

**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**

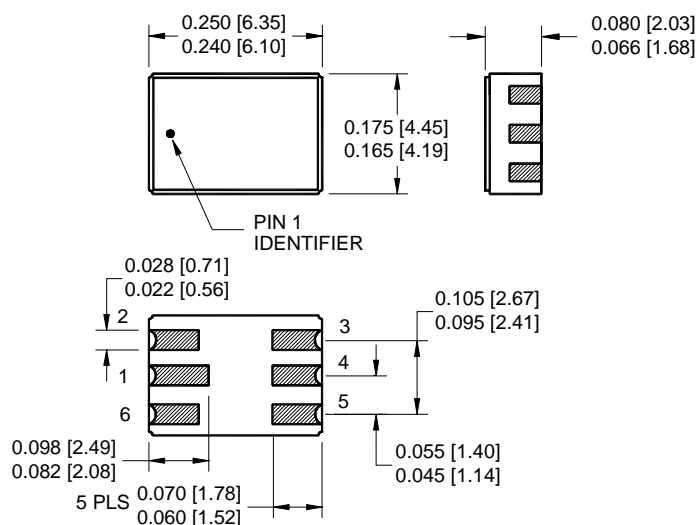
The **66138** single channel optocoupler consists of an infrared LED optically coupled to a high gain silicon phototransistor in a 6 pin LCC package. The 66138 is the electrical equivalent of the 4N22U, 4N23U, 4N24U, 4N47U, 4N48U and the 4N49U and is available as commercial or JAN, JANS, JANTX and JANTXV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

**ABSOLUTE MAXIMUM RATINGS**

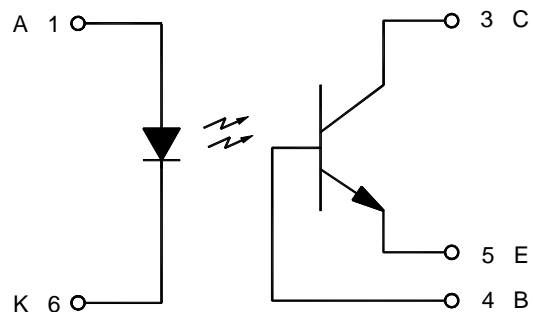
Input-to-output Voltage .....	±1kV
Collector-Base Voltage (4N2X).....	35V
Collector-Base Voltage (4N4X).....	45V
Collector-Emitter Voltage (4N2X) .....	35V
Collector-Emitter Voltage (4N4X) .....	40V
Emitter-Base Voltage (4N2X) .....	4V
Emitter-Base Voltage (4N4X) .....	7V
Input Diode Reverse Voltage .....	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	$\mu\text{A}$	$V_R = 2\text{V}$	1
Input Diode Forward Voltage	$V_F$	1		1.5	V	$I_F = 10\text{mA}$	
(4N22-24) $-55^\circ\text{C}$	$V_F$	1		1.7	V		
(4N47-49) $-55^\circ\text{C}$	$V_F$	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	$V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 1\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 1\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 1\text{mA}$	
$T_A = +25^\circ\text{C}$								
On State Collector Current	4N22 4N23 4N24 4N47 4N48 4N49	$I_{C(ON)}$	1 2.5 4 0.7 1.4 2.8			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	$V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 10\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$ $V_{CE} = 5\text{V}, I_B = 0, I_F = 2\text{mA}$	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	$\mu\text{A}$	$V_{CE} = 20\text{V}, I_B = 0, I_F = 0\text{mA}$	1
Collector-Emitter Saturation Voltage	4N22 4N23 4N24 4N47 4N48 4N49	$V_{CE(SAT)}$			0.3 0.3 0.3 0.3 0.3 0.3	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		$R_{IO}$	$10^{11}$			$\Omega$	$V_{I-O} = 1\text{kV}$	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	$\mu\text{s}$	$V_{CC} = 10\text{V}, I_B = 0, I_F = 5\text{mA}$ $R_L = 100\Omega$	
Rise Time (Photodiode Operation) or Fall Time	4N47-49	$t_r$ or $t_f$		0.85 0.85 0.85	3 3 3	$\mu\text{s}$	$V_{CC} = 10\text{V}, I_E = 0, I_F = 5\text{mA}$ $R_L = 100\Omega$	

**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	$\mu\text{A}$
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**

<b>PART NUMBER</b>	<b>PART DESCRIPTION</b>
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