Designated client product

This product will be discontinued its production in the near term.
And it is provided for customers currently in use only, with a time limit.
It can not be available for your new project. Please select other new or existing products.
For more information, please contact our sales office in your region.

New Japan Radio Co.,Ltd.

www.njr.com

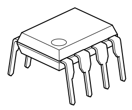
LOW OFFSET VOLTAGE,LOW DRIFT OPERATIONAL AMPLIFIER

■ GENERAL DESCRIPTION

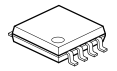
The NJM OP-07 is ultra-low input offset voltage and bias current, low drift and high gain operational amplifier with internal frequency compensation.

The NJM OP-07 is suitable for a precision instrumental amplifier.

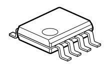
■ PACKAGE OUTLINE



NJMOP-07D



NJMOP-07M

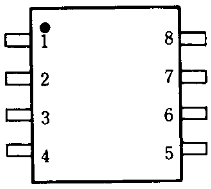


NJMOP-07E

■ FEATURES

- Low V_{IO} (60µV typ.)
- Low I_B (1.8nA typ.)
- Low Drift (unnull 0.5µV/˚C typ.)
  (null 0.4µV/˚C typ.)
  (0.4µV/M_o typ.)
- Wide Operating Voltage (±3V~±22V)
- Package Outline DIP8,DMP8,SOP8 JEDEC 150mil
- Bipolar Technology

■ PIN CONFIGURATION

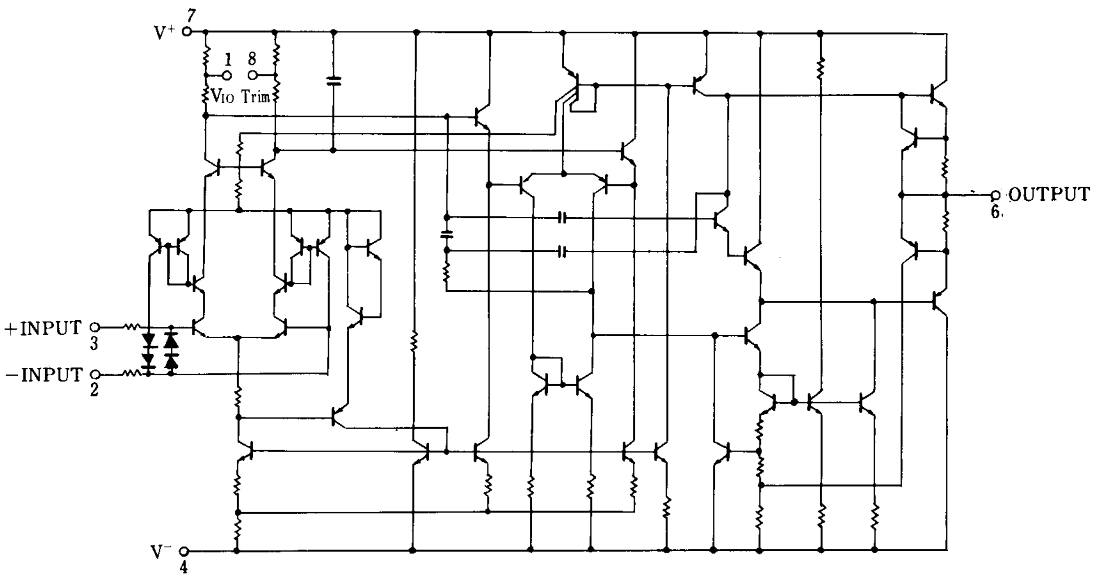


NJMOP-07D
NJMOP-07M
NJMOP-07E

PIN FUNCTION

1. V_{IO} Trim
2. –INPUT
3. +INPUT
4. V^-
5. NC
6. OUTPUT
7. V^+
8. V_{IO} Trim

■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25˚C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+/V^-	± 22	V
Input Voltage	V_1	± 22 (note1)	V
Differential Input Voltage	V_{ID}	± 30	V
Power Dissipation	P_D	(DIP8) 500(note2) (DMP8) 300(note2) / 430(note3) (SOP8) 300 (note2) / 640(note3)	mW
Storage Temperature Range	T_{stg}	-40~+125	˚C
Operating Temperature Range	T_{opr}	-40~+85	˚C
Output Current		continuous	

