

CNB1009 (ON2173)

Reflective photosensor

Non-contact point SW, object sensing

Overview

CNB1009 is a photosensor detecting the change of reflective light in which a high efficiency GaAs infrared light emitting diode is used as the light emitting element, and a high sensitivity Si phototransistor is used as the light detecting element. The two elements are located parallel in the same direction and objects are detected when passing in front of the device.

Features

- Fast response: $t_r, t_f = 6 \mu s$ (typ.)
- Small size, light weight

Applications

- Detection of paper, film and cloth
- Optical mark reading
- Detection of coin and bill
- Detection of position and edge
- Start, end mark detection of magnetic tape

Absolute Maximum Ratings $T_a = 25^\circ C$

| | 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} | 20 | V |
| | Emitter-collector voltage (Base open) | V_{ECO} | 5 | V |
| | Collector current | I_C | 30 | mA |
| | Collector power dissipation *2 | P_C | 100 | mW |
| Temperature | Operating ambient temperature | T_{opr} | -25 to +85 | $^\circ C$ |
| | Storage temperature | T_{stg} | -30 to +100 | $^\circ C$ |

Electrical-Optical Characteristics $T_a = 25^\circ C \pm 3^\circ C$

| | Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|--------------------------|--|---------------|--|-----|-----|-----|---------|
| Input characteristics | Forward voltage | V_F | $I_F = 50 \text{ mA}$ | | 1.2 | 1.5 | V |
| | Reverse current | I_R | $V_R = 3 \text{ V}$ | | | 10 | μA |
| | Terminal capacitance | C_t | $V_R = 0 \text{ V}, f = 1 \text{ MHz}$ | | 50 | | pF |
| Output characteristics | Collector-emitter cutoff current (Base open) | I_{CEO} | $V_{CE} = 10 \text{ V}$ | | | 200 | nA |
| | Collector-emitter capacitance | C_C | $V_{CE} = 10 \text{ V}, f = 1 \text{ MHz}$ | | 5 | | pF |
| Transfer characteristics | Collector current *1, 2 | I_C | $V_{CC} = 10 \text{ V}, I_F = 20 \text{ mA}, R_L = 100 \Omega, d = 5 \text{ mm}$ | 100 | 500 | | μA |
| | Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_F = 50 \text{ mA}, I_C = 0.1 \text{ mA}$ | | | 0.3 | V |
| | Rise time | t_r | $V_{CC} = 10 \text{ V}, I_C = 1 \text{ mA}, R_L = 100 \Omega$ | | 6.0 | | μs |
| | Fall time | t_f | | | 6.0 | | μs |

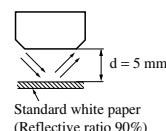
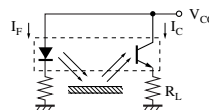
Note) 1. Input and output are handled electrically.

2. This product is not designed to withstand radiation

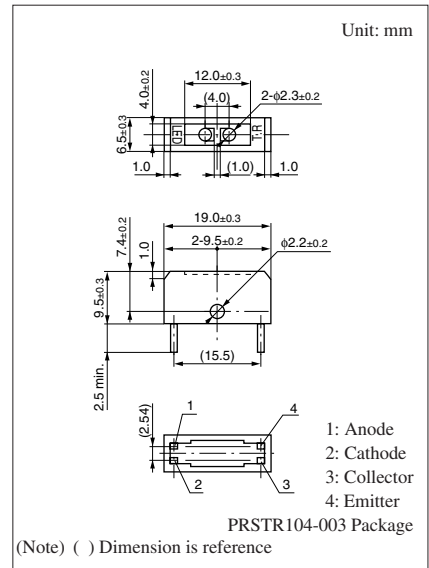
3. *1: Output current measurement circuit
(Ambient light is shut off completely)

*2: Rank classification

| Rank | Q | R | S | No-rank |
|---------------|------------|------------|------------|------------|
| $I_C (\mu A)$ | 100 to 500 | 350 to 750 | $600 \leq$ | $100 \leq$ |

