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April 1st, 2010 Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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BIPOLAR ANALOG INTEGRATED CIRCUIT $\mu PC4064$

J-FET INPUT LOW-POWER QUAD OPERATIONAL AMPLIFIER

DESCRIPTION

The μ PC4064 is a low power J-FET input quad operational amplifier that will operate at voltage levels as low as ±2 V. Input current is typically less than 1mA. With input bias and offset currents as low as a few pA, the μ PC4064 is an excellent choice for hand-held measurement equipment.

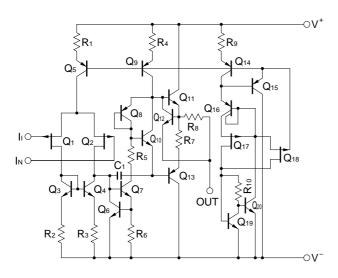
FEATURES

- Low supply current: 800 μA (TYP.)
- · Very low input bias and offset currents
- High input impedance...J-FET Input Stage
- Low supply voltage operation
- Output short circuit protection
- Internal frequency compensation

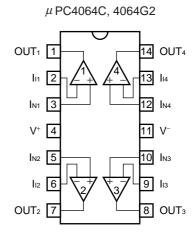
ORDERING INFORMATION

Part Number	Package
μPC4064C	14-pin plastic DIP (7.62 mm (300))
μPC4064G2	14-pin plastic SOP (5.72 mm (225))

EQUIVALENT CIRCUIT (1/4 Circuit)



PIN CONFIGURATION (Top View)



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Document No. G15166EJ4V0DS00 (4th edition) Date Published March 2004 N CP(K) Printed in Japan

The mark \star shows major revised points.

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^{\circ}C$)

Par	ameter	Symbol	Ratings	Unit
Voltage between V^{+} a	nd V ^{-Note 1}	V^*-V^-	-0.3 to +36	V
Differential Input Volta	age	Vid	±30	V
Input Voltage ^{Note 2}		Vı	V⁻–0.3 to V⁺ +0.3	V
Output Voltage ^{Note 3}		Vo	V⁻–0.3 to V⁺ +0.3	V
Power Dissipation	C Package ^{Note 4}	P⊤	570	mW
	G2 Package ^{Note 5}		550	mW
Output Short Circuit Duration ^{Note 6}			Indefinite	sec
Operating Ambient Temperature		TA	-20 to +80	°C
Storage Temperature		Tstg	-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 -7.6 mV/°C when operating ambient temperature is higher than 50°C.
- 5. Thermal derating factor is -5.5 mV/°C when operating ambient temperature is higher than 25°C.
- **6.** Pay careful attention to the total power dissipation not to exceed the absolute maximum ratings, Note 4 and Note 5.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	V^{\pm}	±2		±16	V
Output Source Current	IO SOURCE			5	mA
Output Sink Current	lo sink			3.5	mA
Capacitive Load (A _V = +1, $R_f = 0 \Omega$)	C∟			100	pF

