April 1990
Edition 2.0

FUJITSU

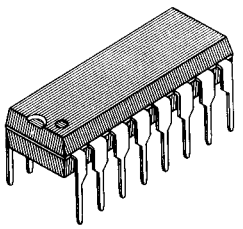
DATA SHEET

MB3604
HIGH FREQUENCY OPERATIONAL AMPLIFIER

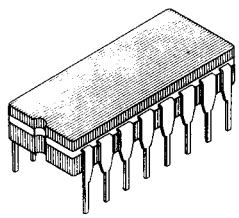
HIGH FREQUENCY SINGLE OPERATIONAL AMPLIFIER

The Fujitsu MB3604 is a monolithic high frequency operational amplifier fabricated by Fujitsu Bipolar Technology.

The MB3604 has differential inputs, single-end output, and an on-chip buffer transistor for video band use.

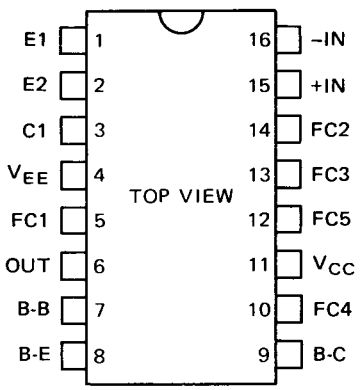


PLASTIC PACKAGE
DIP-16P-M04



CERAMIC PACKAGE
DIP-16C-C01

PIN ASSIGNMENT



ABSOLUTE MAXIMUM RATINGS (See NOTE) (T_A = 25°C)

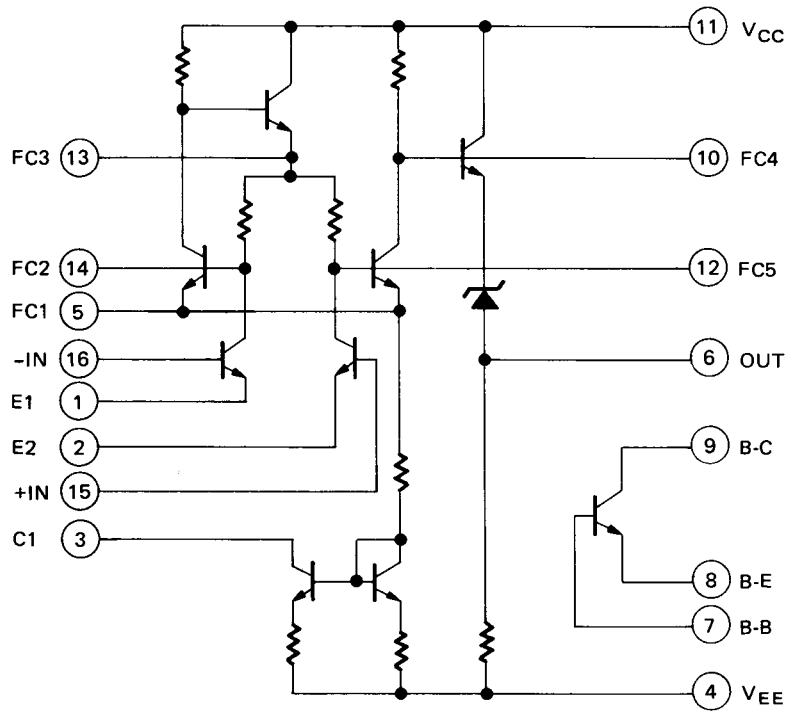
Rating		Symbol	Value	Unit
Power Supply Voltage		V_{CC}	+14	V
Power Supply Voltage		V_{EE}	−7	V
Differential Input Voltage		V_{ID}	±5	V
Common Mode Input Voltage		V_I	−7 to +1.4	V
Output Current		I_O	10	mA
Collector-Emitter Voltage for Buffer Transistor		V_{CEO}*	21	V
Collector Current for Buffer Transistor		I_C*	50	mA
Power Dissipation		P_D	500	mW
Storage Temperature	Ceramic	T_{STG}	−65 to +150	°C
	Plastic		−55 to +125	°C

NOTE: *: For buffer transistor

Permanent device damage may occur if 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.

