

### High Reliability Photocoupler

#### ● Features

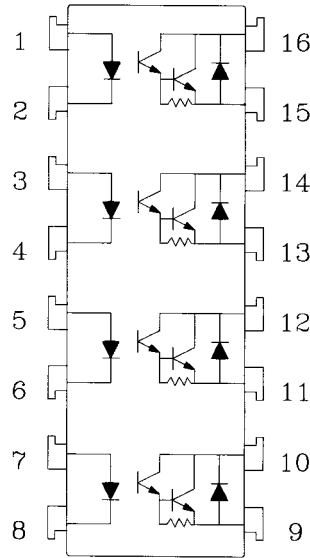
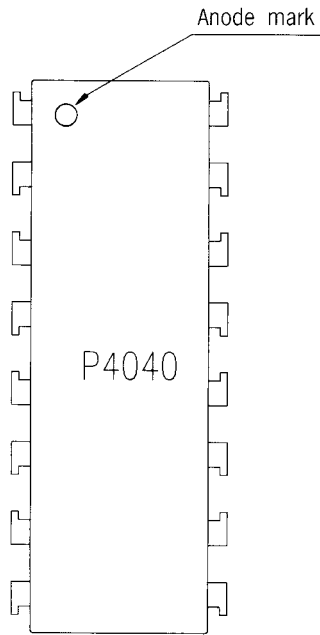
1. High current transfer ratio ( $V_{ce} : 300V \text{ MIN}$ )  
(CTR: MIN.600 at  $I_f=1mA$ ,  $V_{ce}=2V$ )
2. High isolation voltage between Input and output ( $V_{iso} : 5000V_{rms}$ ).
3. Compact dual-in-line package.

#### ● Applications

1. System appliances, measuring instruments.
2. Industrial robots.
3. Copiers, automatic vending machines.
4. Signal transmission between circuits of different potentials and impedances.
5. Telephone sets.
6. Copiers, facsimiles.
7. Interface with various power supply circuits, power distribution boards.
8. Numerical control machines.

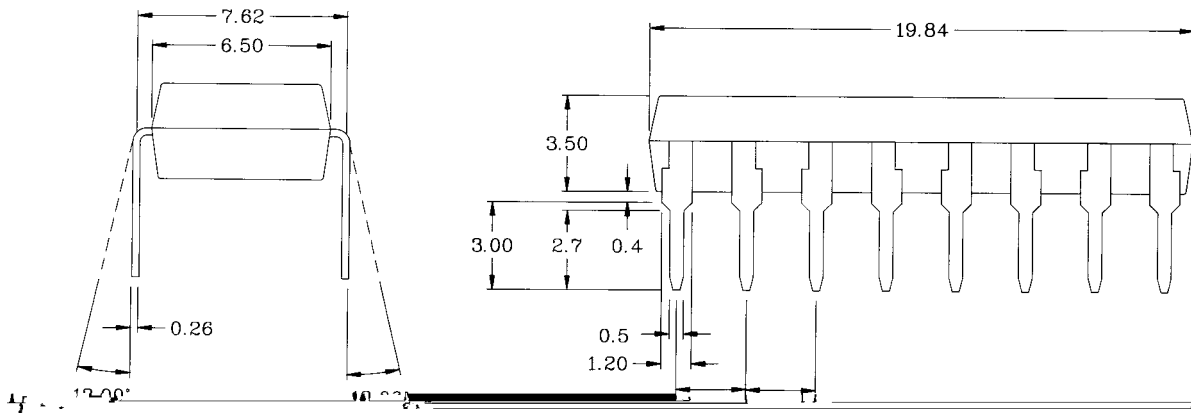
1. OUTSIDE DIMENSION : UNIT (mm)

2. SCHEMATIC : TOP VIEW



- 01,03,05,07 Anode
- 02,04,06,08 Cathode
- 09,11,13,15. Emitter
- 10,12,14,16. Collector

TOLERANCE :  $\pm 0.1\text{mm}$



● Absolute Maximum Ratings

(Ta=25°C)

