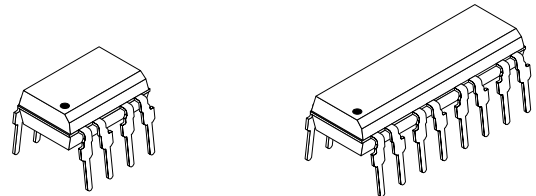


Multichannel Optocoupler with Phototransistor Output

Description

The CNY74-2H and CNY74-4H consist of a phototransistor optically coupled to a gallium arsenide infrared-emitting diode in an 8-lead, resp. 16-lead plastic dual inline package.

The elements are mounted on one leadframe using a **coplanar technique**, providing a fixed distance between input and output for highest safety requirements.



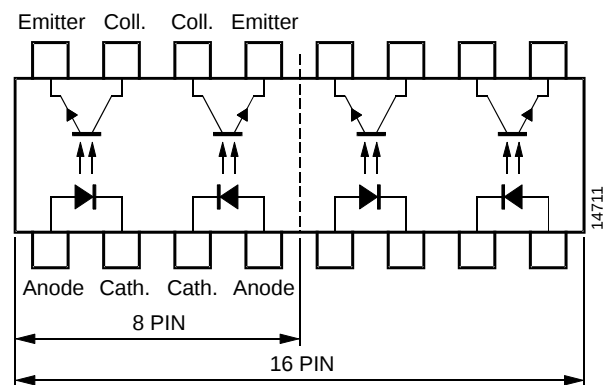
14926

Applications

Galvanically separated circuits, non-interacting switches

Features

- CNY74-2H includes 2 isolater channels
- CNY74-4H includes 4 isolater channels
- Isolation test voltage $V_{IO} = 5 \text{ kV}$
- Test class 25/100/21 DIN 40 045
- Low coupling capacitance of typical 0.3 pF
- **C**urrent **T**ransfer **R**atio (CTR) of typical 100%
- Low temperature coefficient of CTR
- Wide ambient temperature range
- **U**nderwriters **L**aboratory (UL) 1577 recognized, file number E-76222
- **C**SA (C-UL) 1577 recognized, file number E-76222 – Double Protection
- Coupling System U



Order Instruction

Ordering Code	CTR Ranking	Remarks
CNY74-2H	50 to 600%	8 Pin = Dual channel
CNY74-4H	50 to 600%	16 Pin = Quad channel

Absolute Maximum Ratings

Input (Emitter)

Parameter	Test Conditions	Symbol	Value	Unit
Reverse voltage		V_R	6	V
Forward current		I_F	60	mA
Forward surge current	$t_p \leq 10 \mu s$	I_{FSM}	1.5	A
Power dissipation	$T_{amb} \leq 25^\circ C$	P_V	100	mW
Junction temperature		T_j	125	$^\circ C$

Output (Detector)

Parameter	Test Conditions	Symbol	Value	Unit
Collector emitter voltage		V_{CEO}	70	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
Peak collector current	$t_p/T = 0.5, t_p \leq 10 \text{ ms}$	I_{CM}	100	mA
Power dissipation	$T_{amb} \leq 25^\circ C$	P_V	150	mW
Junction temperature		T_j	125	$^\circ C$

Coupler

Parameter	Test Conditions	Symbol	Value	Unit
AC isolation test voltage (RMS)	$t = 1 \text{ min}$	$V_{IO}^{1)}$	5	kV
Total power dissipation	$T_{amb} \leq 25^\circ C$	P_{tot}	250	mW
Ambient temperature range		T_{amb}	-40 to +100	$^\circ C$
Storage temperature range		T_{stg}	-55 to +125	$^\circ C$
Soldering temperature	2 mm from case, $t \leq 10 \text{ s}$	T_{sd}	260	$^\circ C$
¹⁾ Related to standard climate 23/50 DIN 50014				

Electrical Characteristics ($T_{amb} = 25^{\circ}\text{C}$)

Input (Emitter)

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	$I_F = 50 \text{ mA}$	V_F		1.25	1.6	V

Output (Detector)

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
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 dark current	$V_{CE} = 20 \text{ V}, I_F = 0, E = 0$	I_{CEO}			100	nA

Coupler

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
DC isolation test voltage	$t = 2 \text{ s}$	$V_{IO}^{1)}$	5			kV
Isolation resistance	$V_{IO} = 1000 \text{ V}$, 40% relative humidity	$R_{IO}^{1)}$		10^{12}		Ω
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		100		kHz
Coupling capacitance	$f = 1 \text{ MHz}$	C_k		0.3		pF

