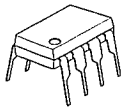
DUAL J-FET INPUT OPERATIONAL AMPLIFIER

■ GENERAL DESCRIPTION

These devices are low cost, high speed, dual JFET input operational amplifiers with an internally trimmed input offset voltage. They require low supply current yet maintain a large gain bandwidth product and fast slew rate. In addtion, well matched high voltage JFET input devices provide very low input bias and offset currents.

These amplifiers may be used in applicationas such as high speed integrators, fast D/A converters, sample and hold circuits and many other circuits requiring low input offset voltage, low input bias current, high input impedance, high slew rate and wide bandwidth. The devices also exhibit low noise and offsset voltage drift.

■ PACKAGE OUTLINE



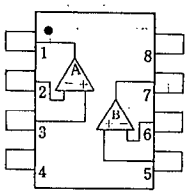
NJM353D

NJM353M

■ FEATURES

- Operating Voltage (±5V～±18V)
- J-FET Input
- Low Input Bias Current (50pA typ.)
- High Slew Rate (13V/μs typ.)
- Wide Unity Gain Bandwidth (4MHz typ.)
- Package Outline DIP8, DMP8
- Bipolar Technology

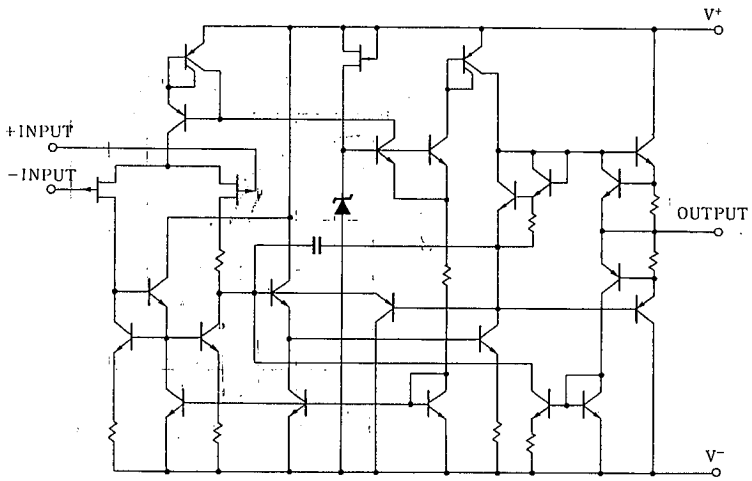
■ PIN CONFIGURATION



NJM353D
NJM353M

PIN FUNCTION
1. A OUTPUT
2. A−INPUT
3. A+INPUT
4. V⁻
5. B+INPUT
6. B−INPUT
7. B OUTPUT
8. V⁺

■ EQUIVALENT CIRCUIT (1/2 Shown)



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+/V^-	±18	V
Differential Input Voltage	V_{ID}	±30	V
Input Voltage	V_{IC}	±15	V
Power Dissipation	P_D	(DIP8) 500	mW
		(DMP8) 300	mW
Operating Temperature Range	T_{opr}	−40～+85	℃
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

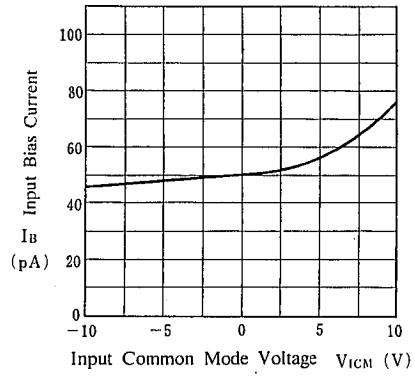
($Ta=25℃$, $V^+/V^-=\pm15V$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	$R_S=10k\Omega$	—	5	10	mV
Average TC of Input Offset Voltage	$\Delta V_{IO}/\Delta T$	$R_S=10k\Omega$	—	10	—	μV/℃
Input Offset Current	I_{IO}		—	25	100	pA
Input Bias Current	I_B		—	50	200	pA
Input Resistance	R_{IN}		—	10^{12}	—	Ω
Large-signal Voltage Gain	A_V	$R_L=2k\Omega$, $V_O=\pm10V$	88	100	—	dB
Maximum Peak-to-peak Output Voltage Swing	V_{OM}	$R_L=10k\Omega$	±12	±13.5	—	V
Input Common Mode Voltage Range	V_{ICM}		±11	+15, −12	—	V
Common Mode Rejection Ratio	CMR	$R_S\leqq10k\Omega$	70	100	—	dB
Supply Voltage Rejection Ratio	SVR		70	100	—	dB
Operating Current	I_{CC}		—	3.6	6.5	mA
Channel Separate	CS	f=1Hz~20kHz	—	120	—	dB
Slew Rate	SR		—	13	—	V/μs
Unity Gain Bandwidth	f_T		—	4	—	MHz
Equivalent Input Noise Voltage	e_n	$R_S=100\Omega$, f=1kHz	—	16	—	$nV/\sqrt{Hz}$
Equivalent Input Noise Current	i_n	f=1kHz	—	0.01	—	$pA/\sqrt{Hz}$

