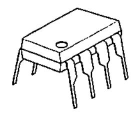
μ-POWER OPERATIONAL AMPLIFIER

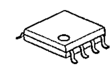
■ GENERAL DESCRIPTION

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.

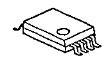
■ PACKAGE OUTLINE



NJM4250D



NJM4250M

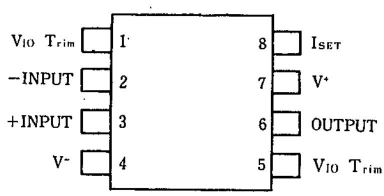


NJM4250V

■ FEATURES

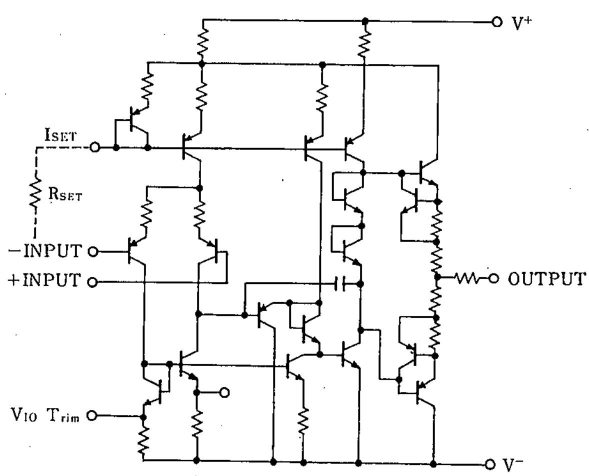
- Operating Voltage (±1V~±18V)
- Low Operating Current (0.1mA max.)
- Programable monolithic OP-Amp
- Very Low Power Consumption
- Package Outline DIP8, DMP8, SSOP8
- Bipolar Technology

■ PIN CONFIGURATION



NJM4250D
NJM4250M
NJM4250V

■ EQUIVALENT CIRCUIT (1/2 shown)



■ ABSOLUTE MAXIMUM RATINGS

(T_a=25℃)

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	℃
Storage Temperature Range	T_{stg}	−40～+125	℃

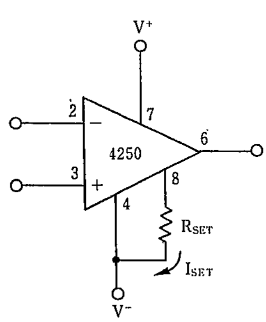
(note) For supply voltage less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

■ ELECTRICAL CHARACTERISTICS

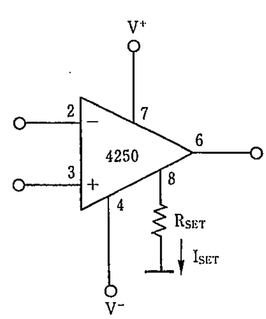
(T_a=25℃, V^+/V^-=±15V)

PARAMETER	SYMBOL	TEST CONDITION	ISET=1 μA		ISET=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	Av 1	V_o=±10V, R_L≧100kΩ	96	—	—	—	dB
Large Signal Voltage Gain 2	Av 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

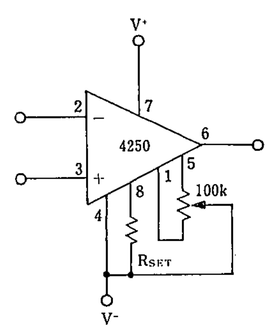
■ TYPICAL APPLICATION (I_{SET}, V_{IO} Adjustment)



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



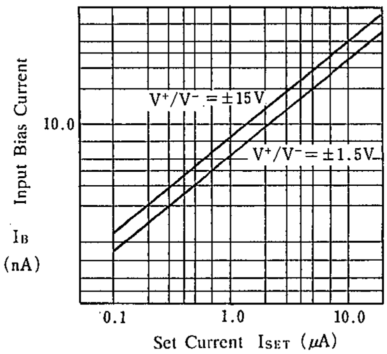
$$I_{SET} = \frac{V^+ - 0.5}{R_{SET}}$$



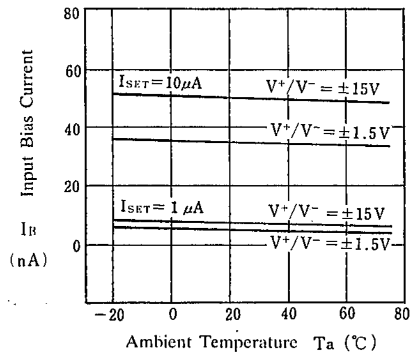
Offset Adjustment

■ TYPICAL CHARACTERISTICS

Input Bias Current vs. Set Current
(Ta=25℃)