¹⁾ Related to standard climate 23/50 DIN 50014

Current Transfer Ratio (CTR)

Parameter	Test Conditions	Type	Symbol	Min.	Typ.	Max.	Unit
I_C/I_F	$V_{CE} = 5 \text{ V}, I_F = 5 \text{ mA}$		CTR	0.5	1.0	6.0	
	$V_{CE} = 5 \text{ V}, I_F = 10 \text{ mA}$		CTR	0.6	1.2		

Switching Characteristics

Parameter	Test Conditions	Symbol	Typ.	Unit
Delay time	$V_S = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\ \Omega$ (see figure 1)	t_d	3.0	μs
Rise time		t_r	3.0	μs
Fall time		t_f	4.7	μs
Storage time		t_s	0.3	μs
Turn-on time		t_{on}	6.0	μs
Turn-off time		t_{off}	5.0	μs
Turn-on time	$V_S = 5\text{ V}$, $I_F = 10\text{ mA}$, $R_L = 1\text{ k}\Omega$ (see figure 2)	t_{on}	9.0	μs
Turn-off time		t_{off}	18.0	μs

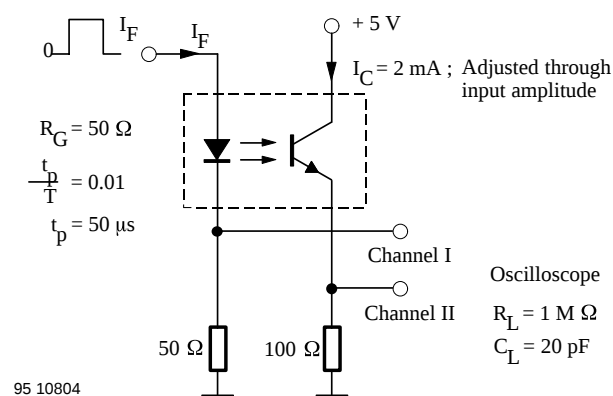


Figure 1. Test circuit, non-saturated operation

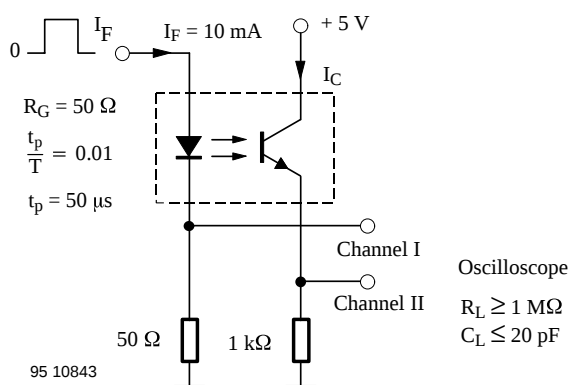


Figure 2. Test circuit, saturated operation

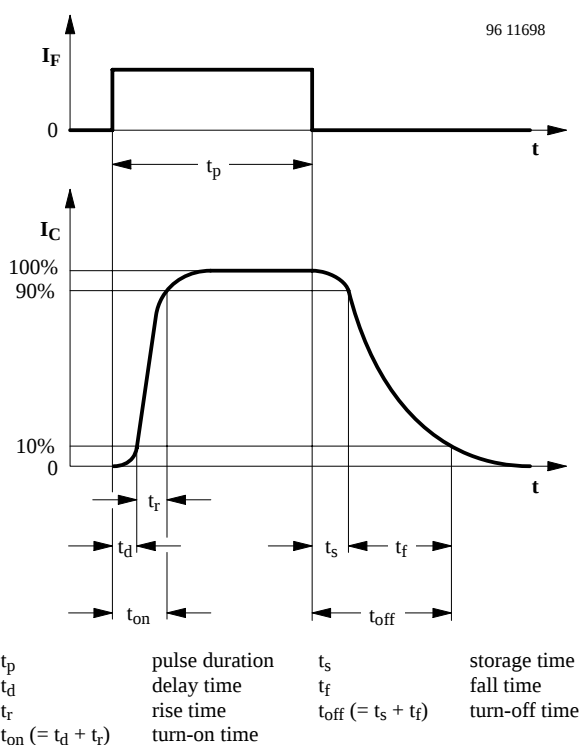


Figure 3. Switching times

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

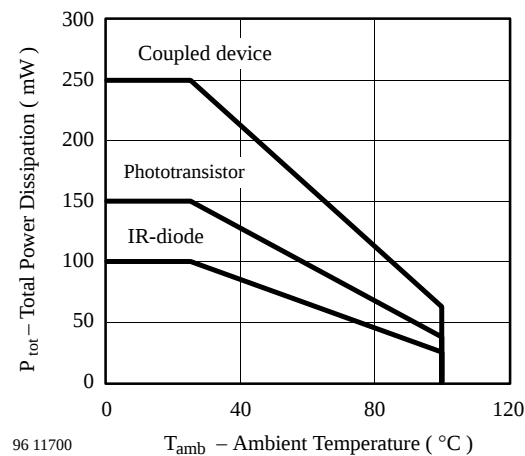


Figure 4. Total Power Dissipation vs. Ambient Temperature

