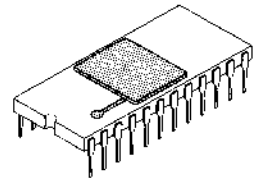
ECL 4096-BIT BIPOLAR RANDOM ACCESS MEMORY

DESCRIPTION

The Fujitsu MBM10474 is a fully decoded 4096-bit ECL read/write random access memory designed for high speed scratch pad, control and buffer storage applications.

The MBM10474 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 MBM10474 is specified over a temperature range of 0°C to 75°C ambient. It features metal-sealed 24-pin dual in-line packaging and is fully compatible with industry-standard 10K-series ECL families.

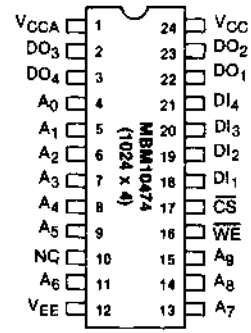


CERAMIC PACKAGE
DIP-24C-A02

FEATURES

- **1024 words x 4-bits organization**
- **On-chip voltage compensation for improved noise margin**
- **Fully compatible with industry-standard 10K-series ECL families**
- **Address access time:**
  25ns Max
  18ns Typ
- **Chip select time:**
  10ns Max
  7ns Typ.
- **Open emitter output for easy memory expansion**
- **Low power dissipation:**
  0.2mW/bit
- **DOPOS and IOP processing**
- **Pin compatible with F10474**

PIN ASSIGNMENT



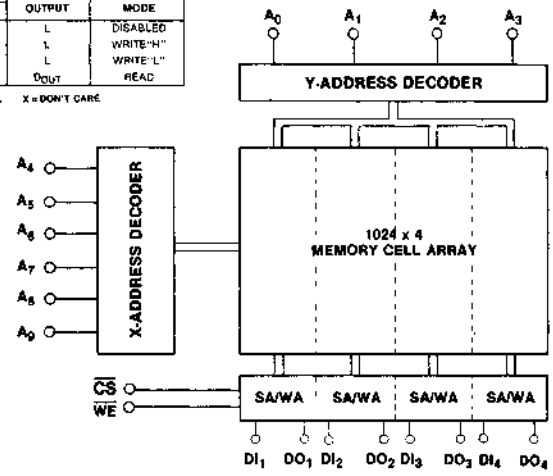
Small geometry bipolar integrated circuits are occasionally susceptible to damage from static voltages or electric fields. It is therefore advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this device.

MBM10474 BLOCK DIAGRAM

TRUTH TABLE

INPUT			OUTPUT	MODE
$\overline{CS}$	$\overline{WE}$	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



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}	−5.46	−5.2	−4.94	V	0°C to +75°C

CAPACITANCE

Parameter	Symbol	Min	Typ	Max	Unit
Input Pin Capacitance	C_{IN}	—	4	—	pF
Output Pin Capacitance	C_{OUT}	—	7	—	pF

DC CHARACTERISTICS

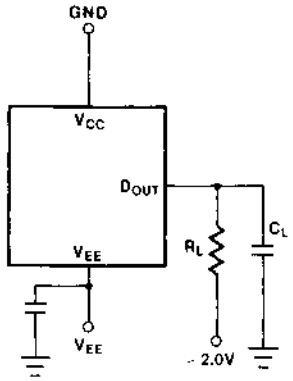
(V_{CC} = 0V, V_{EE} = −5.2V ±5%, Output load = 50Ω to −2.0V and Airflow ≥ 2.5m/s unless otherwise noted.)

