FUJITSU
MICROELECTRONICS

MB7072E

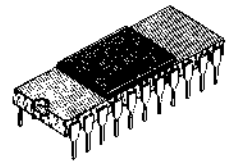
ECL 256 X 4-BIT BIPOLAR RANDOM ACCESS MEMORY

DESCRIPTION

The Fujitsu MB7072 is a fully decoded 1024-bit ECL read/write random access memory designed for high-speed scratch pad, control and buffer storage applications. The MB7072 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 MB7072 is specified over a temperature range of 0°C to 75°C (ambient).

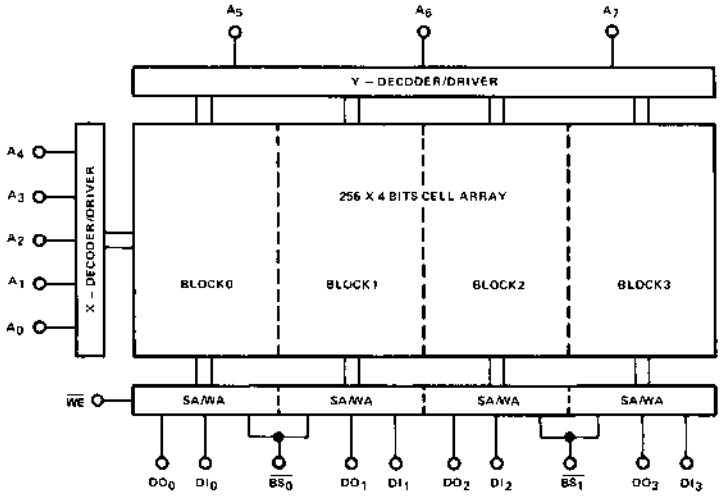
FEATURES

- **Organized as 256 words by 4-bits**
- **On-chip voltage compensation for improved noise margin**
- **Fully compatible with industry standard 10K-series ECL families**
- **Address Access Time: MB7072E 12ns Max.**
- **DOPOS and IOP Processing**
- **Two block select pins for flexibility in organization**

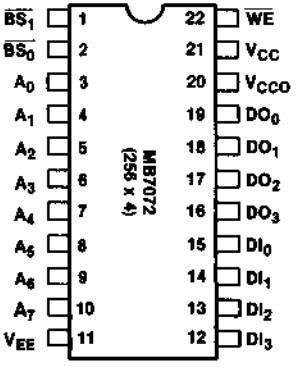


CERAMIC PACKAGE
DIP-22C-F01

Fig. 1-MB7072E BLOCK DIAGRAM



PIN ASSIGNMENT



TRUTH TABLE

INPUT			OUTPUT	MODE
$\overline{BS}$	$\overline{WE}$	DI		
H	X	X	L	DISABLE
L	L	H	L	WRITE "H"
L	L	L	L	WRITE "L"
L	H	X	DO	READ

H = HIGH VOLTAGE LEVEL
L = LOW VOLTAGE LEVEL
X = DON'T CARE

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.

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	−25 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 operational sections of this data sheet.

GUARANTEED OPERATING RANGES

Part Number	Supply Voltage (V_{EE})			Ambient Temperature
	Min	Typ	Max	
MB7072 E	−5.46V	−5.2V	−4.94V	0°C to 75°C

CAPACITANCE

Parameter	Symbol	Min	Typ	Max	Unit
*Input Pin Capacitance	C_{IN}	—	—	8	pF
Output Pin Capacitance	C_{OUT}	—	—	8	pF

*$\overline{BS}$ Capacitance = 12pF (max)

DC CHARACTERISTICS

($V_{CC} = V_{CCO} = 0V, V_{EE} = -5.2V$, Output Load = 50Ω to −2.0V, with transverse airflow ≥ 2.5 m/s, unless otherwise noted.)

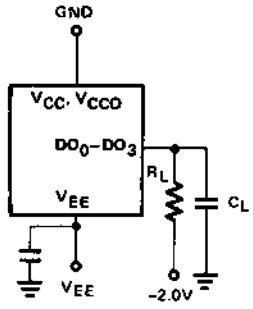
Parameter	Symbol	Min	Typ	Max	Unit	T_A
Output High Voltage ($V_{IN} = V_{IHmax}$ or V_{ILmin})	V_{OH}	−1000 −960 −900	— — —	−840 −810 −720	mV	0°C 25°C 75°C
Output Low Voltage ($V_{IN} = V_{INmax}$ or V_{ILmin})	V_{OL}	−1870 −1850 −1830	— — —	−1665 −1650 −1625	mV	0°C 25°C 75°C
Output High Voltage ($V_{IN} = V_{IHmin}$ or V_{ILmax})	V_{OHC}	−1020 −980 −920	— — —	— — —	mV	0°C 25°C 75°C
Output Low Voltage ($V_{IN} = V_{IHmin}$ or V_{ILmax}	V_{OLC}	— — —	— — —	−1645 −1630 −1606	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 ($V_{IN} = V_{IHmax}$)	I_{IH}	—	—	220	μA	0° to 75°C
**Input Low Current ($V_{IN} = V_{ILmin}$)	I_{IL}	0.5	—	170	μA	0° to 75°C
Power Supply Current (All Inputs and Output Open)	I_{EE}	−200	—	—	mA	0° to 75°C

