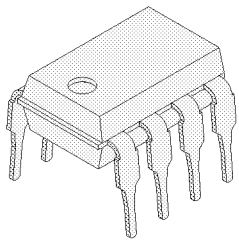
CNY74-2/74-4

Multichannel Optocoupler with Phototransistor Output

Description

The CNY74-2 and CNY74-4 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.



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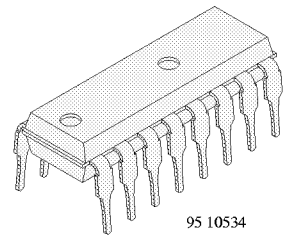

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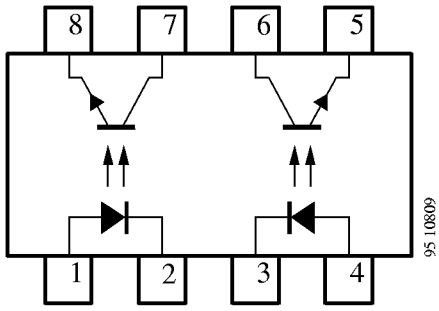
Applications

Galvanically separated circuits, non-interacting switches.

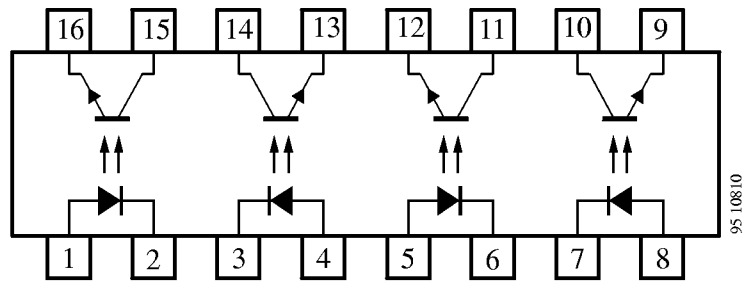
Features

- CNY74-2 includes 2 isolator channels
- CNY74-4 includes 4 isolator channels
- DC isolation test voltage V_{IO} = 2.5 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

Pin Connections



CNY74-2



CNY74-4

Absolute Maximum Ratings

For single coupled system

Input (Emitter)

Parameters	Test Conditions	Symbol	Value	Unit
Reserve 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	$T_{amb} \leq 25°C$	P_V	100	mW
Junction temperature		T_j	125	°C

Output (Detector)

Parameters	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	$t_p/T = 0.5$, $t_p \leq 10$ ms	I_{CM}	100	mA
Power dissipation	$T_{amb} \leq 25°C$	P_V	150	mW
Junction temperature		T_j	125	°C

Coupler

Parameters	Test Conditions	Symbol	Value	Unit
DC Isolation test voltage		V_{IO} [1)]	2.5	kV
Total power dissipation	$T_{amb} \leq 25°C$	P_{tot}	250	mW
Ambient temperature range		T_{amb}	–40 to +100	°C
Storage temperature range		T_{stg}	–55 to +125	°C
Soldering temperature	2 mm from case, $t \leq 10$ s	T_{sd}	260	°C

1) Related to standard climate 23/50 DIN 50 014

Electrical Characteristics

For single coupled system, T_{amb} = 25°C

Input (Emitter)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	I_F = 50 mA	V_F		1.25	1.6	V

Output (Detector)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector emitter voltage	I_C = 1 mA	V_{CEO}	70			V
Emitter collector voltage	I_E = 100 µA	V_{ECO}	7			V
Collector dark current	V_{CE} = 20 V, I_F = 0, E = 0	I_{CEO}			100	nA

Coupler

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
DC isolation test voltage	t = 2 s	V_{IO} [1]	2.5			kV
Isolation resistance	V_{IO} = 1000 V, 40% relative humidity	R_{IO} [1]	10^{10}	10^{12}		Ω
Collector current	I_F = 5 mA, V_{CE} = 5 V I_F = 10 mA, V_{CE} = 5 V	I_C I_C	2.5 6	5 12	30	mA mA
I_C/I_F	I_F = 5 mA, V_{CE} = 5 V	CTR	0.5	1	6	
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		100		kHz
Coupling capacitances	f = 1 MHz	C_k		0.3		pF