■ TYPICAL CHARACTERISTICS

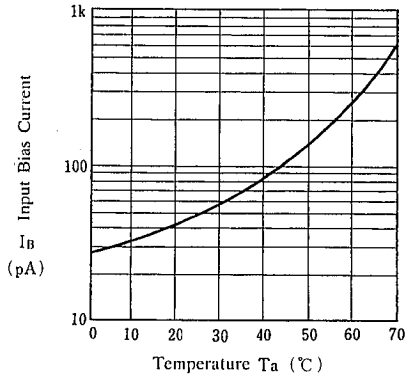
Input Bias Current

(V⁺/V⁻ = ±15V, Ta = 25℃)



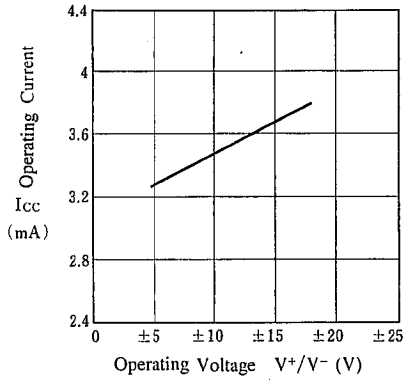
Input Bias Current

(VICM = 0, V⁺/V⁻ = ±15V)



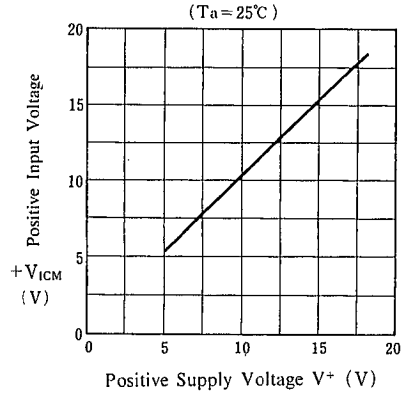
Operating Current vs. Operating Voltage

(Ta = 25℃)



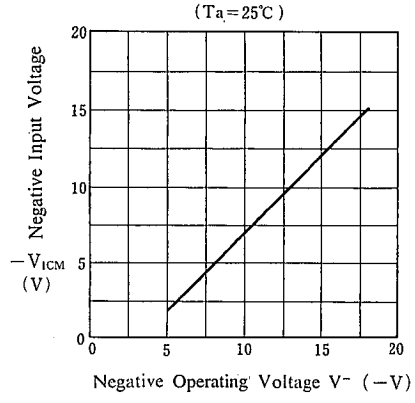
Positive Input Voltage

(Ta = 25℃)

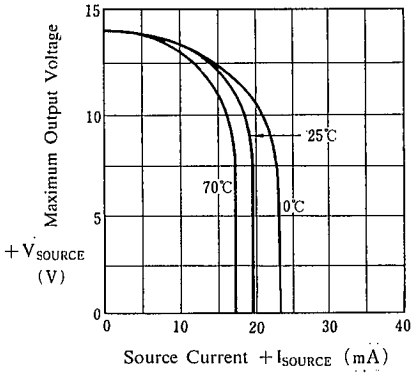


Negative Input Voltage

(Ta = 25℃)

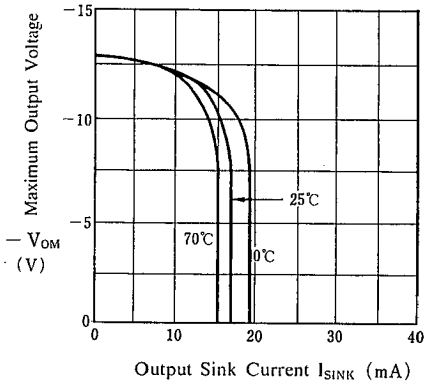


Positive Current Limit



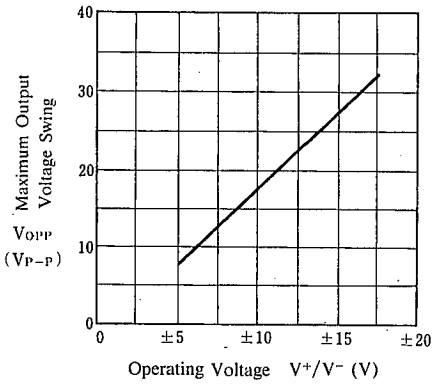
■ TYPICAL CHARACTERISTICS

Negative Current Limit



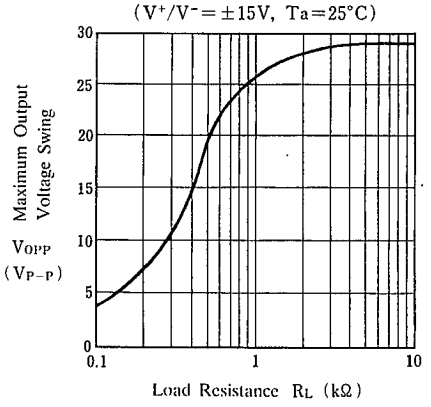
Maximum Output Voltage Swing vs. Operating Voltage

