

PRELIMINARY TECHNICAL DATA

Precision Very Low Noise Low Input Bias Current Operational Amplifiers



Preliminary Technical Data AD8671/AD8672/AD8674

FEATURES

Low Noise: $3\text{nV}/\sqrt{\text{Hz}}$
Wide Bandwidth: 10MHz
Low Input Bias Current: 10nA max.
Low Offset Voltage: 75 mV max.
High open loop gain: 135dB
Low Supply Current: 3 mA/Amp
Dual supply operation: $\pm 5\text{V}$ to $\pm 15\text{V}$
Unity Gain Stable
No Phase Reversal

APPLICATIONS

PLL filters
Instrumentation
Sensors and Controls
Professional quality audio

GENERAL DESCRIPTION

The AD8671, AD8672 and AD8674 are precision single, dual and quad amplifiers featuring very low noise, very low offset voltage and drift, low input bias current, 10Mhz bandwidth and low power consumption. Outputs are stable with capacitive loads of over 100pF. Supply current is less than 3 mA per amplifier at 30V.

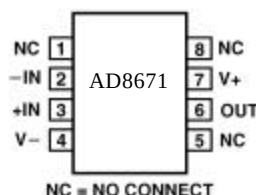
Applications for these amplifiers include high quality PLL filters, instrumentation--thermocouple, RTD, strain-bridge and other sensor signal conditioning--precision filters and professional quality audio.

The AD8671, AD8672 and AD8674 are specified over the extended industrial (-40° to $+125^{\circ}\text{C}$) temperature range. The AD8671, single, is available in the 8-lead MSOP and 8-lead SOIC packages. The AD8672, dual, is available in the 8-lead MSOP and 8-lead SOIC packages. The AD8674, quad, is

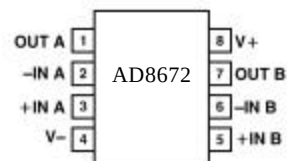
available in 14-lead TSSOP and narrow 14-lead SO packages. Surface mount devices in TSSOP and MSOP packages are available in tape and reel only.

PIN CONFIGURATIONS

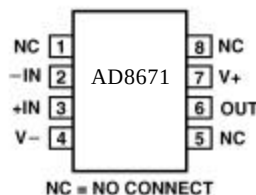
8-Lead MSOP
(RM-8)



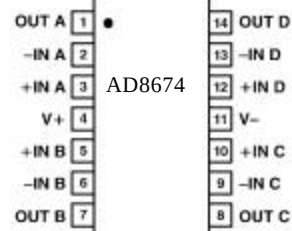
8-Lead SO
(R-8)



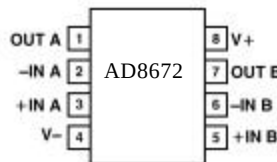
8-Lead SO
(R-8)



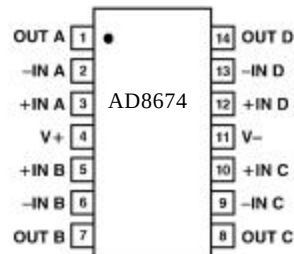
14-Lead TSSOP
(RU-14)



8-Lead MSOP
(RM-8)



14-Lead SO
(R-14)



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AD8671/AD8672/AD8674

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ELECTRICAL CHARACTERISTICS

(@ $V_S = \pm 5.0V$, $V_{CM} = 0V$, $T_A = +25^\circ C$ unless noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
INPUT CHARACTERISTICS						
Offset Voltage	V_{OS}	$-40^\circ < T_A < +125^\circ C$			75 175	μV μV
Input Bias Current	I_B		-10		10	nA
Input Offset Current	I_{OS}		-10		10	nA
Input Voltage Range			-2.5		2.5	V
Common-Mode Rejection Ratio	CMRR	$V_{CM} = -2V$ to $2V$	100	130		dB
Large Signal Voltage Gain	A_{VO}	$R_L = 2\text{ k}\Omega$, $V_O = -3V$ to $3V$	1000	6000		V/mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$	$-40^\circ < T_A < +125^\circ C$		0.3	1	$\mu V/^\circ C$
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	$I_L = 1\text{ mA}$, $-40^\circ C$ to $+125^\circ C$	3	3.8		V
Output Voltage Low	V_{OL}	$I_L = 1\text{ mA}$, $-40^\circ C$ to $+125^\circ C$		-3.9	-3	V
Output Current	I_{OUT}			± 10		mA
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	$V_S = \pm 2.5\text{ V}$ to $\pm 15\text{ V}$	110	130		dB
Supply Current/Amplifier	I_{SY}	$V_O = 0V$ $-40^\circ < T_A < +125^\circ C$		3000	3500 4000	μA μA
DYNAMIC PERFORMANCE						
Slew Rate	SR	$R_L = 2\text{ k}\Omega$		4		V/ μs
Gain Bandwidth Product	GBP			10		MHz
NOISE PERFORMANCE						
Voltage Noise	e_n p-p	0.1 Hz to 10 Hz		0.08		μV p-p
Voltage Noise Density	e_n	$f = 1\text{ kHz}$		3		nV/ $\sqrt{Hz}$
Current Noise Density	i_n	$f = 1\text{ kHz}$		0.2		pA/ $\sqrt{Hz}$

