

**66177**

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



01/23/2007

**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), but is screened to MIL-PRF-38534 which includes high temperature testing at +125°C. Available in standard and screened versions.

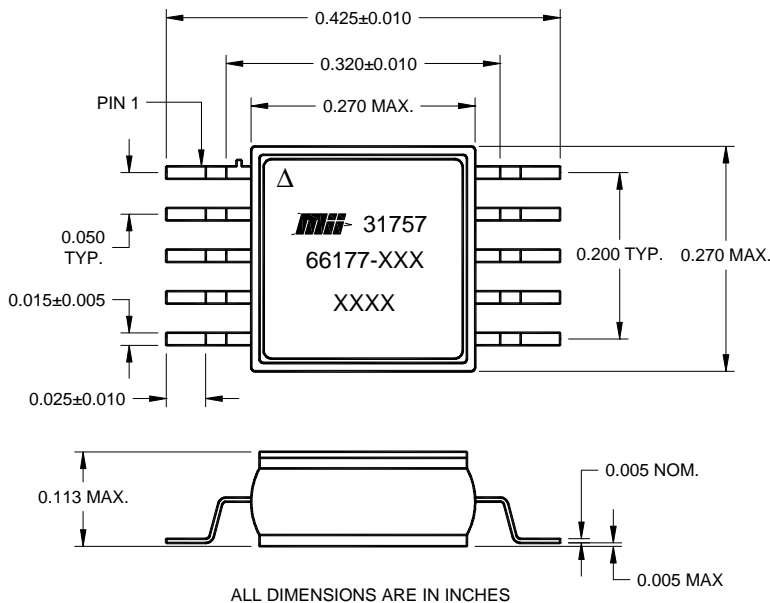
**ABSOLUTE MAXIMUM RATINGS**

Input Diode Continuous Forward Current at (or below) 65°C Free-Air Temperature (see note 1) .....	40 mA
Input Power Dissipation .....	35 mW
Reverse Input Voltage .....	3 V
Collector-Base Voltage .....	45 V
Collector-Emitter Voltage .....	40 V
Emitter-Base Voltage .....	7 V
Continuous Collector Current .....	50 mA
Continuous Transistor Power Dissipation at (or below) 25°C Free-Air Temperature (see Note 2).....	300 mW
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

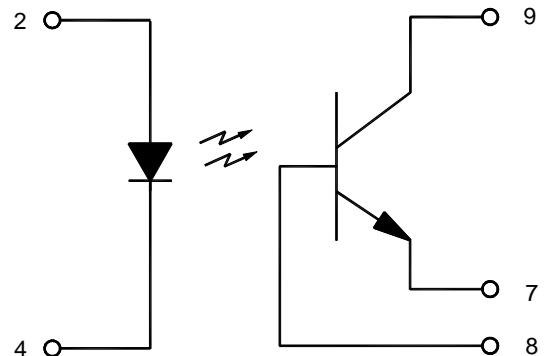
**Notes:**

1. Derate linearly to 125°C free-air temperature at the rate of 1.1 mA/°C.
2. Derate linearly to 125°C free-air temperature at the rate of 4.0 mW/°C.

**Package Dimensions**



**Schematic Diagram**



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**ELECTRICAL CHARACTERISTICS**

T<sub>A</sub> = -55°C to 125°C unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS	NOTE
Input Diode Static Reverse Current	I <sub>R</sub>			100	μA	V <sub>R</sub> = 2 V	
Input Diode Static Forward Voltage	V <sub>F</sub>		1.0	1.7	V	I <sub>F</sub> = 10 mA	
-55°C			0.8	1.4	V		
+25°C			0.7	1.3	V		
Input to Output Resistance	R <sub>IO</sub>	10 <sup>11</sup>			Ω	V <sub>IN-OUT</sub> = 1 kV	1
Input to Output Capacitance	C <sub>IO</sub>		2.5	5	pF	f = 1 MHz, V <sub>IN-OUT</sub> = 0	1
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>			0.3	V	I <sub>F</sub> = 2 mA, I <sub>C</sub> = 0.5 mA, I <sub>B</sub> = 0	
-X01	V <sub>CE(SAT)</sub>			0.3	V	I <sub>F</sub> = 2 mA, I <sub>C</sub> = 1 mA, I <sub>B</sub> = 0	
-X02	V <sub>CE(SAT)</sub>			0.3	V	I <sub>F</sub> = 2 mA, I <sub>C</sub> = 2 mA, I <sub>B</sub> = 0	
-X03	V <sub>CE(SAT)</sub>			0.3	V	I <sub>F</sub> = 2 mA, I <sub>C</sub> = 2 mA, I <sub>B</sub> = 0	

