Ordering number : ENN*6856

Monolithic Linear IC

LA6210M

Dual Operational Amplifier

Preliminary

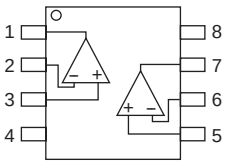
Overview

LA6210M is a low supply voltage and low saturation output voltage (±2.0Vp-p at supply voltage ±2.5V) operational amplifier. It is applicable to handy type CD, radio cassette CD, and portable DAT, that are digital audio apparatus which require the 5V single supply operation and high output voltage.

Features

- Single supply operation.
- Operating voltage. (±1.0V to ±3.5V)
- Low saturation output voltage.
- High slew rate. (4.5V / μs typ.)
- Package outline. MFP8
- Bipolar technology.

Pin Configuration



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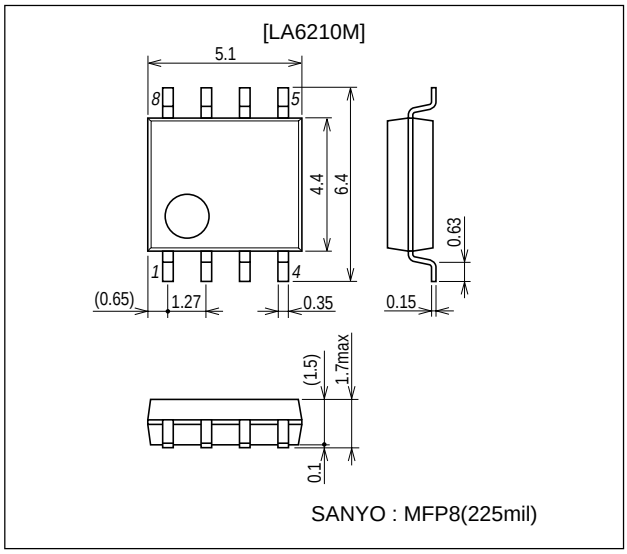
Pin function

1. A OUTPUT
2. A –INPUT
3. A +INPUT
4. V⁻
5. B +INPUT
6. B –INPUT
7. B OUTPUT
8. V⁺

Package Dimensions

unit : mm

3202C



Specifications

Absolute Maximum Ratings at Ta = 25 °C

Parameter	Symbol	Ratings	Unit
Supply voltage	V^+/V^-	±3.5	V
Differential input voltage	V_{ID}	±7	V
Power dissipation	P_D	300	mW
Operating temperature range	Topr	-40 to +85	°C
Storage temperature range	Tstg	-40 to +150	°C

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Electrical Characteristics at Ta = 25 °C, V^+/V^-=±2.5V

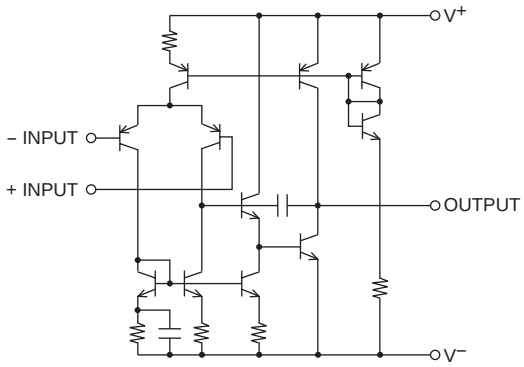
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input offset voltage	V_{IO}	R_S≤10kΩ	–	0.3	6	mV
Input offset current	I_{IO}		–	1.5	200	nA
Input bias current	I_B		–	75	300	nA
Large signal voltage gain	A_V	R_L≥10kΩ	60	90	–	dB
Maximum output voltage swing	V_{OM}	R_L≥2.5kΩ	±2	±2.2	–	V
Input common mode voltage range	V_{ICM}		±1.5	–	–	V
Common mode rejection ratio	CMR		60	80	–	dB
Supply voltage rejection ratio	SVR(+)		60	92	–	dB
	SVR(-)		60	72	–	dB
Operating current	I_{CC}	V_{IN}=0, R_L=∞	–	3.4	5	mA
Slew rate	SR	A_V=1, V_{IN}=±1V	–	4.5	–	V/μS
Gain-bandwidth product	GB		–	12	–	MHz

(Note 1) Applied circuit voltage gain is desired to be operated within the range of 3 dB to 30 dB.

