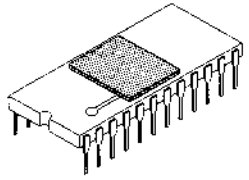
ECL 1024-BIT BIPOLAR RANDOM ACCESS MEMORY

DESCRIPTION

The Fujitsu MBM100422 is a 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 compensation for improved noise margin.

The MBM100422 offers extremely small cell and chip sizes, realized through the use of Fujitsu's patented DOPOS (Doped Polysilicon), as well as IOP (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 MBM100422 is specified over a temperature range of 0°C to 85°C (ambient). It also features metal-sealed 24-pin dual in-line packaging, and is fully compatible with industry-standard 100K-series ECL families.



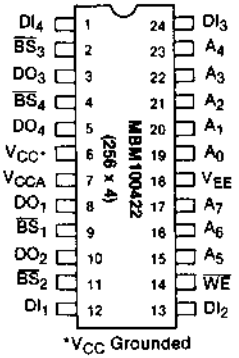
CERAMIC PACKAGE
DIP-24C-A02

ALSO AVAILABLE IN FLAT PACKAGE
FPT-24C-F02

FEATURES

- **256 words x 4-bits organization**
- **On-chip voltage compensation for improved noise margin**
- **Fully compatible with industry-standard 100K-series ECL families**
- **Address Access Time: 10ns max.**
- **Block Select Access Time: 5ns max.**
- **Open emitter output for easy memory expansion**
- **Low power dissipation of 0.7mW/bit**
- **DOPOS and IOP processing**
- **Pin compatible with the F100422**

PIN ASSIGNMENT



*V_{CC} Grounded

NOTE: DIP and Flat package styles conform to the same pin assignment

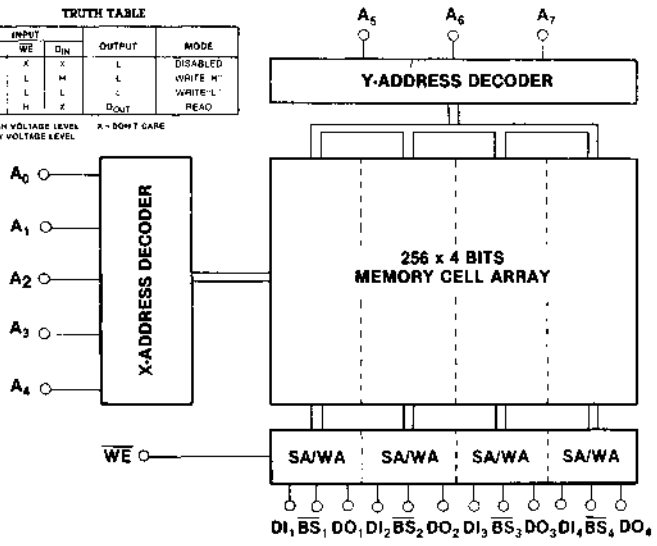
Small geometry bipolar integrated circuits are occasionally susceptible to damage from static voltages or electric fields. It is therefore advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this device.

MBM100422 BLOCK DIAGRAM

TRUTH TABLE

INPUT			OUTPUT	MODE
$\overline{BS}$	$\overline{WE}$	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 X = DON'T CARE
L = LOW VOLTAGE LEVEL



FUNCTIONAL DESCRIPTION

The Fujitsu MBM100422 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 $A_0 \sim A_7$. The active low Block Select ($\overline{BS}$) 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,

ABSOLUTE MAXIMUM RATINGS (See Note)

Rating	Symbol	Value	Unit
V_{EE} Pin Potential to Ground Pin (V_{CC})	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	−55 to +125	°C
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.

GUARANTEED OPERATING CONDITIONS

(Referenced to V_{CC})

Parameter	Symbol	Min	Typ	Max	Unit	Ambient Temperature
Supply Voltage	V_{EE}	−5.7	−4.5	−4.2	V	0°C to +85°C

CAPACITANCE

Parameter	Symbol	Min	Typ	Max	Unit
Input Pin Capacitance	C_{IN}	—	4	—	pF
Output Pin Capacitance	C_{OUT}	—	6	—	pF

DC CHARACTERISTICS

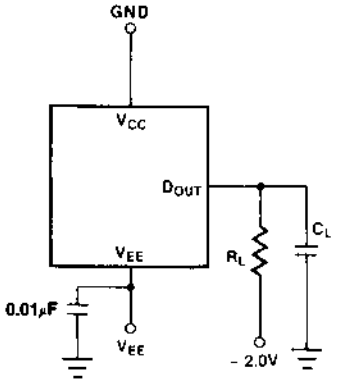
(V_{CC} = 0V, V_{EE} = −4.5V, Output Load = 50Ω to −2.0V, T_A = 0°C to 85°C and Airflow ≥ 2.5 m/s, unless otherwise noted.)

