

μ -POWER OPERATIONAL AMPLIFIER

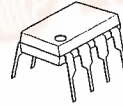
■ GENERAL DESCRIPTION

The NJM4250 is extremely versatile programmable monolithic operational amplifiers. A single external master bias current setting resistor programs the input bias current, input offset current, quiescent power consumption, slew rate, input noise, and the gain-bandwidth product. The device is a truly general purpose operational amplifier.

■ FEATURES

- Operating Voltage ($\pm 1V \sim \pm 18V$)
- Low Operating Current (0.1mA max.)
- Programmable monolithic OP-Amp
- Very Low Power Consumption
- Package Outline DIP8, DMP8, SSOP8
- Bipolar Technology

■ PACKAGE OUTLINE



NJM4250D

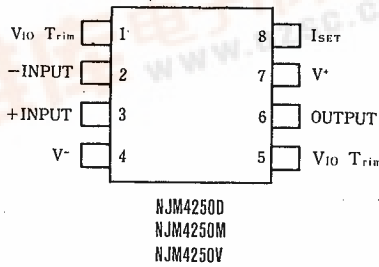


NJM4250M

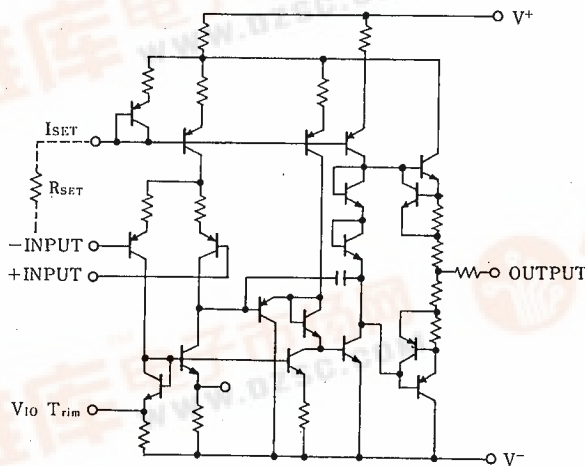


NJM4250V

■ PIN CONFIGURATION



■ EQUIVALENT CIRCUIT (1/2 shown)



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■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺ /V ⁻	±18	V
Differential Input Voltage	V _{ID}	±30	V
Input Voltage	V _{IC}	±15 (note)	V
Power Dissipation	P _D	(DIP8) 500	mW
		(DMP8) 300	mW
		(SSOP8) 250	mW
I _{SET} Current	I _{SET}	150	μA
Operating Temperature Range	T _{opr}	-20~+75	°C
Storage Temperature Range	T _{stg}	-40~+125	°C

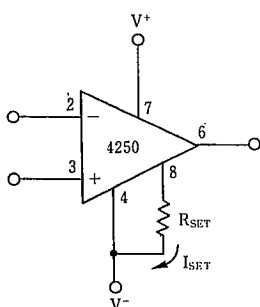
(note) For supply voltage less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

■ ELECTRICAL CHARACTERISTICS

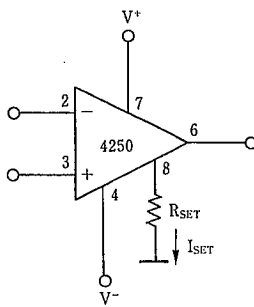
(Ta=25°C, V⁺/V⁻=±15V)

