

FUJITSU

ECL 1024-BIT BIPOLAR RANDOM ACCESS MEMORY

MBM 100422A-5
MBM 100422A-7

April 1987
Edition 3.0

1024-BIT BIPOLAR ECL RANDOM ACCESS MEMORY

The Fujitsu MBM 100422A is fully decoded 1024-bit ECL read/write random access memory designed for high-speed scratch pad, control and buffer storage applications. This device is organized as 256 words by 4 bits, and it features on-chip voltage/temperature compensation for improved noise margin.

The MBM 100422A offers extremely small cell and chip size, realized through the use of Fujitsu's patented DOPOS (Doped Polysilicon), as well as IOP-II (Isolation by Oxide and Polysilicon), processing. As a result, very fast access time with high yields and outstanding device reliability are achieved in volume production.

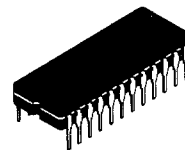
Operation for the MBM 100422A is specified over a temperature range of from 0° to 85°C (T_A for DIP, T_C for Flat Package and LCC). It also features 24-pin DIP, Flat Package, or LCC. It is fully compatible with industry-standard 100K-series ECL families.

- 256 words x 4 bits organization
- On-chip voltage/temperature compensation for improved noise margin
- Fully compatible with industry-standard 100K-series ECL families
- Address access time: 5 ns max. (MBM 100422A-5)
7 ns max. (MBM 100422A-7)
- Block select access time: 3 ns max. (MBM 100422A-5)
4 ns max. (MBM 100422A-7)
- Open emitter output for ease of memory expansion
- Low power dissipation of 0.7mW/bit
- DOPOS and IOP-II processing.
- Pin compatible with the F100422.

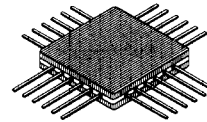
ABSOLUTE MAXIMUM RATINGS (See NOTE)

Rating	Symbol	Value	Unit
V_{EE} Pin Potential to Ground Pin	V_{EE}	+0.5 to -7.0	V
Input Voltage	V_{IN}	+0.5 to V_{EE}	V
Output Current (DC, Output High)	I_{OUT}	-30	mA
Temperature Under Bias	T_A for DIP	-55 to +125	°C
	T_C for Flat Package and LCC		
Storage Temperature	T_{STG}	-65 to +150	°C

NOTE: 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.



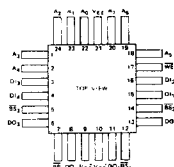
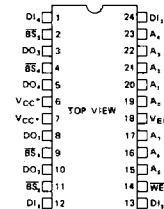
CERAMIC PACKAGE
DIP-24C-C05



CERAMIC PACKAGE
FPT-24C-C02

LCC-24C-F02: See Page 8

PIN ASSIGNMENT



* V_{CC} grounded

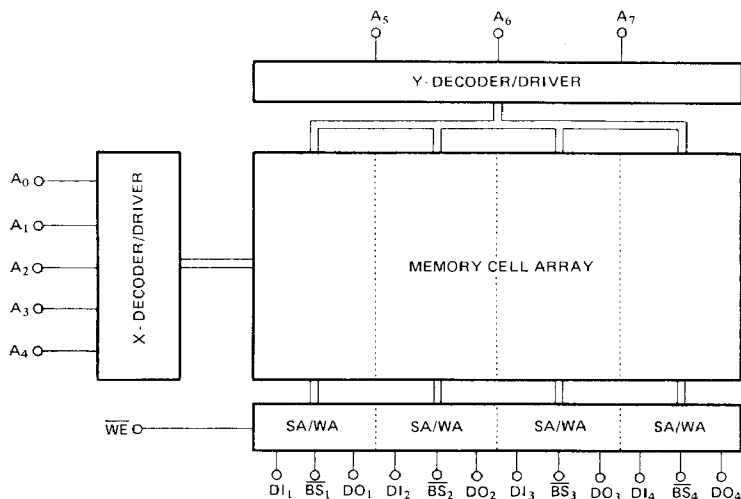
LCC PAD CONFIGURATION: See Page 8

Small geometry bipolar integrated circuits are occasionally susceptible to damage from static voltages or electric fields. It is therefore advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this device.



