DATA SHEET

NEC

BIPOLAR ANALOG INTEGRATED CIRCUIT

μPC4741

HIGH PERFORMANCE QUAD OPERATIONAL AMPLIFIER

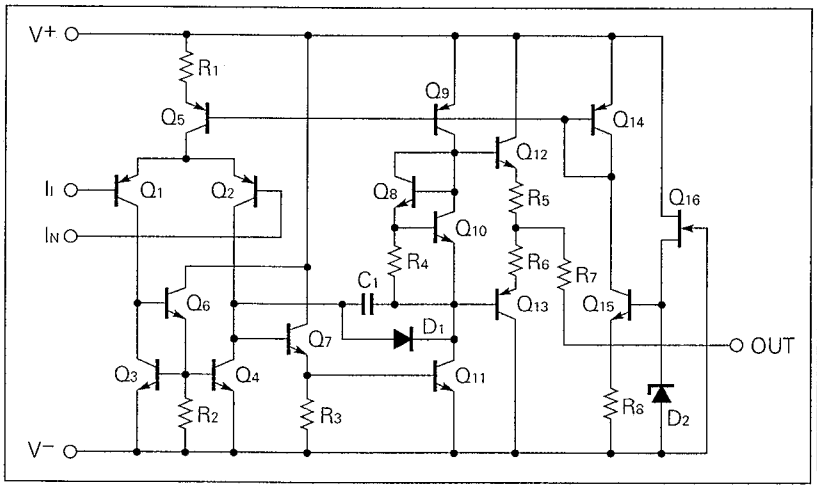
DESCRIPTION

The μPC4741 consists of four independent frequency compensated operational amplifiers featuring higher speed, broader band than general purpose type as 741. The μPC4741 is most appropriate for AC signal amplifier applications such as active filters or pulse amplifiers.

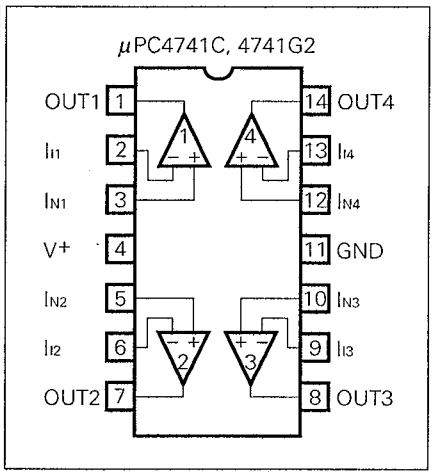
FEATURES

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

EQUIVALENT CIRCUIT (1/4 Circuit)



CONNECTION DIAGRAM (Top View)



ORDERING INFORMATION

PART NUMBER	PACKAGE	QUALITY GRADE
μPC4741C	14 PIN PLASTIC DIP (300 mil)	Standard
μPC4741G2	14 PIN PLASTIC SOP (225 mil)	Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

Document No. IC-1197A
(O.D. No. IC-6139C)
Date Published March 1993P
Printed in Japan

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

PARAMETER		SYMBOL	μPC4741	UNIT
Voltage between V^+ and V^- **(Note 1)**		$V^+ - V^-$	−0.3 to +40	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	C Package **(Note 4)**	P_T	570	mW
	G2 Package **(Note 5)**		550	mW
Output Short Circuit Duration **(Note 6)**			10	sec
Operating Temperature Range		T_{opt}	−20 to +80	°C
Storage Temperature Range		T_{stg}	−55 to +125	°C

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

Note 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.

Note 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.

Note 4. Thermal derating factor is −7.6 mW/°C when ambient temperature is higher than 50 °C.

Note 5. Thermal derating factor is −5.5 mW/°C when ambient temperature is higher than 25 °C.

Note 6. Pay careful attention to the total power dissipation not to exceed the absolute maximum ratings, Notes 4 and 5.