1) Related to standard climate 23/50 DIN 50 014

Switching Characteristics (Typical Values)

V_S = 5 V

Type	R_L = 100 Ω (see figure 1)							R_L = 1 kΩ (see figure 2)		
	t_d[µs]	t_r[µs]	t_{on}[µs]	t_s[µs]	t_f[µs]	t_{off}[µs]	I_C[mA]	t_{on}[µs]	t_{off}[µs]	I_F[mA]
CNY74-2/ CNY74-4	3.0	3.0	6.0	0.3	4.7	5.0	2	9	18	10

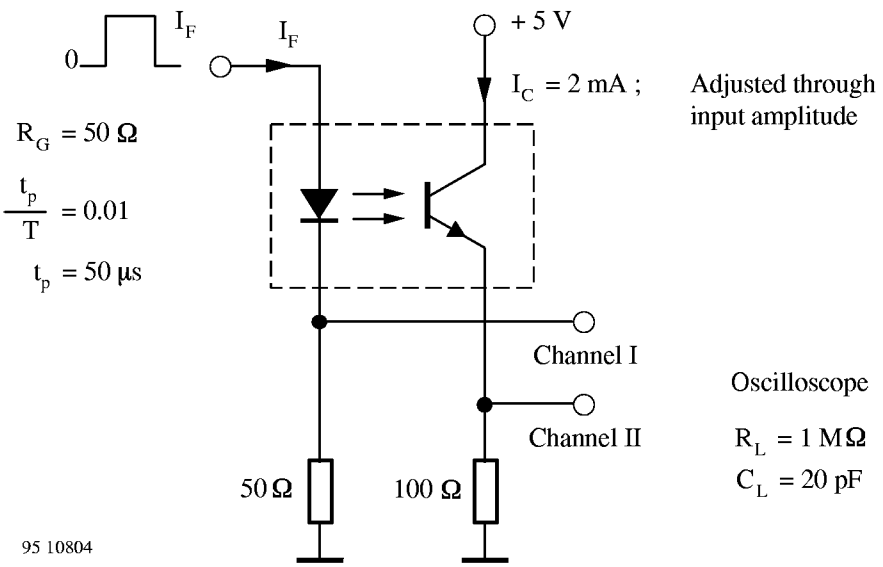


Figure 1. Test circuit, non-saturated operation