(Note 2) Special care being required for input common mode voltage range and the oscillation due to the capacitive load when operating on voltage follower.

(Note 3) Special care being required for the oscillation, yet having the gain when the supply voltage is applied at more than ±2.5V (single supply voltage 5V).

Equivalent Circuit



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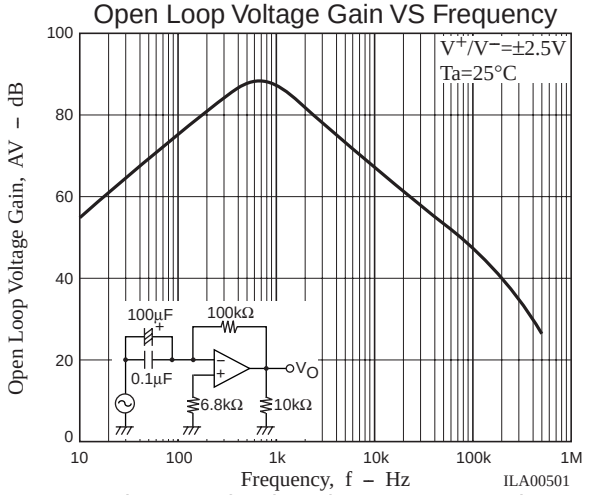
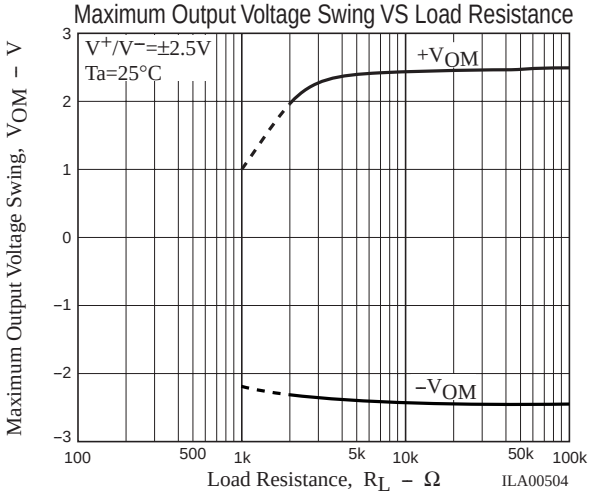
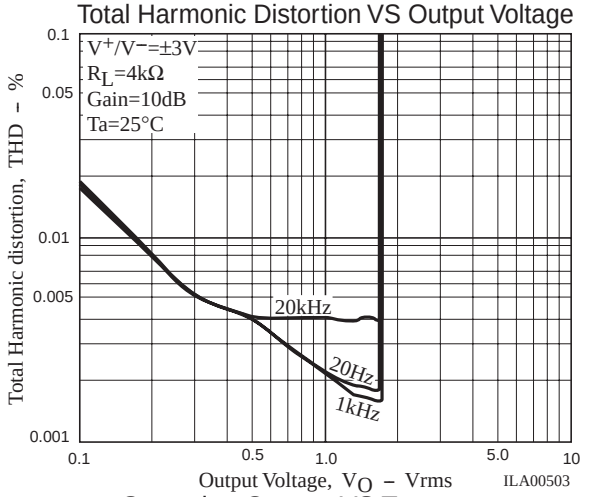
Open Loop Voltage Gain VS Frequency



