2H
DIP-16, quad channel	CNY74-4H

Note

- Additional options may be possible, please contact sales office

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)					
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
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					
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
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

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

- 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 Fig. 1)	t_d	-	3	-	µs
Rise time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see Fig. 1)	t_r	-	3	-	µs
Fall time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see Fig. 1)	t_f	-	4.7	-	µs
Storage time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see Fig. 1)	t_s	-	0.3	-	µs
Turn-on time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see Fig. 1)	t_{on}	-	6	-	µs
Turn-off time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see Fig. 1)	t_{off}	-	5	-	µs
Turn-on time	V_S = 5 V, I_C = 10 mA, R_L = 1 kΩ (see Fig. 2)	t_{on}	-	9	-	µs
Turn-off time	V_S = 5 V, I_C = 10 mA, R_L = 1 kΩ (see Fig. 2)	t_{off}	-	18	-	µs

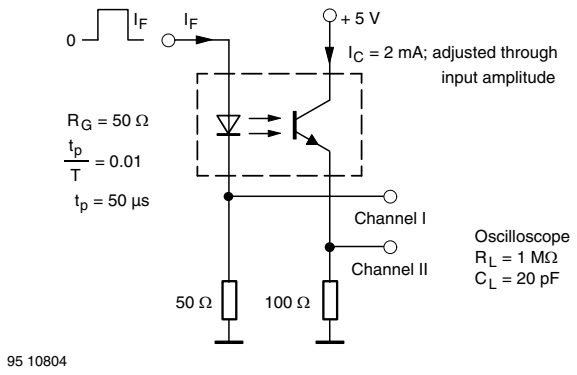


Fig. 1 - Test Circuit, Non-Saturated Operation

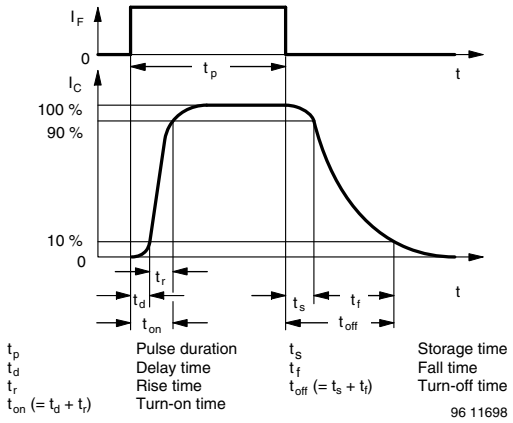


Fig. 3 - Switching Times

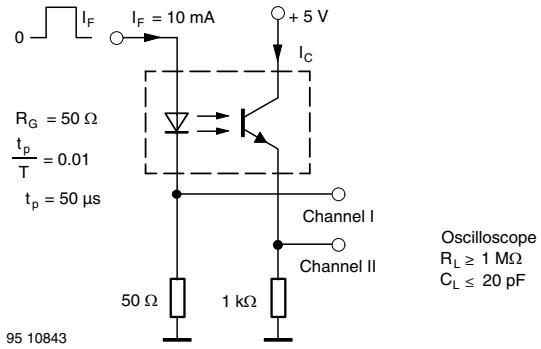


Fig. 2 - Test Circuit, Saturated Operation

SAFETY AND INSULATION RATINGS				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Climatic classification	According to IEC 68 part 1		55 / 100 / 21	
Comparative tracking index		CTI	175	
Maximum rated withstanding isolation voltage	t = 1 min	V_{ISO}	4420	V_{RMS}
Maximum transient isolation voltage		V_{IOTM}	10 000	V_{peak}
Maximum repetitive peak isolation voltage		V_{IORM}	890	V_{peak}
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
Output safety power		P_{SO}	400	mW
Input safety current		I_{SI}	275	mA
Safety temperature		T_S	175	°C
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Insulation thickness		DTI	≥ 0.4	mm

Note

- As per IEC 60747-5-5, § 7.4.3.8.2, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

