# PRODUCT SPECIFICATION

DATE：01/20/2010

| cosmo ELECTRONICS CORPORATION | Photocoupler： KP4010H | NO.62P20006 | REV. 1 |
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## High Reliability Photocoupler

### ● Features

1. High current transfer ratio (Vceo：300V min)
   ( CTR：Min. 600% at IF=1mA $V_{CE}$=2V )
2. High isolation voltage between input and output
   ( Viso：5000Vrms )
3. Compact long creepage distance type package.

### ● Application：

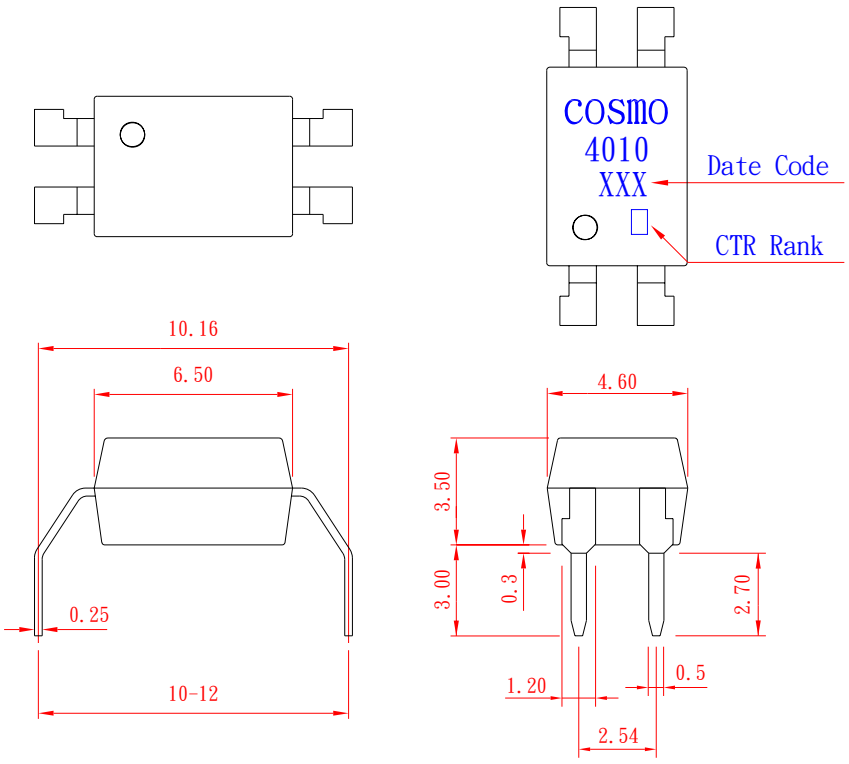
1. System appliances, measuring instruments.
2. Industrial robots.
3. Copiers, automatic vending machines.
4. Signal transmission between circuits of different potentials and impedances.
5. Telephone sets.
6. Copiers, facsimiles.
7. Interface with various power supply circuits, power distribution boards.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

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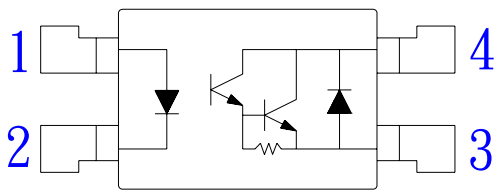
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## ● Outside Dimension：Unit ( mm )




TOLERANCE：±0.2mm

## ● Schematic：Top View




1. Anode
2. Cathode
3. Emitter
4. Collector

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## ● Absolute Maximum Ratings

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Input | Forward current | $I_F$ | 50 | mA |
| | Peak forward current | $I_{FM}$ | 1 | A |
| | Reverse voltage | $V_R$ | 6 | V |
| | Power dissipation | $P_D$ | 70 | mW |
| Output | Collector-emitter voltage | $V_{CEO}$ | 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 | | $T_{opr}$ | -55 to +100 | ℃ |
| Storage temperature | | $T_{stg}$ | -55 to +125 | ℃ |
| Soldering temperature 10 second | | $T_{sol}$ | 260 | ℃ |

