Ordering number : EN*A0334

Preliminary

SANYO Semiconductors
DATA SHEET

LA6220AM — Monolithic Linear IC
Rail-to-Rail Dual Operational Amplifier for Automotive Applications

Overview

The LA6220AM dual operational amplifier is optimal for both consumer and industrial applications, including all types of transducer amplifier and DC amplifier circuit. It supports from ground to V_{CC} (rail to rail) as the voltage range for both inputs and outputs and is a high-performance dual operational amplifier that features the wide operating temperature range of -40 to +125°C. It is optimal for the amplification of signals from all types of sensors.

Features

- Does not require phase compensation
- Supports from ground to V_{CC} (rail to rail) as the voltage range for both inputs and outputs
- Low current dissipation : I_{CC} = 1.2mA typ/V_{CC} = +5V, $R_L = \infty$

Specifications

Maximum Ratings at Ta = -40°C to +125°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Supply Voltage	V_{CC} max		18	V
Differential Input Voltage	V_{ID}		±1	V
Maximum Input Voltage	V_{IN} max		-0.3 to +18	V
Operating Temperature	Topr		-40 to +125	°C
Storage Temperature	Tstg		-55 to +150	°C

Recommended Operating Conditions at Ta = -40°C to +125°C

Parameter	Symbol	Conditions	Ratings			unit
			min	typ	max	
Supply Voltage	V_{CC}		2		17	V

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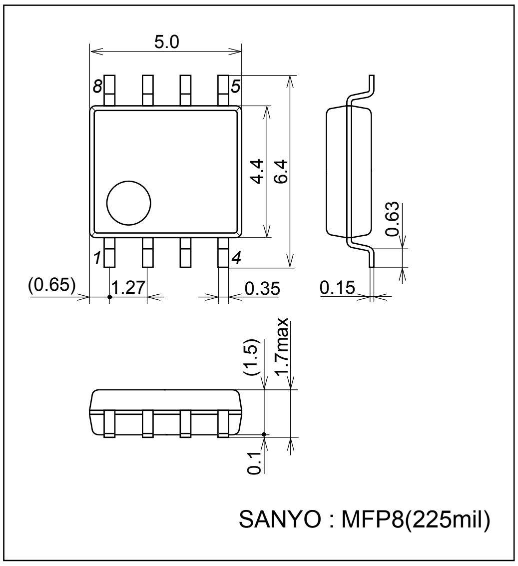
Electrical Characteristics at Ta = -40°C to +125°C, V_{CC} = 5V, (Otherwise unless specified.)

Parameter	Symbol	Conditions	Test Circuit	Ratings min	Ratings typ	Ratings max	unit
Input Offset Voltage	V_{IO}		1		±2	±7	mV
Input Offset Current	I_{IO}	$I_{IN}(+)/I_{IN}(-)$	2		±5	±50	nA
Input Bias Current	I_B	$I_{IN}(+)/I_{IN}(-)$	3,4		45	250	nA
Common-Mode Input Voltage Range	VICM		5	0		V_{CC}	V
Common-Mode Rejection Ration	CMR		5		80		dB
Large Amplitude Voltage Gain	VG		6		100		V/mV
Output Voltage Range	$V_{OH}1A$	R_L = 20kΩ: Ta = 25°C	12	4.9			V
	$V_{OH}1B$	R_L = 20kΩ: Ta = -40 to 125°C	12	4.85			V
	$V_{OL}1$	R_L = 20kΩ	12			0.1	V
Output Voltage Range	$V_{OH}2$	R_L = 2kΩ	12	4.75			V
	$V_{OL}2$	R_L = 2kΩ	12			0.25	V
Supply Voltage Rejection Ratio	SVR		11		80		dB
Channel Separation		f = 1kHz to 20kHz	7		80		dB
Current Drain	I_{CC}		8		1.2	2.5	mA
Output Current (Source)	I_O source	$V_{IN}+$ = 1V, $V_{IN}-$ = 0V	9	6	10		mA
Output Current (Sink)	I_O sink	$V_{IN}+$ = 0V, $V_{IN}-$ = 1V	10	3	5		mA
Slew Rate	SR	R_L = 2kΩ			0.35		V/µs
Gain-Bandwidth Product	Ft	R_L = 2kΩ			1		MHz
Phase Margin	ΦM	R_L = 2kΩ			80		Deg

