

CNZ3731 (ON3731)

Optoisolators

■ Overview

The CNZ3731 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): $V_{CEO} > 300$ V
- High current transfer ratio with darlington phototransistor output: CTR = 4000% (typ.)
- High I/O isolation voltage: $V_{ISO} \geq 5000$ V[rms]
- Small DIL package for saving mounting space
- UL listed (UL File No. E79920)

■ Applications

- Telephones
- Telephone switches
- Fax
- Programmable controllers
- 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}	300	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 $T_a \geq 25^\circ\text{C}$

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

*3: Output power derating ratio is 1.5 mW/°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	$V_R = 0 \text{ V}, f = 1 \text{ MHz}$		30		pF
Output characteristics	Collector-emitter voltage (Base open)	V_{CEO}	$I_C = 100 \mu\text{A}$	300			V
	Emitter-collector voltage (Base open)	V_{ECO}	$I_E = 100 \mu\text{A}$	0.3			V
	Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{\text{CE}} = 200 \text{ V}$			200	nA
	Collector-emitter capacitance	C_C	$V_{\text{CE}} = 10 \text{ V}, f = 1 \text{ MHz}$		10		pF
Transfer characteristics	DC current transfer ratio *1	CTR	$V_{\text{CE}} = 2 \text{ V}, I_F = 1 \text{ mA}$	1000	4000		%
	Isolation capacitance, input to output	C_{ISO}	$f = 1 \text{ MHz}$		0.7		pF
	Isolation resistance, input to output	R_{ISO}	$V_{\text{ISO}} = 500 \text{ V}$	10^{11}			Ω
	Rise time *2	t_r	$V_{\text{CC}} = 10 \text{ V}, I_C = 10 \text{ mA},$ $R_L = 100 \Omega$		40		μs
	Fall time *3	t_f			15		μs
	Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_F = 1 \text{ mA}, I_C = 2 \text{ mA}$			1.0	V

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

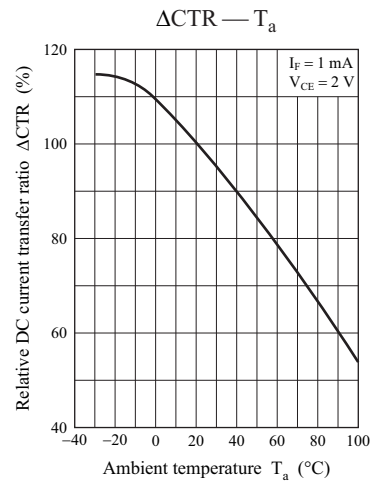
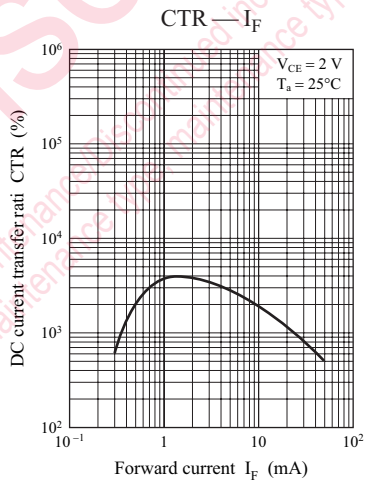
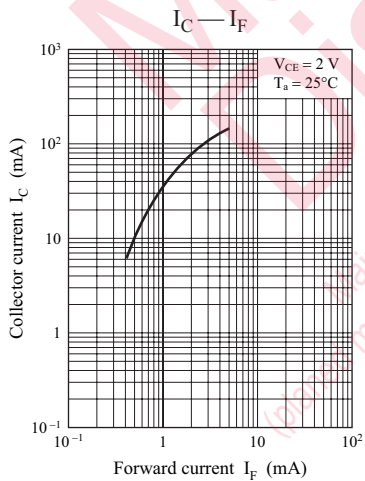
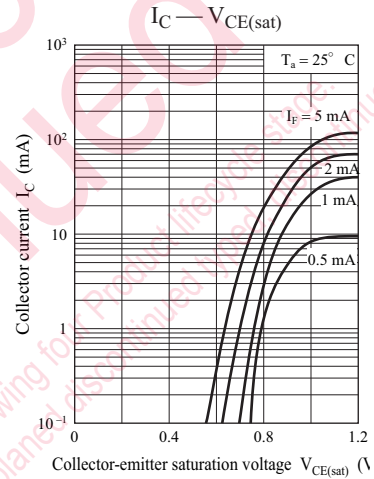
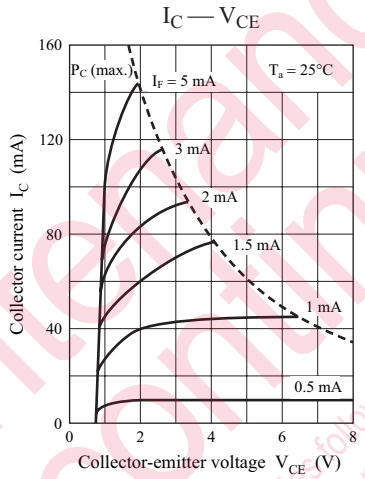
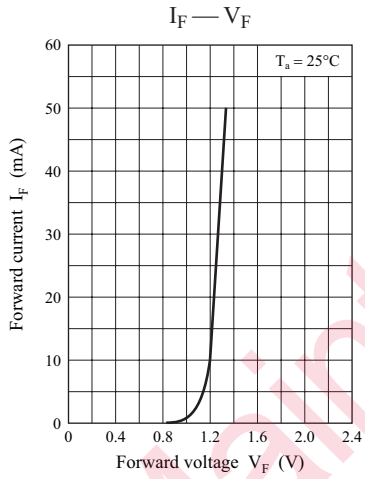
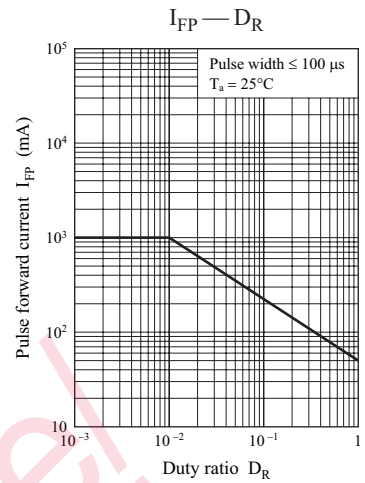
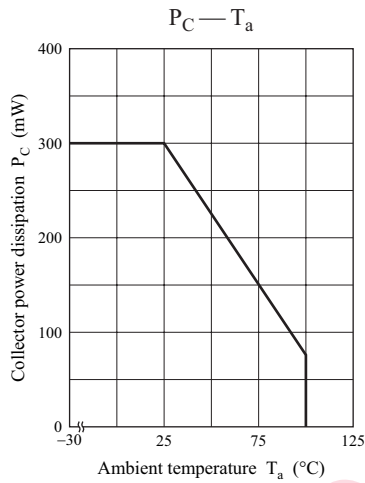
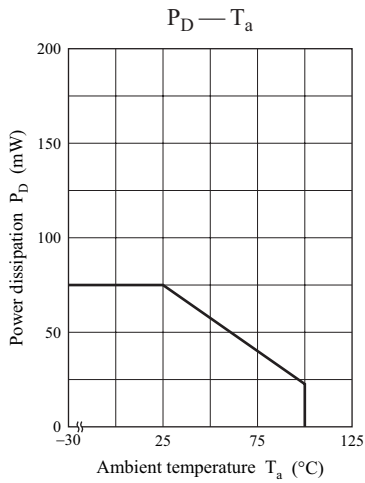
2. This device is designed by disregarding radiation.

