PJ76324

QUAD OPERATIONAL AMPLIFIERS
In a SOP-14P and TSSOP-14P Package

GENERAL DESCRIPTION

The PJ76324 consists of four independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low-power supply current drain is independent of the magnitude of the power supply voltage.

Application areas include transducer amplifiers, DC gain blocks and all the conventional op amp circuits.

Available Package : SOP-14P and TSSOP-14P.

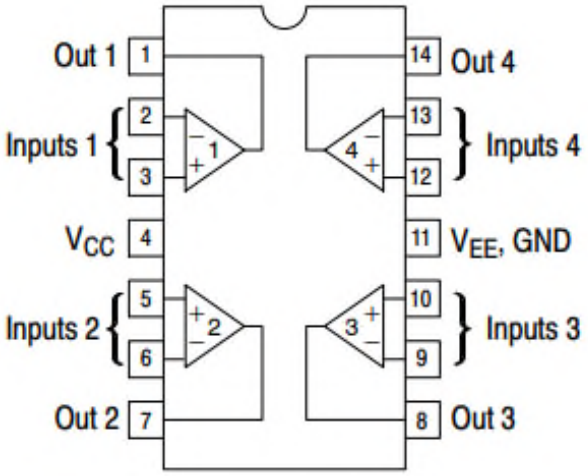
FEATURES

- Wide Supply Voltage Range : 3 V to 36 V
- Low Supply Current Drain essentially Independent of Supply Voltage
- Low Input Biasing Current
- Low Input Offset Current and Offset Voltage
- Input Common-mode Voltage Range includes Ground
- Differential Input Voltage Range Equal to the Power Supply Voltage
- DC voltage gain 100 V/mV (Typ.)
- Internal Frequency Compensation

APPLICATIONS

- Battery Charger
- Cordless Telephone
- Switching Power Supply

PIN CONFIGURATION



SOP-14P and TSSOP-14P (TOP VIEW)

FUNCTIONAL PIN DESCRIPTION

TERMINAL		DESCRIPTION
NUMBER	NAME	
1	Out 1	Output
2	Input 1-	Inverting Input
3	Input 1+	Non-Inverting Input
4	Vcc	IC Power Supply
5	Input 2+	Non-Inverting Input
6	Input 2-	Inverting Input
7	Out 2	Output
8	Out 3	Output
9	Input 3-	Inverting Input
10	Input 3+	Non-Inverting Input
11	GND	Ground
12	Input 4+	Non-Inverting Input
13	Input 4-	Inverting Input
14	Out 4	Output

ORDERING INFORMATION

ORDER NUMBER	Marking ID	Package	Description
PJ76324P_R2	PJ76324 PYMDNN	SOP-14P	Halogen free RoHS compliant in T/R, 4,000 pcs/Reel
PJ76324B_R2	PJ76324 BYMDNN	TSSOP-14P	Halogen free RoHS compliant in T/R, 4,000 pcs/Reel

Note 1

1. Panjit can meet RoHS 2.0/REACH requirement. So most package types Panjit offers only states halogen free, instead of lead free.

MARKING INFORMATION

Marking ID	Package	Definition
PJ76324 **PYMDNN**	SOP-14P	PJ76324: Product code P: Package code Y: Year code M: Month code D: Day code NN: Serial No.
PJ76324 **BYMDNN**	TSSOP-14P	PJ76324: Product code B: Package code Y: Year code M: Month code D: Day code NN: Serial No.

ABSOLUTE MAXIMUM RATINGS

Over operating free-air temperature range (unless otherwise noted) (1)

PARAMETER		MIN	MAX	Unit
Supply Voltage	V_{CC}	-0.3	36	V
		-18	18	V
Differential Input Voltage	V_{IND}		36	V
Input Voltage	V_{IN}	-0.3	36	V
Input Current (V_{IN} < -0.3 V)	I_{IO}		50	mA
Operating junction temperature range	T_J	-40	125	°C
Maximum Junction Temperature	$T_{J(MAX)}$		150	°C
Storage temperature range	T_{STG}	-65	150	°C

(1) Stresses beyond those listed under ***absolute maximum ratings*** may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under ***recommended operating conditions*** is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) All voltage values, unless otherwise noted, are with respect to the midpoint between V_{CC+} and V_{CC-}.

