CNA1006N

Photo Interrupter

For contactless SW, object detection

■ Outline
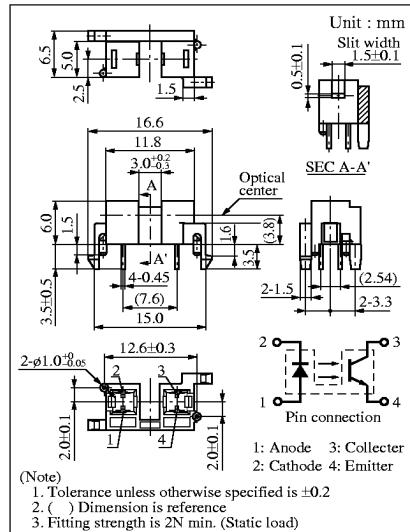
CNA1006N is a transmittive photosensor in which a high efficiency GaAs infrared light emitting diode is used as the light emitting element, and a high sensitivity phototransistor is used as the light detecting element. The two elements are arranged so as to face each other, and objects passing between them are detected.

■ Features

● Highly precise position detection : 0.3 mm

● Gap width : 3 mm

● Type which is fastened using hooks with printed circuit board (PWB) positioning pins

Unit : mm
Slit width 1.5±0.1

Pin connection
1: Anode   3: Collecter
2: Cathode 4: Emitter

(Note)
1. Tolerance unless otherwise specified is ±0.2
2. ( ) Dimension is reference
3. Fitting strength is 2N min. (Static load)

■ Absolute Maximum Ratings (Ta = 25°C)

Parameter		Symbol	Ratings	Unit
Input (Light emitting diode)	Reverse voltage (DC)	V_R	3	V
	Forward current (DC)	I_F	50	mA
	Power dissipation	$P_D{}^{*1}$	75	mW
Output (Photo transistor)	Collector current	I_C	20	mA
	Collector to emitter voltage	V_{CEO}	30	V
	Emitter to collector voltage	V_{ECO}	5	V
	Collector power dissipation	$P_C{}^{*2}$	100	mW
Temperature	Operating ambient temperature	T_{opr}	–25 to +85	°C
	Storage temperature	T_{stg}	– 30 to +100	°C
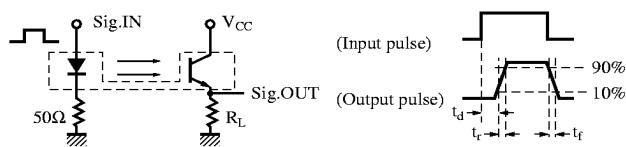
*1 Input power derating ratio is
  1.0 mW/°C at Ta ≥ 25°C.
*2 Output power derating ratio is
  1.33 mW/°C at Ta ≥ 25°C.

■ Electrical Characteristics (Ta = 25°C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Input characteristics	Forward voltage (DC)	V_F	$I_F = 20mA$		1.25	1.4	V
	Reverse current (DC)	I_R	$V_R = 3V$			10	μA
Output characteristics	Collector cutoff current	I_{CEO}	$V_{CE} = 10V$		10	200	nA
Transfer characteristics	Collector current	I_C	$V_{CE} = 5V$, $I_F = 20mA$	0.7		14	mA
	Collector to emitter saturation voltage	$V_{CE(sat)}$	$I_F = 40mA$, $I_C = 1mA$			0.4	V
	Response time	t_r, $t_f{}^*$	$V_{CC} = 5V$, $I_C = 1mA$, $R_L = 100\Omega$		5		μs

* Switching time measurement circuit

(Input pulse)

(Output pulse)

t_d : Delay time
t_r : Rise time (Time required for the collector current to increase from 10% to 90% of its final value)
t_f : Fall time (Time required for the collector current to decrease from 90% to 10% of its initial value)

I_F , I_C — Ta

Forward current, collector current I_F, I_C (mA)

I_F
I_C

Ambient temperature   Ta (°C)

I_F — V_F

Ta = 25°C

Forward current I_F (mA)

Forward voltage V_F (V)

V_F — Ta

Forward voltage V_F (V)

I_F = 50mA
10mA
1mA

Ambient temperature   Ta (°C)

I_C — I_F

V_{CE} = 5V
Ta = 25°C

Collector current I_C (mA)

Forward current I_F (mA)

I_C — V_{CE}

Ta = 25°C

I_F = 30mA
20mA
10mA

Collector current I_C (mA)

Collector to emitter voltage V_{CE} (V)

I_C — Ta

V_{CE} = 5V
I_F = 20mA

Relative output current I_C (%)

Ambient temperature   Ta (°C)

I_{CEO} — Ta

V_{CE} = 10V

Dark current I_{CEO} (nA)

Ambient temperature   Ta (°C)

t_r — I_C

V_{CC} = 5V
Ta = 25°C

R_L = 1kΩ
500Ω
100Ω

Rise time t_r (μs)

Sig.IN V_{CC}
Sig.
OUT   Sig.
OUT
50Ω R_L 90%
10%
t_r t_d t_F

Collector current I_C (mA)

I_C — d

V_{CE} = 5V
Ta = 25°C
I_F = 20mA

Criterion
0
d

Relative output current I_C (%)

Distance   d (mm)

Panasonic