



| Parameter                  | Rating      | Units            |
|----------------------------|-------------|------------------|
| LED Operating Range        | 2-10        | mA               |
| K3, Transfer Gain          | 0.773-1.072 | -                |
| Isolation, Input to Output | 3750        | V <sub>rms</sub> |

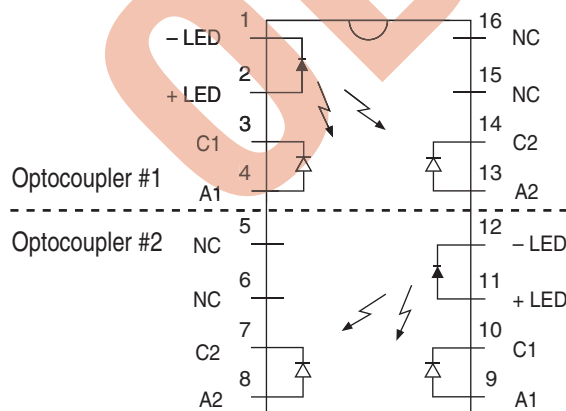
### Features

- 0.01% Servo Linearity
- THD -87dB Typical
- Wide Bandwidth (>200kHz)
- Couples Analog and Digital Signals
- High Gain Stability
- Low Input/Output Capacitance
- Low Power Consumption
- 16-Pin SOIC Package (PCMCIA Compatible)
- Machine Insertable, Wave Solderable
- Surface Mount Tape & Reel Version Available
- VDE Compatible

### Applications

- Modem Transformer Replacement With No Insertion Loss
- Digital Telephone Isolation
- Power Supply Feedback Voltage/Current
- Medical Sensor Isolation
- Audio Signal Interfacing
- Isolation of Process Control Transducers

### Pin Configuration



### Description

The LOC210P Dual Linear Optocoupler features an infrared LED optically coupled with two photodiodes. A feedback (input) photodiode is used to generate a control signal that provides a servomechanism to the LED drive current, thus compensating for the LED's nonlinear time and temperature characteristics. The other (output) photodiode provides an output signal that is linear with respect to the servo LED current. The product features wide bandwidth, high input to output isolation and excellent servo linearity.

### Approvals

- UL Recognized Component: File # E76270
- CSA Certified Component: Certificate # 1175739
- EN/IEC 60950-1 Certified Component:  
TUV Certificate # B 13 12 82667 003

### Ordering Information

| Part #    | Description             |
|-----------|-------------------------|
| LOC210P   | 16-Pin SOIC (50/tube)   |
| LOC210PTR | 16-Pin SOIC (1000/Reel) |

#### K3 Sorted Bins

| Bin   | K3 Range      |
|-------|---------------|
| Bin 1 | 0.773 - 0.886 |
| Bin 2 | 0.887 - 1.072 |

#### Bin Matrix

|        | Top Pole Optocoupler* | Bottom Pole Optocoupler** |
|--------|-----------------------|---------------------------|
| Suffix | Bin                   |                           |
| K      | 1                     | 1                         |
| L      | 1                     | 2                         |
| M      | 2                     | 1                         |
| N      | 2                     | 2                         |

\*Top Optocoupler: Pins 1,2,3,4,13, and 14

\*\*Bottom Optocoupler: Pins 7 through 12

### Part Number Information

The LOC210P is shipped in anti-static tubes (50 pieces each) or tape/reel (1,000 pieces each). Each container has only 1 bin combination which will be branded on each part with the appropriate bin letter K, L, M, or N in the lower right hand corner. Suffix representation is described in the "Bin Matrix".



**Absolute Maximum Ratings @ 25°C**

| Parameter                                                   | Ratings     | Units            |
|-------------------------------------------------------------|-------------|------------------|
| Reverse LED Voltage                                         | 5           | V                |
| Input Control Current                                       | 100         | mA               |
| Peak (10ms)                                                 | 1           | A                |
| Input Power Dissipation <sup>1</sup>                        | 150         | mW               |
| Power Dissipation<br>Total Package Dissipation <sup>2</sup> | 800         | mW               |
| Isolation Voltage, Input to Output                          | 3750        | V <sub>rms</sub> |
| Operational Temperature                                     | -40 to +85  | °C               |
| Storage Temperature                                         | -40 to +125 | °C               |

<sup>1</sup> Derate linearly 1.33 mW / °C

<sup>2</sup> Derate linearly 6.67 mW / °C

Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.