(3) For supply voltages less than ±22 V, the absolute maximum input voltage is equal to the supply voltage.

(4) Differential voltages are at Input+ with respect to Input–.

(5) The output may be shorted to ground or either power supply

RECOMMENDED OPERATING CONDITIONS

PARAMETER		MIN	TYP	MAX	UNIT
V_{CC}	Supply Voltage	3		32	V
T_A	Operating Ambient temperature	-40		85	°C

ELECTRICAL CHARACTERISTICS

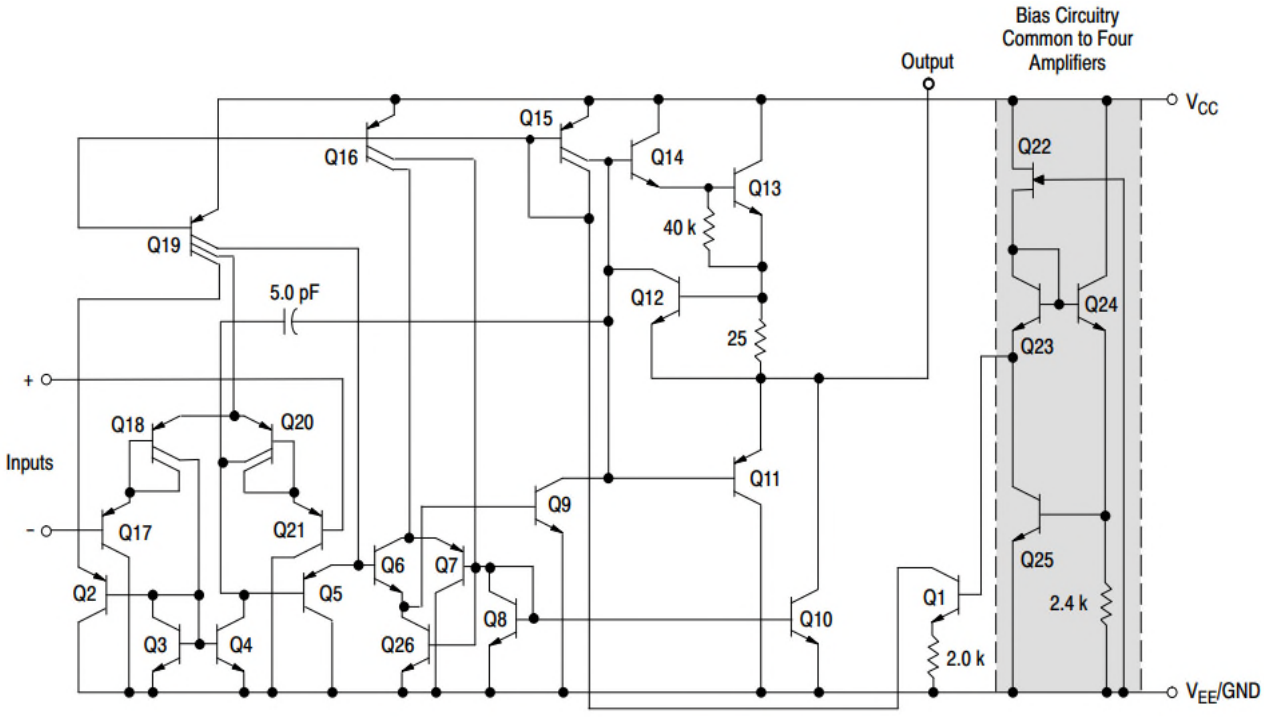
Test Condition : V_{CC} = 5.0 V, unless otherwise specified, all limits are 100% test at T_A = 25°C. (1)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{IO}	Input Offset Voltage	V_{CC} = 5 V to MAX, V_{IC} = V_{ICRMIN}, V_O = 1.4 V, T_A = 25°C		3	7	mV
		V_{CC} = 5 V to 30 V, V_{IC} = V_{ICRMIN}, V_O = 1.4 V, T_A = -40 to 85°C			9	mV
αV_{IO}	Average Temperature Coefficient of Input Offset Voltage	T_A = -40 to 85°C		7		uV/°C
I_{IO}	Input Offset Current	V_O = 1.4 V, T_A = 25°C		2	50	nA
		V_O = 1.4 V, T_A = -40 to 85°C			150	nA
αI_{IO}	Average Temperature Coefficient of Input Offset Current	T_A = -40 to 85°C		10		pA/°C