## ● Electro-optical Characteristics

| 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 | - | - | 1.0 | μA |
| Transfer characteristics | Current transfer ratio | CTR | $I_F$=1mA, $V_{CE}$=2V | 600 | - | 9000 | % |
| | Collector-emitter saturation | $V_{CE(sat)}$ | $I_F$=20mA, $I_C$=5mA | - | - | 1.5 | V |
| | Isolation resistance | $R_{iso}$ | DC500V | $5x10^{10}$ | - | - | Ω |
| | Floating capacitance | $C_f$ | V=0, f=1MHz | - | 0.6 | 1.0 | pF |
| | Cut-off frequency | $f_C$ | $V_{CC}$=5V, $I_C$=2mA, $R_L$=100Ω | - | 7 | - | KHz |
| | Response time ( Rise ) | $t_r$ | $V_{CE}$=2V, $I_C$=20mA, $R_L$=100Ω | - | 60 | 300 | μs |
| | Response time ( Fall ) | $t_f$ | | - | 50 | 250 | μs |

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Classification table of current transfer ratio is shown below.

| Model No. | CTR ( % ) |
|---|---|
| KP40103A | 600 ~ 2000 |
| KP40103B | 1500 ~ 4000 |
| KP40103C | 3000 ~ 6000 |
| KP40103D | 5000 ~ 9000 |
| KP40103E | 600 ~ 9000 |

