December 1992
Edition 2.0

FUJITSU

DATA SHEET

MB834200A/AL

CMOS 4M-BIT MASK READ ONLY MEMORY

256K x 16 (512K x 8) CMOS MASK READ ONLY MEMORY

The Fujitsu MB834200A/AL is a CMOS Si-gate mask-programmable static read only memory organized as 262,144 words by 16 bits or 524,288 words by 8 bits.

All pins are TTL-compatible and 3-state output level. The device is full-static operatable (i.e. no need of clock signal) with a single +5V power supply. Also, the MB834200AL can be used with a single +3V power supply which is required for battery powered applications.

The MB834200A/AL is designed for applications such as character generator and program storage which require large memory capacity and high-speed/low-power operation.

The memory organization of MB834200A/AL is configuable between 16 bits and 8 bits by $\overline{BYTE}$ pin.. (ex. The system using 8 bits CPU and 16 bits CPU can use common data on the same chip.)

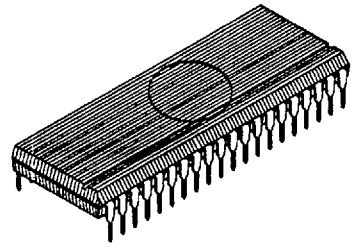
- Organization: 262,144 words x 16 bits
  524,288 words x 8 bits
- Access time: 200ns max.@Vcc = 5V (MB834200A/AL)
  400ns max.@Vcc = 3V (MB834200AL)
- Completely static operation: No clock required
- TTL compatible Input/Output
- Three state output
- Single +5V power supply (MB834200A/AL)
  Single +3V power supply (MB834200AL)
- Power dissipation:220mW max. (Active) @Vcc = 5V (MB834200A/AL)
  40mW max. (Active) @Vcc = 3V (MB834200AL)
- Standard 40-pin Plastic DIP: Suffix: P
- 44-pin Plastic Quad Flat Package (QFP): Suffix: PFQ
- 48-pin Plastic Thin Small Outline Package (TSOP):
  Suffix: PFTN(Normal Bend)
  Suffix: PFTR(Reversed Bend)
- 64-pin Plastic Quad Flat Package (QFP): Suffix: PFQ

ABSOLUTE MAXIMUM RATINGS (see NOTE)

Rating	Symbol	Value	Unit
Supply Voltage	V_{CC}	−0.3 to +7.0 *	V
Input Voltage	V_{IN}	−0.5 to Vcc +0.5 *	V
Output Voltage	V_{OUT}	−0.5 to Vcc +0.5 *	V
Temperature Under Bias	T_{BIAS}	−10 to +85	°C
Storage Temperature Range	T_{STG}	−45 to +125	°C

* Referenced to GND

NOTE: 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.

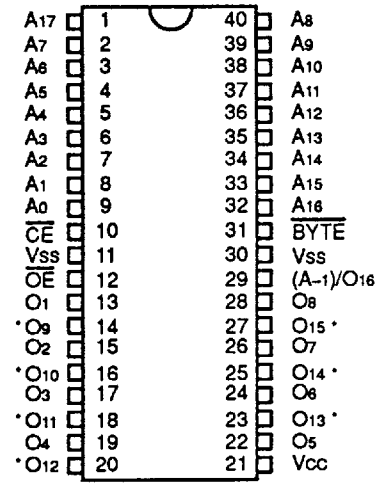


PLASTIC PACKAGE
DIP-40P-M01

FPT-44P-M04 See Page 6, 7
FPT-48P-M07 See Page 8, 9
FPT-48P-M08 See Page 10, 11
FPT-64P-M06 See Page 12, 13

PIN ASSIGNMENT

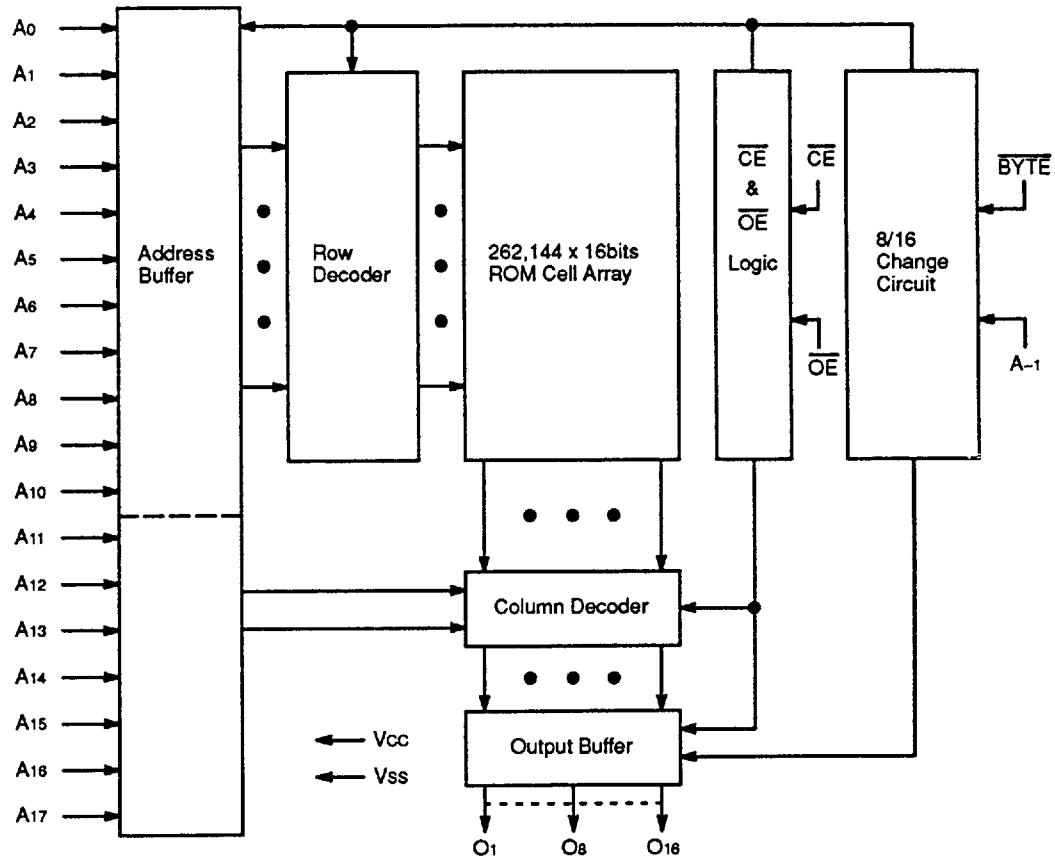
(TOP VIEW)



