

66174

**GULL WING HERMETICALLY SEALED,
FOUR CHANNEL OPTOCOUPLER
(Electrically Similar To 6N140)**



**OPTOELECTRONIC PRODUCTS
DIVISION**

Features:

- High current transfer ratio: 1000% typical
- 1000 Vdc isolation test voltage
- Low power consumption, low input current
- High radiation immunity

Applications:

- High reliability systems
- Voltage Level Shifting
- Isolated Receiver Input
- Communication systems
- Medical systems

DESCRIPTION

The **66174** optocoupler contains four infrared LEDs optically coupled to four corresponding high gain photon detectors. This unique quad optocoupler provides high CTR and low leakage currents over the full military temperature range (-55° to +125°C). The 66174 is a 16 pin gull wing hermetically sealed package and is available in standard and screened (883) versions or tested to customer specifications.

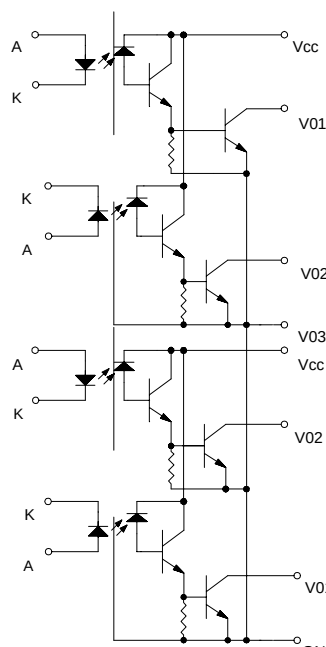
ABSOLUTE MAXIMUM RATINGS

(No derating required up to 125°C)

Storage Temperature.....	-65°C to +150°C
Operating Free-Air Temperature Range	-55°C to +125°C
Lead Solder Temperature (10s, 1/16" [1.6mm] from package)	260°C
Peak Forward Input Current (each channel)	20mA (1ms duration)
Average Forward Input Current, I_F (each channel) Derate at 0.01 mA/°C above 25°C	10mA
Input Power Dissipation	35mW
Reverse Input Voltage (each channel).....	5V
Supply Voltage - V_{CC}	-0.5 to 20V
Output Current - I_O (each channel)	40mA
Output Power Dissipation (each channel) Derate at 0.5 mW/°C above 25°C	50mW
Output Voltage - V_O	-0.5 to 20V
Total Power Dissipation (Derate at 3.5 mW/°C above 25°C)	350mW

Package Dimensions**Schematic Diagram**

CONTACT FACTORY
FOR PACKAGE
AND PIN OUT
INFORMATION



ELECTRICAL CHARACTERISTICS $T_a = -55^{\circ}\text{C}$ to 125°C unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS	NOTE
Current Transfer Ratio	CTR	300	1000		%	$I_F = 0.5\text{mA}$, $V_O = 0.4\text{V}$, $V_{CC} = 4.5\text{V}$	1,2
		300	750		%	$I_F = 1.6\text{mA}$, $V_O = 0.4\text{V}$, $V_{CC} = 4.5\text{V}$	1,2
		200	400		%	$I_F = 5.0\text{mA}$, $V_O = 0.4\text{V}$, $V_{CC} = 4.5\text{V}$	1,2
Logic Low Output Voltage	V_{OL}		0.1	0.4	V	$I_F = 0.5\text{mA}$, $I_{OL} = 1.5\text{mA}$, $V_{CC} = 4.5\text{V}$	1
			0.2	0.4	V	$I_F = 5.0\text{mA}$, $I_{OL} = 10\text{mA}$, $V_{CC} = 4.5\text{V}$	
Logic High Output Current	I_{OH}		.005	250	μA	$I_F = 2\mu\text{A}$, $V_O = V_{CC} = 18\text{V}$	1,3
Logic High Supply Current	I_{CCH}		.010	40	μA	$I_{F1} = I_{F2} = I_{F3} = I_{F4} = 0\text{mA}$, $V_{CC} = 18\text{V}$	
Logic Low Supply Current	I_{CCL}		2	4	mA	$I_{F1} = I_{F2} = I_{F3} = I_{F4} = 1.6\text{mA}$, $V_{CC} = 18\text{V}$	
Input Forward Voltage	V_F		1.4	1.8	V	$I_F = 1.6\text{mA}$	1
Input Reverse Breakdown Voltage	BV_R	5			V	$I_R = 10\mu\text{A}$	1
Input-Output Insulation Leakage Current	I_{I-O}			1.0	μA	$V_{I-O} = 1000\text{Vdc}$, Relative Humidity = 45% $T_a = 25^{\circ}\text{C}$, $t = 5\text{s}$	4
Propagation Delay Time To High Output Level	t_{PLH}		5	60	μs	$I_F = 0.5\text{mA}$, $V_{CC} = 5.0\text{V}$, $R_L = 4.7\text{k}\Omega$	
			4	20	μs	$I_F = 5\text{mA}$, $V_{CC} = 5.0\text{V}$, $R_L = 680\text{k}\Omega$	
Propagation Delay Time To Low Output Level	t_{PHL}		8	100	μs	$I_F = 0.5\text{mA}$, $V_{CC} = 5.0\text{V}$, $R_L = 4.7\text{k}\Omega$	
			2	5	μs	$I_F = 5\text{mA}$, $V_{CC} = 5.0\text{V}$, $R_L = 680\text{k}\Omega$	