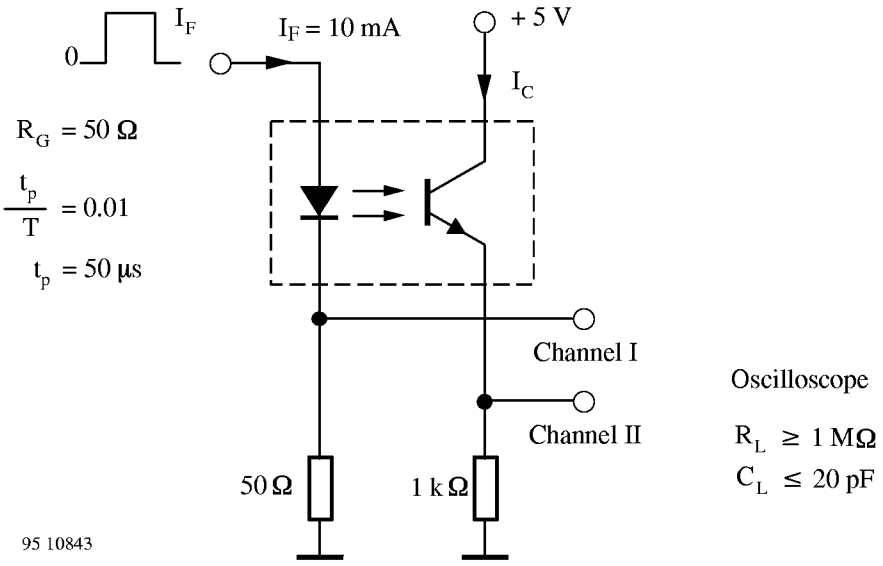


Figure 2. Test circuit, saturated operation

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

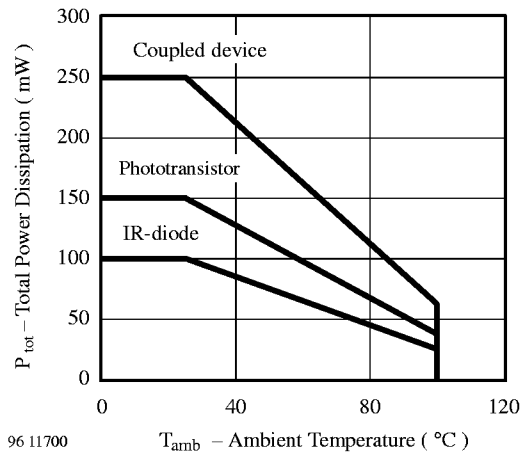


Figure 3. Total Power Dissipation vs. Ambient Temperature

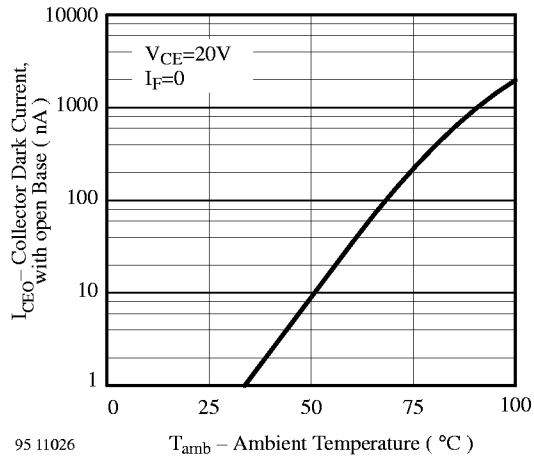


Figure 6. Collector Dark Current vs. Ambient Temperature

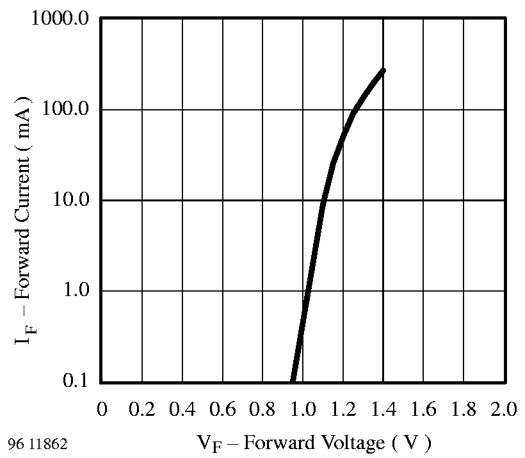