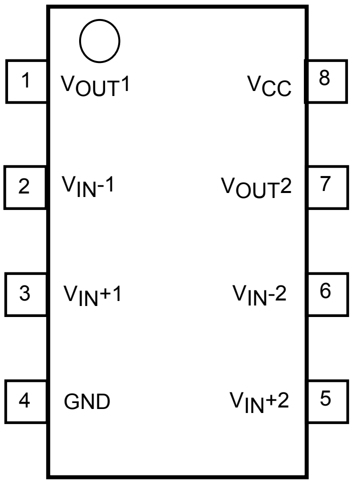
Package Dimensions

unit : mm

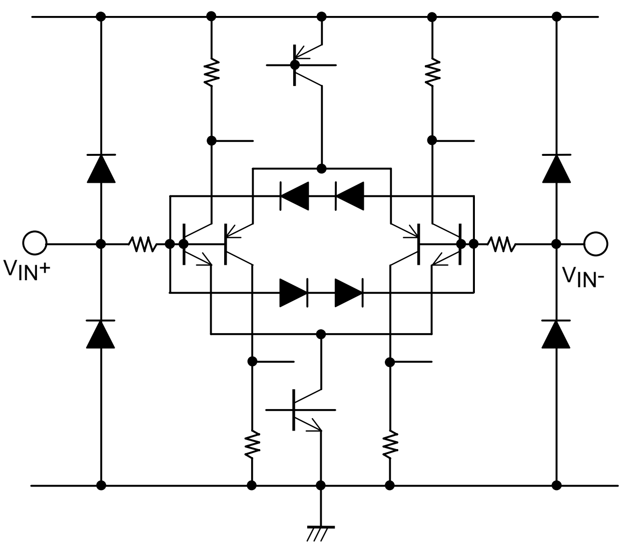
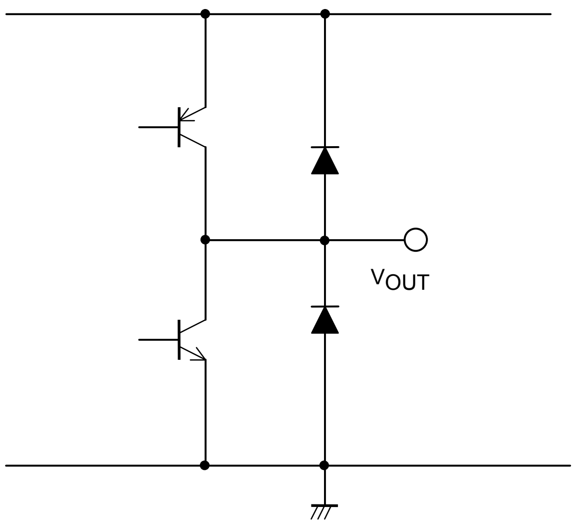
3032D



Pin Assignment

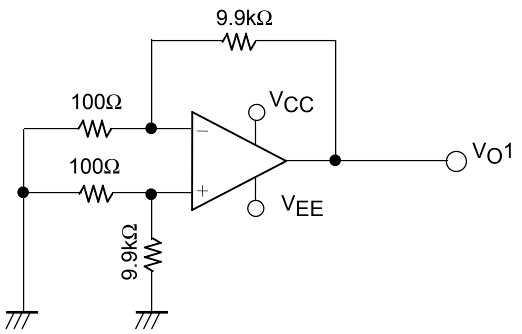


Pin Description

Pin Name	Pin Symbol	Pin No.	Equivalent Circuit Diagram	Pin Description
V_{IN}	V_{IN}+1 V_{IN}-1 V_{IN}+2 V_{IN}-2	3 2 5 7		Inverting inputs Noninverting inputs
V_{OUT}	V_{OUT}1 V_{OUT}2	1 7		Outputs