(RL=2kΩ, Ta=25°C)



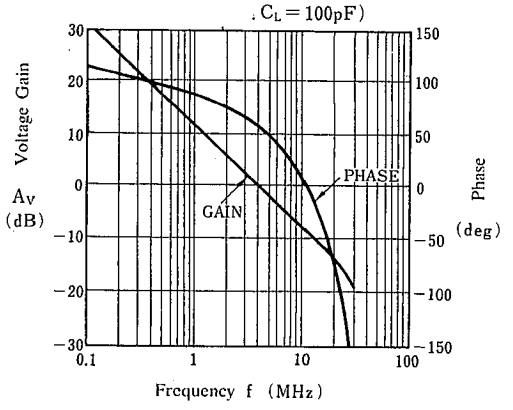
Maximum Output Voltage Swing vs. Load Resistance

(V+/V−=±15V, Ta=25°C)



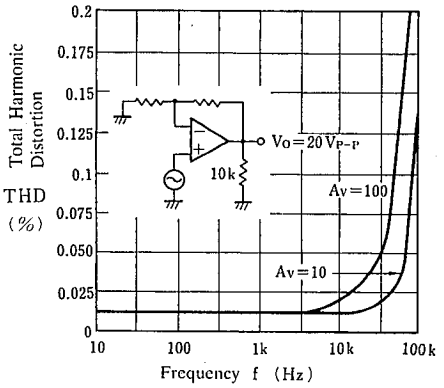
Voltage Gain, Phase vs. Frequency

(V+/V−=±15V, RL=2kΩ, CL=100pF)



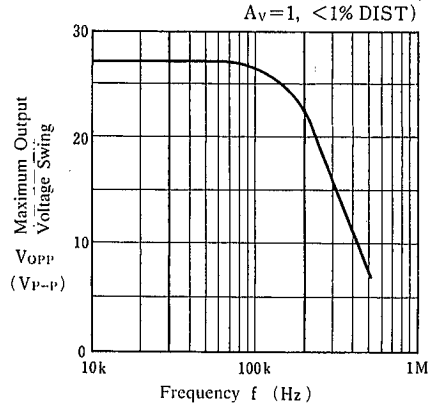
Total Harmonic Distortion vs. Frequency

(V+/V−=±15V, Ta=25°C)



Maximum Output Voltage Swing vs. Frequency

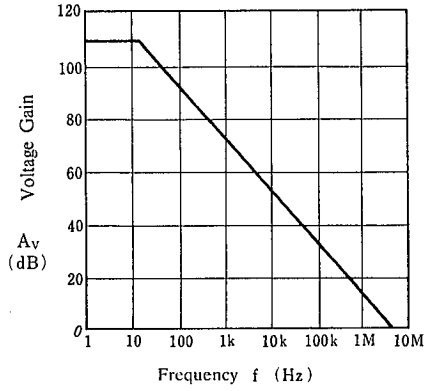
(V+/V−=±15V, RL=2kΩ, Ta=25°C, AV=1, <1% DIST)



■ TYPICAL CHARACTERISTICS

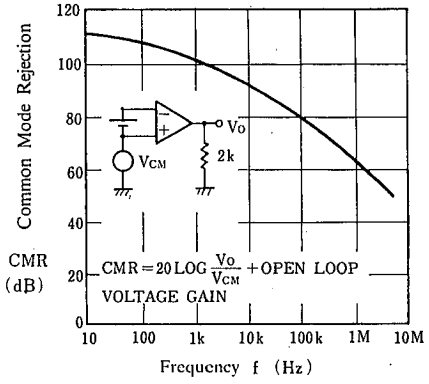
Voltage Gain vs. Frequency vs. Frequency

(R_L=2kΩ, V^+/V^-=±15V, Ta=25°C)



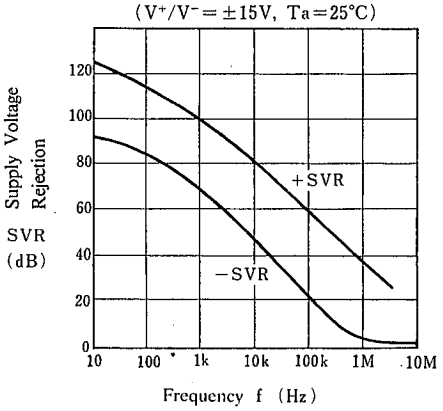
Common Mode Rejection vs. Frequency

(V^+/V^-=±15V, R_L=2kΩ, Ta=25°C)