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V^{\pm}$	±4		±16	V

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

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
Input Offset Voltage	V_{IO}		±1.0	±5.0	mV	$R_S \leq 100\ \Omega$
Input Offset Current **(Note 7)**	I_{IO}		±30	±5.0	nA	
Input Bias Current **(Note 7)**	I_B		100	300	nA	
Large Signal Voltage Gain	A_v	25,000	50,000			$R_L \geq 2\ k\Omega$, $V_O = \pm 10$ V
Power Consumption	Pd		150	210	mW	I_O = 0 A, All Amplifiers
Common Mode Rejection Ratio	CMR	80	90		dB	
Supply Voltage Rejection Ratio	SVR		50	100	μV/V	
Maximum Output Voltage	V_{om}	±12	±13.7		V	$R_L \geq 10\ k\Omega$
Maximum Output Voltage	V_{om}	±10	±12.5		V	$R_L \geq 2\ k\Omega$
Common Mode Input V. Range	V_{ICM}	±12	±14		V	
Slew Rate	SR		1.6		V/μs	A_v = 1
Input Equivalent Noise Voltage Density	e_n		9		$nV/\sqrt{Hz}$	f = 1 kHz
Channel Separation			108		dB	f = 10 kHz

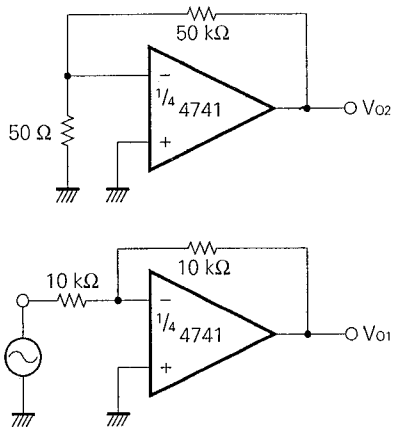
Note 7. Input bias currents flow out from IC. Because each currents are base current of PNP-transistor on input stage.

Please be careful with followings:

In low input level circuits, relative interferences may sometimes occur due to the temperature gradient in the IC chip when the difference of power dissipation between channels is extremely large.

MEASUREMENT CIRCUIT

Fig. 1 Channel Separation Measurement Circuit

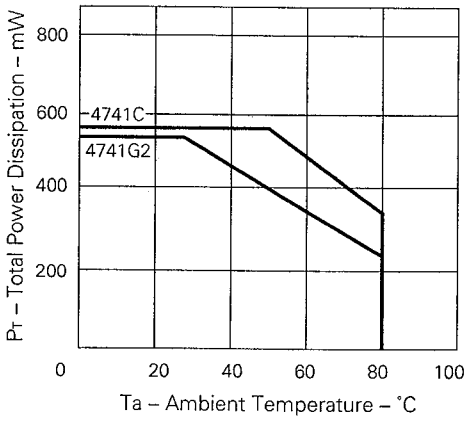


Channel Separation

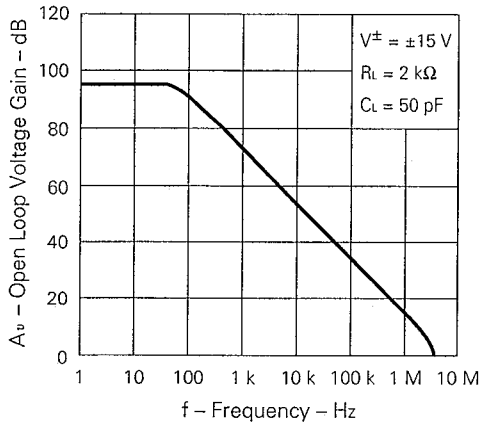
$$= \left| 20 \cdot \log \left(\frac{1}{1000} \cdot \frac{V_{O2}}{V_{O1}} \right) \right|$$

