Dual operational amplifier

BA728/BA728F/BA728N

The BA728, BA728F, and BA728N are ICs with two independently functioning operational amplifiers featuring internal phase compensation. These products offer a wide range of operating voltages, from 3 to 18V (±1.5 to 9V) and are high-performance operational amplifiers which can be driven from a single power supply within the in-phase mode input range, including a negative power supply.

●Applications

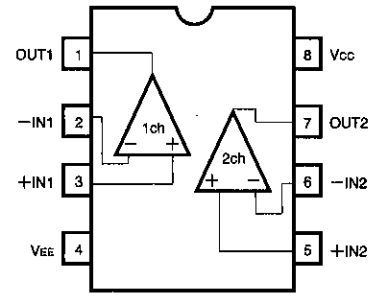
Ground sensing small-signal amplifiers
Control amplifiers requiring high phase margin, such as motor drivers
Amplifiers operated on low voltages
Capacitive loaded amplifiers

●Features

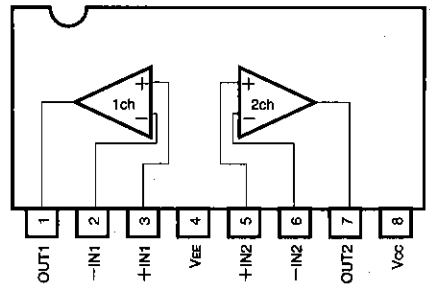
1) Can be driven from a single power supply.
2) Low power.
3) Pin layout is the same as that of the general-purpose 4558 operational amplifier.
4) When driven from a single power supply, the power supply voltage ranges from 3 to 18V.
5) When driven from a dual power supply, the power supply voltage ranges from ±1.5 to ±9V.
6) Output is protected against short-circuits.
7) Output block is operated as a class AB to minimize crossover distortion.
8) Low input bias current of 10nA (typ.).
9) Each package contains two operational amplifiers.
10) Internal phase compensation provided.

●Block diagram

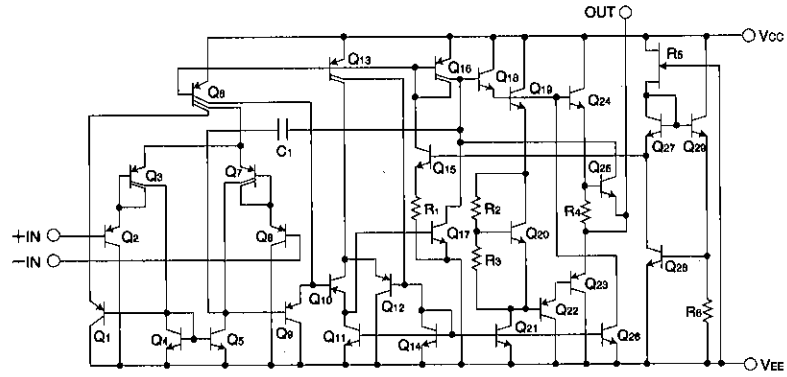
BA728 / BA728F



BA728N



●Internal circuit configuration diagram



●Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits			Unit
		BA728	BA728F	BA728N	
Power supply voltage	V_{CC}	18 (±9)	18 (±9)	18 (±9)	V
Power dissipation	Pd	600*	450*	900*	mW
Differential input voltage	V_{ID}	V_{CC}	V_{CC}	V_{CC}	V
In-phase input voltage	V_I	−0.3~V_{CC}	−0.3~V_{CC}	−0.3~V_{CC}	V
Operating temperature	Topr	−20~75	−20~75	−20~75	℃
Storage temperature	Tstg	−55~125	−55~125	−55~125	℃

* For Pd values, please see Pd characteristic diagram.
* Values are those when BA728F 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}=+6V, V_{EE}=−6V)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Conditions
Input offset voltage		V_{IO}	—	2	10	mV	—
Input offset current		I_{IO}	—	1	50	nA	—
Input bias current		I_B	—	10	250	nA	—
High amplitude voltage gain		A_V	86	100	—	dB	R_L≧2kΩ
Common mode input voltage		V_{ICM}	4~−6	4.5~−6	—	V	—
Maximum output voltage		V_{OM}	±3.0	±4.5	—	V	R_L≧2kΩ
Common mode rejection ratio		CMRR	70	90	—	dB	—
Power supply voltage rejection ratio		PSRR	—	30	150	μV/V	—
Slew rate		S. R.	—	0.7	—	V/μS	A_V=1, R_L=2kΩ
Maximum frequency		f_T	—	0.7	—	MHz	—
Channel separation		CS	—	120	—	dB	—
Maximum output current	source	Isource	—	20	—	mA	V_{IN}^+=1V, V_{IN}^-=0V
	sink	Isink	—	10	—	mA	V_{IN}^-=1V, V_{IN}^+=0V