I_{IB}	Input Bias Current	V_O = 1.4 V, T_A = 25°C		-20	-250	nA
		V_O = 1.4 V, T_A = -40 to 85°C			-500	nA
V_{ICR}	Common-mode Input Voltage Range(1)	V_{CC} = 5 V to MAX, T_A = 25°C	0		V_{CC}–1.5	V
		T_A = -40 to 85°C	0		V_{CC}–2.0	V
V_{OH}	High-level Output Voltage	R_L = 2 kΩ, T_A = 25°C	V_{CC}–1.5			V
		V_{CC} = MAX, R_L = 2 kΩ, T_A = -40 to 85°C	26			V
		V_{CC} = MAX, R_L = 10 kΩ, T_A = -40 to 85°C	27	28		V
V_{OL}	Low-level Output Voltage	R_L = 10 kΩ, T_A = -40 to 85°C		5	20	mV
A_{VD}	Large-Signal Differential Voltage Amplification	V_{CC} = 15V, V_O=1V to 11V, $R_L \geq$ 2 kΩ, T_A = 25°C	25	100		V/mV
		V_{CC} = 15V, V_O=1V to 11V, $R_L \geq$ 2 kΩ, T_A = -40 to 85°C	15			V/mV
CMRR	Common-mode Rejection Ratio	V_{CC} = 5 V to MAX, V_{IC} = V_{ICR} min T_A = 25°C	65	80		dB
k_{SVR}	Supply Voltage RejectionRatio (ΔVcc / ΔV_{IO})	V_{CC} = 5 V to MAX, T_A = 25°C	65	100		dB
Vo1/Vo2	Crosstalk Attenuation	f =1 kHz to 20 kHz, T_A = 25°C		120		dB
I_O	Output Current	V_{CC} = 15 V, V_{ID} = 1 V, V_O = 0 V T_A = 25°C	-20	-30		mA
		V_{CC} = 15 V, V_{ID} = 1 V, V_O = 0 V T_A = -40 to 85°C	-10			mA

