

# CNC7S101 (ON3181)

## Optoisolators

### ■ Overview

CNC7S101 is an AC input compatible optoisolator in which two GaAs high output infrared light emitting diode chips are connected in reverse parallel as light emitting elements, and optically are connected to a high sensitivity Si phototransistor chip as a light detecting element in a small DIL 4-pin package.

The CNC7S101 have a number of excellent features, including high I/O isolation voltage and current transfer ratio (CTR), as well as high speed response and high reliability.

### ■ Features

- AC input support
- High I/O isolation voltage:  $V_{ISO} = 5000 \text{ V[rms]}$  (min.)
- Fast response:  $t_r = 4 \mu\text{s}$ ,  $t_f = 3 \mu\text{s}$
- UL listed (UL File No. E79920)

### ■ Applications

- Telephones
- Telephone switches
- Programmable controllers
- AC/DC input modules for measuring

### ■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter		Symbol	Rating	Unit
Input (Light emitting diode)	Power dissipation *1	$P_D$	75	mW
	Forward current	$I_F$	$\pm 50$	mA
	Pulse forward current *2	$I_{FP}$	$\pm 1$	A
Output (Photo transistor)	Collector-emitter voltage (Base open)	$V_{CEO}$	80	V
	Emitter-collector voltage (Base open)	$V_{ECO}$	7	V
	Collector current	$I_C$	50	mA
	Collector power dissipation *3	$P_C$	150	mW
Isolation voltage, input to output *4		$V_{ISO}$	5000	V[rms]
Total power dissipation		$P_T$	200	mW
Operating ambient temperature		$T_{opr}$	-30 to +100	$^\circ\text{C}$
Storage temperature		$T_{stg}$	-55 to +125	$^\circ\text{C}$

Note) \*1: Input power derating ratio is 0.75 mW/ $^\circ\text{C}$  at  $T_a \geq 25^\circ\text{C}$

\*2: Pulse width  $\leq 100 \mu\text{s}$ , repeat 100 pps

\*3: Output power derating ratio is 1.5 mW/ $^\circ\text{C}$  at  $T_a \geq 25^\circ\text{C}$

\*4: AC 1 min. RH < 60%

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

■ 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	$V_F$	$I_F = \pm 50 \text{ mA}$		1.35	1.50	V
	Terminal capacitance	$C_t$	$V_R = 0 \text{ V}, f = 1 \text{ MHz}$		35		pF
Output characteristics	Collector-emitter voltage (Base open)	$V_{CEO}$	$I_C = 100 \mu\text{A}$	80			V
	Emitter-collector voltage (Base open)	$V_{ECO}$	$I_E = 10 \mu\text{A}$	7			V
	Collector-emitter cutoff current (Base open)	$I_{CEO}$	$V_{CE} = 20 \text{ V}$		5	100	nA
	Collector-emitter capacitance	$C_C$	$V_{CE} = 10 \text{ V}, f = 1 \text{ MHz}$		3.0		pF
Transfer characteristics	DC current transfer ratio *1, *2	CTR	$V_{CE} = 5 \text{ V}, I_F = \pm 1 \text{ mA}$	20		300	%
	Isolation capacitance, input to output	$C_{ISO}$	$f = 1 \text{ MHz}$		0.6		pF
	Isolation resistance, input to output	$R_{ISO}$	$V_{ISO} = 500 \text{ V}$	$10^{11}$			$\Omega$
	Rise time *3	$t_r$	$V_{CC} = 10 \text{ V}, I_C = 2 \text{ mA},$ $R_L = 100 \Omega$		4		$\mu\text{s}$
	Fall time *4	$t_f$			3		$\mu\text{s}$
	Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F = \pm 20 \text{ mA}, I_C = 1 \text{ mA}$		0.1	0.2	V
Collector current ratio *5	$I_{C(Ratio)}$	$V_{CE} = 5 \text{ V}, I_F = 1 \text{ mA}$	0.33	1.00	3.00	—	

Note) 1. Input and output are practiced by electricity.

2. This device is designed by disregarding radiation.

3. \*1:

$$\text{CTR} = \frac{I_C}{I_F} \times 100\%$$

\*2: Rank classification

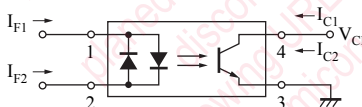
Rank	R	S	No-rank
CTR (%)	50 to 150	100 to 300	20 to 300

