

**66088****SINGLE/DUAL, HIGH SPEED OPTOCOUPLER****Mii****OPTOELECTRONIC PRODUCTS  
DIVISION****Features:**

- Electrically similar to 4N55
- 1500 Vdc isolation test voltage
- Low power consumption
- 2 MHz bandwidth typical
- Low output saturation voltage

**Applications:**

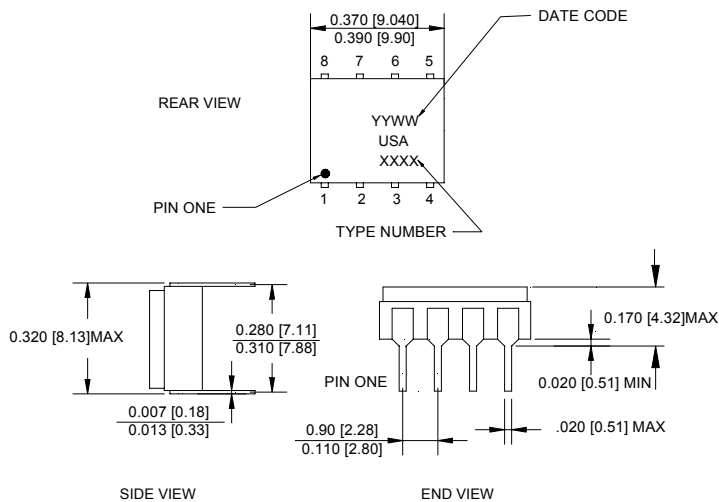
- Digital logic ground isolation
- Microprocessor system interface
- Isolated receiver input
- Communication systems
- Medical systems

**DESCRIPTION**

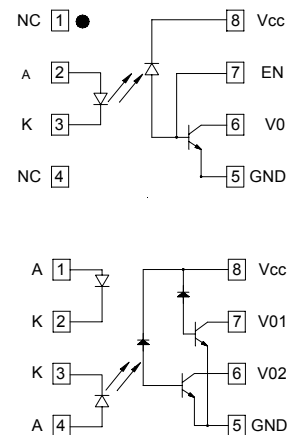
The **66088** single/dual optocouplers utilize infrared LEDs optically coupled to high gain photon detectors. These unique optocouplers provide high CTR and low leakage current. The 66088 optocouplers are available in military temperature range and military temperature with 100% device screening. The devices are built in an 8 pin hermetic, side-braced package and provide high input to output isolation (1500Vdc minimum).

**ABSOLUTE MAXIMUM RATINGS**

|   |   |
|---|---|
| Storage Temperature.....  | -65°C to +150°C                           |
| Operating Free-Air Temperature Range .....  | -55°C to +125°C                           |
| Lead Solder Temperature.....  | 260°C for 10s (1.6mm below seating plane) |
| Peak Forward Input Current (per channel).....   | 40mA (1ms duration)                       |
| Average Forward Input Current (per channel).....(see Note 2)                                  | 20mA                                      |
| Reverse Input Voltage (each channel).....   | 5V  |
| Supply Voltage - $V_{CC}$ (each channel).....(see Note 1)                                     | -0.5 to 20V Output                        |
| Output Current - $I_O$ (each channel) .....   | 8mA                                       |
| Output Power Dissipation (each channel)...(derate linearly at a rate of 1.4mW/°C above 100°C) | .50mW                                     |
| Output Voltage - $V_O$ (each channel).....(see Note 1)  | -0.5 to 20V                               |

**Package Dimensions**

NOTE: ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]

**Schematic Diagram****Notes:**

1. The lowest total  $I_{OH}$  over temperature is developed by keeping  $V_{CC}$  as low as possible, but greater than 2V. The negative voltage at the detector side should be applied to PIN 5.
2. Derate  $I_F$  at 0.1 mA/°C above 25°C.

