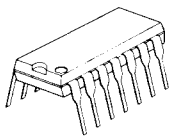
NJM2900/3900

The NJM2900/3900 consist of four independent, dual input, internally compensated amplifiers which were designed specifically to operate off of a single power supply voltage and to provide a large output voltage swing. These amplifiers make use of a current mirror to achieve the non-inverting input function. Application areas include: ac amplifiers, RC active filters, low frequency triangle, squarewave and pulse waveform generation circuits, tachometers and low speed, high voltage digital logic gates.

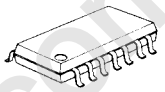
■ Absolute Maximum Ratings (Ta=25°C)

Supply Voltage	V^+ (2900)	+36V (±18V)
	V^+ (3900)	+32V (±16V)
Power Dissipation	P_D (N-Type)	500mW
	(M,E-Type)	300mW
Input Current	I_{IN}	20mA
Operating Temperature Range	T_{opr} (2900)	−40~+85°C
	T_{opr} (3900)	−20~+75°C
Storage Temperature Range	T_{stg}	−40~+125°C

■ Package Outline



NJM2900N
NJM3900N



NJM2900M
NJM3900M

NJM2900E
NJM3900E

■ Electrical Characteristics (Ta=25°C, V^+=+15V)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Voltage Gain	A_V	Open Loop, f=100Hz	61.5	69	—	dB
Input Resistance	R_{IN}	Open Loop, Inverting Input	—	1	—	MΩ
Output Resistance	R_O	Open Loop	—	8	—	kΩ
Unity Gain Bandwidth	GB	A_V=1, Inverting Input (note 1)	—	2.5	—	MHz
Input Bias Current	I_B	Inverting Input	—	30	200	nA
Slew Rate	SR	Positive Output Swing	—	0.5	—	V/μs
		Negative Output Swing	—	20	—	V/μs
Supply Current	I_{CC}	$R_L=\infty$	—	6.2	10	mA
Output High Voltage Swing	V_{OH}	I_{IN}^-=0, I_{IN}^+=0, R_L=5.1kΩ	13.5	14.2	—	V
Output Low Voltage Swing	V_{OL}	I_{IN}^-=10μA, I_{IN}^+=0, R_L=5.1kΩ	—	0.09	0.2	V
Output Source Current	I_{SOURCE}		6	18	—	mA
Output Sink Current	I_{SINK}	(note 2)	0.5	1.3	—	mA
Power Supply Rejection	SVR	f=100Hz	—	70	—	dB
Mirror Gain	M	I_{IN}^+=200μA (note 3)	0.90	1	1.1	μA/μA
Mirror Current	I_M	(note 4)	—	10	500	μA
Negative Input Current	I_{IN}^-	(note 5)	—	1.0	—	mA

note 1. The output sink current capacity can be increased by over-driving the inverting input.
2. This standard shows the current amplification degree of a current mirror when NJM2900/3900 serves as a non-inverting amplifier.
3. The V_{BE} matching of input stage transistors is designed to meet a mirror current of about 10μA.
4. The input clamp transistor is designed in such a way as the input voltage is not lower than about 0.3V. If the negative input current exceeds 4mA, the output may drop to a low voltage.

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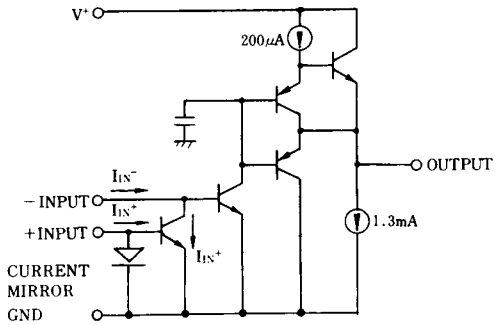
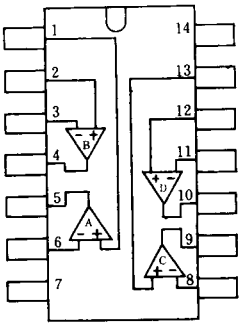
■ Equivalent Circuit



■ Connection Diagram

N,M,E-Type
(Top View)

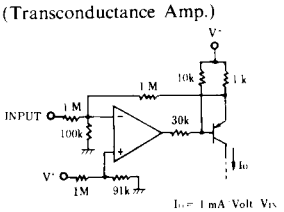


PIN FUNCTION

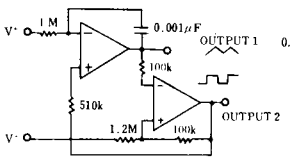
1.A+INPUT	14.V+
2.B+INPUT	13.C+INPUT
3.B−INPUT	12.D+INPUT
4.B OUTPUT	11.D−INPUT
5.A OUTPUT	10.D OUTPUT
6.A−INPUT	9.C OUTPUT
7.GND	8.C−INPUT

■ Typical Application (V^+=15V)

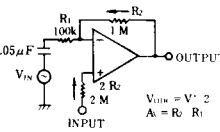
Voltage Control Current Source
(Transconductance Amp.)



