

ASSP

# QUAD OPERATIONAL AMPLIFIER

## MB3615

### QUAD OPERATIONAL AMPLIFIER

#### OPERATES FROM A SINGLE OR DUAL POWER SUPPLY

The Fujitsu MB3615 is a Quad operational amplifier having a phase compensatory circuit and operates from a single power supply or dual power supplies.

The device has equivalent electrical characteristics of current industrial standard operational amplifier and requires low power supply current.

MB3615 can be mounted in high density because it integrates 4 circuits on a chip in 14-pin package. It is taking the countermeasure for cross-over distortion, so can be used for amplifying AC.

The MB3615 is pin compatible with Motorola MC3303.

- No phase compensation required
- Wide power supply voltage
  - Single power supply: +3 to +30 V
  - Dual power supplies:  $\pm 1.5$  to  $\pm 15$  V
- Wide input common mode range: 0 to (VCC -1.5) V
- Low power supply current: 2 mA typ.
- Low Cross-over distortion

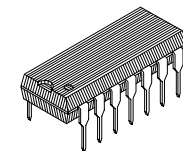
#### ABSOLUTE MAXIMUM RATINGS (see NOTE)

Ta=25°C

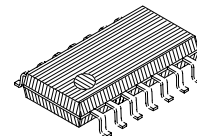
| Rating                       | Symbol           | Value       | Unit |
|------------------------------|------------------|-------------|------|
| Power Supply Voltage *       | V <sub>CC</sub>  | 36          | V    |
| Differential Input Voltage * | V <sub>ID</sub>  | 36          | V    |
| Input Common Mode Voltage *  | V <sub>I</sub>   | -0.3 to +36 | V    |
| Power Dissipation            | P <sub>D</sub>   | 570         | mW   |
| Operating Temperature        | T <sub>OP</sub>  | -20 to +75  | °C   |
| Storage Temperature          | T <sub>STG</sub> | -55 to +125 | °C   |

NOTE: \* Single Power Supply.

Permanent device damage may occur if the above **Absolute Maximum Ratings** are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