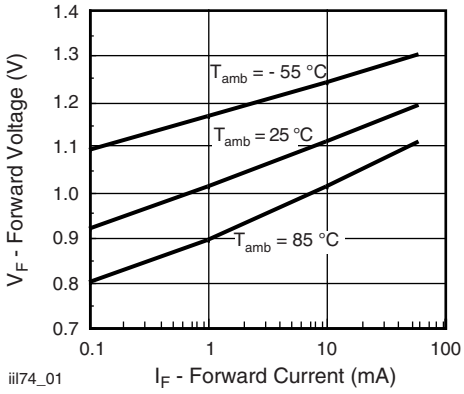


Fig. 4 - Forward Voltage vs. Forward Current

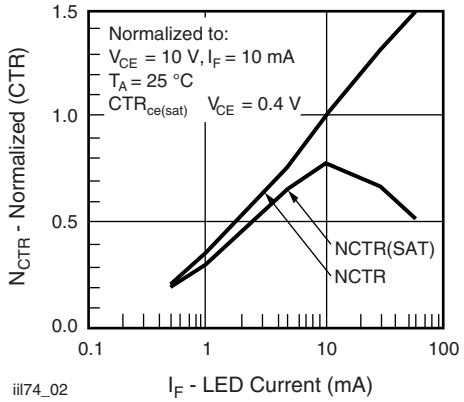


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

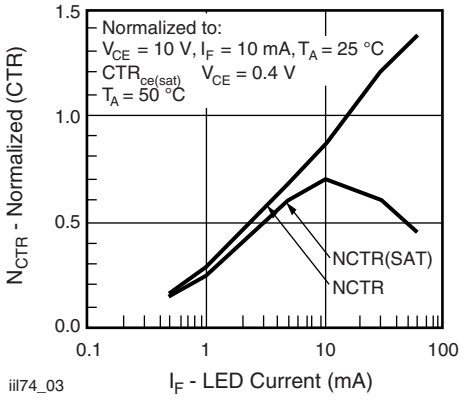


Fig. 6 - Normalized Non-Saturated and Saturated CTR vs. LED Current

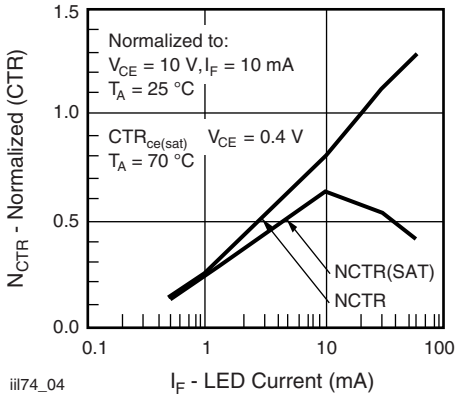


Fig. 7 - Normalized Non-Saturated and Saturated CTR vs. LED Current

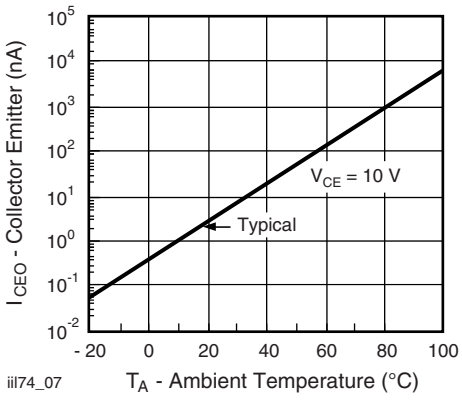


Fig. 10 - Collector Emitter Leakage Current vs.Temperature

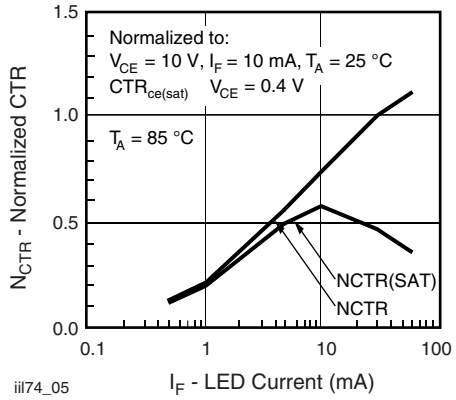


