SONY

CXA1753M

I-V Photo IC for CD Player

For the availability of this product, please contact the sales office.

Description

The CXA1753M is a photo IC developed as a photodetector for the optical pickup of CD players.

It has a built-in I-V amplifier, and features low output impedance for stable output.

- Focus servo : astigmatic method
- Tracking servo : three-spot method

Features

- I-V amplifier (current-voltage conversion circuit)
- Compact transparent molded package (SOP)
  Identical to the shape of conventional photodiodes

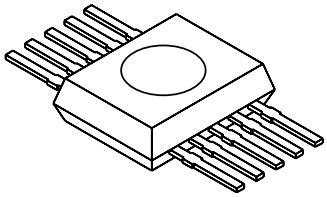
Applications

Optical pickup of CD players

Structure

Bipolar silicon monolithic IC

PD-S-14



Absolute Maximum Ratings (Ta=25 °C)

• Supply voltage	V_{CC}	12	V
• Operating temperature	Topr	–20 to +75	°C
• Storage temperature	Tstg	–40 to +85	°C
• Allowable power dissipation	P_D	200	mW

Operating Conditions

Supply voltage	V_{CC}	2.8 to 11.0	V

E93537A79-TE

Electrical and Optical Characteristics I (V_{CC}=3.0 V, V_C=1.5 V, Ta=25 °C)

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current consumption	I_{CC}	In the dark	—	2.0	2.8	mA
Output offset voltage (A-F)	Voff	In the dark	–15	0	15	mV
Output offset voltage difference	ΔVoff	(A+B) – (C+D) In the dark	–15	0	15	mV
		(A+D) – (B+C) In the dark	–15	0	15	mV
		(A+C) – (B+D) In the dark	–15	0	15	mV
		E–F In the dark	–10	0	10	mV
Output voltage (A-D)	V_O	P_O=10 µW, λ=780 nm	290	370	450	mV
Output voltage (E, F)	V_O	P_O=10 µW, λ=780 nm	610	770	930	mV
Maximum output voltage (A-D)	V_{omax}	P_O=100 µW, λ=780 nm	2.0	2.2	—	V
Maximum output voltage (E, F)	V_{omax}	P_O=100 µW, λ=780 nm	2.5	2.9	—	V
Frequency response (A-D)	f_C	100 kHz reference, –3 dB	2.0	3.0	—	MHz
Frequency response (E, F)	f_C	10 kHz reference, –3 dB	100	400	—	kHz

Electrical and Optical Characteristics II (V_{CC}=5.0 V, V_C=2.5 V, Ta=25 °C)

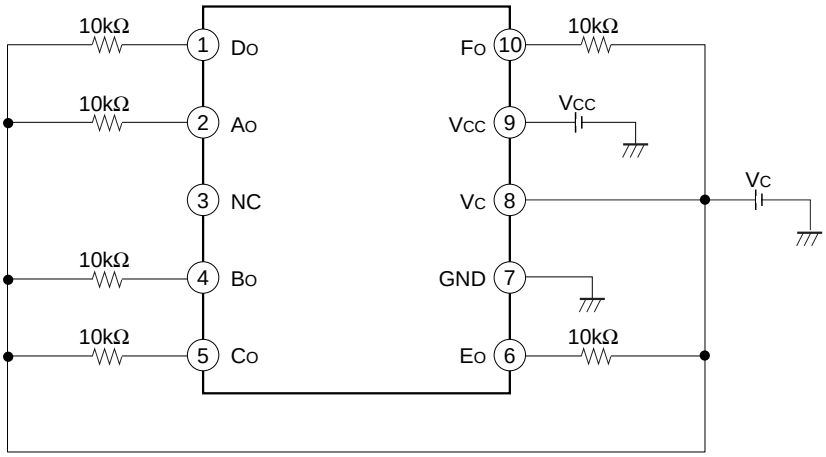
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current consumption	I_{CC}	In the dark	—	3.5	4.5	mA
Output offset voltage (A-F)	Voff	In the dark	–15	0	15	mV
Output offset voltage difference	ΔVoff	(A+B) – (C+D) In the dark	–15	0	15	mV
		(A+D) – (B+C) In the dark	–15	0	15	mV
		(A+C) – (B+D) In the dark	–15	0	15	mV
		E–F In the dark	–10	0	10	mV
Output voltage (A-D)	V_O	P_O=10 µW, λ=780 nm	290	370	450	mV
Output voltage (E, F)	V_O	P_O=10 µW, λ=780 nm	610	770	930	mV
Maximum output voltage (A-D)	V_{omax}	P_O=100 µW, λ=780 nm	4.0	4.2	—	V
Maximum output voltage (E, F)	V_{omax}	P_O=100 µW, λ=780 nm	4.5	4.9	—	V
Frequency response (A-D)	f_C	100 kHz reference, –3 dB	2.0	2.5	—	MHz
Frequency response (E, F)	f_C	10 kHz reference, –3 dB	100	400	—	kHz