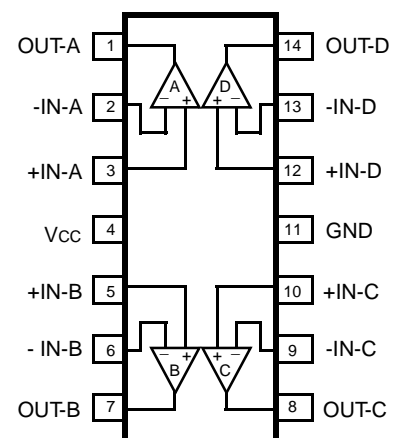


PLASTIC PACKAGE  
DIP-14P-M02



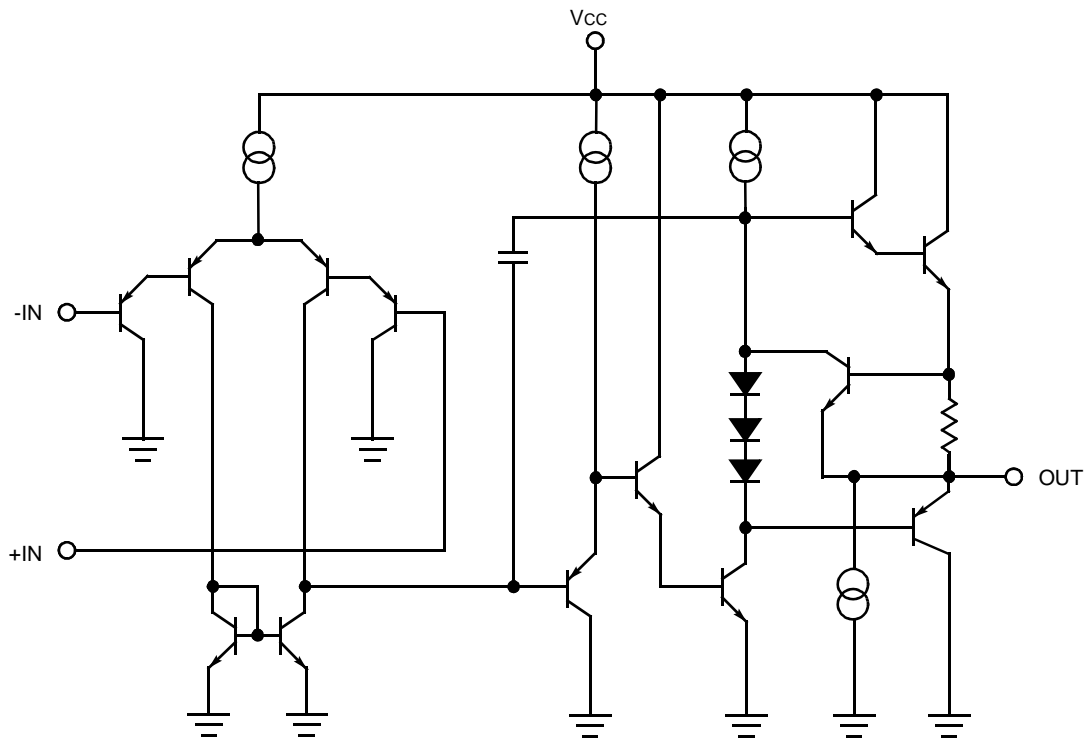
PLASTIC PACKAGE  
FPT-14P-M04

#### PIN ASSIGNMENT (TOP VIEW)



This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields. However, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit.

Fig. 1 — MB3615 EQUIVALENT CIRCUIT



## ■ ELECTRICAL CHARACTERISTICS

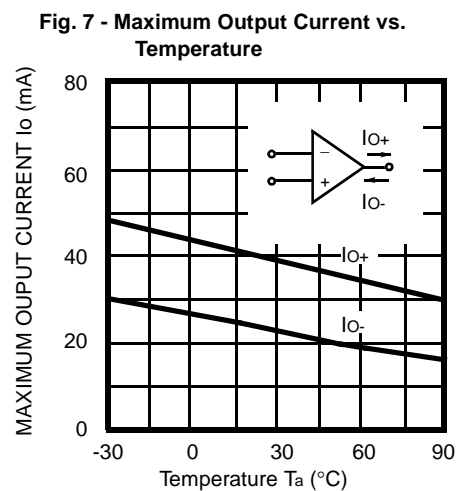
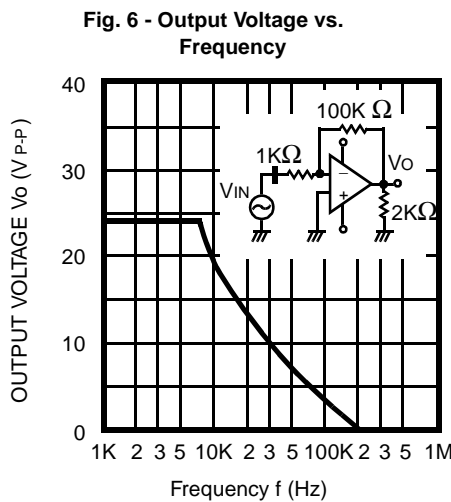
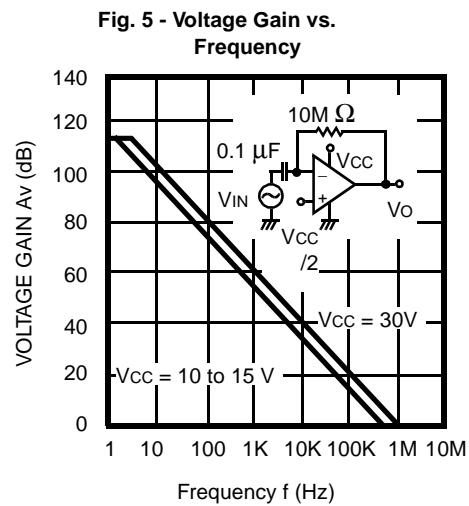
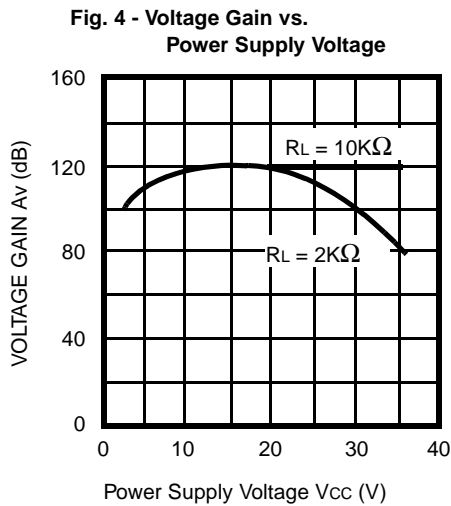
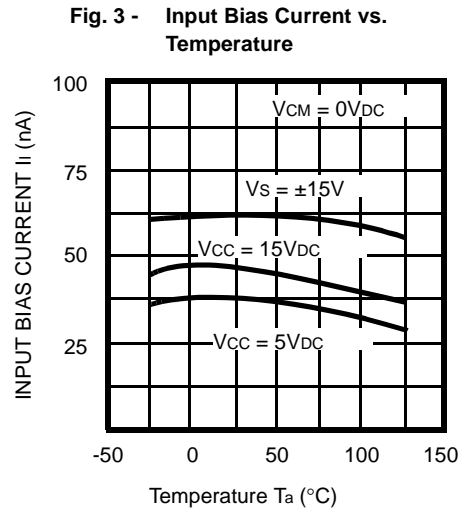
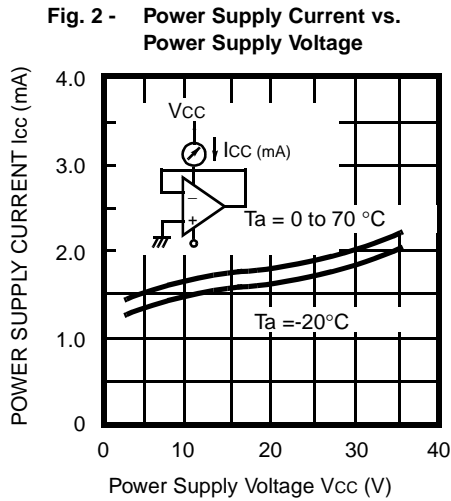
(VCC = +15V, VEE = -15V, Ta = 25°C)