Fig.1 **Current Transfer Ratio vs. Forward Current**

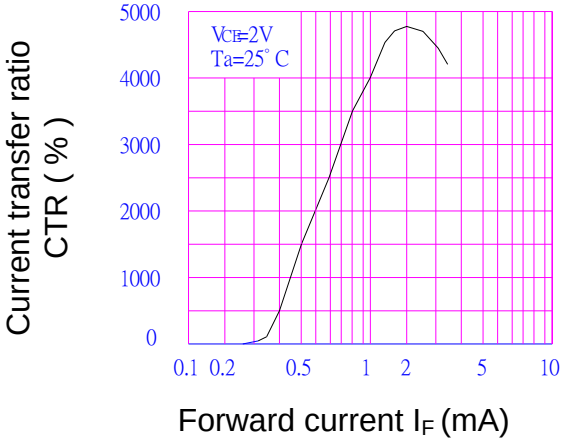



Fig.2 **Collector Power Dissipation vs. Ambient Temperature**

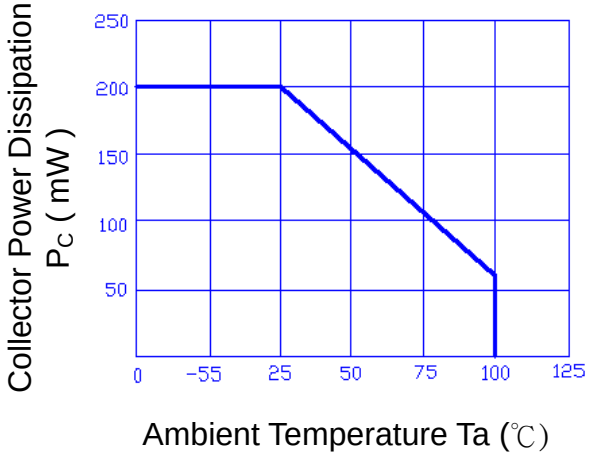



Fig.3 **Collector Dark Current vs. Ambient Temperature**

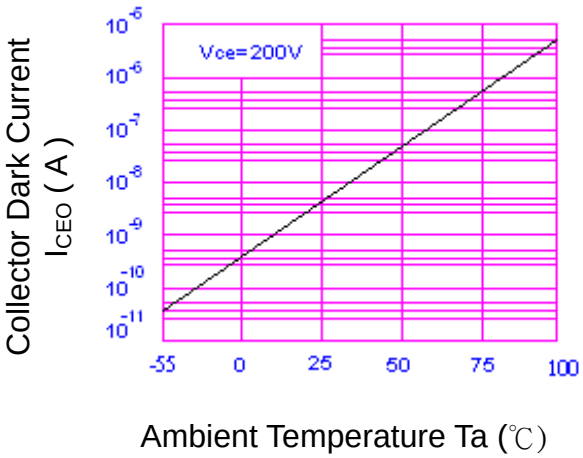



Fig.4 **Forward Current vs. Ambient Temperature**

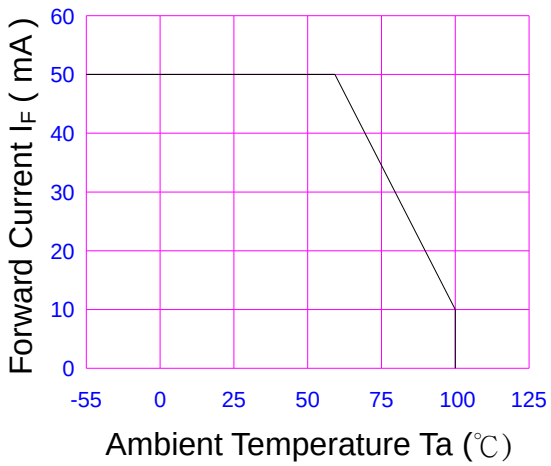
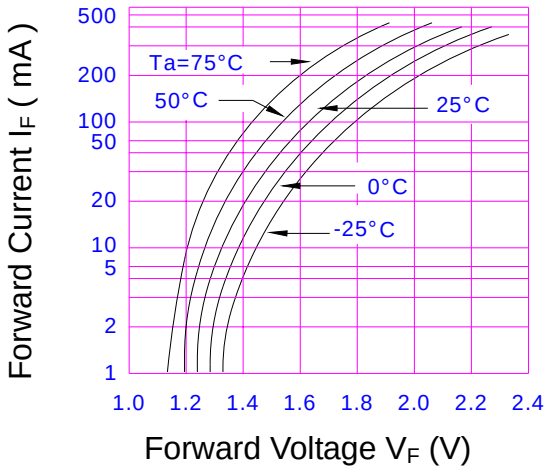



Fig.5 **Forward Current vs. Forward Voltage**



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

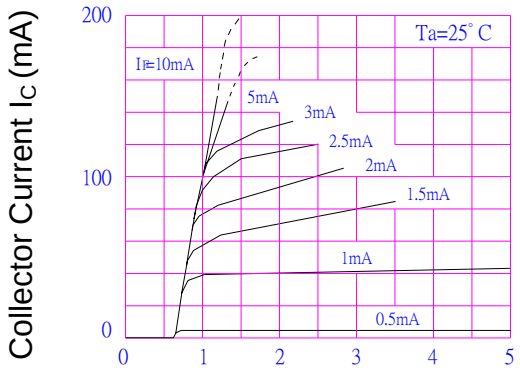



Fig.7 **Relative Current Transfer Ratio vs. Ambient Temperature**

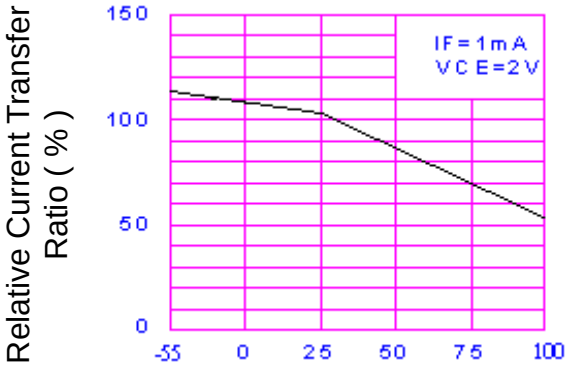



Fig.8 **Collector-Emitter Saturation Voltage vs. Forward Current**

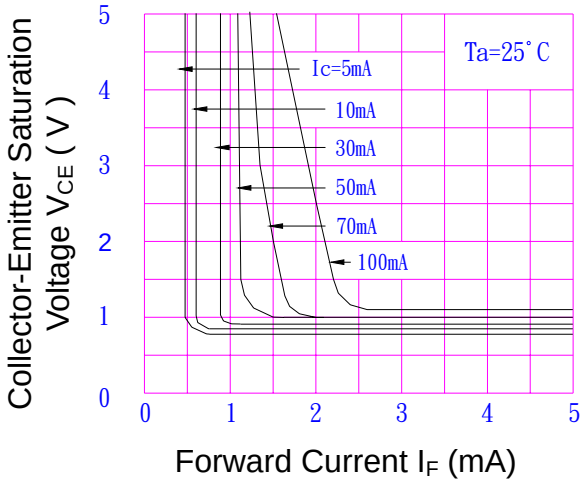
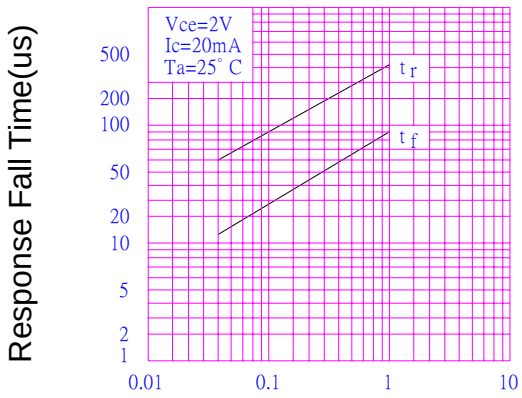



Fig.9 **Response ime vs. Load Resistance**



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