(note1) For supply voltage less than ±22V. the absolute maximum input voltage is equal to the supply voltage.
(note2) Device itself.
(note3) Mounted on the EIA/JEDEC standard board (76.2×114.3×1.6mm, two layer, FR-4).

■ ELECTRICAL CHARACTERISTICS

(Ta=+25˚C,V^+/V^-=±15V)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}		-	60	150	µV
Long Term Stability		(note4,5)	-	0.4	2	µV/M_O
Input Offset Current	I_{IO}		-	0.8	6	nA
Input Bias Current	I_B		-	± 1.8	± 7	nA
Open Loop Output Resistance	R_O	V_O=0,I_O=0	-	60	-	Ω
Input Resistance	R_{ID}	(Differential Mode)	8	33	-	MΩ
Input Resistance	R_{IC}	(Common Mode)	-	120	-	GΩ
Input Common Mode Voltage Range	V_{ICM}		± 13	±14	-	V
Common Mode Rejection Ratio	CMR	V_{CM}=±13V	100	120	-	dB
Supply Voltage Rejection Ratio	SVR	V^+/V^-=±3V~±18V	90	104	-	dB
Large Signal Voltage Gain 1	AV_1	R_L≥2kΩ,V_O=±10V	101.5	112.0	-	dB
Large Signal Voltage Gain 2	AV_2	R_L=500Ω,V_O=±0.5V,V^+/V^-=±3V	100.0	112.0	-	dB
Maximum Output Voltage 1	V_{OM1}	R_L≥10kΩ	±12	±13	-	V
Maximum Output Voltage 2	V_{OM2}	R_L>2kΩ	±11.5	±12.8	-	V
Maximum Output Voltage 3	V_{OM3}	R_L>1kΩ	-	±12	-	V
Slew Rate	SR	R_L≥2kΩ	-	0.17	-	V/µS
Unity Gain Bandwidth	f_T	A_{VCL}=1	-	0.5	-	MHz
Operating Current 1	I_{CC1}	V^+/V^-=±15V	-	2.7	5.0	mA
Operating Current 2	I_{CC2}	V^+/V^-=±3V	-	0.67	1.3	mA
Offset Adjustment Range		R_P=20kΩ	-	± 4	-	mV
Equivalent Input Noise Voltage	V_{NI}	0.1H_Z~10Hz (note5)	-	0.38	0.65	µV_{P-P}
Equivalent Input Noise Voltage 1	e_{n1}	f_O=10Hz (note5)	-	10.5	20	nV/√Hz
Equivalent Input Noise Voltage 2	e_{n2}	f_O=100Hz (note5)	-	10.2	13.5	nV/√Hz
Equivalent Input Noise Voltage 3	e_{n3}	f_O=1kHz (note5)	-	9.8	11.5	nV/√Hz
Equivalent Input Noise Current	I_{NI}	0.1Hz~10Hz (note5)	-	15	35	pA_{P-P}
Equivalent Input Noise Current 1	i_{n1}	f_O=10Hz (note5)	-	0.35	0.9	pA/√Hz
Equivalent Input Noise Current 2	i_{n2}	f_O=100Hz (note5)	-	0.15	0.27	pA/√Hz
Equivalent Input Noise Current 3	i_{n3}	f_O=1kHz (note5)	-	0.13	0.18	pA/√Hz

