

MICRO-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.

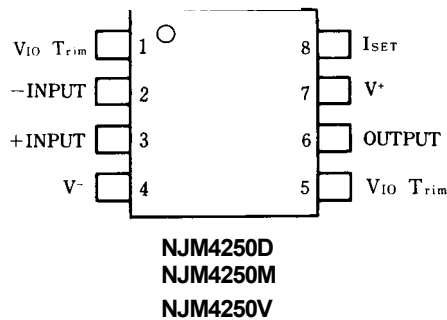
■ PACKAGE OUTLINE



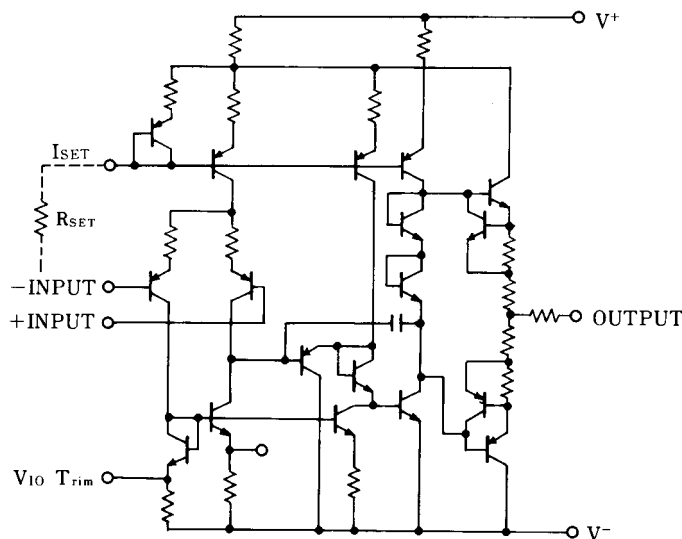
■ FEATURES

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

■ PIN CONFIGURATION



■ EQUIVALENT CIRCUIT



NJM4250

■ 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 (DMP8) 300 (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

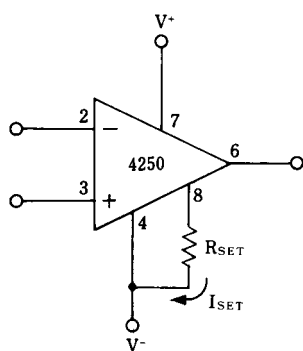
(note) For supply voltage less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

■ ELECTRICAL CHARACTERISTICS

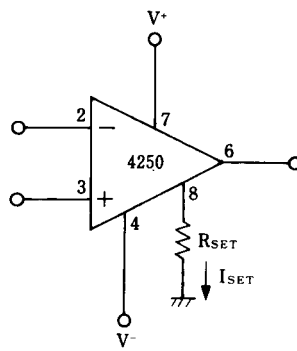
(Ta=25°C, V⁺/V⁻=±15V)

PARAMETER	SYMBOL	TEST CONDITION	I _{SET} =1μA		I _{SET} =10μA		UNIT
			MIN.	MAX.	MIN.	MAX.	
Input Offset Voltage 1	V _{IO1}	R _S ≤100kΩ	-	5	-	6	mV
Input Offset Voltage 2	V _{IO2}	V ⁺ /V ⁻ =±1.5V, R _S ≤100kΩ	-	5	-	6	mV
Input Offset Current	I _{IO}		-	6	-	20	nA
Input Bias Current 1	I _{B1}		-	10	-	75	nA
Input Bias Current 2	I _{B2}	V ⁺ /V ⁻ =±1.5V	-	10	-	75	nA
Large Signal Voltage Gain 1	A _{V1}	V _O =± 10V, R _L ≥100kΩ	96	-	-	-	dB
Large Signal Voltage Gain 2	A _{V2}	V _O =± 10V, R _L ≥10kΩ	-	-	96	-	dB
Operating Current 1	I _{CC1}		-	11	-	100	μA
Operating Current 2	I _{CC2}	V ⁺ /V ⁻ =±1.5V	-	8	-	90	μA
Input Common Mode Voltage Range 1	V _{ICM1}		± 13.5	-	± 13.5	-	V
Input Common Mode Voltage Range 2	V _{ICM2}	V ⁺ /V ⁻ =±1.5V	± 0.6	-	± 0.6	-	V
Maximum Output Voltage Swing 1	V _{OM1}	R _L ≥100kΩ	± 12	-	-	-	V
Maximum Output Voltage Swing 2	V _{OM2}	V ⁺ /V ⁻ =±1.5V, R _L ≥100kΩ	± 0.6	-	-	-	V
Maximum Output Voltage Swing 3	V _{OM3}	R _L ≥10kΩ	-	-	± 12	-	V
Maximum Output Voltage Swing 4	V _{OM4}	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

