

# PRODUCT SPECIFICATION

DATE:05/14/2007

|   |                                  |              |           |
|---|----------------------------------|--------------|-----------|
| <b>cosmo</b><br>ELECTRONICS CORPORATION | Photocoupler :<br><b>KPC4N33</b> | NO.60P21011  | REV.<br>1 |
|   |                                  | SHEET 1 OF 6 |           |

## High Reliability Photocoupler

### ●Features

- 1.High current transfer ratio.  
(CTR : MIN.500% at  $I_F = 1\text{mA}$ ,  $V_{ce} = 2\text{V}$ )
- 2.High isolation voltage between input and output (Viso : 5000Vrms).
- 3.Compact dual-in-line package.

### ●Applications

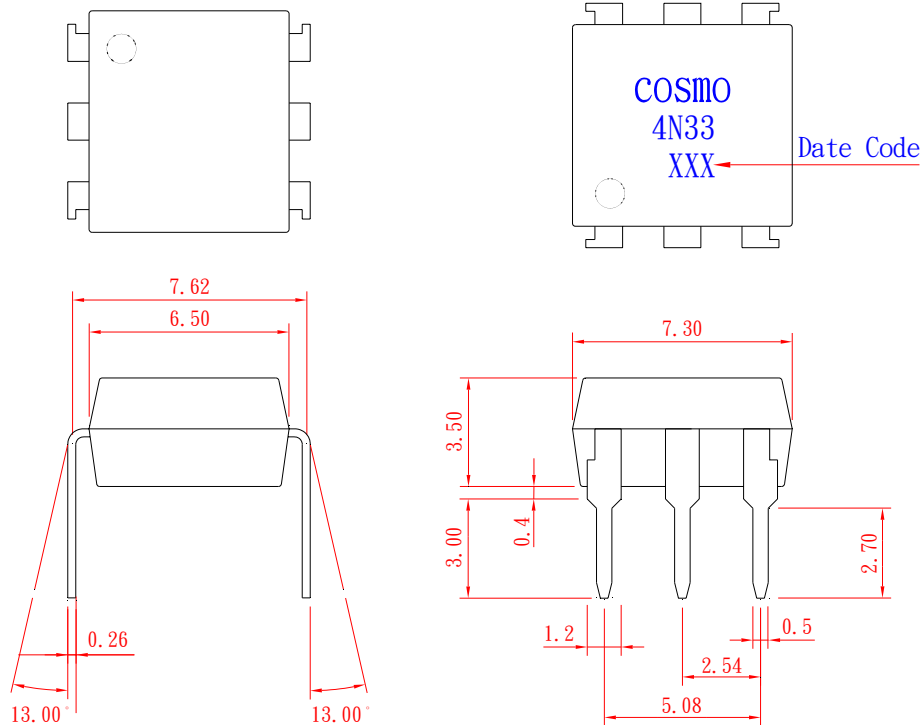
1. System appliances, measuring instruments.
2. Industrial robots.
3. Copiers, automatic vending machines.
4. Signal transmission between circuits of different potentials and impedances.
5. Telephone sets.
6. Copiers, facsimiles.
7. Interface with various power supply circuits, power distribution boards.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

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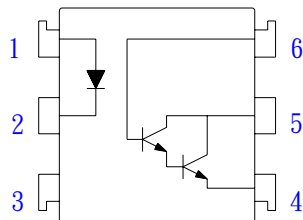
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| <b>cosmo</b><br>ELECTRONICS CORPORATION | Photocoupler : | NO.60P21011  | REV. |
|   | <b>KPC4N33</b> | SHEET 2 OF 6 | 1    |

## 1. OUTSIDE DIMENSION : UNIT (mm)



**TOLERANCE :  $\pm 0.2$ mm**

## 2. SCHEMATIC : TOP VIEW



- 1. Anode
- 2. Cathode
- 3. NC
- 4. Emitter
- 5. Collector
- 6. Base

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|   | <b>KPC4N33</b> | SHEET 3 OF 6 | 1    |