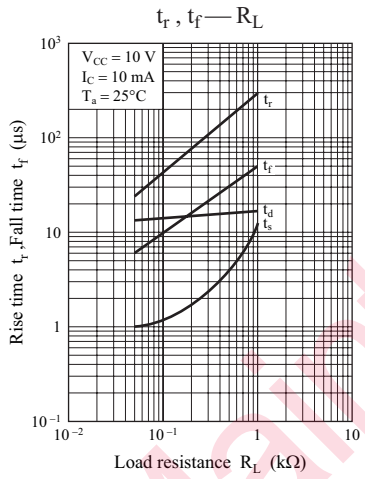
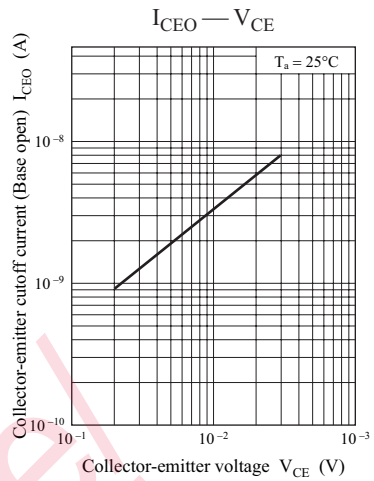
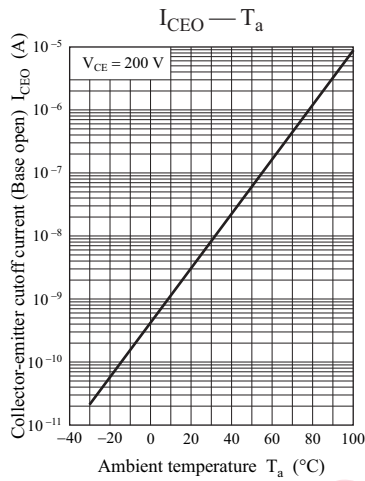
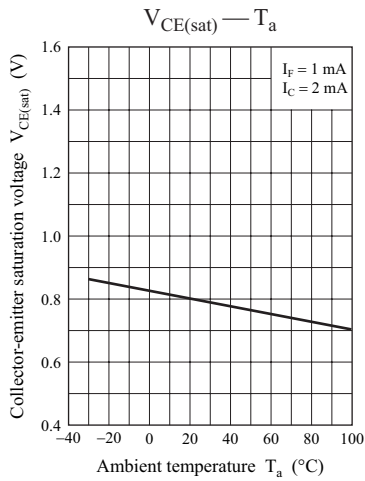
3. *1:

