STRUCTURE SILICON MONOLITHIC INTEGRATED CIRCUIT

FUNCTION LOW OFFSET VOLTAGE DUAL OPERATIONAL AMPLIFIERS

PRODUCT SERIES BA8522RF
BA8522RFV
BA8522RFVM

FEATURES
- Operating temperature range(-40[℃]～+105[℃])
- Slew Rate(3.0[V/us] typ.)
- High output current(Io=50[mA] typ.)
- Low input offset voltage(1.5[mV] max.)

○ABSOLUTE MAXIMUM RATINGS(Ta=25[℃])

Parameter	Symbol		Rating	Unit
Supply Voltage	VCC-VEE		+36	V
Power dissipation	Pd	BA8522RF	780(*1)(*4)	mW
		BA8522RFV	690(*2)(*4)	
		BA8522RFVM	590(*3)(*4)	
Differential Input Voltage (*5)	Vid		36	V
Input Common-mode Voltage Range	Vicm		(VEE-0.3)～VEE+36	V
Operating Temperature	Topr		-40～+105	℃
Storage Temperature Range	Tstg		-55～+150	℃
Maximum junction Temperature	Tjmax		150	℃

・This IC is not designed for protection against radioactive rays.
(*1) To use at temperature above Ta=25[℃] reduce 6.24[mW]/[℃].
(*2) To use at temperature above Ta=25[℃] reduce 5.52[mW]/[℃].
(*3) To use at temperature above Ta=25[℃] reduce 4.72[mW]/[℃].
(*4) Mounted on a glass epoxy PCB(70[mm]×70[mm]×1.6[mm]).
(*5) The voltage difference between inverting input and non-inverting input is the differential input voltage. Then input terminal voltage is set to more than VEE.

○OPERATING CONDITION(Ta=-40[℃]～+105[℃])

Parameter	Symbol	Rating	Unit
Supply Voltage	VCC	+4.0～+32.0 (Single Supply)	V
		±2.0～±16.0 (Split Supply)	

Status of this document
The Japanese version of this document is the formal specification.
A customer may use this translation version only for a reference to help reading the formal version.
If there are any differences in translation version of this document formal version takes priority.

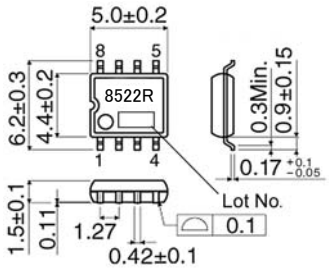
Application example
- ROHM cannot provide adequate confirmation of patents.
- The product described in this specification is designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys). Should you intend to use this product 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 and other safety devices),please be sure to consult with our sales representative in advance.
- ROHM assumes no responsibility for use of any circuits described herein, conveys no license under any patent or other right, and makes no representations that the circuits are free from patent infringement.

○ELECTRICAL CHARACTERISTICS (unless otherwise specified VCC=+15[V]、VEE=-15[V], Ta=25[℃])

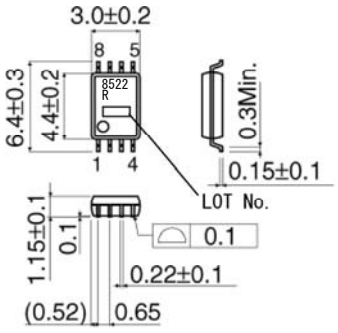
Parameter	Symbol	Guaranteed Limit	Unit			Condition	Parameter
			Min.	Typ.	Max.		
Input Offset Voltage (*6)	Vio	25℃	-	0.1	1.5	mV	
Input Offset Voltage Drift(*6)	Vio/ΔT		-	2	-	μV/℃	
Input Offset Current (*6)	Iio	25℃	-	5	200	nA	
Input Bias Current (*6)	Ib	25℃	-	50	500	nA	
Supply Current	ICC	25℃	-	5.5	9	mA	RL=∞ All Op-Amps
Maximum Output Voltage	VOH	25℃	±12	±13.5	-	V	RL≧10[kΩ]
			±10.5	±11	-	V	RL≧2[kΩ]
Large Signal Voltage Gain	AV	25℃	86	110	-	dB	RL≧2[kΩ],VOUT=±10[V]
Input Common-mode Voltage Range	Vicm	25℃	±12	±14	-	V	
Common-mode Rejection Ratio	CMRR	25℃	70	90	-	dB	
Power Supply Rejection Ratio	PSRR	25℃	76.5	90	-	dB	
Channel Separation	CS	25℃	-	105	-	dB	
Slew Rate	SR	25℃	-	3	-	V/us	
Gain Band Width	GB	25℃	-	6	-	MHz	
Input Referred Noise Voltage	Vni	25℃	-	1.2	-	uVrms	
Total Harmonic Distortion	THD	25℃	-	0.002	-	%	Av=20[dB],VOUT=5[Vrms],f=1[kHz]

(*6) Absolute value.