PARAMETER	SYMBOL	TEST CONDITION	I _{SET} =1 μA		I _{SET} =10 μA		UNIT
			MIN.	MAX.	MIN.	MAX.	
Input Offset Voltage 1	V _{IO 1}	R _S ≤ 100kΩ	—	5	—	6	mV
Input Offset Voltage 2	V _{IO 2}	V ⁺ /V ⁻ = ±1.5V, R _S ≤ 100kΩ	—	5	—	6	mV
Input Offset Current	I _{IO}		—	6	—	20	nA
Input Bias Current 1	I _{B 1}		—	10	—	75	nA
Input Bias Current 2	I _{B 2}	V ⁺ /V ⁻ = ±1.5V	—	10	—	75	nA
Large Signal Voltage Gain 1	A _{v 1}	V _o = ±10V, R _L ≥ 100kΩ	96	—	—	—	dB
Large Signal Voltage Gain 2	A _{v 2}	V _o = ±10V, R _L ≥ 10kΩ	—	—	96	—	dB
Operating Current 1	I _{CC 1}		—	11	—	100	μA
Operating Current 2	I _{CC 2}	V ⁺ /V ⁻ = ±1.5V	—	8	—	90	μA
Input Common Mode Voltage Range 1	V _{ICM 1}		±13.5	—	±13.5	—	V
Input Common Mode Voltage Range 2	V _{ICM 2}	V ⁺ /V ⁻ = ±1.5V	±0.6	—	±0.6	—	V
Maximum Output Voltage Swing 1	V _{OM 1}	R _L ≥ 100kΩ	±12	—	—	—	V
Maximum Output Voltage Swing 2	V _{OM 2}	V ⁺ /V ⁻ = ±1.5V, R _L ≥ 100kΩ	±0.6	—	—	—	V
Maximum Output Voltage Swing 3	V _{OM 3}	R _L ≥ 10kΩ	—	—	±12	—	V
Maximum Output Voltage Swing 4	V _{OM 4}	V ⁺ /V ⁻ = ±1.5V, R _L ≥ 10kΩ	—	—	±0.6	—	V
Common Mode Rejection Ratio	CMR	R _S ≤ 10kΩ	70	—	70	—	dB
Supply Voltage Rejection Ratio	SVR	R _S ≤ 10kΩ	74	—	74	—	dB

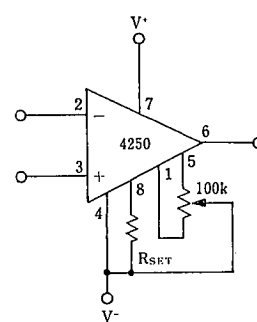
■ TYPICAL APPLICATION (I_{SET}, V_{IO} Adjustment)



$$I_{SET} = \frac{V^+ + |V^-| - 0.5}{R_{SET}}$$



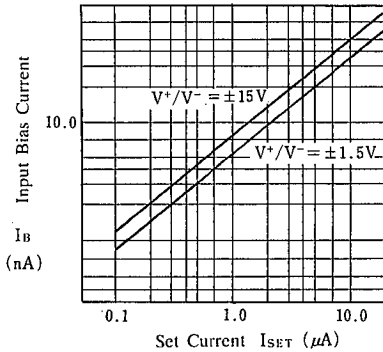
$$I_{SET} = \frac{V^+ - 0.5}{R_{SET}}$$



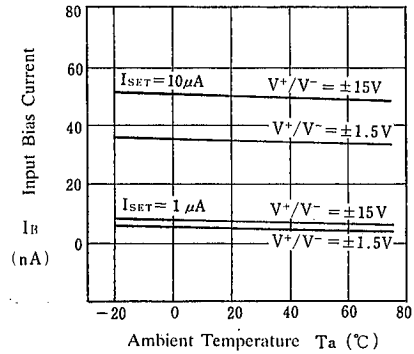
Offset Adjustment

■ TYPICAL CHARACTERISTICS

Input Bias Current vs. Set Current
($T_a = 25^\circ\text{C}$)

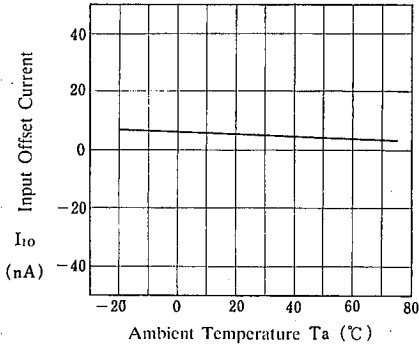


Input Bias Current vs. Temperature



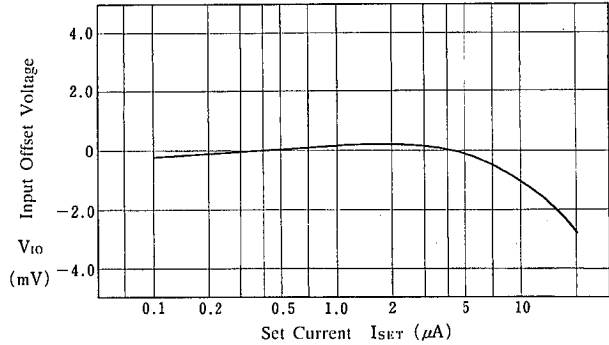
Input Offset Current vs. Ambient Temperature