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 – MB3604 EQUIVALENT CIRCUIT



RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	+12±5%	V
Power Supply Voltage	V_{EE}	-6±5%	V
Operating Temperature	T_A	-20 to +75	°C

ELECTRICAL CHARACTERISTICS-I

(V_{CC} = +12V, V_{EE} = -6V, T_A = 0 to 70°C)

Parameter	Symbol	Condition	Value		Unit
			Min	Max	
Input Offset Voltage	V_{IO}	R_S = 50Ω		6.0	mV
Input Offset Current	I_{IO}			5.0	μA
Input Bias Current	I_I			20	μA
Voltage Gain	A_V	$R_L \geq 5k\Omega$	60		dB
Common Mode Rejection Ratio	CMRR	R_S = 50Ω	70		dB
Maximum Positive Output Voltage	$V_{OM}(+)$	V_{IN} = 0.1V	4.0		V
Maximum Negative Output Voltage	$V_{OM}(-)$	V_{IN} = 0.1V	5.5		V
0dB Frequency	f_O	R_S = 50Ω, R_L = 50Ω	90		MHz
Input Resistance	R_{IN}	f = 1kHz	3.0		kΩ
Power Supply Current	$I_{SUP}(+)$			9.0	mA
Power Supply Current	$I_{SUP}(-)$			6.7	mA
Collector Cutoff Current for Buffer Transistor	I_{CBO}	V_{CB} = 18V, I_E = 0		2.0	μA
DC Current Gain for Buffer Transistcr	h_{FE}	V_{CB} = 6V, I_C = 20mA	40	200	

ELECTRICAL CHARACTERISTICS-II

(V_{CC} = +12V, V_{EE} = -6V, T_A = 25°C)

Parameter	Symbol	Condition	Value		Unit
			Min	Max	
Output Resistance	R_O	f = 1kHz		200	Ω
3dB Frequency	f_C	R_S = 50Ω, R_L = 50Ω	1		MHz
Slew Rate	SR	$A_V \doteq 1$, R_I = 50Ω	10		V/μs
Current Gain-Bandwidth Product for Buffer Transistor	f_T	V_{CE} = 6V, I_C = 20mA	300		MHz
Collector Capacitance for Buffer Transistor	C_{ob}	V_{CE} = 6V, I_E = 0A, f = 1MHz		5	pF

MEASUREMENT CIRCUT DIAGRAM

Fig. 2 – 0dB FEEDBACK AMPLIFIER

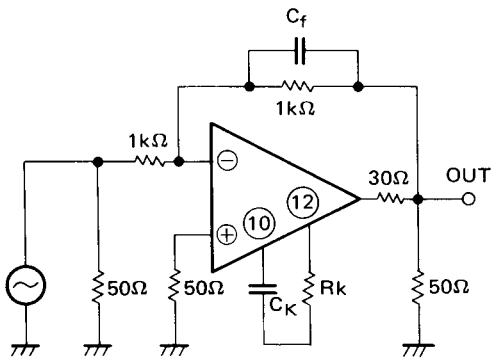


Fig. 3 – 20dB FEEDBACK AMPLIFIER

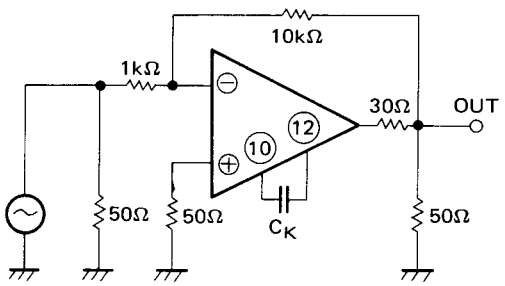
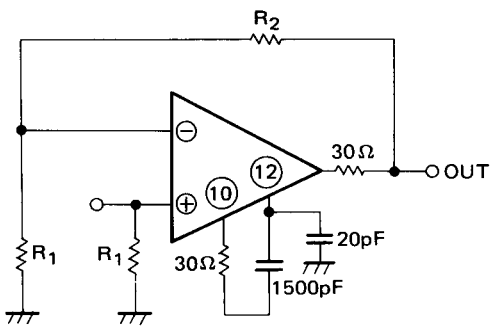