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

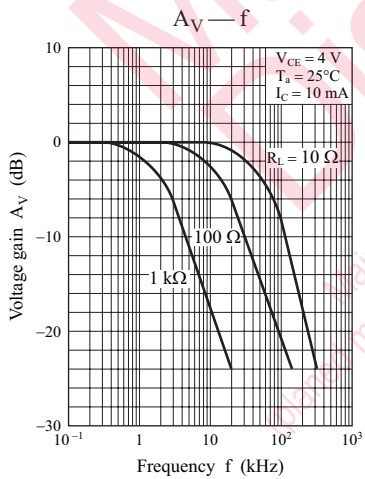
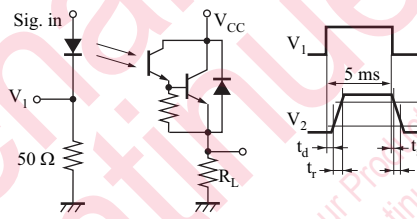
*2: t_r : Time required for the collector current to increase from 10% to 90% of its final value

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

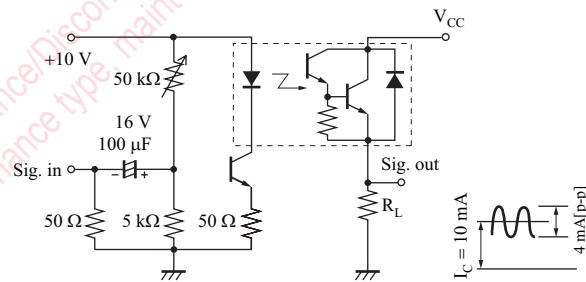




Switching time measurement circuit

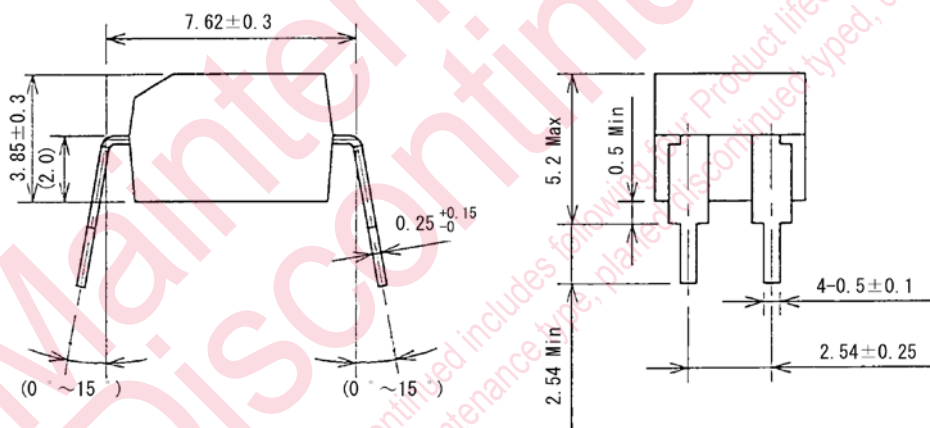
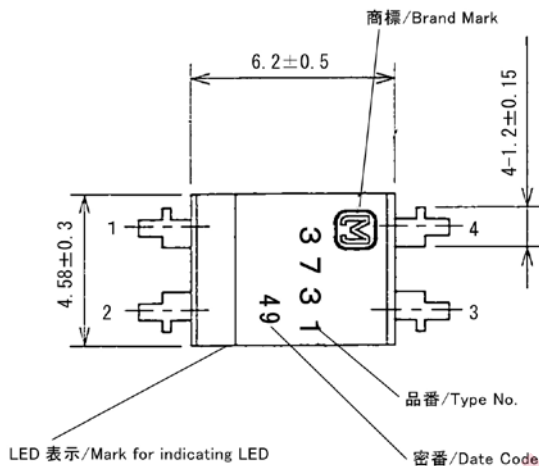


Measurement circuit of frequency characteristics



■ Package (Unit: mm)

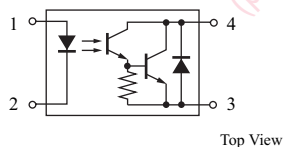
LCTXXN4Z0001



• Pin name

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

■ Internal Connection



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