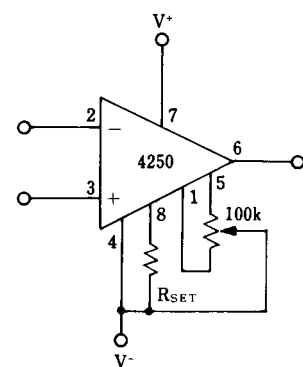
■ TYPICAL APPLICATION (I_{SET}, V_{IO} Adjustment)



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



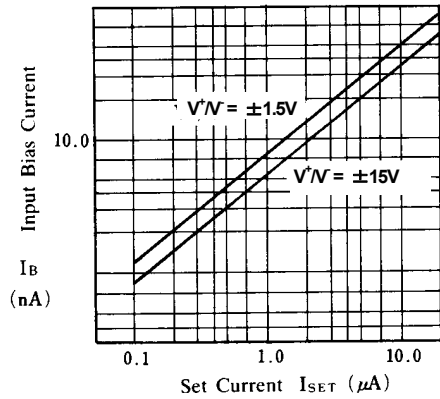
$$I_{SET} = \frac{V^+ - 0.5}{R_{SET}}$$



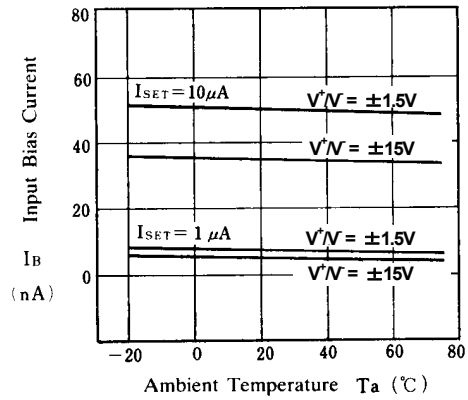
Offset Adjustment

■ TYPICAL CHARACTERISTICS

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

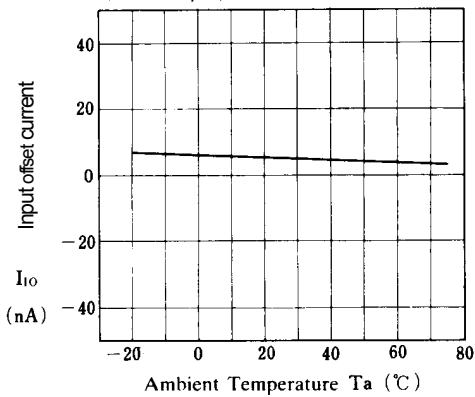


Input Bias Current vs. Temperature



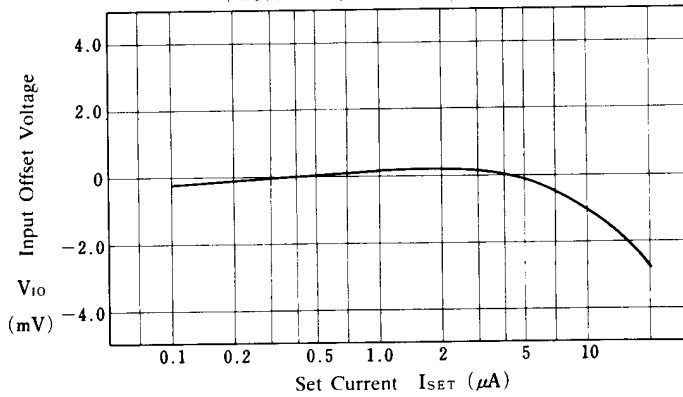
Input Offset Current vs. Ambient Temperature

