

Current/Voltage Conversion Amplifier for CD Optical Pickups

Monolithic IC MM1729XB

Outline

This IC is a current/voltage converting amplifier developed for compact disc optical pickups including photodiode elements.

Features

1. High speed frequency response $f_c=8\text{MHz typ.}$
2. High sensitivity $37\text{mV}/\mu\text{W typ.}$
3. Wide temperature range $-20\sim+75^\circ\text{C}$
4. High-performance, compact transparent molded package.

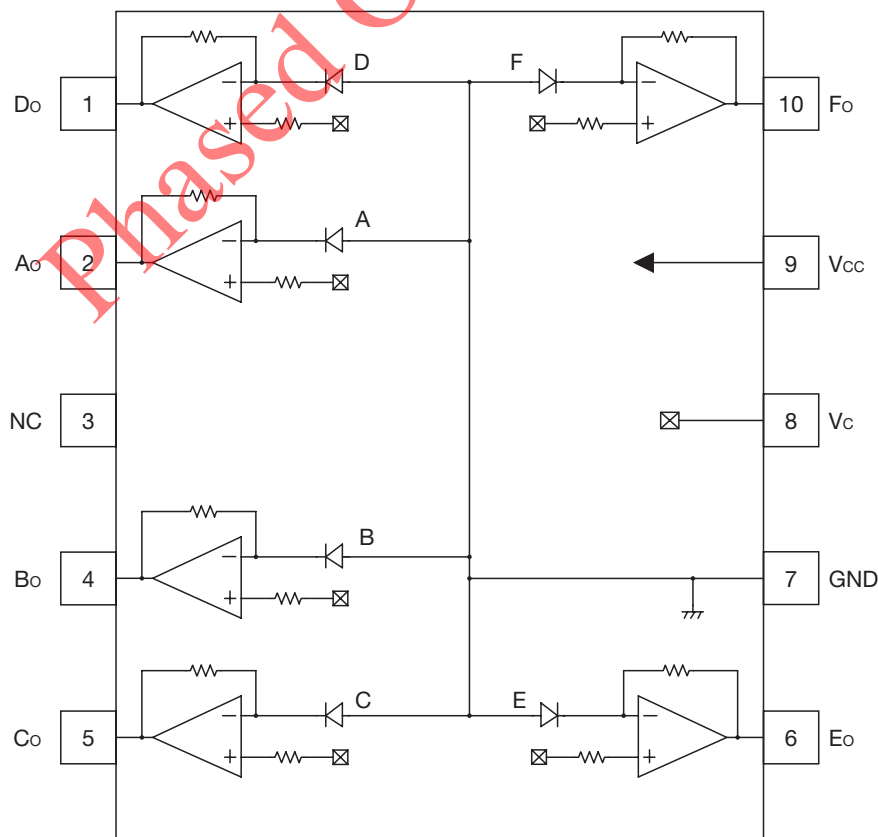
Package

CMP-10C $4.0 \times 5.0\text{mm}$ compact transparent molded package

Applications

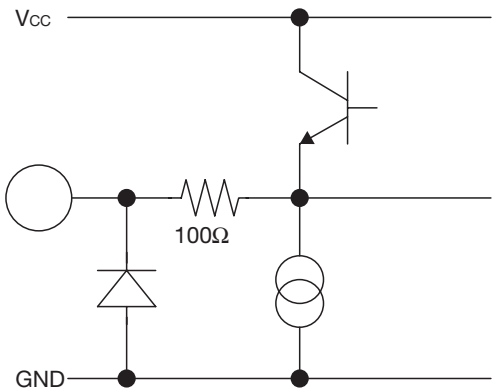
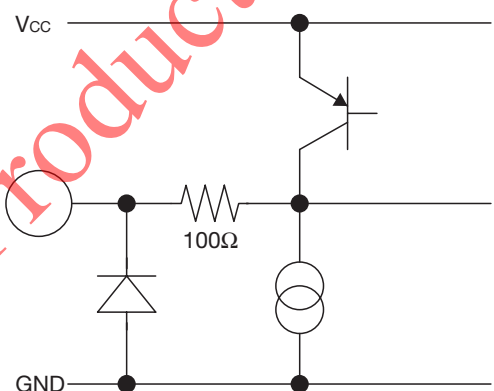
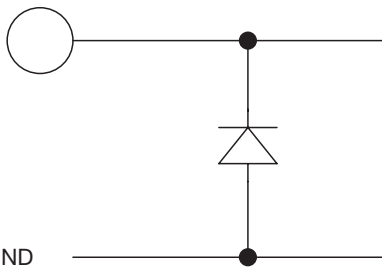
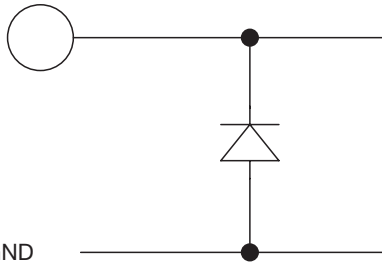
1. Music CD players
2. Portable music CD players

Block Diagram



A, B, C, D, E, and F are photodiodes

Pin Description

Pin No.	Pin name	I/O	Functions	Internal equivalent circuit diagram
1 2 4 5	Do Ao Bo Co	Output	Output of electrical signal converted from optical signals.	
3	NC			
6 10	Eo Fo	Output	Output of electrical signal converted from optical signals.	
7	GND		GND Pin.	
8	Vc	Input	Center voltage input pin.	
9	Vcc	Input	Power voltage supply pin.	

Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Ratings	Units
Storage temperature	T _{STG}	-40~+85	°C
Operating temperature	T _{OPR}	-20~+75	°C
Supply voltage	V _{CC} max.	6	V
Allowable loss	P _d	200	mW

Recommended Operating Conditions