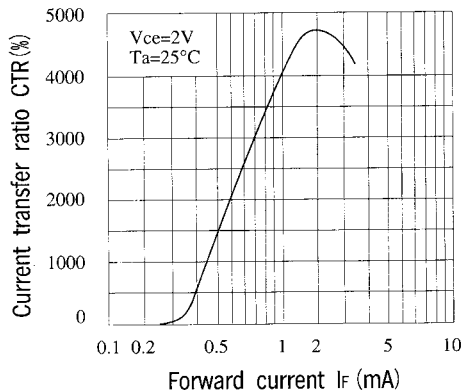
Parameter		Symbol	Rating	Unit
Input	Forward current	$I_F$	50	mA
	Peak forward current	$I_{FM}$	1	A
	Reverse voltage	$V_E$	6	V
	Power dissipation	$P$	70	mW
Output	Collector-emitter voltage	$V_{CE0}$	300	V
	Emitter-collector voltage	$V_{ECO}$	0.1	V
	Collector current	$I_c$	150	mA
	Collector power dissipation	$P_c$	200	mW
Total power dissipation		$P_{tot}$	200	mW
Isolation voltage 1 minute		$V_{iso}$	5000	Vrms
Operating temperature		$T_{opr}$	-30 to +100	°C
Storage temperature		$T_{stg}$	-55 to +125	°C
Soldering temperature 10 seconds		$T_{sol}$	260	°C

● Electro-optical Characteristics

(Ta=25°C)

Parameter		Symbol	Conditions	MIN	TYP	MAX	Unit
Input	Forward voltage	$V_F$	$I_F = 20mA$	-	1.2	1.4	V
	Peak forward voltage	$V_{FM}$	$I_{FM} = 0.5A$	-	-	3.5	V
	Reverse current	$I_R$	$V_R = 4V$	-	-	10	μA
	Terminal capacitance	$C_t$	$V = 0, f = 1kHz$	-	30	-	pF
Output	Collector dark current	$I_{CEO}$	$V_{CE} = 200V, I_F = 0$	-	-	$10^{-6}$	A
Transfer characteristics	Current transfer ratio	CTR	$I_F = 1mA, V_{CE} = 2V$	600	-	9000	%
	Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F = 20mA, I_c = 5mA$	-	-	1.5	V
	Isolation resistance	$R_{iso}$	DC500V	$5 \times 10^{10}$	-	-	ohm
	Floating capacitance	$C_f$	$V = 0, f = 1MHz$	-	0.6	1.0	pF
	Cut-off frequency	$f_c$	$V_{CE} = 5V, I_c = 2mA, R_L = 100ohm$	-	7	-	kHz
	Response time (Rise)	$t_r$	$V_{CE} = 2V, I_c = 20mA, R_L = 100ohm$	-	60	300	μs
Response time (Fall)	$t_f$	-		50	250	μs	

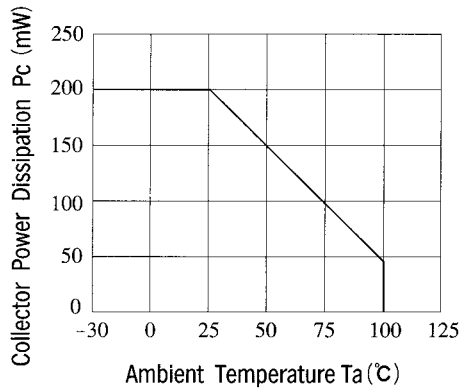
Fig 1 Current Transfer Ratio vs. Forward Current



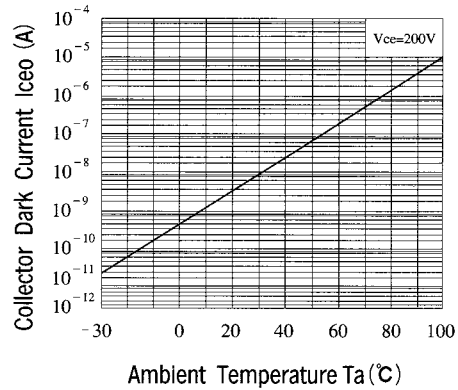
Classification table of current transfer ratio is shown below.