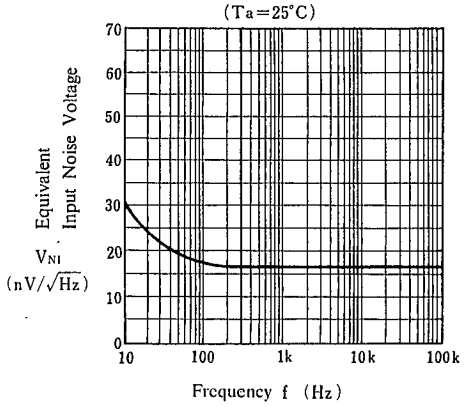
Supply Voltage Rejection vs. Frequency

(V^+/V^-=±15V, Ta=25°C)



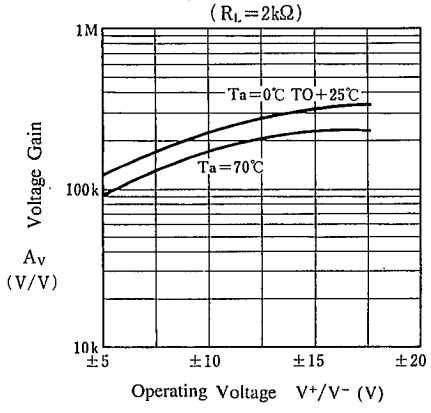
Equivalent Input Noise Voltage vs. Frequency

(Ta=25°C)



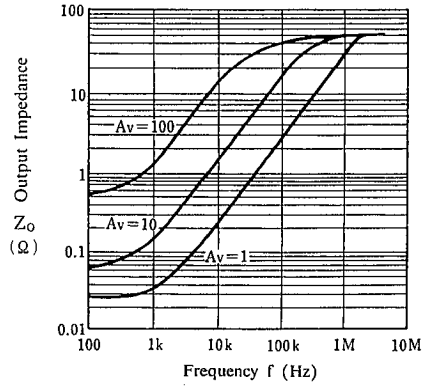
Voltage Gain vs. Operating Voltage

(R_L=2kΩ)



Output Impdedance vs. Frequency

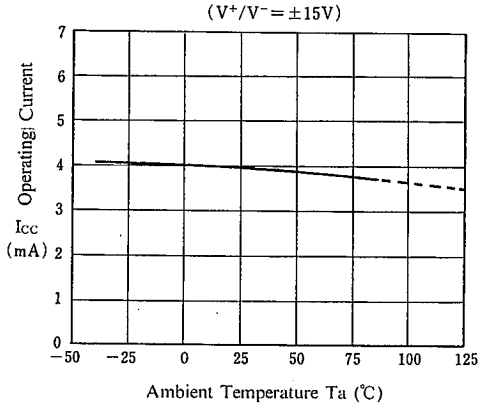
(V^+/V^-=±15V, Ta=25°C)



■ TYPICAL CHARACTERISTICS

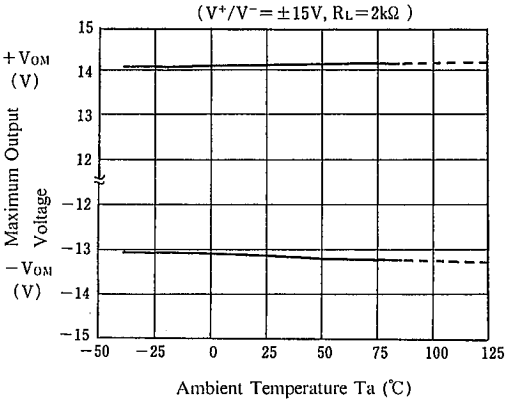
Operating Current vs. Temperature

($V^+/V^-=\pm15V$)



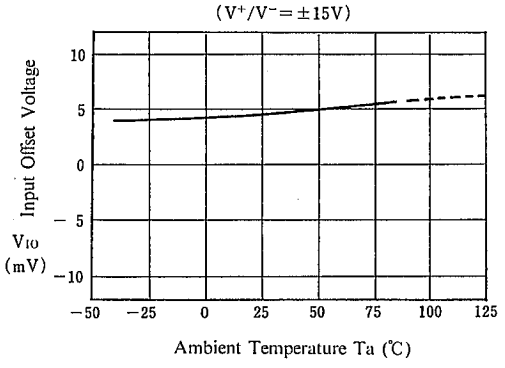
Maximum Output Voltage vs. Temperature

($V^+/V^-=\pm15V$, $R_L=2k\Omega$)



Input Offset Voltage vs. Temperature

($V^+/V^-=\pm15V$)



MEMO