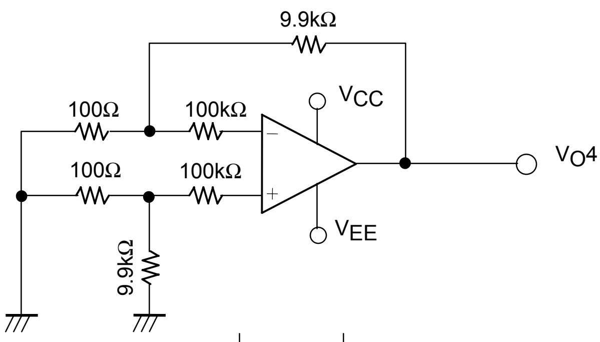
Test Circuits

1. Input offset voltage V_{IO}



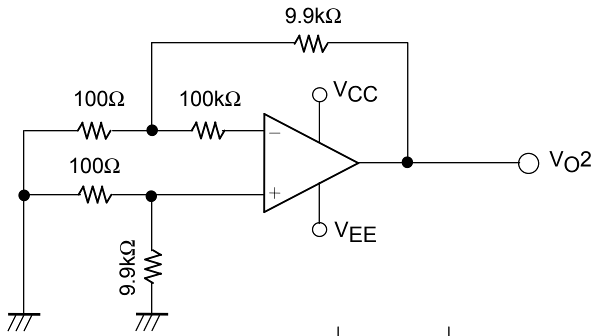
$V_{CC}/V_{EE} = \pm 2.5V$
$V_{IO} = V_O1/100$

2. Input offset current I_{IO}



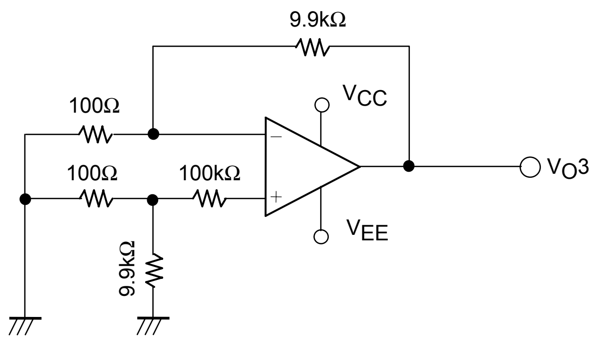
$$I_{IO} = \frac{|V_O4 - V_O1|}{100k\Omega \times 100}$$

3. Input bias current I_B (-)



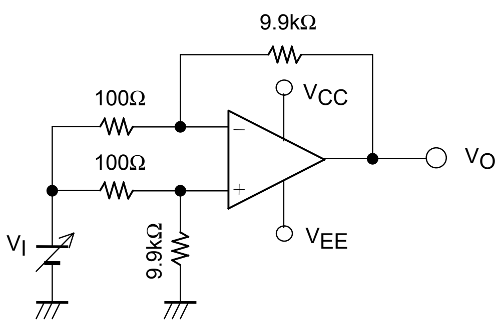
$$I_B(-) = \frac{|V_O2 - V_O1|}{100k\Omega \times 100}$$

4. Input bias current I_B (+)



$$I_B(+) = \frac{|V_O3 - V_O1|}{100k\Omega \times 100}$$

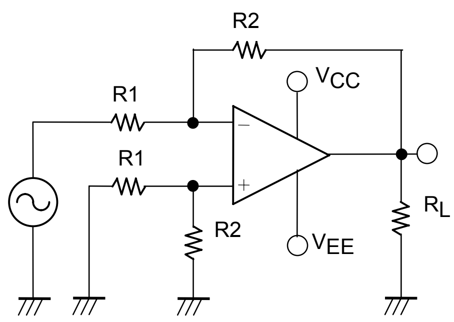
5. Common-mode rejection ratio (CMR)
Common-mode input voltage range (VICM)



CMR $V_I = \pm 2.5V$

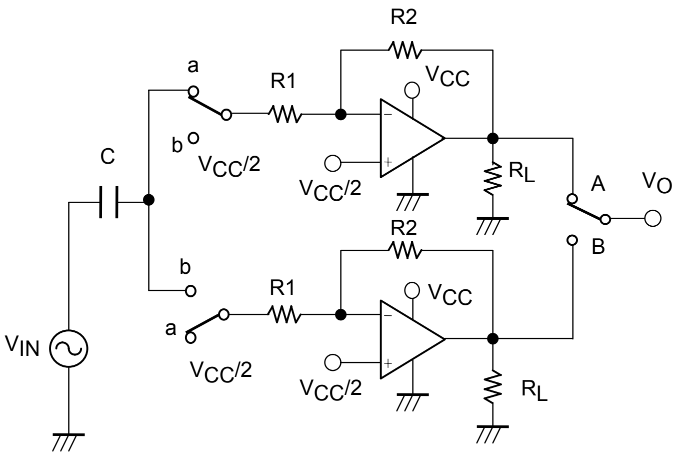
CMR = 20log(5×100/ $|\Delta V_O|$)

