SONY

CXA1915AN

I-V Photo IC for MiniDisc

Description

The CXA1915AN is a photo IC developed as a photo detector for the optical pickup of MiniDisc. The photodiode for RF signal detection has a built-in I-V amplifier and features low output impedance for stable output.

- Focus servo: astigmatic method
- Tracking servo: three-spot method
- Magneto optical signal (RF signal) detection: Wollaston prism method

Features

- I-V amplifier (current-voltage conversion circuit)
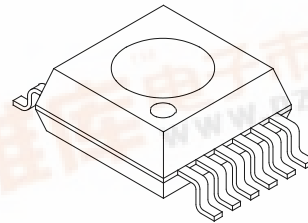- Ultra-compact transparent molded package (SSOP)

Applications

Optical pickup for MiniDisc

Structure

Bipolar silicon monolithic IC

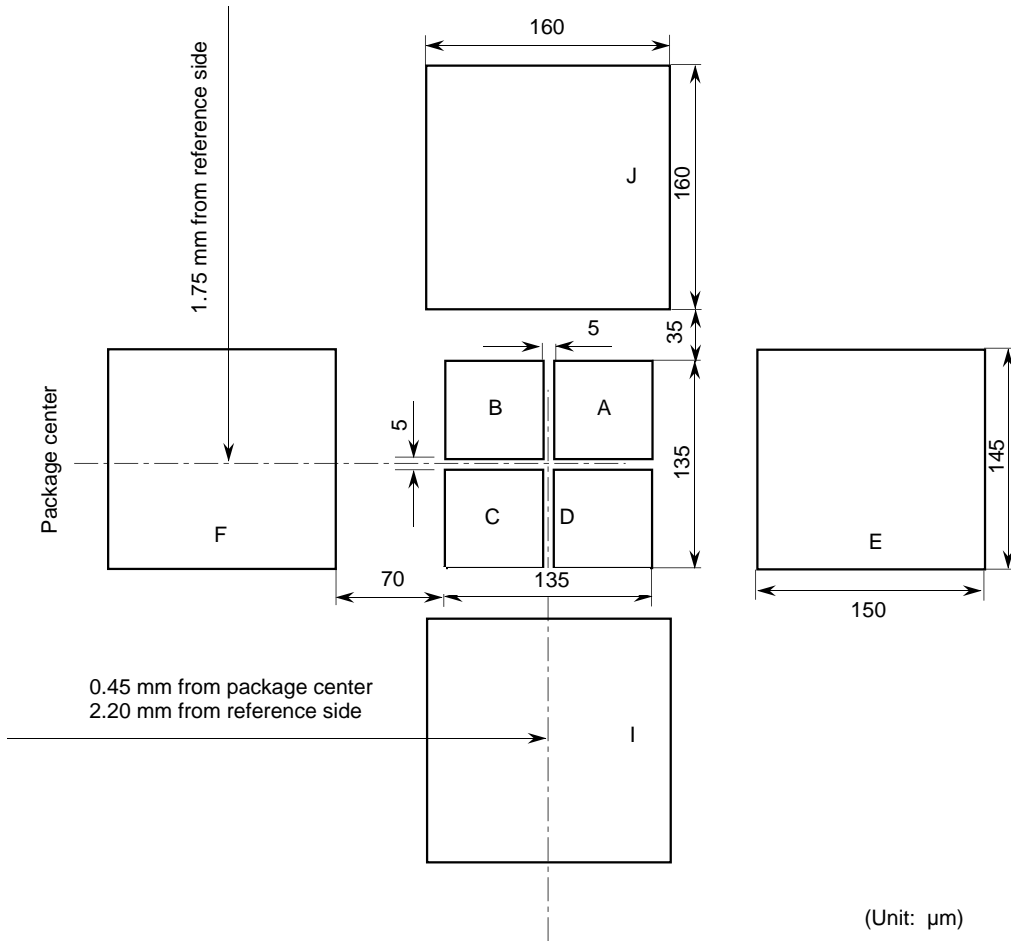16 pin PD-S (Plastic)