($I_{SET} = 10\mu\text{A}$, $\pm 1.5\text{V} \leq V^+/V^- \leq \pm 15\text{V}$)



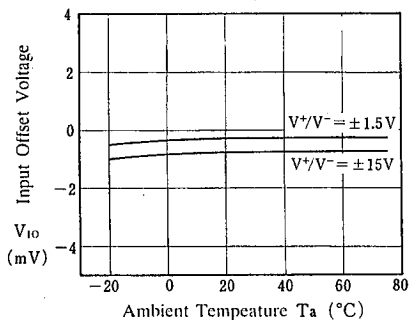
Input Offset Voltage vs. Set Current

($\pm 1.5\text{V} \leq V^+/V^- \leq \pm 15\text{V}$, $T_a = 25^\circ\text{C}$)



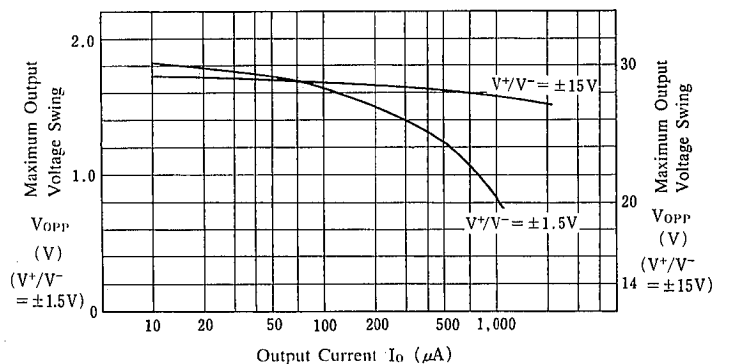
Input Offset Voltage vs. Ambient Temperature

($I_{SET} = 10\mu\text{A}$)



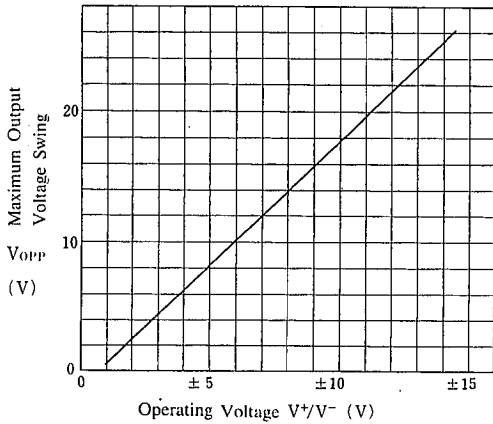
Maximum Output Voltage Swing vs. Output Current

($I_{SET} = 10\mu\text{A}$, $T_a = 25^\circ\text{C}$)

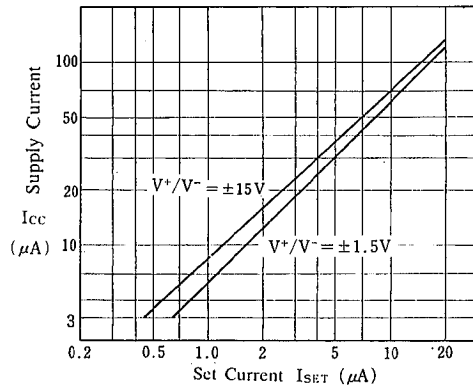


■ TYPICAL CHARACTERISTICS

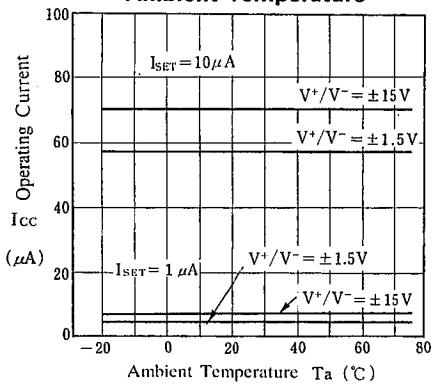
**Maximum Output Voltage Swing
vs.
Operating Voltage**
($1\mu A \leq I_{SET} \leq 10\mu A$, $R_L = 10k\Omega$, $T_a = 25^\circ C$)



