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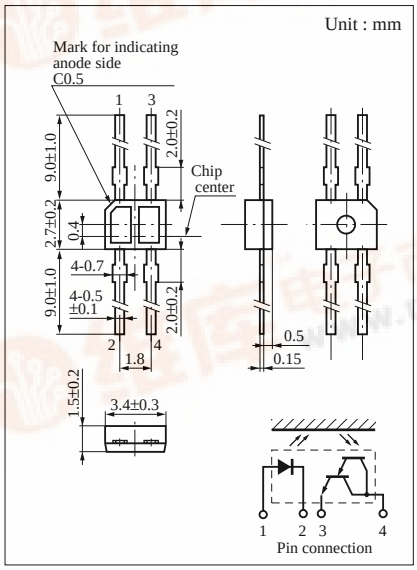
CNB2301

Reflective Photosensor

Overview

CNB2301 is a small, thin reflective photosensor consisting of a high efficiency GaAs infrared light emitting diode which is integrated with a high sensitivity Darlington phototransistor used as the photo detector in a single resin package.



Features

- Ultraminiature : 2.7 × 3.4 mm
- Visible light cutoff resin is used
- High current-transfer ratio

Applications

- Detection of paper, film and cloth
- Detection of position and edge
- Detection of rotary positioning
- Liquid level sensor
- 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	30	mA
	Collector to emitter voltage	V_{CEO}	20	V
	Emitter to collector voltage	V_{ECO}	5	V
	Collector power dissipation	P_C *2	75	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 1.0 mW/˚C at Ta ≥ 25˚C.

Electrical Characteristics (Ta = 25˚C)

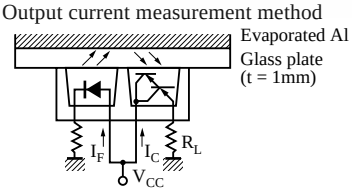
Parameter		Symbol	Conditions	min	typ	max	Unit
Input characteristics	Forward voltage (DC)	V_F	I_F = 50mA		1.3	1.5	V
	Reverse current (DC)	I_R	V_R = 3V		0.01	10	µA
	Capacitance between terminals	C_t	V_R = 0V, f = 1MHz		30		pF
Output characteristics	Collector cutoff current	I_{CEO}	V_{CE} = 10V			1.0	µA
Transfer characteristics	Collector current	I_C *1, *2	V_{CC} = 5V, I_F = 2mA, R_L = 100Ω, d = 1mm	0.46		12.0	mA
	Leakage current	I_D	V_{CC} = 5V, I_F = 2mA, R_L = 100Ω			2.0	µA
	Response time	t_r *3 , t_f *4	V_{CC} = 10V, I_C = 1mA, R_L = 100Ω		150		µs
	Collector to emitter saturation voltage	$V_{CE(sat)}$	I_F = 5mA, I_C = 0.5mA			1.5	V

*1 I_C classifications

Class	Q	R	S
I_C (mA)	0.46 to 1.75	1.3 to 4.95	3.15 to 12.0

*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

*2 Output current measurement method



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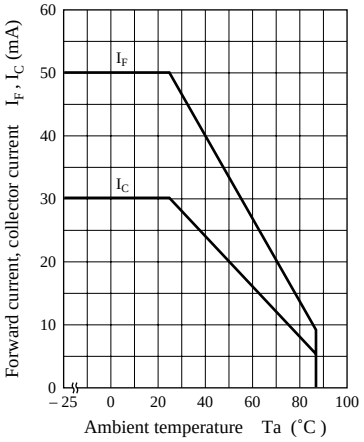
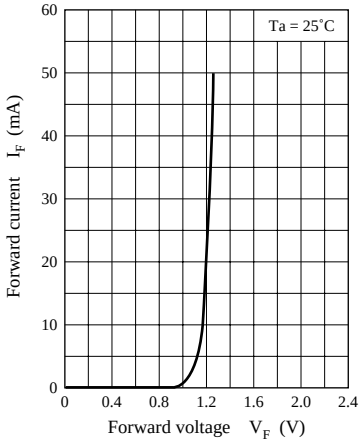
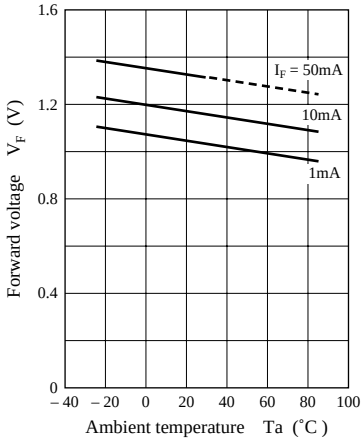
I_F , I_C — Ta