Item	Symbol	Ratings	Units
V _{CC} Operating supply voltage	V _{CCOP}	2.80~5.50	V
V _C Operating supply voltage	V _{COP}	1.40~2.75 (note1)	V
Operating temperature	T _{OPR}	-20~+75	°C

note 1 : V_{COP} = 1/2 V_{CCOP}

Electrical Characteristics (Except where noted otherwise Ta=25°C, V_{CC}=5V, V_C=2.5V)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Current consumption	I _{CC}	In dark condition		4.0	6.0	mA
Output offset voltage (note 1-1)	V _{OFF}	A~D In dark condition	-10	0	10	mV
		E, F In dark condition	-10	0	10	mV
Output offset voltage difference	ΔV _{OFF}	(A+B) - (C+D) In dark condition	-10	0	10	mV
		(A+C) - (B+D) In dark condition	-10	0	10	mV
		(A+D) - (B+C) In dark condition	-10	0	10	mV
		E - F In dark condition	-10	0	10	mV
Output voltage (note 1-2, 4)	V _O	A~D Po=10μW, λ=780nm	29.0	37.0	45.0	mV/μW
		E, F Po=10μW, λ=780nm	61.0	77.0	93.0	mV/μW
Maximum output voltage (note 1-3, 4)	V _{OMAX.}	A~D Po=100μW, λ=780nm	3.9	4.1		V
		E, F Po=100μW, λ=780nm	4.5	4.9		V
Frequency characteristics (note 1-4)	f _c	A~D Po=10μW, λ=780nm 100kHz reference, -3dB	6.0	8.0		MHz
		E, F Po=10μW, λ=780nm 10kHz reference, -3dB	0.5	2.0		MHz

note1-1 : Measure output offset voltage A to F with reference to V_C.

note1-2 : Measure output voltage with reference to output offset voltage.

note1-3 : Measure maximum output voltage with reference to GND.

note1-4 : Output voltage, Frequency characteristics and Maximum output voltage are guaranteed by design.