MBM 100422A-5
MBM 100422A-7

Fig. 1 — MBM 100422A BLOCK DIAGRAM



TRUTH TABLE

INPUT			OUTPUT	MODE
BS	WE	D _{IN}		
H	X	X	L	DISABLED
L	L	H	L	WRITE "H"
L	L	L	L	WRITE "L"
L	H	X	D _{OUT}	READ

H = High Voltage Level
L = Low Voltage Level
X = Don't care

FUNCTIONAL DESCRIPTION

The Fujitsu MBM 100422A is fully decoded 1024-bit read/write random access memory organized as 256 words by 4 bits. Memory cell selection is achieved by means of a 8-bit address designated A₀ through A₇. The active low Block Select (BS) input is provided for memory expansion. The read and write operations are controlled by the state of the

active low Write Enable ($\overline{WE}$) input. With $\overline{WE}$ and $\overline{BS}$ held low, the data at D_{IN} is written into the addressed location. To read, $\overline{WE}$ is held high, while $\overline{BS}$ is held low. Data at the addressed location is then transferred to D_{OUT} and read out non-inverted. Open emitter outputs are provided to allow for maximum flexibility in output wired-OR connection.

GUARANTEED OPERATING CONDITIONS

(Referenced to V_{CC})

Parameter	Symbol	Value			Unit	Ambient Temperature for DIP Case Temperature for Flat Package and LCC
		Min	Typ	Max		
Supply Voltage	V	-5.7	-4.5	-4.2	V	0°C to 85°C

DC CHARACTERISTICS

($V_{CC} = 0V$, $V_{EE} = -4.5V$, Output Load = 50Ω to $-2.0V$, $T_A = 0^\circ C$ to $85^\circ C$ for DIP, Air flow ≥ 2.5 m/s, $T_C = 0^\circ C$ to $85^\circ C$ for Flat Package and LCC, unless otherwise noted.)

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Output High Voltage ($V_{IN} = V_{IH\ max}$ or $V_{IL\ min}$)	V_{OH}	-1025		-880	mV
Output Low Voltage ($V_{IN} = V_{IH\ max}$ or $V_{IL\ min}$)	V_{OL}	-1810		-1620	mV
Output High Voltage ($V_{IN} = V_{IH\ min}$ or $V_{IL\ max}$)	V_{OHC}	-1035			mV
Output Low Voltage ($V_{IN} = V_{IH\ min}$ or $V_{IL\ max}$)	V_{OLC}			-1610	mV
Input High Voltage (Guaranteed Input Voltage High for All Inputs)	V_{IH}	-1165		-880	mV
Input Low Voltage (Guaranteed Input Voltage Low for All Inputs)	V_{IL}	-1810		-1475	mV
Input High Current ($V_{IN} = V_{IH\ max}$)	I_{IH}			220	μA
Input Low Current ($V_{IN} = V_{IL\ min}$)	I_{IL}	-50			μA
BS Input Low Current ($V_{IN} = V_{IL\ min}$)	I_{IL}	0.5		170	μA
Power Supply Current (All Inputs and Outputs Open)	I_{EE}	-200			mA

CAPACITANCE

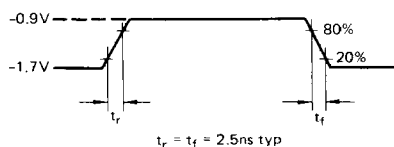
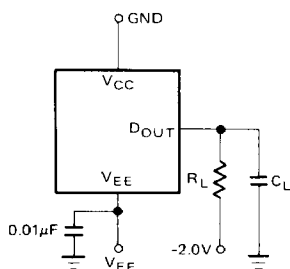
Parameter	Symbol	MBM 100422A-5			MBM 100422A-7			Unit
		Min	Typ	Max	Min	Typ	Max	
Input Pin Capacitance	C_{IN}			6			5	pF
Output Pin Capacitance	C_{OUT}			7			8	pF



AC CHARACTERISTICS

($V_{CC} = 0V$, $V_{EE} = -4.5V \pm 5\%$, Output Load = 50Ω to $-2.0V$ and $30pF$ to GND, $T_A = 0^\circ C$ to $85^\circ C$ for DIP, Air flow ≥ 2.5 m/s, $T_C = 0^\circ C$ to $85^\circ C$ for Flat Package and LCC, unless otherwise noted.)