Note 1 : V_C is reference for output voltage and output offset voltage.

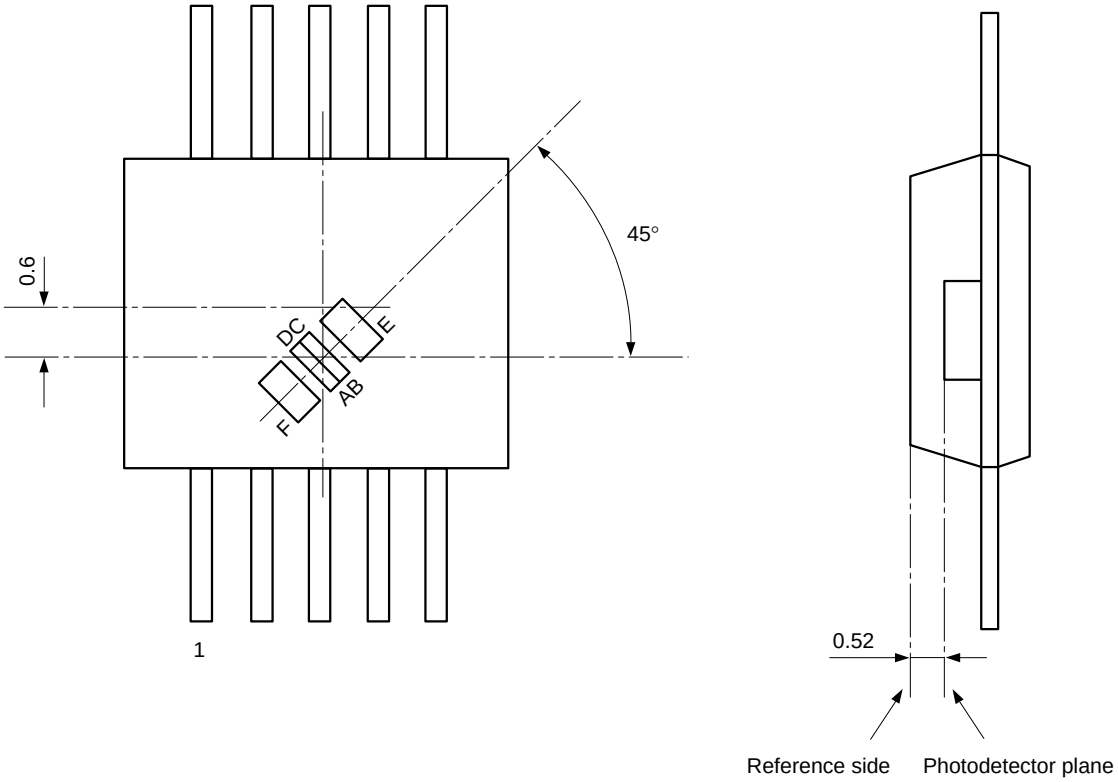
Note 2 : GND is reference for maximum output voltage.

Note 3 : Output voltage and frequency response are subject to confirmation of design.