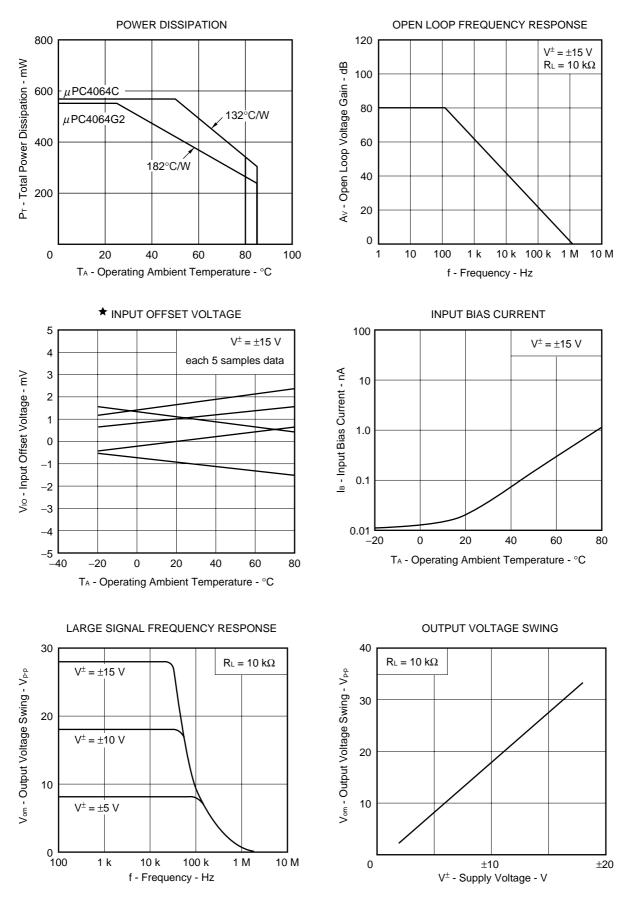
ELECTRICAL CHARACTERISTICS (T_A = 25°C, V[±] = \pm 15 V)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
	Input Offset Voltage	Vio	$R_S \le 50 \ \Omega$		±2	±10	mV
	Input Offset Current Note 7	Ію			±5	±50	pА
	Input Bias Current Note 7	Ів			10	100	pА
	Large Signal Voltage Gain	Av	$R_L \geq 10 \; k\Omega$, V_O = $\pm 10 \; V$	3000	9000		
*	Supply Current Note 8	Icc	lo = 0 A		800	1000	μA
	Common Mode Rejection Ratio	CMR		70	90		dB
	Supply Voltage Rejection Ratio	SVR		70	90		dB
	Output Voltage Swing	Vom	$R_L \ge 10 \ k\Omega$	±12	+14.0		V
					-13.6		
	Common Model Input Voltage Range	VICM		±12	+15		V
					-13		
	Slew Rate	SR	Av = 1		3		V/µs
	Unity Gain Frequency	funity			1		MHz
	Input Equivalent Noise Voltage Density	en	Rs = 100 Ω, f = 1 kHz		30		nV/√Hz
	Channel Separation				120		dB
	Input Offset Voltage	Vio	$R_S \le 50 \ \Omega$, $T_A = -20 \text{ to } +70^{\circ}C$			±15	mV
	Average V ₁₀ Temperature Drift	ΔVιο/ΔΤ	T _A = -20 to +70°C		±10		μV/°C
	Input Offset Current Note 7	Ію	T _A = -20 to +70°C			±2	nA
	Input Bias Current Note 7	Ів	T _A = -20 to +70°C			3.5	nA

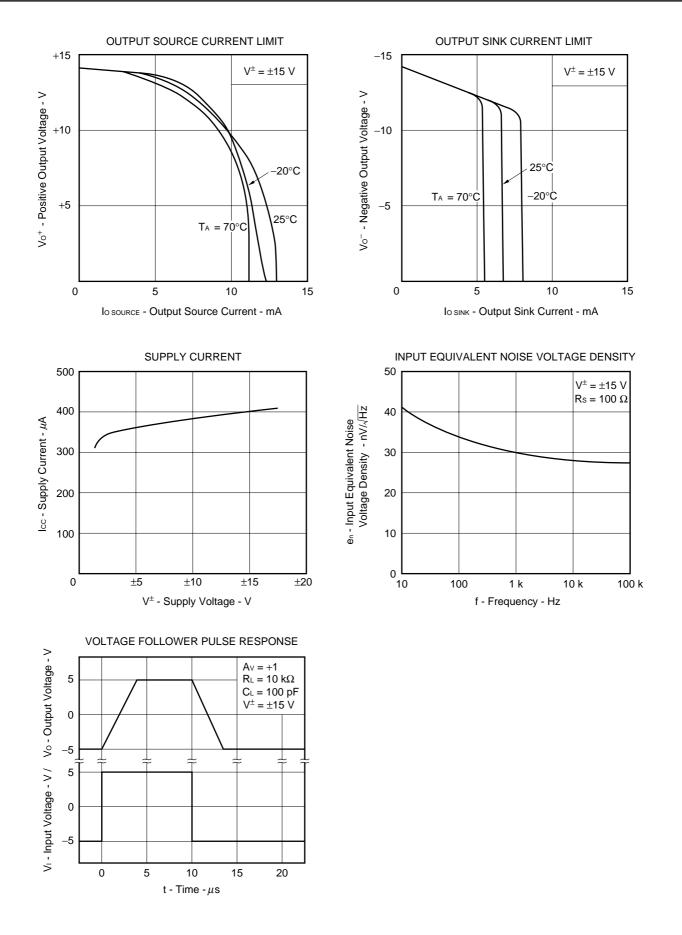
Notes 7. Input bias currents flow into IC. Because each currents are gate leak current of P-channel J-FET on input stage. And that are temperature sensitive. Short time measuring method is recommendable to maintain the junction temperature close to the operating ambient temperature.

