66138

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

OPTOELECTRONIC PRODUCTS DIVISION

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

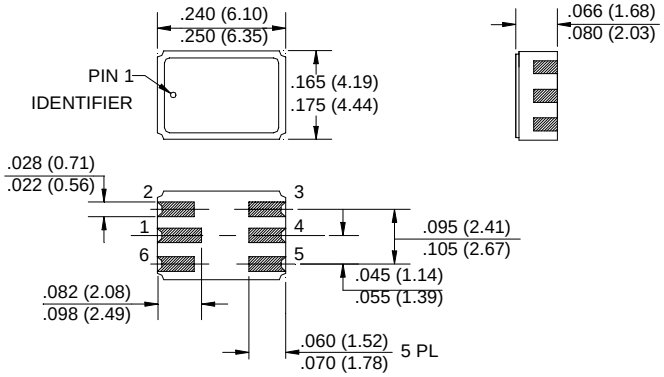
DESCRIPTION

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 in standard and JAN, JANS, JANTX and JANTXV screened versions.

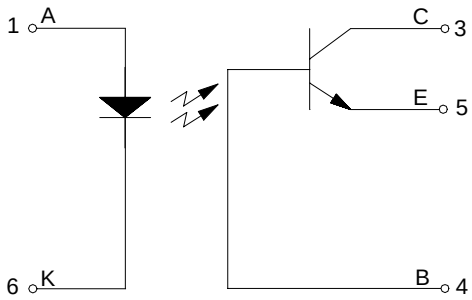
ABSOLUTE MAXIMUM RATINGS

Input-to-output Voltage ..... ±1kV
Collector-Base Voltage (4N2X) 35V
Collector-Base Voltage (4N4X) 45V
Collector-Emitter Voltage (Value applies to emitter-base open-circuited & the input-diode equal to zero – 4N2X) 35V
Collector-Emitter Voltage (Value applies to emitter-base open-circuited & the input-diode equal to zero – 4N4X) 40V
Emitter-Base Voltage 4V
Emitter-Base Voltage (4N4X) 7V
Input Diode Reverse Voltage 2V
Input Diode Continuous Forward Current at (or below) 65°C Free-Air Temperature (see 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 at (or below) 25°C Free-Air Temperature (see Note 2) 300mW
Storage Temperature ..... -65°C to +150°C
Operating Free-Air Temperature Range ..... -55°C to +125°C
Lead Solder Temperature (1/16" (1.6mm) from case for 10 seconds) ..... 240°C

Package Dimensions



Schematic Diagram



Notes:

1. Derate linearly to 125°C free-air temperature at the rate of 0.67 mA/°C above 65°C.
2. Derate linearly to 125°C free-air temperature at the rate of 3 mW/°C.

ELECTRICAL CHARACTERISTICS

T_A = 25°C unless otherwise specified.

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

OUTPUT TRANSISTOR

T_A = 25°C unless otherwise specified.

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

COUPLED CHARACTERISTICS

T_A = 25°C unless otherwise specified.

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

NOTES:

1. Parameter applies to all part numbers.
2. These parameters are measured between all phototransistor leads shorted together and with both input diode leads shorted together.
3. This parameter measured using pulse techniques t_w =100µs, duty cycle ≤ 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