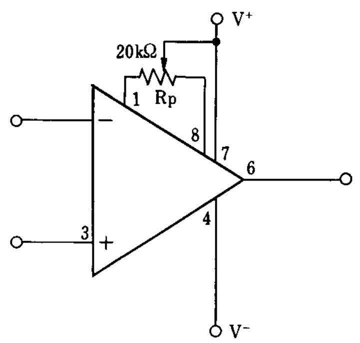
■ ELECTRICAL CHARACTERISTICS

(0°C≤Ta≤70°C,V⁺/V⁻=±15V)

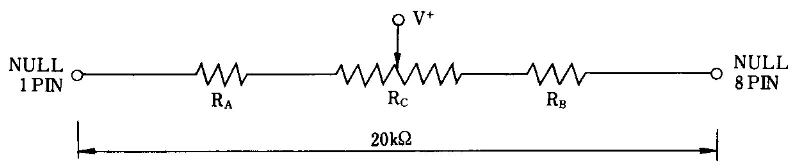
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}		-	85	250	µV
Average V_{IO} Drift (unnull)		(note5)	-	0.5	1.8	µV/°C
Average V_{IO} Drift (null)		R_P=20kΩ,(note5)	-	0.4	1.6	µV/°C
Input Offset Current	I_{IO}		-	1.6	8	nA
Average I_{IIO} Drift		(note5)	-	12	50	pA/°C
Input Bias Current	I_{IB}		-	± 2.2	± 9	nA
Average I_{IB} Drift		(note5)	-	18	50	pA/°C
Input Common Mode Voltage Range	V_{ICM}		± 13	± 13.5	-	V
Common Mode Rejection Ratio	CMR	V_{CM}=±13V	97	120	-	dB
Supply Voltage Rejection Ratio	SVR	V^+/V^-=±3V~±18V	86	120	-	dB
Voltage Gain	A_V	R_L≥2kΩ,V_O=±10V	100	400	-	V/mV
Maximum Output Voltage	V_{OM}	R_L≥2kΩ	± 11	± 12.6	-	V

(note 4) Long Term Stability refers to the average trend line of V_{IO} vs. time over extended periods after the first 30 days of operation.
(note 5) According to the evaluation by NJRC, more than 90% of all these products can be guaranteed.

■ OFFSET ADJUSTMENT METHOD



For making low sensitivity of change in the input offset voltage against resistance regulation of potentiometer
(Easy case of offset adjustment)

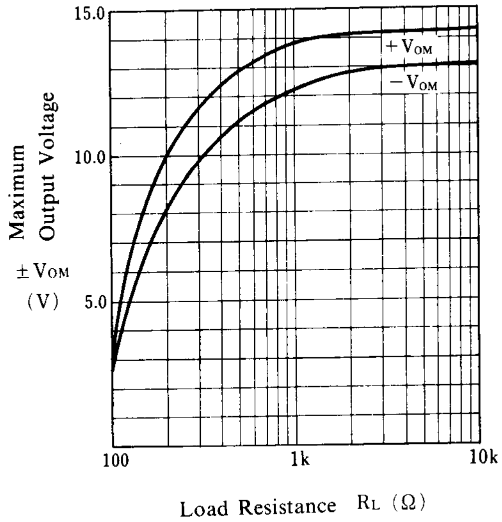


* R_A,R_B Fixed 7.5kΩ,R_C adjustable 5.0kΩ
* R_A,R_B,R_C are metalfilm resisters, R_C is more than 10 times winding.