Fig. 2 – AC TEST CONDITIONS



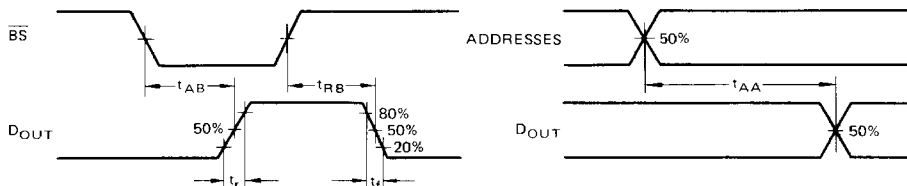
Output Load: $R_L = 50\Omega$
 $C_L = 30pF$
(including jig and stray capacitance)

NOTE: All timing measurements referenced to 50% input levels.

READ CYCLE

Parameter	Symbol	MBM 100422A-5			MBM 100422A-7			Unit
		Min	Typ	Max	Min	Typ	Max	
Address Access Time	t_{AA}	1.5		5			7	ns
Block Select Access Time	t_{AB}	0.5		3			4	ns
Block Select Recovery Time	t_{RB}	0.5		3			4	ns

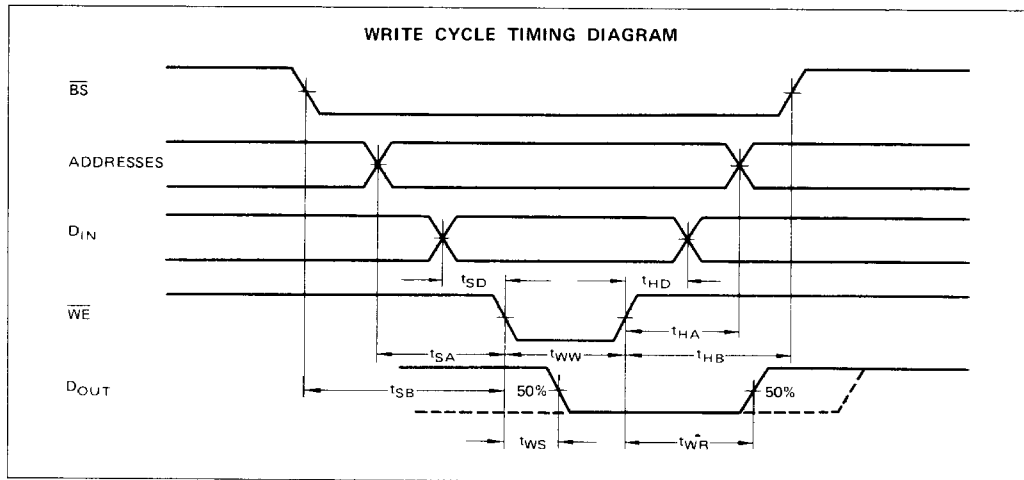
READ CYCLE TIMING DIAGRAMS



WRITE CYCLE

Parameter	Symbol	MBM 100422A-5			MBM 100422A-7			Unit
		Min	Typ	Max	Min	Typ	Max	
Write Pulse Width	t_{WW}	3.5			5			ns
Write Disable Time	t_{WS}	0.5		3.5			4	ns
Write Recovery Time	t_{WR}	0.5		3.5			8	ns
Address Set Up Time	t_{SA}	0.5			1			ns
Block Select Set Up Time	t_{SB}	0.5			1			ns
Data Set Up Time	t_{SD}	0.5			1			ns
Address Hold Time	t_{HA}	1.0			1			ns
Block Select Hold Time	t_{HB}	1.0			1			ns
Data Hold Time	t_{HD}	1.0			1			ns

1



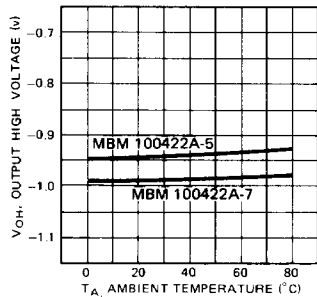
RISE TIME and FALL TIME

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Output Rise Time	t_r		1.5		ns
Output Fall Time	t_f		1.5		ns

