QUAD OPERATIONAL AMPLIFIER

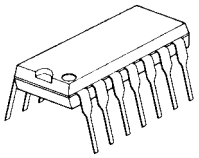
■ GENERAL DESCRIPTION

The NJM2059 integrated circuit is a quad high-gain operational amplifier internally compensated and constructed on a single silicon chip using an advanced epitaxial process.

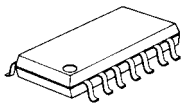
The NJM2059 has wider unity gain bandwidth and larger slew rate compared to the NJM2058.

Each amplifier of the NJM2059 has the same electrical characteristics of the NJM4559.

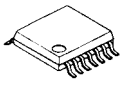
■ PACKAGE OUTLINE



NJM2059D



NJM2059M

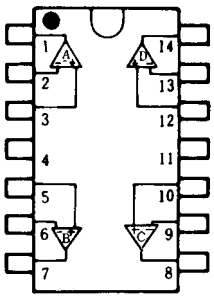


NJM2059V

■ FEATURES

- Operating Voltage (±4V~±18V)
- Slew Rate (2V/μs typ.)
- Unity Gain Bandwidth (6MHz typ.)
- Package Outline DIP14,DMP14,SSOP14
- Bipolar Technology

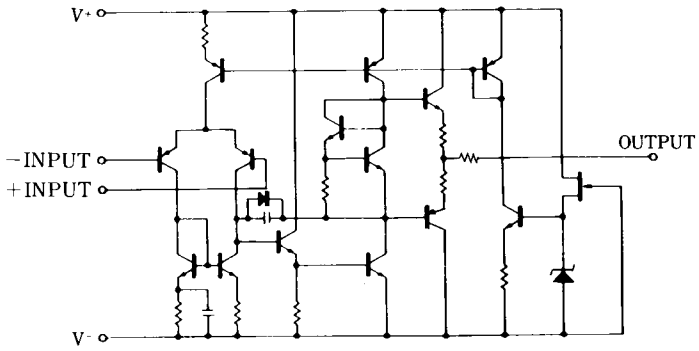
■ PIN CONFIGURATION



NJM2059D
NJM2059M
NJM2059V

PIN FUNCTION
1. A OUTPUT
2. A -INPUT
3. A +INPUT
4. V^+
5. B +INPUT
6. B -INPUT
7. B OUTPUT
8. C OUTPUT
9. C –INPUT
10. C +INPUT
11. V^-
12. D +INPUT
13. D –INPUT
14. D OUTPUT

■ EQUIVALENT CIRCUIT (1/4 Shown)



■ 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 (note1)	V
Power Dissipation	P_D	(DIP14) 700 (DMP14) 700 (note2) (SSOP14) 300	mW
Operating Temperature Range	T_{opr}	-40~+85	°C
Storage Temperature Range	T_{stg}	-40~+125	°C

(note1) For supply voltage less than ±15V. the absolute maximum input voltage is equal to the supply voltage.
(note2) At on PC board

■ ELECTRICAL CHARACTERISTICS

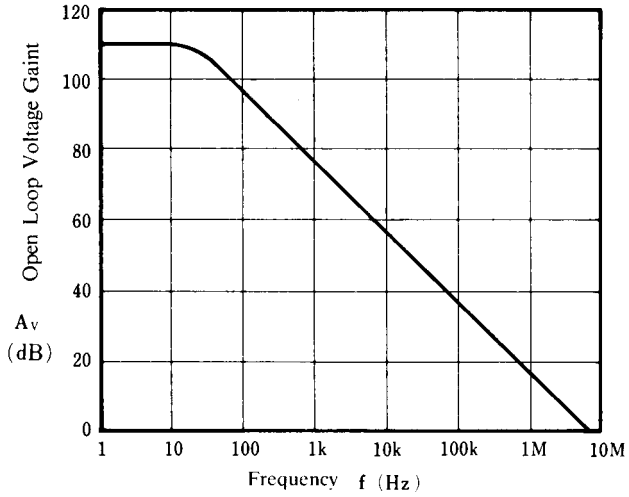
(Ta=25°C, V^+/V^-=±15V)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	R_S≤10kΩ	-	0.5	6	mV
Input Offset Current	I_{IO}		-	5	200	nA
Input Bias Current	I_B		-	20	500	nA
Input Resistance	R_{IN}		0.3	1	-	MΩ
Large Signal Voltage Gain	A_V	R_L≥2kΩ, V_O=±10V	86	100	-	dB
Maximum Output Voltage Swing 1	V_{OM1}	R_L≥10kΩ	± 12	± 14	-	V
Maximum Output Voltage Swing 2	V_{OM2}	R_L≥2kΩ	± 10	± 13	-	V
Input Common Mode Voltage Range	V_{ICM}		± 12	± 14	-	V
Common Mode Rejection Ratio	CMR	R_S≤10kΩ	70	90	-	dB
Supply Voltage Rejection Ratio	SVR	R_S≤10kΩ	76.5	90	-	dB
Operating Current	I_{CC}		-	7	11.3	mA
Slew Rate	SR		-	2	-	V/μs
Equivalent Input Noise Voltage	V_{NI}	RIAA, R_S=2.2kΩ, 30kHz LPF	-	1.4	-	μVrms

