Quad ground sense operational amplifier

BA10324A/BA10324AF/BA10324AFV

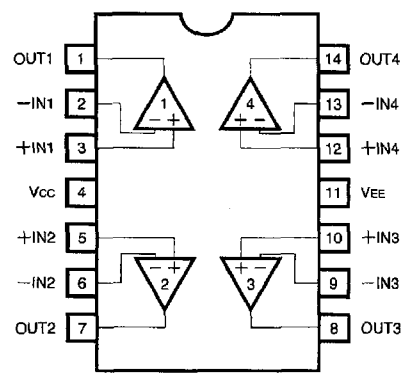
The BA10324A, BA10324AF, and BA10324AFV are monolithic ICs with four built-in operational amplifiers featuring internal phase compensation.
Either a dual or single power supply can be driven, and these products can be driven by a digital system 5V single power supply. These products can be used in a wide range of administrative and industrial applications, including transducer amplifiers and DC amplifiers.

●Applications
Ground sensing type pre-amplifiers
Active filters
DC amplifiers
Pulse generators

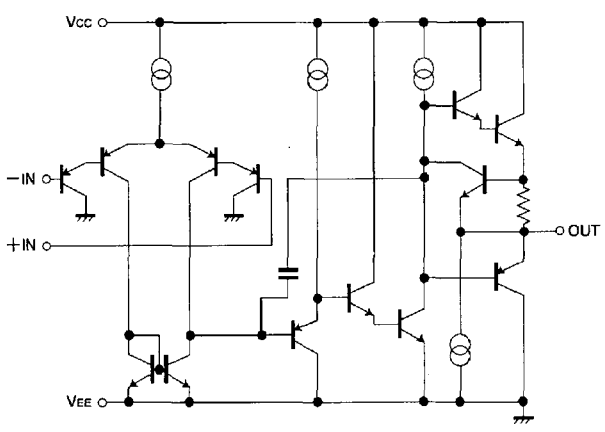
●Features
1) Wide range of operating voltages and single power supply drive enabled.
(single power supply : 3 to 32V, dual power supply : ±1.5 to ±16V)
2) Common mode input voltage can be operated from the ground level.
3) Differential input voltage can be operated up to the power supply voltage level.
4) Low current consumption (I_D = 0.6mA)
5) Low offset voltage and offset current (V_{IO} = 2mV, I_{IO} = 5nA typ.)
6) Four operational amplifiers with phase compensation are built into the DIP/SOP Pin 14.
7) Compatible with model 324 operational amplifiers of other manufacturers.

●Block diagram

BA10324A/BA10324AF/BA10324AFV



●Internal circuit configuration diagram



●Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits			Unit
		BA10324A	BA10324AF	BA10324AFV	
Power supply voltage	Vcc	32 (±16)	32 (±16)	32 (±16)	V
Power dissipation	Pd	1000*	450*	350*	mW
Differential input voltage	VID	±Vcc	±Vcc	±Vcc	V
In-phase input voltage	VI	−0.3~Vcc	−0.3~Vcc	−0.3~Vcc	V
Operating temperature	Topr	−40~85	−40~85	−40~85	℃
Storage temperature	Tstg	−55~125	−55~125	−55~125	℃

*For Pd values, please see Pd characteristic diagram.
Values are those when BA10324AF/BA10324AFV is mounted on a glass epoxy PCB (50 mm x 50 mm x 1.6 mm).