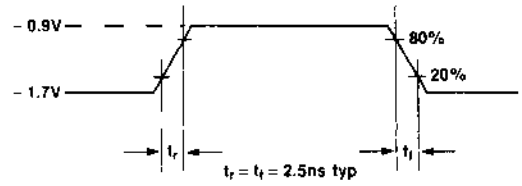
Parameter	Symbol	Min	Typ	Max	Unit	T_A
Output High Voltage (V_{IN} = $V_{IH\ max.}$ or $V_{IL\ min.}$)	V_{OH}	−1000 −970 −900	—	−840 −810 −720	mV	0°C 25°C 75°C
Output Low Voltage (V_{IN} = $V_{IH\ max.}$ or $V_{IL\ min.}$)	V_{OL}	−1870 −1850 −1830	—	−1665 −1650 −1625	mV	0°C 25°C 75°C
Output High Voltage (V_{IN} = $V_{IH\ min.}$ or $V_{IL\ max.}$)	V_{OHC}	−1020 −980 −920	—	—	mV	0°C 25°C 75°C
Output Low Voltage (V_{IN} = $V_{IH\ min.}$ or $V_{IL\ max.}$)	V_{OLC}	—	—	−1645 −1630 −1605	mV	0°C 25°C 75°C
Input High Voltage (Guaranteed Input Voltage High for All Inputs)	V_{IH}	−1145 −1105 −1045	—	−840 −810 −720	mV	0°C 25°C 75°C
Input Low Voltage (Guaranteed Input Voltage Low for All Inputs)	V_{IL}	−1870 −1850 −1830	—	−1490 −1475 −1450	mV	0°C 25°C 75°C
Input High Current (V_{IN} = $V_{IH\ max.}$)	I_{IH}	—	—	220	μA	0° to 75°C
Input Low Current (V_{IN} = $V_{IL\ min.}$)	I_{IL}	−50	—	—	μA	0° to 75°C
$\overline{CS}$ Input Low Current (V_{IN} = $V_{IL\ min.}$)	I_{IL}	0.5	—	170	μA	0° to 75°C
Power Supply Current (All Inputs and Outputs Open)	I_{EE}	−200	—	—	mA	0° to 75°C

AC CHARACTERISTICS

(Full Guaranteed Operating Ranges, Output Load = 50Ω to −2.0V and 30pF to GND and Airflow ≥ 2.5m/s unless otherwise noted.)

AC TEST CONDITIONS





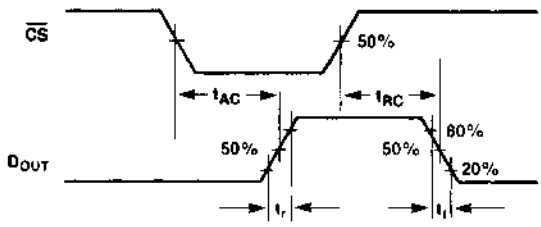
Output Load: RL = 50Ω
C_L = 30pF
(including jig and stray capacitance)

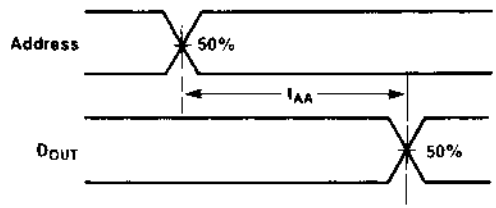
NOTE: All timing measurements referenced to 50% input levels.

READ CYCLE

Parameter	Symbol	Min	Typ	Max	Unit
Address Access Time	t_{AA}	—	18	25	ns
Chip Select Access Time	t_{AC}	—	7	10	ns
Chip Select Recovery Time	t_{RC}	—	7	10	ns

