

66138

**SINGLE CHANNEL, HERMETIC 6 PIN LCC,
ELECTRICALLY SIMILAR TO 4N22, 4N23, 4N24,
4N47, 4N48, 4N49**



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Features:

- High Reliability
- Base lead provided for conventional transistor biasing
- Very high gain, high voltage transistor
- Stability over wide temperature range.
- +1kV electrical isolation

Applications:

- Eliminate ground loops
- Level shifting
- Line receiver
- Switching power supplies
- Motor control

DESCRIPTION

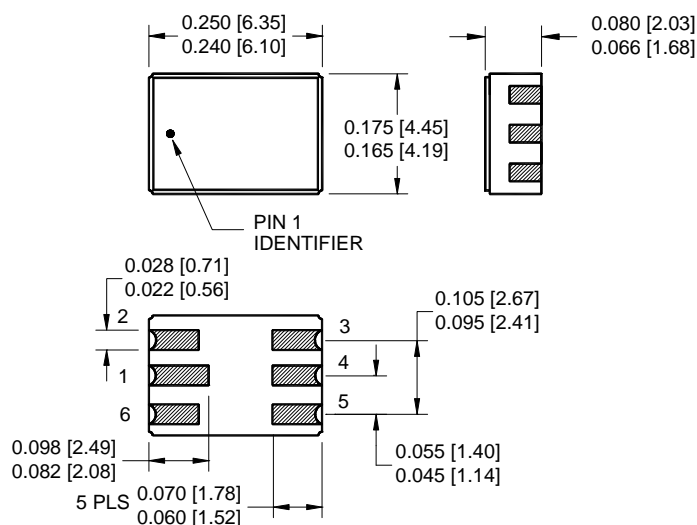
The **66138** single channel optocoupler consists of an infrared LED optically coupled to a high gain silicon phototransistor in a 6 pin LCC package. The 66138 is the electrical equivalent of the 4N22U, 4N23U, 4N24U, 4N47U, 4N48U and the 4N49U and is available as commercial or JAN, JANS, JANTX and JANTXV screened versions.

ABSOLUTE MAXIMUM RATINGS

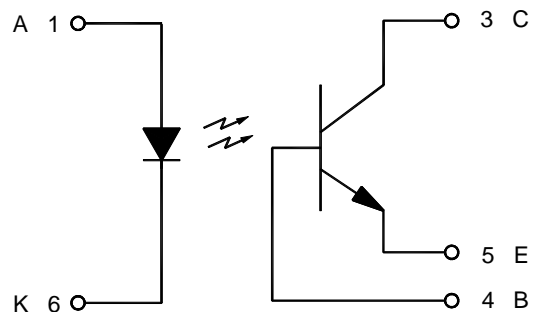
| | |
|--|-----------------|
| Input-to-output Voltage | ±1kV |
| Collector-Base Voltage (4N2X)..... | 35V |
| Collector-Base Voltage (4N4X)..... | 45V |
| Collector-Emitter Voltage (4N2X) | 35V |
| Collector-Emitter Voltage (4N4X) | 40V |
| Emitter-Base Voltage (4N2X) | 4V |
| Emitter-Base Voltage (4N4X) | 7V |
| Input Diode Reverse Voltage | 2V |
| Input Diode Continuous Forward Current (Note 1) | 40mA |
| Peak Forward Input Current (Value applies for $t_w \leq 1\mu s$, PRR < 300 pps) | 1A |
| Continuous Collector Current | 50mA |
| Continuous Transistor Power Dissipation (Note 2) | 300mW |
| Storage Temperature..... | -65°C to +150°C |
| Operating Free-Air Temperature Range..... | -55°C to +125°C |
| Lead Solder Temperature (10 seconds, 1/16" from case)..... | 240°C |

Notes:

1. Derate linearly to 125°C free-air temperature at the rate of 0.4 mA/°C above 25°C.
2. Derate linearly to 125°C free-air temperature at the rate of 3 mW/°C above 25°C.

Package Dimensions

ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]

Schematic Diagram

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ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$ unless otherwise specified.

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | TEST CONDITIONS | NOTE |
|------------------------------------|--------|-----|-----|-----|---------------|---------------------|------|
| Input Diode Static Reverse Current | I_R | | | 100 | μA | $V_R = 2\text{V}$ | 1 |
| Input Diode Forward Voltage | V_F | 1 | | 1.5 | V | $I_F = 10\text{mA}$ | |
| (4N22-24) -55°C | V_F | 1 | | 1.7 | V | | |
| (4N47-49) -55°C | V_F | 0.8 | | 1.3 | V | | |
| (4N22-24) $+25^\circ\text{C}$ | V_F | 0.8 | | 1.5 | V | | |
| (4N47-49) $+25^\circ\text{C}$ | V_F | 0.7 | | 1.2 | V | | |
| (4N22-24) $+100^\circ\text{C}$ | V_F | 0.7 | | 1.3 | V | | |

OUTPUT TRANSISTOR $T_A = 25^\circ\text{C}$ unless otherwise specified.

| | | | | | | | |
|-------------------------------------|------------------------|---------------|----------|--|---|---|--|
| Collector-Base Breakdown Voltage | (4N22-24) (4N47-49) | $V_{(BR)CBO}$ | 35 45 | | V | $I_C = 100\mu\text{A}, I_B = 0, I_F = 0$ | |
| Collector-Emitter Breakdown Voltage | (4N22-24) (4N47-49) | $V_{(BR)CEO}$ | 35 40 | | V | $I_C = 1\text{mA}, I_B = 0, I_F = 0$ | |
| Emitter-Base Breakdown Voltage | (4N22-24) (4N47-49) | $V_{(BR)EBO}$ | 4 7 | | V | $I_C = 0\text{mA}, I_E = 100\mu\text{A}, I_F = 0$ | |

