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 ≥ 100%
- High I/O isolation voltage: V_{ISO} = 5 000 V[rms] (min.)
- Fast response: t_r = 2 µs, t_f = 3 µs (typ.)
- Small collector-emitter cutoff current (base open): I_{CEO} ≤ 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 phsical and chemical equipment
- Signal transmission between circuits with different potentials and impedances

■ Absolute Maximum Ratings T_a = 25°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}	5 000	V[rms]
Total power dissipation		P_T	200	mW
Operating ambient temperature		T_{opr}	–30 to +100	°C
Storage temperature		T_{stg}	–55 to +125	°C

Note) *1: Input power derating ratio is 0.75 mW/°C at T_a ≥ 25°C

*2: Pulse width ≤ 100 µs, repeat 100 pps

*3: Output power derating ratio is 1.5 mW/°C at T_a ≥ 25°C

*4: AC 1 min. RH < 60%

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

■ Electrical-Optical Characteristics T_a = 25°C±3°C

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Input characteristics	Reverse current	I_R	V_R = 3 V			10	μA
	Forward voltage	V_F	I_F = 50 mA		1.35	1.50	V
	Terminal capacitance	C_t	V_R = 0 V, f = 1 MHz		15		pF
Output characteristics	Collector-emitter voltage (Base open)	V_{CEO}	I_C = 100 μA	80			V
	Emitter-collector voltage (Base open)	V_{ECO}	I_E = 10 μA	7			V
	Collector-emitter cutoff current (Base open)	I_{CEO}	V_{CE} = 20 V		5	100	nA
	Collector-emitter capacitance	C_C	V_{CE} = 10 V, f = 1 MHz		10		pF
Transfer characteristics	DC current transfer ratio *1, *2	CTR	V_{CE} = 5 V, I_F = 5 mA	100		600	%
	Isolation capacitance, input to output	C_{ISO}	f = 1 MHz		0.7		pF
	Isolation resistance, input to output	R_{ISO}	V_{ISO} = 500 V	10^{11}			Ω
	Rise time *3	t_r	V_{CC} = 10 V, I_C = 2 mA, R_L = 100 Ω		2		μs
	Fall time *4	t_f			3		μs
	Collector-emitter saturation voltage	$V_{CE(sat)}$	I_F = 20 mA, I_C = 1 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:

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

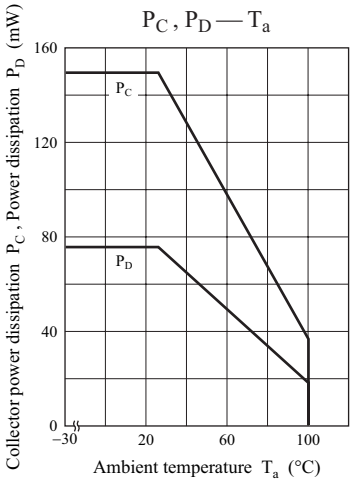
*2: Rank classification

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

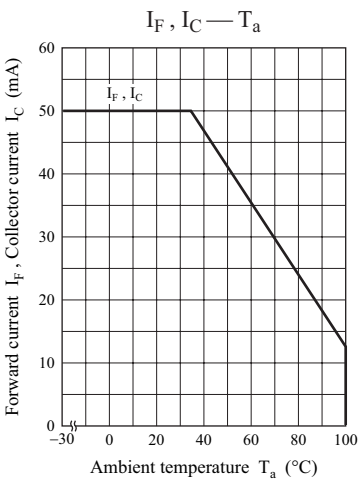
*3: t_r : Time required for the collector current to increase from 10% to 90% of its final value