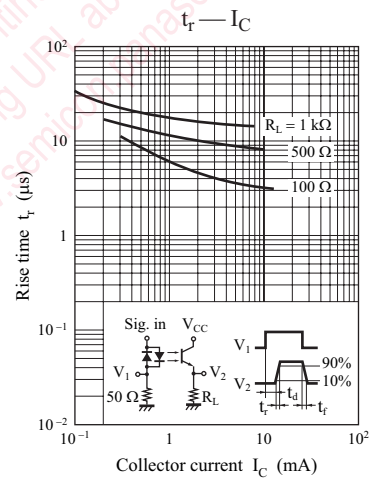
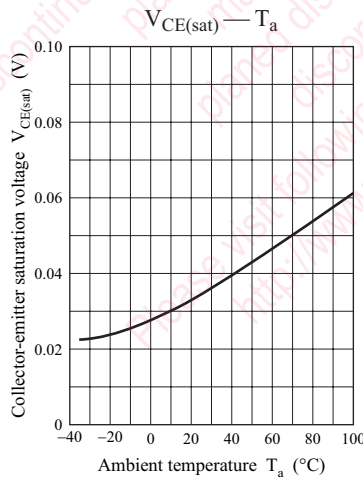
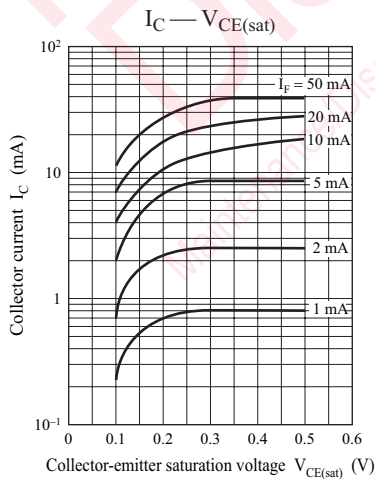
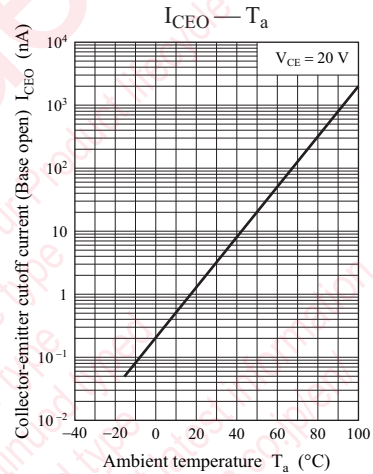
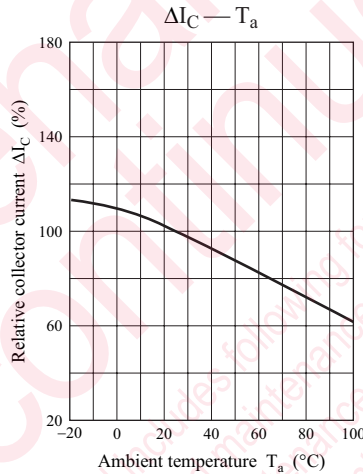
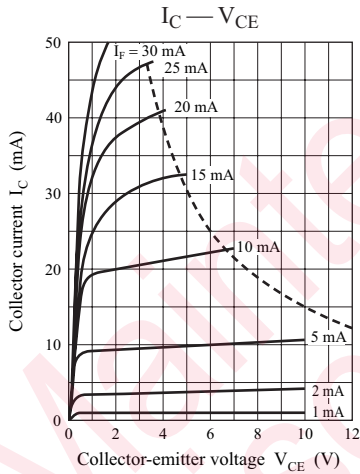
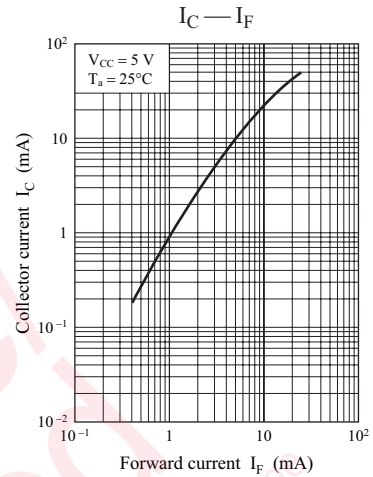
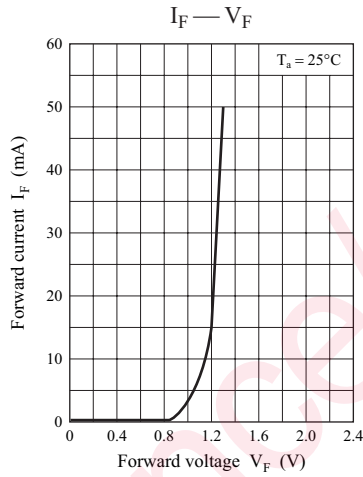
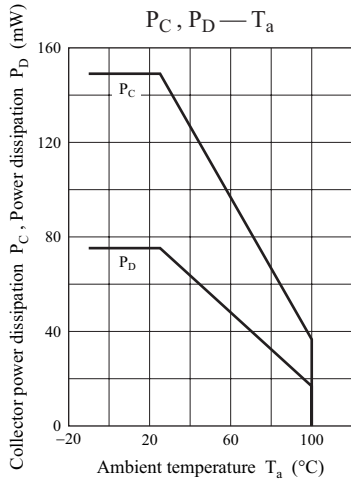
\*3:  $t_r$ : Time required for the collector current to increase from 10% to 90% of its final value