Absolute Maximum Ratings (Ta=25°C)

- Supply voltage V_{CC} 6   V
- Operating temperature T_{opr} −20 to 90   °C
- Storage temperature T_{stg} −40 to 90   °C
- Allowable power dissipation

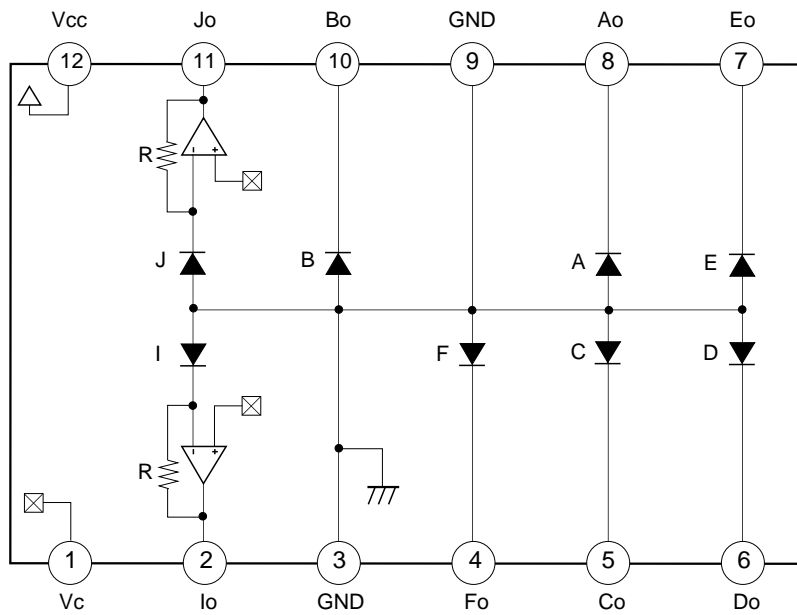P_D 150   mW

Recommended Operating Conditions

- Supply voltage V_{CC} 2.5 to 5.5   V

Photo Detector Pattern Dimensions

160

J

160

5

35

1.75 mm from reference side

Package center

F

70

B   A

5

135

5

C   D

135

E

145

150

0.45 mm from package center
2.20 mm from reference side

I

(Unit: μm)

Circuit Block Diagram

Vcc	Jo	Bo	GND	Ao	Eo
12	11	10	9	8	7

R

J   B   A   E

I   F   C   D

R

1	2	3	4	5	6
Vc	Io	GND	Fo	Co	Do

R=115kΩ

A, B, C, D, E, F, I, and J are photodiodes.

Electrical and Optical Characteristics   (Vcc=3.0V, Vc=1.5V, Ta=25°C)

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current consumption	ICC	In the dark		2.2	3.2	mA
Dark current (A to F)	ID	In the dark			4.0	nA
Optical sensitivity (A to F)	S	Po=5μW, λ = 780nm	0.3	0.4		A/W
Output offset voltage (I, J)	Voff	In the dark	-10	5.5	10	
Output offset voltage difference (I-J)	ΔVoff	In the dark	-10	0	10	mV
Output voltage (I, J)	Vo	Po=5μW, λ = 780nm	100	130	160	
Maximum output voltage (I, J)	Vomax	Po=100μW, λ = 780nm	2.7	2.8		V
Frequency response (I, J)	fc	100kHz reference, -3 dB	1.8	2.3		MHz

Note)

