**4N38X, 4N38AX**
**4N38, 4N38A**

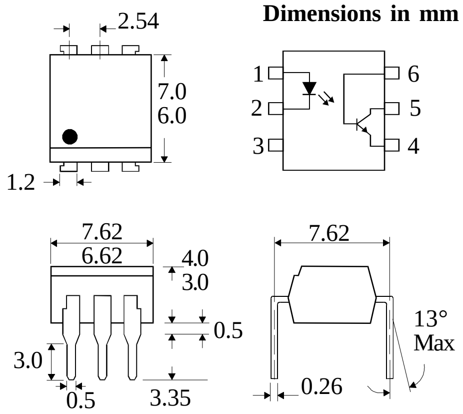
# OPTICALLY COUPLED ISOLATOR PHOTOTRANSISTOR OUTPUT

## APPROVALS

- UL recognised, File No. E91231

## 'X' SPECIFICATION APPROVALS

- VDE 0884 in 3 available lead form : -
  - STD
  - G form
  - SMD approved to CECC 00802
- Certified to EN60950 by the following Test Bodies :-
  Nemko - Certificate No. P01102464
  Fimko - Certificate No. FI18166
  Semko - Reference No. 0202037/01-22
  Demko - Certificate No. 311158-01
- BSI approved - Cetificate No. 8001




## DESCRIPTION

The 4N38, 4N38A series of optically coupled isolators consist of infrared light emitting diode and NPN silicon photo transistor in a standard 6 pin dual in line plastic package.

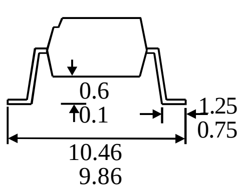
## FEATURES

- Options :-
  10mm lead spread - add G after part no.
  Surface mount - add SM after part no.
  Tape&reel - add SMT&R after part no.
- High $BV_{CEO}$ (80V min)
- High Isolation Voltage ($5.3kV_{RMS}$ ,$7.5kV_{PK}$ )
- All electrical parameters 100% tested
- Custom electrical selections available

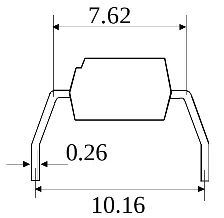
## APPLICATIONS

- DC motor controllers
- Industrial systems controllers
- Measuring instruments
- Signal transmission between systems of different potentials and impedances

**OPTION SM**
**SURFACE MOUNT**




**OPTION G**




## ABSOLUTE MAXIMUM RATINGS (25°C unless otherwise specified)

| | |
|---|---|
| Storage Temperature | -55°C to + 150°C |
| Operating Temperature | -55°C to + 100°C |
| Lead Soldering Temperature (1/16 inch (1.6mm) from case for 10 secs) | 260°C |

## INPUT DIODE

| | |
|---|---|
| Forward Current | 60mA |
| Reverse Voltage | 6V |
| Power Dissipation | 105mW |

## OUTPUT TRANSISTOR

| | |
|---|---|
| Collector-emitter Voltage $BV_{CEO}$ | 80V |
| Collector-base Voltage $BV_{CBO}$ | 80V |
| Emitter-collector Voltage $BV_{ECO}$ | 6V |
| Power Dissipation | 160mW |

## POWER DISSIPATION

| | |
|---|---|
| Total Power Dissipation (derate linearly 2.67mW/°C above 25°C) | 200mW |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**ELECTRICAL CHARACTERISTICS ( $T_A$= 25°C Unless otherwise noted )**