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
I_O	Output Current	V_{CC} = 15 V, V_{ID} = 1 V, V_O = 15 V T_A = 25°C	10	20		mA
		V_{CC} = 15 V, V_{ID} = 1 V, V_O = 15 V T_A = -40 to 85°C	5			mA
		V_{ID} = -1 V, V_O = 200 mV	12	30		uA
I_{OS}	Short-Circuit Output Current	V_{CC} at 5V, GND at -5V, VO = 0 TA = -40 to 85°C		±40	±60	mA
I_{CC}	Supply Current (Four Amplifiers)	V_O = 2.5 V, No Load T_A = 25 °C		1.1	2.4	mA
		VCC = MAX, V_O = 0.5 V_{CC}, No Load, T_A = -40 to 85°C		1.5	3	mA

(1) ***All characteristics are measured under open loop conditions with zero common-mode input voltage unless otherwise specified. "MAX" V_{CC} for testing purposes is 30V. Operating temperature: -40 ~ 85°C, MAX Junction temperature: + 150°C.***

SCHEMATIC DIAGRAM



TYPICAL PERFORMANCE CHARACTERISTICS

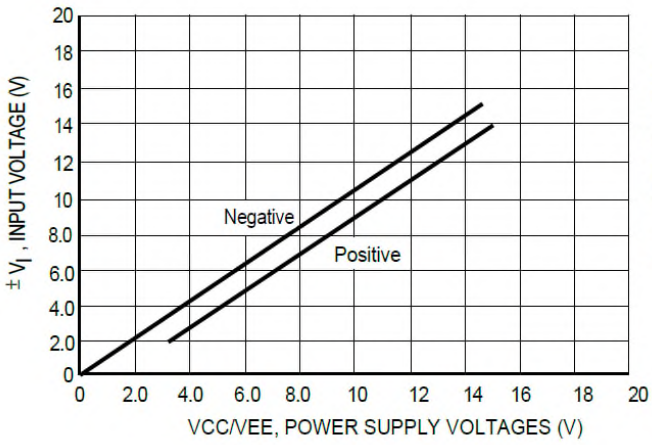


Figure 1. Input Voltage Range

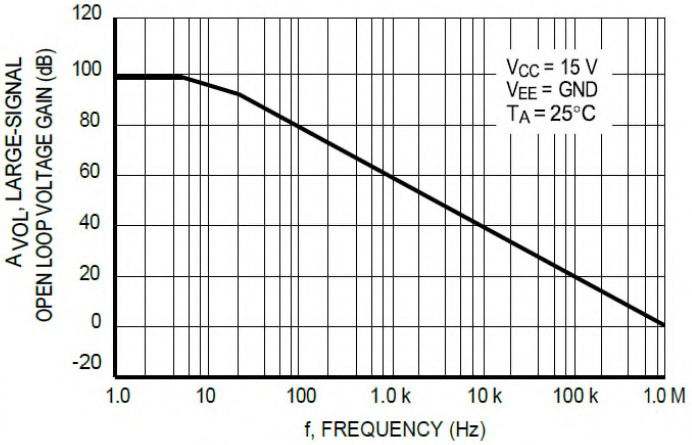


Figure 2. Open Loop Frequency

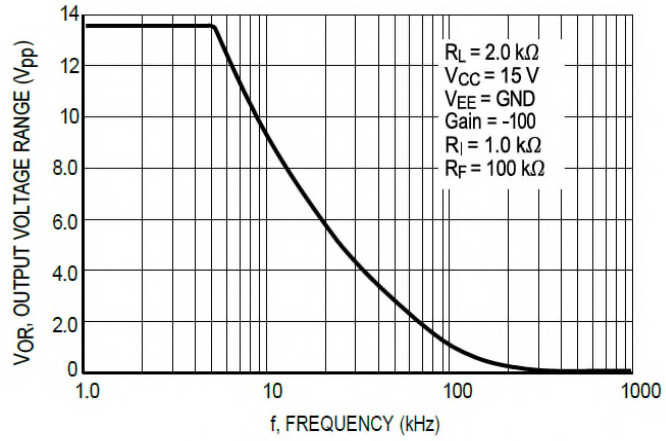


Figure 3. Large−Signal Frequency Response

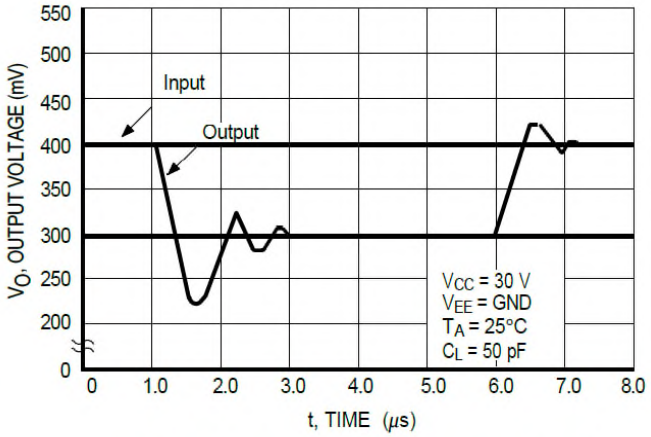


Figure 4. Small−Signal Voltage Follower Pulse Response (Noninverting)