■ TYPICAL CHARACTERISTICS

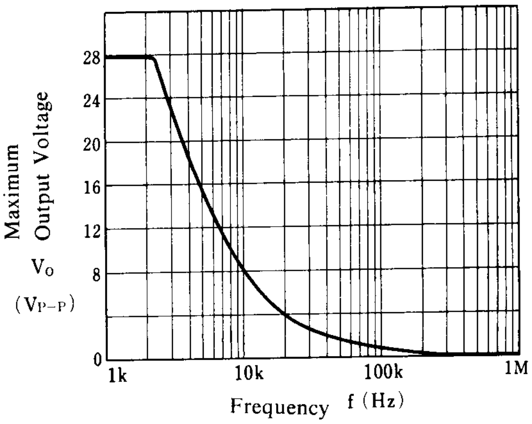
Maximum Output Voltage vs. Load Resistance

($V^+/V^- = \pm 15V$, $V_{in} = \pm 10mV$, $Ta = 25°C$)



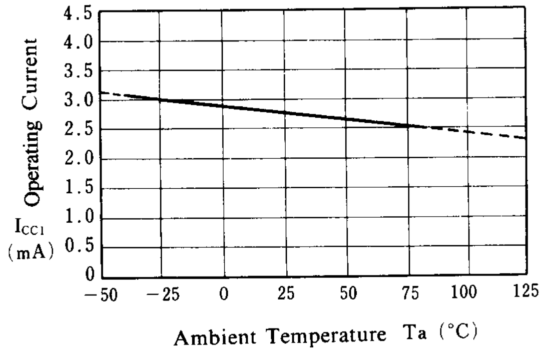
Maximum Output Voltage Swing vs. Frequency

($V^+/V^- = \pm 15V$, $Ta = 25°C$)



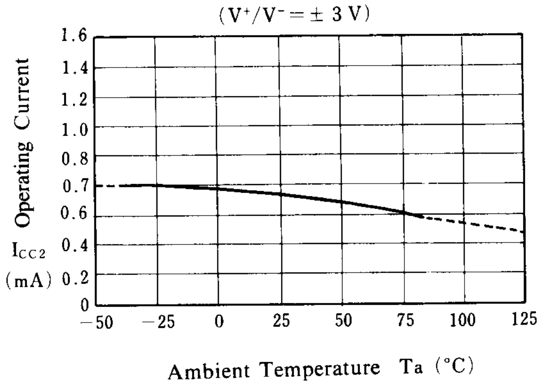
Operating Current vs. Temperature

($V^+/V^- = \pm 15V$)



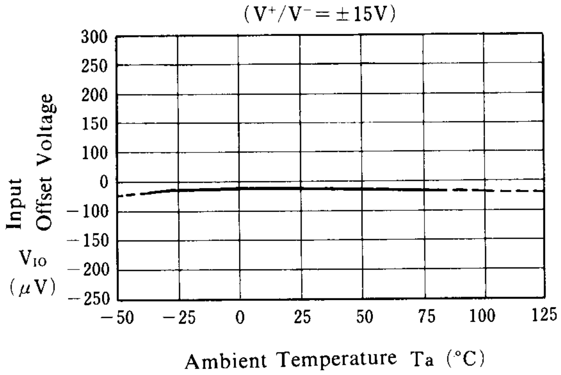
Operating current vs. Temperature

($V^+/V^- = \pm 3V$)



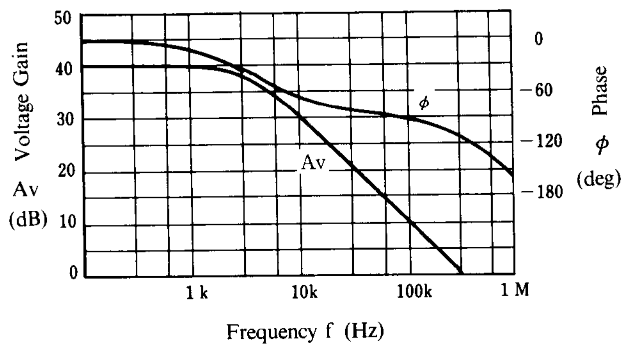
Input Offset Voltage vs. Temperature

($V^+/V^- = \pm 15V$)