## ●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   | $V_{CEO}$   | 30        | V  |
|                                 | Collector-base voltage      | $V_{CBO}$   | 30        | V  |
|                                 | Emitter-base voltage        | $V_{EBO}$   | 6         | 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        | $V_{rms}$ |    |
| Operating temperature           | $T_{opr}$                   | -55 to +115 | °C        |    |
| Storage temperature             | $T_{sta}$                   | -55 to +125 | °C        |    |
| Soldering temperature 10 second | $T_{sol}$                   | 260         | °C        |    |

## ●Electro-optical Characteristics

| Parameter                | Symbol                       | Conditions    | MIN.                               | TYP.               | MAX. | Unit |     |
|--------------------------|------------------------------|---------------|------------------------------------|--------------------|------|------|-----|
| Input                    | Forward voltage              | $V_F$         | $I_F=10mA$                         | -                  | 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   | uA  |
|                          | Terminal capacitance         | $C_t$         | $V=0, f=1kHz$                      | -                  | 30   | -    | pF  |
| Output                   | Collector dark current       | $I_{CEO}$     | $V_{CE}=10V, I_F=0$                | -                  | -    | 0.1  | uA  |
| Transfer characteristics | Current transfer ratio       | CTR           | $I_F=1mA, V_{CE}=2V$               | 500                | 4000 | -    | %   |
|                          | Collector-emitter saturation | $V_{CE(sat)}$ | $I_F=8mA, I_C=2mA$                 | -                  | -    | 1.0  | 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            | $f_c$         | $V_{CC}=5V, I_C=2mA, R_L=100ohm$   | -                  | 7    | -    | kHz |
|                          | Response time (Rise)         | $t_r$         | $V_{ce}=10V, I_C=50mA, R_L=100ohm$ | -                  | 5    | 40   | us  |
|                          | Response time (Fall)         | $t_f$         |                                    | -                  | 60   | 100  | us  |

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|   | <b>KPC4N33</b> | SHEET 4 OF 6 |           |

