CNC2S501 (ON3731A)

Optoisolators

■ Overview

The CNC2S501 of optoisolators consist of a GaAs infrared LED which is optically coupled with a Si NPN Darlington phototransistor, and housed in a small DIL package. The series provides high I/O isolation voltage and high collector/emitter isolation voltage, as well as a high current transfer ratio (CTR).

■ Features

- High collector-emitter voltage (base open): V_{CEO} > 350 V
- High current transfer ratio with darlington phototransistor output: CTR = 4000% (typ.)
- High I/O isolation voltage: V_{ISO} ≥ 5000 V[rms]
- Small DIL package for saving mounting space
- UL listed (UL File No. E79920)
- Guaranteed internal insulating distance of 0.4 mm

■ Applications

- Telephones
- Telephone switches
- Fax
- Programmable controllers
- 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}	350	V
	Emitter-collector voltage (Base open)	V_{ECO}	0.3	V
	Collector current	I_C	150	mA
	Collector power dissipation *3	P_C	300	mW
Isolation voltage, input to output *4		V_{ISO}	5000	V[rms]
Total power dissipation		P_T	320	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		30		pF
Output characteristics	Collector-emitter voltage (Base open)	V_{CEO}	I_C = 100 μA	350			V
	Emitter-collector voltage (Base open)	V_{ECO}	I_E = 100 μA	0.3			V
	Collector-emitter cutoff current (Base open)	I_{CEO}	V_{CE} = 200 V			200	nA
	Collector-emitter capacitance	C_C	V_{CE} = 10 V, f = 1 MHz		10		pF
Transfer characteristics	DC current transfer ratio *1	CTR	V_{CE} = 2 V, I_F = 1 mA	1000	4000		%
	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 *2	t_r	V_{CC} = 10 V, I_C = 10 mA, R_L = 100 Ω		40		μs
	Fall time *3	t_f			15		μs
	Collector-emitter saturation voltage	$V_{CE(sat)}$	I_F = 1 mA, I_C = 2 mA			1.0	V

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

2. This device is designed by disregarding radiation.

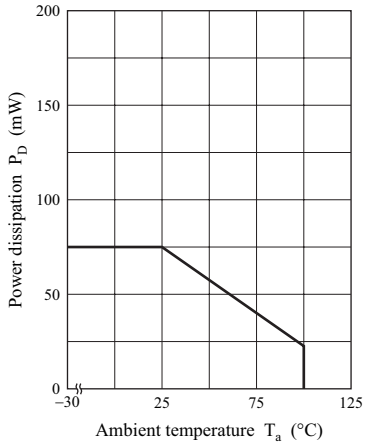
3. *1:

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

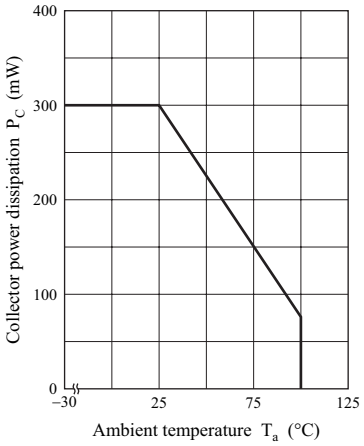
*2: t_r : Time required for the collector current to increase from 10% to 90% of its final value

