

# CNB1009 (ON2173)

## Reflective Photosensor

### 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

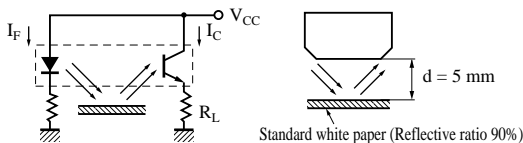
### Absolute Maximum Ratings ( $T_a = 25^\circ C$ )

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

### Electrical Characteristics ( $T_a = 25^\circ C$ )

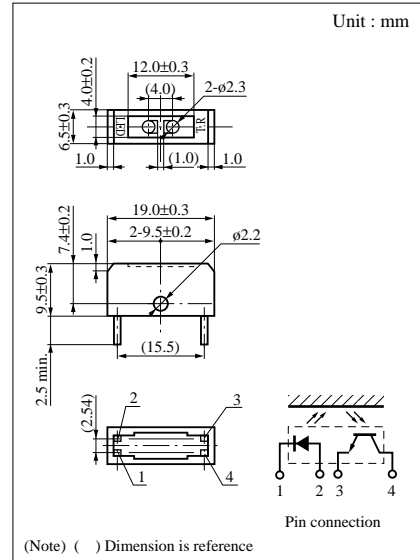
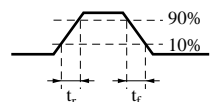
Parameter		Symbol	Conditions	min	typ	max	Unit
Input characteristics	Forward voltage (DC)	$V_F$	$I_F = 50mA$		1.2	1.5	V
	Reverse current (DC)	$I_R$	$V_R = 3V$			10	$\mu A$
	Capacitance between pins	$C_t$	$V_R = 0V, f = 1MHz$		50		pF
Output characteristics	Collector cutoff current	$I_{CEO}$	$V_{CE} = 10V$			0.2	$\mu A$
Transfer characteristics	Collector to emitter capacitance	$C_C$	$V_{CE} = 10V, f = 1MHz$		5		pF
	Collector current	$I_C^{*1}$	$V_{CC} = 10V, I_F = 20mA, R_L = 100\Omega$	100	500		$\mu A$
	Response time	$t_r^{*2}, t_f^{*3}$	$V_{CC} = 10V, I_C = 1mA, R_L = 100\Omega$		6		$\mu s$
	Collector to emitter saturation voltage	$V_{CE(sat)}$	$I_F = 50mA, I_C = 0.1mA$			0.3	V

\*1 Transfer characteristics measurement circuit (Ambient light is shut off completely)



\*2 Time required for the collector current to increase from 10% to 90% of its final value.