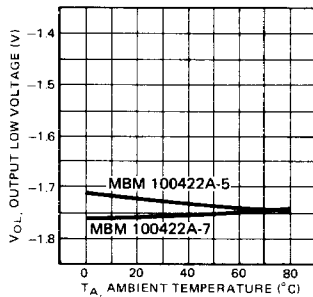


TYPICAL CHARACTERISTICS CURVES

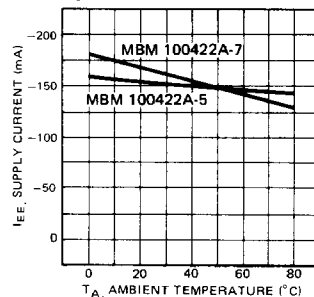
**Fig. 3 – OUTPUT HIGH VOLTAGE
vs AMBIENT TEMPERATURE**



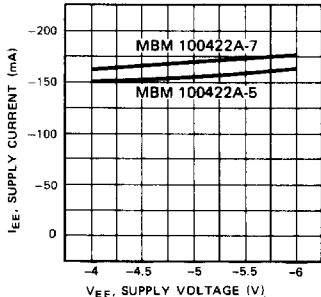
**Fig. 4 – OUTPUT LOW VOLTAGE
vs AMBIENT TEMPERATURE**



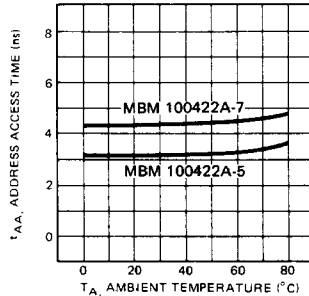
**Fig. 5 – SUPPLY CURRENT
vs AMBIENT TEMPERATURE**



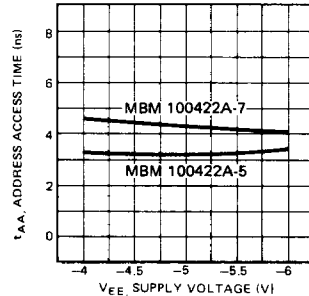
**Fig. 6 – SUPPLY CURRENT
vs SUPPLY VOLTAGE**



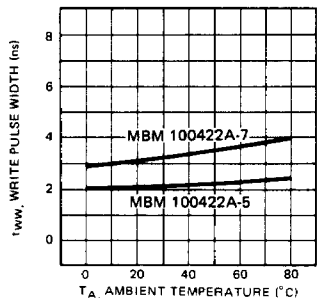
**Fig. 7 – ADDRESS ACCESS TIME
vs AMBIENT TEMPERATURE**



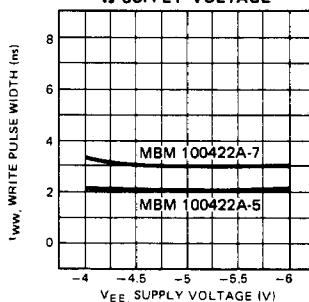
**Fig. 8 – ADDRESS ACCESS TIME
vs SUPPLY VOLTAGE**