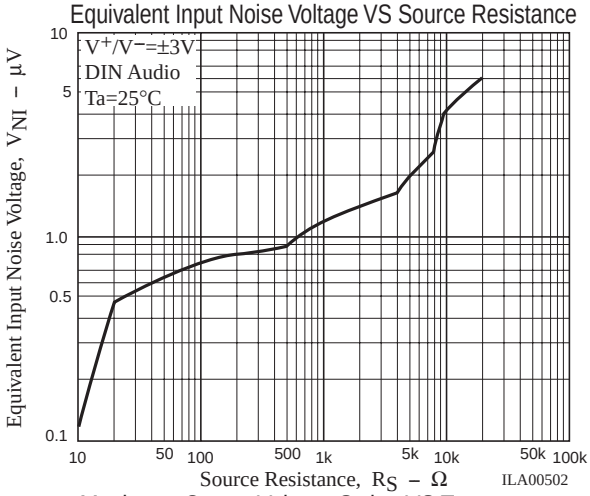
Maximum Output Voltage Swing VS Load Resistance



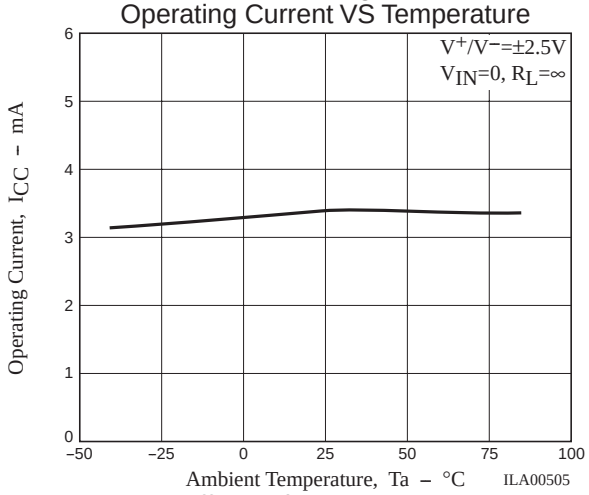
Total Harmonic Distortion VS Output Voltage



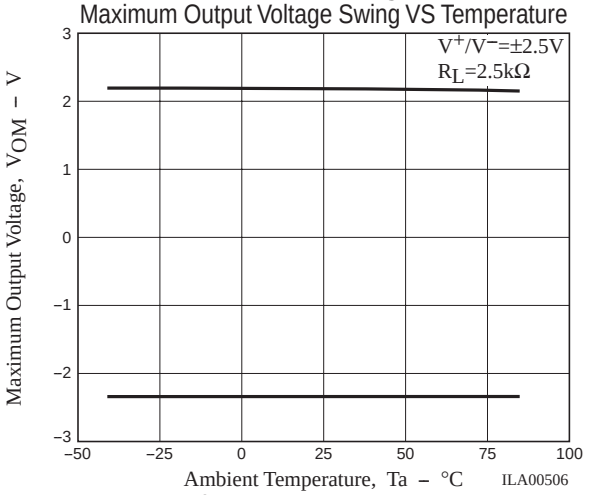
Equivalent Input Noise Voltage VS Source Resistance



