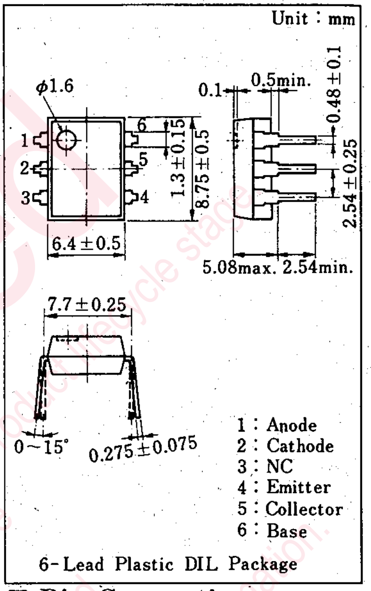
ON3100

Optoisolator

■ Outline

The ON3100 is a high transfer ratio optoisolator. Dark current is small and stable transfer ratio is obtained against temperature fluctuation as high power GaAs infrared light emitting diode and high sensitive Si phototransistor are used for light emitting device and receiving device, respectively.



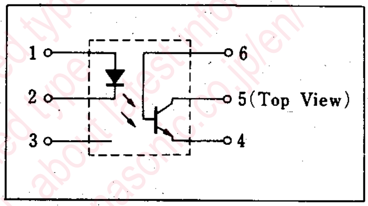
■ Features

- High CTR: CTR>50%
- High V_{ISO}: V_{ISO}=2500V (AC)
- Fast response: t_r, t_f=5μs (typ.)
- Low CTR charge against fluctuation in temperature
- UL recognized File No. E79920 (M)

■ Use

- Solid state relay
- Elimination of ground loop and EMI/RFI problems associated differential ground.

■ Pin Connection



■ Absolute Maximum Ratings (Ta=25°C)

Item		Symbol	Value	Unit
Input (Light Emitting Diode)	Reverse Voltage (DC)	V_R	3	V
	Forward Current (DC)	I_F	50	mA
	Pulse Forward Current	I_{FP}*1	2	A
	Power Dissipation	P_D*2	75	mW
Output (Photo Transistor)	Collector Current	I_C	50	mA
	Collector to Emitter Voltage	V_{CEO}	30	V
	Collector to Base Voltage	V_{CBO}	35	V
	Emitter to Base Voltage	V_{EBO}	5	V
	Emitter to Collector Voltage	V_{ECO}	5	V
	Collector Power Dissipation	P_C*3	120	mW
Total Power Dissipation		P_T	150	mW
Operating Ambient Temperature		T_{opr}	−25～+85	℃
Storage Temperature		T_{stg}	−40～+100	℃

*1 Pulse width 1 μs, repeat 300 pps.
*2 Derate (1.0 mW/°C) above 25°C ambient
*3 Derate (1.6 mW/°C) above 25°C ambient

■ Recommended Operating Conditions

Item	Symbol	min.	typ.	max.	Unit
Supply Voltage (collector supplying voltage)	V_{CC}		5～24		V
Input Forward Current	I_F		5～20		mA

■ Electro-Optical Characteristics (Ta=25°C)

	Item	Symbol	Condition	min.	typ.	max.	Unit
Input Characteristics	Reverse Current (DC)	I_R	V_R=3 V			10	μA
	Forward Voltage (DC)	V_F	I_F=50 mA		1.25	1.5	V
	Capacitance between Terminals	C_t	V_R=0, f=1 MHz		30		pF
Output Characteristics	Collector Cutoff Current	I_{CEO}	V_{CE}=10 V		10	200	nA
	Collector to Emitter Voltage	V_{CEO}	I_C=100 μA	30	50		V
	DC Current Amplification Factor	h_{FE}	V_{CE}=5 V, I_C=2 mA		500		
	Collector Output Capacitance	C_C	V_{CB}=10 V, f=1 MHz		10		pF
Coupled Characteristics	DC Current Transfer Ratio	CTR*1*3	V_{CE}=10 V, I_F=5 mA	50		600	%
	Input/Output Breakdown	V_{ISO}*2	t=1min, RH<60 %	DC3000 AC2500			V
	Input/Output Capacity	C_{ISO}	f=1 MHz		0.5		pF
	Input/Output Resistance	R_{ISO}	V_{ISO}=500 V	10^{11}			Ω
	Response Time	t_r, t_f*2*4	V_{CC}=10 V, I_C=5 mA, R_L=100 Ω		5		μs
	Collector Saturation Voltage	$V_{CE(sat)}$	I_F=5 mA, I_C=1 mA			0.4	V

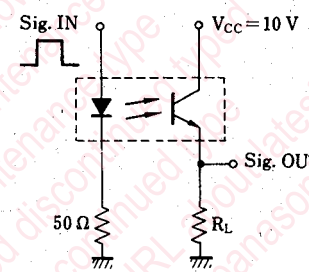
*1 DC current transfer ratio (CTR) is a ratio of output against DC input current.