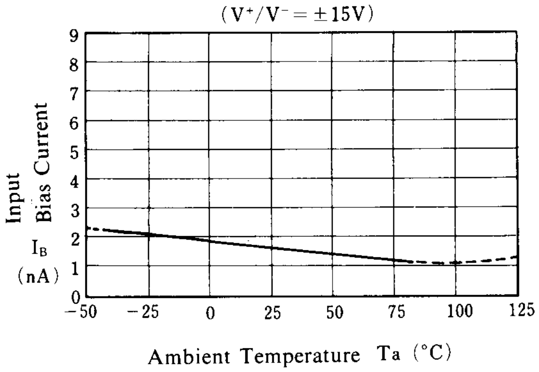
Voltage Gain, Phase vs. Frequency

($V^+/V^- = \pm 15V$, $R_L = 2k\Omega$, 40dB Amp. $Ta = 25°C$)

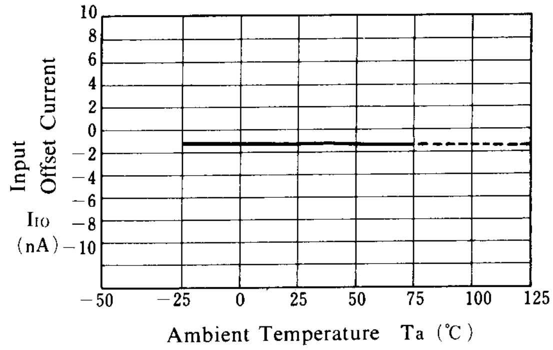


■ TYPICAL CHARACTERISTICS

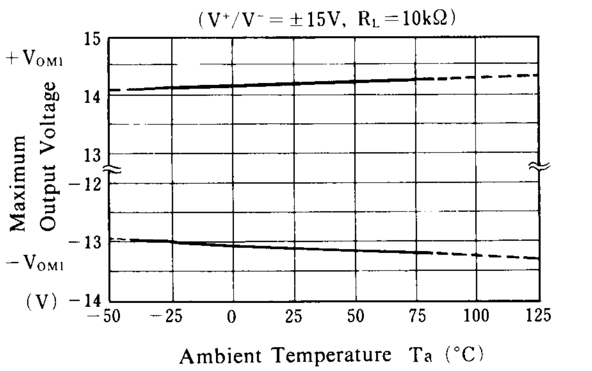
Input Bias Current vs. Temperature



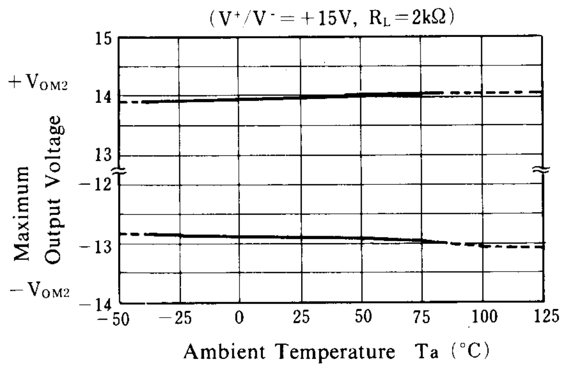
Input Offset Current vs. Temperarure



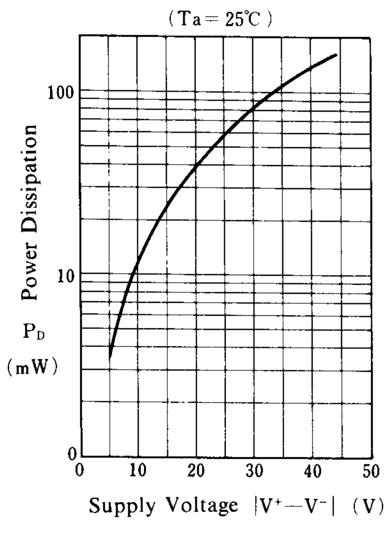
Maximum Output Voltage vs. Temperature



Maximum Output Voltage vs. Temperature



Power Dissipation vs. Supply Voltage



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