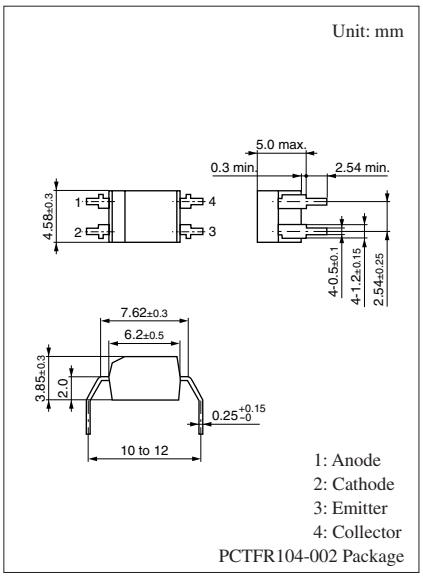
CNC1S171 (ON3171)

Optoisolator

For isolated signal transmission



■ Features

- High current transfer ratio: CTR > 50%
- High I/O isolation voltage: V_{ISO} = 5 000 V[rms] (min.)
- Fast response: t_r = 2 µs, t_f = 3 µs (typ.)
- Low collector-emitter cutoff current (Base open) : I_{CEO} < 100 nA
- VDE approved (VDE0884)
- UL listed (No. E79920)
- BSI certified (BS415 No. 7889, BS7002 No.7890)
- SEMKO certified (No. 9625004)
- DEMKO certified (No. 305848)
- NEMKO certified (No. 199633176)
- FIMKO certified (No. 191784)
- CSA approved (No. CA109151)

■ Absolute Maximum Ratings T_a = 25°C

Parameter		Symbol	Rating	Unit
Input (Light emitting diode)	Reverse voltage	V_R	6	V
	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		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: Pulse width ≤ 100 µs, repeat 100 pps
*2: Input power derating ratio is 0.75 mW/°C at $T_a \geq 25°C$
*3: Output power derating ratio is 1.5 mW/°C at $T_a \geq 25°C$

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

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Input characteristics	Forward voltage	V_F	I_F = 50 mA		1.35	1.50	V
	Reverse current	I_R	V_R = 3 V			10	µA
	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, 4	CTR	V_{CE} = 10 V, I_F = 5 mA	50		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 *2	t_r	V_{CC} = 10 V, I_C = 2 mA		2		µs
	Fall time *3	t_f	R_L = 100 Ω		3		µs
	Collector-emitter saturation voltage	$V_{CE(sat)}$	I_F = 20 mA, I_C = 1 mA		0.1	0.2	V

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

■ Electrical-Optical Characteristics (continued) $T_a = 25°C \pm 3°C$

Note) 1. Input and output are handled electrically.

2. This product is not designed to withstand radiation

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

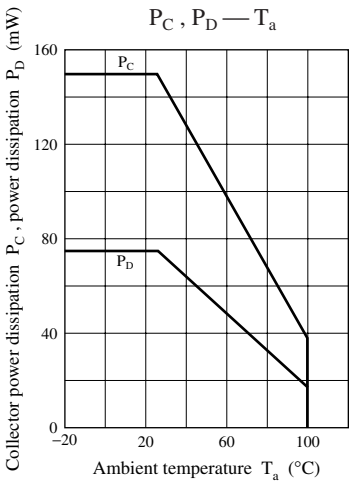
∗2: t_r; Time required for the collector current to increase from 10% to 90% of its final value