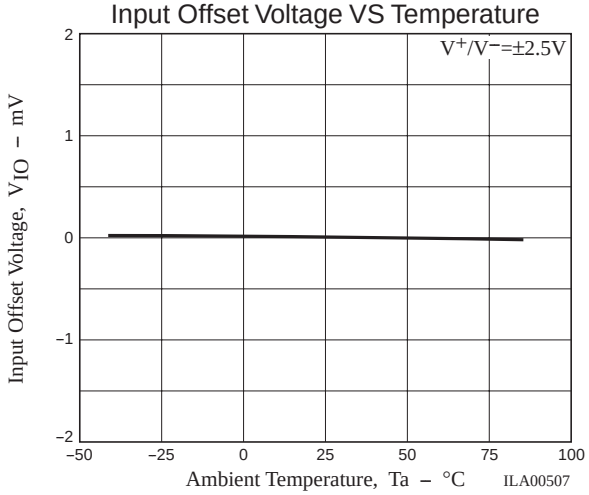
Operating Current VS Temperature



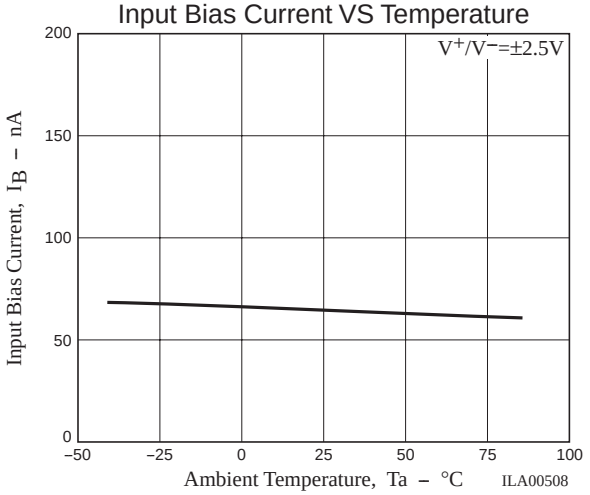
Maximum Output Voltage Swing VS Temperature



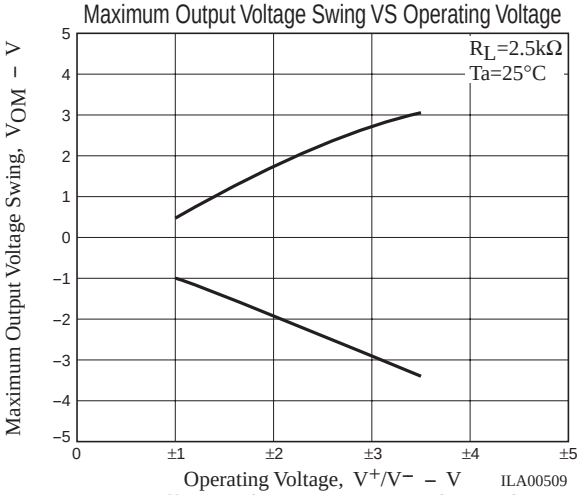
Input Offset Voltage VS Temperature



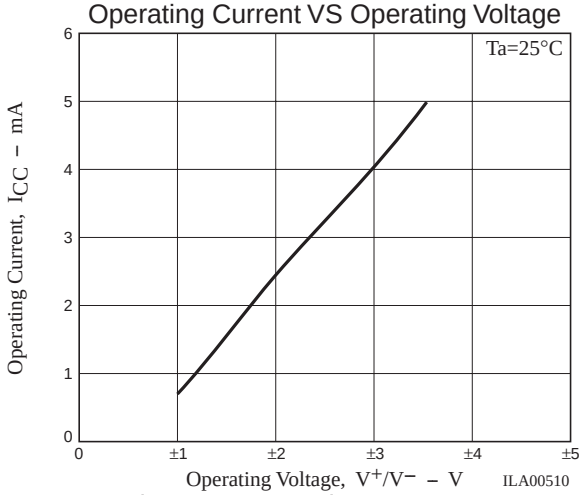
Input Bias Current VS Temperature



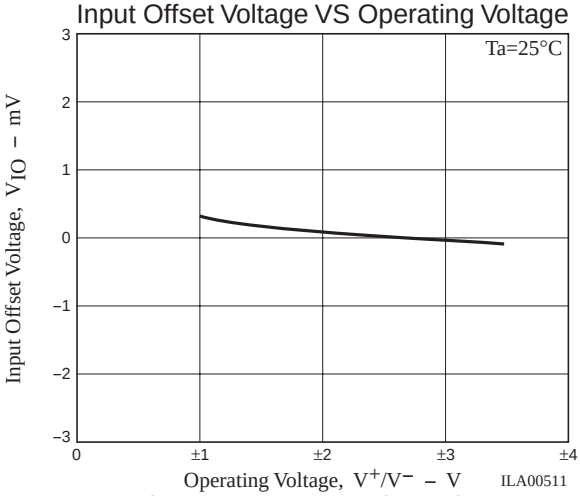
Maximum Output Voltage Swing VS Operating Voltage