Figure 4. Forward Current vs. Forward Voltage

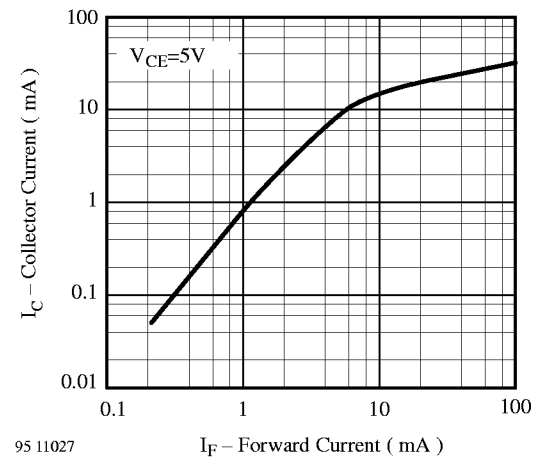


Figure 7. Collector Current vs. Forward Current

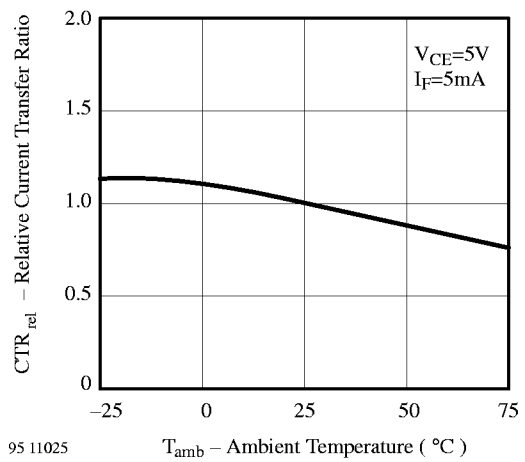


Figure 5. Rel. Current Transfer Ratio vs. Ambient Temperature

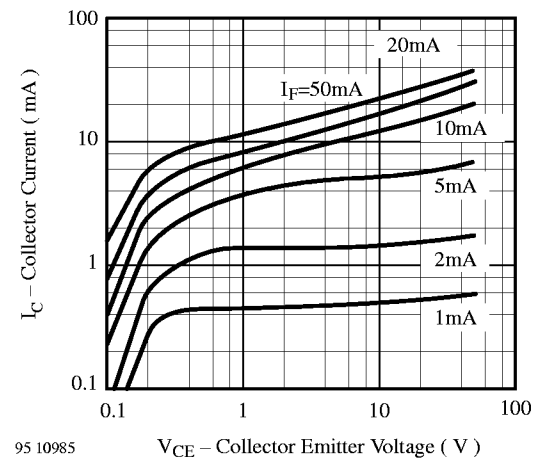


Figure 8. Collector Current vs. Collector Emitter Voltage

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