Fig. 4 – LOW FREQUENCY FEEDBACK AMPLIFIER



PIN CONNECTION FOR Fig. 2 to Fig. 5

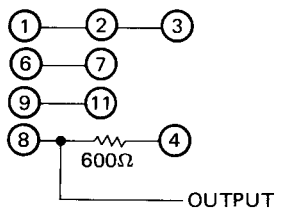


Fig. 5 – FREQUENCY CHARACTERISTICS MEASUREMENT CIRCUIT

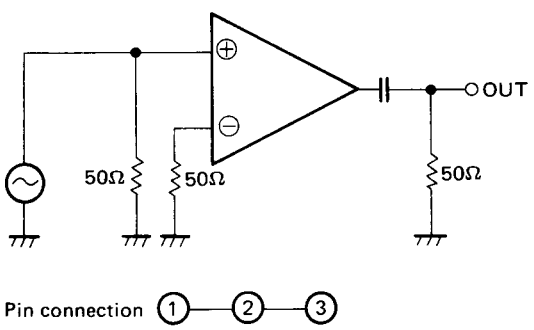
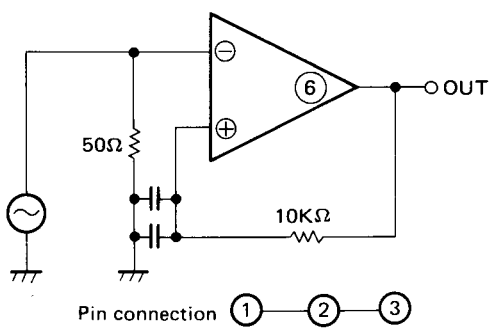