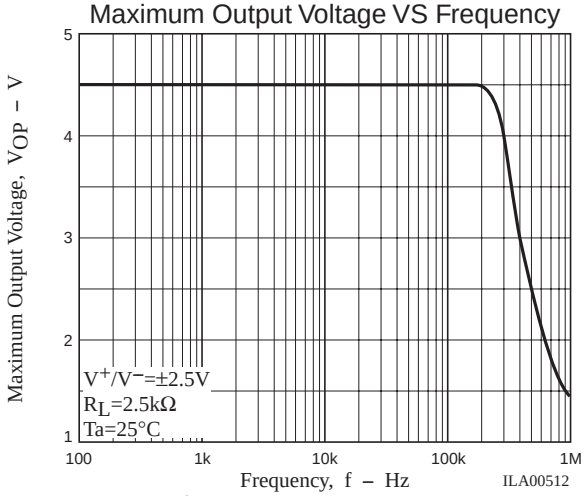
Operating Current VS Operating Voltage



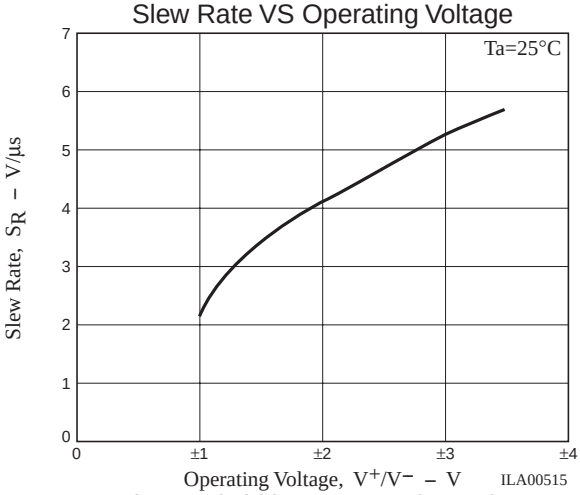
Input Offset Voltage VS Operating Voltage