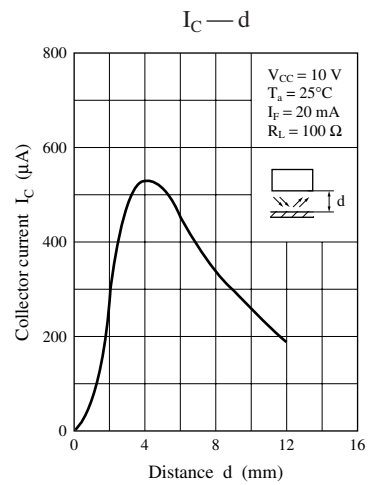
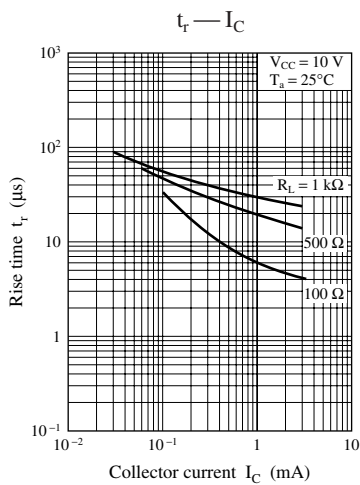
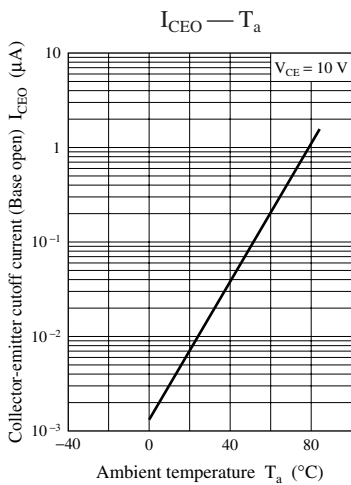
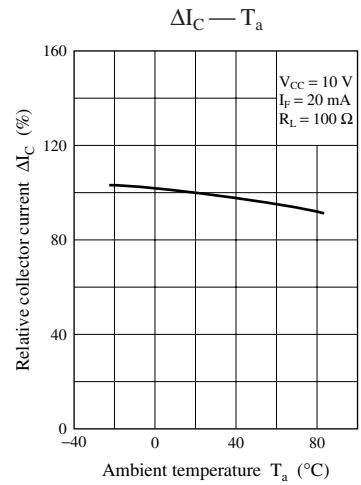
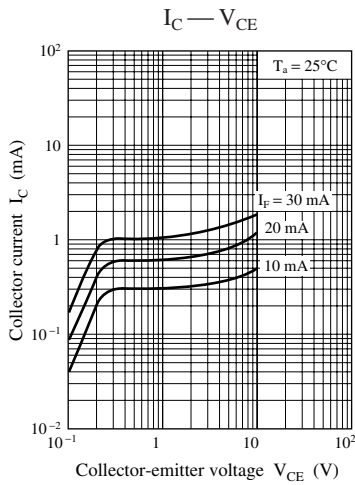
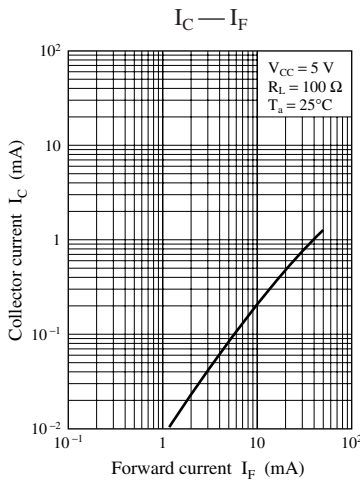
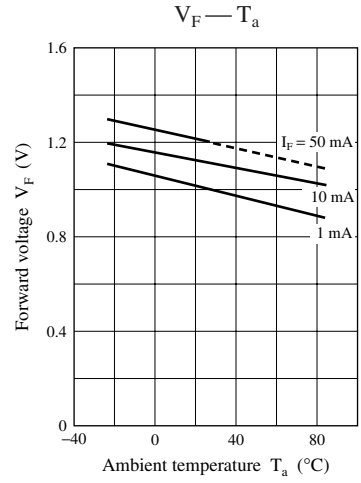
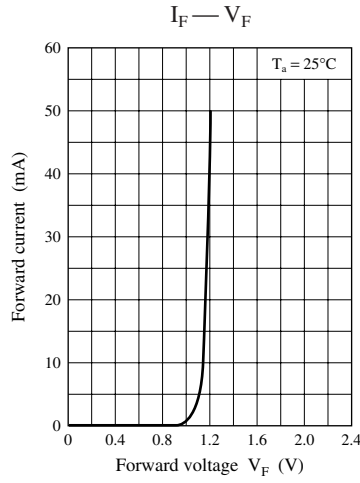
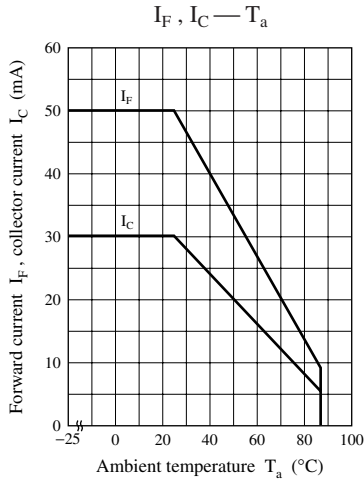


Note) The part number in the parenthesis shows conventional part number.



Note) *1: Input power derating ratio is 1.0 mW/ $^\circ C$ at $T_a \geq 25^\circ C$.

*2: Output power derating ratio is 1.33 mW/ $^\circ C$ at $T_a \geq 25^\circ C$.



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 from general industrial waste or household garbage.

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