

# CNZ2153 (ON2153)

## Reflective photosensor

Non-contact point SW, object sensing

### Overview

CNZ2153 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 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
- Small size and 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 $T_a = 25^\circ\text{C}$

	Parameter	Symbol	Rating	Unit
Input (Light emitting diode)	Reverse voltage	$V_R$	3	V
	Forward current	$I_F$	50	mA
	Power dissipation *1	$P_D$	75	mW
Output (Photo transistor)	Collector-emitter voltage (Base open)	$V_{CEO}$	30	V
	Emitter-collector voltage (Base open)	$V_{ECO}$	5	V
	Collector current	$I_C$	20	mA
	Collector power dissipation *2	$P_C$	50	mW
	Operating ambient temperature	$T_{opr}$	-25 to +85	$^\circ\text{C}$
Temperature	Storage temperature	$T_{stg}$	-30 to +100	$^\circ\text{C}$

### Electrical-Optical Characteristics $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

	Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input characteristics	Forward voltage	$V_F$	$I_F = 50\text{ mA}$		1.2	1.5	V
	Reverse current	$I_R$	$V_R = 3\text{ V}$			10	$\mu\text{A}$
	Terminal capacitance	$C_t$	$V_R = 0\text{ V}, f = 1\text{ MHz}$		50		pF
Output characteristics	Collector-emitter cutoff current (Base open)	$I_{CEO}$	$V_{CE} = 10\text{ V}$			0.2	$\mu\text{A}$
Transfer characteristics	Collector current *1, 2	$I_C$	$V_{CC} = 5\text{ V}, I_F = 20\text{ mA}, R_L = 100\ \Omega$	100		1200	$\mu\text{A}$
	Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F = 50\text{ mA}, I_C = 0.1\text{ mA}$			0.5	V
	Rise time	$t_r$	$V_{CC} = 10\text{ V}, I_C = 0.1\text{ mA}, R_L = 100\ \Omega$		6.0		$\mu\text{s}$
	Fall time	$t_f$			6.0		$\mu\text{s}$

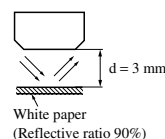
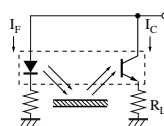
Note) 1. Input and output are handled electrically.

2. This product is not designed to withstand radiation

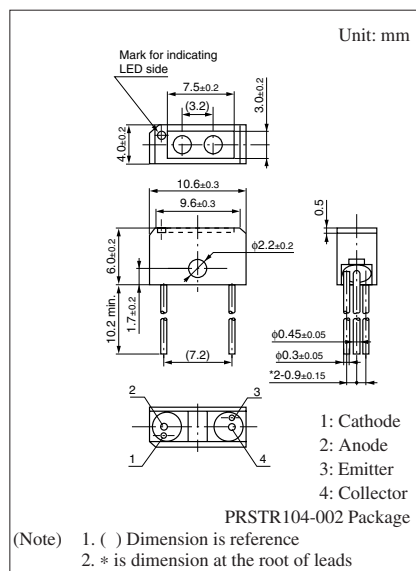
3. \*1: Output current measurement circuit  
(Ambient light is shut off completely)

\*2: Rank classification

Rank	Q	R	S	No-rank
$I_C$ ( $\mu\text{A}$ )	100 to 300	200 to 600	400 to 1 200	100 to 1 200