| PARAMETER | | MIN | TYP | MAX | UNITS | TEST CONDITION |
|---|---|---|---|---|---|---|
| Input | Forward Voltage ($V_F$) | | 1.2 | 1.5 | V | $I_F$ = 10mA |
| | Reverse Current ($I_R$) | | | 10 | µA | $V_R$=6V |
| Output | Collector-emitter Breakdown ($BV_{CEO}$) ( note 2 ) | 80 | | | V | $I_C$ = 1mA |
| | Collector-base Breakdown ($BV_{CBO}$) | 80 | | | V | $I_C$ = 100µA |
| | Emitter-collector Breakdown ($BV_{ECO}$) | 6 | | | V | $I_E$ = 100µA |
| | Collector-emitter Dark Current ($I_{CEO}$) | | | 50 | nA | $V_{CE}$ = 60V |
| | Collector-base Dark Current ($I_{CBO}$) | | | 20 | nA | $V_{CE}$ = 60V |
| Coupled | Current Transfer Ratio (CTR) | 20 | | | % | 10mA $I_F$ , 10V $V_{CE}$ |
| | Collector-emitter Saturation Voltage$V_{CE(SAT)}$ | | | 1.0 | V | 20mA $I_F$ , 4mA $I_C$ |
| | Input to Output Isolation Voltage $V_{ISO}$ | 5300<br>7500 | | | $V_{RMS}$<br>$V_{PK}$ | See note 1<br>See note 1 |
| | Input-output Isolation Resistance $R_{ISO}$ | $5x10^{10}$ | | | Ω | $V_{IO}$ = 500V (note 1) |
| | Response Time (rise)<br>Response Time (fall) | | 2<br>2 | | µs<br>µs | $V_{CC}$=5V,<br>$I_F$= 10mA, $R_L$ = 75Ω<br>(FIG 1) |

Note 1 Measured with input leads shorted together and output leads shorted together.

Note 2 Special Selections are available on request. Please consult the factory.

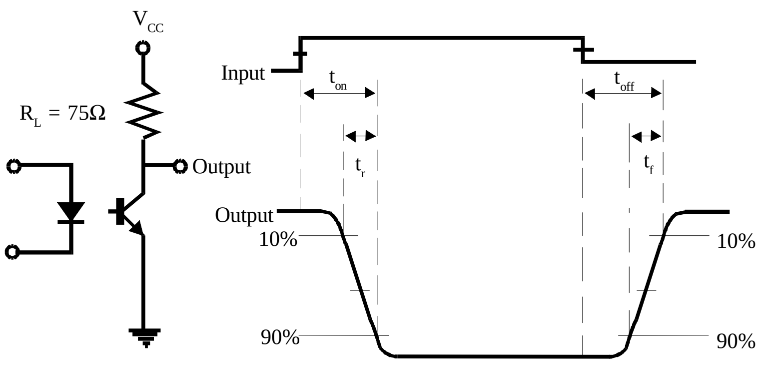
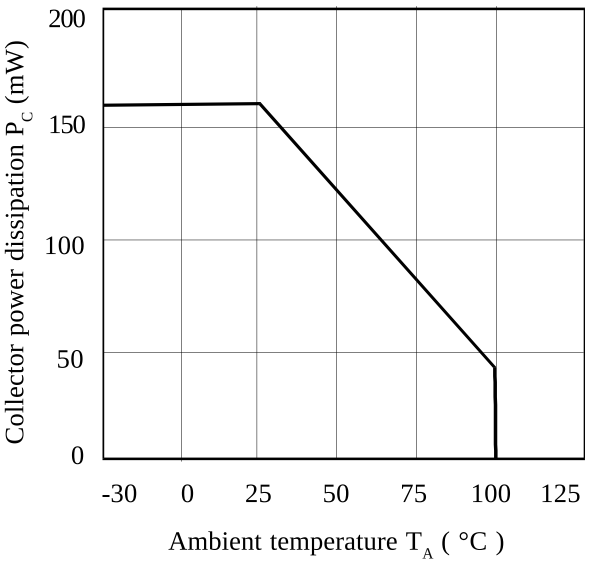
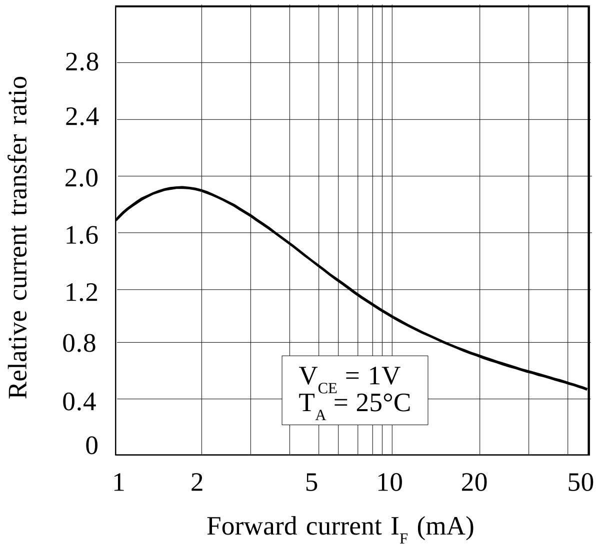