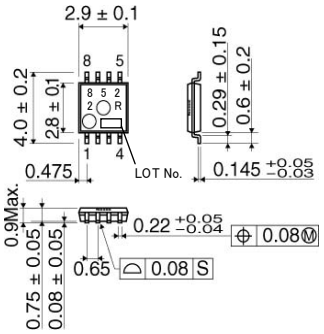
○ Physical Dimensions



BA8522RF(SOP8) (単位 : [mm])

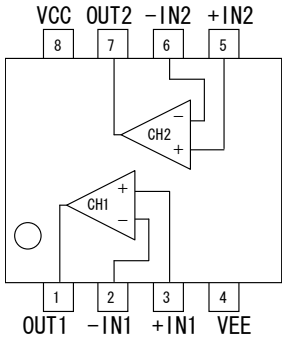


BA8522RFV(SSOP-B8) (単位 : [mm])



BA8522RFVM(MSOP8) (単位 : [mm])

○Block Diagram



F:SOP8 FV:SSOP-B8 FVM:MSOP8

○Pin No.・Pin Name

Pin No.	Pin Name
1	OUT1
2	−IN1
3	+IN1
4	VEE
5	+IN2
6	−IN2
7	OUT2
8	VCC

○Application example

(1) Absolute maximum ratings

Absolute maximum ratings are the values which indicate the limits, within which the given voltage range can be safely charged to the terminal. However, it does not guarantee the circuit operation.

(2) The example of disabled circuit application

When there is a circuit not in use, it is recommended to make the non-inverting input terminal be the potential in the common-mode input voltage range like in Fig.1.
Circuit operation is guaranteed within Operating Conditions.

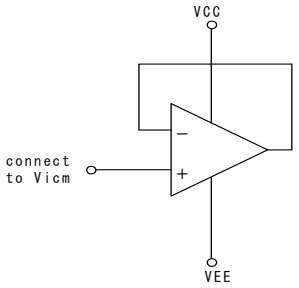


Fig.1 The example of disabled circuit

(3) Applied voltage to the input terminal

For normal circuit operation of operational amplifier, please input voltage for its input terminal within input common mode voltage VCC-2.0[V]. Then, regardless of power supply voltage,VEE+36[V] can be applied to input terminals without deterioration or destruction of its characteristics.

(4) Operating power supply (split power supply/single power supply)

The OP-Amp operates if a given level of voltage is applied between VCC and VEE. Therefore, the OP-Amp can be operated under single power supply or split power supply.

(5) Power dissipation(Pd)

If the IC is used under excessive power dissipation. An increase in the chip temperature will cause deterioration of the radical characteristics of IC.
For example, reduction of current capability. Take consideration of the effective power dissipation and thermal
design with a sufficient margin. Pd is reference to the provided power dissipation curve.

(6) Short circuits between pins and incorrect mounting

Short circuits between pins and incorrect mounting when mounting the IC on a printed circuits board, take notice of the direction and positioning of the IC.
If IC is mounted erroneously, It may be damaged. Also, when a foreign object is inserted between output, between output and VCC terminal or VEE terminal which causes short circuit, the IC may be damaged.

(7) Using under strong electromagnetic field

Be careful when using the IC under strong electromagnetic field because it may malfunction.

(8) Usage of IC

When stress is applied to the IC through warp of the printed circuit board,
The characteristics may fluctuate due to the piezo effect.
Be careful of the warp of the printed circuit board.

(9) Testing IC on the set board

When testing IC on the set board, in cases where the capacitor is connected to the low impedance, make sure to discharge per fabrication because there is a possibility that IC may be damaged by stress.
When removing IC from the set board, it is essential to cut supply voltage.
As a countermeasure against the static electricity, observe proper grounding during fabrication process and take due care when carrying and storage it.

(10) The IC destruction caused by capacitive load

The transistors in circuits may be damaged when VCC terminal and VEE terminal is shorted with the charged output terminal capacitor.
When IC is used as a comparator or as application circuits no constructed negative feed back, where oscillation is not activated by an output capacitor, the output capacitor must be kept below 0.1[μF] in order to prevent the damage mentioned above.

(11) The oscillation caused by capacitive load

Designed negative feedback circuit using this IC, verify output oscillation caused by capacitive load.

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