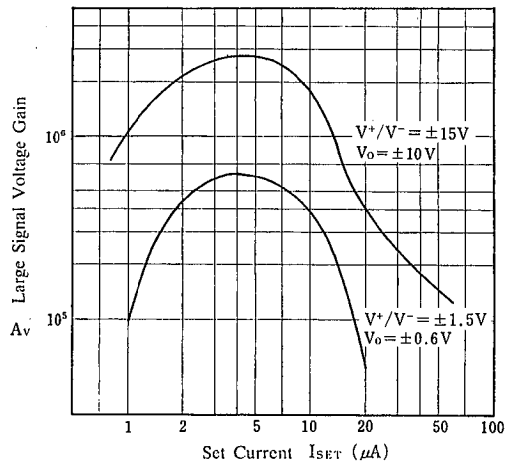
**Operating Current
vs.
Set Current**
($T_a = 25^\circ C$)



**Operating Current
vs.
Ambient Temperature**



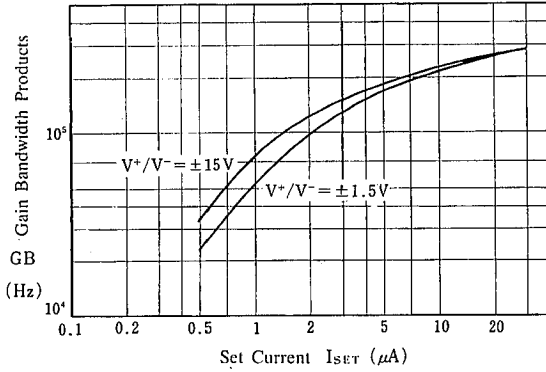
**Open Loop Voltage Gain
vs.
Set Current**
($R_L = 10k\Omega$, $T_a = 25^\circ C$)



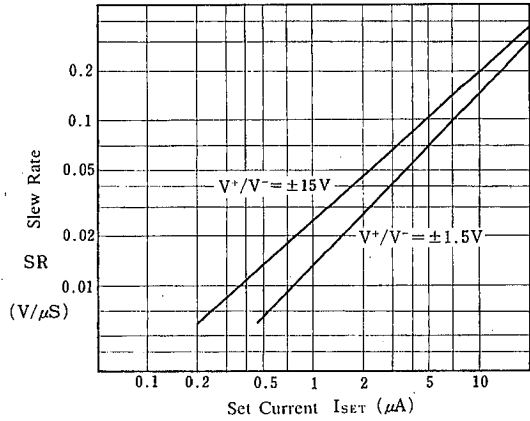
NJM4250

■ TYPICAL CHARACTERISTICS

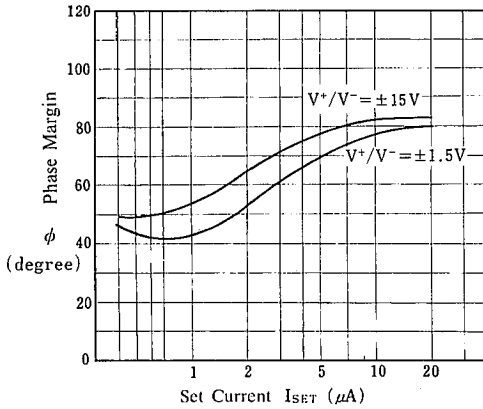
Gain Bandwidth Product vs. Set Current
($T_a = 25^\circ\text{C}$)



Slew Rate vs. Set Current
($R_L = 10\text{k}\Omega$, $T_a = 25^\circ\text{C}$)

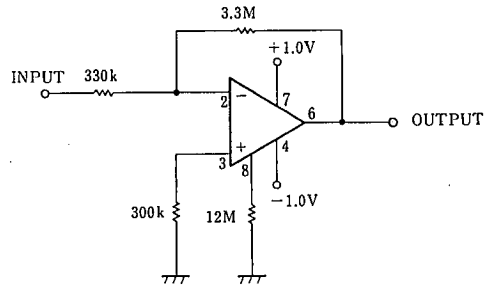


Phase Margin vs. Set Current



■ TYPICAL APPLICATIONS

500nW, 10times Inverting Amplifier



NJM4250

MEMO

[CAUTION]

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