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

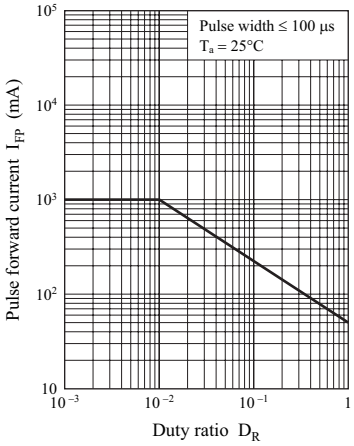
P_D — T_a



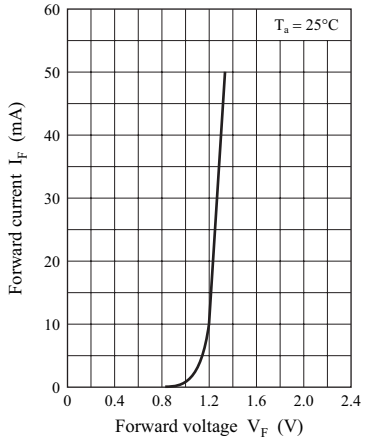
P_C — T_a



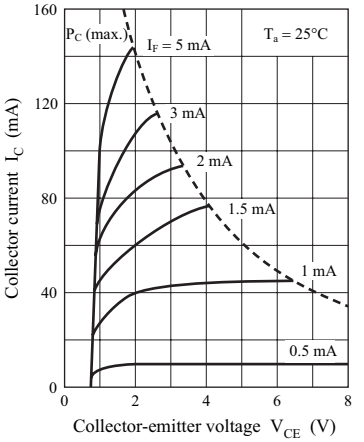
I_{FP} — D_R



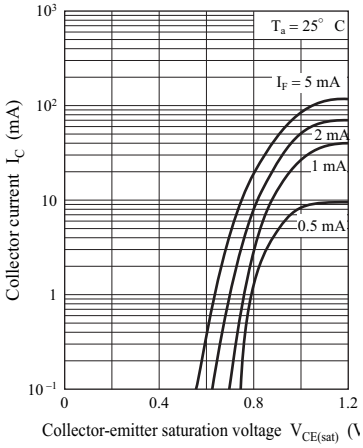
I_F — V_F



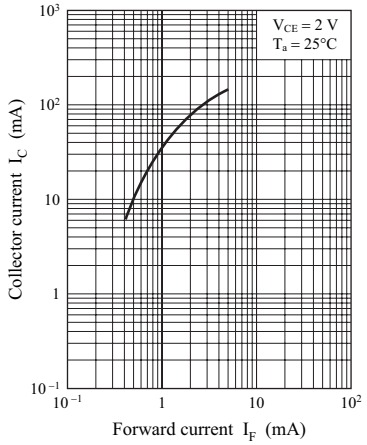
I_C — V_{CE}



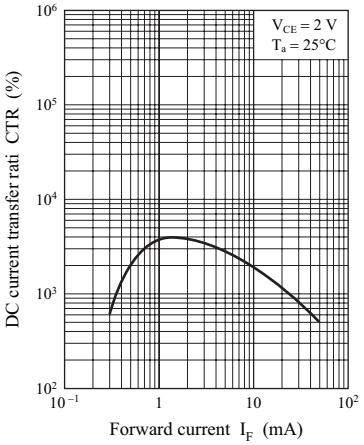
I_C — $V_{CE(sat)}$



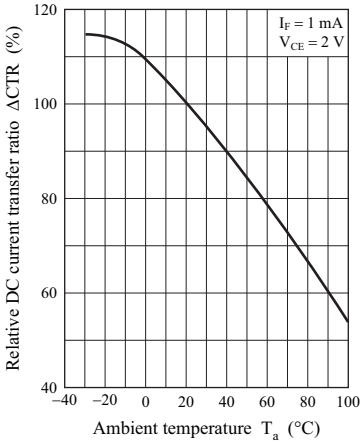
I_C — I_F



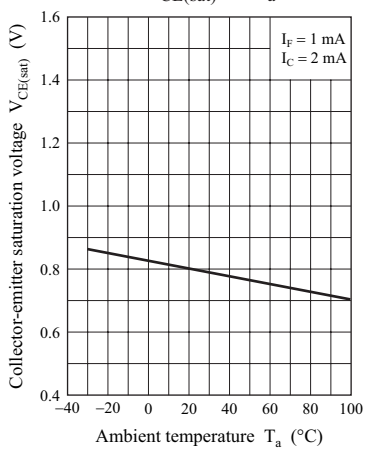
CTR — I_F



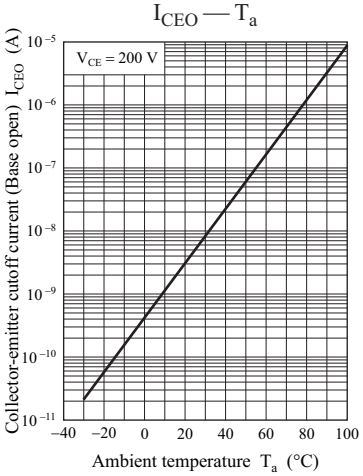
ΔCTR — T_a



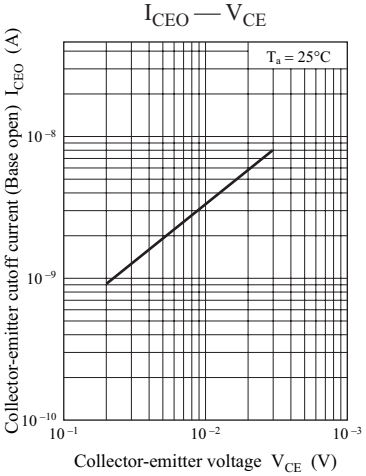
$V_{CE(sat)}$ — T_a



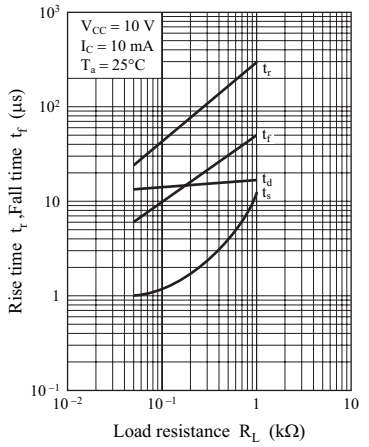