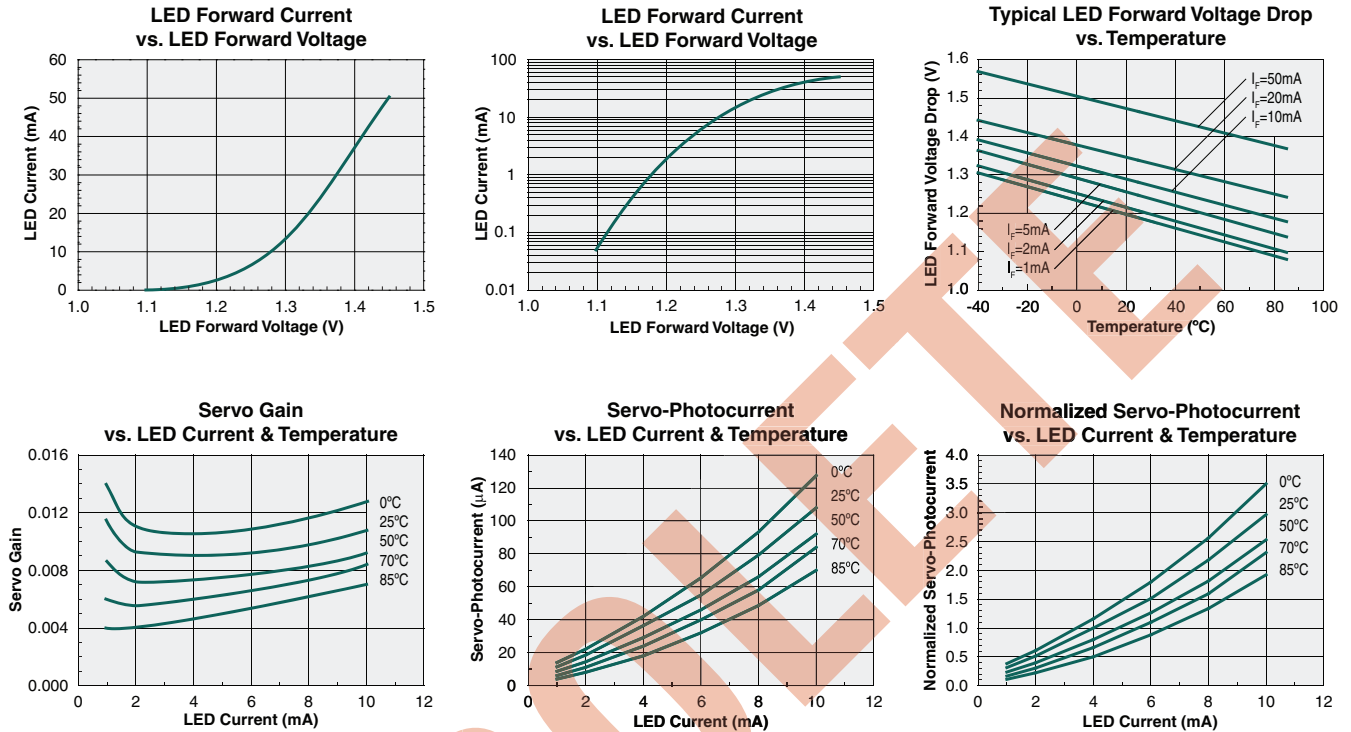
**Electrical Characteristics @ 25°C**

| Parameter                                           | Conditions                                                      | Symbol               | Min   | Typ   | Max   | Units                 |
|-----------------------------------------------------|-----------------------------------------------------------------|----------------------|-------|-------|-------|-----------------------|
| Input Characteristics                               |                                                                 |                      |       |       |       |                       |
| LED Voltage Drop                                    | $I_F=2 - 10\text{mA}$                                           | $V_F$                | 0.9   | 1.2   | 1.4   | V                     |
| Reverse LED Current                                 | $V_R=5\text{V}$                                                 | $I_R$                | -     | -     | 10    | $\mu\text{A}$         |
| Coupler/Detector Characteristics                    |                                                                 |                      |       |       |       |                       |
| Dark Current                                        | $I_F=0\text{mA}$ , $V_{C1-A1}=V_{C2-A2}=15\text{V}$             | $I_D$                | -     | 1     | 25    | nA                    |
| K1, Servo Gain ( $I_{C1}/I_F$ )                     | $I_F=2 - 10\text{mA}$ , $V_{C1-A1}=V_{C2-A2}=15\text{V}$        | K1                   | 0.004 | -     | 0.030 | -                     |
| K2, Forward Gain ( $I_{C2}/I_F$ )                   |                                                                 | K2                   | 0.004 | -     | 0.030 | -                     |
| K3, Transfer Gain ( $K2/K1=I_{C2}/I_{C1}$ )         |                                                                 | K3                   | 0.773 | -     | 1.072 | -                     |
| $\Delta K3$ , Transfer Gain Linearity (non-servoed) | $I_F=2 - 10\text{mA}$                                           | $\Delta K3$          | -     | -     | 1     | %                     |
| K3 Temperature Coefficient                          | $I_F=2 - 10\text{mA}$ , $V_{C1-A1}=V_{C2-A2}=5\text{V}$         | $\Delta K3/\Delta T$ | -     | 0.005 | -     | %/ $^{\circ}\text{C}$ |
| Common Mode Rejection Ratio                         | $V=20\text{V}_{P-P}$ , $R_L=2\text{k}\Omega$ , $f=100\text{Hz}$ | CMRR                 | -     | 130   | -     | dB                    |
