

# CNB1302

## Reflective Photosensor

### Overview

CNB1302 is a small, thin reflective photosensor consisting of a high efficiency GaAs infrared light emitting diode which is integrated with a high sensitivity Si phototransistor in a single resin package.

### Features

- Ultraminiature, thin type : 2.7 × 3.4 mm (height : 1.5 mm)
- Visible light cutoff resin is used
- Fast response :  $t_r, t_f = 20\mu s$  (typ.)
- Easy interface for control circuit

### Applications

- Control of motor and other rotary units
- Detection of position and edge
- Detection of paper, film and cloth
- Start, end mark detection of magnetic tape

### 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    |
| Temperature                  | Collector power dissipation   | $P_C^{*2}$ | 50          | mW   |
|                              | Operating ambient temperature | $T_{opr}$  | -25 to +85  | °C   |
|                              | Storage temperature           | $T_{stg}$  | -30 to +100 | °C   |

### Electrical Characteristics (Ta = 25°C)

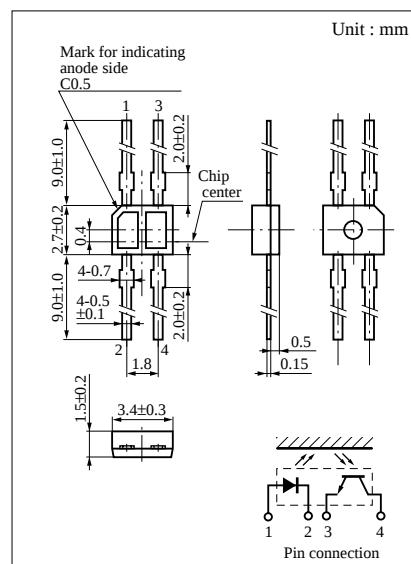
|                          | Parameter                               | Symbol               | Conditions                                                               | min | typ  | max | Unit          |
|--------------------------|-----------------------------------------|----------------------|--------------------------------------------------------------------------|-----|------|-----|---------------|
| Input characteristics    | Forward voltage (DC)                    | $V_F$                | $I_F = 50\text{mA}$                                                      |     | 1.3  | 1.5 | V             |
|                          | Reverse current (DC)                    | $I_R$                | $V_R = 3\text{V}$                                                        |     | 0.01 | 10  | $\mu\text{A}$ |
|                          | Capacitance between terminals           | $C_t$                | $V_R = 0\text{V}, f = 1\text{MHz}$                                       |     | 30   |     | pF            |
| Output characteristics   | Collector cutoff current                | $I_{CEO}$            | $V_{CE} = 10\text{V}$                                                    |     |      | 200 | nA            |
| Transfer characteristics | Collector current                       | $I_C^{*1, *2}$       | $V_{CC} = 5\text{V}, I_F = 10\text{mA}, R_L = 100\Omega, d = 1\text{mm}$ | 90  |      | 880 | $\mu\text{A}$ |
|                          | Leakage current                         | $I_D$                | $V_{CC} = 5\text{V}, I_F = 10\text{mA}, R_L = 100\Omega$                 |     |      | 200 | nA            |
|                          | Response time                           | $t_r^{*3}, t_f^{*4}$ | $V_{CC} = 5\text{V}, I_C = 0.1\text{mA}, R_L = 100\Omega$                |     | 20   |     | $\mu\text{s}$ |
|                          | Collector to emitter saturation voltage | $V_{CE(sat)}$        | $I_F = 20\text{mA}, I_C = 0.1\text{mA}$                                  |     |      | 0.4 | V             |

\*1  $I_C$  classifications

| Class                   | Q         | R          | S          |
|-------------------------|-----------|------------|------------|
| $I_C$ ( $\mu\text{A}$ ) | 90 to 220 | 180 to 440 | 360 to 880 |

\*3 Time required for the output current to increase from 10% to 90% of its final value

\*4 Time required for the output current to decrease from 90% to 10% of its initial value



\*1 Input power derating ratio is 1.0 mW/°C at Ta ≥ 25°C.

\*2 Output power derating ratio is 0.67 mW/°C at Ta ≥ 25°C.

\*2 Output current measurement method

