DATA SHEET

NEC

BIPOLAR ANALOG INTEGRATED CIRCUIT

μPC4559

HIGH PERFORMANCE DUAL OPERATIONAL AMPLIFIER

DESCRIPTION

The μPC4559 is a dual type operational amplifier having better slew rate and bandwidth than the μPC4558C with satisfying unity gain frequency compensation. Having low noise characteristics, this device is very convenient to make active filters and other audio application circuits.

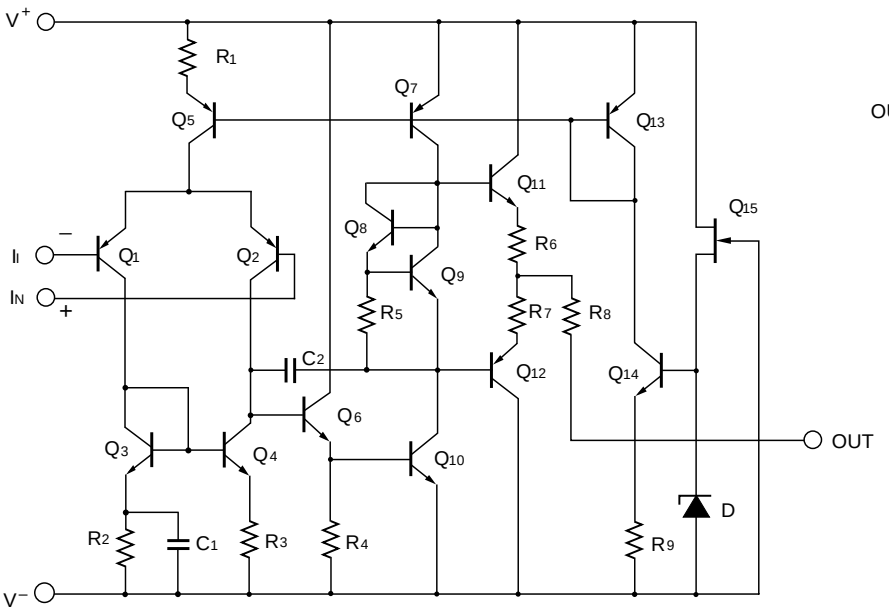
FEATURES

- Internal frequency compensation
- Low noise
- Output short circuit protection

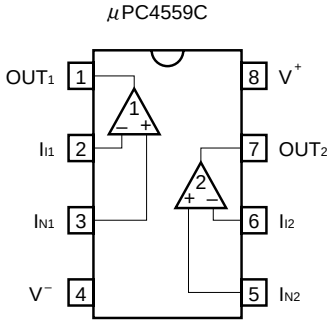
ORDERING INFORMATION

Part Number	Package
μPC4559C	8-pin plastic DIP (7.62 mm (300))

EQUIVALENT CIRCUIT (1/2 Circuit)



PIN CONFIGURATION (Top View)



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The mark ★ shows major revised points.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameter	Symbol	Ratings	Unit
Voltage between V^+ and V^- Note 1	$V^+ - V^-$	–0.3 to +36	V
Differential Input Voltage	V_{ID}	±30	V
Input Voltage Note 2	V_I	V^-–0.3 to V^+ +0.3	V
Output Voltage Note 3	V_O	V^-–0.3 to V^+ +0.3	V
Power Dissipation Note 4	P_T	350	mW
Output Short Circuit Duration Note 5		Indefinite	sec
Operating Ambient Temperature	T_A	–20 to +80	°C
Storage Temperature	T_{stg}	–55 to +125	°C

Notes 1. Reverse connection of supply voltage can cause destruction.

2. The input voltage should be allowed to input without damage or destruction. Even during the transition period of supply voltage, power on/off etc., this specification should be kept. The normal operation will establish when the both inputs are within the Common Mode Input Voltage Range of electrical characteristics.

3. This specification is the voltage which should be allowed to supply to the output terminal from external without damage or destructive. Even during the transition period of supply voltage, power on/off etc., this specification should be kept. The output voltage of normal operation will be the Output Voltage Swing of electrical characteristics.