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

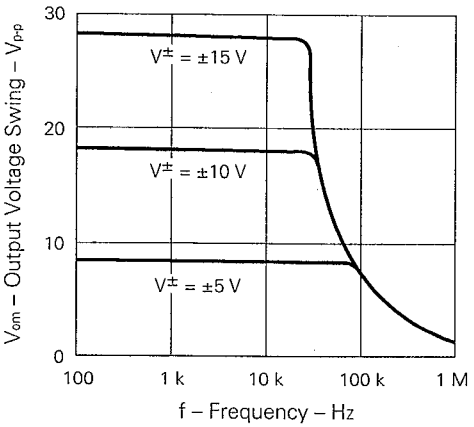
POWER DISSIPATION



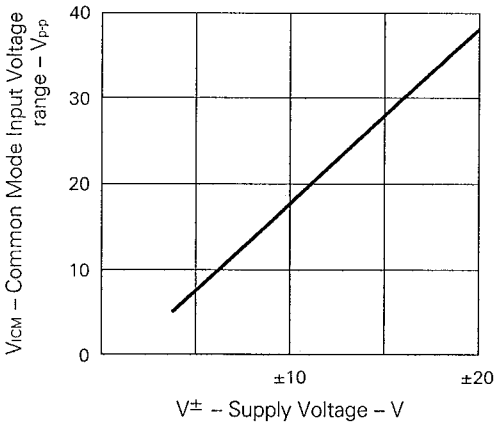
OPEN LOOP FREQUENCY RESPONSE



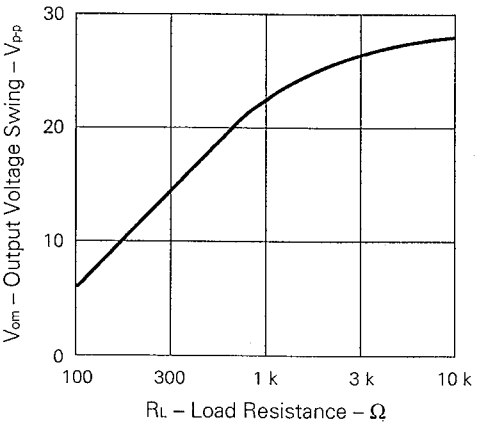
LARGE SIGNAL FREQUENCY RESPONSE



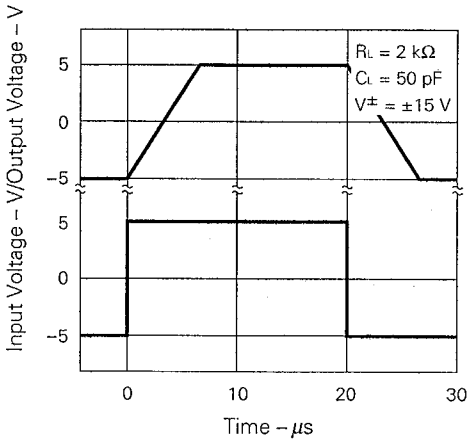
COMMON MODE INPUT VOLTAGE RANGE



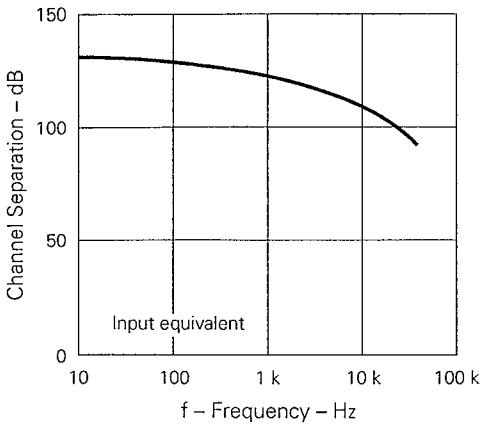
OUTPUT VOLTAGE SWING



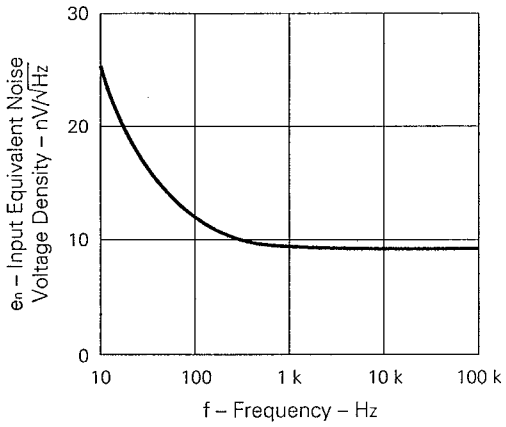
VOLTAGE FOLLOWER PULSE RESPONSE