■ TYPICAL CHARACTERISTICS

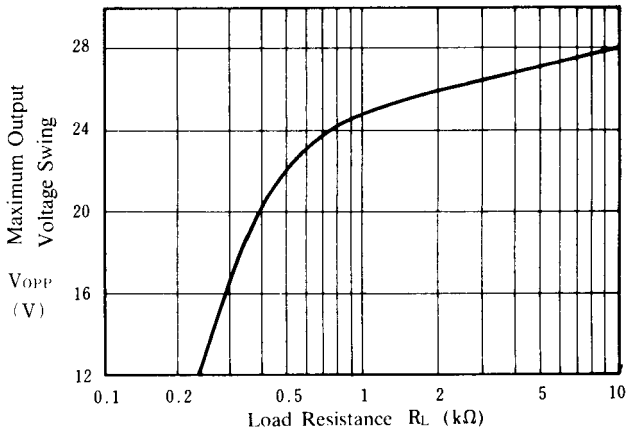
Open Loop Voltage Gain vs. Frequency

(V^+/V^-=±15V, RL=2kΩ, Ta=25°C)



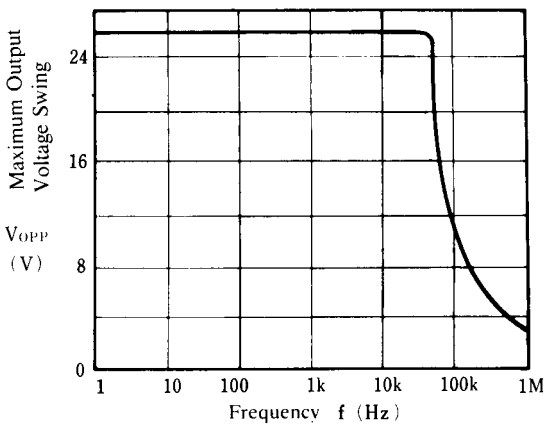
Maximum Output Voltage Swing vs. Load Resistance

(V^+/V^-=±15V, Ta=25°C)



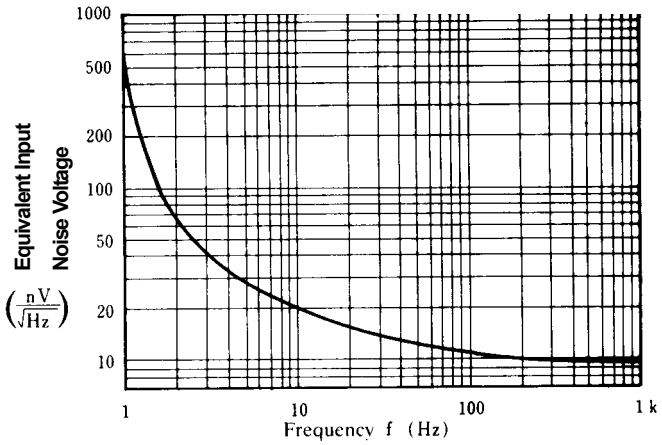
Maximum Output Voltage Swing vs. Frequency

(V^+/V^- = ±15V, RL=2kΩ, Ta=25°C)



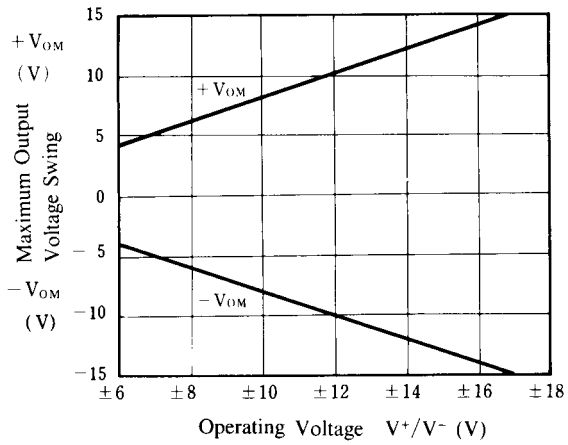
Equivalent Input Noise Voltage vs. Frequency

(V^+/V^-=±15V, Rs=50Ω, Av=60dB, Ta=25°C)



