



| Parameter                  | Rating      | Units            |
|----------------------------|-------------|------------------|
| LED Operating Range        | 2-10        | mA               |
| K3, Transfer Gain          | 0.733-1.072 | -                |
| 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
- 8-Pin Flatpack or DIP Package (PCMCIA Compatible)
- Machine Insertable, Wave Solderable
- Surface Mount and Tape & Reel Versions 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

### Description

The LOC112 Single Linear Optocoupler features an infrared LED optically coupled with two photodiodes. One 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
- Certified to:
  - IEC60950 -1: 2005
  - EN60950 -1: 2006
  - TUV Certificate B 09 07 49410 006

### Ordering Information

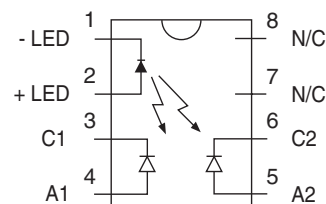
| Part Number | Description                     |
|-------------|---------------------------------|
| LOC112      | 8-Pin DIP (50/Tube)             |
| LOC112P     | 8-Pin Flatpack (50/Tube)        |
| LOC112PTR   | 8-Pin Flatpack (1000/Reel)      |
| LOC112S     | 8-Pin Surface Mount (50/tube)   |
| LOC112STR   | 8-Pin Surface Mount (1000/Reel) |

#### K3 Sorted Bins

|                       |
|-----------------------|
| Bin D = 0.733 - 0.805 |
| Bin E = 0.806 - 0.886 |
| Bin F = 0.887 - 0.974 |
| Bin G = 0.975 - 1.072 |

- The LOC112 will be shipped using bins available at date of order. Any bin (D - G) can be shipped. Each tube or reel will contain one K3-sorted bin. Each device will be marked with the designated bin.

### Pin Configuration



## 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               |
| Total Package Dissipation <sup>2</sup> | 500         | 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

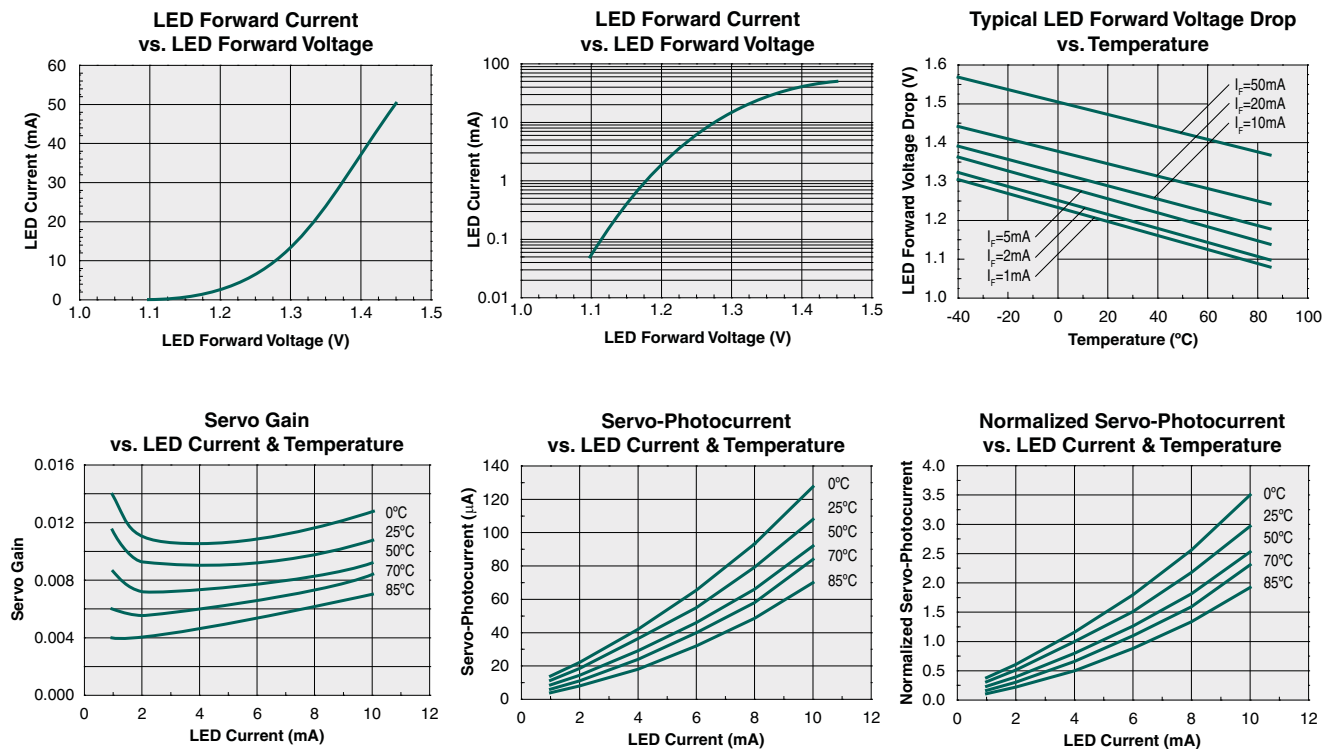
*Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.*