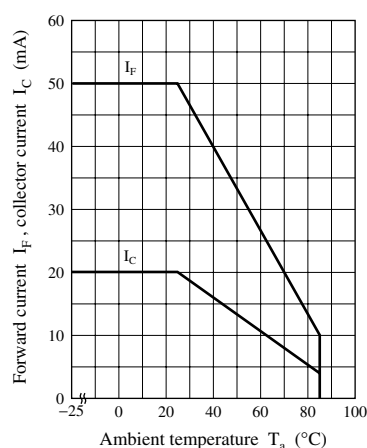
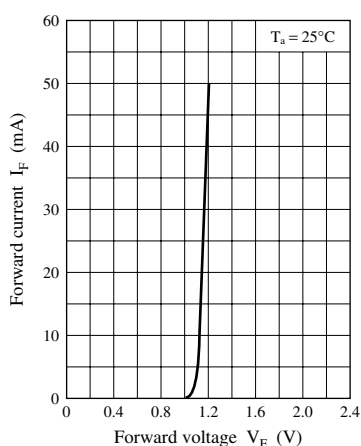
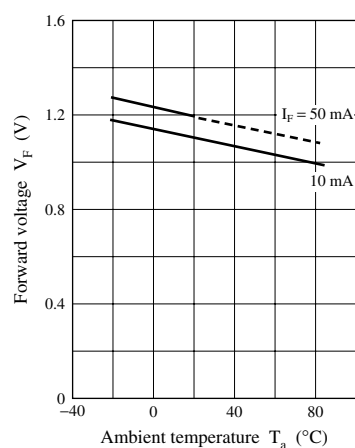
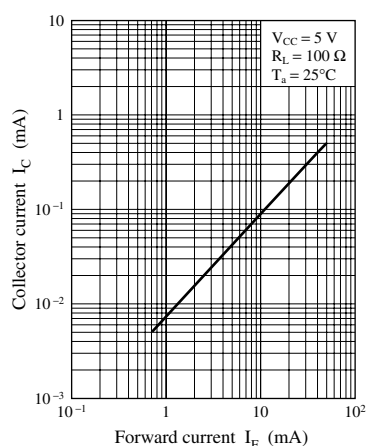
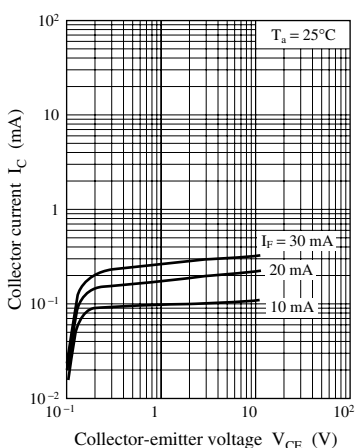
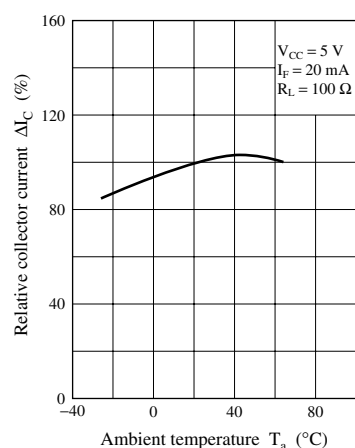
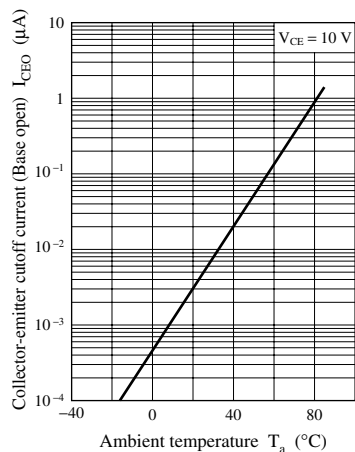
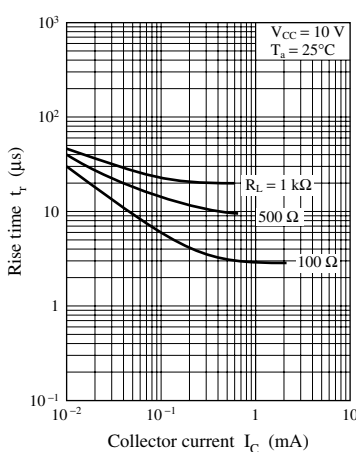
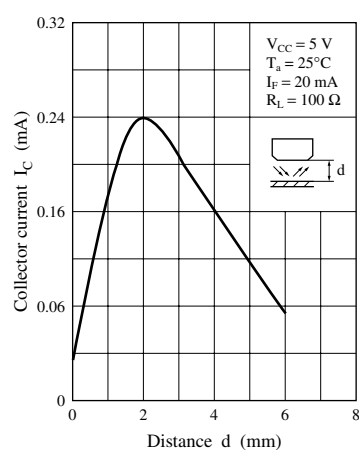


Note) The part number in the parenthesis shows conventional part number.



Note) \*1: Input power derating ratio is  
1.0 mW/ $^\circ\text{C}$  at  $T_a \geq 25^\circ\text{C}$ .

\*2: Output power derating ratio is  
0.67 mW/ $^\circ\text{C}$  at  $T_a \geq 25^\circ\text{C}$ .

$I_F, I_C - T_a$  $I_F - V_F$  $V_F - T_a$  $I_C - I_F$  $I_C - V_{CE}$  $\Delta I_C - T_a$  $I_{CEO} - T_a$  $t_r - I_C$  $I_C - d$ 

# Caution for Safety

 **DANGER**

## ■ This product contains Gallium Arsenide (GaAs).

GaAs powder and vapor are hazardous to human health if inhaled or ingested. Do not burn, destroy, cut, cleave off, or chemically dissolve the product. Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.

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