4. Thermal derating factor is –5.0 mV/°C when ambient temperature is higher than 55°C.

5. Pay careful attention to the total power dissipation not to exceed the absolute maximum ratings, Note 4.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	$V^{\pm}$	±4		±16	V

ELECTRICAL SPECIFICATIONS (T_A = 25°C, $V^{\pm}$ = ±15 V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input Offset Voltage	V_{IO}	$R_S \leq 10\ \Omega$		±0.5	±6.0	mV
Input Offset Current [Note]	I_{IO}			±5	±200	nA
Input Bias Current [Note]	I_B			60	500	nA
Large Signal Voltage Gain	A_V	$R_L \geq 20\ k\Omega$, V_O = ±10 V	20,000	100,000		
★ Power Consumption	P_d	I_O = 0 A		90	170	mW
Common Mode Rejection Ratio	CMR	$R_S \leq 10\ k\Omega$	70	90		dB
Supply Voltage Rejection Ratio	SVR	$R_S \leq 10\ k\Omega$		30	150	μV/V
Output Voltage Swing	V_{om}	$R_L \geq 10\ k\Omega$	±12	±14		V
		$R_L \geq 2\ k\Omega$	±10	±13		V
Common Mode Input Voltage Range	V_{ICM}		±12	±14		V
Slew Rate	SR	A_V = 1		2.0		V/μs
Input Equivalent Noise Voltage	V_n	R_S = 1 kΩ, f = 1 Hz to 1 kHz (Figure1)		6		μV_{p-p}
Channel Separation		f = 1 kHz (Figure2)		105		dB

Note Input bias currents flow out from IC, because each currents are base current of PNP-transistor on input stage.

MEASUREMENT CIRCUIT

Figure1 Noise Measurement Circuit

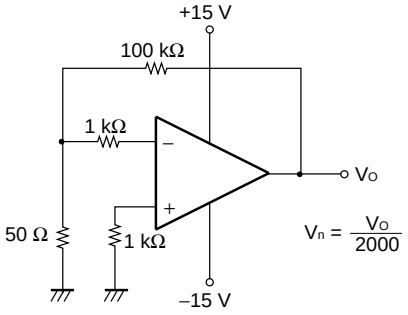
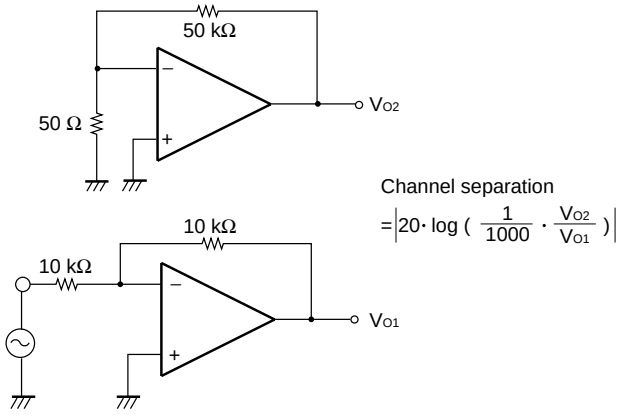
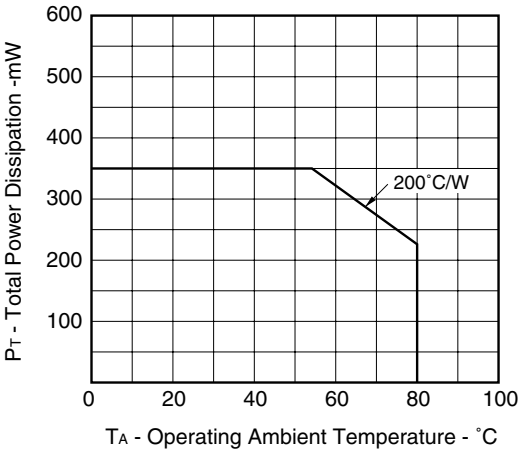


Figure2 Channel Separation Measurement Circuit

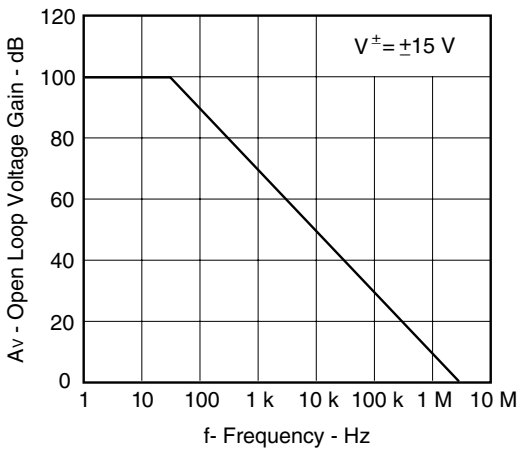


TYPICAL PERFORMANCE CHARACTERISTICS (T_A = 25°C, TYP.)