●Measurement circuits

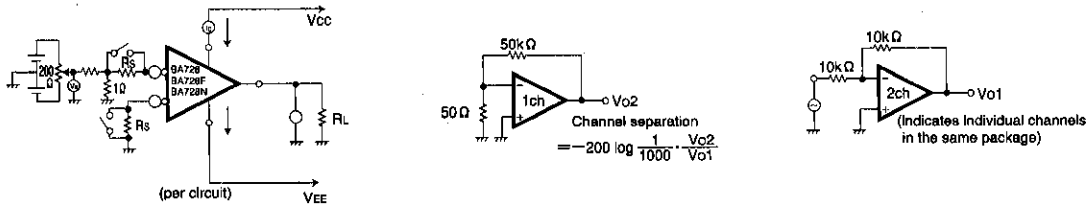


Fig. 1 Channel separation measurement circuit

●Electrical characteristic curves

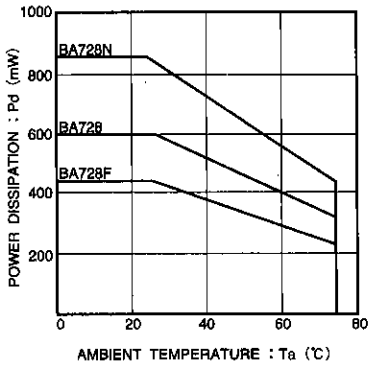


Fig.2 Power dissipation - ambient temperature characteristic

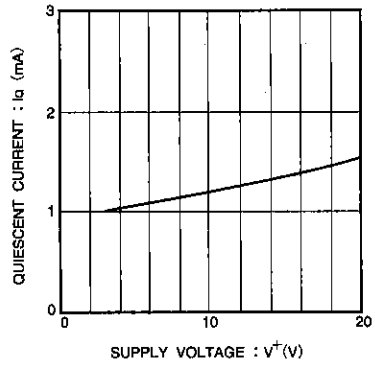


Fig.3 Quiescent current - power supply voltage characteristic

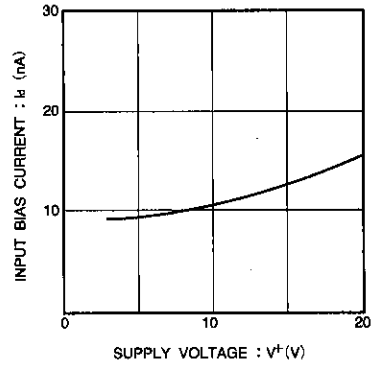


Fig.4 Input bias current - power supply voltage characteristic

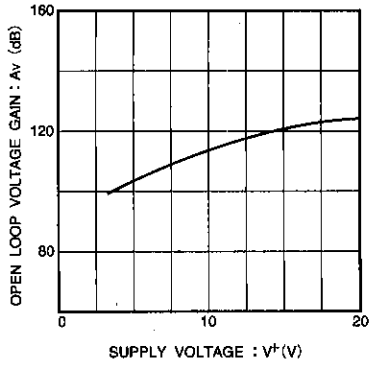


Fig.5 Open loop voltage gain - power supply voltage characteristic

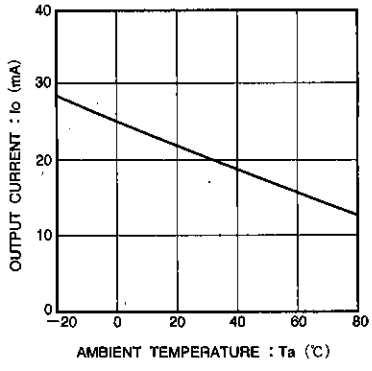


Fig.6 Current control characteristic

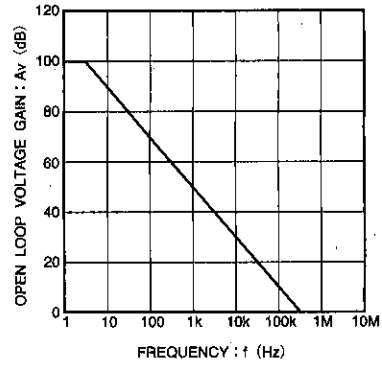


Fig.7 Open loop voltage gain - frequency characteristic

●Electrical characteristic curve

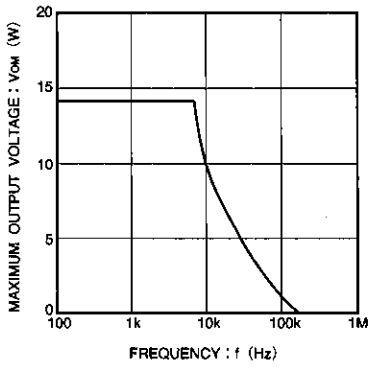


Fig.8 Maximum output voltage - frequency characteristic

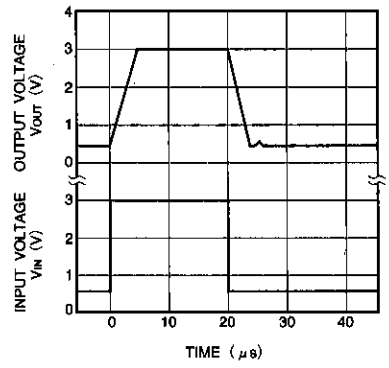


Fig.9 Output response characteristic

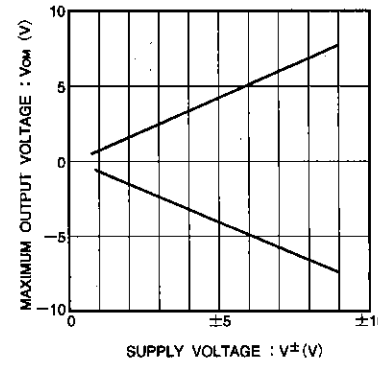


Fig.10 Maximum output voltage - power supply voltage characteristic

●Operation notes

Unused circuit connections

If there are any circuits which are not being used, we recommend making connections as shown in Figure 11, with the non-inverted input pin connected to the potential within the in-phase input voltage range (V_{ICM}).

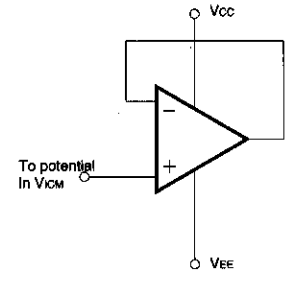
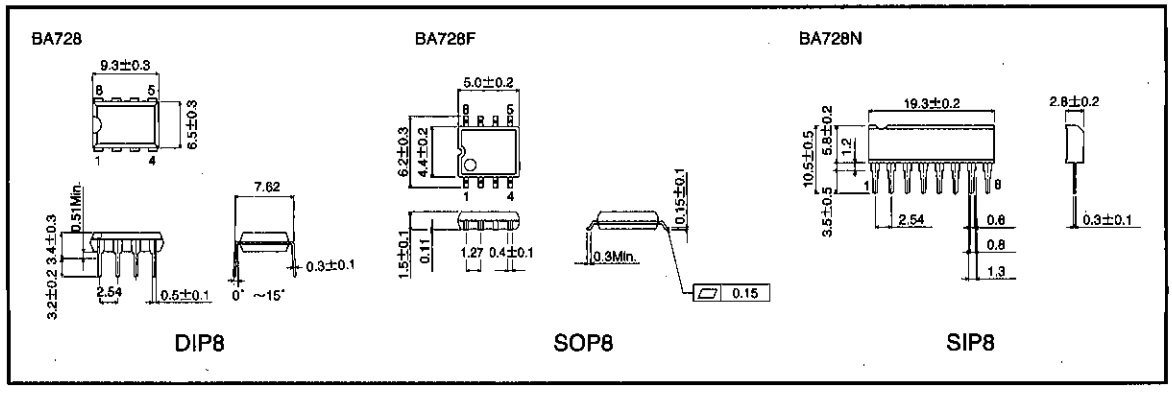


Fig.11 Unused circuit connections

●External dimensions (Units: mm)



Notes

- The contents described in this catalogue are correct as of March 1997.
- No unauthorized transmission or reproduction of this book, either in whole or in part, is permitted.
- The contents of this book are subject to change without notice. Always verify before use that the contents are the latest specifications. If, by any chance, a defect should arise in the equipment as a result of use without verification of the specifications, ROHM CO., LTD., can bear no responsibility whatsoever.
- Application circuit diagrams and circuit constants contained in this data book are shown as examples of standard use and operation. When designing for mass production, please pay careful attention to peripheral conditions.
- Any and all data, including, but not limited to application circuit diagrams, information, and various data, described in this catalogue are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO., LTD., disclaims any warranty that any use of such device shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes absolutely no liability in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices; other than for the buyer's right to use such devices itself, resell or otherwise dispose of the same; no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by ROHM CO., LTD., is granted to any such buyer.
- The products in this manual are manufactured with silicon as the main material.
- The products in this manual are not of radiation resistant design.

The products listed in this catalogue are designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys). Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers, or other safety devices) please be sure to consult with our sales representatives in advance.

- Notes when exporting
  - It is essential to obtain export permission when exporting any of the above products when it falls under the category of strategic material (or labor) as determined by foreign exchange or foreign trade control laws.
  - Please be sure to consult with our sales representatives to ascertain whether any product is classified as a strategic material.