# CNB1303 (ON2180)

## Reflective Photosensor

### ■ Overview

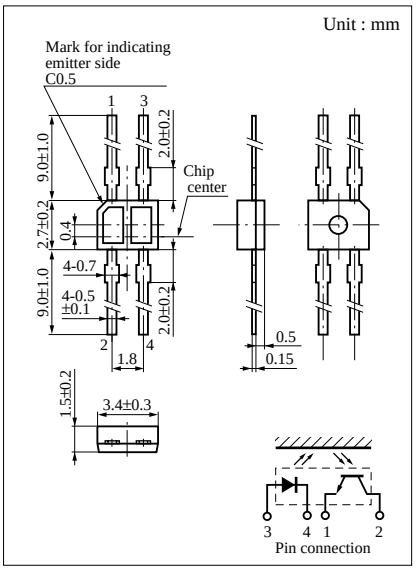
CNB1303 is a small, thin reflective photosensor consisting of a high efficiency GaAs infrared light emitting diode which is integrated with a high sensitivity Si phototransistor in a single resin package.

### ■ Features

- Ultraminiature, thin type : 2.7 × 3.4 mm (height : 1.5 mm)
- Visible light cutoff resin is used
- Fast response : $t_r$, $t_f$ = 20µs (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 |
| | Collector power dissipation | $P_C$ *2 | 50 | 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 0.67 mW/˚C at Ta ≥ 25˚C.

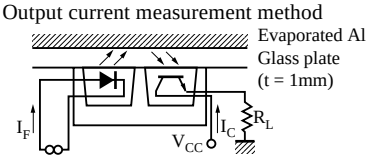
### ■ Electrical Characteristics (Ta = 25˚C)

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

*1 $I_C$ classifications

| Class | Q | R | S |
|---|---|---|---|
| $I_C$ (µA) | 90 to 220 | 180 to 440 | 360 to 880 |

*2 Output current measurement method

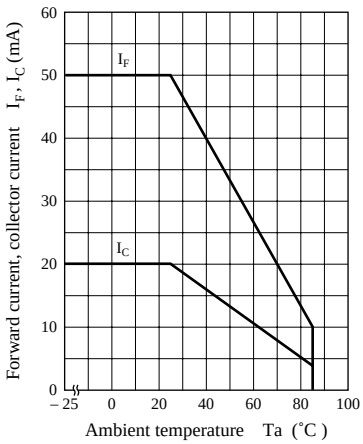



*3 Time required for the output current to increase from 10% to 90% of its final value

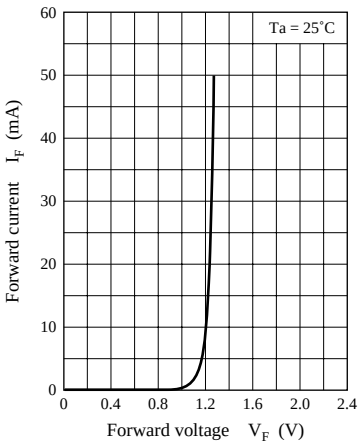
*4 Time required for the output current to decrease from 90% to 10% of its initial value

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

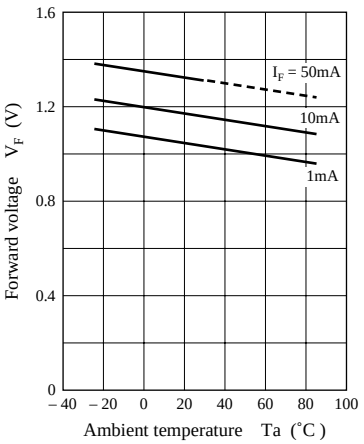
$I_F$ , $I_C$ — Ta



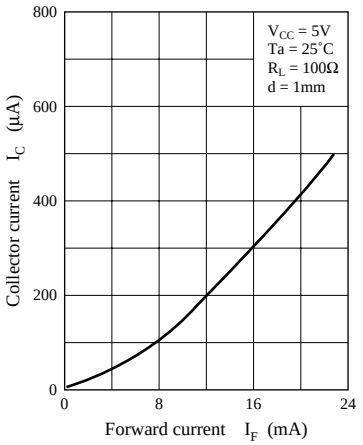

$I_F$ — $V_F$



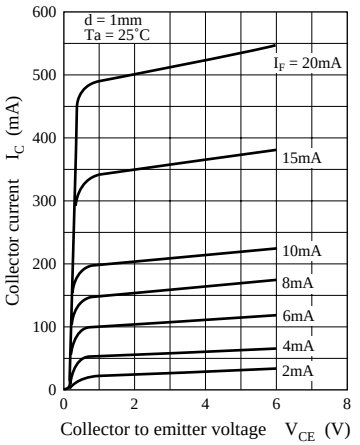

$V_F$ — Ta



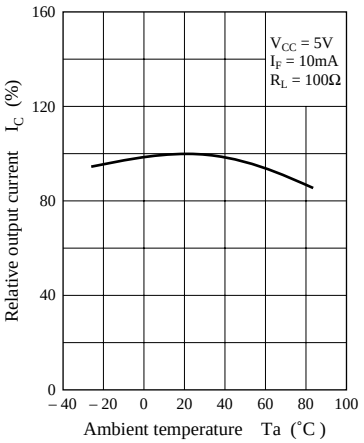

$I_C$ — $I_F$



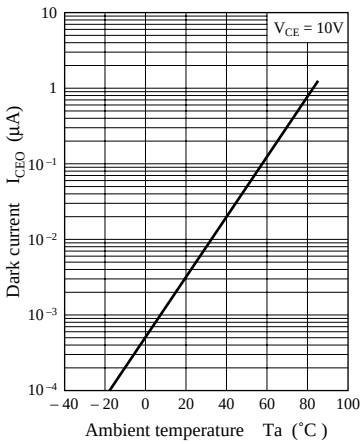

$I_C$ — $V_{CE}$



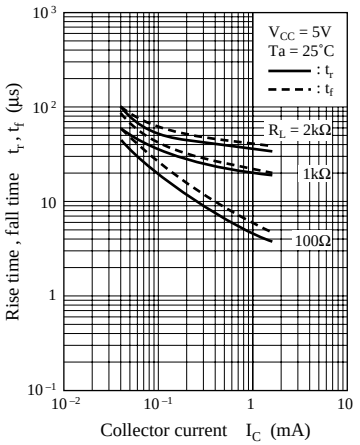

$I_C$ — Ta



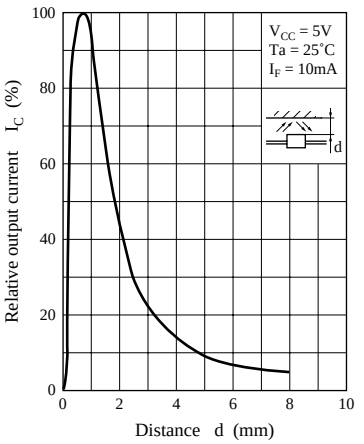

$I_{CEO}$ — Ta




$t_r$ , $t_f$ — $I_C$




$I_C$ — d



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