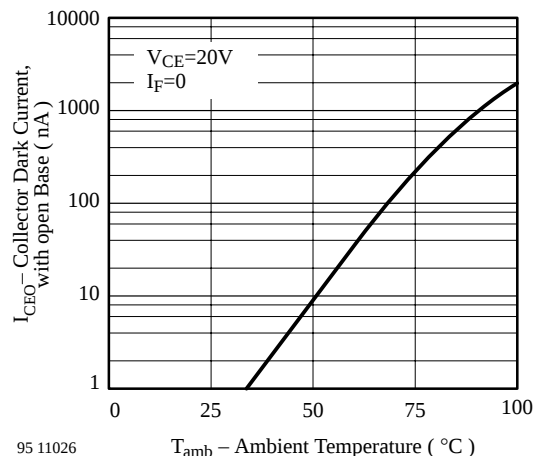


Figure 7. Collector Dark Current vs. Ambient Temperature

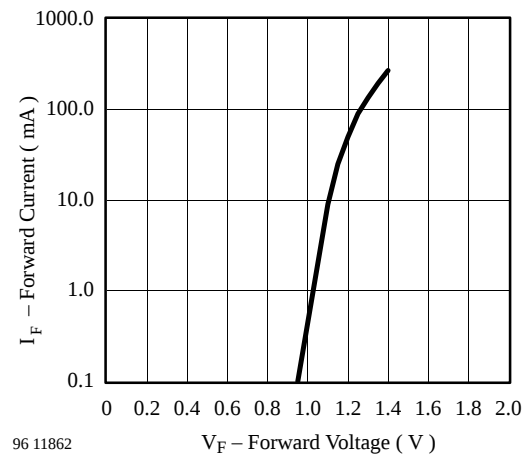


Figure 5. Forward Current vs. Forward Voltage

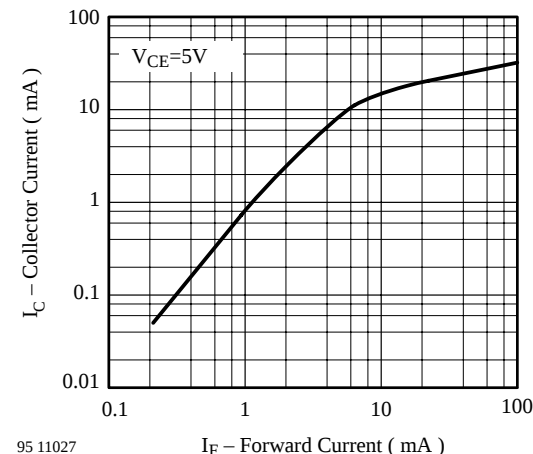


Figure 8. Collector Current vs. Forward Current

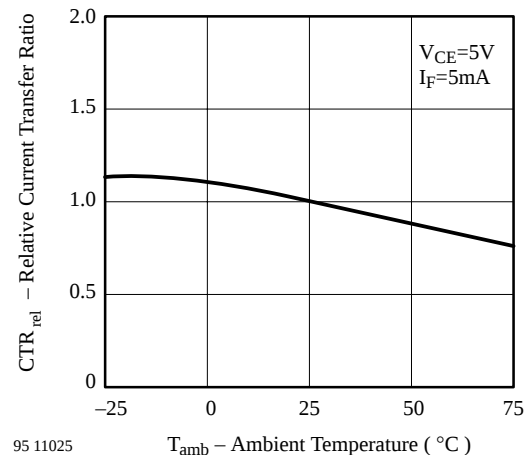


Figure 6. Relative Current Transfer Ratio vs. Ambient Temperature

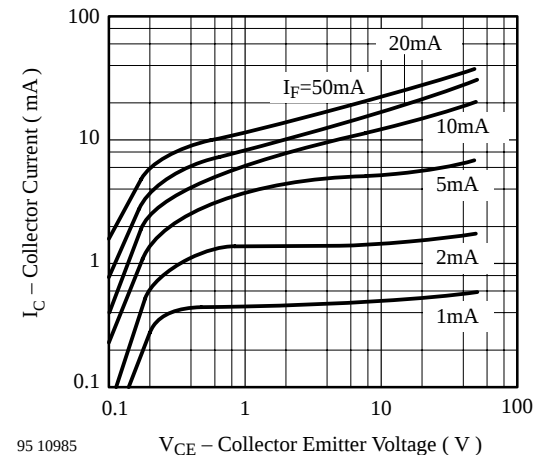
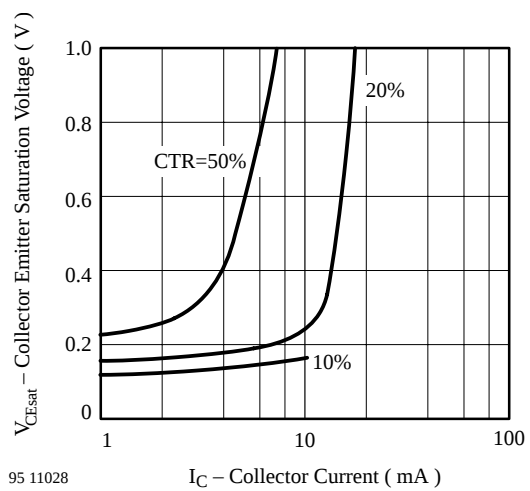
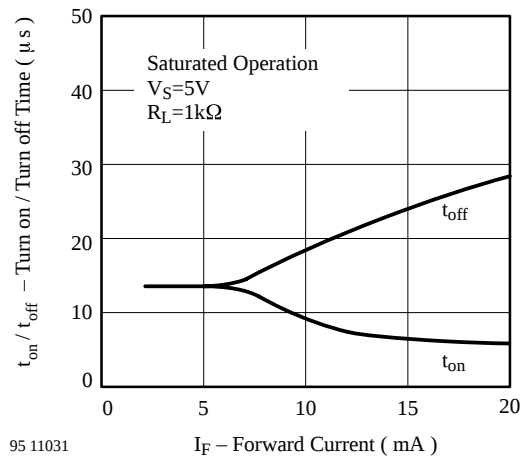