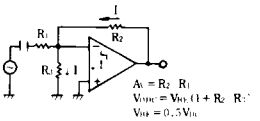
Triangle/Square Wave Generator



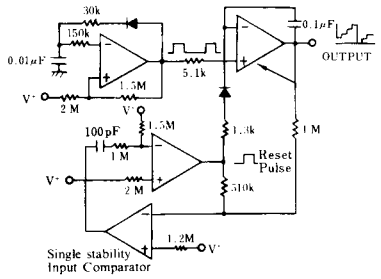
Inverting Amplifier



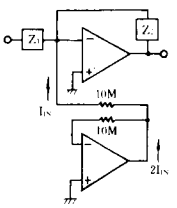
V_{BE} Bias



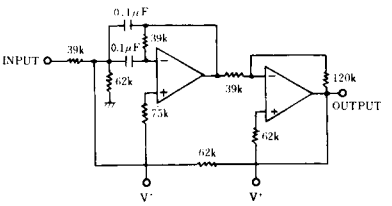
Stepped wave generator/Pulse Counter



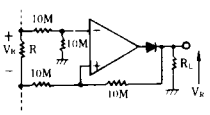
Auxiliary Amp. for In Sapplier



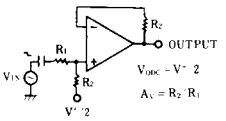
Band Buss Active Filter



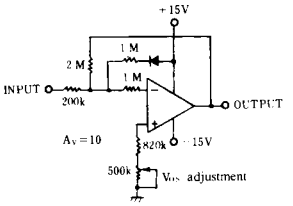
Differential input signal
ditecting circuit



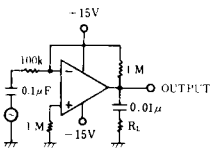
Non-Inverting Amplifier



Double Voltage ($V^+/V^-=\pm15V$)
Non inverting AC Amp.



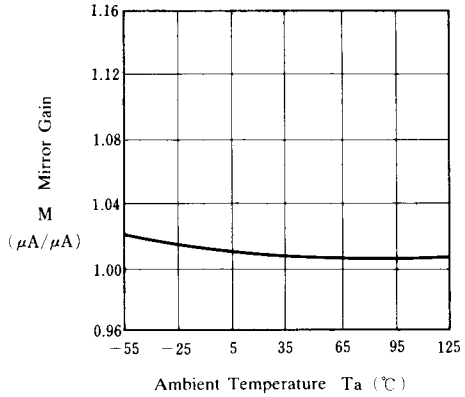
AC Amp.



■ Typical Characteristics

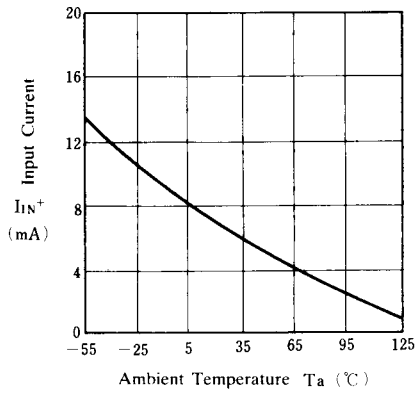
Mirror Gain vs. Temperature

(V^+=15V, I_{IN}=10μA)



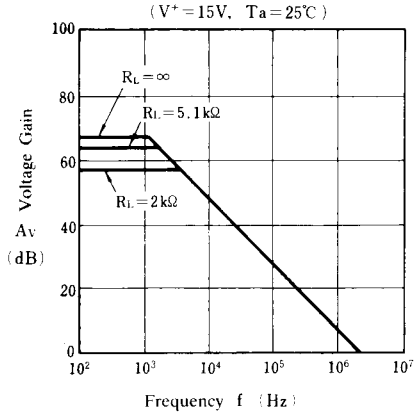
Maximum Mirror Current vs. Temperature

(V^+=15V, A_I≧0.90)



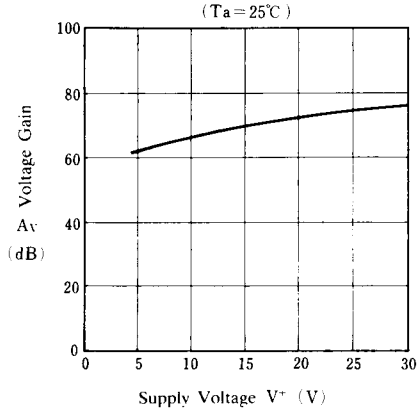
Voltage Gain vs. Frequency

(V^+=15V, Ta=25℃)



