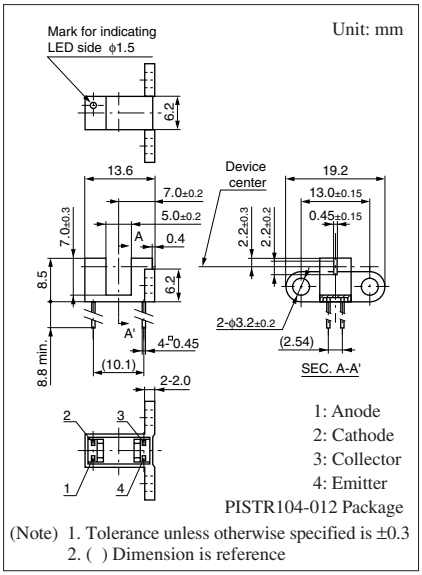
CNA1011K (ON1113)

Photo Interrupter

For contactless SW, object detection



(Note) 1. Tolerance unless otherwise specified is ±0.3
2. ( ) Dimension is reference

■ Overview

CNA1011K is a small size photocoupler package consisting of a high efficiency GaAs infrared light emitting diode used as the light emitting element, and a high sensitivity phototransistor is used as the light detecting element.

■ Features

- Highly precise position detection: 0.3 mm
- Wide gap between emitting and detecting elements, suitable for thick plate detection
- Fast response: t_r , t_f = 6 µs (typ.)
- Small output current variation against change in temperature

■ Absolute Maximum Ratings T_a = 25°C

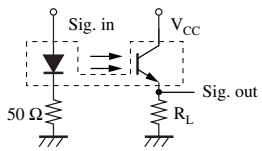
Parameter		Symbol	Rating	Unit
Input (Light emitting diode)	Reverse voltage	V_R	3	V
	Forward current	I_F	50	mA
	Power dissipation *1	P_D	75	mW
Output (Photo transistor)	Collector-emitter voltage (Base open)	V_{CEO}	30	V
	Emitter-collector voltage (Base open)	V_{ECO}	5	V
	Collector current	I_C	20	mA
	Collector power dissipation *2	P_C	100	mW
Temperature	Operating ambient temperature	T_{opr}	−25 to +85	°C
	Storage temperature	T_{stg}	−30 to +100	°C

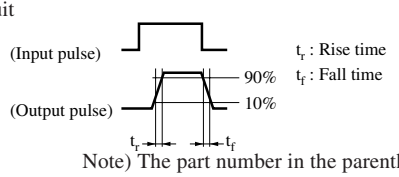
Note) ∗1: Input power derating ratio is 1.0 mW/°C at $T_a \geq 25°C$.
∗2: Output power derating ratio is 1.34 mW/°C at $T_a \geq 25°C$.

■ Electrical-Optical Characteristics T_a = 25°C ± 3°C

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Input characteristics	Forward voltage	V_F	I_F = 50 mA		1.2	1.5	V
	Reverse current	I_R	V_R = 3 V			10	µA
	Terminal capacitance	C_t	V_R = 0 V, f = 1 MHz		35		pF
Output characteristics	Collector-emitter cutoff current (Base open)	I_{CEO}	V_{CE} = 10 V			200	nA
	Collector-emitter capacitance	C_C	V_{CE} = 10 V, f = 1 MHz		5		pF
Transfer characteristics	Collector current	I_C	V_{CC} = 10 V, I_F = 20 mA, R_L = 100 Ω	0.3			mA
	Collector-emitter saturation voltage	$V_{CE(sat)}$	I_F = 50 mA, I_C = 0.1 mA			0.5	V
	Rise time *	t_r	V_{CC} = 10 V, I_C = 1 mA		6		µs
	Fall time *	t_f	R_L = 100 Ω		6		µs

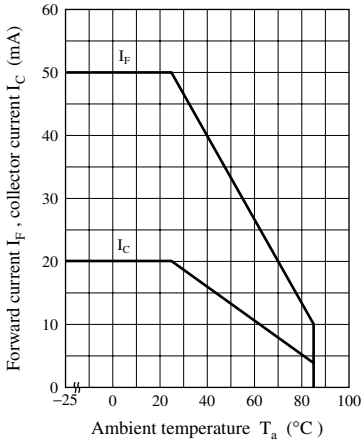
Note) 1. Input and output are practiced by electricity.
2. This device is designed be disregarded radiation.
3. ∗: Switching time measurement circuit



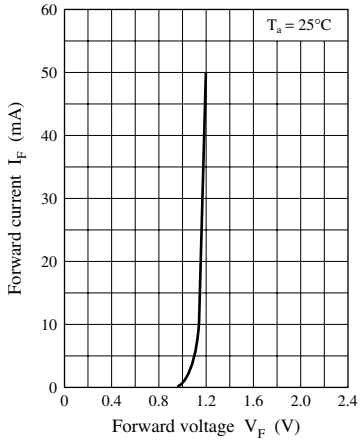


Note) The part number in the parenthesis shows conventional part number.