This pin (*) is High-Z, the device is used 8 bits.

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 — MB834200A/AL BLOCK DIAGRAM



OUTPUT MODE SELECTION — A–1 is LSB.

BYTE	O1 to O8	O9 to O15	O16/(A–1)
H	O1 to O8	O9 to O15	O16
L	O1 to O8	High-Z	A–1 ("L" INPUT)
L	O9 to O16	High-Z	A–1 ("H" INPUT)

TRUTH TABLE

CE	OE	MODE	OUTPUT	POWER DISSIPATION MODE
H	X	NOT SELECTED	High-Z	STANDBY
L	H	NOT SELECTED	High-Z	ACTIVE
L	L	SELECTED	DOUT	ACTIVE

CAPACITANCE (TA=25° C, f=1MHz)

Parameter	Symbol	Min	Typ	Max	Unit
Output Capacitance (VOUT=0V)	COUT			15	pF
Input Capacitance (VIN=0V)	CIN			10	pF

RECOMMENDED OPERATING CONDITIONS

(Referenced to GND)

Parameter	Symbol	MB834200A/AL			MB834200/AL			Unit
		Min	Typ	Max	Min	Typ	Max	
Supply Voltage	V_{CC}	4.5	5.0	5.5	2.7	3.0	3.3	V
Input Low Voltage	V_{IL}	–0.3		0.8	–0.3		0.6	V
Input High Voltage	V_{IH}	2.2		Vcc+0.3	Vccx0.7		Vcc+0.3	V
Ambient Temperature	T_A	0		70	0		70	° C

DC CHARACTERISTICS

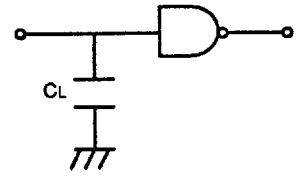
(Recommended operating conditions unless otherwise noted.)

Parameter	Test Condition	Symbol	MB834200A/AL			MB834200AL			Unit
			Min	Typ	Max	Min	Typ	Max	
Active Supply Current	$\overline{CE}$=V_{IL}, Minimum Cycle Output = Open	I_{CC}			40			12	mA
Standby Supply Current	$\overline{CE}$=V_{IH}	I_{SB1}			1			0.5	mA
	$\overline{CE}$=Vcc=V_{IH}, V_{IN}=GND or Vcc	I_{SB2}			50			10	µA
Input Leakage Current	V_{IN}=0 to Vcc	I_{LI}	–10		10	–5		5	µA
Output Leakage Current	$\overline{CE}$=V_{IH} $\overline{OE}$=V_{IH}	I_{LO}	–10		10	–5		5	µA
Output High Voltage	I_{OH}=–400µA	V_{OH}	2.4			2			V
Output Low Voltage	I_{OL}=2.1mA	V_{OL}			0.4				V
	I_{OL}=1.0mA							0.4	

AC TEST CONDITIONS

Fig. 2 — AC TEST CONDITIONS

- Input Pulse Level : 0.6 to 2.4V @Vcc = 5V (MB834200A/AL)
  0.4 to Vccx0.8V @Vcc = 3V(MB834200AL)
- Input Pulse Rise and Fall Time : t_T=5ns
- Timing Reference Levels : Input: V_{IL}=0.8V, V_{IH}=2.2V / Output: V_{OL}=0.8V, V_{OH}=2.2V
  @Vcc = 5V (MB834200A/AL)
  : Input: V_{IL}=0.6V, V_{IH}=Vccx0.7V / Output: V_{OL}=V_{OH}=1.5V
  @Vcc = 3V (MB834200AL)
- Output Load : 1 TTL Gate and 100pF