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



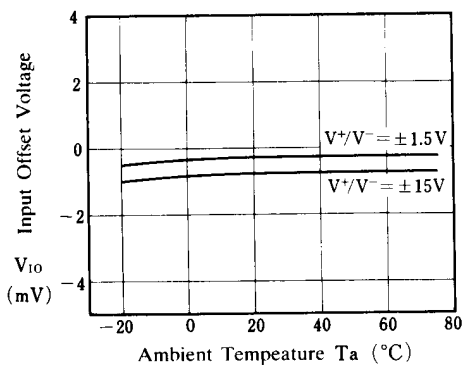
Input Offset Voltage vs. Set Current

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



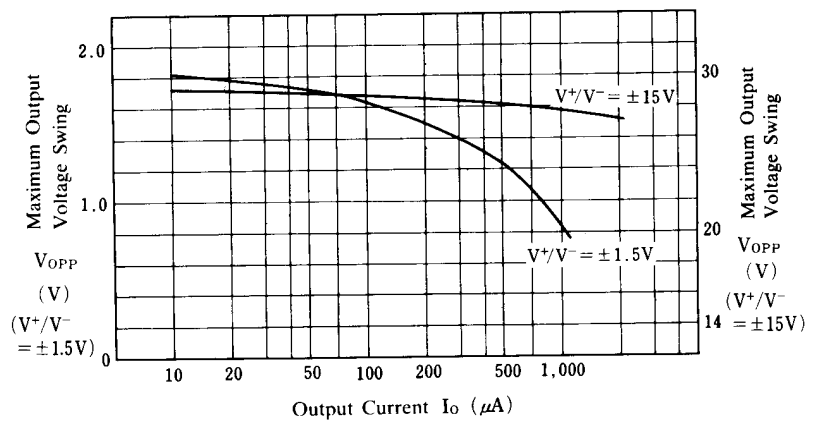
Input Offset Voltage vs. Ambient Temperature

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



Maximum Output Voltage Swing vs. Output Current

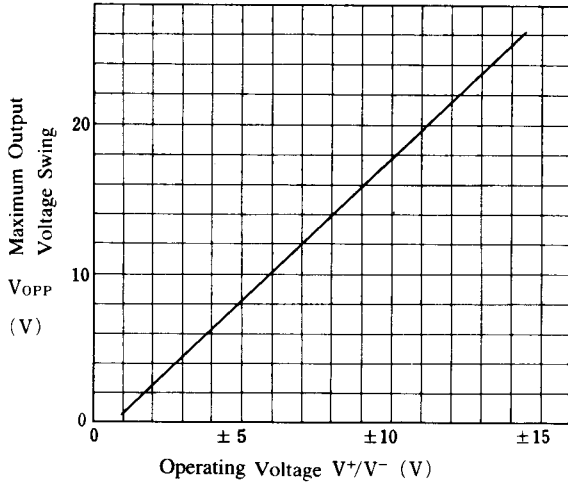
($I_{SET} = 10\mu\text{A}$, $T_a = 25^\circ\text{C}$)



■ TYPICAL CHARACTERISTICS

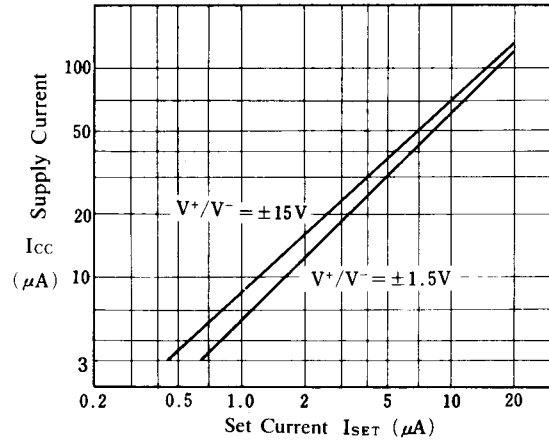
**Maximum Output Voltage Swing
vs.
Operating Voltage**

($1\mu\text{A} \leq I_{\text{SET}} \leq 10\mu\text{A}$, $R_L = 10\text{k}\Omega$, $T_a = 25^\circ\text{C}$)

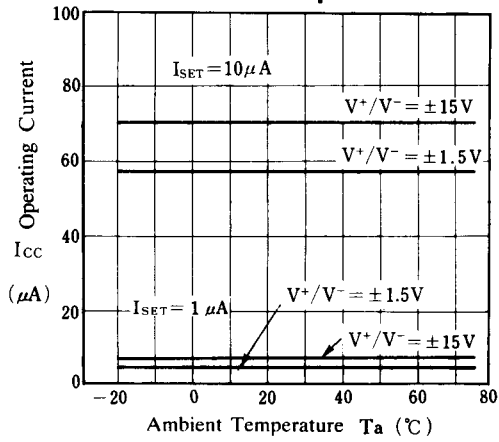


**Operating Current
vs.
Set Current**

($T_a = 25^\circ\text{C}$)