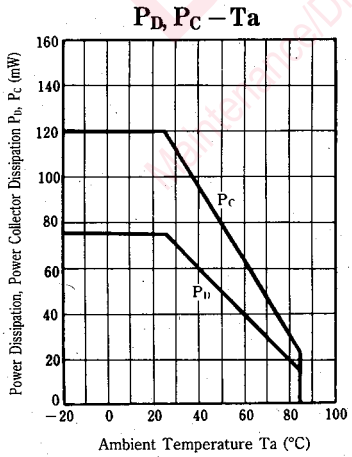
*2 Rise time (Time required for the collector current to increase from 10% to 90% of its final value)
Fall time (Time required for the collector current to decrease from 90% to 10% of its final value)

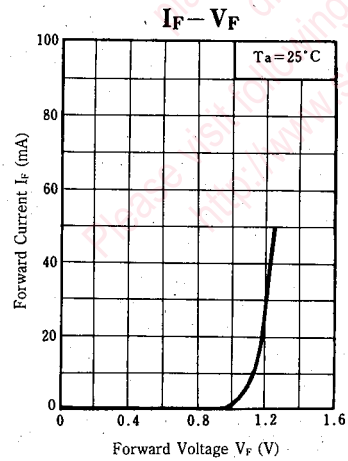
*3 CTR Classification

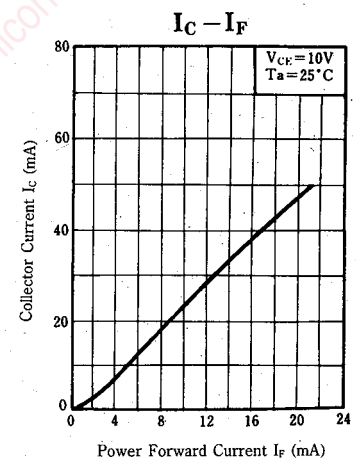
Class	Q	R	S
CTR	50~120%	100~250%	200~600%

*4 Measuring circuit for response characteristics

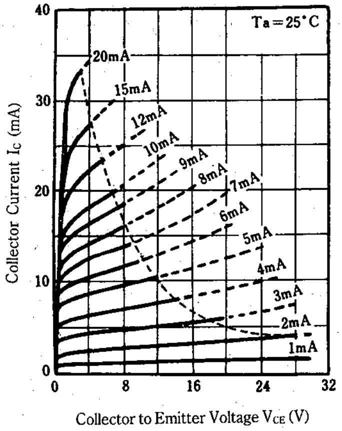




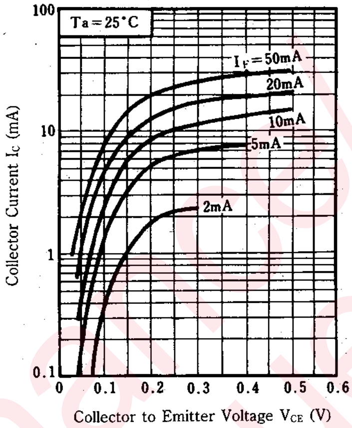




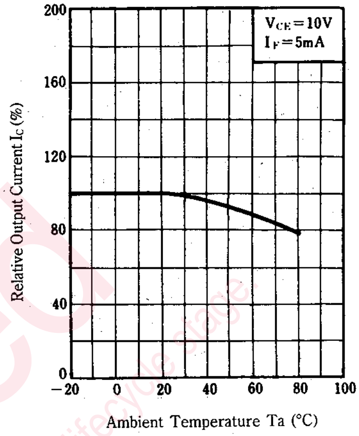
$I_C - V_{CE}$



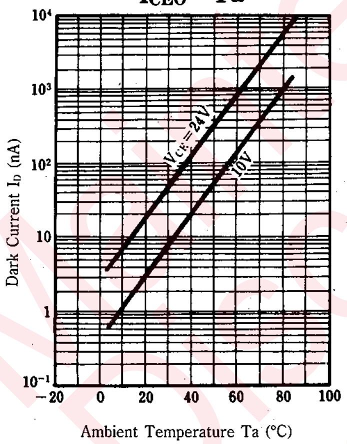
$I_C - V_{CE}$



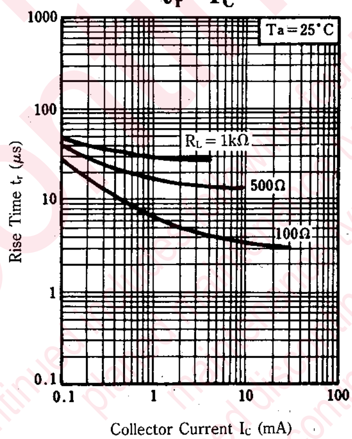
$I_C - Ta$



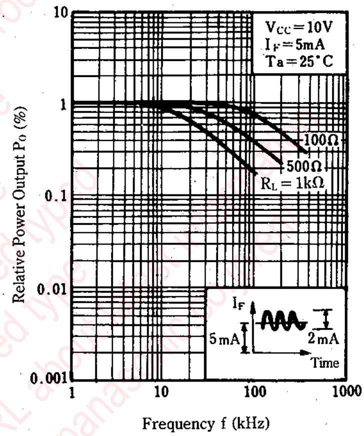
$I_{CEO} - Ta$



$t_r - I_C$



Frequency Characteristics



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