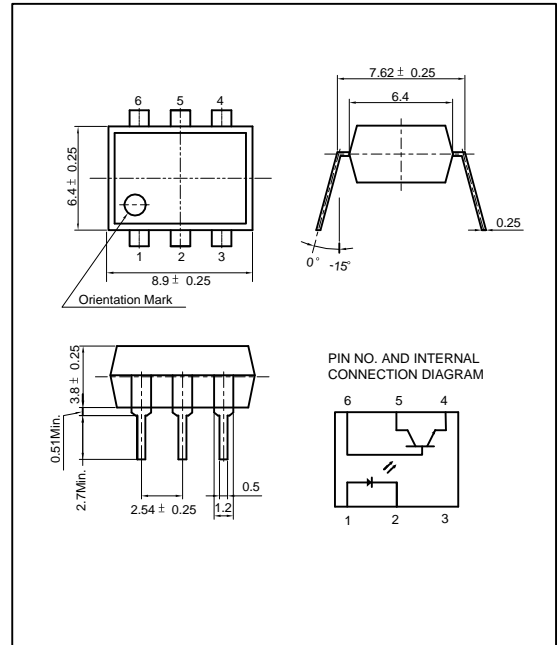


# K4N38 • K4N38A

These Photocouplers consist of a Gallium Arsenide Infrared Emitting Diode and a Silicon NPN Phototransistor in a 6-pin package.

**DIMENSION**

(Unit : mm)



**FEATURES**

- Switching Time - Typ.  $3\mu s$
- Collector-Emitter Voltage : Min. 80V
- Current Transfer Ratio : Typ. 100% (at  $I_F=10mA, V_{CE}=10V$ )
- Electrical Isolation Voltage : AC2500V<sub>rms</sub>
- UL Recognized File No. E107486

**APPLICATIONS**

- Interface between two circuits of different potential
- Vending Machine, Voltage Regulator
- Traffic Controller System
- Programmable Controller

**MAXIMUM RATINGS**

( $T_a=25^\circ C$ )

| Parameter                                |                                     | Symbol     | Rating   | Unit      |
|--|-------------------------------------|------------|----------|-----------|
| Input                                    | Forward Current                     | $I_F$      | 60       | mA        |
|  | Reverse Voltage                     | $V_R$      | 5        | V         |
|  | Peak Forward Current <sup>*1</sup>  | $I_{FP}$   | 3        | A         |
|  | Power Dissipation                   | $P_D$      | 70       | mW        |
| Output                                   | Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | 80       | V         |
|  | Emitter-Collector Breakdown Voltage | $BV_{ECO}$ | 6        | V         |
|  | Collector-Base Breakdown Voltage    | $BV_{CBO}$ | 80       | V         |
|  | Collector Current                   | $I_C$      | 100      | mA        |
|  | Collector Power Dissipation         | $P_C$      | 150      | mW        |
| Input to Output Isolation Voltage*2      |                                     | $V_{iso}$  | AC2500   | $V_{rms}$ |
| Storage Temperature                      |                                     | $T_{stg}$  | -55~+125 |           |
| Operating Temperature                    |                                     | $T_{opr}$  | -30~+100 |           |
| Lead Soldering Temperature <sup>*3</sup> |                                     | $T_{sol}$  | 260      |           |
| Total Power Dissipation                  |                                     | $P_{tot}$  | 200      | mW        |

\*1. Input current with  $100\mu s$  pulse width, 1% duty cycle  
 \*2. Measured at RH=40~60% for 1min  
 \*3. 1/16 inch form case for 10sec

## K4N38 • K4N38A

### ELECTRO-OPTICAL CHARACTERISTICS

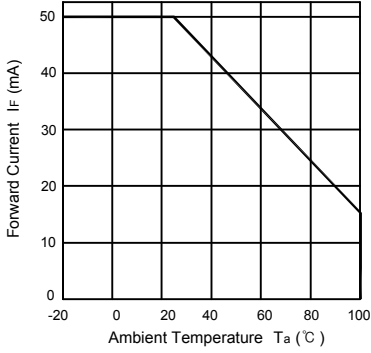
(Ta=25 , unless otherwise noted)