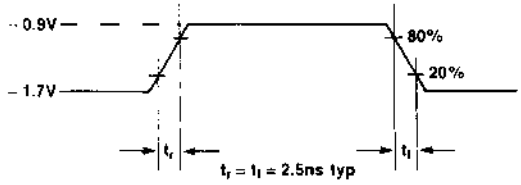
Parameter	Symbol	Min	Typ	Max	Unit
Output High Voltage (V_{IN} = V_{IH}max. or V_{IL}min.)	V_{OH}	−1025	—	−880	mV
Output Low Voltage (V_{IN} = V_{IH}max. or V_{IL}min.)	V_{OL}	−1810	—	−1620	mV
Output High Voltage (V_{IN} = V_{IH}min. or V_{IL}max.)	V_{OHC}	−1035	—	—	mV
Output Low Voltage (V_{IN} = V_{IH}min. 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
$\overline{BS}$ Input Low Current (V_{IN} = V_{IL}min.)	I_{IL}	0.5	—	170	μA
Power Supply Current (All Inputs and Outputs Open)	I_{EE}	−180	—	—	mA

AC CHARACTERISTICS

(V_{CC} = 0V, V_{EE} = −4.5V ±5%, T_A = 0°C tp 85°C, Output Load = 50Ω to −2.0V and 30pF to GND, and Airflow ≥ 2.5 m/s, unless otherwise noted.)

AC TEST CONDITIONS





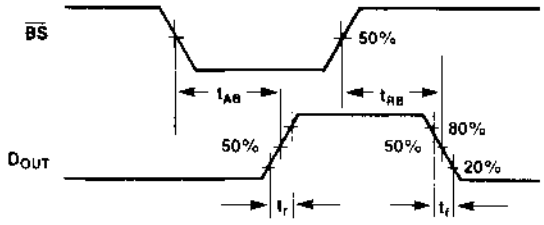
Output Load: RL = 50Ω
C_L = 30pF
(including jig and stray capacitance)

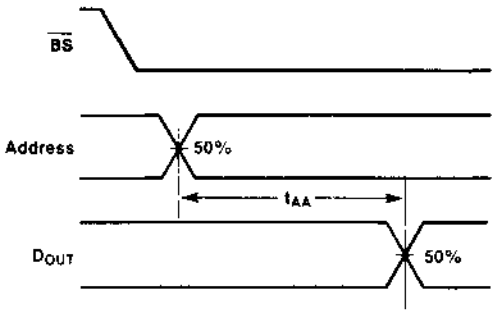
NOTE: All timing measurements referenced to 50% input levels.

READ CYCLE

Parameter	Symbol	Min	Typ	Max	Unit
Address Access Time	t_{AA}	—	—	10	ns
Block Select Access Time	t_{AB}	—	—	5	ns
Block Select Recovery Time	t_{RB}	—	—	5	ns