Fig.1 Forward Current vs. Ambient Temperature

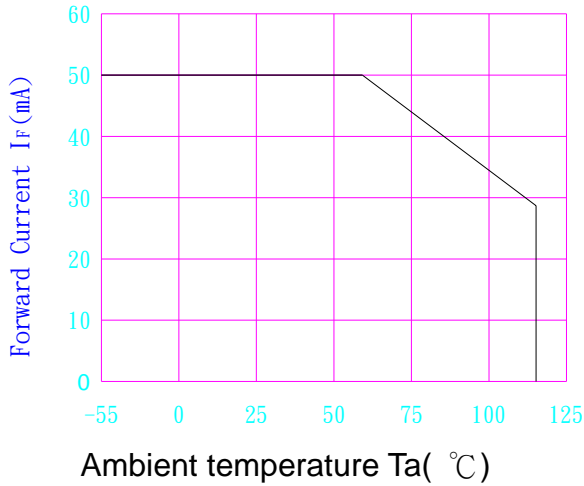


Fig.2 Collector Power Dissipation vs. Ambient Temperature

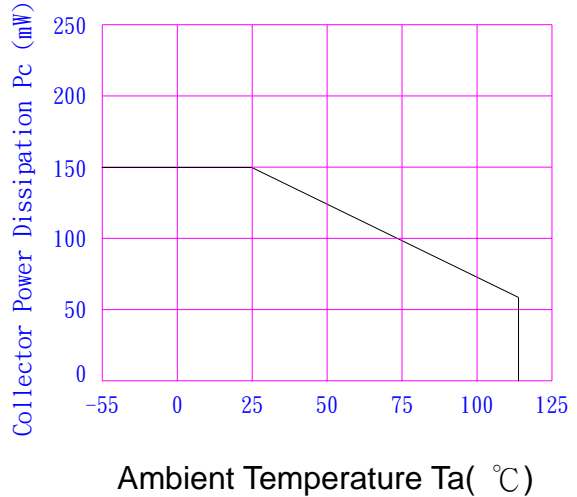


Fig.3 Peak Forward Current vs. Duty Ratio

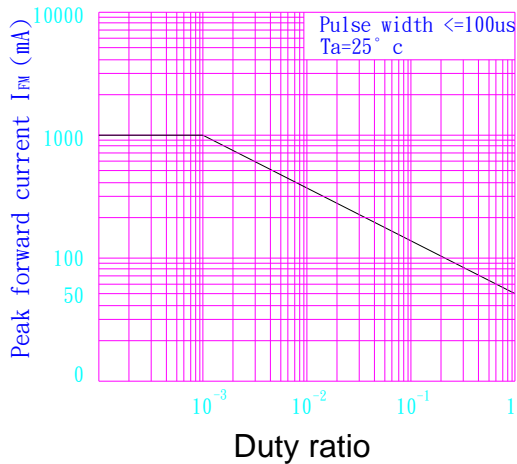


Fig.4 Forward Current vs. Forward Voltage

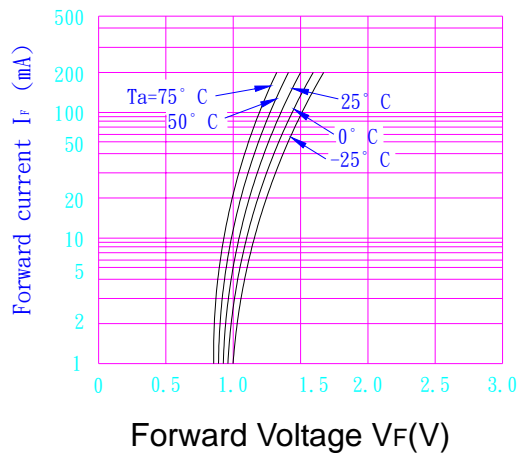


Fig.5 Current Transfer Ratio vs. Forward Current

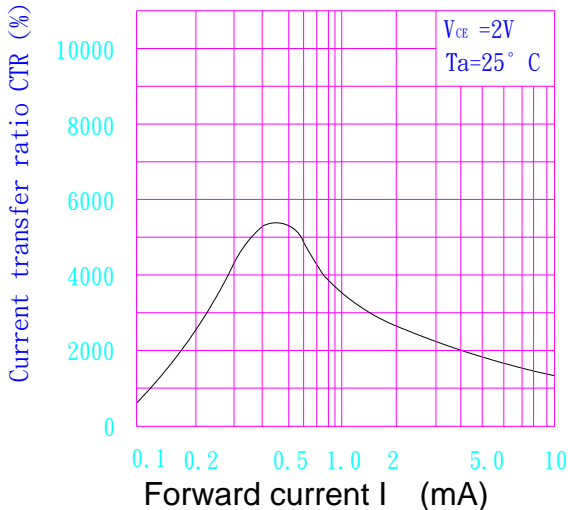
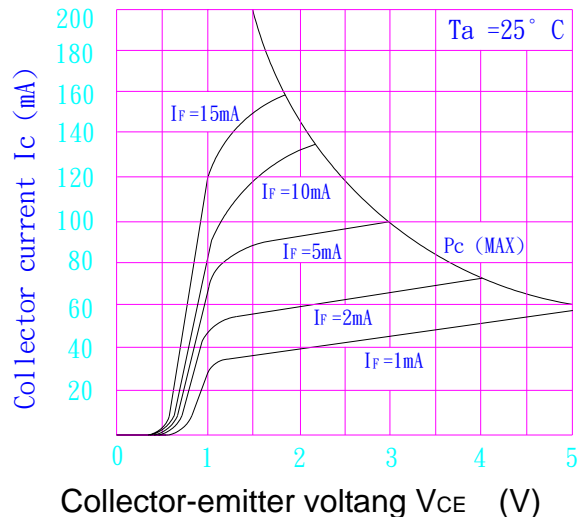


Fig.6 Collector Current vs. Collector-emitter Voltage



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| <b>cosmo</b><br>ELECTRONICS CORPORATION | Photocoupler : | NO.60P21011  | REV. |
|   | <b>KPC4N33</b> | SHEET 5 OF 6 | 1    |