Measurement Circuit



Photodetector position

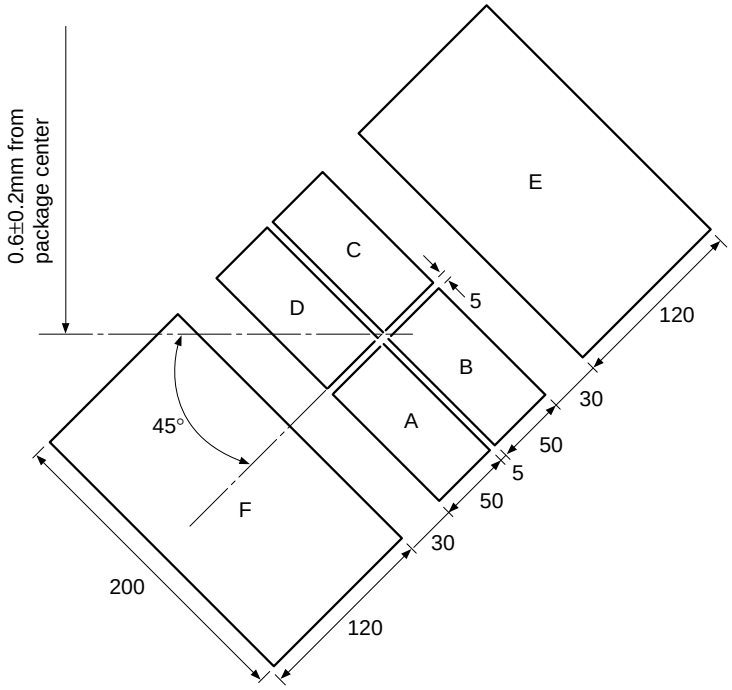


Tolerance in position of photodetector center

X, Y : ±0.2
Z : ±0.2
θ : ±2°

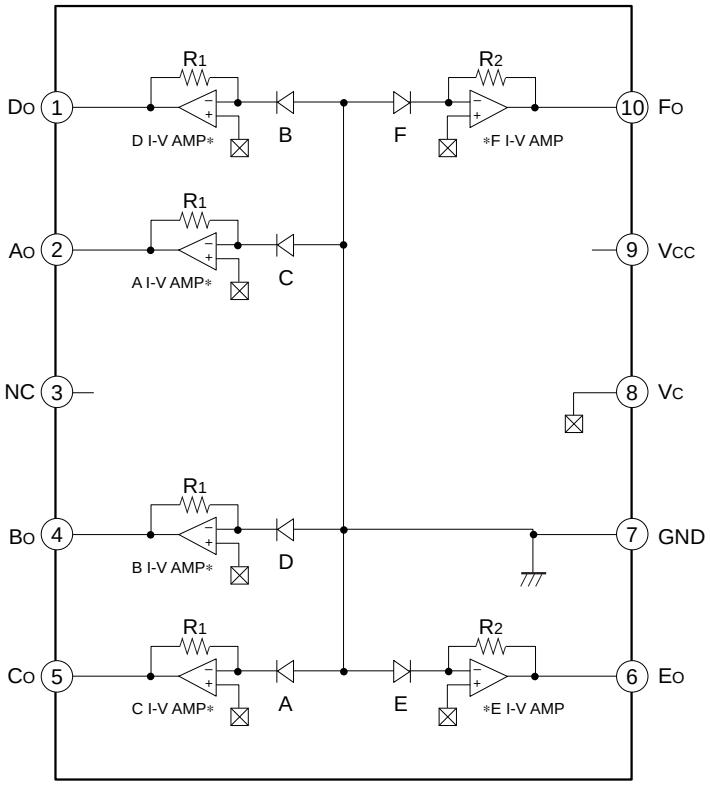
(Unit : mm)

Photodetector Pattern Dimensions



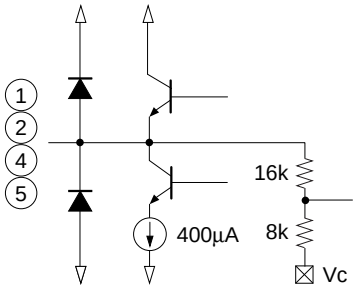
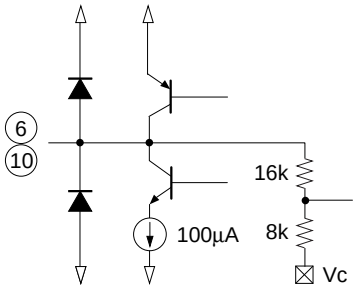
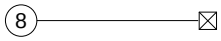
(Unit : µm)

