

66177

**GULL WING HERMETICALLY SEALED,
SINGLE CHANNEL OPTOCOUPLER
(Electrically Similar To 4N47, 4N48, 4N49)**

Mii

**OPTOELECTRONIC
PRODUCTS
DIVISION**

REV A 5/7/01

Features:

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

Applications:

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

DESCRIPTION

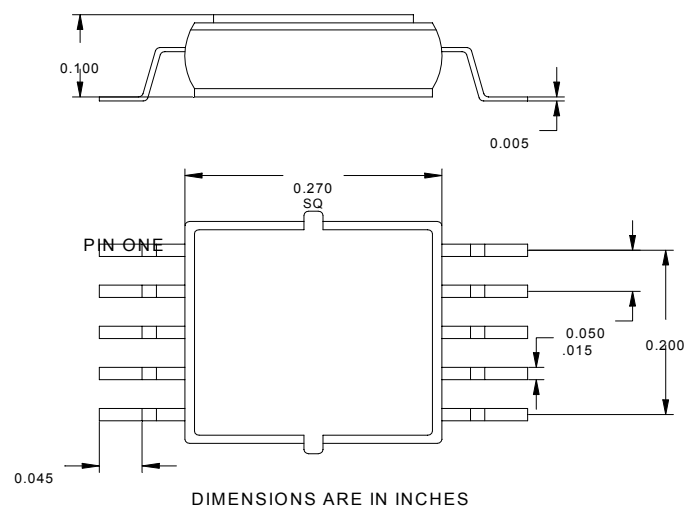
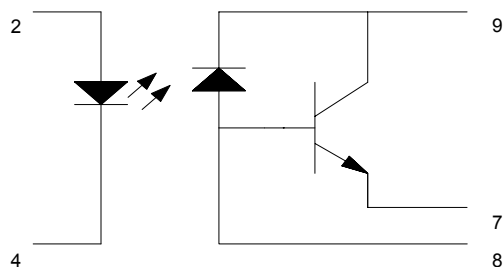
The **66177** single channel optocoupler consists of an LED optically coupled to a high gain silicon phototransistor. The 66177 is electrically equivalent to the 4N47 (-X01), 4N48 (-X02) and the 4N49 (-X03) and is available in standard and screened versions.

ABSOLUTE MAXIMUM RATINGS

Storage Temperature	-65°C to +150°C
Operating Free-Air Temperature Range	-55°C to +125°C
Lead Solder Temperature(10 seconds maximum)	240°C
Peak Forward Input Current	40mA (1ms duration)
Input Diode Continuous Forward Current at (or below) 65°C Free-Air Temperature (see note 2)	20mA
Input Power Dissipation	35mW
Reverse Input Voltage	2V
Collector-Base Voltage	45V
Collector-Emitter Voltage (See note 1).....	40V
Emitter-Base Voltage	7V
Continuous Collector Current	50mA
Continuous Transistor Power Dissipation at (or below) 25°C Free-Air Temperature (see Note 3)	300mW

Notes:

1. This value applies with the emitter-base diode open-circuited and the input-diode current equal to zero.
2. Derate linearly to 125°C free-air temperature at the rate of 0.2mA/°C.
3. Derate linearly to 125°C free-air temperature at the rate of 3mW/°C.

Package Dimensions**Schematic Diagram**

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ELECTRICALLY SIMILAR TO 4N47, 4N48, 4N49

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

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS	NOTE
Input Diode Static Reverse Current	I_R			100	μA	$V_R = 2\text{V}$	
Input Diode Static Forward Voltage	V_F		1.0	1.7	V	$I_F = 10\text{mA}$	
			0.8	1.4	V		
			0.7	1.3	V		
Input to Output Resistance	R_{IO}	10^{11}			Ω	$V_{IN-OUT} = 1\text{kV}$	
Input to Output Capacitance	C_{IO}		2.5	5	pF	$f = 1\text{MHz}$, $V_{IN-OUT} = 0$	1
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.3	V	$I_F = 2\text{mA}$, $I_C = 0.5\text{mA}$, $I_B = 0$	
	$V_{CE(SAT)}$			0.3	V	$I_F = 2\text{mA}$, $I_C = 1\text{mA}$, $I_B = 0$	
	$V_{CE(SAT)}$			0.3	V	$I_F = 2\text{mA}$, $I_C = 2\text{mA}$, $I_B = 0$	