| Total Harmonic Distortion                           | $f_0=350\text{Hz}$ , $0\text{dBm}$                              | THD                  | -96   | -87   | -80   | dB                    |
| Frequency Response <sup>2</sup>                     | Photoconductive Configuration                                   | $f_{-3\text{dB}}$    | -     | 200   | -     | kHz                   |
|                                                     | Photovoltaic Configuration                                      |                      | -     | 40    | -     | kHz                   |
| Common Characteristics                              |                                                                 |                      |       |       |       |                       |
| Input/Output Capacitance                            | -                                                               | $C_{I/O}$            | -     | 3     | -     | pF                    |

<sup>1</sup> All parameters above are for each optocoupler.

<sup>2</sup> Refer to Application Note, AN-107, for LOC210P configurations.

**PERFORMANCE DATA @25°C (Unless Otherwise Noted)\***



\*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

## Manufacturing Information

### Moisture Sensitivity



All plastic encapsulated semiconductor packages are susceptible to moisture ingress. IXYS Integrated Circuits Division classified all of its plastic encapsulated devices for moisture sensitivity according to the latest version of the joint industry standard, **IPC/JEDEC J-STD-020**, in force at the time of product evaluation. We test all of our products to the maximum conditions set forth in the standard, and guarantee proper operation of our devices when handled according to the limitations and information in that standard as well as to any limitations set forth in the information or standards referenced below.

Failure to adhere to the warnings or limitations as established by the listed specifications could result in reduced product performance, reduction of operable life, and/or reduction of overall reliability.

This product carries a **Moisture Sensitivity Level (MSL) rating** as shown below, and should be handled according to the requirements of the latest version of the joint industry standard **IPC/JEDEC J-STD-033**.

| Device  | Moisture Sensitivity Level (MSL) Rating |
|---------|-----------------------------------------|
| LOC210P | MSL 1                                   |

### ESD Sensitivity



This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

### Soldering Profile

This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

| Device  | Maximum Temperature x Time |
|---------|----------------------------|
| LOC210P | 260°C for 30 seconds       |