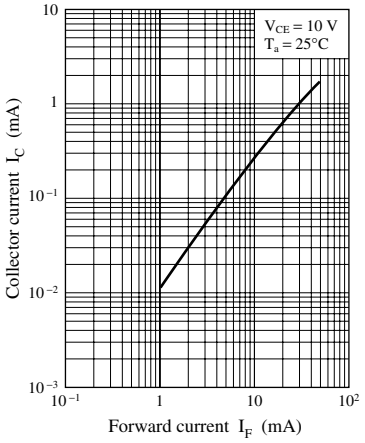
I_F , I_C — T_a



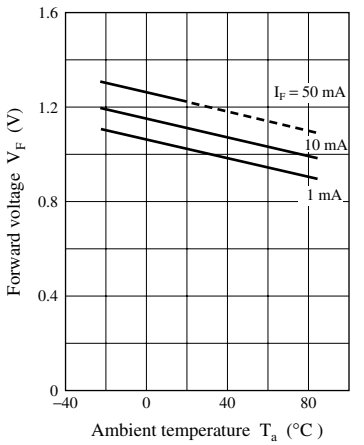
I_F — V_F



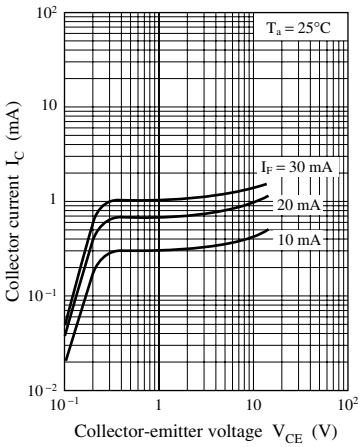
I_C — I_F



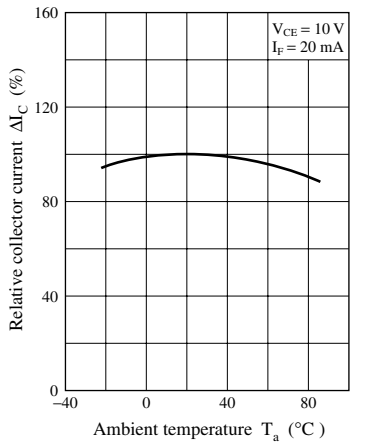
V_F — T_a



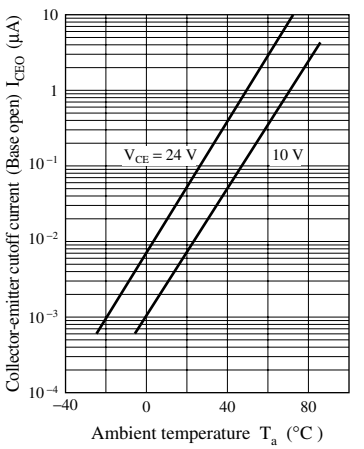
I_C — V_{CE}



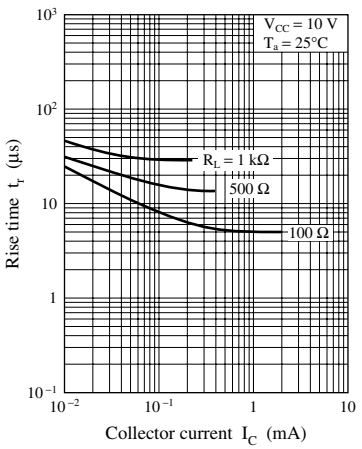
ΔI_C — T_a



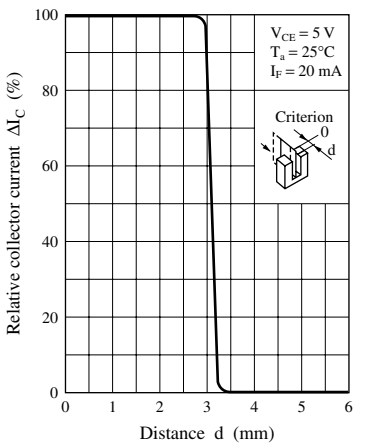
I_{CEO} — T_a



t_r — I_C



ΔI_C — d



⚠ Caution for Safety

⚠ DANGER

■ This product contains Gallium Arsenide (GaAs).

GaAs powder and vapor are hazardous to human health if inhaled or ingested. Do not burn, destroy, cut, cleave off, or chemically dissolve the product. Follow related laws and ordinances for disposal. The product should be excluded form general industrial waste or household garbage.

Request for your special attention and precautions in using the technical information and semiconductors described in this material

(1) An export permit needs to be obtained from the competent authorities of the Japanese Government if any of the products or technical information described in this material and controlled under the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.

(2) The technical information described in this material is limited to showing representative characteristics and applied circuits examples of the products. It neither warrants non-infringement of intellectual property right or any other rights owned by our company or a third party, nor grants any license.

(3) We are not liable for the infringement of rights owned by a third party arising out of the use of the technical information as described in this material.

(4) The products described in this material are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
- Any applications other than the standard applications intended.

(5) The products and product specifications described in this material are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(6) When designing your equipment, comply with the guaranteed values, in particular those of maximum rating, the range of operating power supply voltage, and heat radiation characteristics. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(7) When using products for which damp-proof packing is required, observe the conditions (including shelf life and amount of time let standing of unsealed items) agreed upon when specification sheets are individually exchanged.

(8) This material may be not reprinted or reproduced whether wholly or partially, without the prior written permission of Matsushita Electric Industrial Co., Ltd.