1. Vc is reference for output voltage and output offset voltage.
2. GND is reference for maximum output voltage.
3. Output voltage and frequency response are subject to conformation of design.
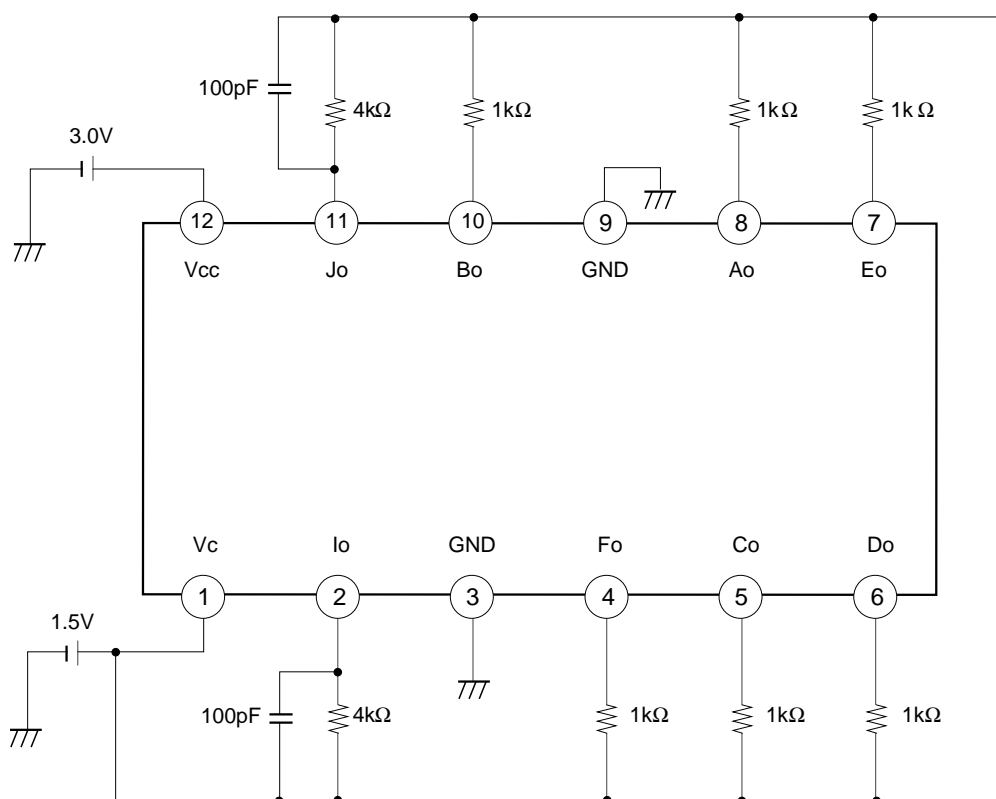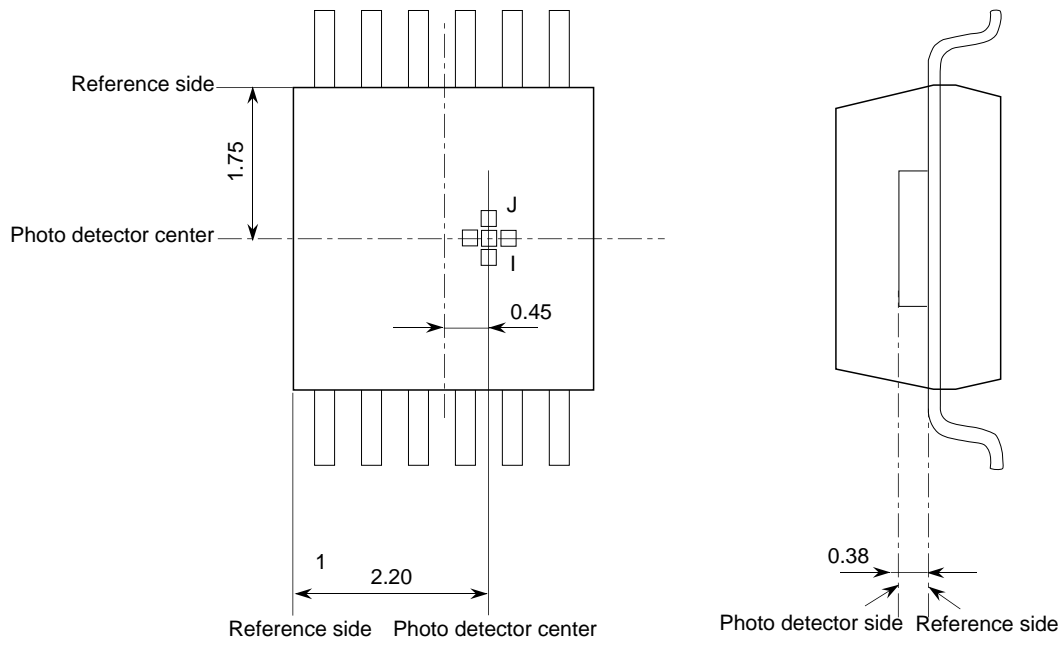
Measurement Circuit
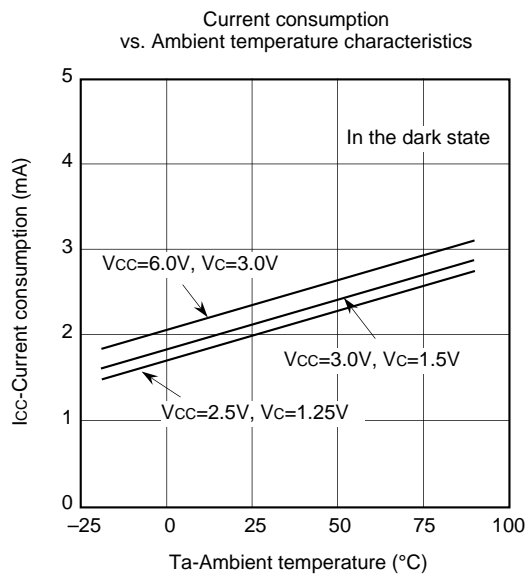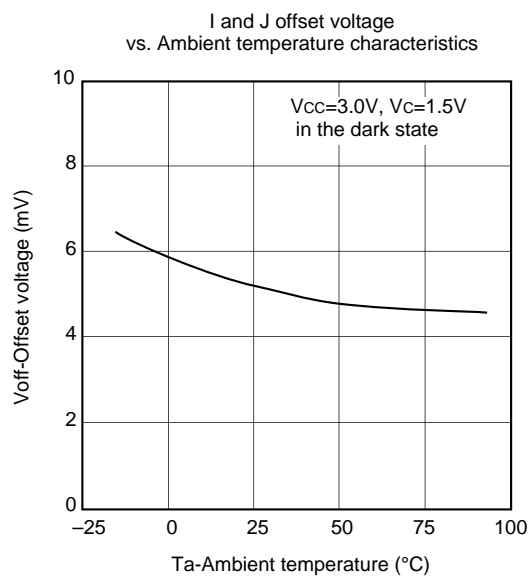
Photo Detector Position