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

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS	NOTE
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	45			V	$I_C = 100\mu\text{A}$, $I_B = 0$, $I_F = 0$	
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40			V	$I_C = 1\text{mA}$, $I_B = 0$, $I_F = 0$	
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	7			V	$I_C = 0\text{mA}$, $I_E = 100\mu\text{A}$, $I_F = 0$	
On State Collector Current	$I_{C(ON)}$	0.5		-	mA	$V_{CE} = 5\text{V}$, $I_B = 0$, $I_F = 1\text{mA}$	
		1.0		5	mA		
		2.0		10	mA		
On State Collector Current	$I_{C(ON)}$	0.7			mA	$V_{CE} = 5\text{V}$, $I_B = 0$, $I_F = 2\text{mA}$	
$T_a = -55^{\circ}\text{C}$		1.4			mA		
		2.8			mA		
On State Collector Current	$I_{C(ON)}$	0.5			mA	$V_{CE} = 5\text{V}$, $I_B = 0$, $I_F = 2\text{mA}$	2
$T_a = +125^{\circ}\text{C}$		1.0			mA		
		2.0			mA		
Off State Collector Current	$I_{C(OFF)}$			100	nA	$V_{CE} = 20\text{V}$, $I_B = 0$, $I_F = 0\text{mA}$	
Off State Collector Current, $T_a = 125^{\circ}\text{C}$	$I_{C(OFF)}$			100	μA	$V_{CE} = 20\text{V}$, $I_B = 0$, $I_F = 0\text{mA}$	
Rise Time (Phototransistor Operation)	t_r		10	20	μs	$V_{CC} = 10\text{V}$, $I_B = 0$, $I_F = 5\text{mA}$, $R_L = 100\Omega$	
or	or		10	25	μs		
Fall Time	t_f		10	25	μs		
Rise Time (Photodiode Operation)	t_r		0.85	3	μs	$V_{CC} = 10\text{V}$, $I_E = 0$, $I_F = 5\text{mA}$, $R_L = 100\Omega$	
or	or		0.85	3	μs		
Fall Time	t_f		0.85	3	μs		

NOTES:

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

RECOMMENDED OPERATING CONDITIONS:

PARAMETERS	SYMBOL	MIN	MAX	UNITS
Input Current, Low Level	I_{FL}	0	100	μA
Input Current, High Level	I_{FH}	1	2	mA
Supply Voltage	V_{CC}	5.0	20	V
Operating Temperature	T_A	-55	125	$^{\circ}\text{C}$

SELECTION GUIDE

PART NUMBER	PART DESCRIPTION
66177-001	Single Channel (4N47) optocoupler, Commercial
66177-101	Single Channel (4N47) optocoupler, full mil-temp (-55° to +125°C) with 100% device screening
66177-201	Single Channel (4N47) optocoupler, military operating range (-55° to +125°C)
66177-301	Single Channel (4N47) optocoupler, extended temperature range (-40° to +85°C)
66177-002	Single Channel (4N48) optocoupler, Commercial
66177-102	Single Channel (4N48) optocoupler, full mil-temp (-55° to +125°C) with 100% device screening
66177-202	Single Channel (4N48) optocoupler, military operating range (-55° to +125°C)
66177-302	Single Channel (4N48) optocoupler, extended temperature range (-40° to +85°C)
66177-003	Single Channel (4N49) optocoupler, Commercial
66177-103	Single Channel (4N49) optocoupler, full mil-temp (-55° to +125°C) with 100% device screening
66177-203	Single Channel (4N49) optocoupler, military operating range (-55° to +125°C)
66177-303	Single Channel (4N49) optocoupler, extended temperature range (-40° to +85°C)