## Electrical Characteristics @ 25°C

| Parameter                                   | Conditions                                                      | Symbol            | Min   | Typ   | Max   | Units  |
|---------------------------------------------|-----------------------------------------------------------------|-------------------|-------|-------|-------|--------|
| <b>Input Characteristics</b>                |                                                                 |                   |       |       |       |        |
| 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    | μA     |
| <b>Coupler/Detector Characteristics</b>     |                                                                 |                   |       |       |       |        |
| 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 | 0.007 | 0.030 | -      |
| K2, Forward Gain ( $I_{C2}/I_F$ )           |                                                                 | K2                | 0.004 | 0.007 | 0.030 | -      |
| K3, Transfer Gain ( $K2/K1=I_{C2}/I_{C1}$ ) |                                                                 | K3                | 0.733 | 1     | 1.072 | -      |
| ΔK3, Transfer Gain Linearity (non-servoed)  | $I_F=2 - 10\text{mA}$                                           | ΔK3               | -     | -     | 1     | %      |
| K3 Temperature Coefficient                  | $I_F=2 - 10\text{mA}$ , $V_{C1-A1}=V_{C2-A2}=5\text{V}$         | ΔK3/ΔT            | -     | 0.005 | -     | % / °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>1</sup>             | Photoconductive Configuration                                   | $f_{-3\text{dB}}$ | -     | 200   | -     | kHz    |
|                                             | Photovoltaic Configuration                                      |                   |       | 40    |       |        |
| Input/Output Capacitance                    | -                                                               | $C_{I/O}$         | -     | 3     | -     | pF     |

<sup>1</sup> Refer to Application Note, AN-107, for LOC112 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 |
|----------------------------|-----------------------------------------|
| LOC112 / LOC112P / LOC112S | MSL 1                                   |

### ESD Sensitivity



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

### Reflow 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 |
|------------------|----------------------------|
| LOC112 / LOC112S | 250°C for 30 seconds       |
| LOC112P          | 260°C for 30 seconds       |

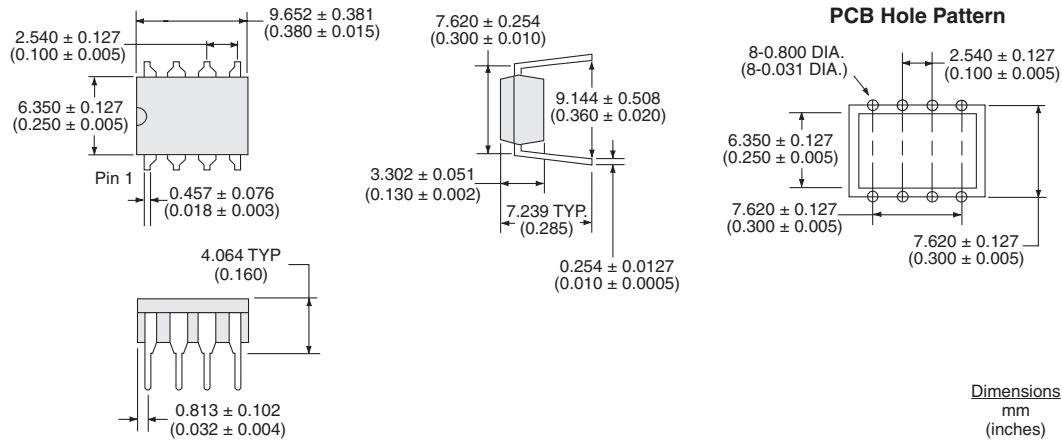
### Board Wash

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 solder reflow processes. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