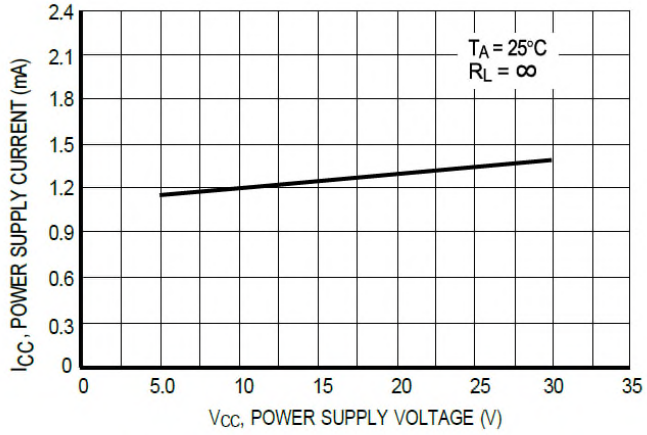


Figure 5. Power Supply Current versus Supply Voltage

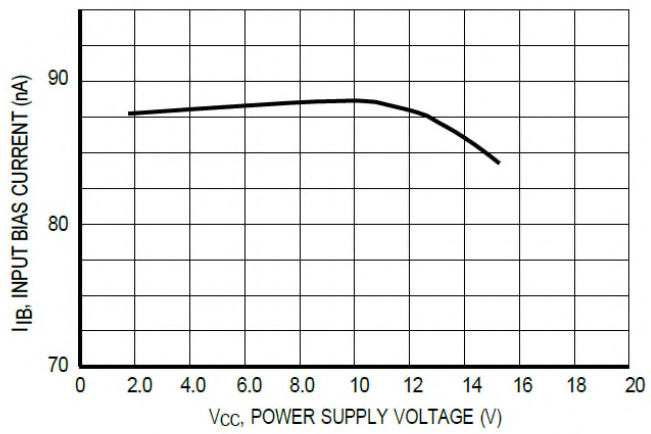
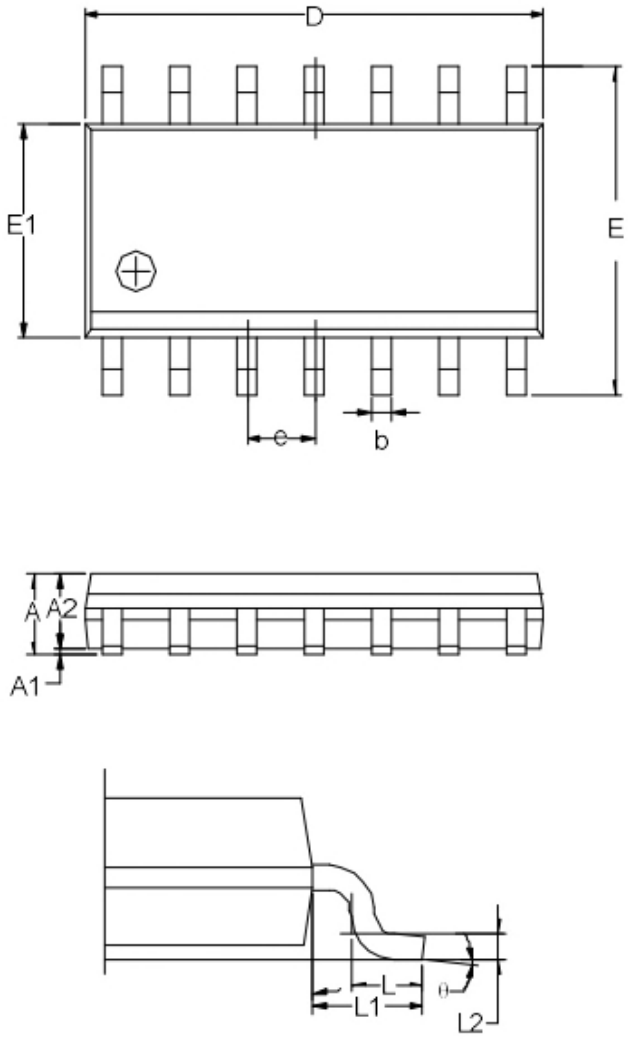