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

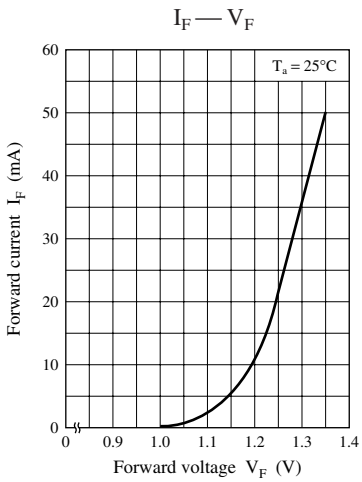
∗4: Rank classification

Rank	Q	R	S	No-rank
CTR (%)	50 to 120	100 to 250	200 to 600	50 to 600

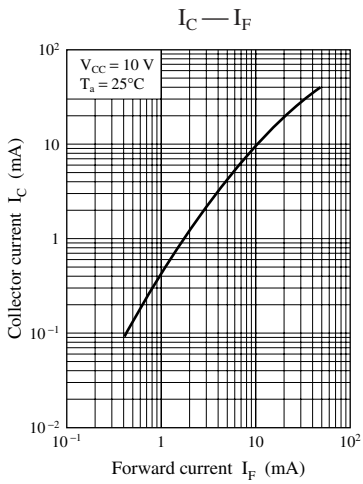
P_C , P_D — T_a



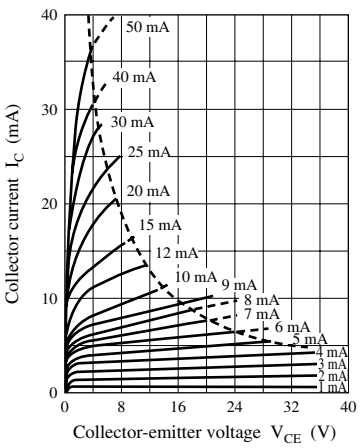
I_F — V_F



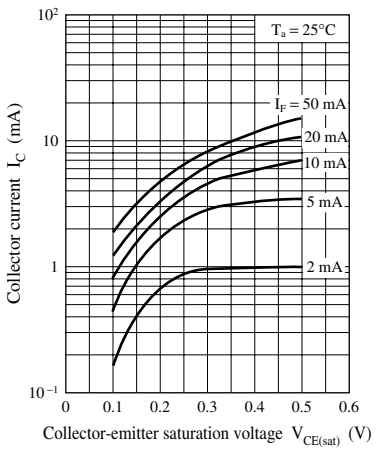
I_C — I_F



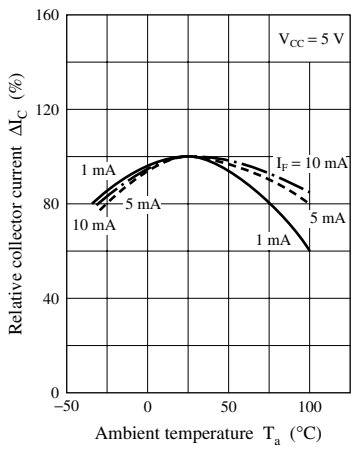
I_C — V_{CE}



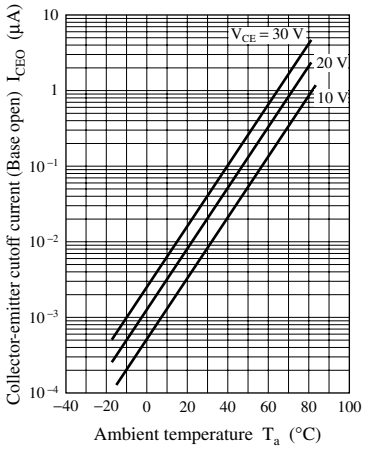
I_C — $V_{CE(sat)}$



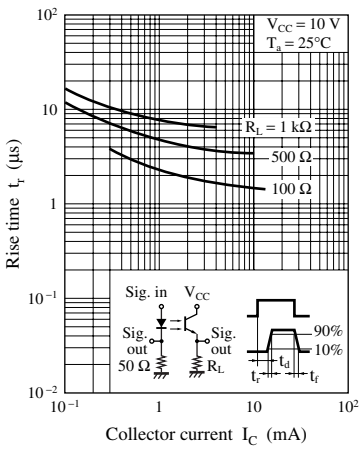
ΔI_C — T_a



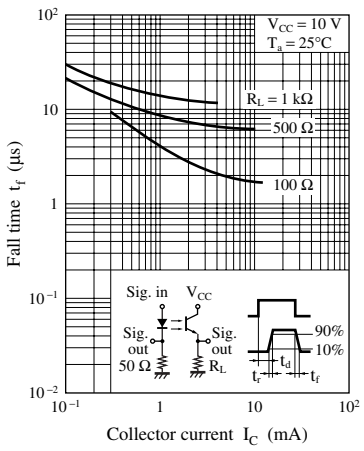
I_{CEO} — T_a



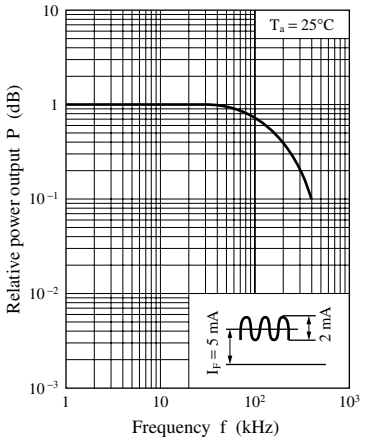
t_r — I_C



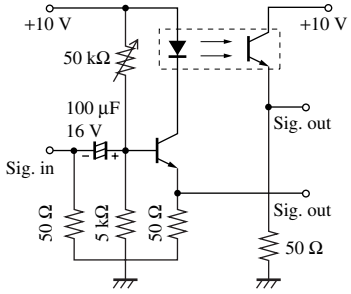
t_f — I_C



Frequency characteristics



Measurement circuit of frequency characteristics



⚠ 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.

Request for your special attention and precautions in using the technical information and semiconductors described in this material

(1) An export permit needs to be obtained from the competent authorities of the Japanese Government if any of the products or technical information described in this material and controlled under the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.

(2) The technical information described in this material is limited to showing representative characteristics and applied circuits examples of the products. It neither warrants non-infringement of intellectual property right or any other rights owned by our company or a third party, nor grants any license.

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(4) The products described in this material are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
- Any applications other than the standard applications intended.

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(6) When designing your equipment, comply with the guaranteed values, in particular those of maximum rating, the range of operating power supply voltage, and heat radiation characteristics. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(7) When using products for which damp-proof packing is required, observe the conditions (including shelf life and amount of time let standing of unsealed items) agreed upon when specification sheets are individually exchanged.