

CNC1S101 (ON3131)

Optoisolators

■ Overview

CNC1S101 is a DIL type 4-pin single-channel optoisolator which is housed in a small package.

The CNC1S101 has a number of good features, including high I/O isolation voltage and current transfer ratio (CTR), as well as high speed response.

■ Features

- High DC current transfer ratio: CTR \geq 100%
- High I/O isolation voltage: $V_{ISO} = 5000$ V[rms] (min.)
- Fast response: $t_r = 2$ μ s, $t_f = 3$ μ s (typ.)
- Small collector-emitter cutoff current (base open): $I_{CEO} \leq 100$ nA
- UL listed (UL File No. E79920)

■ Applications

- Switching power supply
- Computer terminal equipment
- System equipment, measuring equipment
- Telephones, copier and vending machines
- Televisions, VCRs, and other consumer electronics products
- Medical equipment and physical and chemical equipment
- Signal transmission between circuits with different potentials and impedances

■ 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	50	mA
	Pulse forward current *2	I_{FP}	1	A
	Reverse voltage	V_R	6	V
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 ≤ 100 μ 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	Reverse current	I_R	$V_R = 3\text{ V}$			10	μA
	Forward voltage	V_F	$I_F = 50\text{ mA}$		1.35	1.50	V
	Terminal capacitance	C_t	$V_R = 0\text{ V}, f = 1\text{ MHz}$		15		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	$V_{CE} = 10\text{ V}, f = 1\text{ MHz}$		10		pF
Transfer characteristics	DC current transfer ratio *1, *2	CTR	$V_{CE} = 5\text{ V}, I_F = 5\text{ mA}$	100		600	%
	Isolation capacitance, input to output	C_{ISO}	$f = 1\text{ MHz}$		0.7		pF
	Isolation resistance, input to output	R_{ISO}	$V_{ISO} = 500\text{ V}$	10^{11}			Ω
	Rise time *3	t_r	$V_{CC} = 10\text{ V}, I_C = 2\text{ mA},$ $R_L = 100\ \Omega$		2		μs
	Fall time *4	t_f			3		μs
	Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F = 20\text{ mA}, I_C = 1\text{ mA}$		0.1	0.2	V

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

2. This device is designed by disregarding radiation.

3. *1:

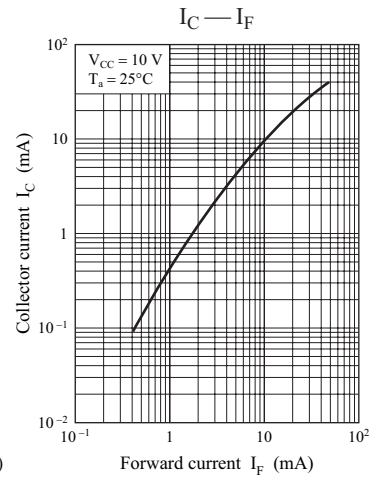
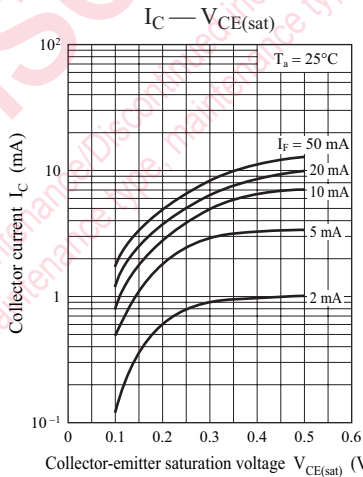
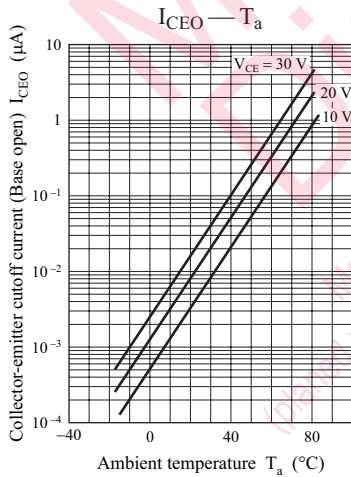
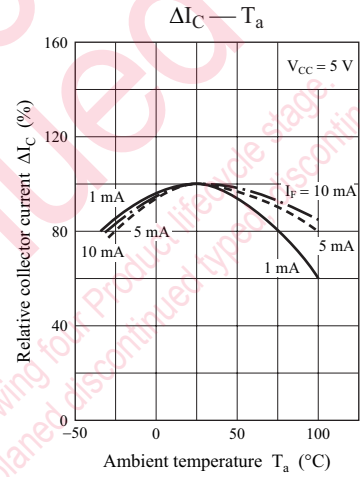
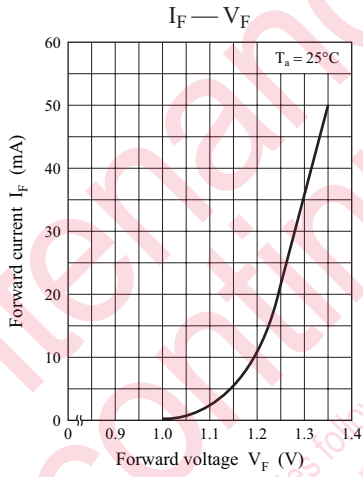
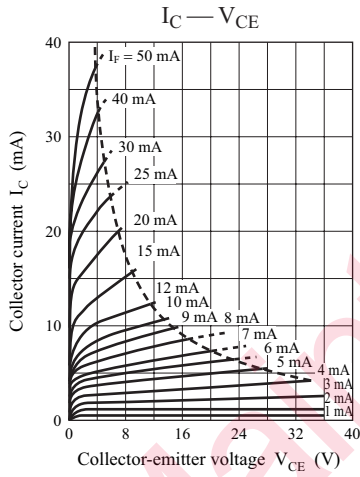
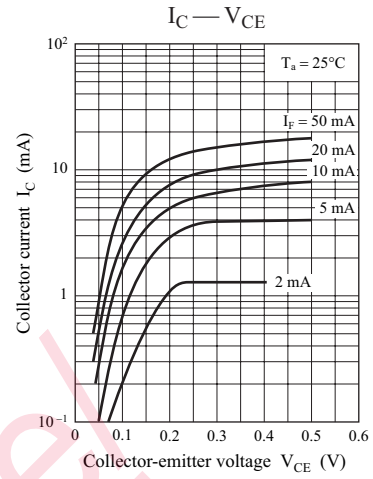
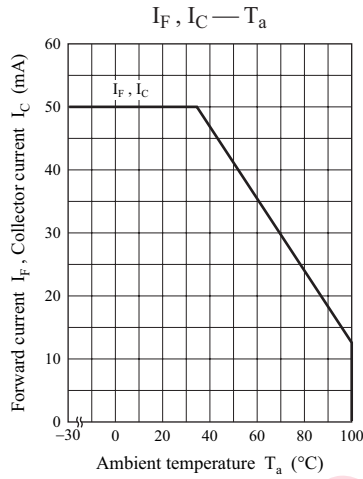
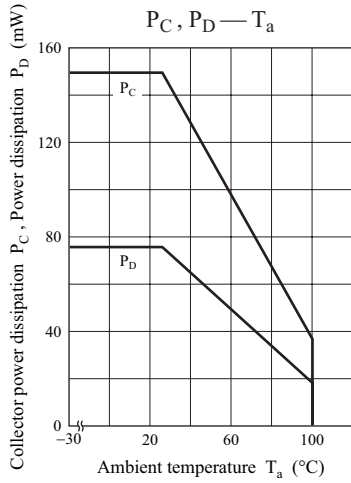
$$\text{CTR} = \frac{I_C}{I_F} \times 100\%$$

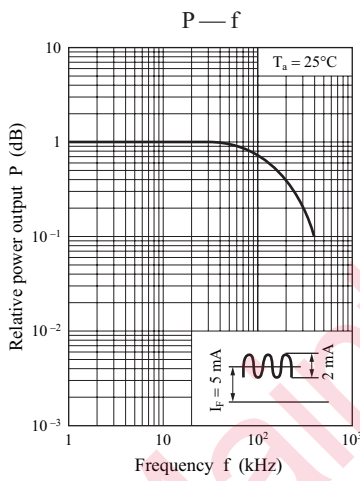
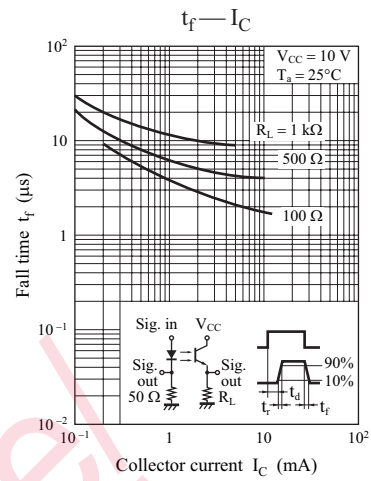
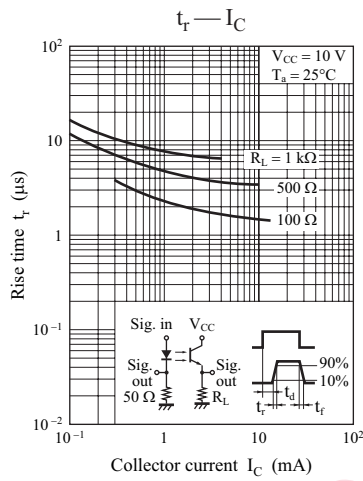
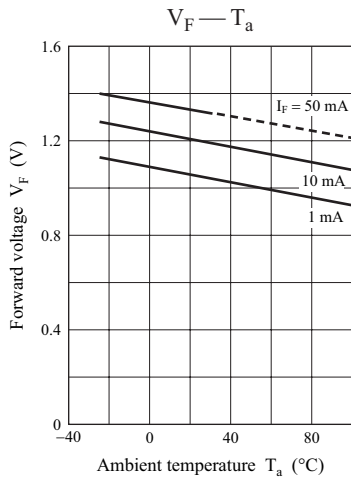
*2: Rank classification