**Fig. 9 – WRITE PULSE WIDTH
vs AMBIENT TEMPERATURE**

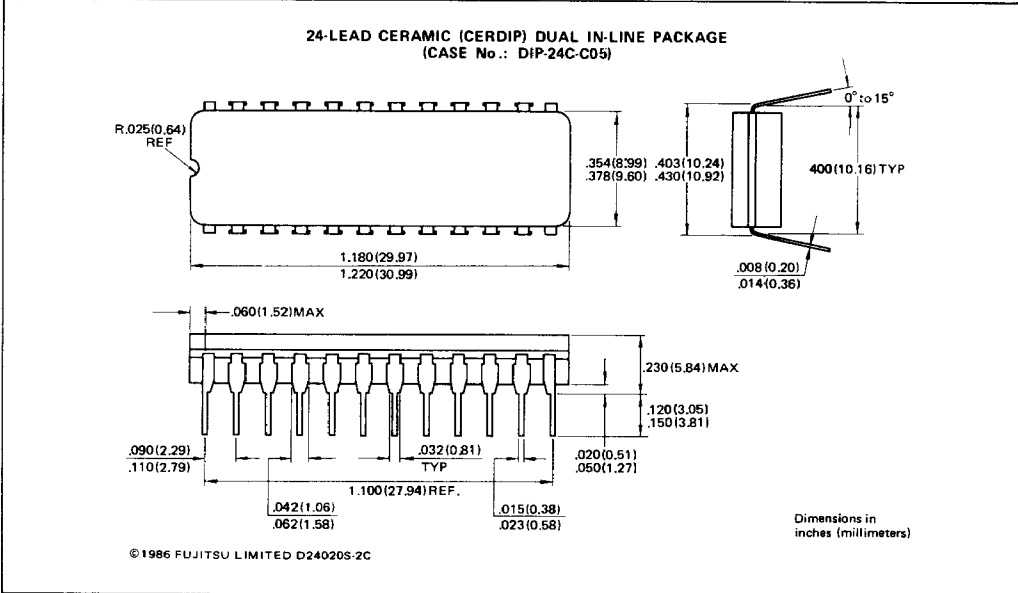


**Fig. 10 – WRITE PULSE WIDTH
vs SUPPLY VOLTAGE**

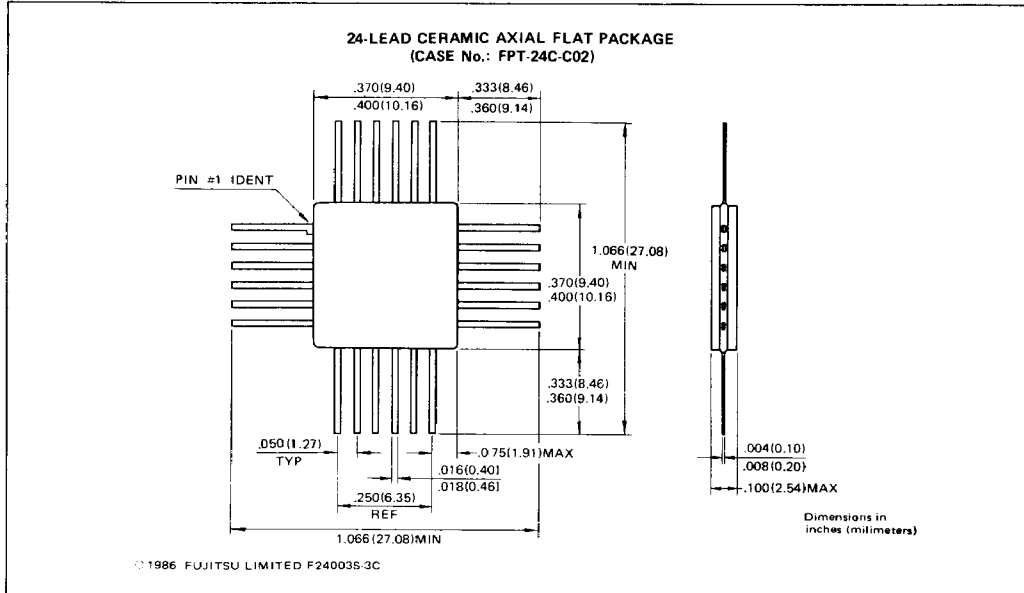


PACKAGE DIMENSIONS

CERAMIC DIP (: -CZ)



CERAMIC FPT (: -ZF)



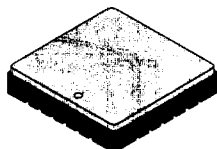


FUJITSU MBM 100422A-5
MBM 100422A-7

PACKAGE DIMENSIONS

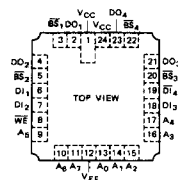
CERAMIC LCC (: -TV)

1

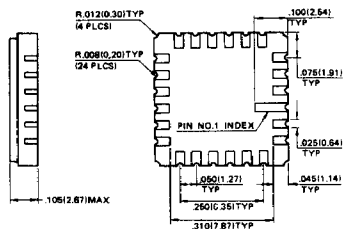
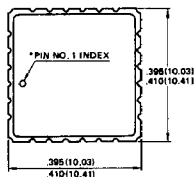


LCC-24C-F02

PAD CONFIGURATION



24-PAD CERAMIC (FRIT SEAL) LEADLESS CHIP CARRIER (CASE No.: LCC-24C-F02)



*Shape of Pin 1 index: Subject to change without notice

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Dimensions in inches
(millimeters)