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

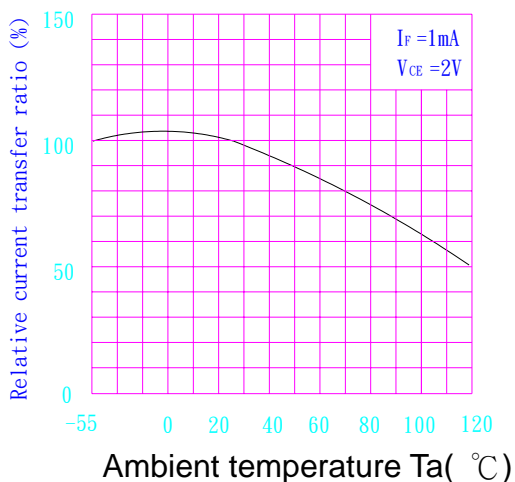


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

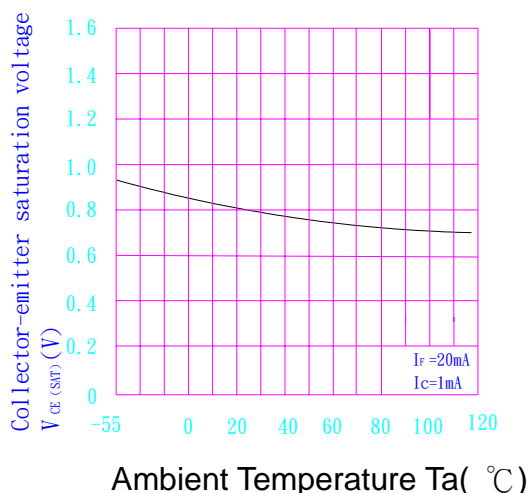


Fig.9 Collector Dark Current vs. Ambient Temperature

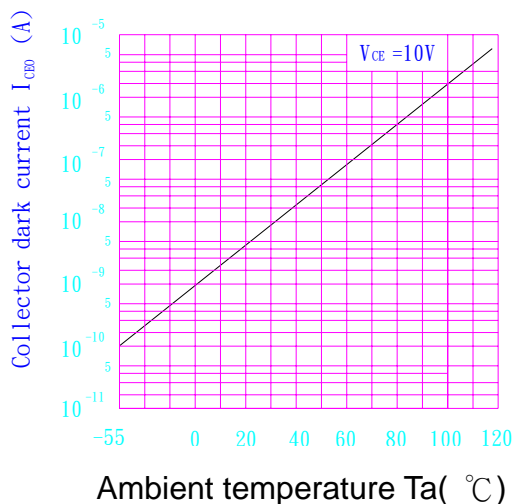


Fig.10 Response Time vs. Load Resistance

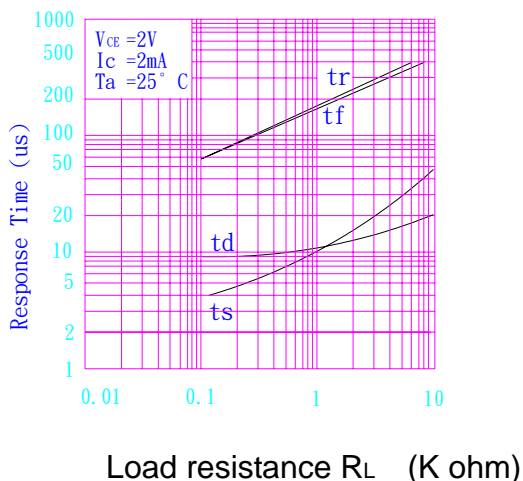
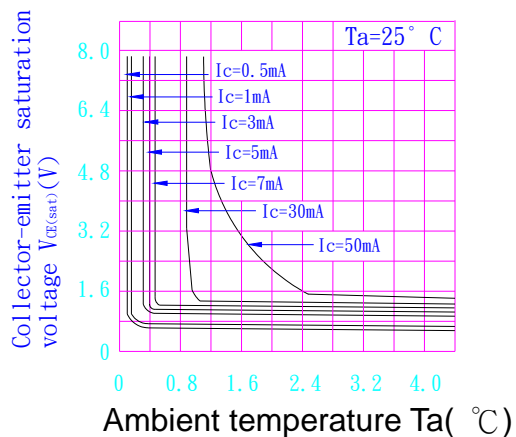


Fig.11 Collector-emitter Saturation Voltage vs. Forward current



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|   |                                  | SHEET 6 OF 6 | 1    |

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