Fig. 6 – POWER SUPPLY VOLTAGE vs. VOLTAGE GAIN MEASUREMENT CIRCUIT



ELECTRICAL CHARACTERISTICS CURVES

Fig. 7 – 0dB FEEDBACK AMPLIFIER

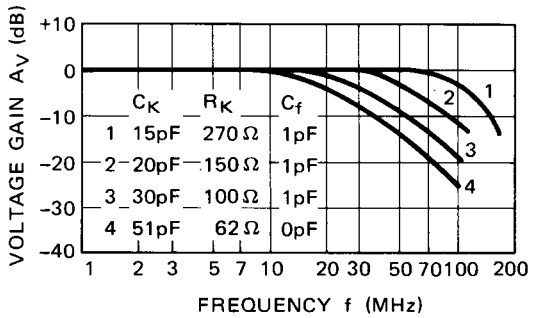


Fig. 8 – 20dB FEEDBACK AMPLIFIER

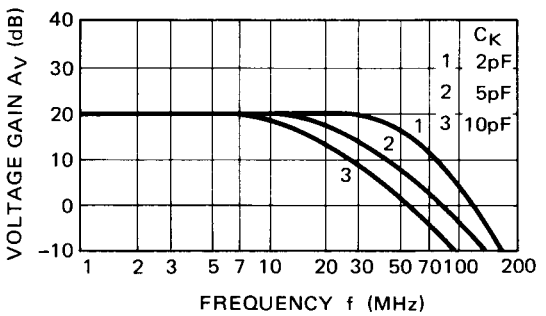


Fig. 9 – LOW FREQUENCY FEEDBACK AMPLIFIER

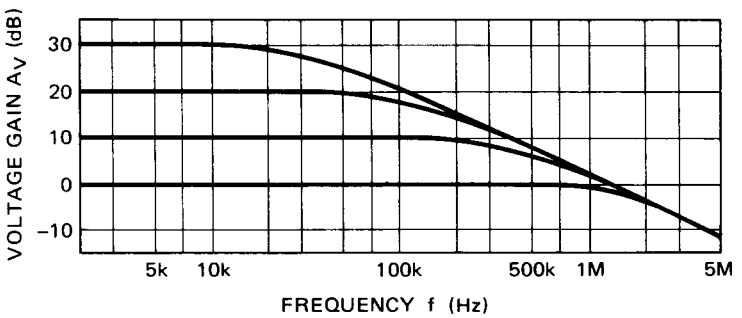


Fig. 10 – FREQUENCY CHARACTERISTICS

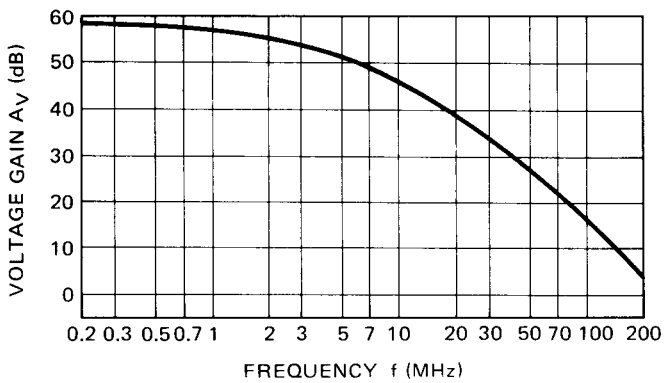
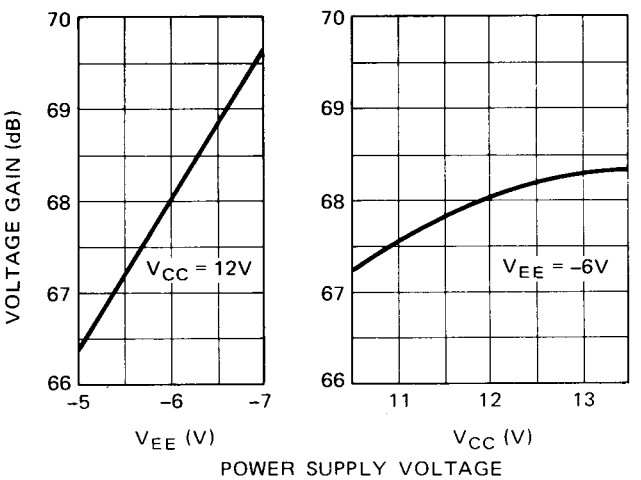
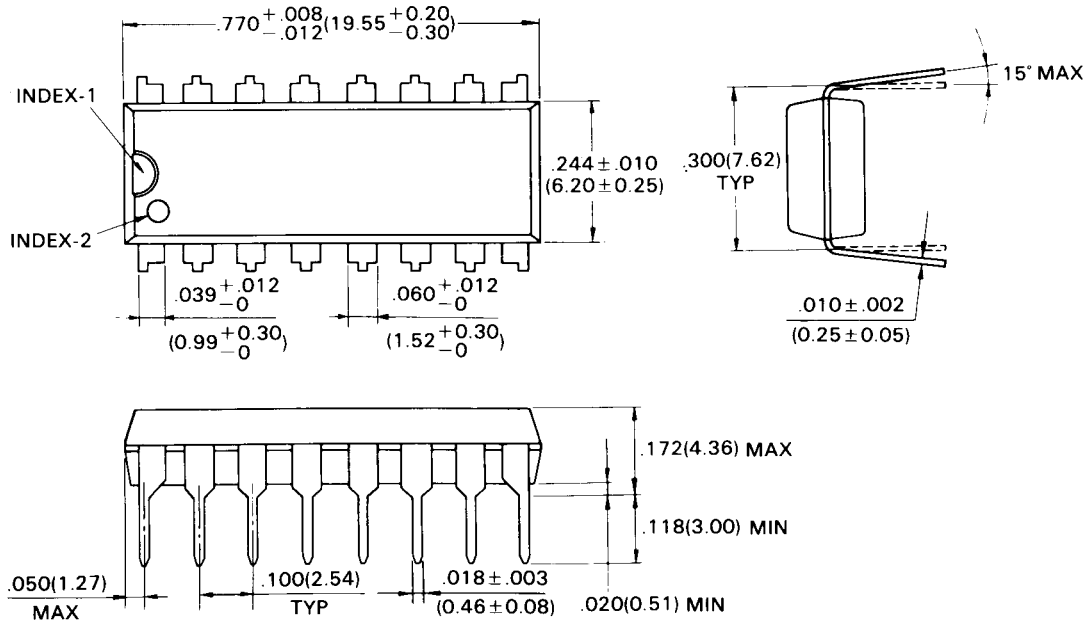