Input Bias Current vs. Temperature



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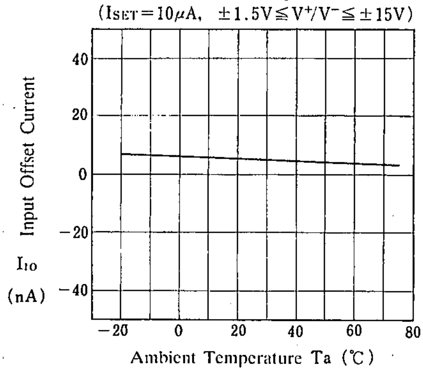
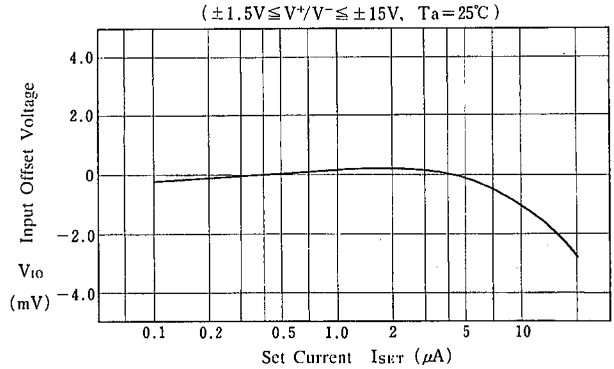
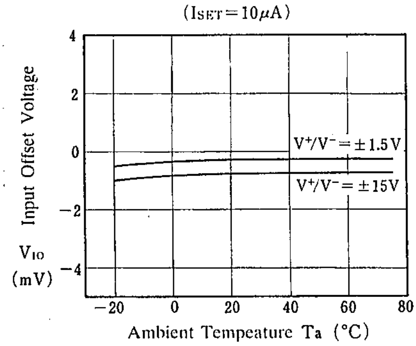
Input Offset Current vs. Ambient Temperature
($I_{SET}=10\mu A$, $\pm1.5V\leqq V^+/V^-\leqq\pm15V$)



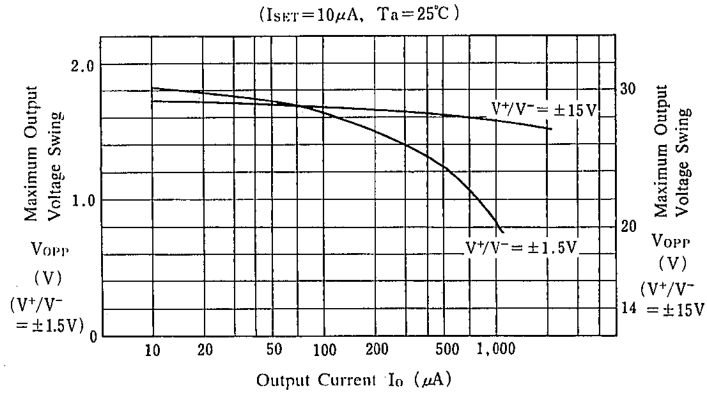
Input Offset Voltage vs. Set Current
($\pm1.5V\leqq V^+/V^-\leqq\pm15V$, Ta=25℃)



Input Offset Voltage vs. Ambient Temperature
($I_{SET}=10\mu A$)



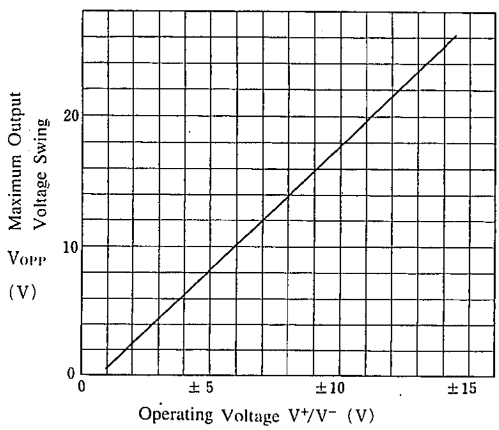
Maximum Output Voltage Swing vs. Output Current
($I_{SET}=10\mu A$, Ta=25℃)



■ TYPICAL CHARACTERISTICS

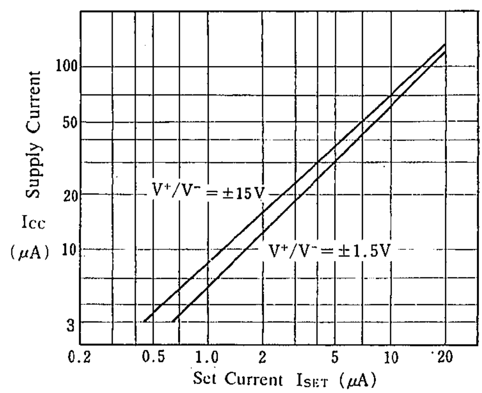
Maximum Output Voltage Swing vs. Operating Voltage