Figure 9. Collector Current vs. Collector Emitter Voltage



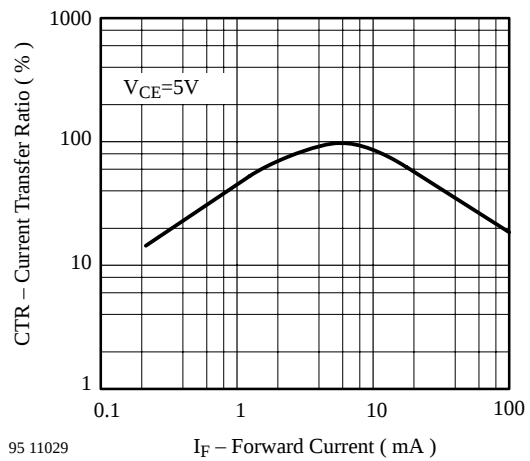
95 11028

Figure 10. Collector Emitter Saturation Voltage vs. Collector Current



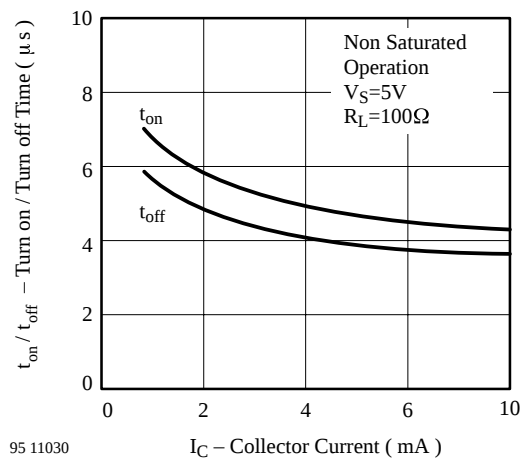
95 11031

Figure 12. Turn on / off Time vs. Forward Current



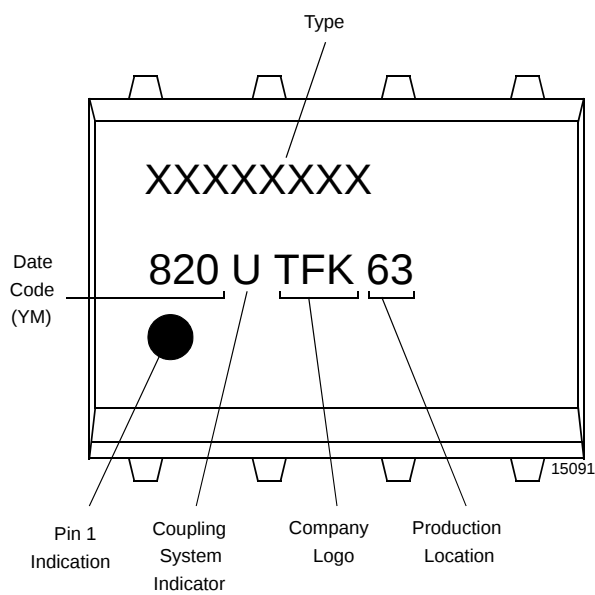
95 11029

Figure 11. Current Transfer Ratio vs. Forward Current

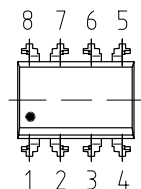
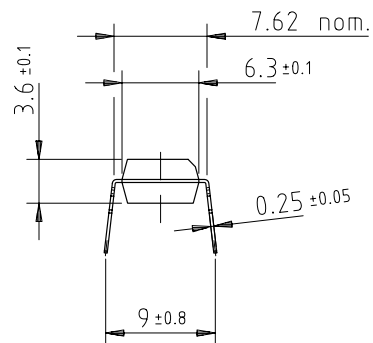
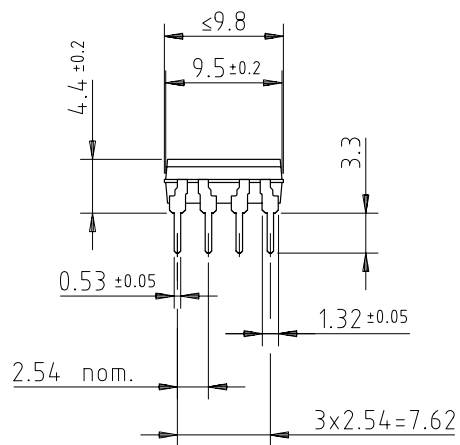


95 11030

Figure 13. Turn on / off Time vs. Collector Current

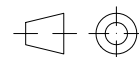


Dimensions of CNY74-2 in mm



weight: ca. 0.55 g
 creepage distance: ≥ 6 mm
 air path: ≥ 6 mm

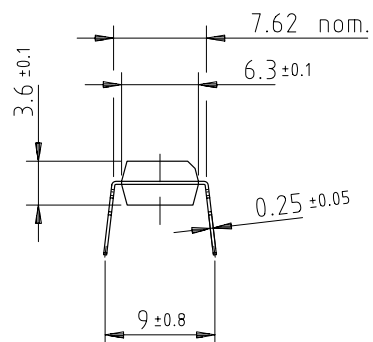
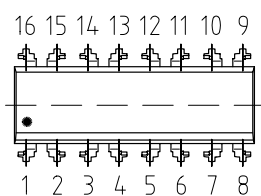
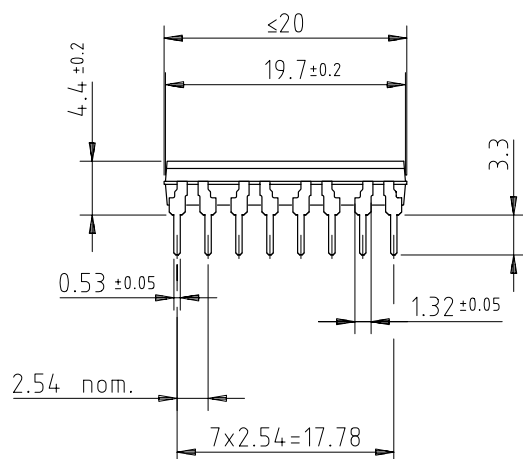
after mounting on PC board



technical drawings
 according to DIN
 specifications

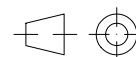
14784

Dimensions of CNY74-4 in mm



weight: ca. 1.0 g
 creepage distance: $\geq 6 \text{ mm}$
 air path: $\geq 6 \text{ mm}$

after mounting on PC board



technical drawings
 according to DIN
 specifications

14783