Fig. 11 – POWER SUPPLY VOLTAGE vs. VOLTAGE GAIN



PACKAGE DIMENSIONS

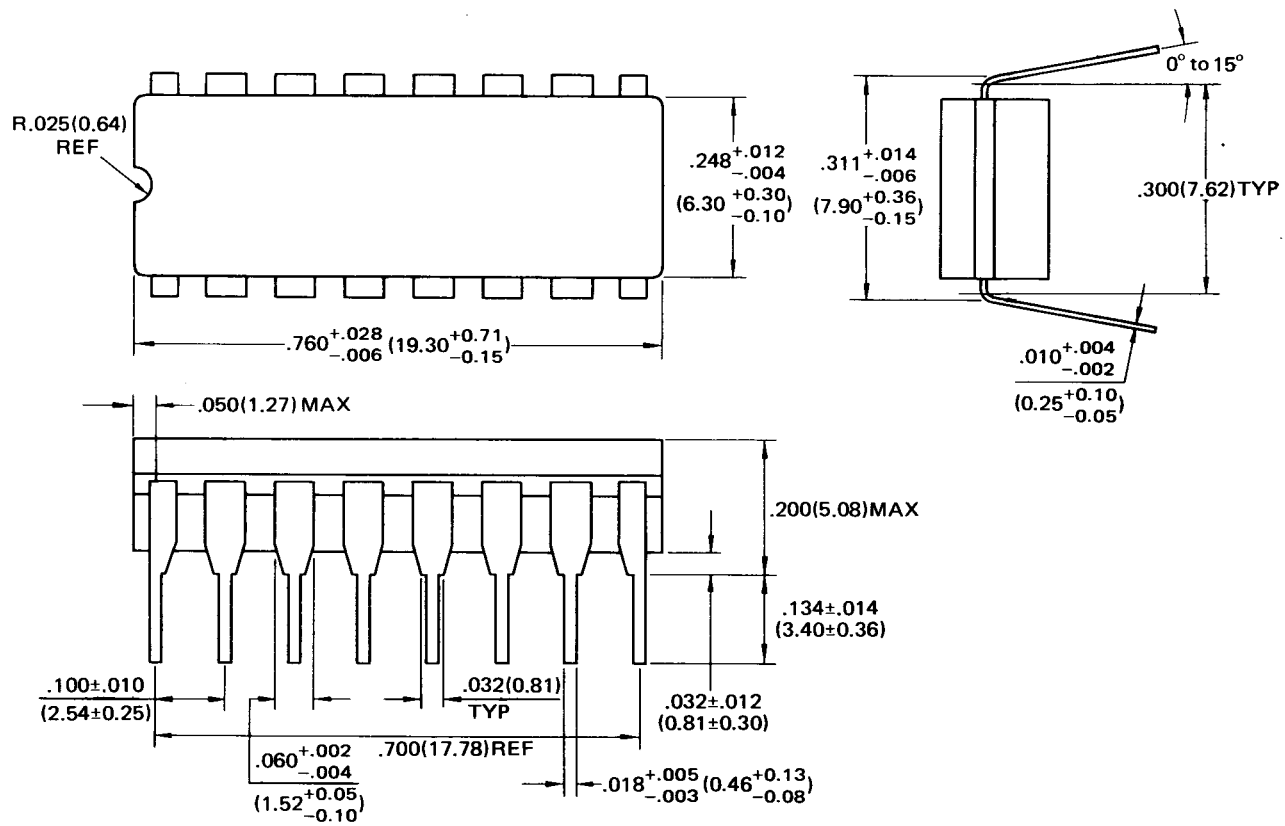
16-LEAD PLASTIC DUAL IN-LINE PACKAGE
(CASE No.: DIP-16P-M04)



Dimensions in
inches (millimeters)

PACKAGE DIMENSIONS (Continued)

16-LEAD CERAMIC (CERDIP) DUAL IN-LINE PACKAGE
(CASE No.: DIP-16C-C01)



Dimensions in
inches (millimeters)

Circuit diagrams utilizing Fujitsu products are included as a means of illustrating typical semiconductor applications. Complete Information sufficient for construction purposes is not necessarily given.

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