Circuit Block Diagram



R1=166kΩ, R2=334kΩ
A, B, C, D, E and F are photodiodes

Pin Description

Pin No.	Symbol	I/O	Equivalent circuit	Description
1 2 4 5	D_O A_O B_O C_O	O		Output of voltage signals converted from optical signals.
3	NC			Common with GND for the package construction.
6 10	E_O F_O	O		Output of voltage signals converted from optical signals.
7	GND	I		For a dual power supply : negative power supply For a single power supply : GND
8	V_C	I		For a dual power supply : GND For a single power supply : center voltage input
9	V_{CC}	I		Positive power supply

Notes on Operation

1. Connection to RF amplifiers

   The CXA1753M features the voltage-output type and the voltage-input type such as the CXA1610M should be used as RF amplifiers. The noise tolerance will be greatly improved over that of conventional photodiodes used with current-input RF amplifiers.

2. Power supply

   The CXA1753M can be used either with a dual 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. For instance when the CXA1610M is used as an RF amplifier, the V_C input pin of the CXA1753M should be connected to the VR output pin of the CXA1610M.

   In addition, note that Pin 3 is internally connected to Pin 7 (GND).

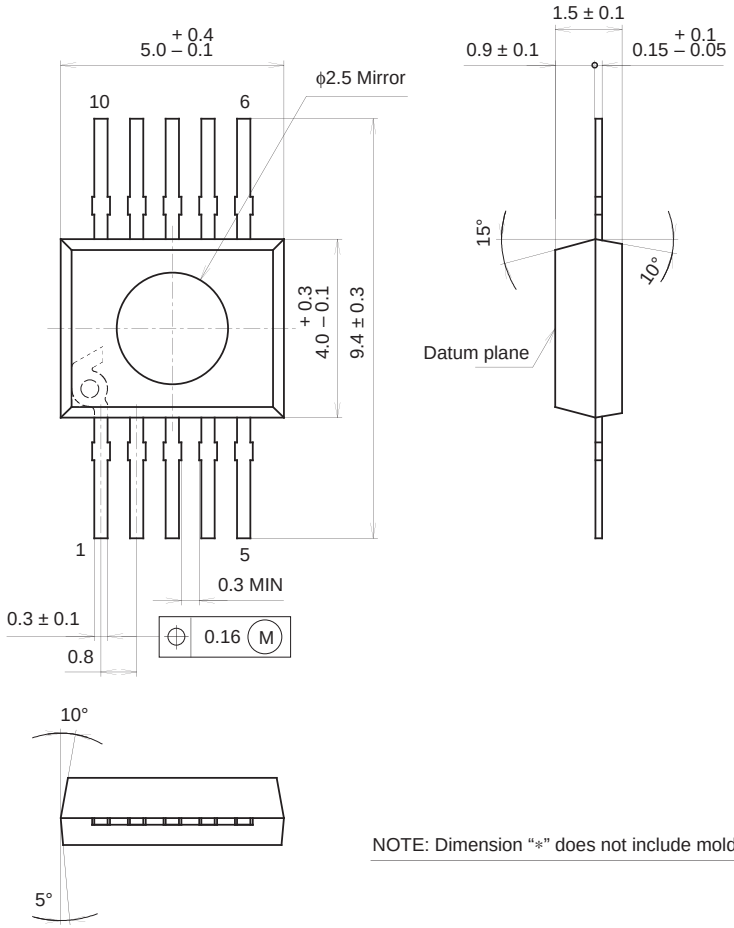
   Power supply connections for each case are as follows.

	(9) V_{CC}	(7) GND	(8) V_C	(3) NC
Dual power supply	Positive power supply	Negative power supply	GND	Negative power supply or open
Single power supply	Positive power supply	GND	Center voltage	GND or open

   For both a dual power supply and a single power supply, the voltage difference between the V_{CC} and GND pins should be within the range of 2.8 V and 11.0 V.

Package Outline Unit : mm

PD-S-14



NOTE: Dimension "∗" does not include mold protrusion.

SONY CODE	PD-S-14
EIAJ CODE	————
JEDEC CODE	————

PACKAGE WEIGHT	0.06g