Electrical Characteristics (Except where noted otherwise Ta=25°C, Vcc=3V, Vc=1.5V)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Current consumption	I _{CC}	In dark condition		3.5	5.5	mA
Output offset voltage (note 2-1)	V _{OFF}	A~D In dark condition	-10	0	10	mV
		E, F In dark condition	-10	0	10	mV
Output offset voltage difference	ΔV _{OFF}	(A+B) - (C+D) In dark condition	-10	0	10	mV
		(A+C) - (B+D) In dark condition	-10	0	10	mV
		(A+D) - (B+C) In dark condition	-10	0	10	mV
		E - F In dark condition	-10	0	10	mV
Output voltage (note 2-2, 4)	V _O	A~D Po=10μW, λ=780nm	29.0	37.0	45.0	mV/μW
		E, F Po=10μW, λ=780nm	61.0	77.0	93.0	mV/μW
Maximum output voltage (note 2-3, 4)	V _{omax.}	A~D Po=100μW, λ=780nm	1.9	2.1		V
		E, F Po=100μW, λ=780nm	2.5	2.9		V
Frequency characteristics (note 2-4)	f _c	A~D Po=10μW, λ=780nm 100kHz reference, -3dB	6.0	8.0		MHz
		E, F Po=10μW, λ=780nm 10kHz reference, -3dB	0.5	2.0		MHz

note2-1 : Measure output offset voltage A to F with reference to V_c.

note2-2 : Measure output voltage with reference to output offset voltage.

note2-3 : Measure maximum output voltage with reference to GND.

note2-4 : Output voltage, Frequency characteristics and Maximum output voltage are guaranteed by design.