READ CYCLE

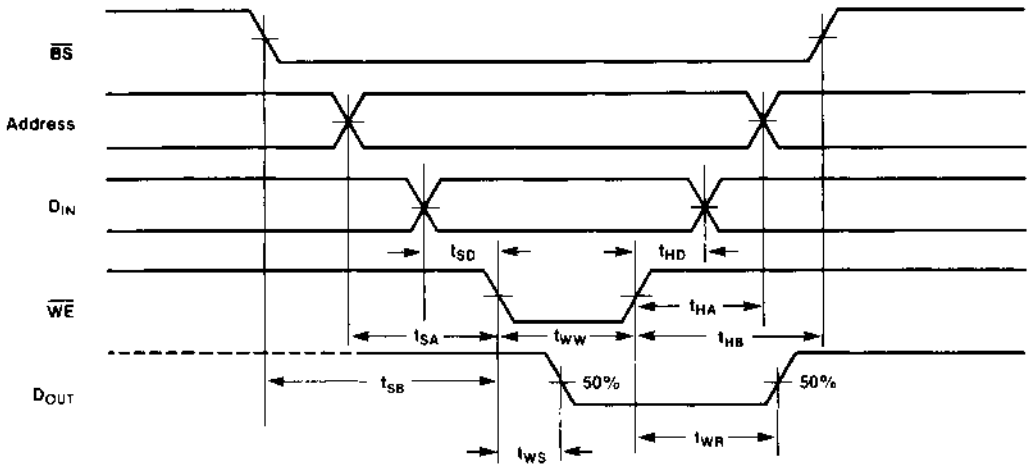




WRITE CYCLE

Parameter	Symbol	Min	Typ	Max	Unit
Write Pulse Width	t_{WW}	7	—	—	ns
Write Disable Time	t_{WS}	—	—	5	ns
Write Recovery Time	t_{WR}	—	—	10	ns
Address Set Up Time	t_{SA}	1	—	—	ns
Block Select Set Up Time	t_{SB}	1	—	—	ns
Data Set Up Time	t_{SD}	1	—	—	ns
Address Hold Time	t_{HA}	2	—	—	ns
Block Select Hold Time	t_{HB}	2	—	—	ns
Data Hold Time	t_{HD}	2	—	—	ns

WRITE CYCLE

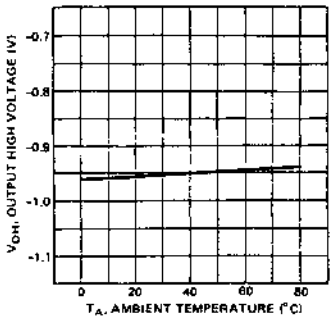


RISE TIME AND FALL TIME

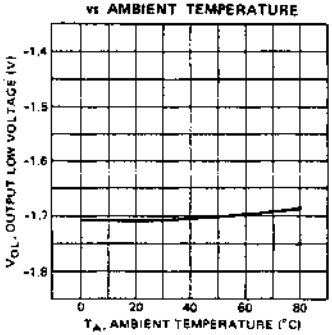
Parameter	Symbol	Min	Typ	Max	Unit
Output Rise Time	t_r	—	2	—	ns
Output Fall Time	t_f	—	2	—	ns

TYPICAL CHARACTERISTICS CURVES

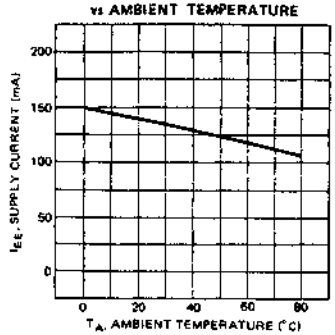
OUTPUT HIGH VOLTAGE
vs AMBIENT TEMPERATURE



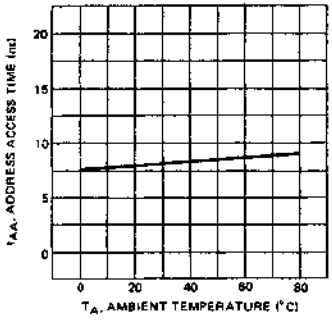
OUTPUT LOW VOLTAGE
vs AMBIENT TEMPERATURE



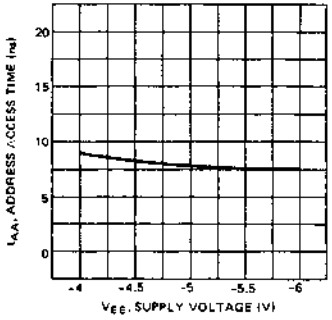
SUPPLY CURRENT
vs AMBIENT TEMPERATURE



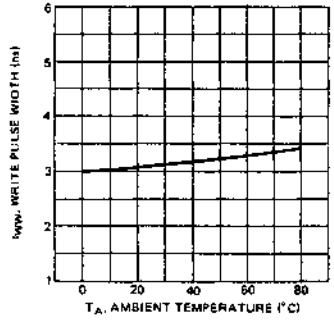
ADDRESS ACCESS TIME
vs AMBIENT TEMPERATURE



ADDRESS ACCESS TIME
vs SUPPLY VOLTAGE



WRITE PULSE WIDTH
vs AMBIENT TEMPERATURE



WRITE PULSE WIDTH
vs SUPPLY VOLTAGE