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

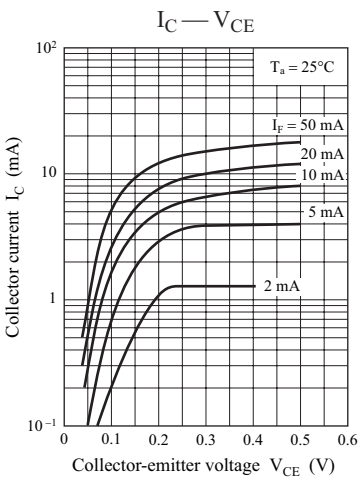
P_C , P_D — T_a



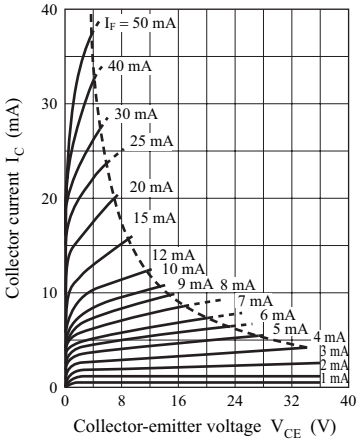
I_F , I_C — T_a



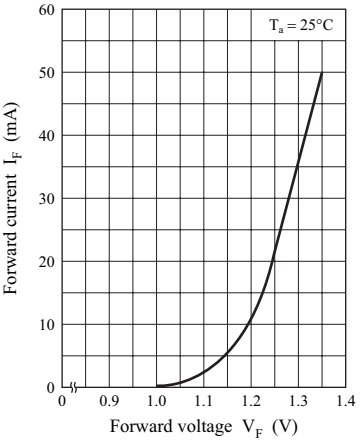
I_C — V_{CE}



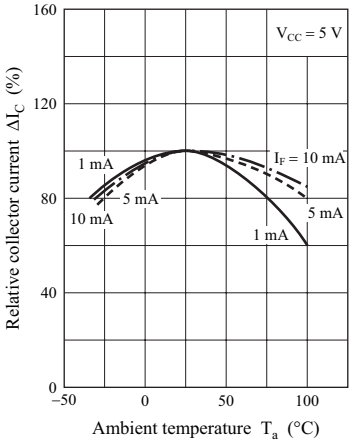
I_C — V_{CE}



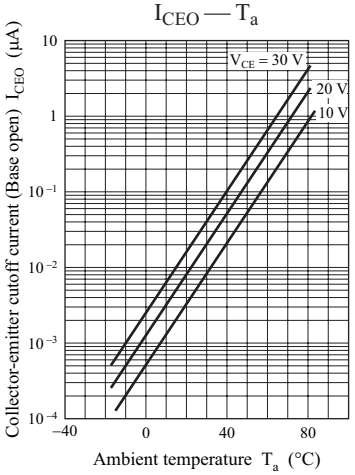
I_F — V_F



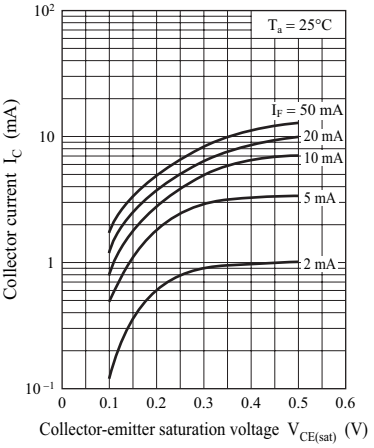
ΔI_C — T_a



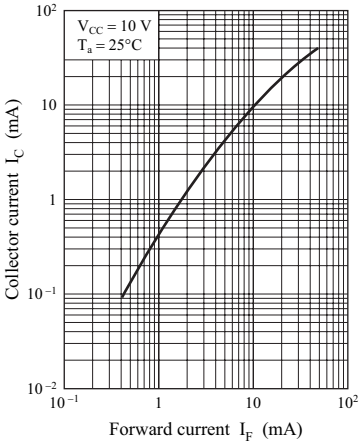
I_{CEO} — T_a



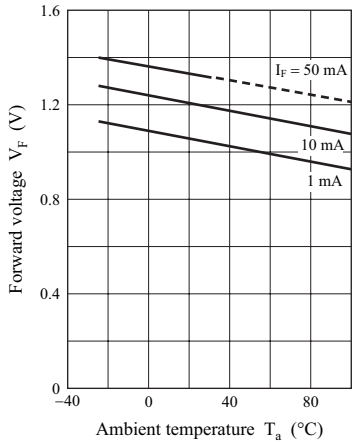
I_C — $V_{CE(sat)}$



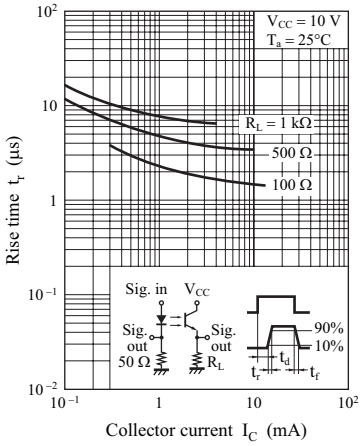
I_C — I_F