**ELECTRICAL CHARACTERISTICS**T<sub>a</sub> = -55°C to 125°C unless otherwise specified.

| PARAMETER                                   | SYMBOL           | MIN | TYP | MAX | UNITS | TEST CONDITIONS   | NOTE |
|---|------------------|-----|-----|-----|-------|---|------|
| Current Transfer Ratio                      | CTR              | 9   | 24  |     | %     | I <sub>F</sub> = 16mA, V <sub>O</sub> = 0.4V, V <sub>CC</sub> = 4.5V                                | 1,2  |
| Logic Low Output Voltage                    | V <sub>OL</sub>  |     | 0.1 | 0.4 | V     | I <sub>F</sub> = 16mA, I <sub>OL</sub> = 2.4mA, V <sub>CC</sub> = 4.5V                              |      |
| Logic High Output Current                   | I <sub>OH</sub>  |     | 20  | 100 | μA    | I <sub>F</sub> = 0, V <sub>CC</sub> = V <sub>O</sub> = 15V<br>I <sub>F</sub> (other channel) = 16mA | 1    |
| High Level Output Current                   | I <sub>CCH</sub> |     | 0.1 | 20  | μA    | I <sub>F</sub> = V <sub>CC</sub> = 15V<br>I <sub>F</sub> (other channel) = 0mA                      | 1    |
| Low Level Supply Current                    | I <sub>CCL</sub> |     |     | 2   | mA    | I <sub>F1</sub> = 16mA, V <sub>CC</sub> = 15V<br>I <sub>F</sub> (other channel) = 16mA              | 1    |
| Input Forward Voltage                       | V <sub>F</sub>   |     | 1.5 | 1.8 | V     | I <sub>F</sub> = 16mA   | 1    |
| Input Reverse Breakdown Voltage             | BV <sub>R</sub>  | 5   |     |     | V     | I <sub>R</sub> = 10μA   | 1    |
| Input-Output Insulation Leakage Current     | I <sub>I-O</sub> |     |     | 1.0 | μA    | V <sub>I-O</sub> = 1500Vdc,<br>Relative Humidity = 45%<br>t <sub>A</sub> = 25°C, t = 5s             | 3    |
| Propagation Delay Time To High Output Level | t <sub>PLH</sub> |     | .08 | 1.6 | μs    | I <sub>F</sub> = 16mA, V <sub>CC</sub> = 5V, R <sub>L</sub> = 1.9kΩ                                 | 1    |
| Propagation Delay Time To Low Output Level  | t <sub>PHL</sub> |     | .08 | 1.6 | μs    | I <sub>F</sub> = 16mA, V <sub>CC</sub> = 5V, R <sub>L</sub> = 1.9kΩ                                 | 1    |

**TYPICAL CHARACTERISTICS**T<sub>a</sub> = 25°C, V<sub>CC</sub> = 5V Each Channel

| PARAMETER   | SYMBOL                          | MIN | TYP              | MAX | UNITS | TEST CONDITIONS   | NOTE |
|---|---------------------------------|-----|------------------|-----|-------|---|------|
| Input Capacitance                                   | C <sub>IN</sub>                 |     | 60               |     | pF    | V <sub>F</sub> = 0, f = MHz   | 1    |
| Capacitance (Input-Output)                          | C <sub>I-O</sub>                |     | 1.5              |     | pF    | f = 1MHz, V <sub>F</sub> = 0  | 1, 4 |
| Capacitance (Input-Output)                          | C <sub>I-I</sub>                |     | 0.55             |     | pF    | f = 1MHz  |      |
| Input Diode Temperature Coefficient                 | $\frac{\Delta V_F}{\Delta T_A}$ |     | -1.8             |     | mV/°C | I <sub>F</sub> = 16mA   | 1    |
| Resistance (Input-Output)                           | R <sub>I-O</sub>                |     | 10 <sup>12</sup> |     | Ω     | V <sub>I-O</sub> = 500Vdc   | 1    |
| Input-Input Insulation Leakage Current              | I <sub>I-I</sub>                |     | 0.5              |     | nA    | Relative Humidity = 45%<br>V <sub>I-I</sub> = 500Vdc, t = 5s                | 3    |
| Common Mode Transient Immunity at High Output Level | CM <sub>H</sub>                 | 500 | 1000             |     | V/μs  | V <sub>CM</sub> = 10V P-P,<br>R <sub>L</sub> = 1.9kΩ, I <sub>F</sub> = 0mA  | 1, 5 |
| Common Mode Transient Immunity at Low Output Level  | CM <sub>L</sub>                 | 500 | 1000             |     | V/μs  | V <sub>CM</sub> = 10V P-P,<br>R <sub>L</sub> = 1.9kΩ, I <sub>F</sub> = 16mA | 1, 6 |

**NOTES:**

- Each channel.
- CURRENT TRANSFER RATIO is defined as the ratio of output collector current, I<sub>O</sub>, to the forward LED input current, I<sub>F</sub>, times 100%.
- Measured between each input pair shorted together.
- Measured between input pins shorted together and the output pins for that channel shorted together.
- CM<sub>H</sub> is the maximum tolerable common mode transient to assure that the output will remain in a high logic state (ie. V<sub>O</sub> > 2.0V).
- CM<sub>L</sub> is the maximum tolerable common mode transient to assure that the output will remain in a low logic state (ie. V<sub>O</sub> < 0.8V).

**RECOMMENDED OPERATING CONDITIONS:**

| PARAMETER                                | SYMBOL          | MIN | MAX | UNITS |
|--|-----------------|-----|-----|-------|
| Input Current, Low Level (each channel)  | I <sub>FL</sub> | 0   | 2   | μA    |
| Input Current, High Level (each channel) | I <sub>FH</sub> | 16  | 20  | mA    |
| Supply Voltage                           | V <sub>CC</sub> | 2.0 | 18  | V     |