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ELECTRICAL CHARACTERISTICS (@ $V_S = \pm 15V$, $V_{CM} = 0V$, $T_A = +25^\circ C$ unless noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
INPUT CHARACTERISTICS						
Offset Voltage	V_{OS}	$-40^\circ < T_A < +125^\circ C$			75	μV
					175	μV
Input Bias Current	I_B		-10		10	nA
Input Offset Current	I_{OS}		-10		10	nA
Input Voltage Range			-12.5		12.5	V
Common-Mode Rejection Ratio	CMRR	$V_{CM} = -12V$ to $12V$	110	140		dB
Large Signal Voltage Gain	A_{VO}	$R_L = 2\text{ k}\Omega$, $V_O = -10V$ to $10V$	1000	6000		V/mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$	$-40^\circ < T_A < +125^\circ C$		0.3	1	$\mu V/^\circ C$
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	$I_L = 10\text{ mA}$, $-40^\circ C$ to $+125^\circ C$	-10	13.5		V
Output Voltage Low	V_{OL}	$I_L = 10\text{ mA}$, $-40^\circ C$ to $+125^\circ C$		-13.5	10	V
Output Current	I_{OUT}			± 20		mA
Short Circuit Current	I_{SC}			± 30		mA
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	$V_S = \pm 2.5\text{ V}$ to $\pm 15\text{ V}$	110	130		dB
Supply Current/Amplifier	I_{SY}	$V_O = 0V$ $-40^\circ < T_A < +125^\circ C$		3000	3500 4000	μA μA
DYNAMIC PERFORMANCE						
Slew Rate	SR	$R_L = 2\text{ k}\Omega$		4		V/ μs
Gain Bandwidth Product	GBP			10		MHz
NOISE PERFORMANCE						
Voltage Noise	e_n p-p	0.1 Hz to 10 Hz		0.08		μV p-p
Voltage Noise Density	e_n	$f = 1\text{ kHz}$		3		nV/ $\sqrt{Hz}$
Current Noise Density	i_n	$f = 1\text{ kHz}$		0.2		pA/ $\sqrt{Hz}$

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ABSOLUTE MAXIMUM RATINGS¹

Supply voltage	36V
Input Voltage.....	V _S - to V _S +
Differential Input Voltage	TBD
Output Short-Circuit Duration	Indefinite
Storage Temperature Range	
RM, R, RU Package	-65°C to +150°C
Operating Temperature Range	
AD8671/AD8672/AD8674.....	-40°C to +125°C
Junction Temperature Range	
RM, R, RU Package	-65°C to +150°C
Lead Temperature Range (Soldering, 60 Sec).....	+300°C

Package Type	θ_{JA}	θ_{JC}	Units
8-pin MSOP (RM)	190	44	°C/W
8-Pin SOIC (R)	158	43	°C/W
14-Pin TSSOP (RU)	180	35	°C/W
14-Pin SOIC (R)	120	36	°C/W

NOTES

¹ Absolute maximum ratings apply at 25°C, unless otherwise noted.

² θ_{JA} is specified for the worst case conditions, i.e., θ_{JA} is specified for device soldered in circuit board for surface mount packages.

ORDERING GUIDE

Model	Temperature Range	Package Description	Package Option
AD8671ARM	-40°C to +125°C	8-Pin MSOP	RM-8
AD8671AR	-40°C to +125°C	8-Pin SOIC	R-8
AD8672ARM	-40°C to +125°C	8-Pin MSOP	RM-8
AD8672AR	-40°C to +125°C	8-Pin SOIC	R-8
AD8674ARU	-40°C to +125°C	14-Pin TSSOP	RU-14
AD8674AR	-40°C to +125°C	14-Pin SOIC	R-14