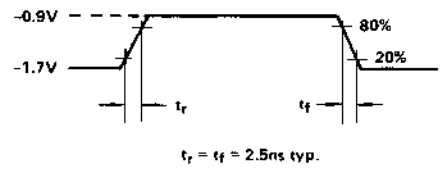
*$\overline{BS}$ Input High Current = 300μA (max)
**$\overline{BS}$ Input Low Current = 240μA (max)

AC CHARACTERISTICS

(V_{CC} = V_{CCO} = 0V, V_{EE} = −5.2V ±5%, T_A = 0° to +75°C with transverse airflow ≥ 2.5 m/s, Output Load = 50Ω to −2V and 15 pF to GND, unless otherwise noted.)

Fig. 2 — AC TEST CONDITIONS





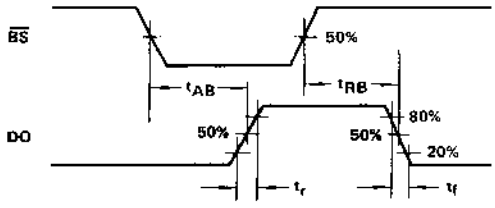
t_r = t_f = 2.5ns typ.

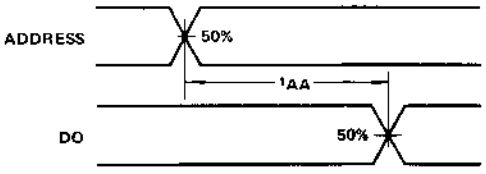
OUTPUT LOAD: R_L = 50Ω
C_L = 15 pF
(INCLUDING JIG AND STRAY CAPACITANCE)

READ CYCLE

Parameter	Symbol	MB7072E			Unit
		Min	Typ	Max	
Address Access Time	t_{AA}	—	—	12	ns
Block Select Access Time	t_{AB}	—	3.0	5.0	ns
Block Select Recovery Time	t_{RB}	—	3.0	5.0	ns

READ CYCLE

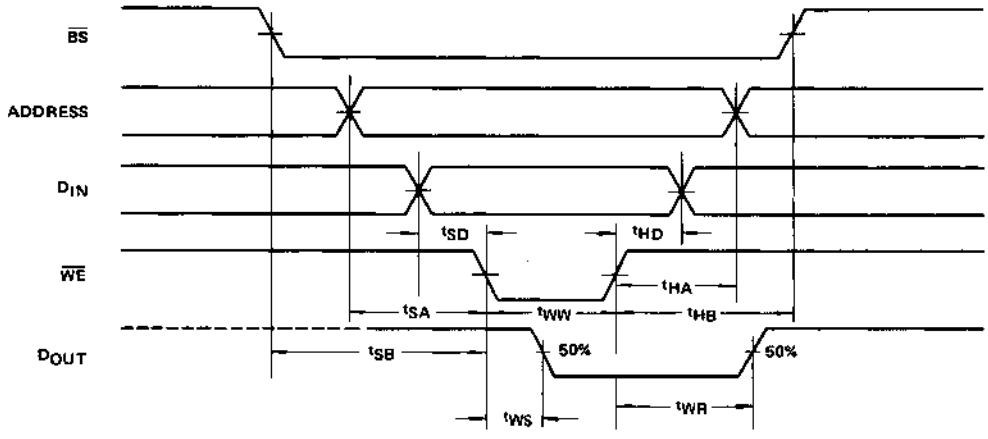




WRITE CYCLE

Parameter	Symbol	MB7072E			Unit
		Min	Typ	Max	
Write Pulse Width	t_{WW}	9.0	5.5	—	ns
Write Recovery Time	t_{WR}	—	6.0	9.0	ns
Write Disable Time	t_{WS}	—	3.0	5.0	ns
Address Set Up Time	t_{SA}	3.0	—	—	ns
Block Select Set Up Time	t_{SB}	2.0	—	—	ns
Data Set Up Time	t_{SD}	2.0	—	—	ns
Address Hold Time	t_{HA}	2.0	—	—	ns
Block Select Hold Time	t_{HB}	2.0	—	—	ns
Data Hold Time	t_{HD}	2.0	—	—	ns

WRITE CYCLE



RISE TIME AND FALL TIME

Parameter	Symbol	MB7072E			Unit
		Min	Typ	Max	
Ouput Rise Time	t_r	—	3.0	—	ns
Output Fall Time	t_f	—	3.0	—	ns

APPLICATION INFORMATION

The Fujitsu MB7072E is a fully decoded 256 word by 4-bits ECL memory. High speed makes them ideally suited to mainframe applications, including cache and microprogram control. Figure 3 illustrates one application; a 4K word x 8-bit memory. As with all ECL memory systems, extreme care must be taken in PC board layout and bussing to minimize reflections and crosstalk.

Fig. 3 — 4K WORD X 8-BIT MEMORY SYSTEM