ON1110

Photo Interrupter

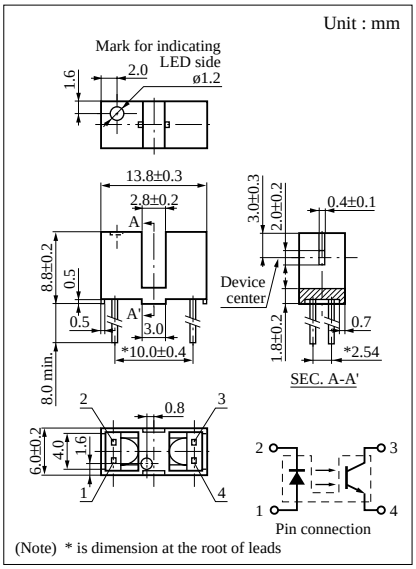
For contactless SW, object detection

■ Outline

ON1110 is a photocoupler in which a high efficiency GaAs infrared light emitting diode is used as the light emitting element, and a high sensitivity phototransistor is used as the light detecting element. The two elements are arranged so as to face each other, and objects passing between them are detected.

■ Features

- Highly precise position detection : 0.3 mm
- Fast response : t_r, t_f = 6 µs (typ.)
- Small output current variation against change in temperature
- Small package used for saving mounting space



■ 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	100	mW
Temperature	Operating ambient temperature	T_{opr}	–25 to +85	˚C
	Storage temperature	T_{stg}	–30 to +100	˚C

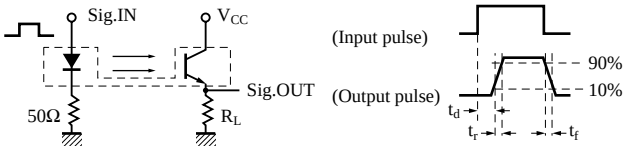
*1 Input power derating ratio is 1.0 mW/˚C at Ta ≥ 25˚C.

*2 Output power derating ratio is 1.33 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 terminals	C_t	V_R = 0V, f = 1MHz		50		pF
Output characteristics	Collector cutoff current	I_{CEO}	V_{CE} = 10V			200	nA
	Collector to emitter capacitance	C_C	V_{CE} = 10V, f = 1MHz		5		pF
Transfer characteristics	Collector current	I_C*2	V_{CE} = 10V, I_F = 20mA	0.3			mA
	Response time	t_r , t_f*1	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

* Switching time measurement circuit



t_d : Delay time

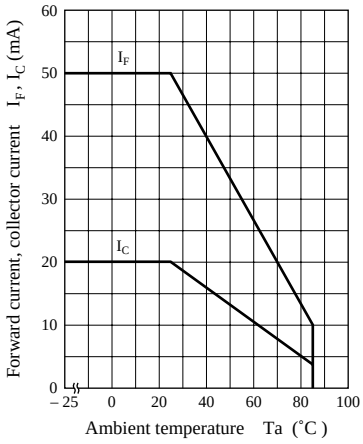
t_r : Rise time (Time required for the collector current to increase from 10% to 90% of its final value)

t_f : Fall time (Time required for the collector current to decrease from 90% to 10% of its initial value)

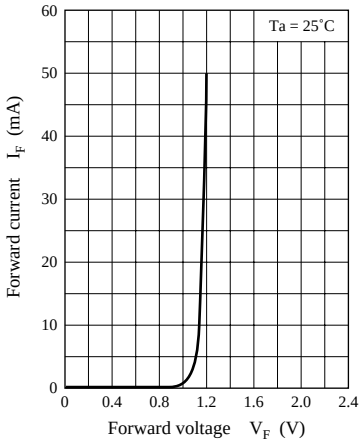
*2 I_C classifications

Class	Q	R	S
I_C (mA)	0.3 to 0.85	0.75 to 2.15	> 1.85

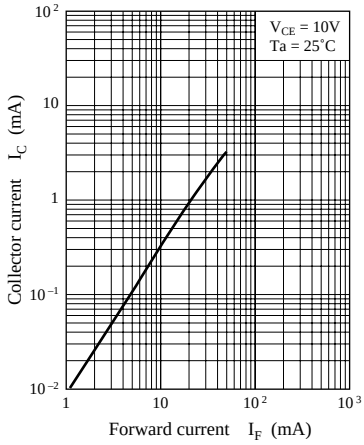
I_F , I_C — Ta



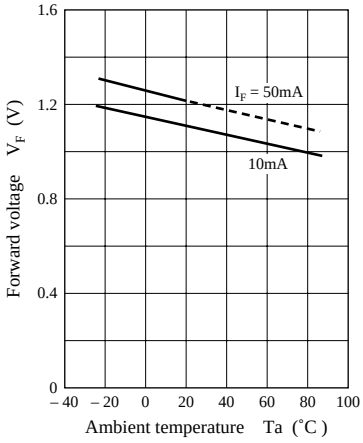
I_F — V_F



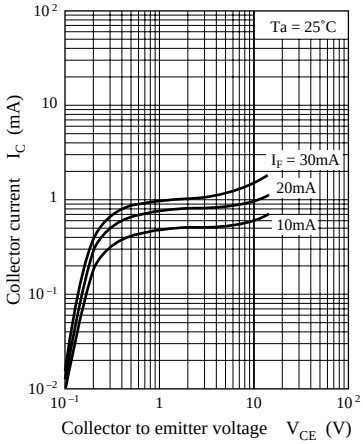
I_C — I_F



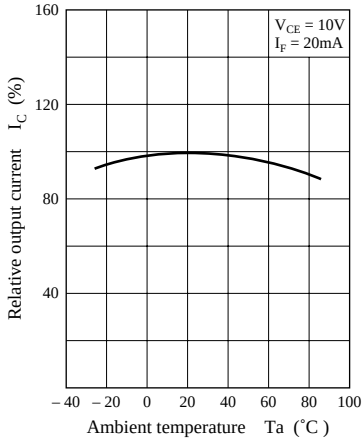
V_F — Ta



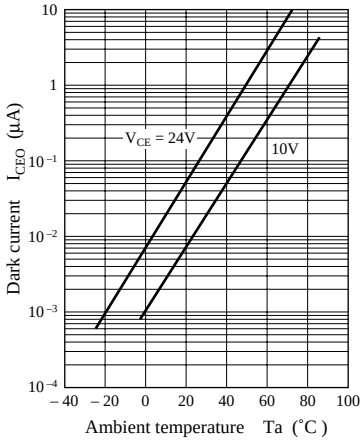
I_C — V_{CE}



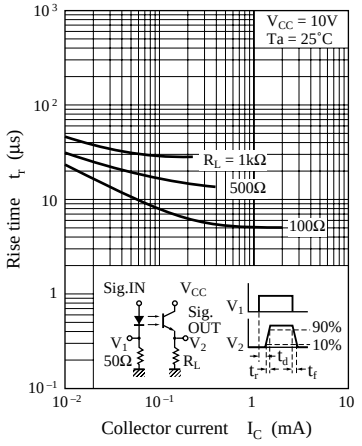
I_C — Ta



I_{CEO} — Ta



t_r — I_C



I_C — d