(Unit: mm)
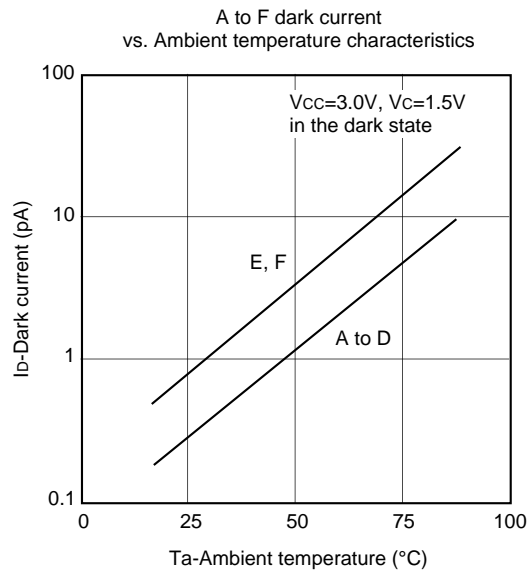
Accuracy in position of photo detector (the reference side shown above is reference.)

X, Y : ±0.2 mm

Z   : ±0.2 mm

θ   : ±2°

Example of Representative Characteristics

A to F dark current
vs. Ambient temperature characteristics

I and J offset voltage
vs. Ambient temperature characteristics

Current consumption
vs. Ambient temperature characteristics

Pin Description

Pin No.	Symbol	I/O	Equivalent circuit	Description
1	Vc	I		For a dual positive/negative power supply: GND For a single power supply: center voltage input
2 11	Io Jo	O		Output of electrical signals converted from optical signals
3 9	GND	I		For a dual positive/negative power supply: negative power supply For a single power supply: GND
4 5 6 7 8 10	Fo Co Do Eo Ao Bo	O		Output of electrical signals converted from optical signals (cathode pin of photodiode)
12	Vcc	I		Positive power supply

Notes on Operation

1. Connection to RF amplifiers

    In the CXA1915AN, the RF signals (I, J) are of the voltage-output type. Therefore, the RF amplifier should have an I-V amplifier at the input block because the servo signals (A to F) are of current-output type.

2. Power supply

    The CXA1915AN can be used either with a dual positive/negative power supply or with a single power supply. However, this IC is not provided with a center voltage generating circuit, and so when used with a single power supply the center voltage must be supplied by an RF amplifier or some other device.
   Power supply connections for each case are as follows.

	(12) V_{CC}	(3) (9) GND	(1) V_C
Dual positive/ negative power supply	Positive power supply	Negative power supply	GND
Single power supply	Positive power supply	GND	Center voltage

Note)   Pins 3 and 9 are shorted in the IC.

For both a dual positive/negative power supply and a single power supply, the voltage difference between the Vcc and GND pins should be within the range of 2.5 V and 5.5 V.

Package Outline   Unit : mm

PD-S-16
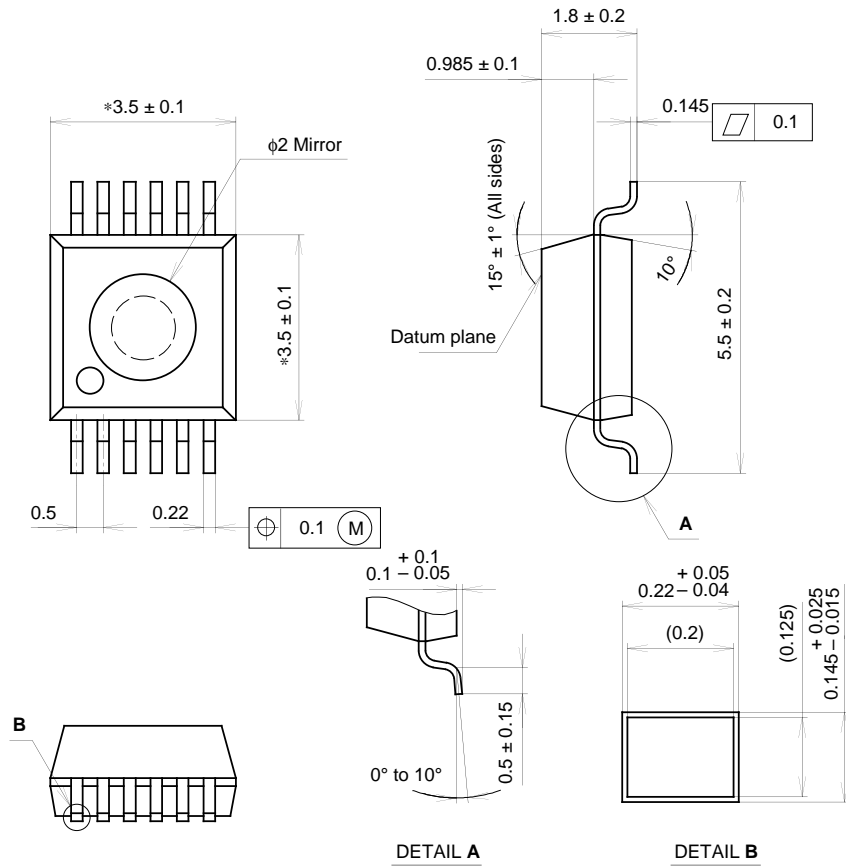
NOTE: Dimension "∗" does not include mold protrusion.

SONY CODE	PD-S-16
EIAJ CODE	————
JEDEC CODE	————

PACKAGE WEIGHT	0.04g