AC CHARACTERISTICS

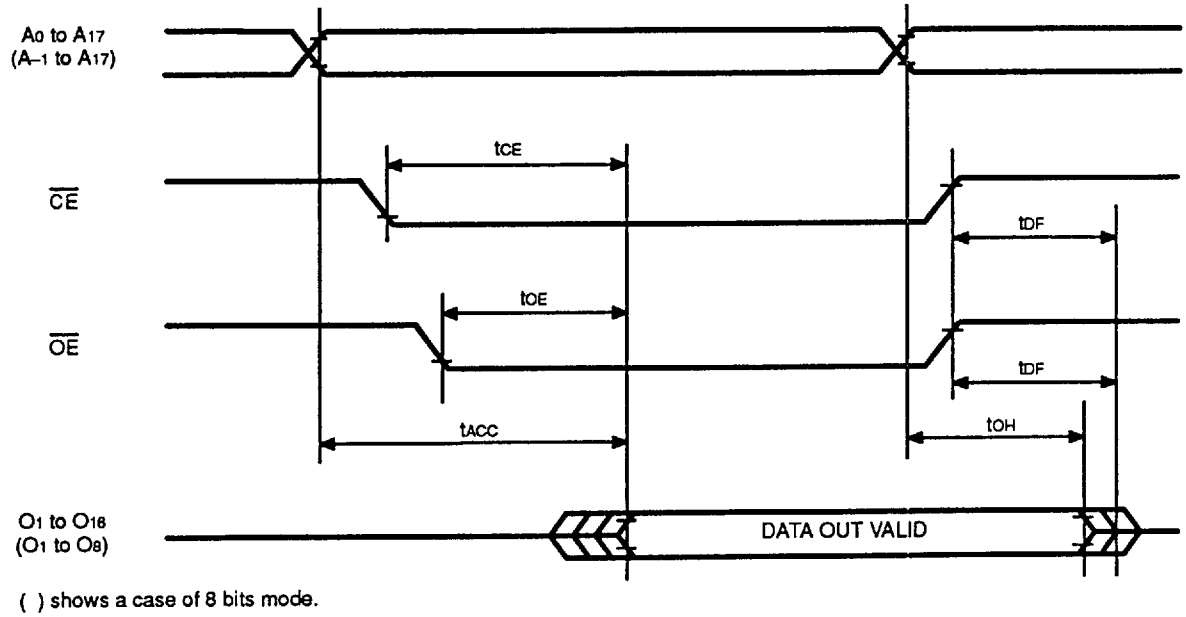
(Recommended operating conditions unless otherwise noted.)

Parameter	Test Condition	Symbol	MB834200A/AL		MB834200AL		Unit
			Min	Max	Min	Max	
Address Access Time	$\overline{CE}$=$\overline{OE}$=V_{IL}	t_{ACC}		200		400	ns
Chip Enable Access Time	$\overline{OE}$=V_{IL}	t_{CE}		200		400	ns
Output Enable Access Time		t_{OE}		80		200	ns
Output Disable Time *1		t_{DF}		60		120	ns
Output Hold Time	$\overline{CE}$=$\overline{OE}$=V_{IL}	t_{OH}	0		0		ns

Note: When contineously switching between 3V operation and 5V operation, during Vcc transition the $\overline{CE}$ should be High state (Standby mode).

*1: t_{DF} is specified by either of $\overline{CE}$ or $\overline{OE}$ changing to High earlier.

TIMING DIAGRAM

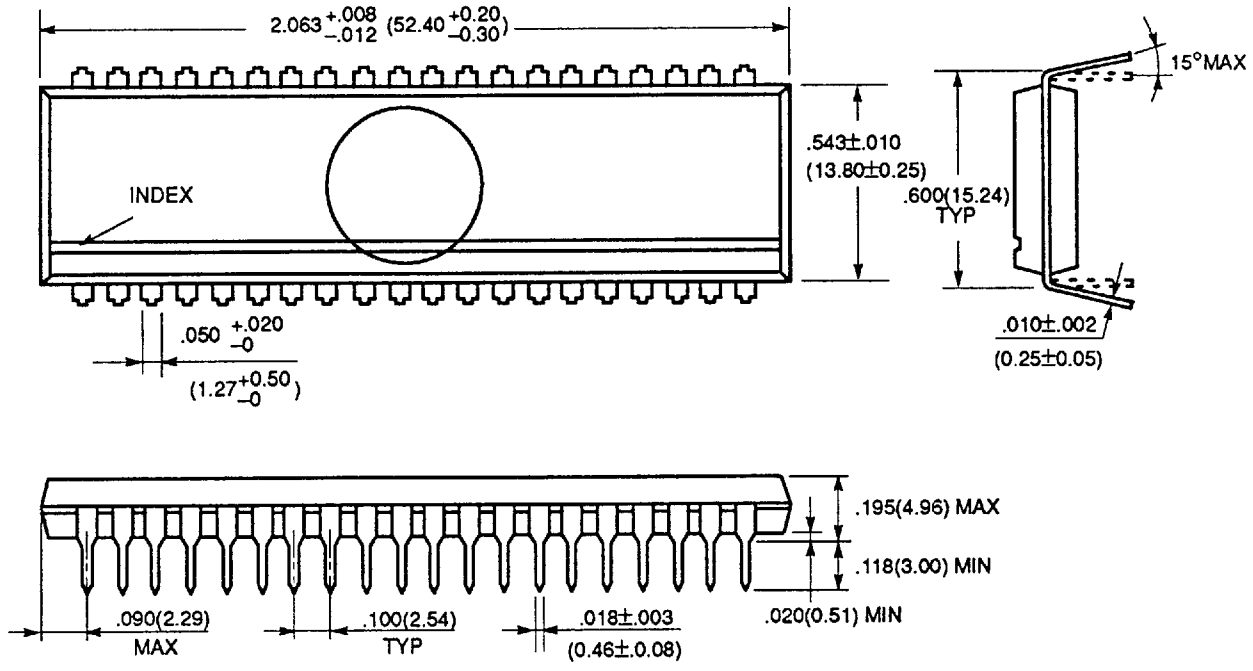


( ) shows a case of 8 bits mode.