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{CC}=5V)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Conditions
Input offset voltage		V_{IO}	—	2	7	mV	R_S=50Ω
Input offset current		I_{IO}	—	5	50	nA	
Input bias current		Ib	—	20	250	nA	*1
Common mode input voltage		V_{ICM}	0	—	V_{CC}−1.5	V	
Common mode rejection ratio		CMRR	65	75	—	dB	
High-amplitude voltage gain		A_{VOI}	87	100	—	dB	R_L≧2kΩ, V_{CC}=15V
Power supply voltage rejection ratio		PSRR	65	100	—	dB	R_S=50Ω
Quiescent circuit current		I_Q	—	0.6	2.0	mA	R_L=∞, on All Op-Amps
Maximum output voltage		V_{OH}	3.5	3.6	—	V	R_L=2kΩ
		V_{OL}	—	0	0.25	V	R_L=∞
Maximum output current	(Source)	I_{OH}	20	35	—	mA	V_O=0
	(Sink)	I_{OL}	10	20	—	mA	V_O=V_{CC}
Channel separation		CS	—	120	—	dB	f=1kHz input conversion

*1 Because the first stage is configured of a PNP transistor, input bias current is from the IC.

●Electrical characteristic curves

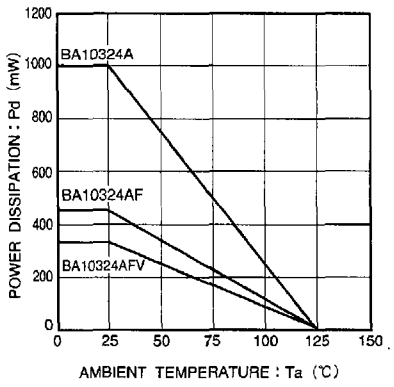


Fig.1 Power dissipation - ambient temperature characteristic

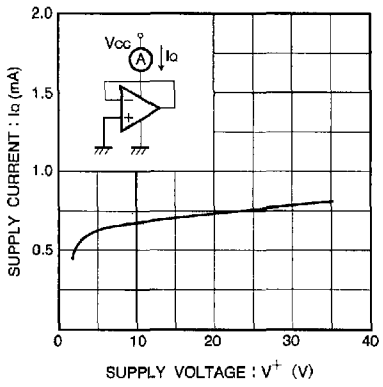


Fig.2 Quiescent current - power supply voltage characteristic

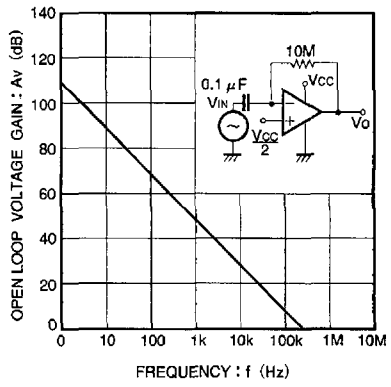


Fig.3 Open loop voltage gain - frequencycharacteristic