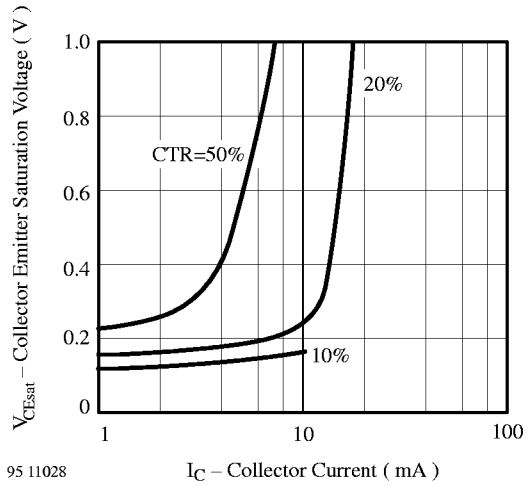


Figure 9. Collector Emitter Sat. Voltage vs. Collector Current

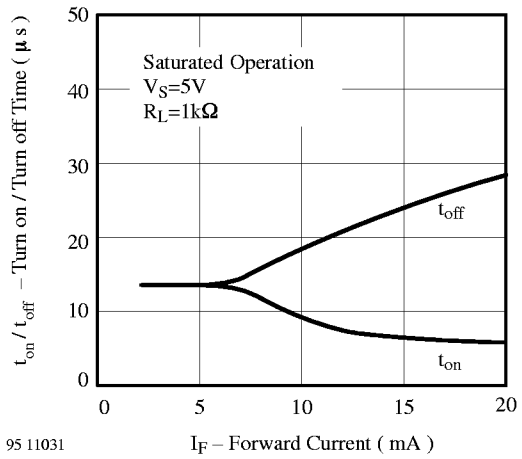


Figure 11. Turn on / off Time vs. Forward Current

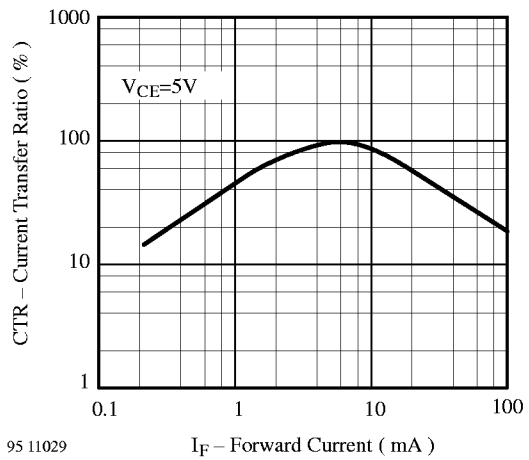


Figure 10. Current Transfer Ratio vs. Forward Current

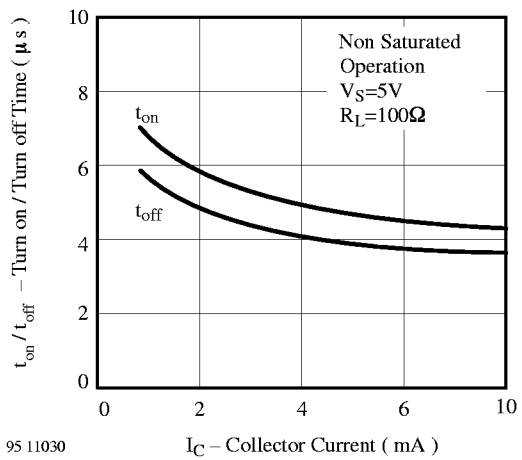
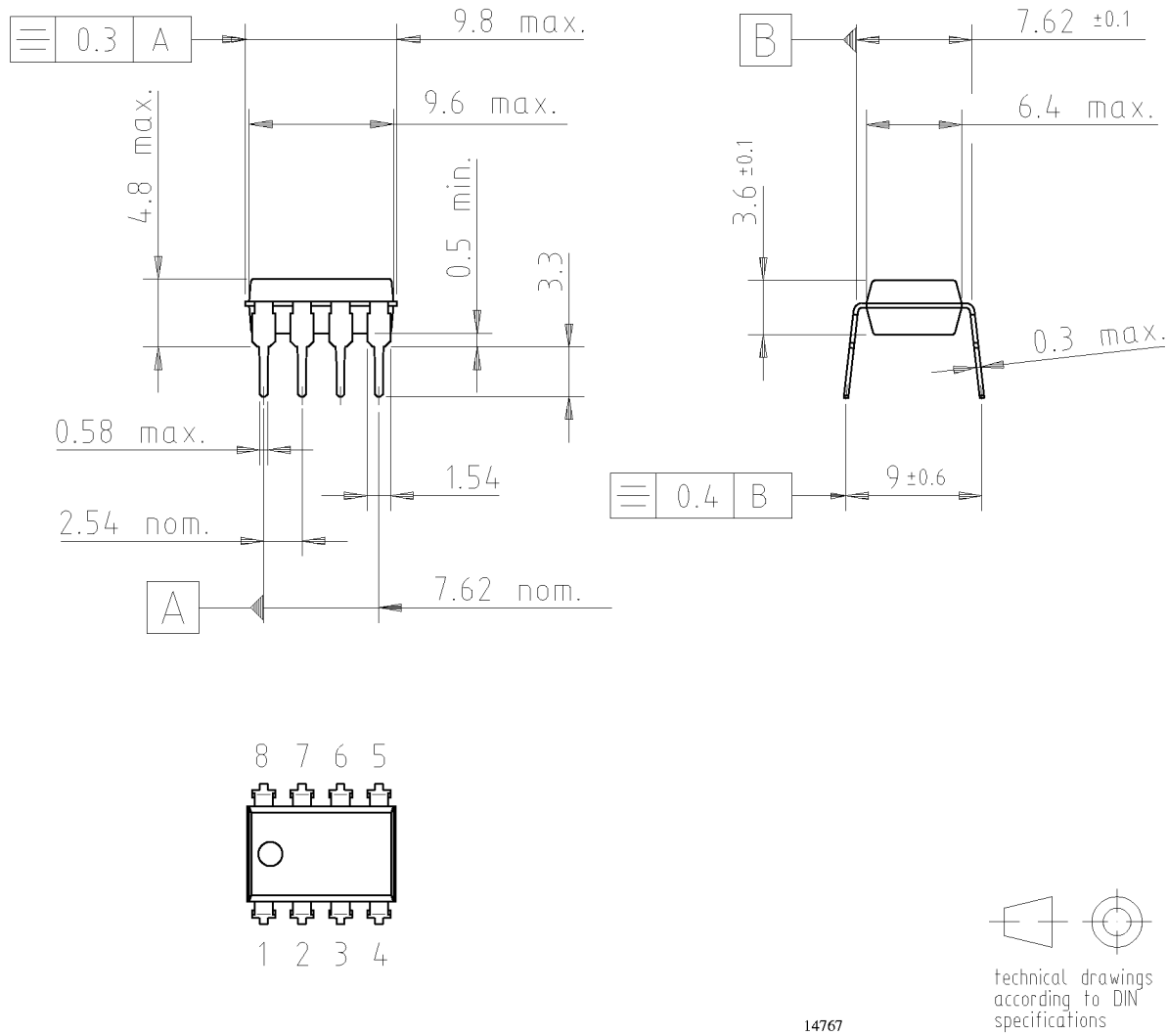