PACKAGE DIMENSIONS

(Suffix: P)

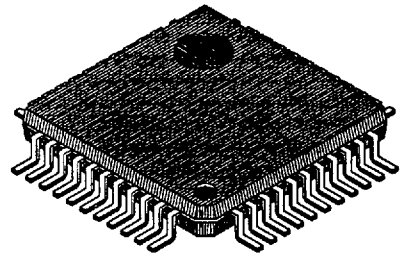
40-LEAD PLASTIC DUAL IN-LINE PACKAGE
(CASE No.: DIP-40P-M01)



Dimensions in
inches (millimeters)

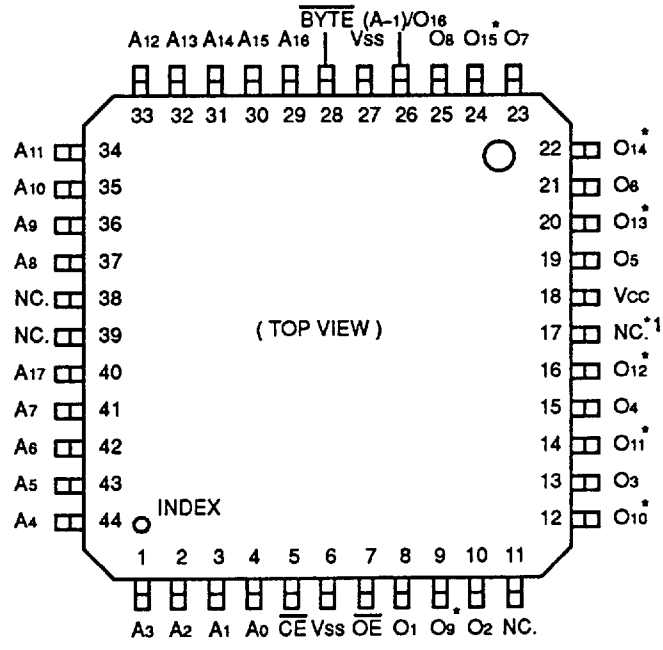
PACKAGE DIMENSIONS (Continued)

(Suffix: PFQ)



PLASTIC PACKAGE
FPT-44P-M04

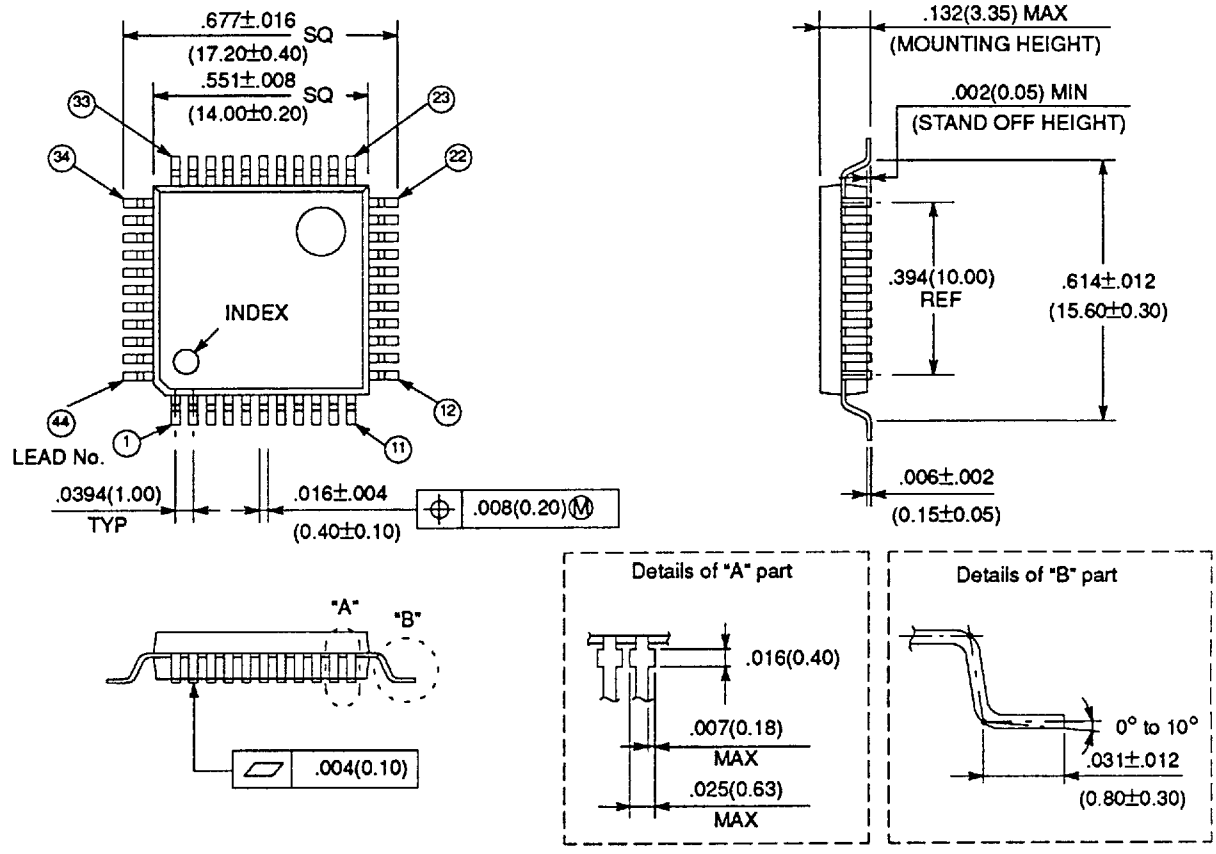
PIN ASSIGNMENT



This pin (*) is High-Z, the device is used 8 bits.
*1: If the voltage is applied externally, it should be connected to Vss.