I_{CEO} — T_a



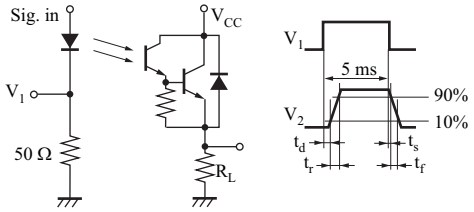
I_{CEO} — V_{CE}



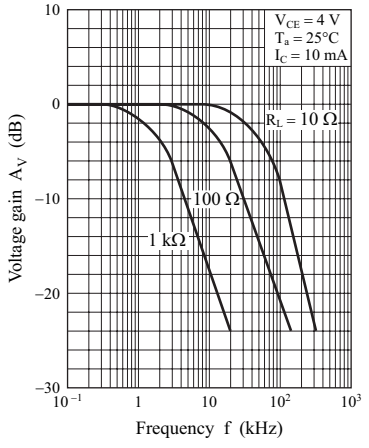
t_r , t_f — R_L



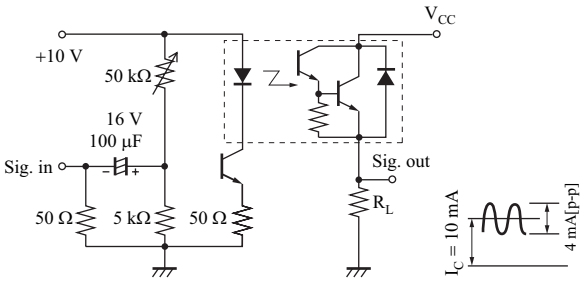
Switching time measurement circuit



A_V — f

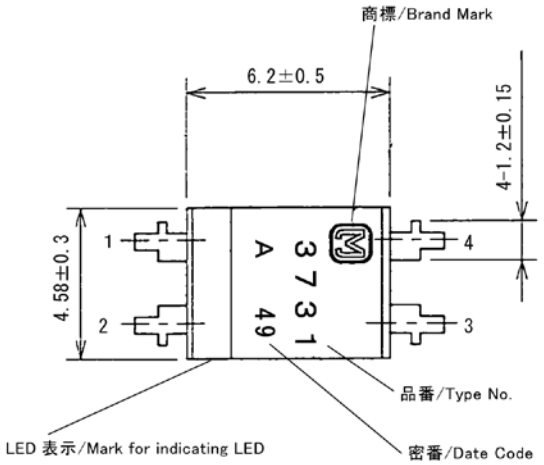


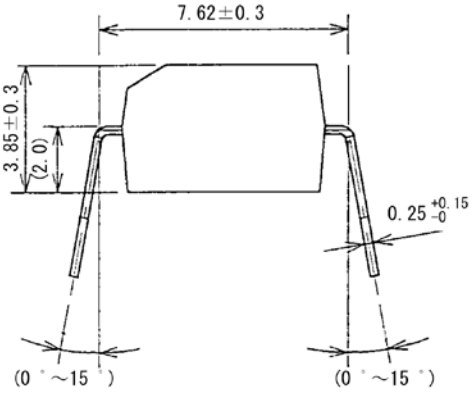
Measurement circuit of frequency characteristics

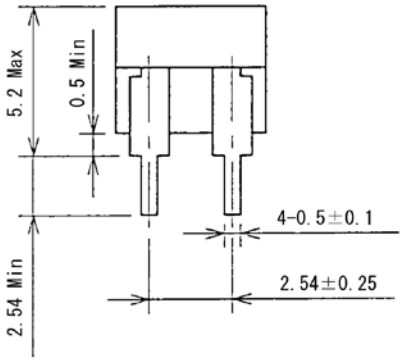


■ Package (Unit: mm)

LCTXXN4Z0001

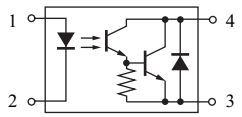






- Pin name
  1: Anode
  2: Cathode
  3: Emitter
  4: Collector

■ Internal Connection



Top View

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