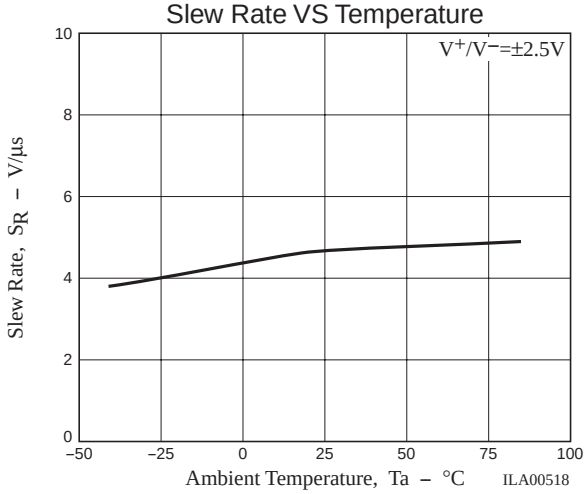
Maximum Output Voltage VS Frequency



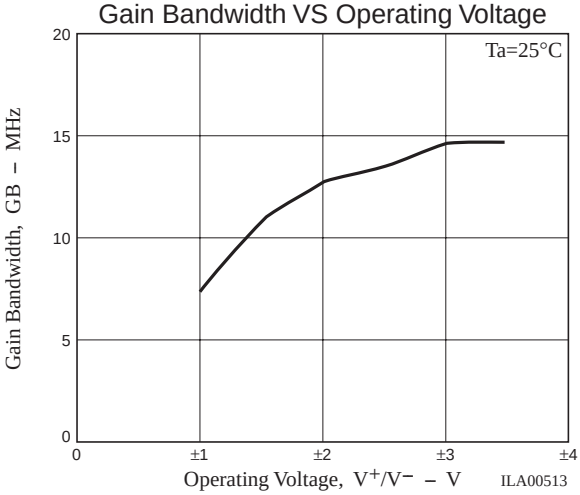
Slew Rate VS Operating Voltage



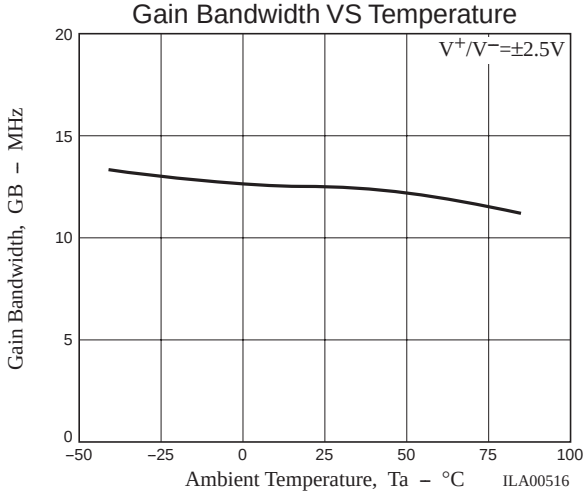
Slew Rate VS Temperature



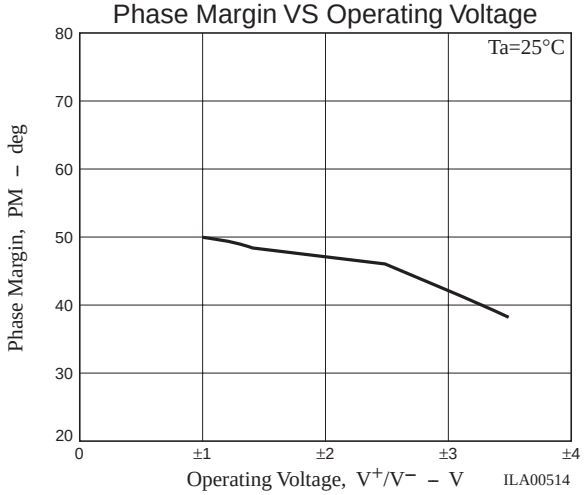
Gain Bandwidth VS Operating Voltage



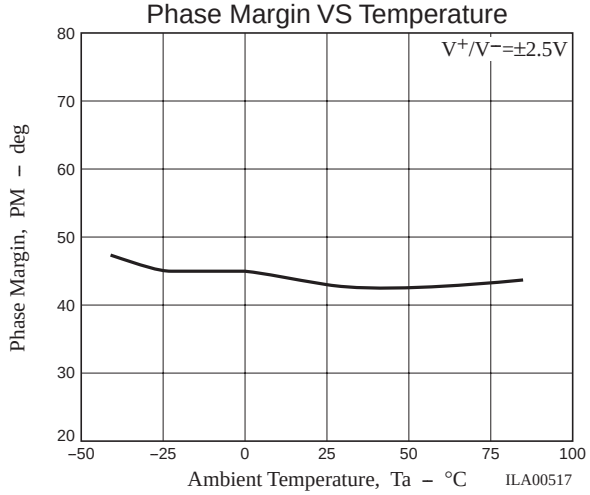
Gain Bandwidth VS Temperature



Phase Margin VS Operating Voltage

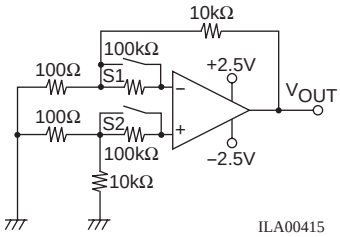


Phase Margin VS Temperature



Test Circuits($V^{\pm}$=2.5V, Ta=25°C, TYP) :

Input Offset Voltage / Input Offset Current / Input Bias Current



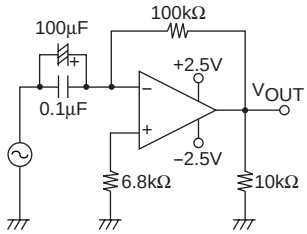
S1	S2	V_{OUT}
on	on	V_O1
off	off	V_O2
on	off	V_O3
off	on	V_O4

$$V_{IO}=\frac{V_O1}{\text{Gain}}$$

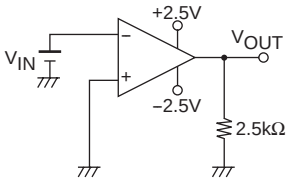
$$I_{IO}=\frac{|V_O2 - V_O1|}{100k\Omega \times \text{Gain}}$$