**FIG 1**

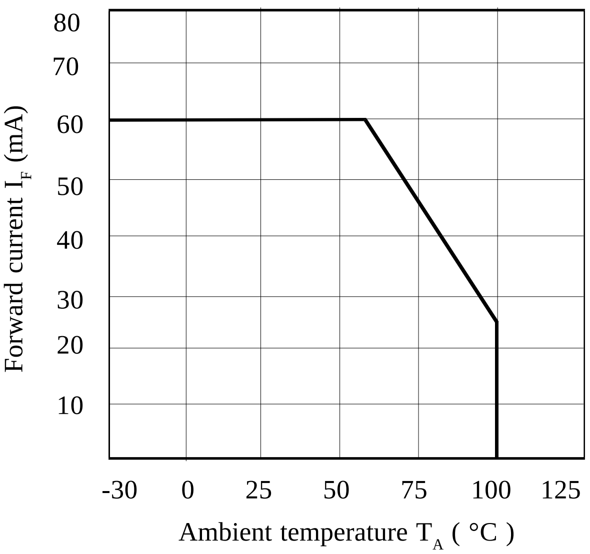
**Collector Power Dissipation vs. Ambient Temperature**




**Relative Current Transfer Ratio vs. Forward Current**




**Forward Current vs. Ambient Temperature**

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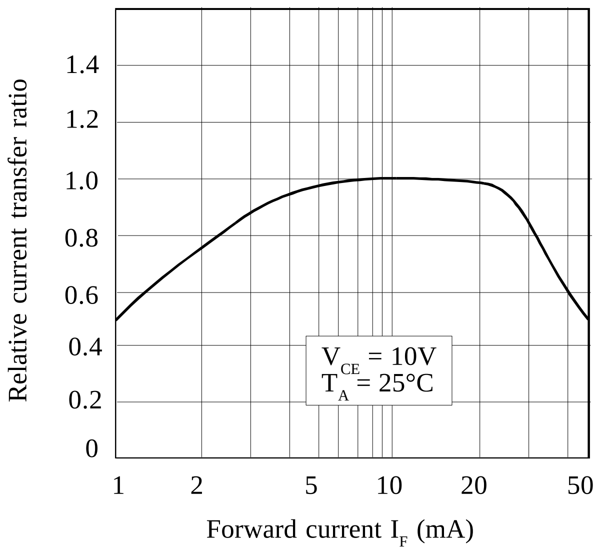
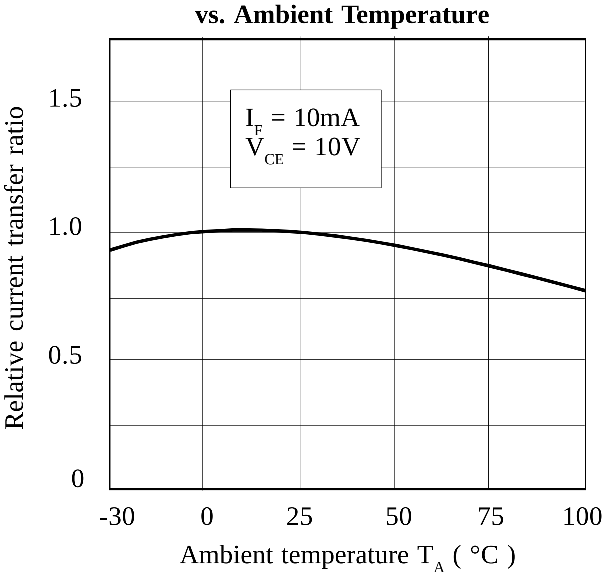



**Relative Current Transfer Ratio vs. Ambient Temperature**




**Collector-emitter Saturation Voltage vs. Ambient Temperature**