Figure 6. Input Bias Current versus Power Power Supply Voltage

PACKAGE OUTLINE DIMENSION (SOP-14P)

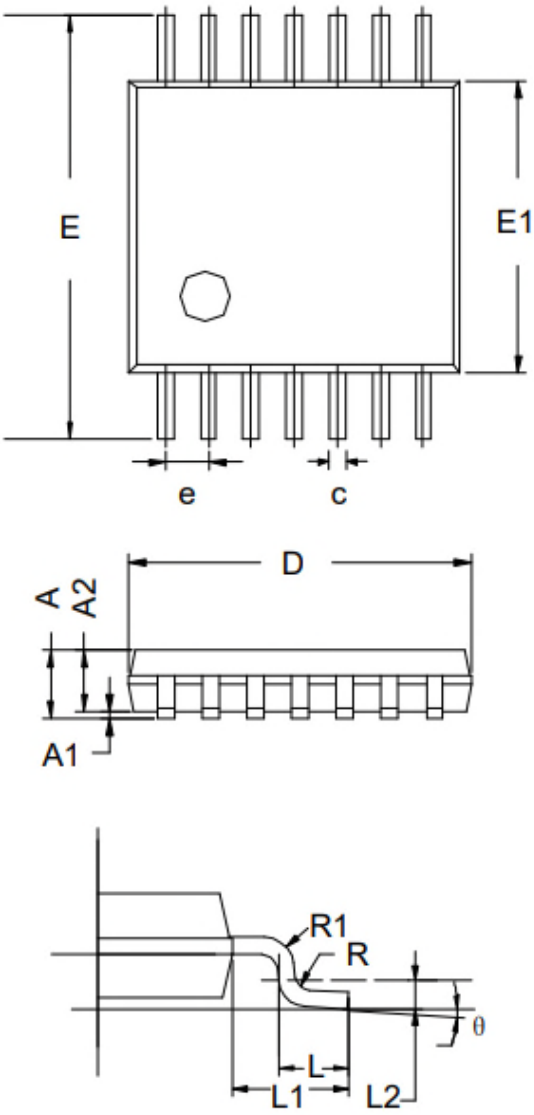
SOP-14P Unit (mm)



Symbol	Dimensions In Millimeters		
	MIN	TYP	MAX
A	1.35	1.60	1.75
A1	0.10	0.15	0.25
A2	1.25	1.45	1.65
b	0.31		0.51
D	8.45	8.63	8.85
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e		1.27 BSC	
L	0.40	0.60	0.80
L1		1.05 REF	
L2		0.25 BSC	
θ	0°		8°

PACKAGE OUTLINE DIMENSION (TSSOP-14P)

TSSOP-14P Unit (mm)



Symbol	Dimensions In Millimeters		
	MIN	TYP	MAX
A	-	-	1.20
A1	0.05	-	0.15
A2	0.80	-	1.05
c	0.19	-	0.30
D	4.86	5.00	5.10
E	6.20	6.40	6.60
E1	4.30	4.40	4.50
e	0.65 BSC		
L	0.45	0.60	0.75
L1	1.00 REF		
L2	0.25 BSC		
R	0.09	-	-
θ	0°	-	8°

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