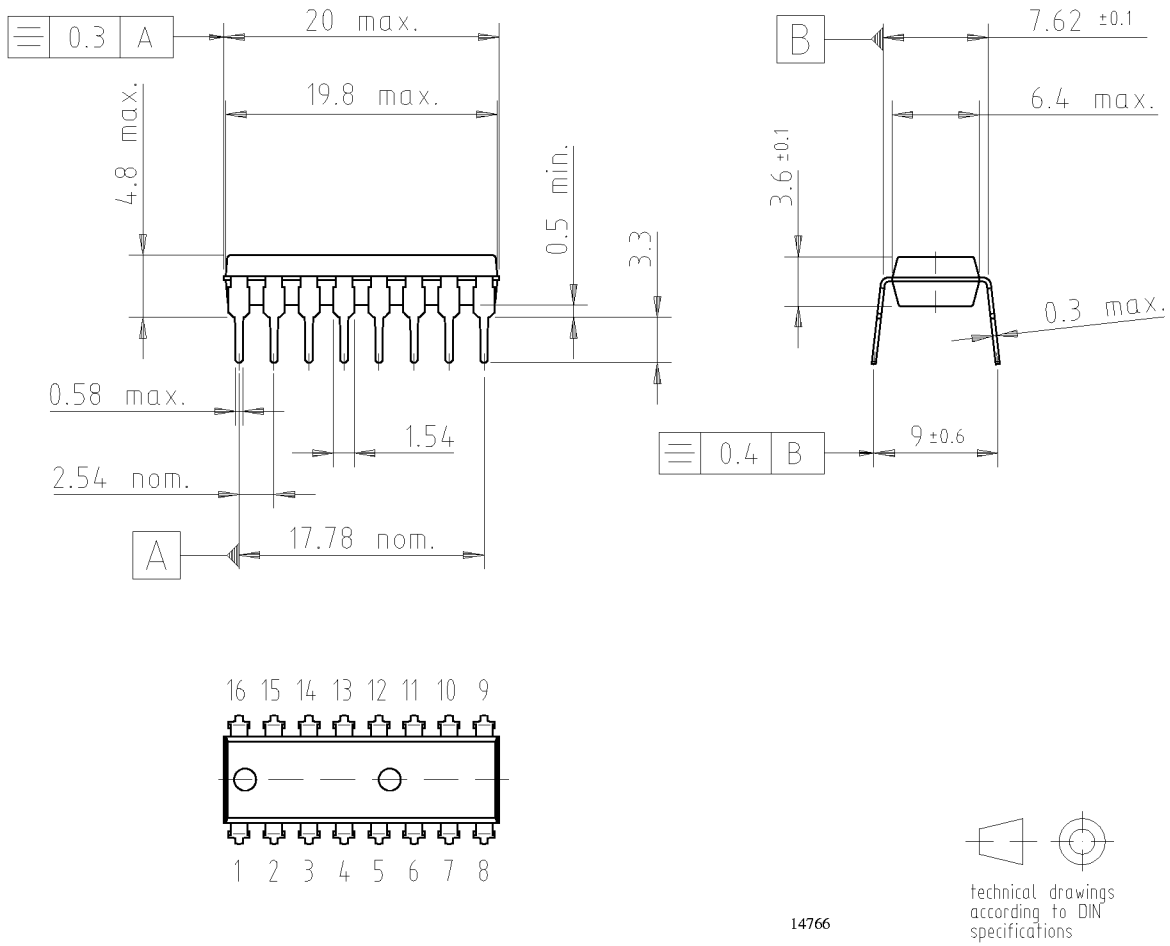
Figure 12. Turn on / off Time vs. Collector Current

Dimensions of CNY74-2 in mm



weight: ca. 0.60 g

Dimensions of CNY74-4 in mm



weight: ca. 1.20 g