COUPLED CHARACTERISTICS $T_A = 25^\circ\text{C}$ unless otherwise specified.

| | | | | | | | | |
|--|--|--|---|----------------------|--|--|--|---|
| On State Collector Current | 4N22 4N23 4N24 4N22 4N23 4N24 4N47 4N48 4N49 | $I_{C(ON)}$ | 0.15 0.2 0.4 2.5 6.0 10.0 0.5 1 2 | | | mA mA mA mA mA mA mA mA mA | $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 1\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 1\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 1\text{mA}$ | |
| $T_A = +25^\circ\text{C}$ | | | | | | | - 5 10 | |
| On State Collector Current | 4N22 4N23 4N24 4N47 4N48 4N49 | $I_{C(ON)}$ | 1 2.5 4 0.7 1.4 2.8 | | | mA mA mA mA mA mA | $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ | |
| $T_A = -55^\circ\text{C}$ | | | | | | | | |
| On State Collector Current | 4N22 4N23 4N24 4N47 4N48 4N49 | $I_{C(ON)}$ | 1 2.5 4 0.5 1.0 2.0 | | | mA mA mA mA mA mA | $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ | 3 |
| $T_A = +100^\circ\text{C}$ | | | | | | | | |
| Off State Collector Current, $T_A = +25^\circ\text{C}$ | | $I_{C(OFF)}$ | | | 100 | nA | $V_{CE} = 20\text{V}, I_B = 0, I_F = 0\text{mA}$ | 1 |
| Off State Collector Current, $T_A = 100^\circ\text{C}$ | | $I_{C(OFF)}$ | | | 100 | μA | $V_{CE} = 20\text{V}, I_B = 0, I_F = 0\text{mA}$ | 1 |
| Collector-Emitter Saturation Voltage | 4N22 4N23 4N24 4N47 4N48 4N49 | $V_{CE(SAT)}$ $V_{CE(SAT)}$ $V_{CE(SAT)}$ $V_{CE(SAT)}$ $V_{CE(SAT)}$ $V_{CE(SAT)}$ | | | 0.3 0.3 0.3 0.3 0.3 0.3 | V V V V V V | $I_F = 20\text{mA}, I_C = 2.5\text{mA}, I_B = 0$ $I_F = 20\text{mA}, I_C = 5\text{mA}, I_B = 0$ $I_F = 20\text{mA}, I_C = 10\text{mA}, I_B = 0$ $I_F = 2\text{mA}, I_C = 0.5\text{mA}, I_B = 0$ $I_F = 2\text{mA}, I_C = 1\text{mA}, I_B = 0$ $I_F = 2\text{mA}, I_C = 2\text{mA}, I_B = 0$ | |
| Input to Output Resistance | | R_{IO} | 10^{11} | | | Ω | $V_{I-O} = 1\text{kV}$ | 2 |
| Input to Output Capacitance | | C_{IO} | | 2.5 | 5 | pF | $F = 1\text{MHz}, V_{I-O} = 0$ | |
| Rise Time (Phototransistor Operation) Or Fall Time | 4N22-23 4N24 4N47 4N48-49 | t_r or t_f | | 10 10 10 10 | 15 15 20 25 | μs μs μs μs | $V_{CC} = 10\text{V}, I_B = 0, I_F = 5\text{mA}$ $R_L = 100\Omega$ | |
| Rise Time (Photodiode Operation) or Fall Time | 4N47-49 | t_r or t_f | | 0.85 0.85 0.85 | 3 3 3 | μs | $V_{CC} = 10\text{V}, I_E = 0, I_F = 5\text{mA}$ $R_L = 100\Omega$ | |

NOTES:

- Parameter applies to all part numbers.
- These parameters are measured between all phototransistor leads shorted together and with both input diode leads shorted together.
- This parameter measured using pulse techniques $t_w = 100\mu\text{s}$, duty cycle $\leq 1\%$.

RECOMMENDED OPERATING CONDITIONS:

| PARAMETER | SYMBOL | MIN | MAX | UNITS |
|---------------------------|----------|-----|-----|---------------|
| Input Current, Low Level | I_{FL} | 0 | 100 | μA |
| Input Current, High Level | I_{FH} | 1 | 10 | mA |
| Supply Voltage | V_{CC} | 5.0 | 20 | V |

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SIMILAR TO 4N22, 4N23, 4N24, 4N47, 4N48, 4N49**

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SELECTION GUIDE

| PART NUMBER | PART DESCRIPTION |
|--------------------|-----------------------------|
| 66138-001 | Commercial, Similar to 4N22 |
| 66138-002 | Commercial, Similar to 4N23 |
| 66138-003 | Commercial, Similar to 4N24 |
| 66138-004 | Commercial, Similar to 4N47 |
| 66138-005 | Commercial, Similar to 4N48 |
| 66138-006 | Commercial, Similar to 4N49 |
| 66138-10X | Screened to JAN level |
| 66138-20X | Screened to JANS level |
| 66138-30X | Screened to JANTX level |
| 66138-40X | Screened to JANTXV level |