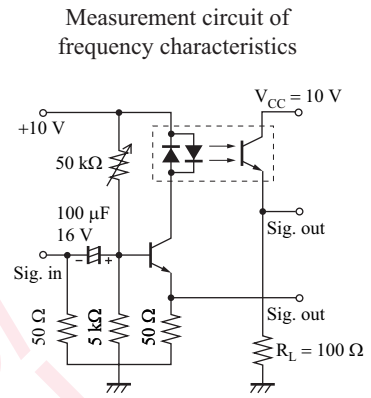
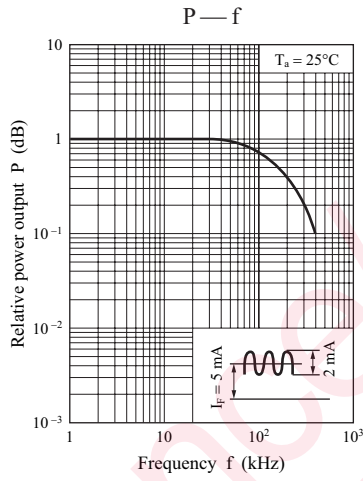
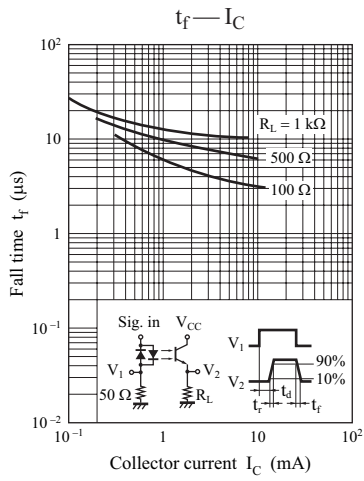
\*4:  $t_f$ : Time required for the collector current to decrease from 90% to 10% of its initial value

\*5:

$$I_{C(Ratio)} = \frac{I_{C2} (I_{F2} = 1 \text{ mA}, V_{CE} = 5 \text{ V})}{I_{C1} (I_{F1} = 1 \text{ mA}, V_{CE} = 5 \text{ V})}$$

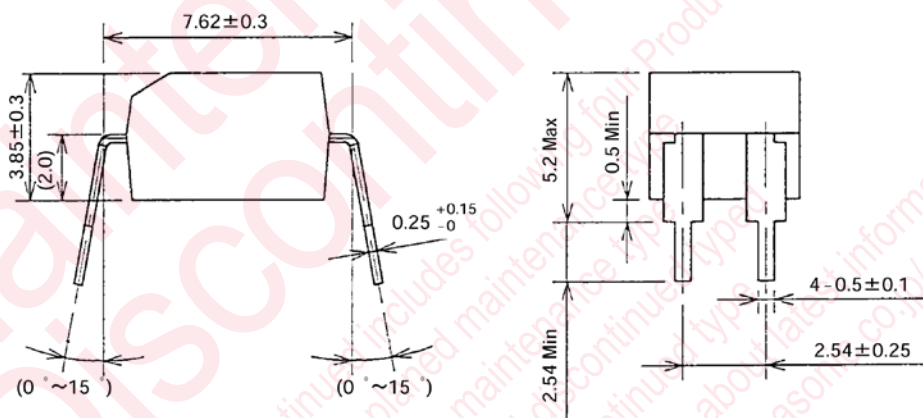
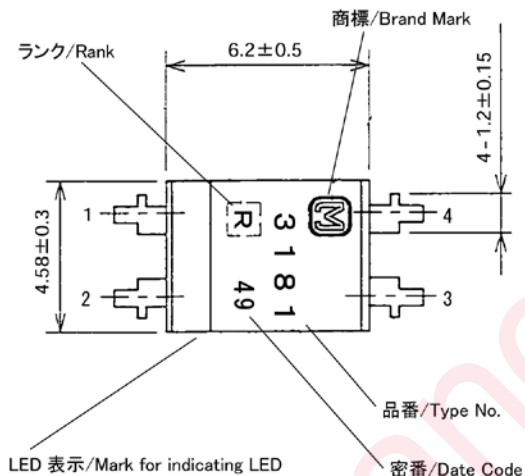






■ Package (Unit: mm)

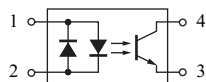
LCTXXN4Z0001



● Pin name

- 1: Anode, Cathode
- 2: Cathode, Anode
- 3: Emitter
- 4: Collector

■ Internal Connection



Top View

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