Fig. 8 - Normalized Non-Saturated and Saturated CTR vs. LED Current

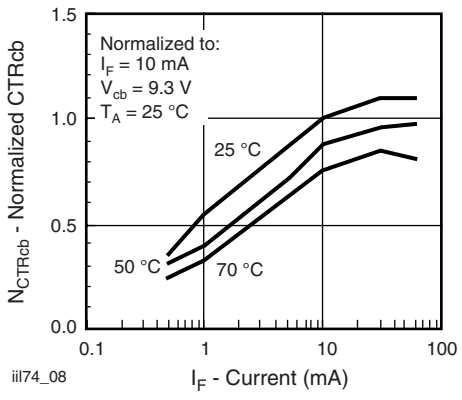


Fig. 11 - Normalized CTR_{cb} vs. LED Current and Temperature

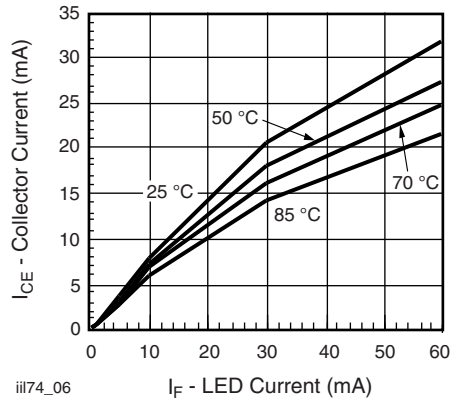


Fig. 9 - Collector Emitter Current vs. Temperature and LED Current

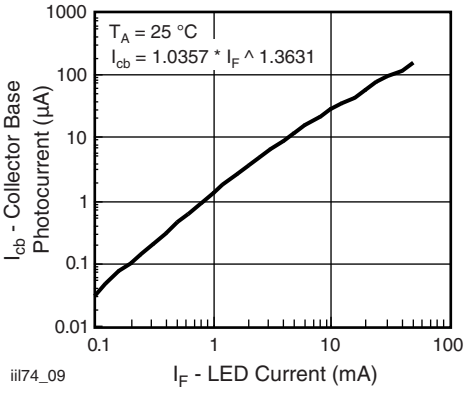


Fig. 12 - Collector Base Photocurrent vs. LED Current

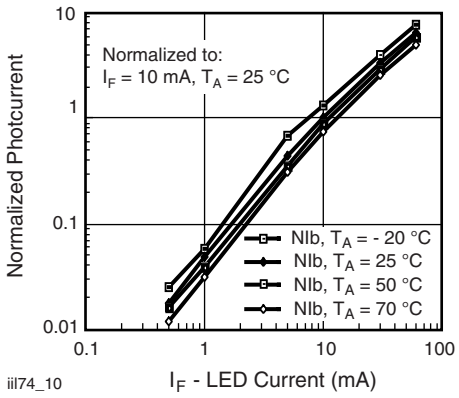


Fig. 13 - Normalized Photocurrent vs. I_F and Temperature

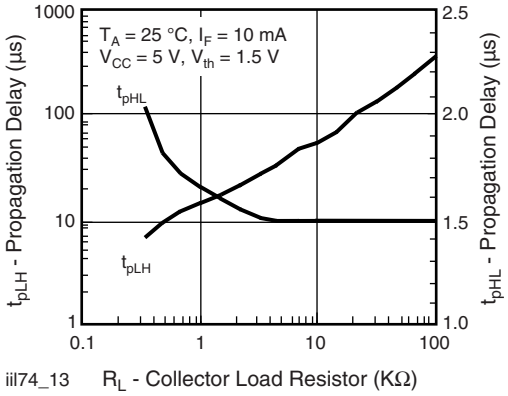


Fig. 16 - Propagation Delay vs. Collector Load Resistor