Rank	R	S	V	No-rank
CTR (%)	100 to 300	200 to 600	80 to 130	100 to 600

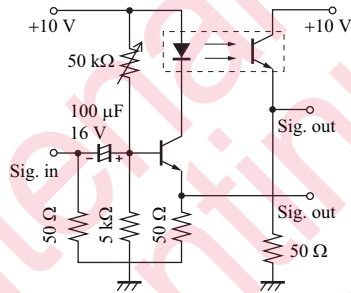
*3: t_r : Time required for the collector current to increase from 10% to 90% of its final value

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



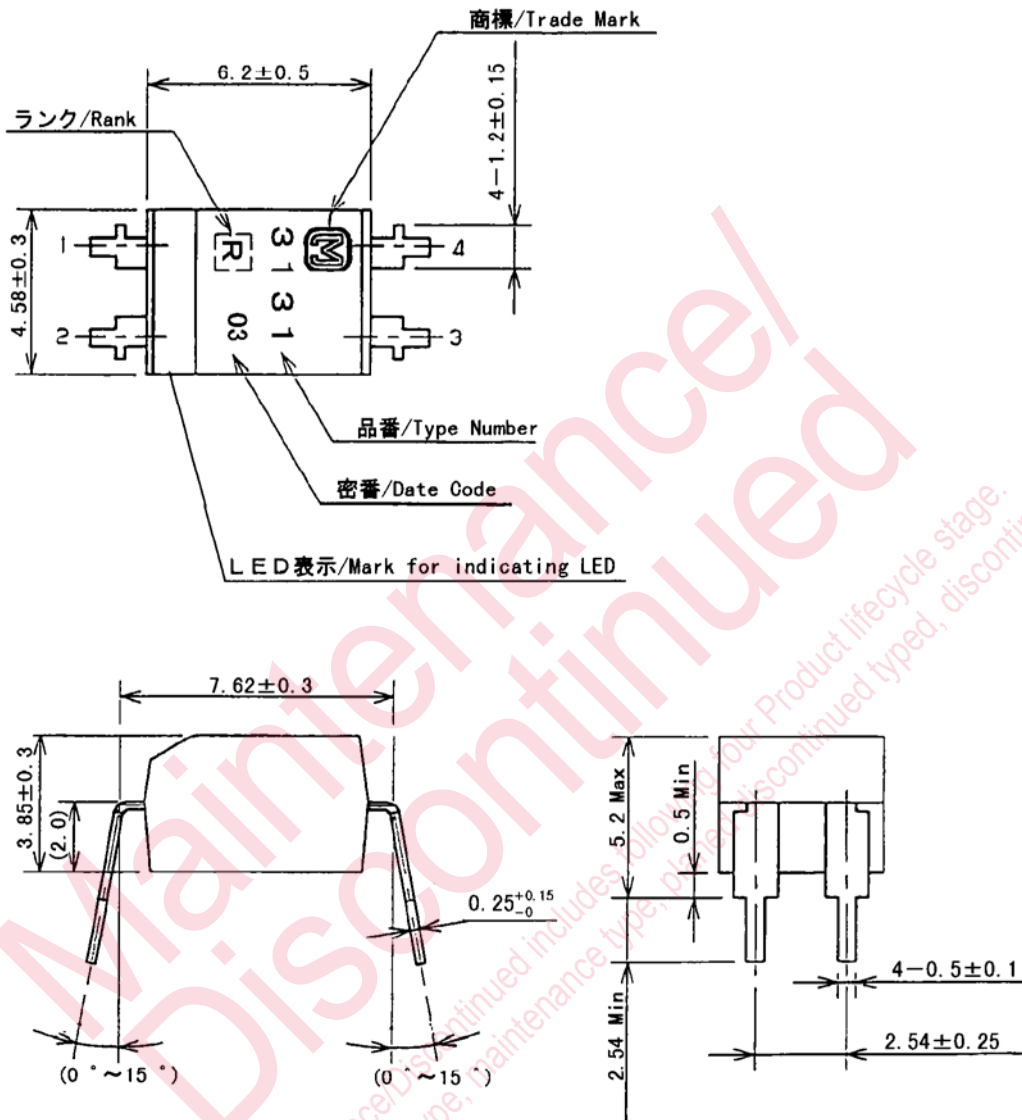


Measurement circuit of frequency characteristics



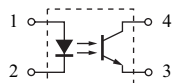
■ Package (Unit: mm)

LCTXXN4Z0001



- Pin name
- 1: Anode
- 2: Cathode
- 3: Emitter
- 4: Collector

■ Internal Connection



Top View

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