

CNC7S101 (ON3181), CNC1H101 (ON3184)

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, CNC1H101 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.

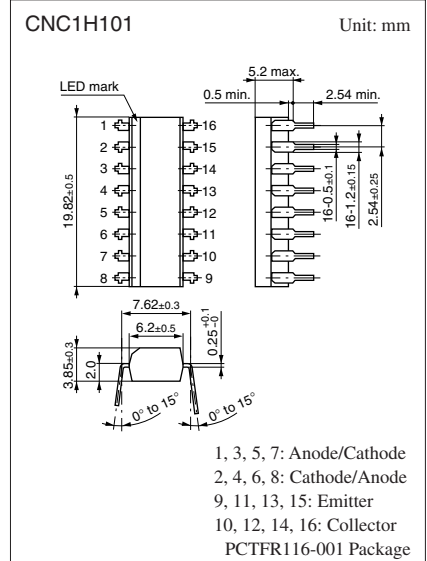
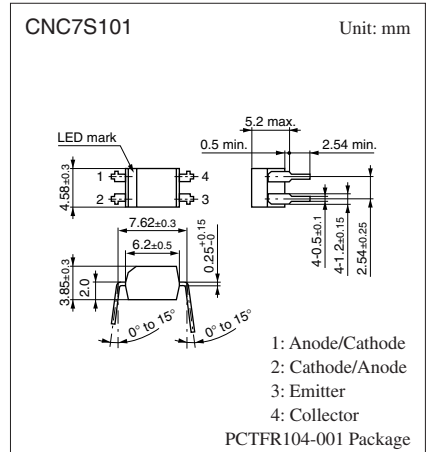
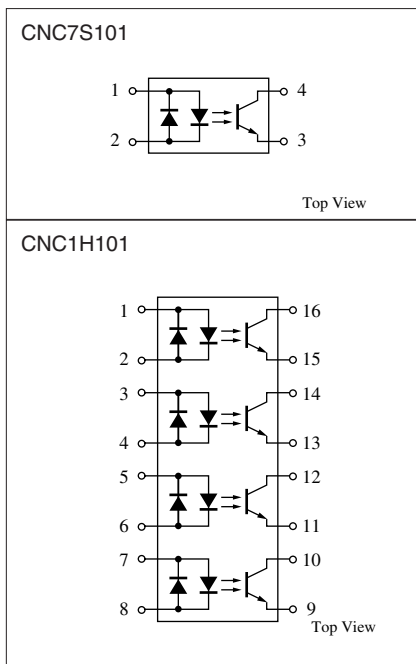
■ Features

- AC input support
- High I/O isolation voltage: $V_{ISO} = 5\,000\text{ V[rms]}$ (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

■ Pin Connection



Note) The part numbers in the parenthesis show conventional part number.

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

Parameter		Symbol	Rating	Unit
Input (Light emitting diode)	Forward current	I_F	± 50	mA
	Pulse forward current *1	I_{FP}	± 1	A
	Power dissipation *2	P_D	75	mW
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}	5 000	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: Pulse width $\leq 100 \mu\text{s}$, repeat 100 pps

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

*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%

■ 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	CNC7S101	$V_R = 0 \text{ V}, f = 1 \text{ MHz}$		35		pF
		CNC1H101			15		
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 *1,5	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}			Ω
	Rise time *2	t_r	$V_{CC} = 10 \text{ V}, I_C = 2 \text{ mA}$		4		μs
	Fall time *3	t_f	$R_L = 100 \Omega$		3		μs
	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 *4	$I_{C(Ratio)}$	$V_{CE} = 5 \text{ V}, I_F = 1 \text{ mA}$	0.33	1.00	3.00	—	

Note) 1. Input and output are handled electrically.