PACKAGE DIMENSIONS (Continued)

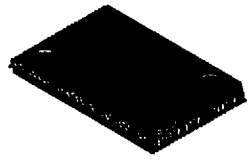
44-LEAD PLASTIC FLAT PACKAGE
(CASE No.: FPT-44P-M04)



Dimensions in
inches (millimeters)

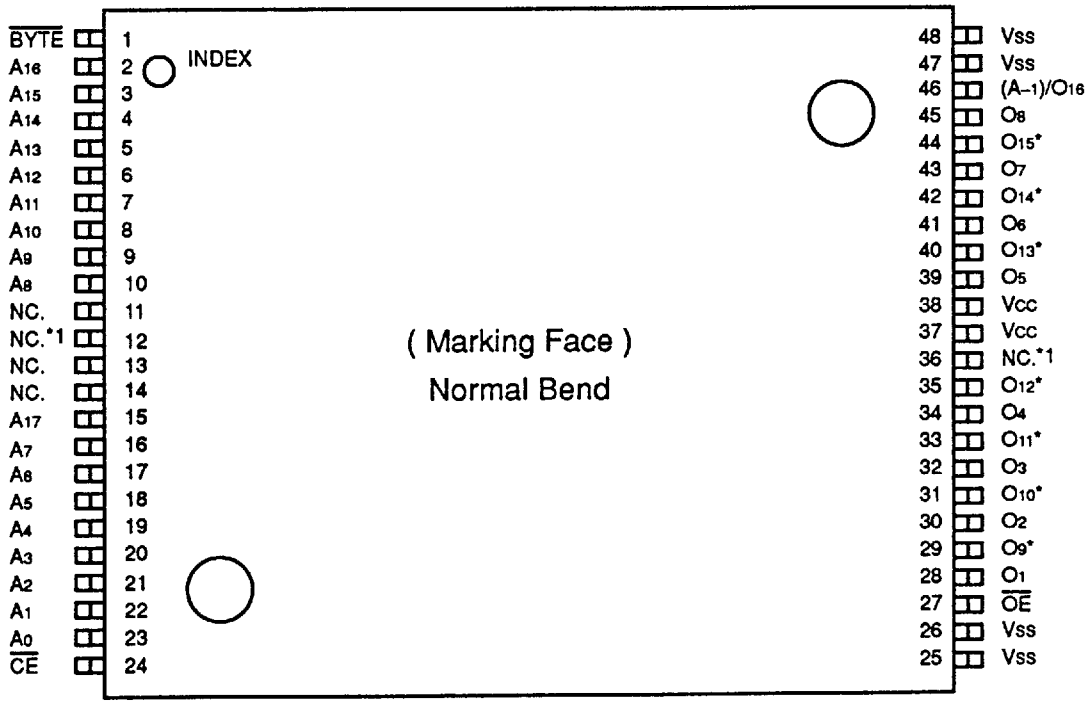
PACKAGE DIMENSIONS (Continued)

(Suffix: PFTN)