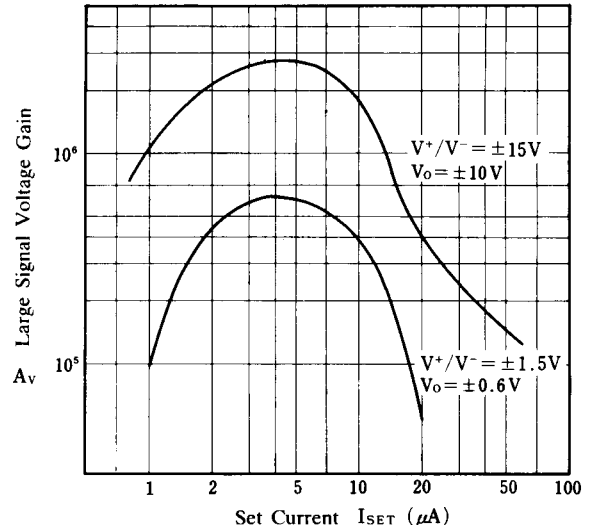


**Operating Current
vs.
Ambient Temperature**



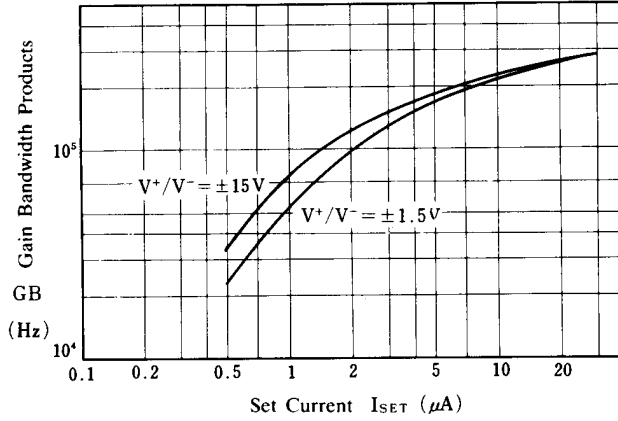
**Open Loop Voltage Gain
vs.
Set Current**

($R_L = 10\text{k}\Omega$, $T_a = 25^\circ\text{C}$)

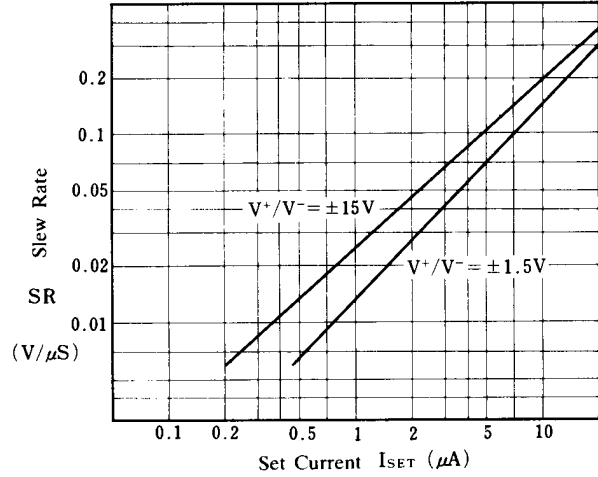


■ TYPICAL CHARACTERISTICS

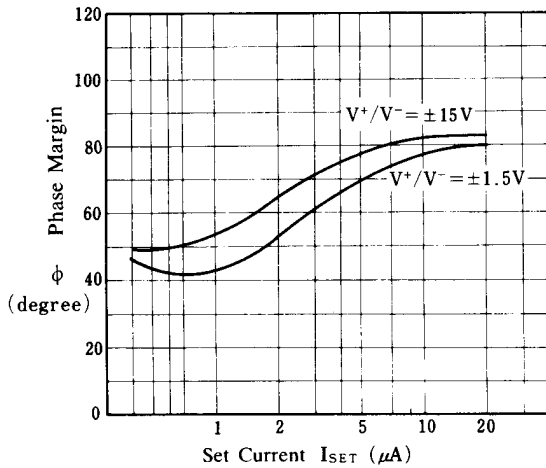
**Gain Bandwidth Product
Vs.
Set Current**
($T_a = 25^\circ\text{C}$)



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

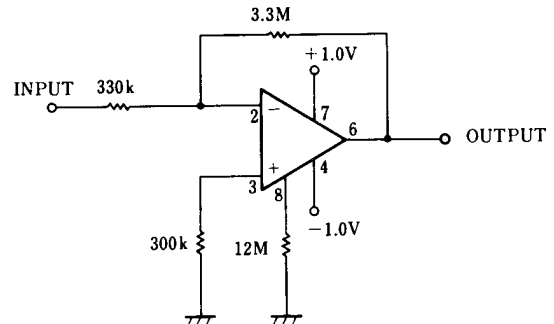


**Phase Margin
vs.
Set Current**



■ TYPICAL APPLICATIONS

Micro-power 10times Inverting Amplifier



[CAUTION]

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