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: $V_{ISO} = 5\ 000\ V[rms]$ (min.)
- Fast response: $t_r = 4 \ \mu s$, $t_f = 3 \ \mu s$
- UL listed (UL File No. E79920)

Applications

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







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

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

I	Symbol	Rating	Unit	
Input (Light	Forward current	$I_{\rm F}$	±50	mA
emitting diode)	Pulse forward current *1	I _{FP}	±1	А
	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 volta	V _{ISO}	5 000	V[rms]	
Total power di	P _T	200	mW	
Operating amb	T _{opr}	-30 to +100	°C	
Storage temper	T _{stg}	-55 to +125	°C	

Note) *1: Pulse width ≤ 100 µs, repeat 100 pps
*2: Input power derating ratio is 0.75 mW/°C at T_a ≥ 25°C
*3: Output power derating ratio is 1.5 mW/°C at T_a ≥ 25°C

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

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

Parameter		Symbol	Conditions	Min	Тур	Max	Unit	
Input	Forward voltage		V _F	$I_F = \pm 50 \text{ mA}$		1.35	1.50	V
characteristics	Terminal	CNC7S101	Ct	$V_R = 0 V, f = 1 MHz$		35		pF
	capacitance	CNC1H101				15		
Output characteristics	Collector-emitter voltage (Base open)		V _{CEO}	$I_C = 100 \ \mu A$	80			V
	Emitter-collector voltage (Base open)		V _{ECO}	$I_E = 10 \ \mu A$	7			V
	Collector-emitter cutoff current (Base open)		I _{CEO}	$V_{CE} = 20 \text{ V}$		5	100	nA
	Collector-emitte	r capacitance	C _C	$V_{CE} = 10 V, f = 1 MHz$		3.0		pF
Transfer	DC current transfer ratio *1, 5		CTR	$V_{CE} = 5 V, I_F = \pm 1 mA$	20		300	%
characteristics	ics Isolation capacitance, input to output		C _{ISO}	f = 1 MHz		0.6		pF
	Isolation resistance, input to output		R _{ISO}	$V_{\rm ISO} = 500 \text{ V}$	1011			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 sa	turation 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)}	$V_{CE} = 5 \text{ V}, \text{ I}_{\text{F}} = 1 \text{ mA}$	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: $t_{\mbox{f}}$, Time required for the collector current to decrease from 90% to 10% of its initial value

*4: $I_{C(Ratio)} = \frac{I_{C2}}{I_{C1}}$ *5: Rank classifi	$(I_{F2} = 1mA, V_{CE})$ $(I_{F1} = 1mA, V_{CE})$ cation	$\frac{=5 \text{ V}}{=5 \text{ V}} \qquad I_{\text{F1}} \rightarrow 0$ $I_{\text{F2}} \rightarrow 0$		
Rank	R	S	No-rank	
CTR (%)	50 to 150	100 to 300	20 to 300	_

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Measurement circuit of







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▲ 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 form general industrial waste or household garbage.

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