PLASTIC PACKAGE
FPT-48P-M07

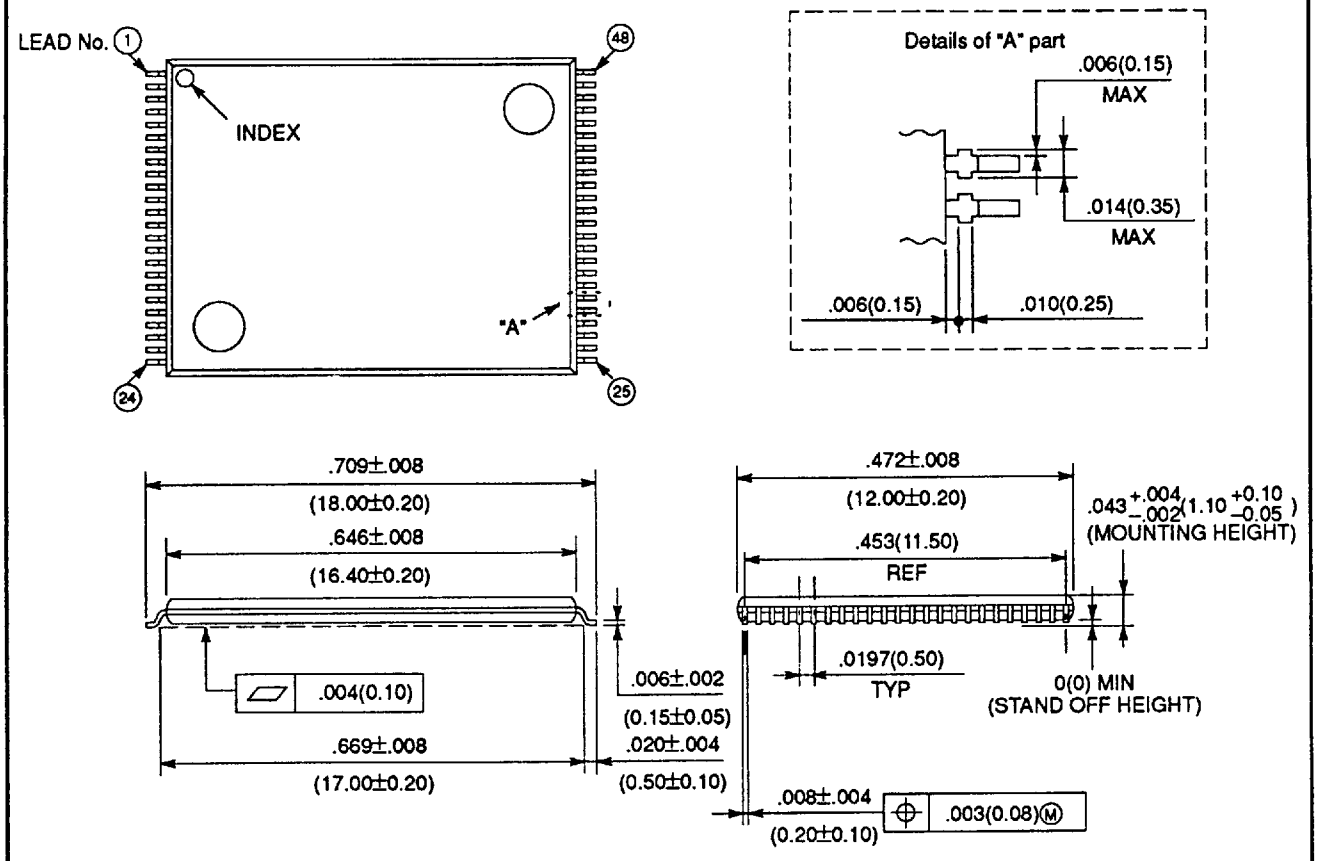
PIN ASSIGNMENT



This pin (*) is High-Z, the device is used 8 bits.
*1: If the voltage is applied externally, it should be connected to Vss.

PACKAGE DIMENSIONS (Continued)

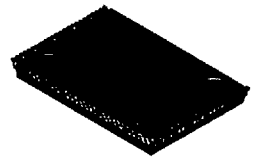
48-LEAD PLASTIC FLAT PACKAGE
(CASE No.: FPT-48P-M07)



Dimensions in
inches (millimeters)

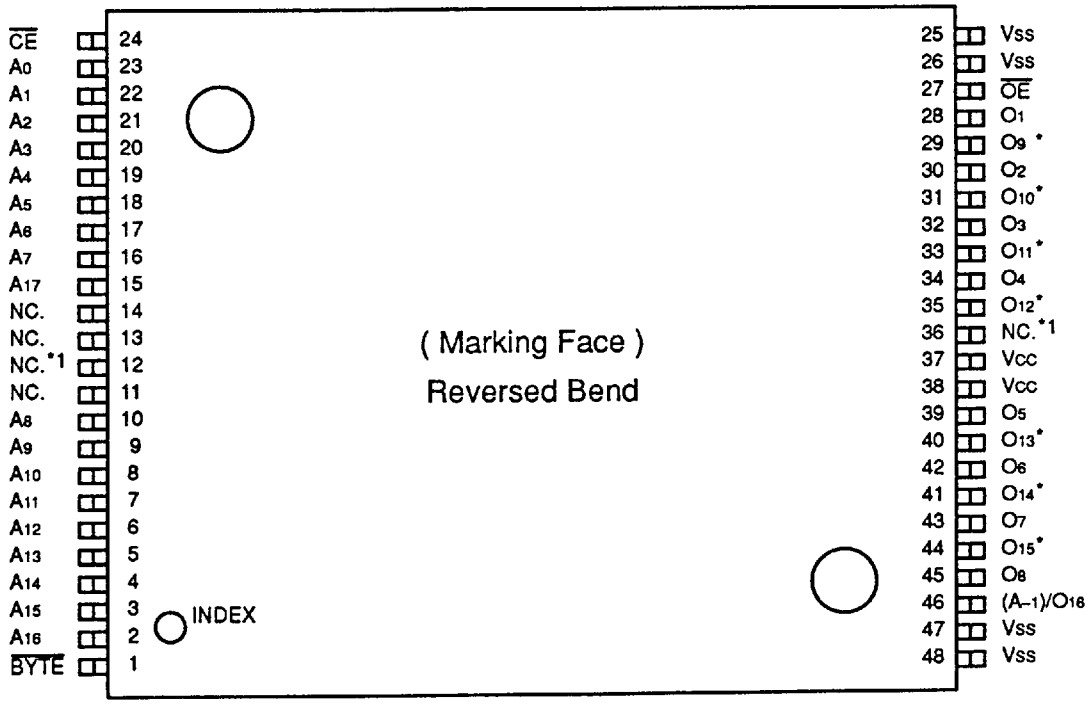
PACKAGE DIMENSIONS (Continued)

(Suffix: PFTR)