Maximum Output Voltage Swing vs. Operating Voltage

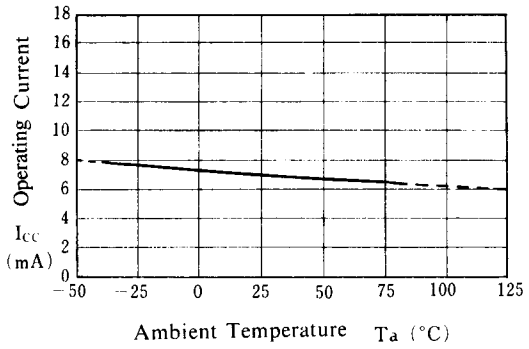
(RL=2kΩ, Ta=25°C)



■ TYPICAL CHARACTERISTICS

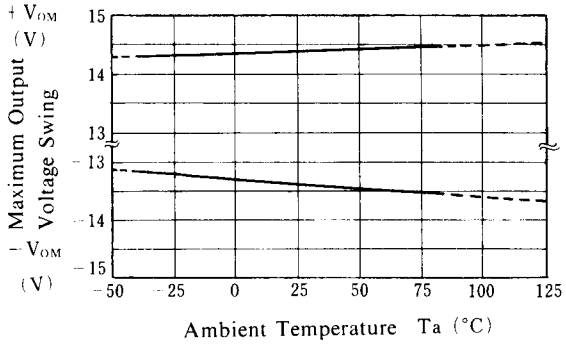
Operating Current vs. Temperature

(V^+/V^-=±15V)



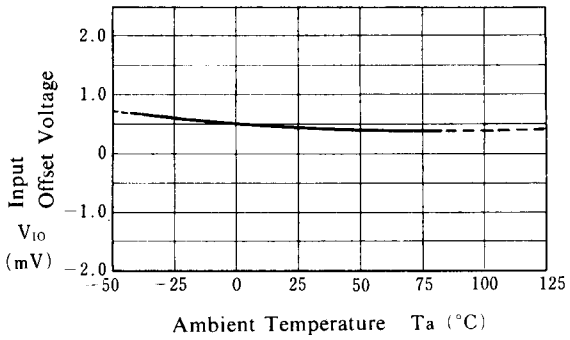
Maximum Output Voltage Swing vs. Temperature

(V^+/V^-=±15V, RL=10kΩ)



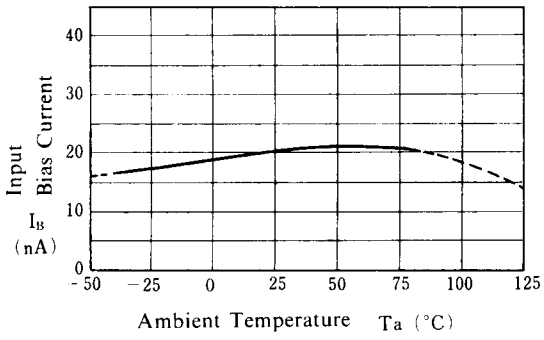
Input Offset voltage vs. Temperature

(V^+/V^-=±15V)



Input Bias Current vs. Temperature

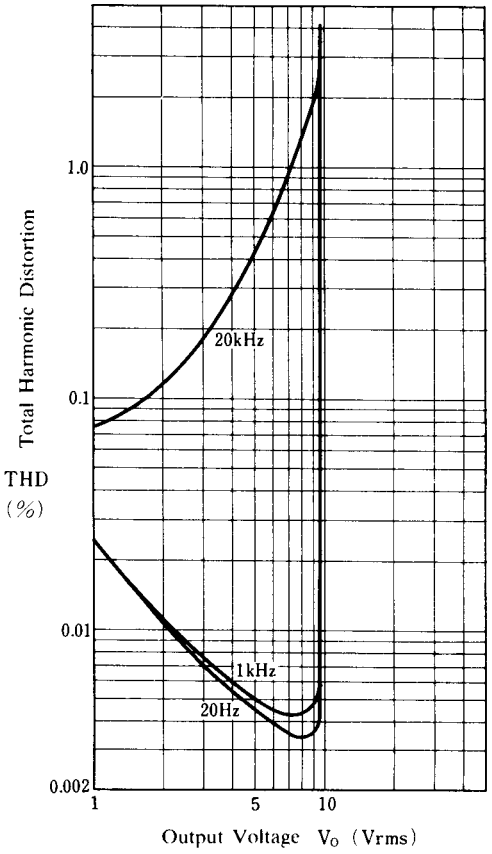
(V^+/V^-=±15V)



■ TYPICAL CHARACTERISTICS

Total Harmonic Distoriton

($V^+/V^-=\pm15V$, Gain=40dB, $R_L=10k\Omega$, Ta=25°C)



Total Harmonic Distortion

($V^+/V^-=\pm15V$, Gain=40dB, $R_L=2k\Omega$, Ta=25°C)