READ CYCLE

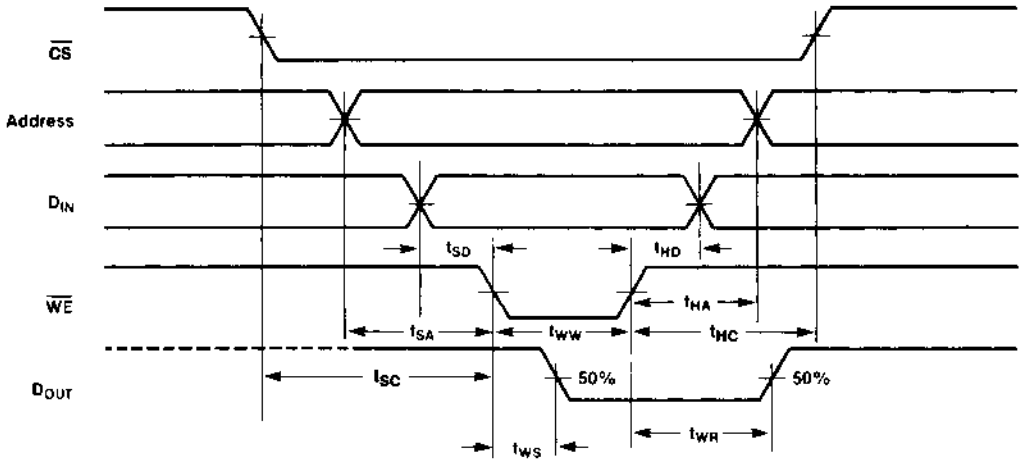




WRITE CYCLE

Parameter	Symbol	Min	Typ	Max	Unit
Write Pulse Width	t_{WW}	15	—	—	ns
Write Disable Time	t_{WS}	—	—	8	ns
Write Recovery Time	t_{WR}	—	—	15	ns
Address Set Up Time	t_{SA}	8	—	—	ns
Chip Select Set Up Time	t_{SC}	5	—	—	ns
Data Set Up Time	t_{SD}	5	—	—	ns
Address Hold Time	t_{HA}	5	—	—	ns
Chip Select Hold Time	t_{HC}	5	—	—	ns
Data Hold Time	t_{HD}	5	—	—	ns

WRITE CYCLE

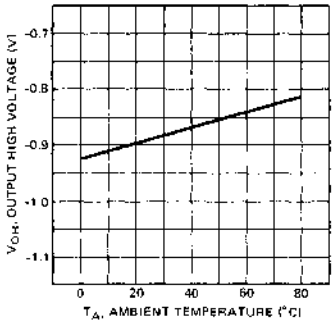


RISE TIME AND FALL TIME

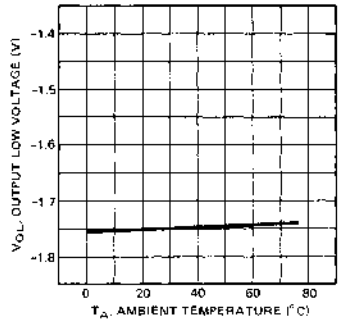
Parameter	Symbol	Min	Typ	Max	Unit
Output Rise Time	t_r	—	5	—	ns
Output Fall Time	t_f	—	5	—	ns

TYPICAL CHARACTERISTICS CURVES

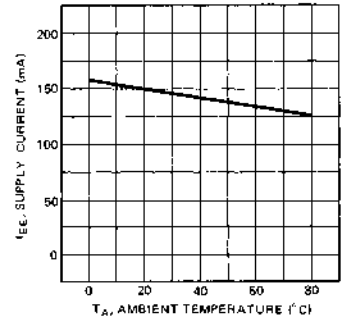
OUTPUT HIGH VOLTAGE vs AMBIENT TEMPERATURE



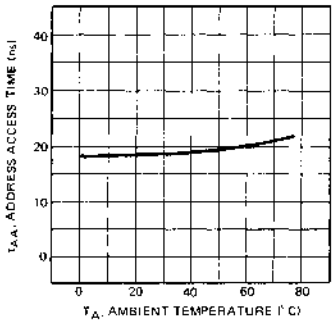
OUTPUT LOW VOLTAGE vs AMBIENT TEMPERATURE



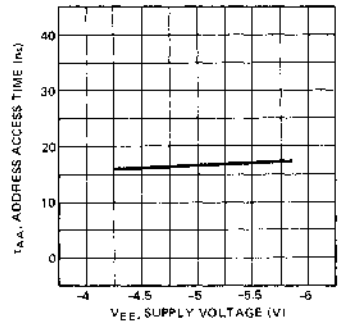
SUPPLY CURRENT vs AMBIENT TEMPERATURE



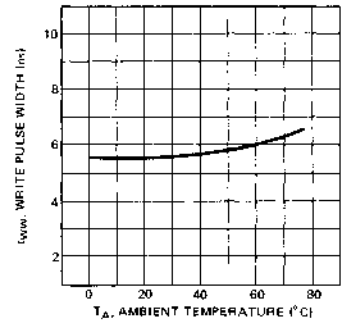
ADDRESS ACCESS TIME vs AMBIENT TEMPERATURE



ADDRESS ACCESS TIME vs SUPPLY VOLTAGE



WRITE PULSE WIDTH vs AMBIENT TEMPERATURE



WRITE PULSE WIDTH vs SUPPLY VOLTAGE