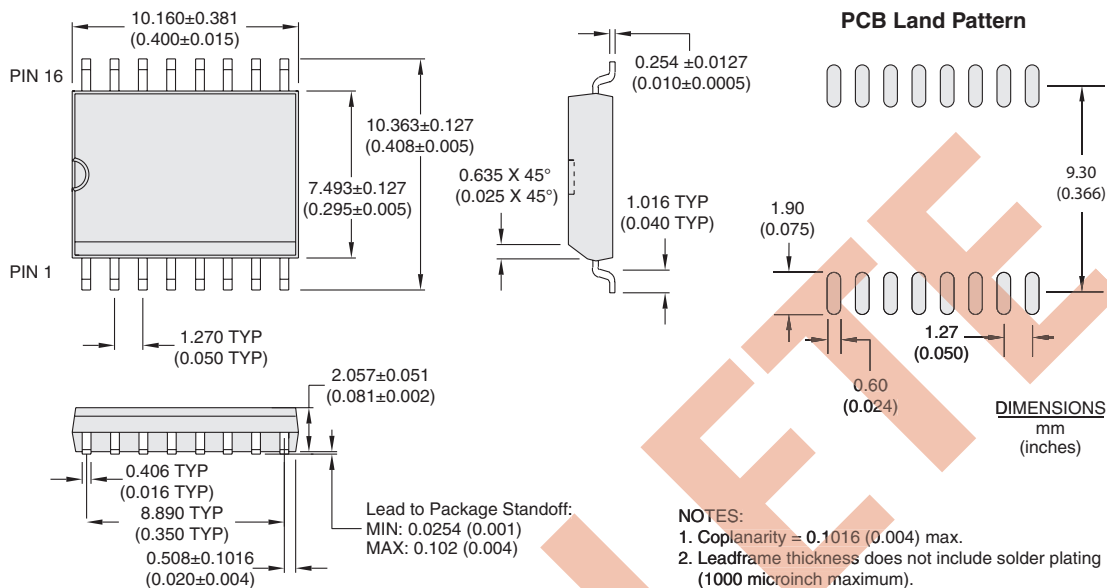
### Board Wash

IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since IXYS Integrated Circuits Division employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake could be necessary if a wash is used after soldering processes. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

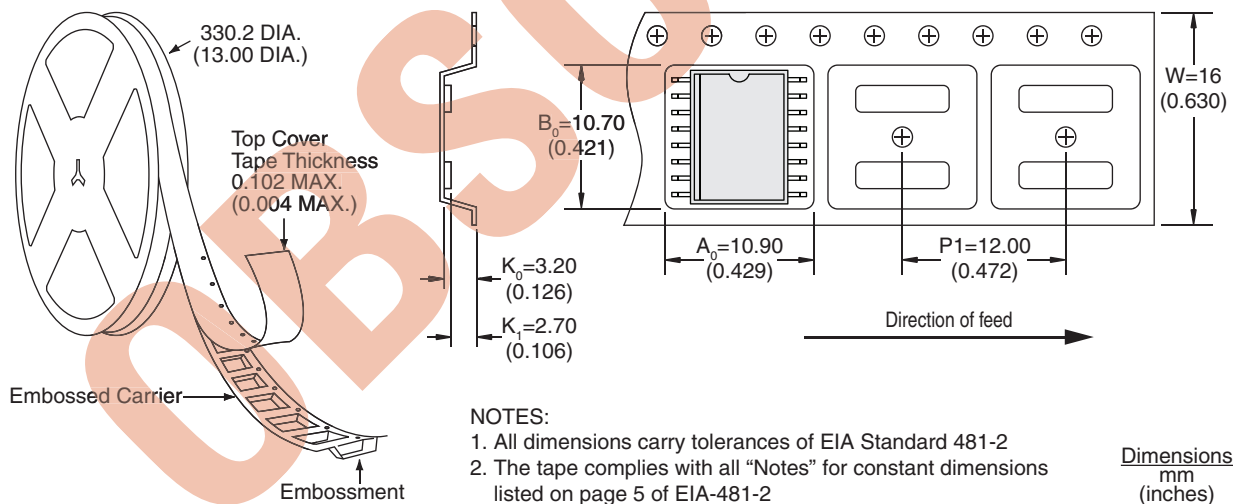


## Mechanical Dimensions

### LOC210P



### LOC210PTR Tape & Reel



For additional information please visit our website at: <https://www.ixysic.com>