PLASTIC PACKAGE
FPT-48P-M08

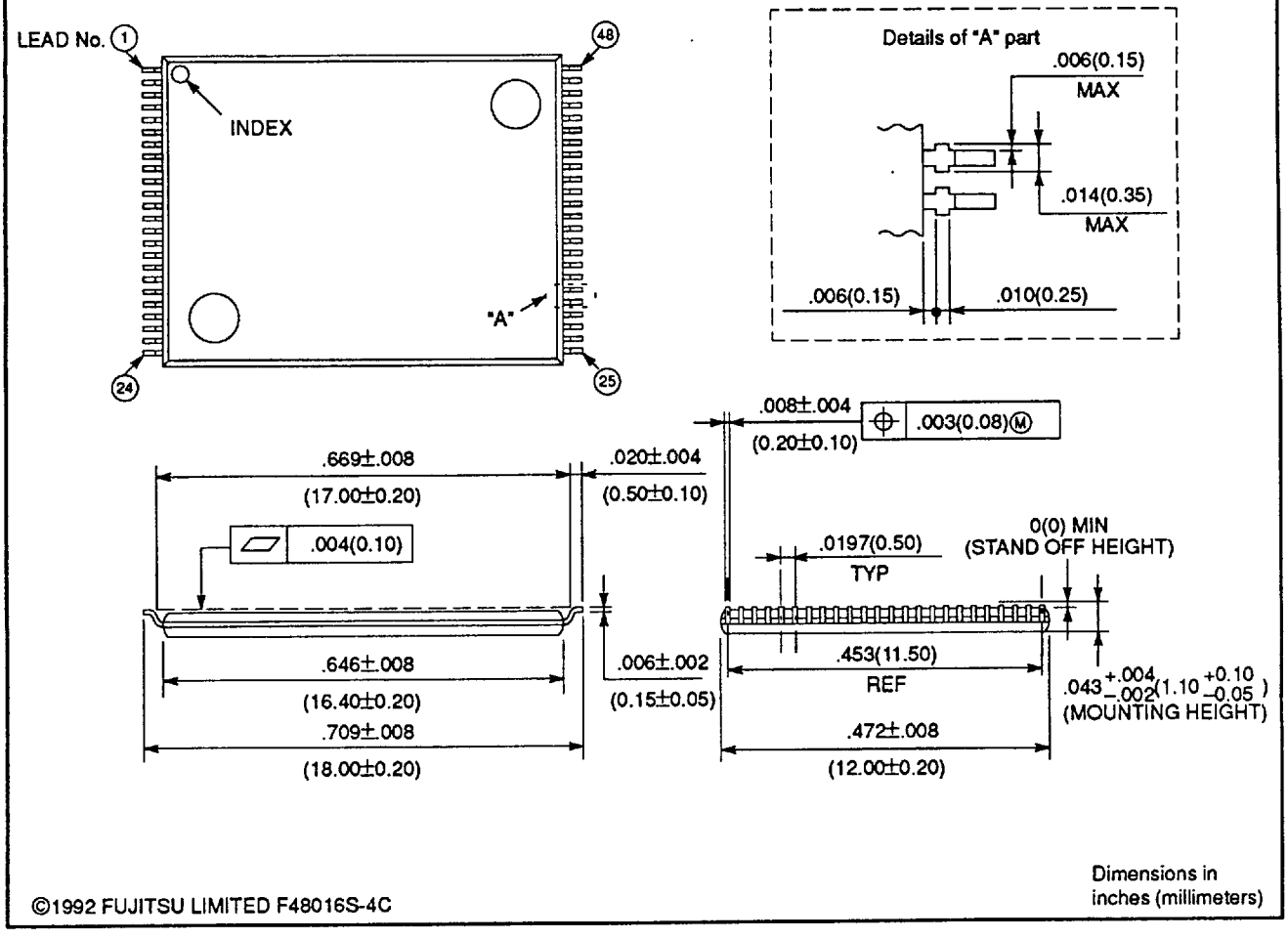
PIN ASSIGNMENT



This pin (*) is High-Z, the device is used 8 bits.
*1: If the voltage applied externally, it should be connected to Vss.

PACKAGE DIMENSIONS (Continued)

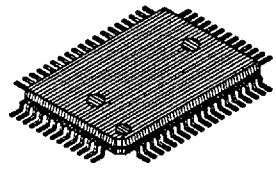
48-LEAD PLASTIC FLAT PACKAGE
(CASE No.: FPT-48P-M08)



Dimensions in
inches (millimeters)