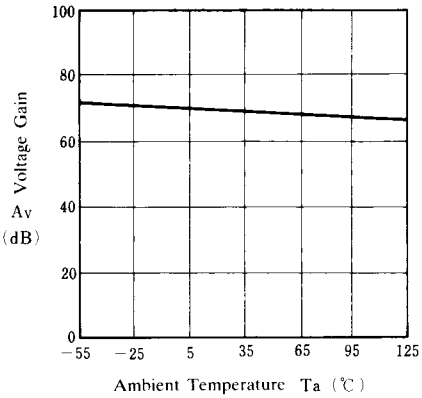
Voltage Gain vs. Supply Voltage

(Ta=25℃)



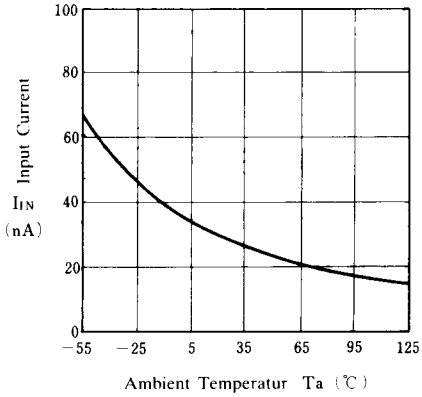
Voltage Gain vs. Temperature

(V^+=15V, $R_L=\infty$)



Input Current vs. Temperature

(V^+=15V)



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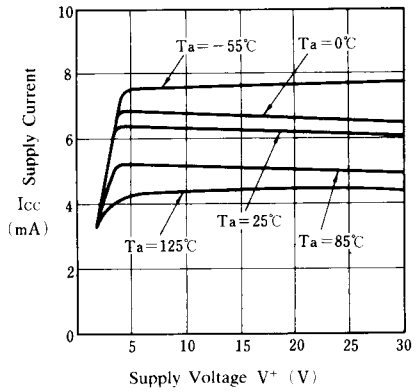
■ Typical Characteristics

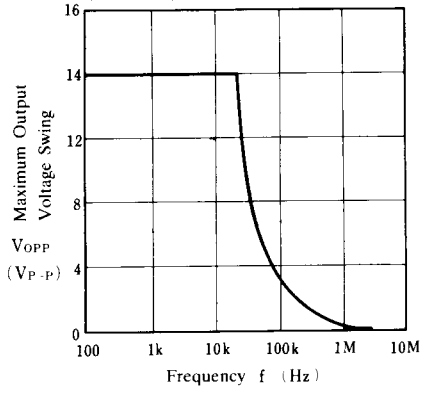
Supply Current vs. Supply Voltage

($R_L = \infty$)



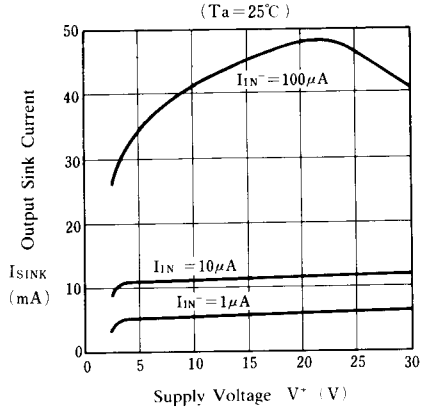
Maximum Output Voltage Swing vs. Frequency

($V^+ = 15V$, $10k\Omega \leqq R_L \leqq \infty$, Ta = 25°C)

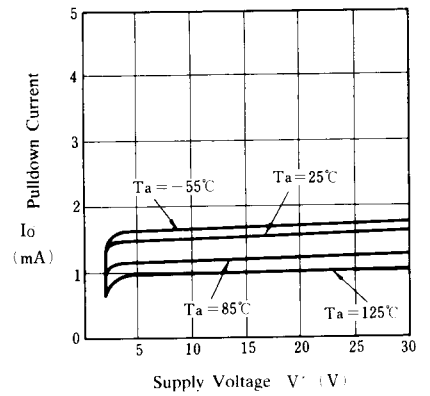


Output Sink Current vs. Supply Voltage

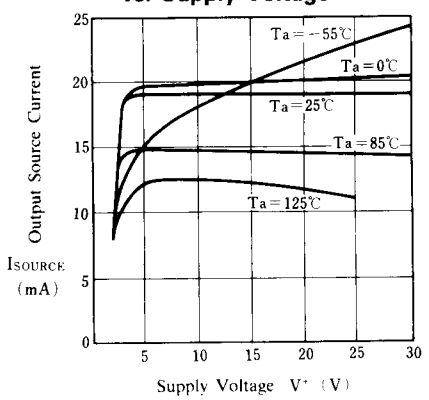
(Ta = 25℃)



A Class Output Bias Current vs. Supply Voltage



Output Source Current vs. Supply Voltage



Supply Voltage Rejection vs. Frequency

(Ta = 25℃)