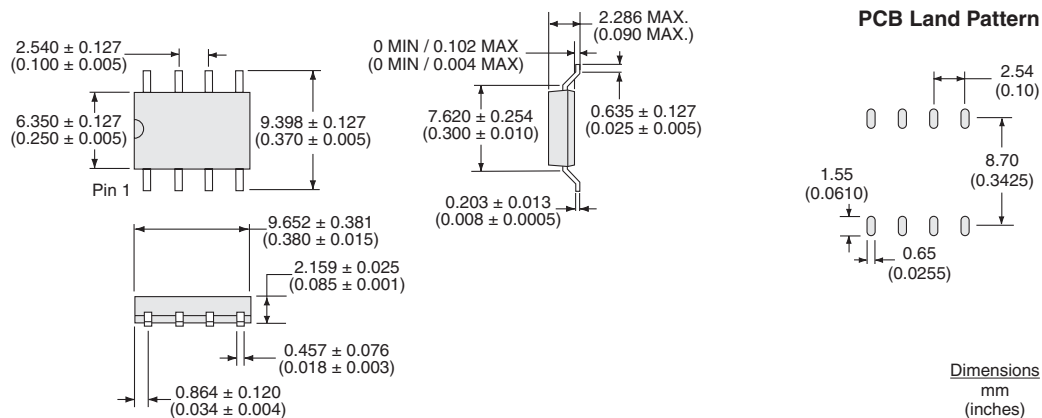


# Mechanical Dimensions

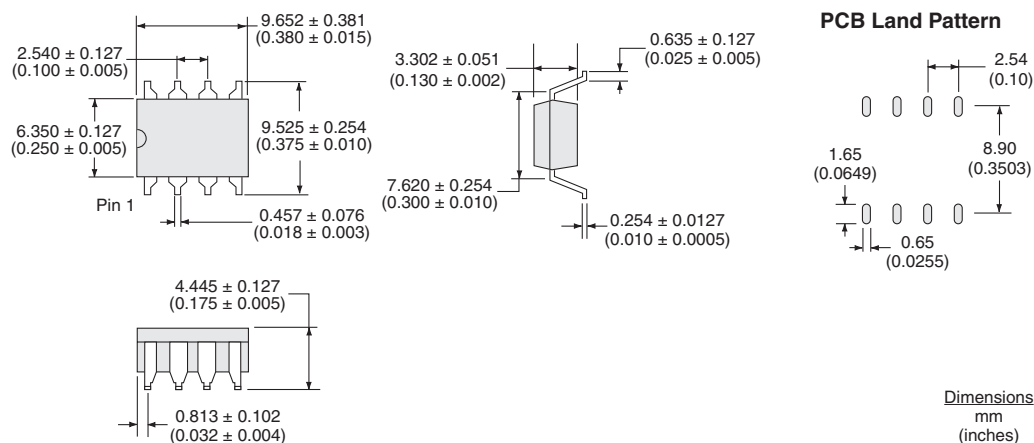
## LOC112



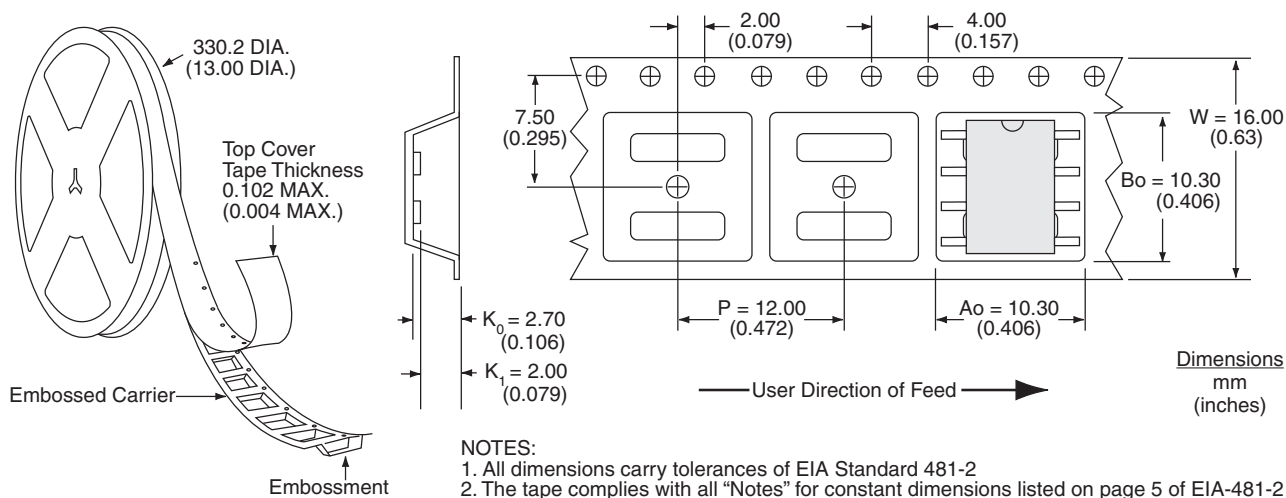
## LOC112P



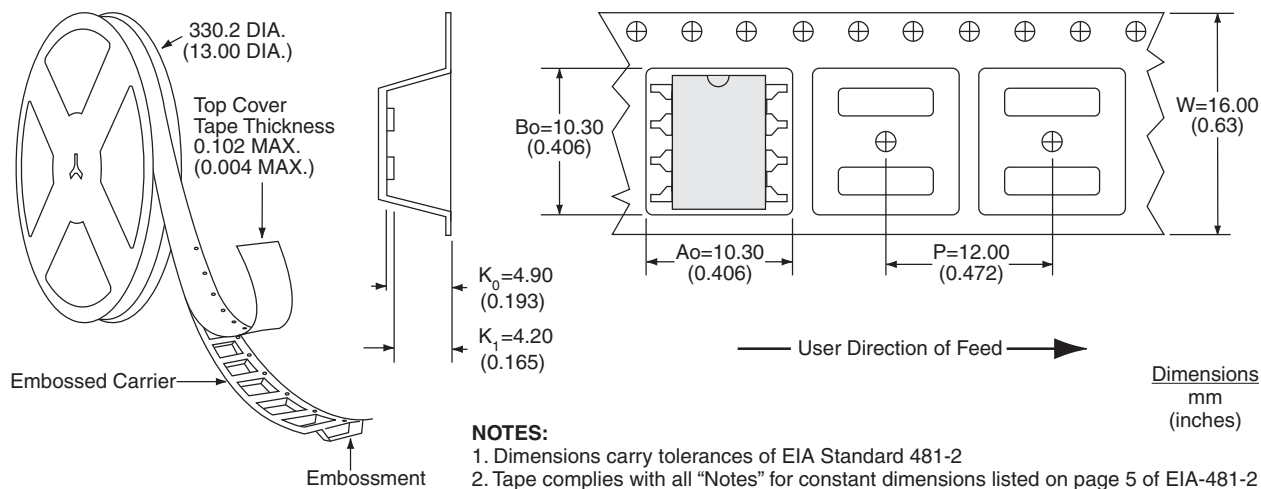
## LOC112S



## LOC112PTR Tape & Reel



## LOC112STR Tape & Reel



For additional information please visit our website at: [www.ixysic.com](http://www.ixysic.com)

IXYS Integrated Circuits Division makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication and reserves the right to make changes to specifications and product descriptions at any time without notice. Neither circuit patent licenses nor indemnity are expressed or implied. Except as set forth in IXYS Integrated Circuits Division's Standard Terms and Conditions of Sale, IXYS Integrated Circuits Division assumes no liability whatsoever, and disclaims any express or implied warranty, relating to its products including, but not limited to, the implied warranty of merchantability, fitness for a particular purpose, or infringement of any intellectual property right.

The products described in this document are not designed, intended, authorized or warranted for use as components in systems intended for surgical implant into the body, or in other applications intended to support or sustain life, or where malfunction of IXYS Integrated Circuits Division's product may result in direct physical harm, injury, or death to a person or severe property or environmental damage. IXYS Integrated Circuits Division reserves the right to discontinue or make changes to its products at any time without notice.