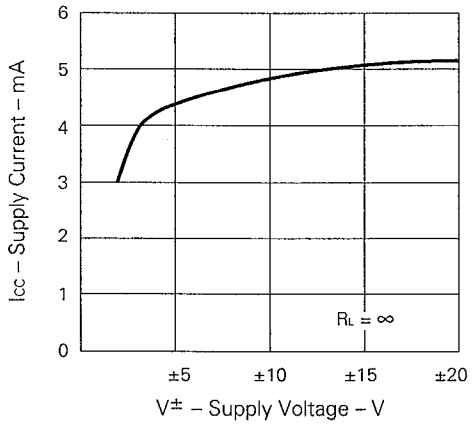
CHANNEL SEPARATION



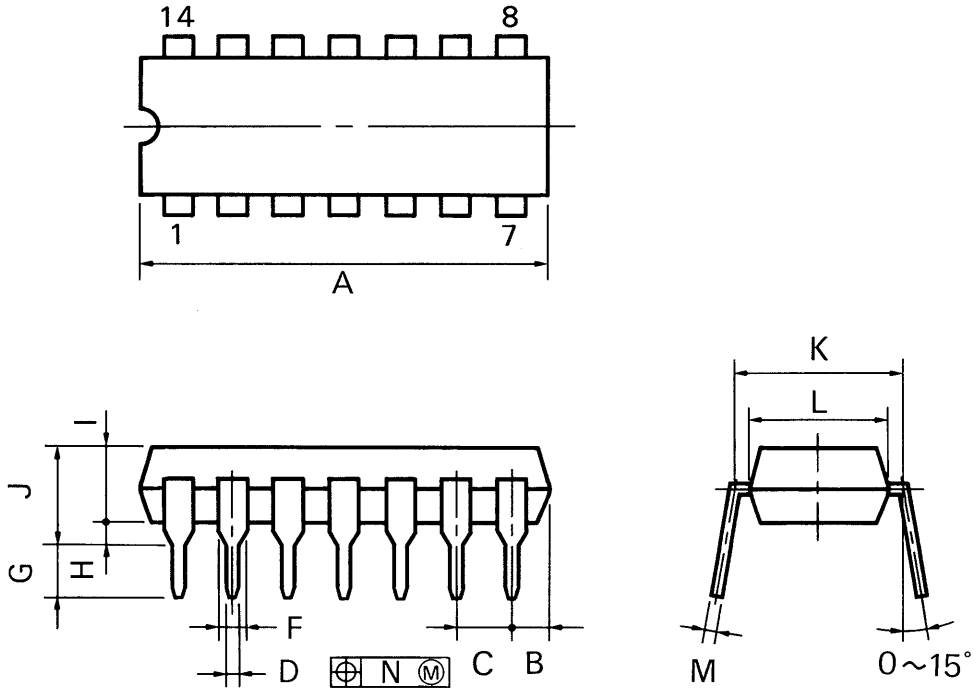
INPUT EQUIVALENT NOISE VOLTAGE DENSITY



SUPPLY CURRENT



14PIN PLASTIC DIP (300 mil)



P14C-100-300B1

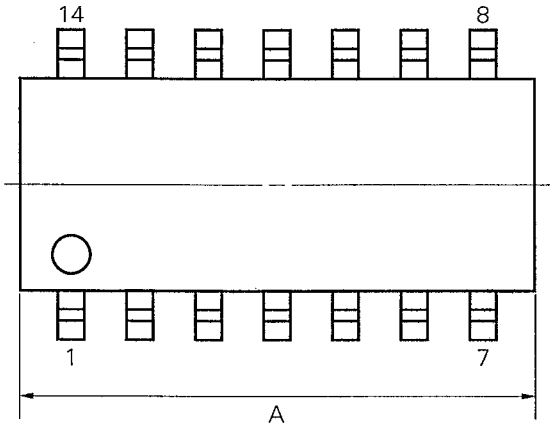
NOTES

1) Each lead centerline is located within 0.25 mm (0.01 inch) of its true position (T.P.) at maximum material condition.

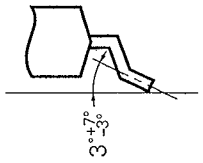
2) Item "K" to center of leads when formed parallel.

