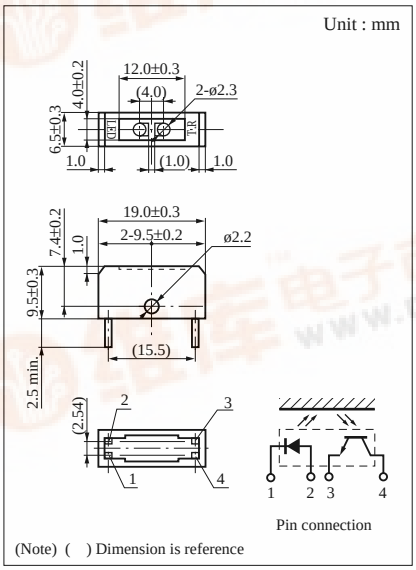
CNB1009

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 µs (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 (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 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	˚C
	Storage temperature	T_{stg}	–30 to +100	˚C

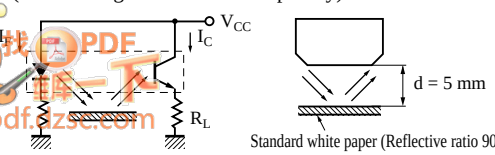
*1 Input power derating ratio is 1.0 mW/˚C at Ta ≥ 25˚C.

*2 Output power derating ratio is 1.34 mW/˚C at Ta ≥ 25˚C.

Electrical Characteristics (Ta = 25˚C)

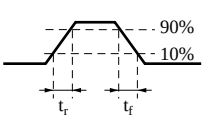
Parameter		Symbol	Conditions	min	typ	max	Unit
Input characteristics	Forward voltage (DC)	V_F	I_F = 50mA		1.2	1.5	V
	Reverse current (DC)	I_R	V_R = 3V			10	µA
	Capacitance between pins	C_t	V_R = 0V, f = 1MHz		50		pF
Output characteristics	Collector cutoff current	I_{CEO}	V_{CE} = 10V			0.2	µA
Transfer 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 = 100Ω	100	500		µA
	Response time	t_r*2 , t_f*3	V_{CC} = 10V, I_C = 1mA, R_L = 100Ω		6		µs
	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)

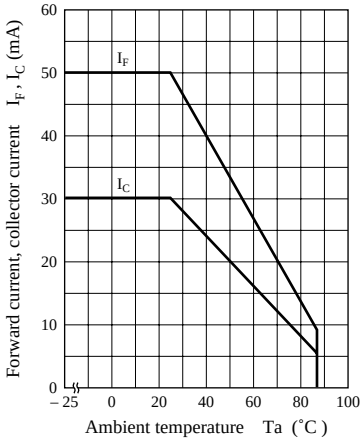


*2 Time required for the collector current to increase from 10% to 90% of its final value.

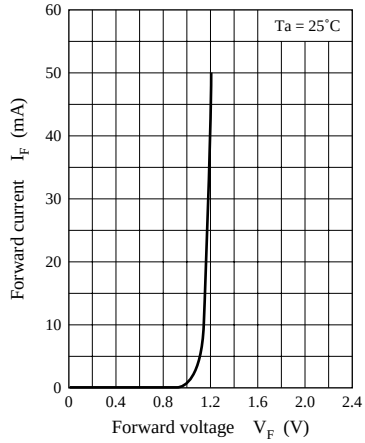
*3 Time required for the collector current to decrease from 90% to 10% of its initial value.



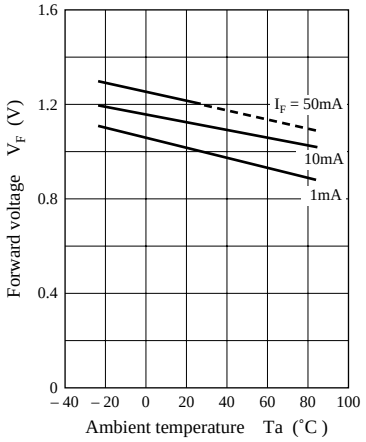
I_F , I_C — Ta



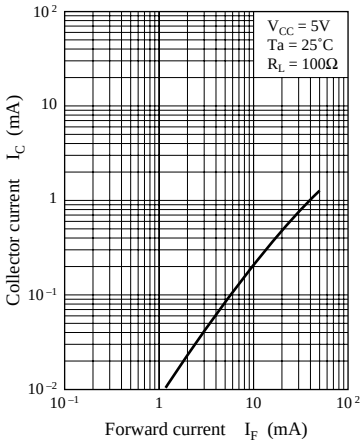
I_F — V_F



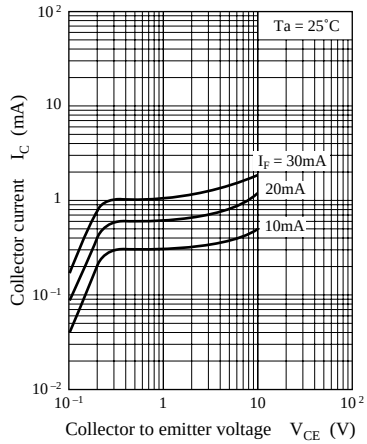
V_F — Ta



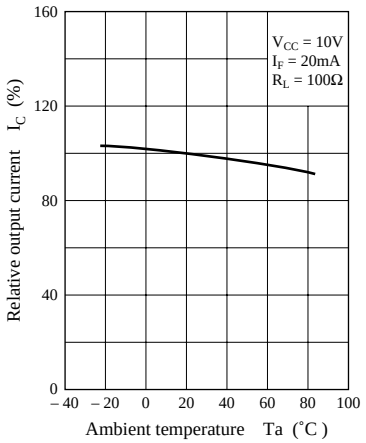
I_C — I_F



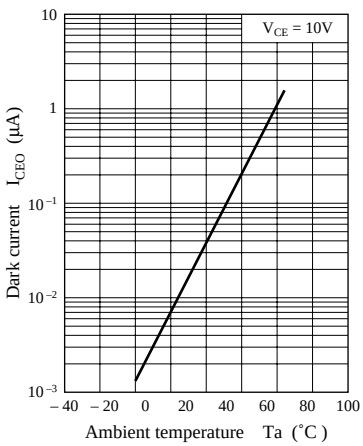
I_C — V_{CE}



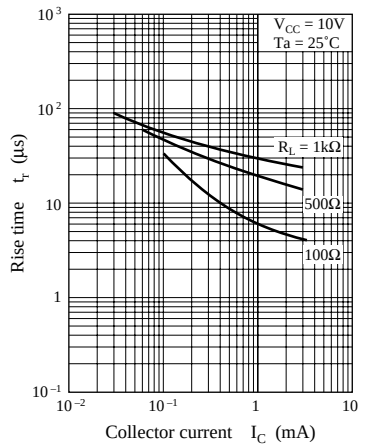
I_C — Ta



I_{CEO} — Ta



t_r — I_C



I_C — d