| Parameter |                                      | Symbol               | Condition                                   | Min. | Typ.             | Max. | Unit. |
|-----------|--------------------------------------|----------------------|---|------|------------------|------|-------|
| Input     | Forward Voltage                      | V <sub>F</sub>       | I <sub>F</sub> =10mA                        | -    | 1.15             | 1.30 | V     |
|           | Reverse Current                      | I <sub>R</sub>       | V <sub>R</sub> =5V                          | -    | -                | 10   | μA    |
|           | Capacitance                          | C <sub>T</sub>       | V=0, f=1MHz                                 | -    | 30               | -    | pF    |
| Output    | Collector-Emitter Breakdown Voltage  | BV <sub>CEO</sub>    | I <sub>C</sub> =1mA                         | 80   | -                | -    | V     |
|           | Emitter-Collector Breakdown Voltage  | BV <sub>ECO</sub>    | I <sub>E</sub> =0.1mA                       | 6    | -                | -    | V     |
|           | Collector-Base Breakdown Voltage     | BV <sub>CBO</sub>    | I <sub>C</sub> =0.1mA                       | 70   | -                | -    | V     |
|           | Collector Dark Current               | I <sub>CEO</sub>     | I <sub>F</sub> =0, V <sub>CE</sub> =10V     | -    | -                | 50   | nA    |
|           | Capacitance                          | C <sub>CE</sub>      | V <sub>CE</sub> =0, f=1MHz                  | -    | 10               | -    | pF    |
| Coupled   | Current Transfer Ratio <sup>*4</sup> | CTR                  | I <sub>F</sub> =10mA, V <sub>CE</sub> =10V  | 10   | -                | -    | %     |
|           | Collector-Emitter Saturation Voltage | V <sub>CE(SAT)</sub> | I <sub>F</sub> =10mA, I <sub>C</sub> =0.5mA | -    | 0.15             | 0.3  | V     |
|           | Input-Output Capacitance             | C <sub>IO</sub>      | V=0, f=1MHz                                 | -    | 1                | -    | pF    |
|           | Input-Output Isolation Resistance    | R <sub>IO</sub>      | RH=40~60%, V=500V                           | -    | 10 <sup>11</sup> | -    |       |
|           | Rise Time                            | t <sub>r</sub>       | V <sub>CE</sub> =10V, R <sub>L</sub> =100   | -    | 3                | 10   | μs    |
|           | Fall Time                            | t <sub>f</sub>       | I <sub>C</sub> =2mA                         | -    | 3                | 10   | μs    |

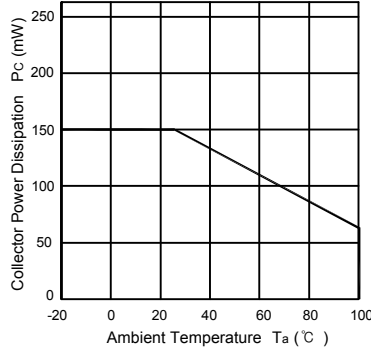
\*4. CTR=(I<sub>C</sub>/I<sub>F</sub>) X 100 (%)

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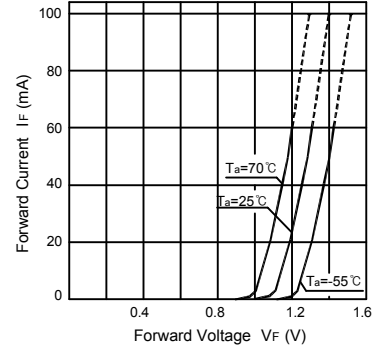
**Forward Current vs. Ambient Temperature**



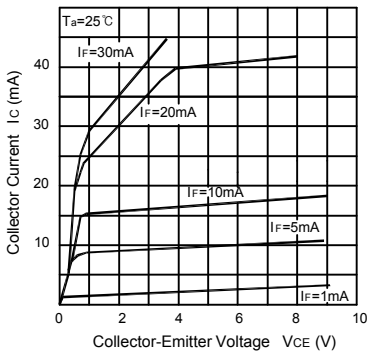
**Collector Power Dissipation vs. Ambient Temperature**



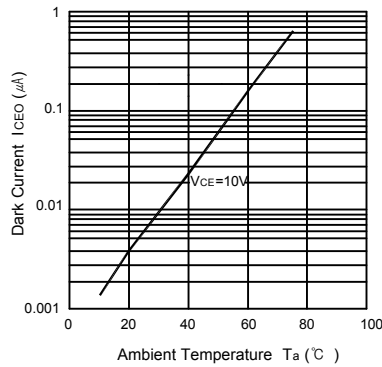
**Forward Current vs. Forward Voltage**



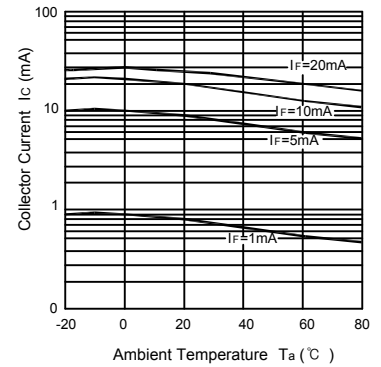
**Collector Current vs. Collector-Emitter Voltage**



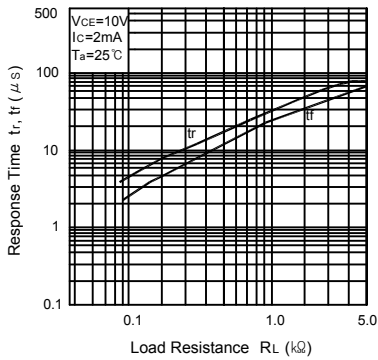
**Dark Current vs. Ambient Temperature**



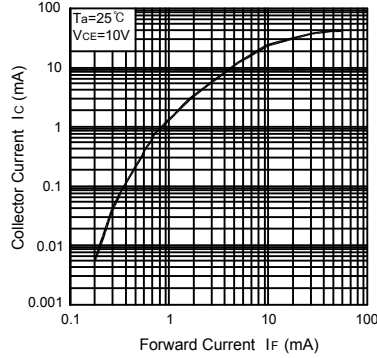
**Collector Current vs. Ambient Temperature**



**Response Time vs. Load Resistance**



**Collector Current vs. Forward Current**



**Switching Time Test Circuit**