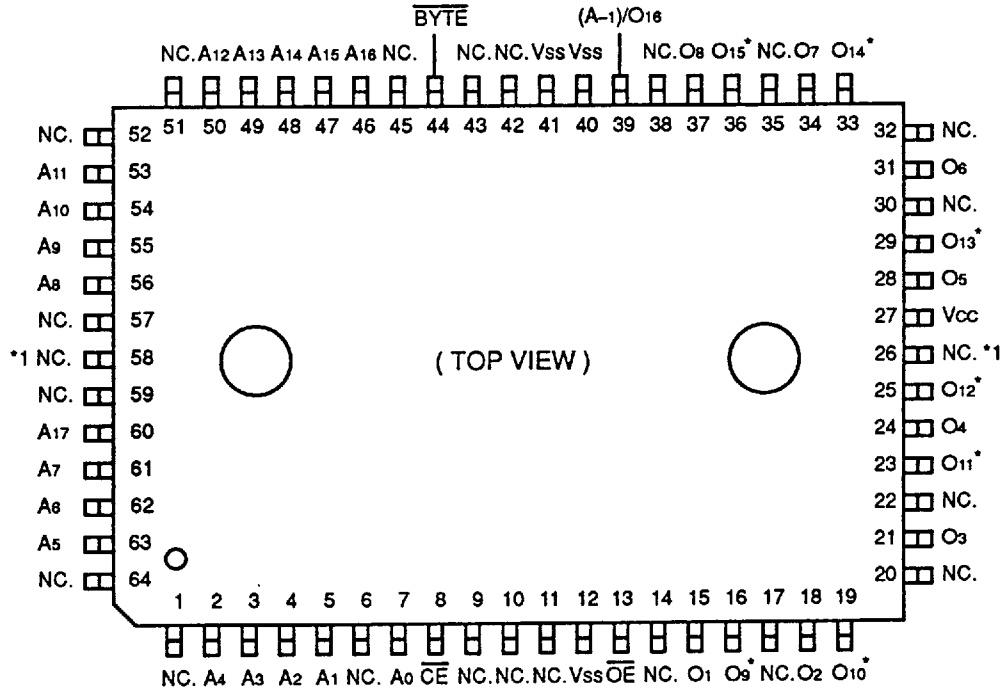
PACKAGE DIMENSIONS (Continued)

(Suffix: PFQ)



PLASTIC PACKAGE
FPT-64P-M06

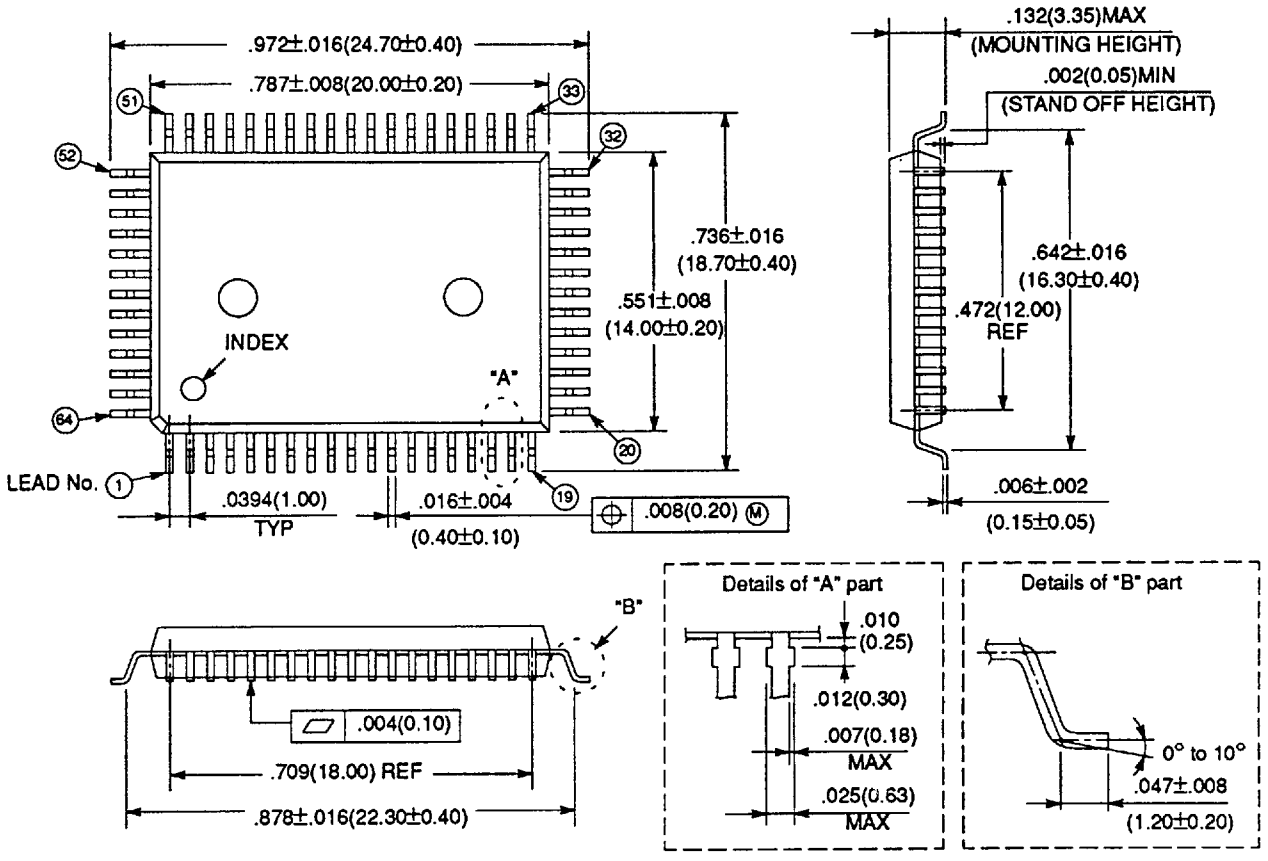
PIN ASSIGNMENT



This pin (*) is High-Z, the device is used 8 bits.
*1: If the voltage is applied externally, it should be connected to Vss.

PACKAGE DIMENSIONS

64-LEAD PLASTIC FLAT PACKAGE
(CASE No.: FPT-64P-M06)



Dimensions in
inches (millimeters)

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