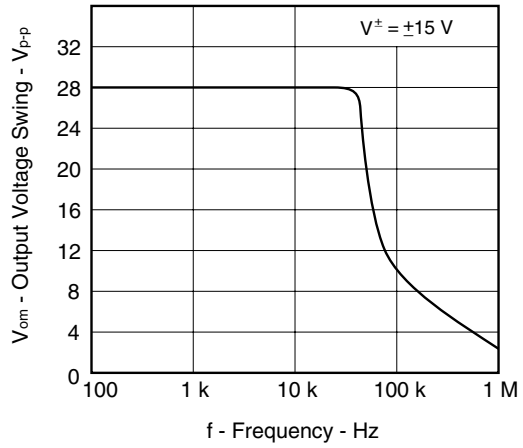
POWER DISSIPATION



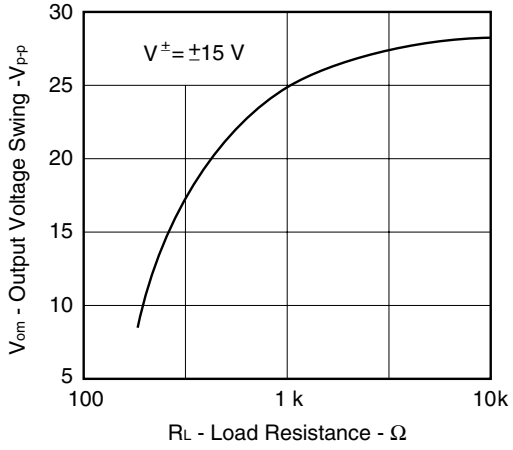
OPEN LOOP FREQUENCY RESPONSE



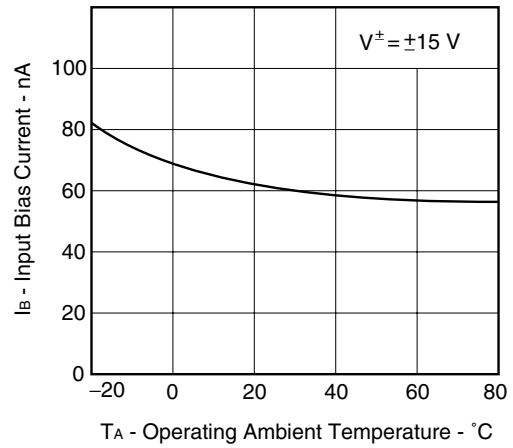
LARGE SIGNAL FREQUENCY RESPONSE



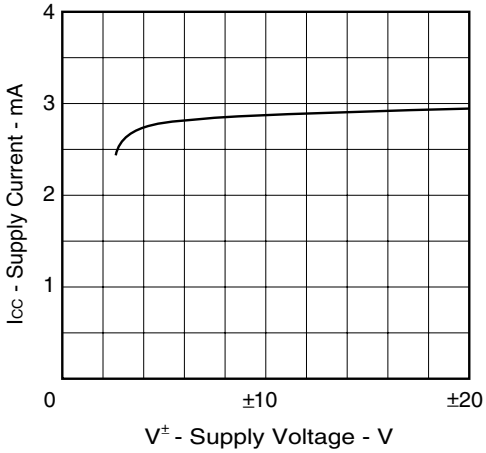
OUTOUT VOLTAGE SWING



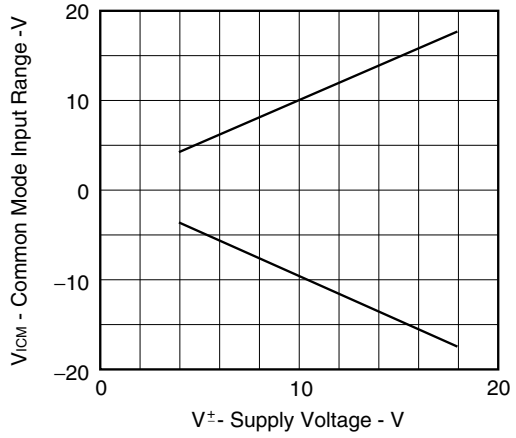
INPUT BIAS CURRENT



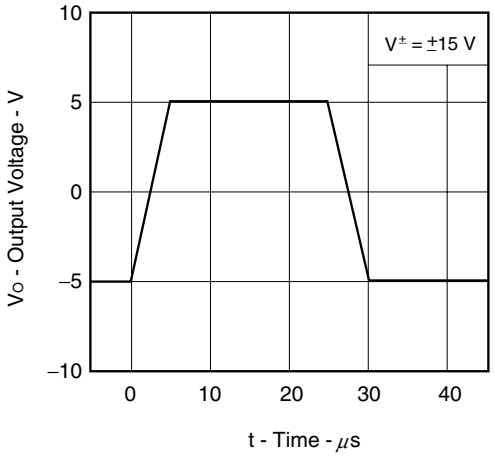
SUPPLY CURRENT



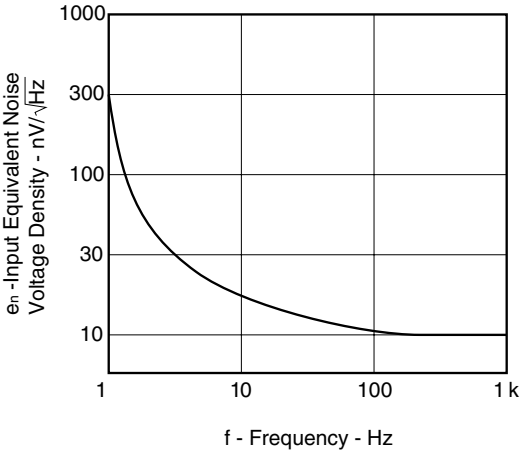
COMMON MODE INPUT VOLTAGE RANGE



VOLTAGE FOLLOWER PULSE RESPONSE

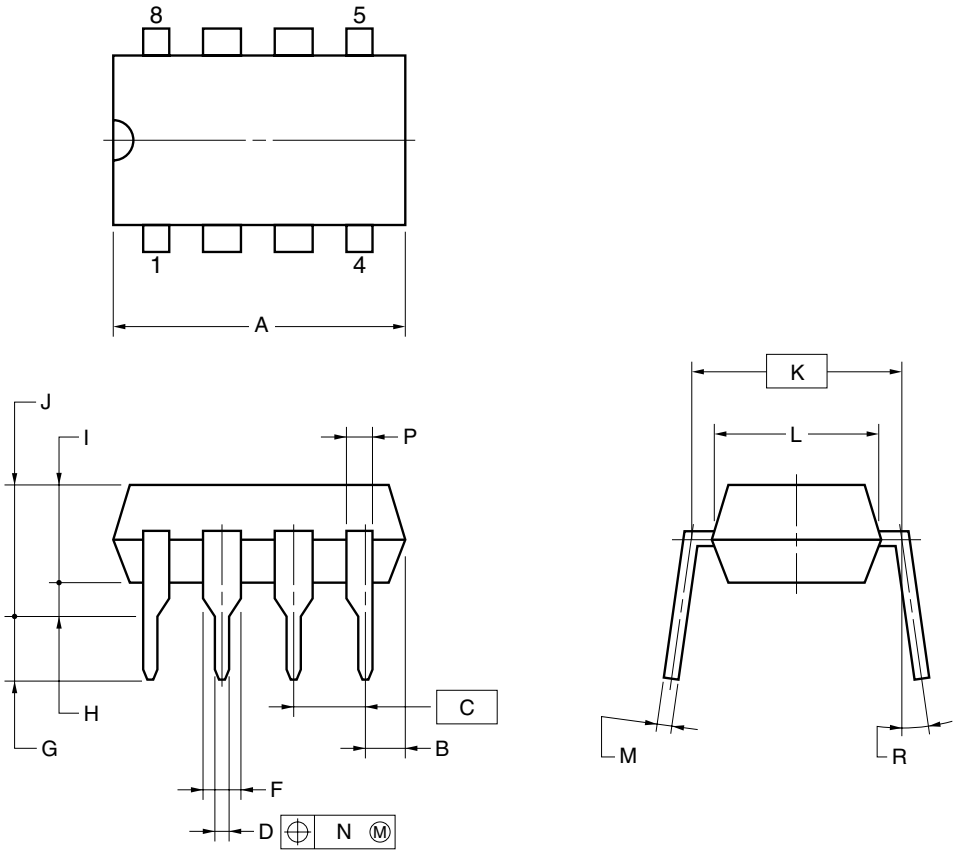


INPUT EQUIVALENT NOISE VOLTAGE DENSITY



PACKAGE DRAWING (Unit : mm)

8-PIN PLASTIC DIP (7.62mm(300))



NOTES

1. Each lead centerline is located within 0.25 mm of its true position (T.P.) at maximum material condition.

2. Item "K" to center of leads when formed parallel.

ITEM	MILLIMETERS
A	10.16 MAX.
B	1.27 MAX.
C	2.54 (T.P.)
D	0.50±0.10
F	1.4 MIN.
G	3.2±0.3
H	0.51 MIN.
I	4.31 MAX.
J	5.08 MAX.
K	7.62 (T.P.)
L	6.4
M	$0.25^{+0.10}_{-0.05}$
N	0.25
P	0.9 MIN.
R	0~15°

P8C-100-300B,C-2

★ RECOMMENDED SOLDERING CONDITIONS

The μPC4559 should be soldered and mounted under the following recommended conditions.

For soldering methods and conditions other than those recommended below, contact an NEC Electronics sales representative.

For technical information, see the following website.

Semiconductor Device Mount Manual (http://www.necel.com/pkg/en/mount/index.html)

Type of Through-hole Device

μPC4559C: 8-pin plastic DIP (7.62 mm (300))

Process	Conditions
Wave Soldering (only to leads)	Solder temperature: 260°C or below, Flow time: 10 seconds or less.
Partial Heating Method	Pin temperature: 300°C or below, Heat time: 3 seconds or less (per each lead).

Caution For through-hole device, the wave soldering process must be applied only to leads, and make sure that the package body does not get jet soldered.

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