(1 μA≦ISET≦10μA, RL=10kΩ, Ta=25℃)

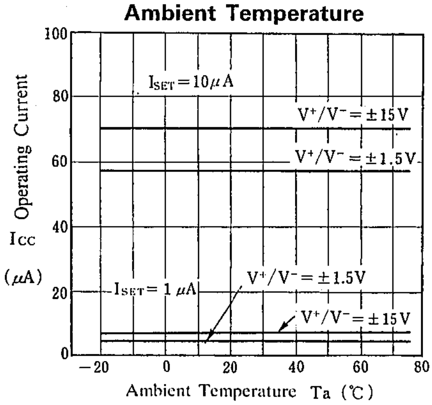


Operating Current vs. Set Current

(Ta=25℃)

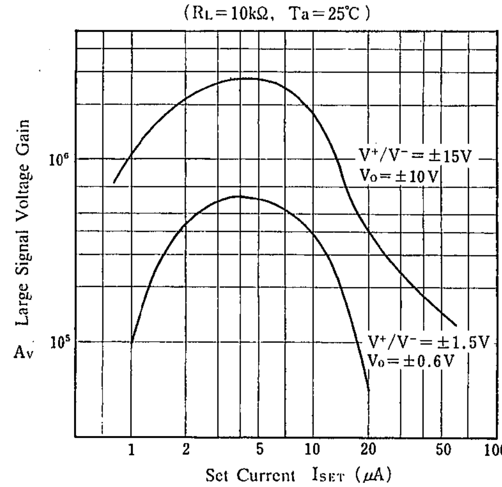


Operating Current vs. Ambient Temperature



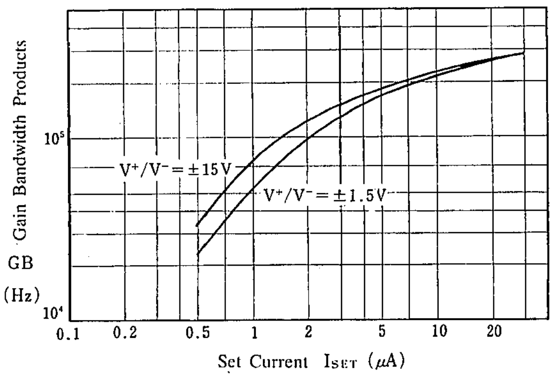
Open Loop Voltage Gain vs. Set Current

(RL=10kΩ, Ta=25℃)

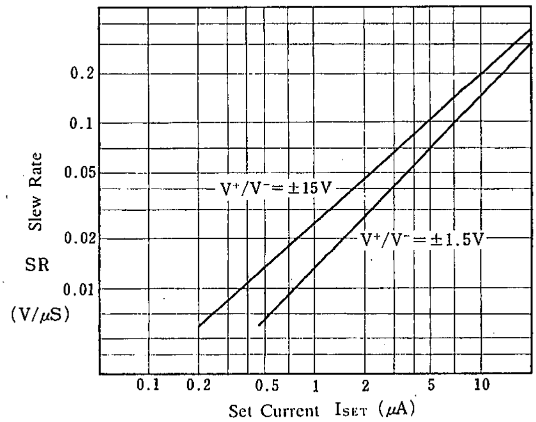


■ TYPICAL CHARACTERISTICS

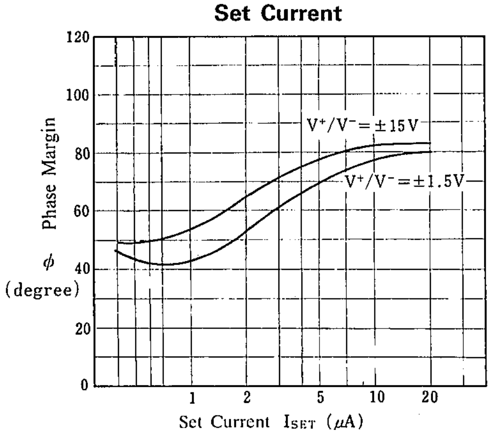
Gain Bnadwidth Product vs. Set Current
(Ta=25°C)



Slew Rate vs. Set Current
(RL=10kΩ, Ta=25°C)

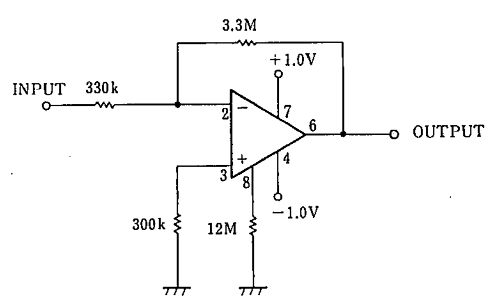


Phase Margin vs. Set Current



■ TYPICAL APPLICATIONS

500nW; 10times Inverting Amplifier



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