STRUCTURE SILICON MONOLITHIC INTEGRATED CIRCUIT

FUNCTION LOW NOISE DUAL OPERATIONAL AMPLIFIERS

PRODUCT SERIES **BA4558RF**
BA4558RFV
BA4558RFVM

FEATURES
- Wide operating temperature range. (-40～+105[℃])
- Internal phase compensation type.

○ABSOLUTE MAXIMUM RATINGS(Ta=25[℃])

Parameter	Symbol		Rating	Unit
Supply Voltage	VCC-VEE		+36	V
Power dissipation	Pd	BA4558RF	780(*1)(*4)	mW
		BA4558RFV	690(*2)(*4)	mW
		BA4558RFVM	590(*3)(*4)	mW
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 6.3[mW]/[℃].
(*2) To use at temperature above Ta=25[℃] reduce 5.6[mW]/[℃].
(*3) To use at temperature above Ta=25[℃] reduce 4.8[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～±15.0 (Split Supply) +8.0～+30.0 (Single Supply)	V

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.
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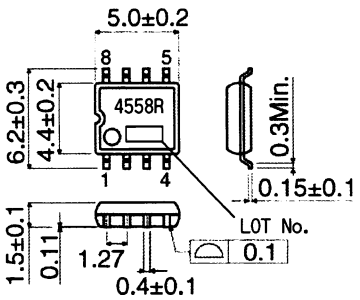
○ELECTRICAL CHARACTERISTICS (unless otherwise specified VCC=+15[V]、VEE=-15[V])

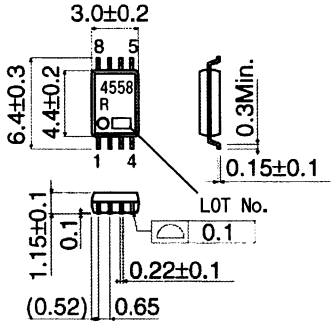
Parameter	Symbol	Temperature Range	Guaranteed Limit			Unit	Condition
			Min.	Typ.	Max.		
Input Offset Voltage (*6)	Vio	25℃	-	0.5	6	mV	VOUT=0[V]
		full range	-	-	7		
Input Offset Current (*6)	Iio	25℃	-	5	200	nA	VOUT=0[V]
		full range	-	-	200		
Input Bias Current (*6)	Ib	25℃	-	60	500	nA	VOUT=0[V]
		full range	-	-	800		
Supply Current	ICC	25℃	-	3	6	mA	RL=∞ All Op-Amps,VIN+=0[V]
		full range	-	-	6.5		
Maximum Output Voltage	VOH	25℃	±10	±13	-	V	RL≧2[kΩ]
		full range	±10	-	-		
		25℃	±12	±14	-		RL≧10[kΩ]
Large Signal Voltage Gain	AV	25℃	86	100	-	dB	RL≧2[kΩ],VOUT=±10[V], VIN+=0[V]
		full range	83	-	-		
Input Common-mode Voltage Range	Vicm	25℃	±12	±14	-	V	VOUT=±12[V]
		full range	±12	-	-		
Common-mode Rejection Ratio	CMRR	25℃	70	90	-	dB	VOUT=±12[V]
Power Supply Rejection Ratio	PSRR	25℃	76.5	90	-	dB	Ri≦10[kΩ]
Channel Separation	CS	25℃	-	105	-	dB	R1=100[Ω], f=1[kHz]
Slew Rate	SR	25℃	-	1	-	V/μs	AV=0[dB],RL=2[kΩ], CL=100[pF]
Maximum Frequency	ft	25℃	-	2	-	MHz	RL=2[kΩ]
Total Harmonic Distortion	THD	25℃	-	0.005	-	%	AV=20[dB],RL=10[kΩ], VIN=0.05[Vrms], f=1[kHz]
Input Referred Noise Voltage	Vn	25℃	-	12	-	nV/√Hz	RS=100[Ω],Vi=0[V],f=1[kHz]

(*6) Absolute value.

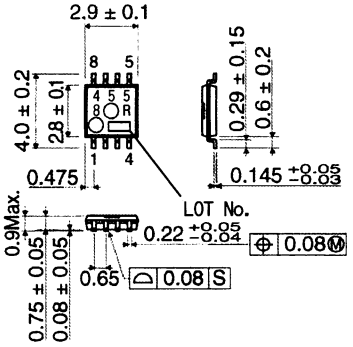
○Physical Dimensions



BA4558RF(SOP8) (Unit:[mm])

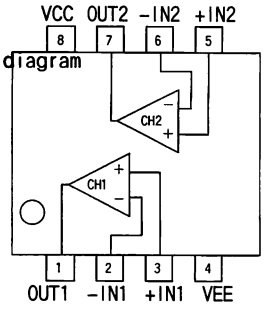


BA4558RFV(SSOP-B8) (Unit:[mm])



BA4558RFVM(MSOP8)(Unit:[mm])

○Block diagram



○Pin No. • Pin Name

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

F:SOP8 FV:SSOP-B8 FVM:MSOP8

○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".

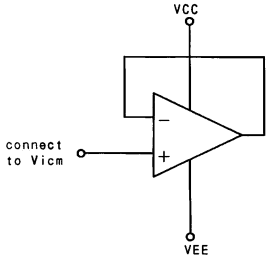


Fig.1 The example of disable circuit

(3) Applied voltage to the input terminal

For normal circuit operation of comparator, please input voltage for its input terminal within input common mode voltage VCC-1.5[V].
Then, regardless of power supply voltage, VEE+36[V] can be applied to input terminals without deterioration or destruction of its characteristics.

(4) Maximum output voltage

Because the output voltage range becomes narrow as the output current increases, design the application with margin by considering changes in electrical characteristics and temperature characteristics.

(5) Output short circuit

If short circuits occur between the output terminal and VCC terminal or between the output terminal and VEE terminal, excessive output current may flow and generate heat, causing destruction of the IC depending on the conditions. To prevent this, protection against short circuit is required by Connecting a resistor as shown in Fig.2.

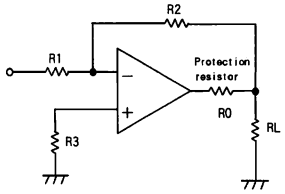


Fig.2 The example of protection resistor

(6) 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.

(7) 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.

(8) 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 power supply or GND terminal which causes short circuit, the IC may be damaged.

(9) Using under strong electromagnetic field

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

(10) 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.

(11) 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.

(12) 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.

(13) The oscillation caused by capacitive load

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

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