| Parameter                            | Symbol              | Condition            | Value           |     |                      | Unit |
|--------------------------------------|---------------------|----------------------|-----------------|-----|----------------------|------|
|                                      |                     |                      | Min             | Typ | Max                  |      |
| Input Offset Voltage                 | V <sub>IO</sub>     | -                    | -               | 2   | 7                    | mV   |
| Input Offset Current                 | I <sub>IO</sub>     | -                    | -               | 5   | 50                   | nA   |
| Input Bias Current                   | I <sub>I</sub> *    | -                    | -               | 45  | 250                  | nA   |
| Power Supply Current                 | I <sub>CC</sub>     | R <sub>L</sub> = ∞   | -               | 2.0 | 4.0                  | mA   |
| Input Common Mode Voltage            | V <sub>CM</sub>     | -                    | V <sub>EE</sub> | -   | V <sub>CC</sub> -1.5 | V    |
| Voltage Gain                         | A <sub>v</sub>      | R <sub>L</sub> ≥ 2kΩ | 20              | 100 | -                    | V/mV |
| Output Voltage Range                 | V <sub>OM</sub>     | R <sub>L</sub> ≥ 2kΩ | ±10             | ±12 | -                    | V    |
|                                      |                     | R <sub>L</sub> = 2kΩ | ±12             | ±13 | -                    | V    |
| Output Current                       | I <sub>SOUECE</sub> | -                    | 10              | 40  | -                    | mA   |
|                                      | I <sub>SINK</sub>   | -                    | 10              | 20  | -                    | mA   |
| Common Mode Rejection Ratio          | CMRR                | -                    | 70              | 85  | -                    | dB   |
| Power Supply Voltage Rejection Ratio | SVRR                | -                    | 65              | 100 | -                    | dB   |
| Channel Separation                   | CS                  | -                    | -               | 120 | -                    | dB   |

NOTE:

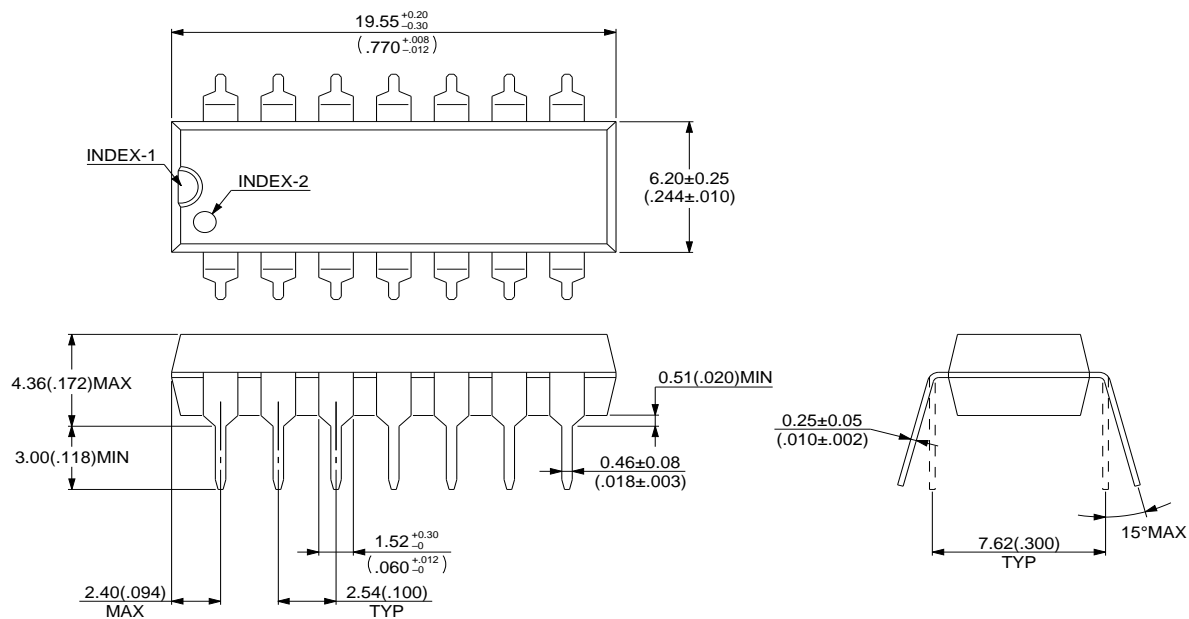
\* A direction of the input bias current flows from IC because first input transistor consists of PNP.

## TYPICAL CHARACTERISTICS CURVES



## ■ PACKAGE DIMENSIONS

14 pin, Plastic DIP  
(DIP-14P-M02)

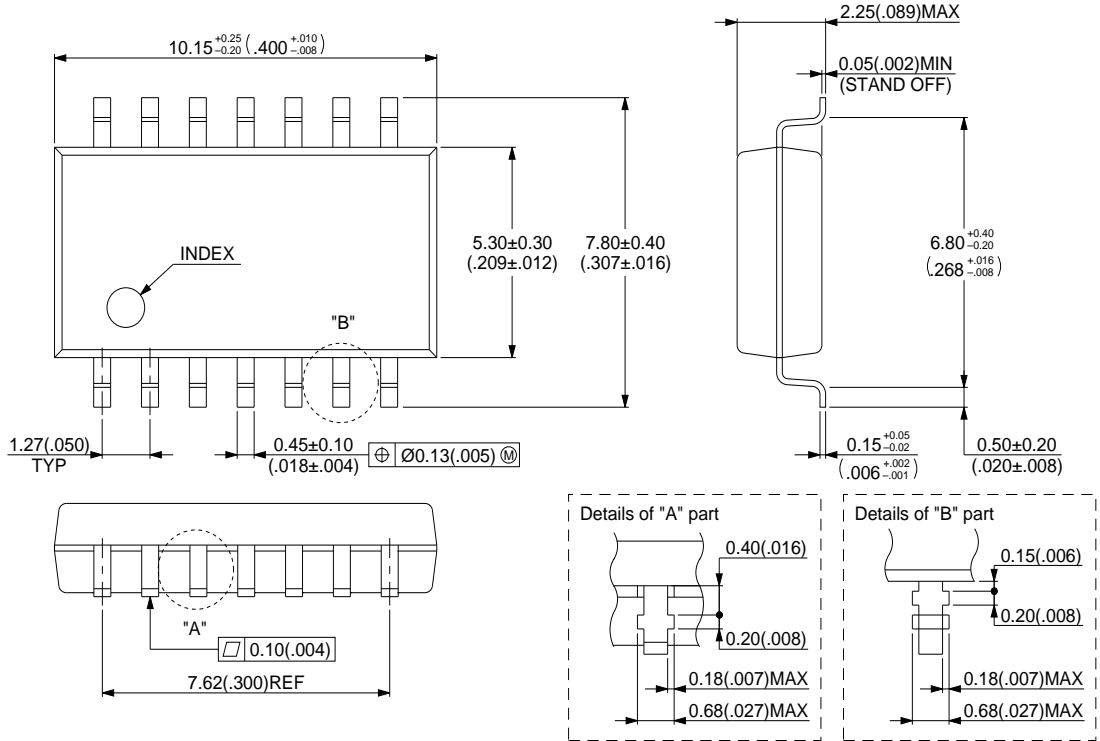


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Dimensions in mm(inches).

## ■ PACKAGE DIMENSIONS (Continued)

14 pin, Plastic SOP  
(FPT-14P-M04)



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Dimensions in mm(inches).

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