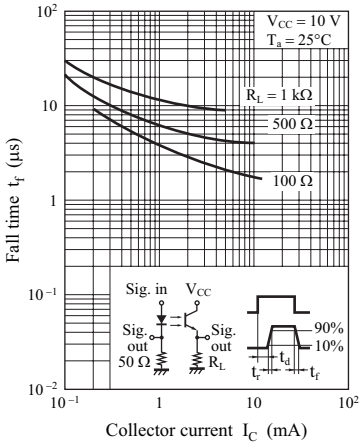
V_F — T_a



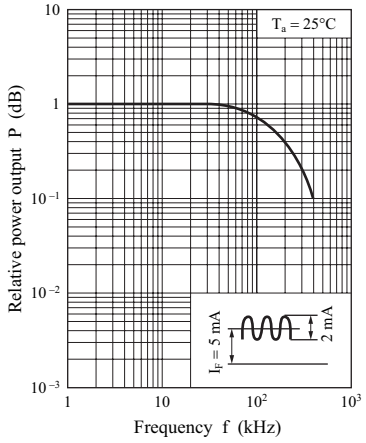
t_r — I_C



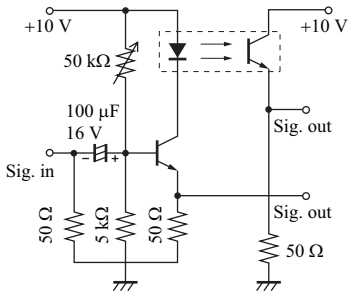
t_f — I_C



P — f

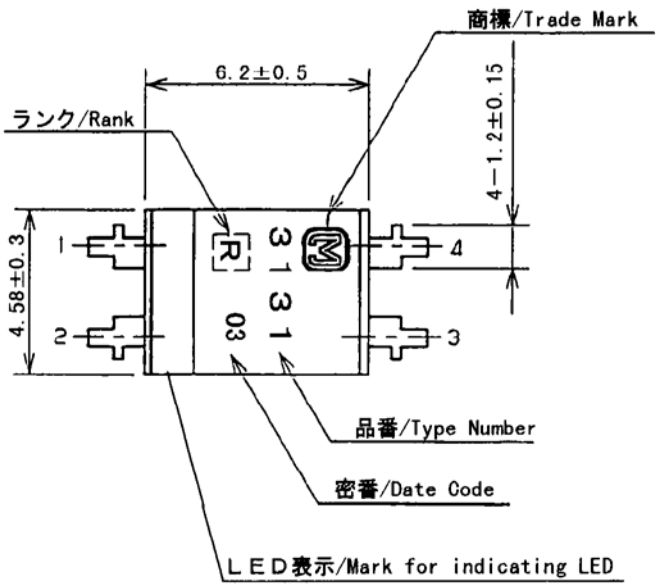


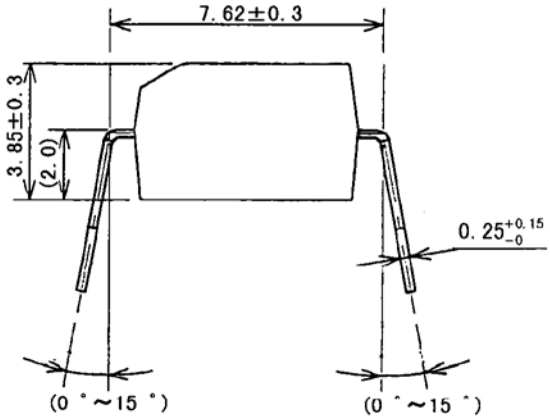
Measurement circuit of frequency characteristics

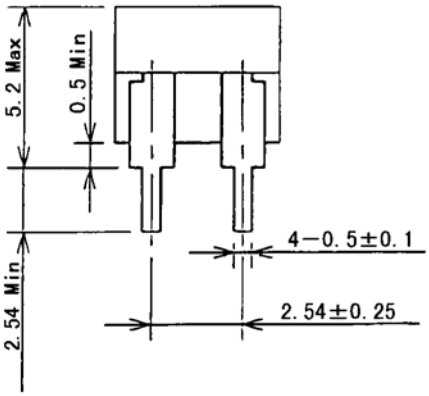


■ Package (Unit: mm)

LCTXXN4Z0001

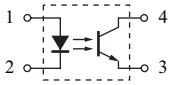






- Pin name
  1: Anode
  2: Cathode
  3: Emitter
  4: Collector

■ Internal Connection



Top View

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