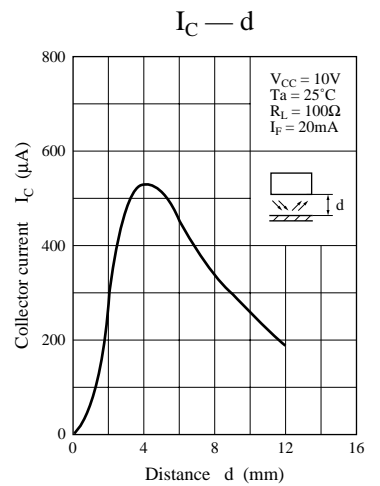
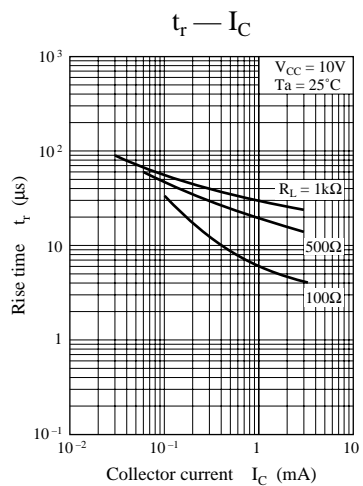
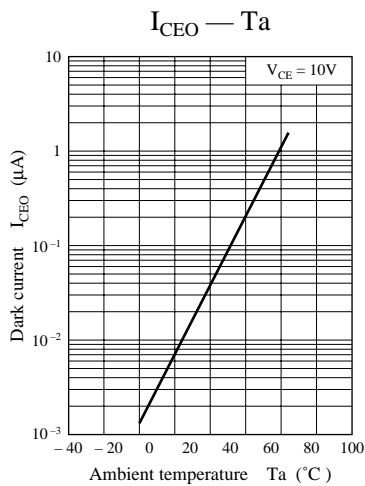
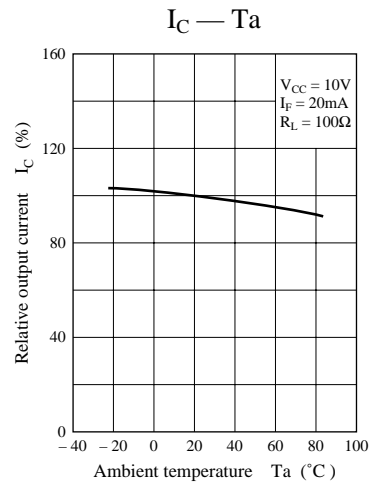
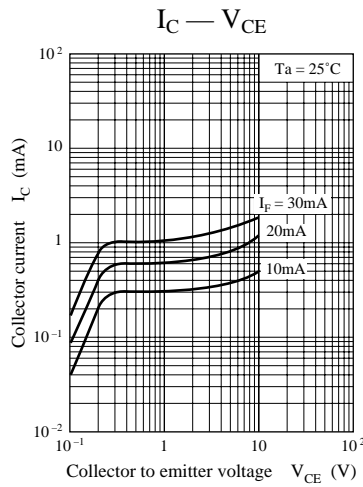
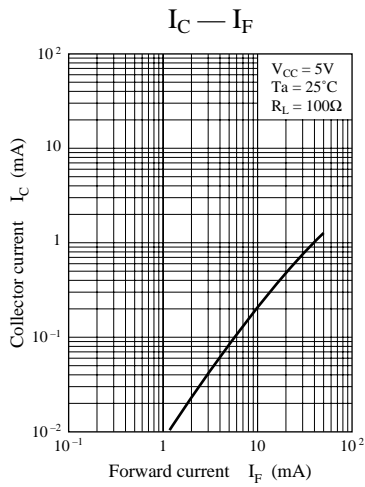
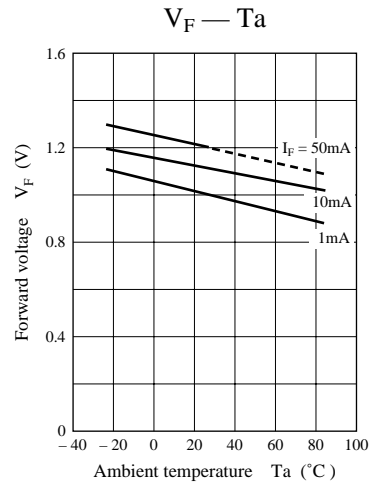
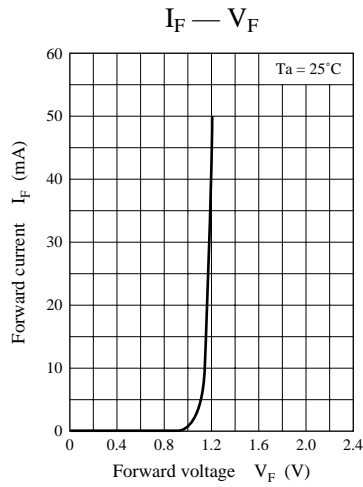
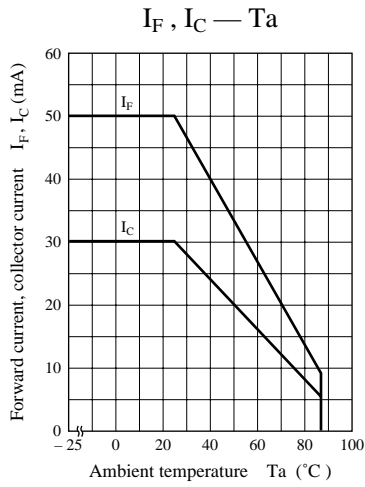
\*3 Time required for the collector current to decrease from 90% to 10% of its initial value.



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

\*2 Output power derating ratio is 1.34 mW/ $^\circ C$  at  $T_a \geq 25^\circ C$ .

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



# Caution for Safety

 **DANGER**

Gallium arsenide material (GaAs) is used in this product.

Therefore, do not burn, destroy, cut, crush, or chemically decompose the product, since gallium arsenide material in powder or vapor form is harmful to human health.

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