$$I_B=\frac{|V_O3 - V_O4|}{2\times 100k\Omega \times \text{Gain}}$$

Large Signal Voltage Gain



Maximum Output Voltage Swing



VOM(+) : V_{IN}= –1V
VOM(–) : V_{IN}=1V

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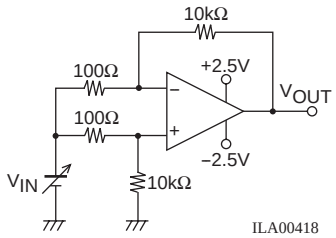
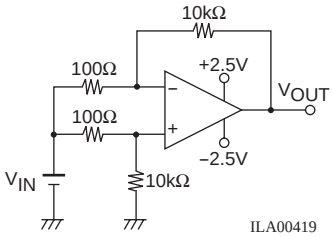
Input Common Mode Voltage Range



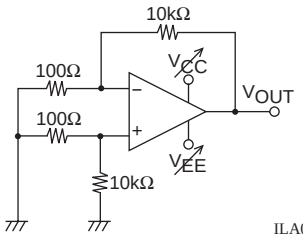
Common Mode Rejection Ratio



V_{IN}=±1V

$$\text{CMR}=20\log\left|\frac{\Delta V_{IN}\times \text{Gain}}{\Delta V_{OUT}}\right|$$

Supply Voltage Rejection Ratio



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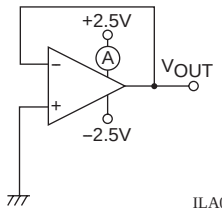
SVR(+) : V_{CC}=1.25V, V_{EE}= –2.5V
SVR(–) : V_{CC}=2.5V, V_{EE}= –1.25V

$$SVR=20\log\left|\frac{Gain\times\Delta V_{SUP}}{\Delta V_{OUT}}\right|$$

Operating Current



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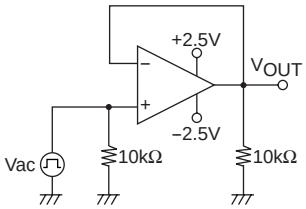
Slew Rate



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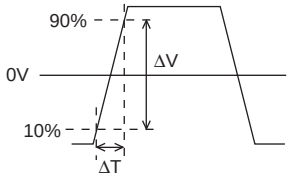

$$SR=\frac{\Delta V}{\Delta T}$$

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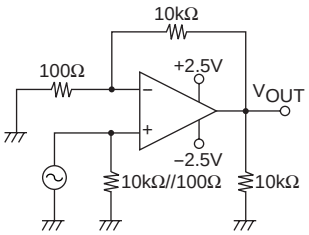
Gain Bandwidth Product



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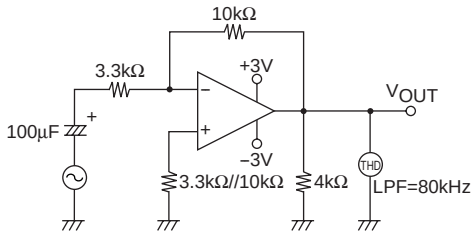
Total Harmonic Distortion



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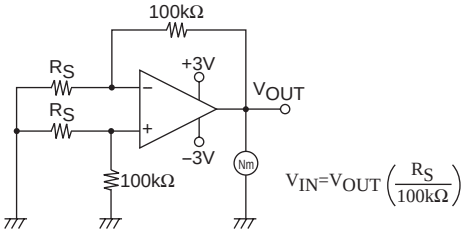
Equivalent Input Noise Voltage



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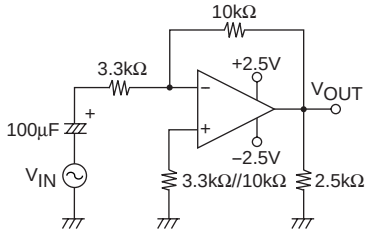
Maximum Output Voltage vs. Frequency



Set V_{IN} level when output is 10% THD at 1kHz.

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