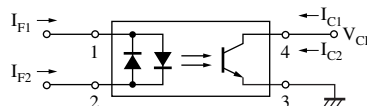
2. This product is not designed to withstand radiation

3. *1:
$$CTR = \frac{I_C}{I_F} \times 100\%$$

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

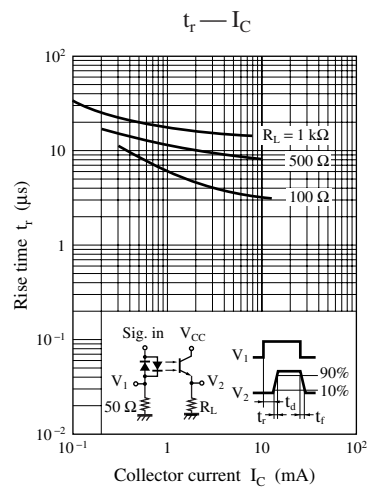
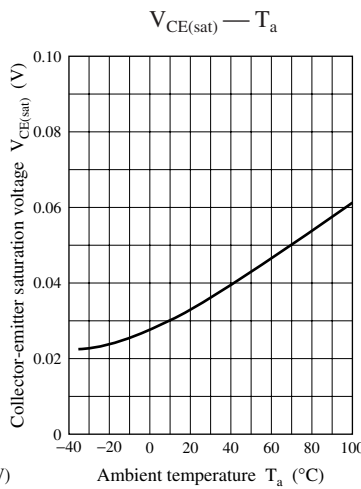
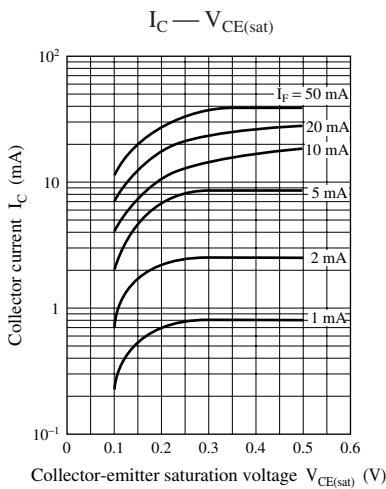
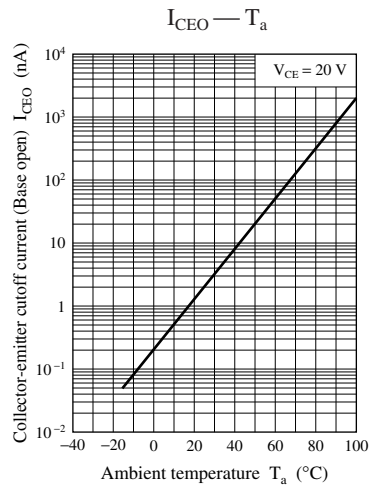
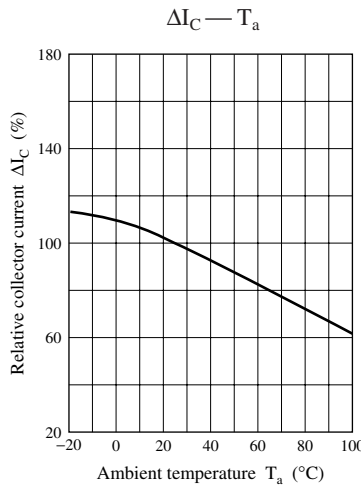
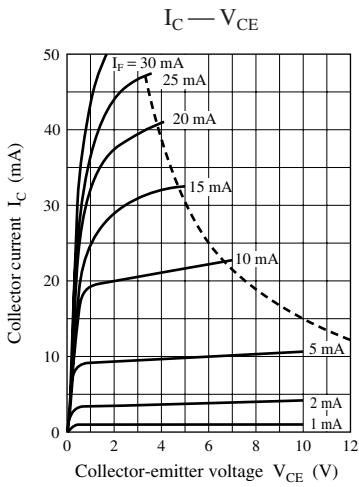
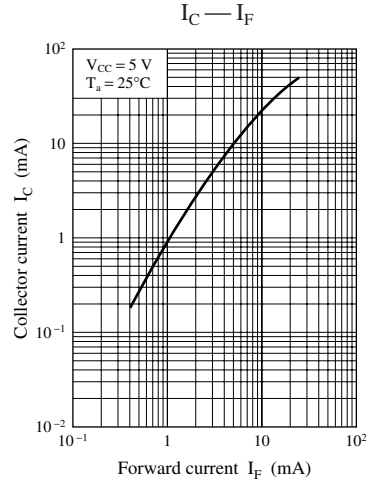
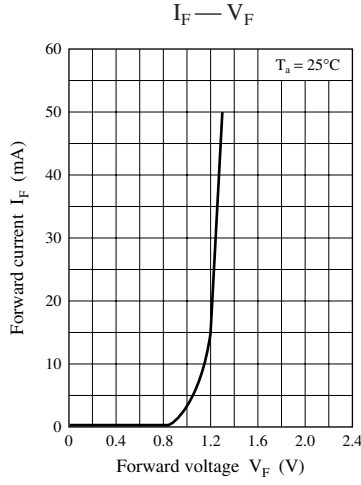
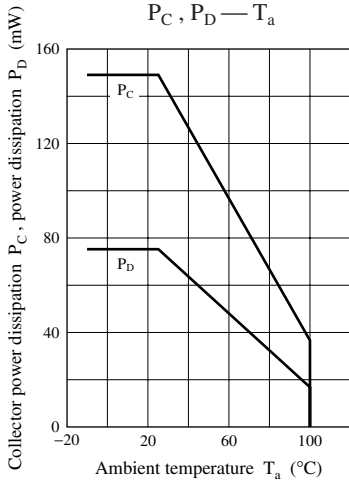
*3: t_f : Time required for the collector current to decrease from 90% to 10% of its initial value