6. Voltage gain (VG)



$$VG = \frac{R2}{R1}$$

7. Channel separation (CS)



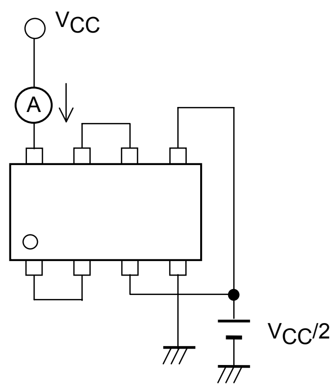
When the switch is in the "a" position.

$$CS(A \rightarrow B) = 20\log\frac{R2V_{OA}}{R1V_{OB}}$$

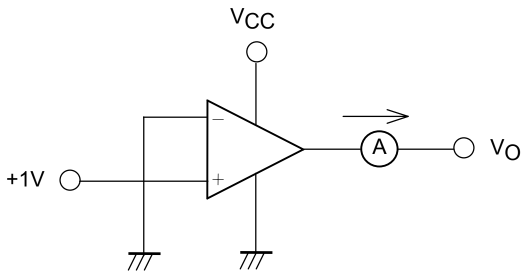
When the switch is in the "b" position.

$$CS(B \rightarrow A) = 20\log\frac{R2V_{OB}}{R1V_{OA}}$$

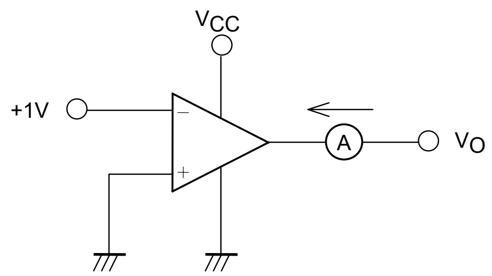
8. Current drain (ICC)



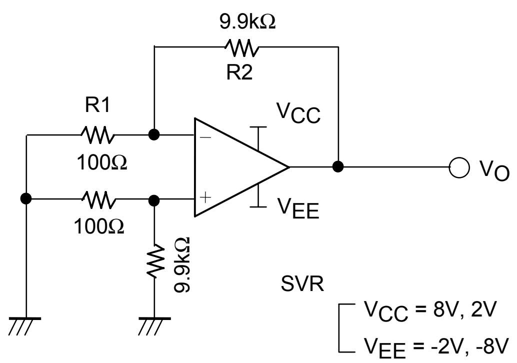
9. Output current ($I_O$source)



10. Output current ($I_O$sink)

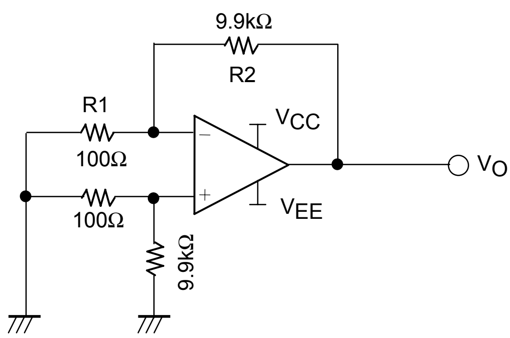


11. Supply voltage rejection ratio SVR (+)



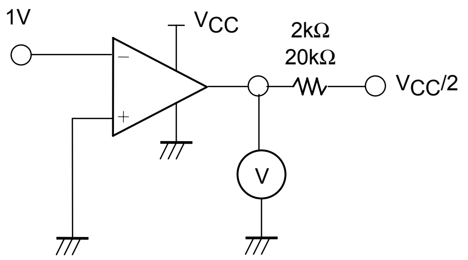
$$SVR(+) = 20\log\left|\frac{\Delta V_{CC} \times 100}{\Delta V_O}\right|$$

12. Supply voltage rejection ratio SVR (-)

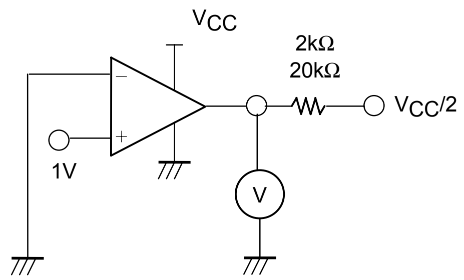


$$SVR(-) = 20\log\left|\frac{\Delta V_{EE} \times 100}{\Delta V_O}\right|$$

13. Output voltage range (Isink)



14. Output voltage range (Isource)



This catalog provides information as of June, 2006. Specifications and information herein are subject to change without notice.