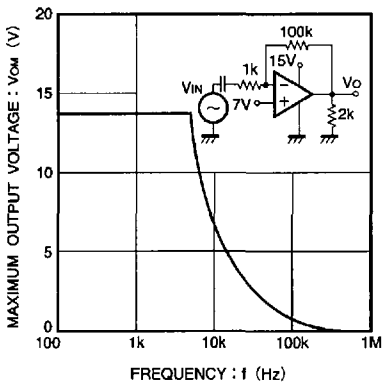


Fig.4 Maximum output voltage - frequency characteristic

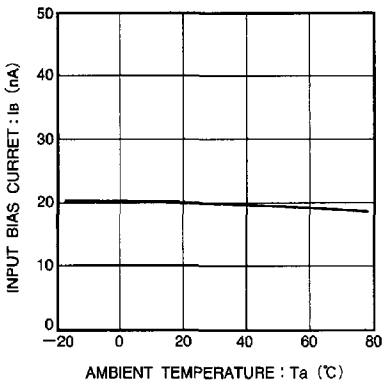


Fig.5 Input bias current - ambient temperature characteristic

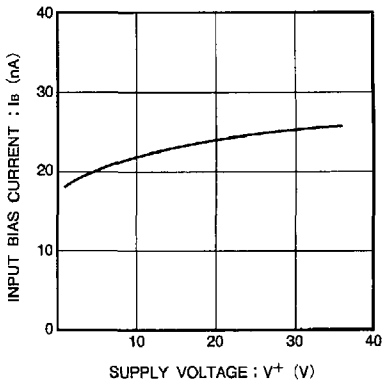


Fig.6 Input bias current - power supply voltage

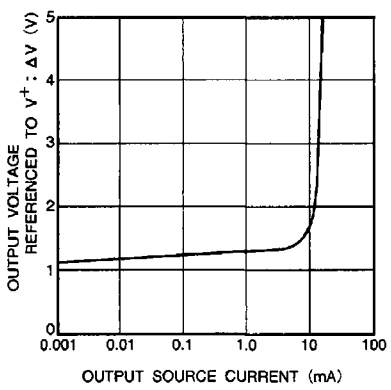


Fig.7 Potential difference during power supply output - output source current characteristic

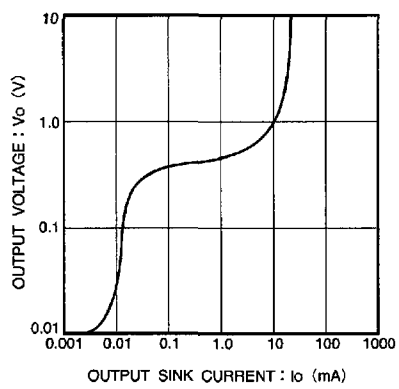


Fig.8 Output voltage - output sink current characteristic

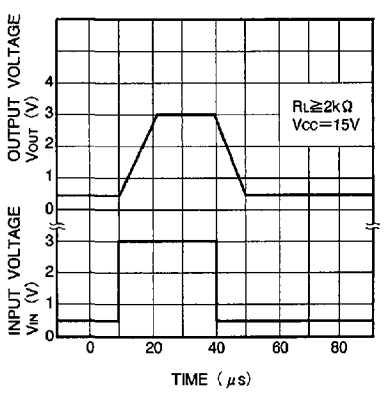


Fig.9 Output response characteristic

●Operation notes

・Unused circuit connections

If there are any circuits which are not being used, we recommend making connections as shown in Figure 10, with the non-inverted input pin connected to the potential within the in-phase input voltage range (VICM).

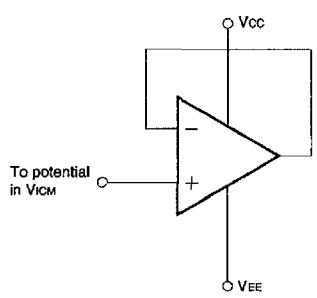
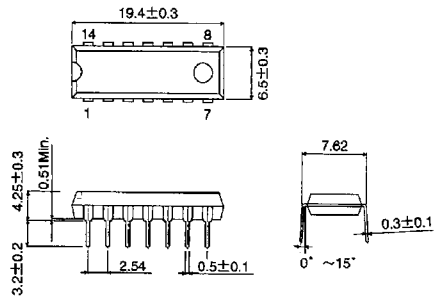


Fig.10 Unused circuit connections

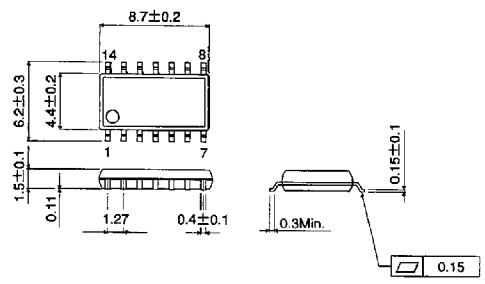
●External dimensions (Units: mm)

BA10324A



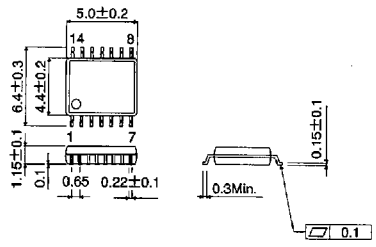
DIP14

BA10324AF



SOP14

BA10324AFV



SSOP - B14