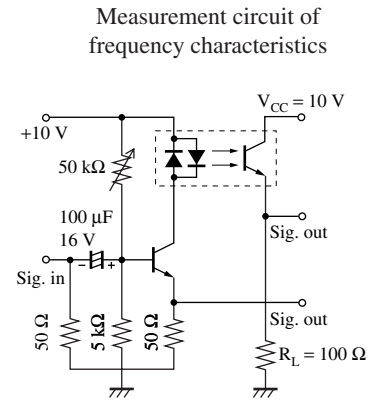
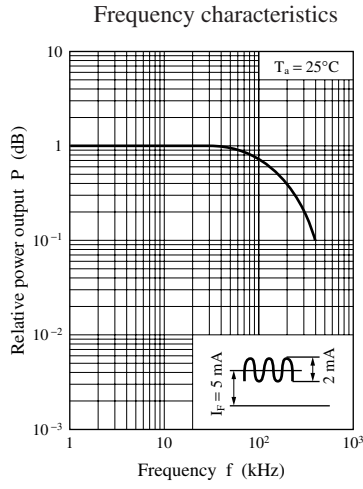
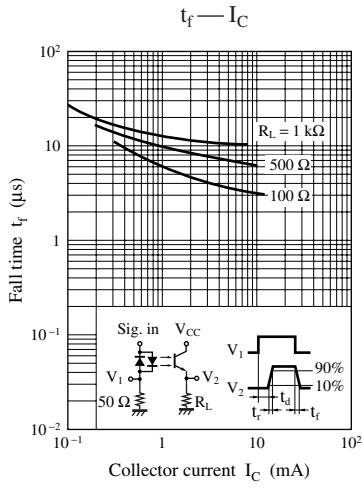
*4:
$$I_{C(Ratio)} = \frac{I_{C2} (I_{F2} = 1\text{mA}, V_{CE} = 5\text{V})}{I_{C1} (I_{F1} = 1\text{mA}, V_{CE} = 5\text{V})}$$



*5: Rank classification

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





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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