Measuring Circuit

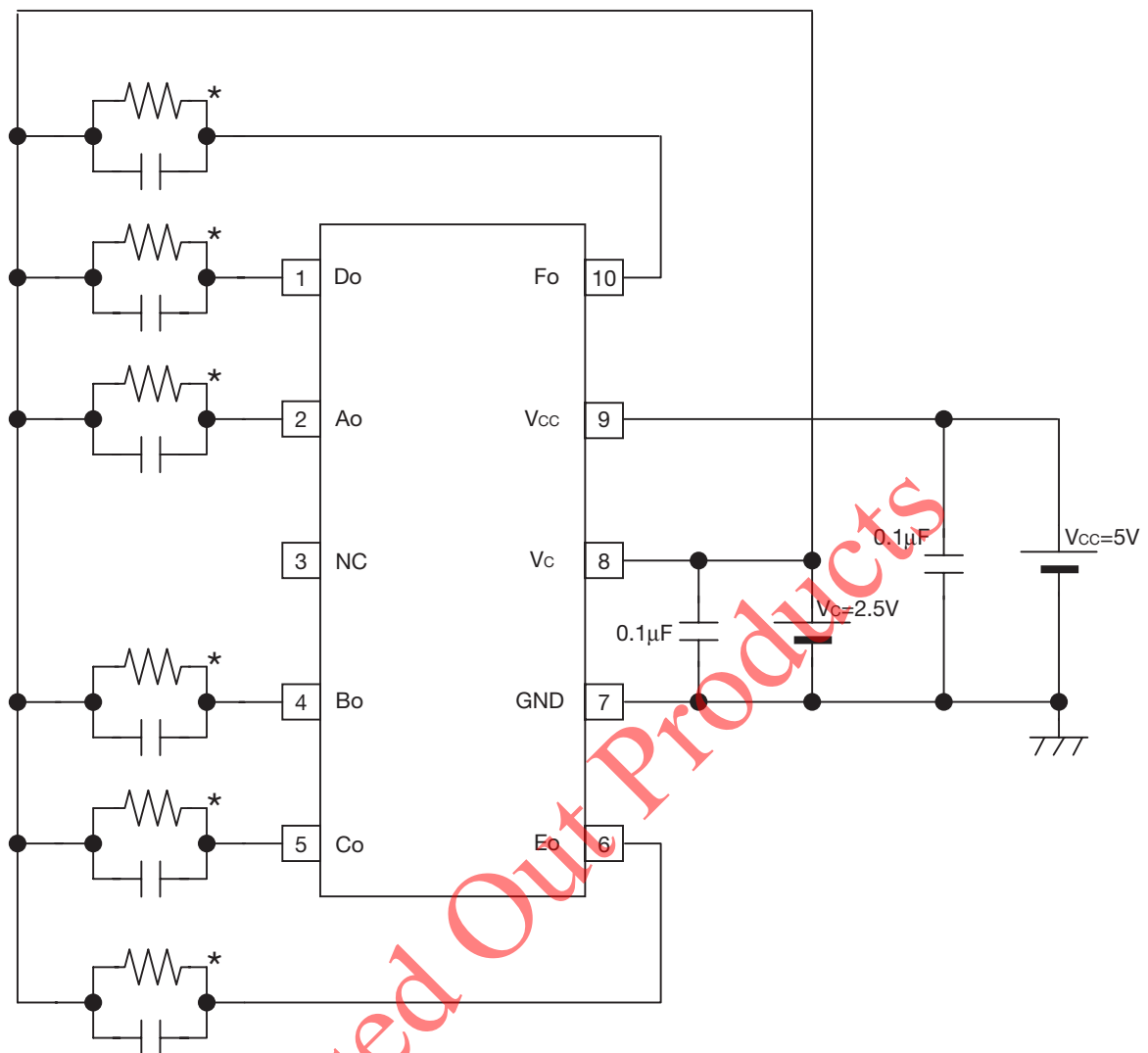


Photo detector pattern dimensions

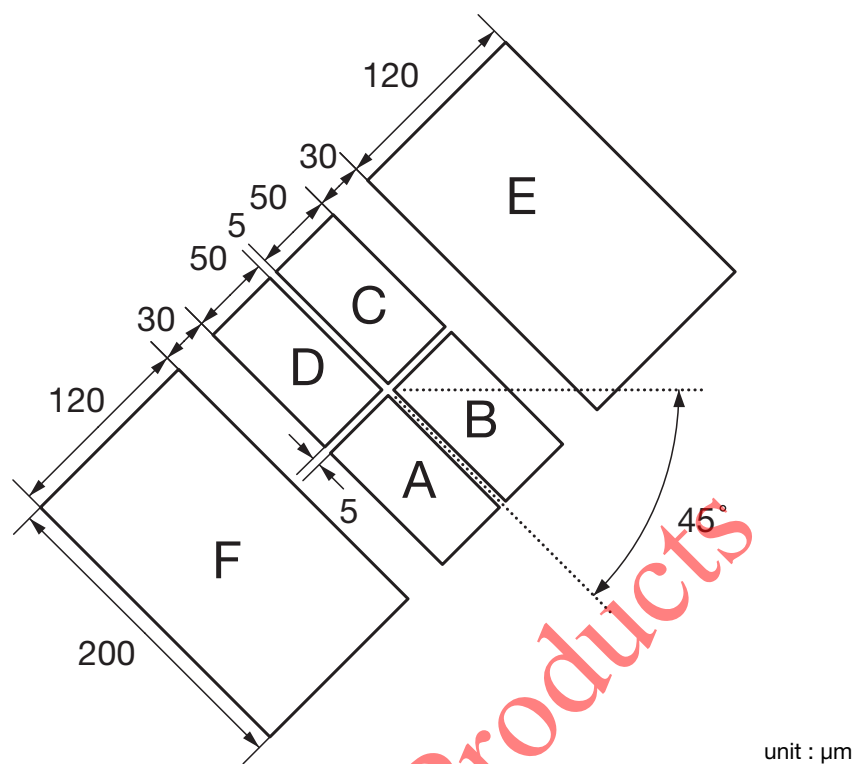


Photo detector position