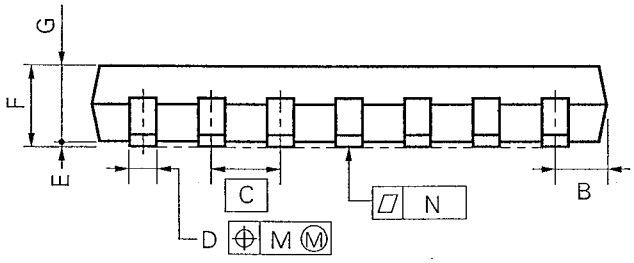
ITEM	MILLIMETERS	INCHES
A	20.32 MAX.	0.800 MAX.
B	2.54 MAX.	0.100 MAX.
C	2.54 (T.P.)	0.100 (T.P.)
D	$0.50^{\pm 0.10}$	$0.020^{+0.004}_{-0.005}$
F	1.2 MIN.	0.047 MIN.
G	$3.6^{\pm 0.3}$	$0.142^{\pm 0.012}$
H	0.51 MIN.	0.020 MIN.
I	4.31 MAX.	0.170 MAX.
J	5.08 MAX.	0.200 MAX.
K	7.62 (T.P.)	0.300 (T.P.)
L	6.4	0.252
M	$0.25^{+0.10}_{-0.05}$	$0.010^{+0.004}_{-0.003}$
N	0.25	0.01

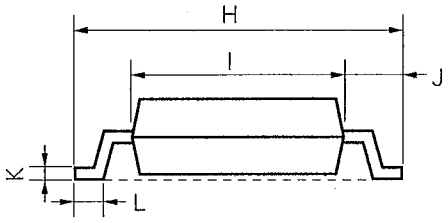
14 PIN PLASTIC SOP (225 mil)



detail of lead end







S14GM-50-225B, C-2

NOTE

Each lead centerline is located within 0.12 mm (0.005 inch) of its true position (T.P.) at maximum material condition.

ITEM	MILLIMETERS	INCHES
A	10.46 MAX.	0.412 MAX.
B	1.42 MAX.	0.056 MAX.
C	1.27 (T.P.)	0.050 (T.P.)
D	$0.40^{+0.10}_{-0.05}$	$0.016^{+0.004}_{-0.003}$
E	0.1±0.1	0.004±0.004
F	1.8 MAX.	0.071MAX.
G	1.49	0.059
H	6.5±0.3	0.256±0.012
I	4.4	0.173
J	1.1	0.043
K	$0.15^{+0.10}_{-0.05}$	$0.006^{+0.004}_{-0.002}$
L	0.6±0.2	$0.024^{+0.008}_{-0.009}$
M	0.12	0.005
N	0.15	0.006

RECOMMENDED SOLDERING CONDITIONS

The following conditions (see table below) must be met when soldering this product.

Please consult with our sales offices in case other soldering process is used, or in case soldering is done under different conditions.

TYPES OF SURFACE MOUNT DEVICE

For more details, refer to our document **"SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL" (IEI-1207)**.

[μPC4741G2]

Soldering method	Soldering conditions	Recommended condition symbol
Infrared ray reflow	Peak package's surface temperature: 230 °C or below, Reflow time: 30 seconds or below (210 °C or higher), Number of reflow process: 1, Exposure limit *: None	IR30-00-1
VPS	Peak package's surface temperature: 215 °C or below, Reflow time: 40 seconds or below (200 °C or higher), Number of reflow process: 1, Exposure limit *: None	VP15-00-1
Wave soldering	Solder temperature: 260 °C or below, Flow time: 10 seconds or below, Number of flow process: 1, Exposure limit *: None	WS15-00-1
Partial heating method	Terminal temperature: 300 °C or below, Flow time: 10 seconds or below, Exposure limit *: None	○

* Exposure limit before soldering after dry-pack package is opened.
Storage conditions: 25 °C and relative humidity at 65 % or less.

Note Do not apply more than a single process at once, except for "Partial heating method".

TYPES OF THROUGH HOLE DEVICE

[μPC4741C]

Soldering method	Soldering conditions	Recommended condition symbol
Wave soldering	Solder temperature: 260 °C or below, Flow time: 10 seconds or below	○

[MEMO]

M4 92.6