8. This current flows irrespective of the existence of use.

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

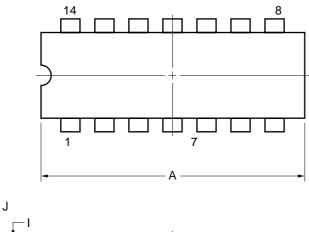


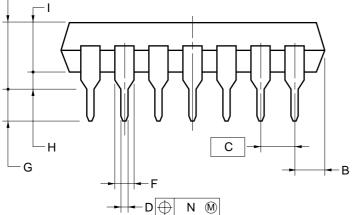
Data Sheet G15166EJ4V0DS

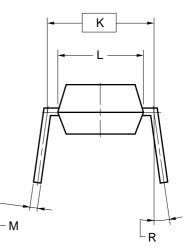


PACKAGE DRAWINGS (Unit : mm)

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







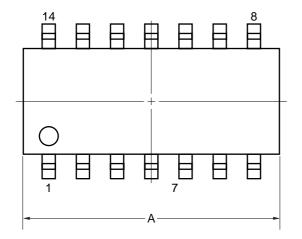
NOTES

- 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.

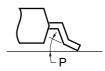
ITEM	MILLIMETERS
А	19.22±0.2
В	2.14 MAX.
С	2.54 (T.P.)
D	0.50±0.10
F	1.32±0.12
G	3.6±0.3
Н	0.51 MIN.
I	3.55
J	4.3±0.2
К	7.62 (T.P.)
L	6.4±0.2
М	$0.25^{+0.10}_{-0.05}$
N	0.25
R	0~15°
	214C-100-200B1-2

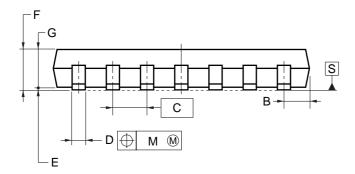
P14C-100-300B1-3

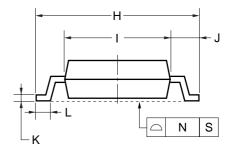
14-PIN PLASTIC SOP (5.72 mm (225))



detail of lead end







NOTE

Each lead centerline is located within 0.1 mm of its true position (T.P.) at maximum material condition.

MILLIMETERS
10.2±0.26
1.42 MAX.
1.27 (T.P.)
$0.42\substack{+0.08\\-0.07}$
0.1±0.1
$1.59^{+0.21}_{-0.2}$
1.49
6.5±0.2
4.4±0.1
1.1±0.16
$0.17\substack{+0.08 \\ -0.07}$
0.6±0.2
0.1
0.10
3° ^{+7°} -3°

S14GM-50-225B, C-6

* RECOMMENDED SOLDERING CONDITIONS

The μ PC4064 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 Surface Mount Device

µPC4064G2: 14-pin plastic SOP (5.72 mm (225))

Process	Conditions	Symbol
Infrared Ray Reflow	Peak temperature: 230°C or below (Package surface temperature), Reflow time: 30 seconds or less (at 210°C or higher), Maximum number of reflow processes: 1 time.	IR30-00-1
Vapor Phase Soldering	Peak temperature: 215°C or below (Package surface temperature), Reflow time: 40 seconds or less (at 200°C or higher), Maximum number of reflow processes: 1 time.	VP15-00-1
Wave Soldering	Solder temperature: 260°C or below, Flow time: 10 seconds or less, Maximum number of flow processes: 1 time, Pre-heating temperature: 120°C or below (Package surface temperature).	WS60-00-1
Partial Heating Method	Pin temperature: 300°C or below, Heat time: 3 seconds or less (Per each side of the device).	-

Caution Apply only one kind of soldering condition to a device, except for "partial heating method", or the device will be damaged by heat stress.

Type of Through-hole Device

µPC4064C: 14-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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