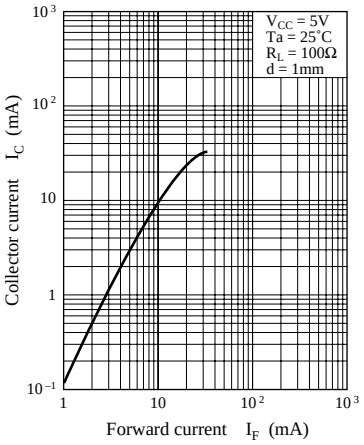
I_F — V_F



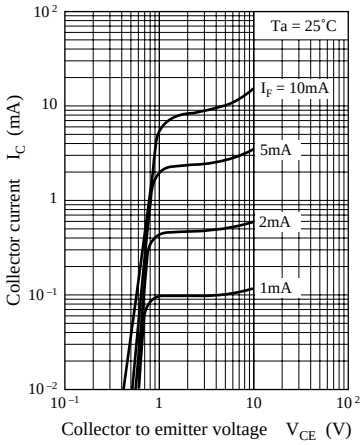
V_F — Ta



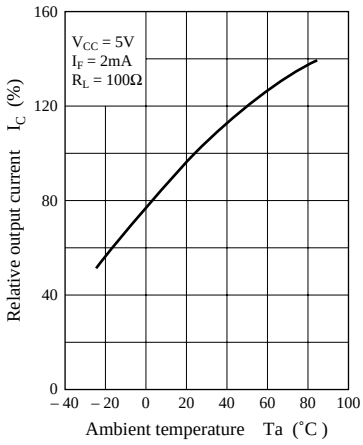
I_C — I_F



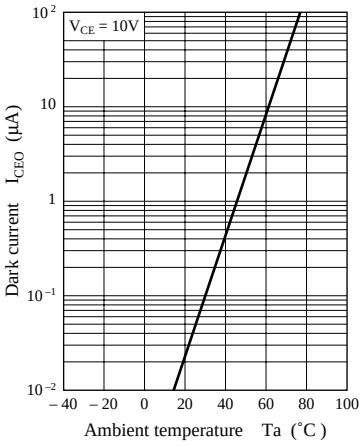
I_C — V_{CE}



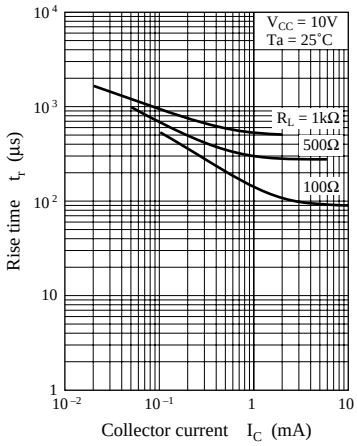
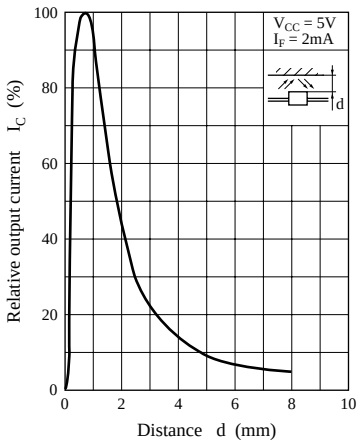
I_C — Ta



I_{CEO} — Ta



t_r — I_C



I_C — d