**TYPICAL CHARACTERISTICS**

At T<sub>A</sub> = 25°C, V<sub>CC</sub> = 5 V Each Channel

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS	NOTE
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	45			V	I <sub>C</sub> = 100 μA, I <sub>B</sub> = 0, I <sub>F</sub> = 0	
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	40			V	I <sub>C</sub> = 1 mA, I <sub>B</sub> = 0, I <sub>F</sub> = 0	
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	7			V	I <sub>C</sub> = 0 mA, I <sub>E</sub> = 100 μA, I <sub>F</sub> = 0	
On State Collector Current	I <sub>C(ON)</sub>	0.5		-	mA	V <sub>CE</sub> = 5 V, I <sub>B</sub> = 0, I <sub>F</sub> = 1 mA	
-X01		1.0		5			
-X02		2.0		10			
On State Collector Current	I <sub>C(ON)</sub>	0.7			mA	V <sub>CE</sub> = 5 V, I <sub>B</sub> = 0, I <sub>F</sub> = 2 mA	
T <sub>a</sub> = -55°C		1.4					
-X01		2.8					
On State Collector Current	I <sub>C(ON)</sub>	0.5			mA	V <sub>CE</sub> = 5 V, I <sub>B</sub> = 0, I <sub>F</sub> = 2 mA	
T <sub>a</sub> = +125°C		1.0					
-X01		2.0					
Off State Collector Current	I <sub>C(OFF)</sub>			100	nA	V <sub>CE</sub> = 20 V, I <sub>B</sub> = 0, I <sub>F</sub> = 0 mA	
Off State Collector Current, T <sub>a</sub> = 125°C	I <sub>C(OFF)</sub>			100	μA	V <sub>CE</sub> = 20 V, I <sub>B</sub> = 0, I <sub>F</sub> = 0 mA	
Rise Time (Phototransistor Operation)	t <sub>r</sub>		10	20	μs	V <sub>CC</sub> = 10 V, I <sub>B</sub> = 0, I <sub>F</sub> = 5 mA, R <sub>L</sub> = 100 Ω	
or			10	20			
Fall Time	t <sub>f</sub>		15	25			
Rise Time (Photodiode Operation)	t <sub>r</sub>		0.85	3	μs	V <sub>CC</sub> = 10 V, I <sub>E</sub> = 0, I <sub>F</sub> = 5 mA, R <sub>L</sub> = 100 Ω	
or			0.85	3			
Fall Time	t <sub>f</sub>		0.85	3			

**NOTES:**

- These parameters are measured between all phototransistor leads shorted together and with both input diode leads shorted together.

**RECOMMENDED OPERATING CONDITIONS:**

PARAMETERS	SYMBOL	MIN	MAX	UNITS
Input Current, Low Level	I <sub>FL</sub>	0	100	μA
Input Current, High Level	I <sub>FH</sub>	1	10	mA
Supply Voltage	V <sub>CC</sub>	5.0	20	V
Operating Temperature	T <sub>A</sub>	-55	125	°C

**SELECTION GUIDE**

PART NUMBER	PART DESCRIPTION
66177-001	4N47, Commercial
66177-101	4N47, Screened
66177-201	4N47(-55° to +125°C)
66177-301	4N47 (-40° to +85°C)
66177-002	4N48, Commercial
66177-102	4N48, Screened
66177-202	4N48(-55° to +125°C)
66177-302	4N48 (-40° to +85°C)
66177-003	4N49, Commercial
66177-103	4N49, Screened
66177-203	4N49(-55° to +125°C)
66177-303	4N49 (-40° to +85°C)