Model NO.	CTR (%)
P4040A	600 TO 2000
P4040B	1500 TO 4000
P4040C	3000 TO 6000
P4040D	5000 TO 9000
P4040E	600 TO 9000

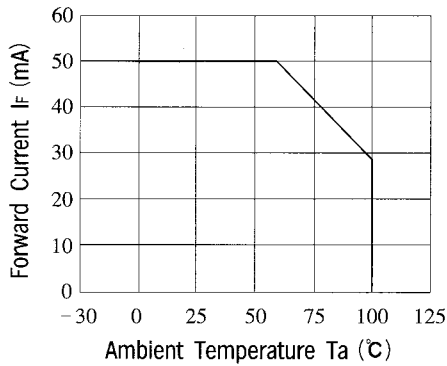
**Fig. 2 Collector Power Dissipation vs. Ambient Temperature**



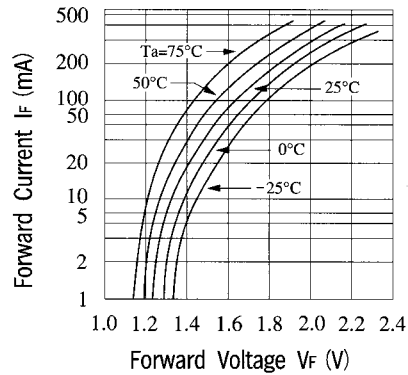
**Fig. 3 Collector Dark Current vs. Ambient Temperature**



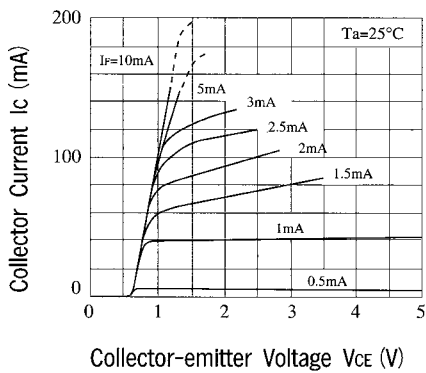
**Fig. 4 Forward Current vs. Ambient Temperature**



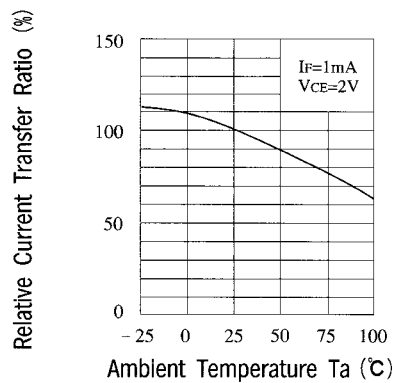
**Fig. 5 Forward Current vs. Forward Voltage**



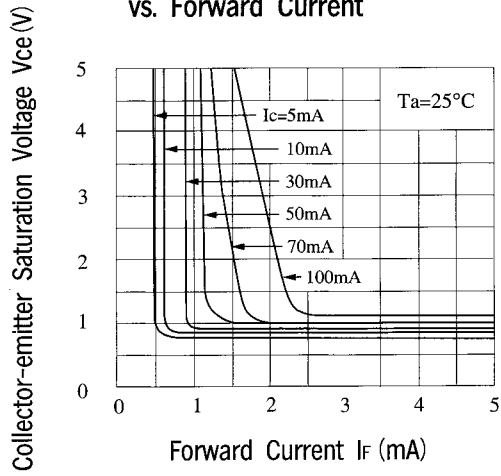
**Fig. 6 Collector Current vs. Collector-emitter Voltage**



**Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature**



**Fig 8 Collector-emitter Saturation Voltage vs. Forward Current**



**Fig 9 Response Time vs. Load Resistance**