TYPICAL CHARACTERISTICS $T_a = 25^{\circ}\text{C}$, $V_{CC} = 5\text{V}$ Each Channel

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	TEST CONDITIONS	NOTE
Input Capacitance	C_{IN}		60		pF	$V_F = 0$, $f = \text{MHz}$, $T_a = 25^{\circ}\text{C}$	1
Capacitance (Input-Output)	C_{I-O}		1.5		pF	$f = 1\text{MHz}$, $T_a = 25^{\circ}\text{C}$	1, 5
Input Diode Temperature Coefficient	$\frac{\Delta V_F}{\Delta T_a}$		-1.8		mV/ $^{\circ}\text{C}$	$I_F = 1.6\text{mA}$	1
Resistance (Input-Output)	R_{I-O}		10^{12}		Ω	$V_{I-O} = 500\text{V}$, $T_a = 25^{\circ}\text{C}$	1, 5
Resistance (Input-Input)	R_{I-I}		10^{12}		Ω	$V_{I-I} = 500\text{V}$, $T_a = 25^{\circ}\text{C}$	6
Input-Input Insulation Leakage Current	I_{I-I}		0.5		nA	Relative Humidity = 45% $V_{I-I} = 500\text{V}$, $t = 5\text{s}$	6
Common Mode Transient immunity at High Output Level	CM_H	500	1000		V/ μs	$V_{CM} = 50\text{V p-p}$, $V_{CC} = 5.0\text{V}$, $R_L = 1.5\text{k}\Omega$, $I_F = 0\text{mA}$ $T_a = 25^{\circ}\text{C}$	7,9
Common Mode Transient Immunity at Low Output Level	CM_L	500	1000		V/ μs	$V_{CM} = 50\text{V p-p}$, $V_{CC} = 5.0\text{V}$, $R_L = 1.5\text{k}\Omega$, $I_F = 1.6\text{mA}$ $T_a = 25^{\circ}\text{C}$	8,9

NOTES:

- Each channel.
- CURRENT TRANSFER RATIO is defined as the ratio of output collector current, I_O , to the forward LED input current, I_F , times 100%.
- $I_F = 2\mu\text{A}$ for channel under test. For all other channels, $I_F = 10\text{mA}$.
- Device considered a two-terminal device. Pins 1-6 and 16 are shorted together and pins 7-14 are shorted together.
- Measured between each input pair shorted together.
- Measured between adjacent pairs shorted together, i.e. between pins 1 and 2 shorted together and pins 3 and 4 shorted together, etc.
- CM_H is the maximum tolerable common mode transient to assure that the output will remain in a high logic state (ie. $V_O > 2.0\text{V}$).
- CM_L is the maximum tolerable common mode transient to assure that the output will remain in a low logic state (ie. $V_O < 0.8\text{V}$).
- In applications where dv/dt may exceed 50,000 V/ μs (such as static discharge) a series resistor, R_{CC} , should be included to protect the detector IC's from destructively high surge currents. The recommended value is $R_{CC} = \frac{1\text{V}}{0.6I_F (\text{mA})} = \text{k}\Omega$

RECOMMENDED OPERATING CONDITIONS:

PARAMETER	SYMBOL	MIN	MAX	UNITS
Input Current, Low Level	I_{FL}	0	2	μA
Input Current, High Level	I_{FH}	0.5	5	mA
Supply Voltage	V_{CC}	2.0	18	V

SELECTION GUIDE

PART NUMBER	PART DESCRIPTION
66174-000	Four Channel optocoupler, full mil-temp (-55° to $+125^{\circ}\text{C}$) with 100% device screening
66174-002	Four Channel optocoupler, military operating range (-55° to $+125^{\circ}\text{C}$)
66174-003	Four Channel optocoupler, commercial (0° to 70°C)
66174-004	Four Channel optocoupler, extended temperature range (-40° to $+85^{\circ}\text{C}$)