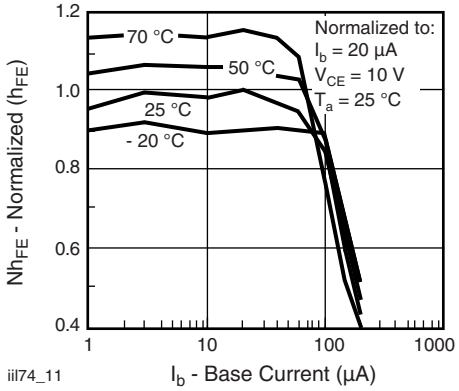


Fig. 14 - Normalized Non-Saturated h_{FE} vs. Base Current and Temperature

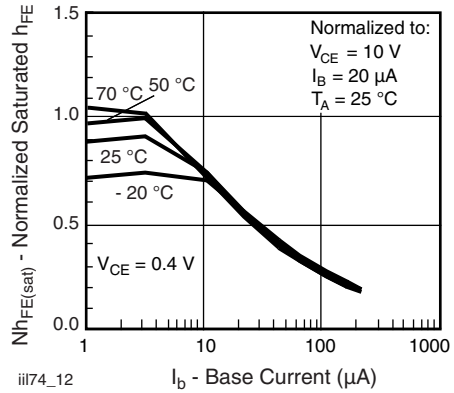
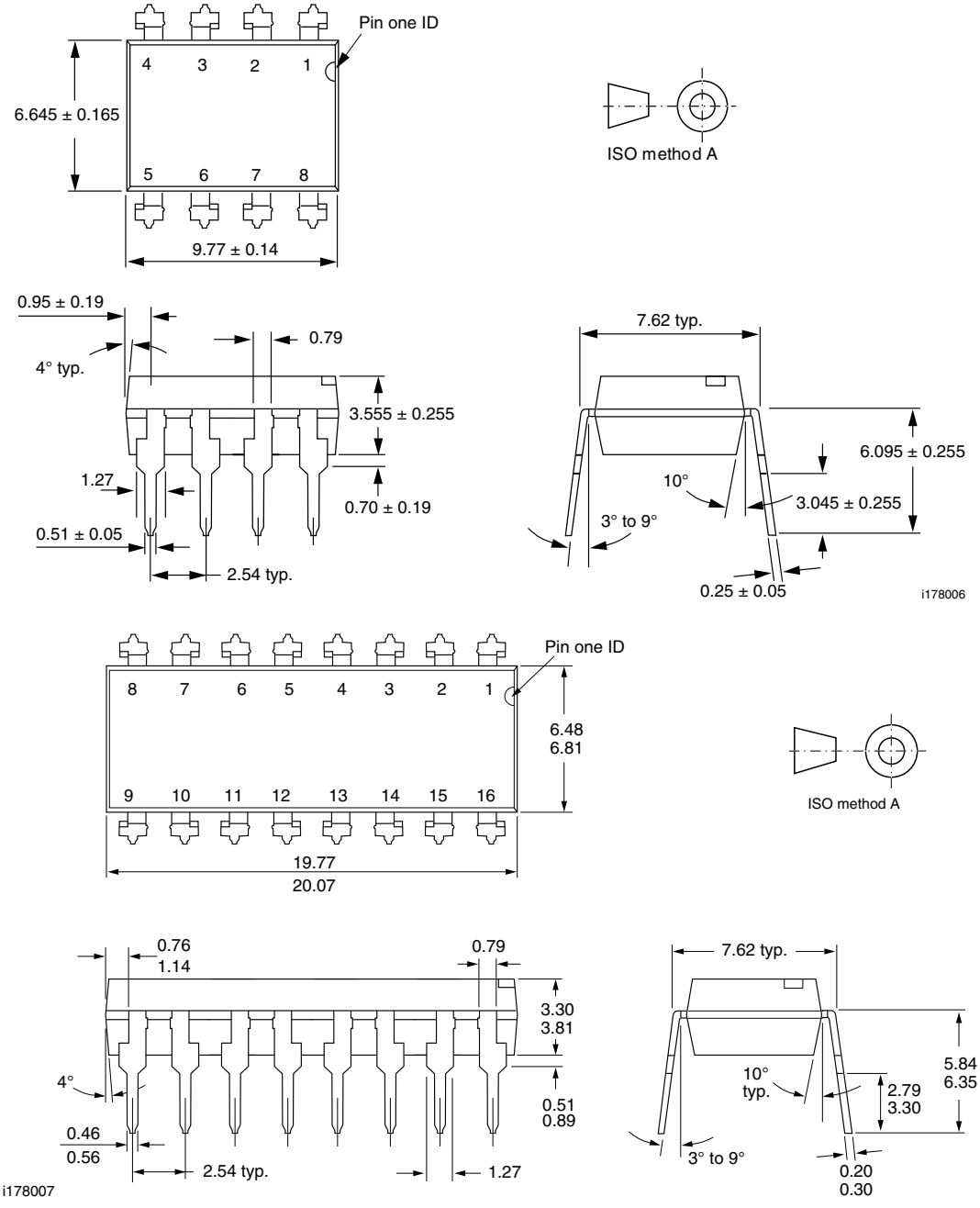
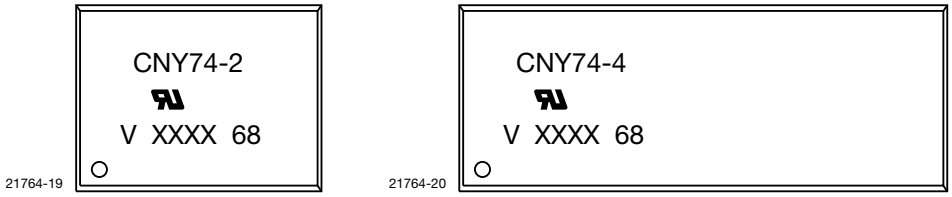


Fig. 15 - Normalized Saturated h_{FE} vs. Base Current and Temperature

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING



Note

- XXXX = LMC (lot marking code)
- CNY74-2H and CNY74-4H are marked as CNY74-2 and CNY74-4 respectively

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