

# ECL 256 X 4-BIT BIPOLAR RANDOM ACCESS MEMORY

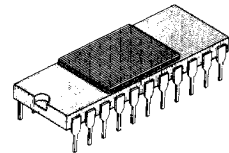
## DESCRIPTION

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).

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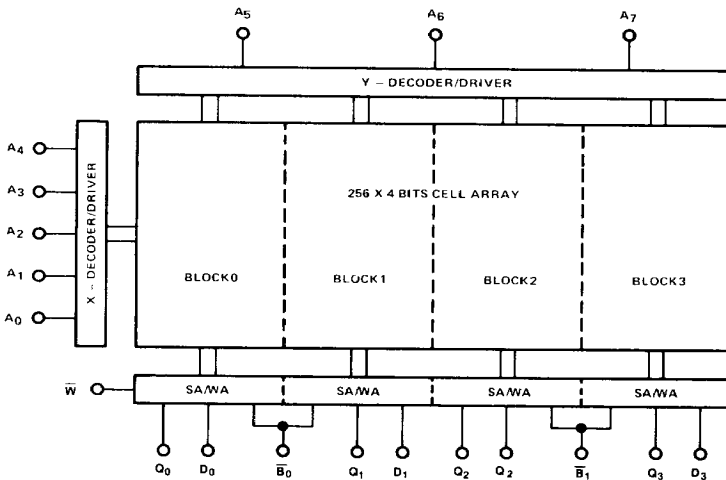
## FEATURES

- 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**

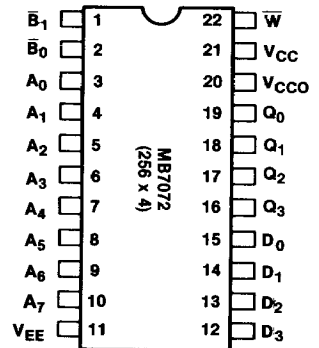


**TRUTH TABLE**

INPUT			OUTPUT	MODE
$\bar{B}$	$\bar{W}$	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

## 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.

**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

\*B Capacitance = 12pF (max)

**DC CHARACTERISTICS**

( $V_{CC} = V_{CC0} = 0V$ ,  $V_{EE} = -5.2V$ , Output Load = 500 to -2.0V, with transverse airflow  $\geq 2.5$  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	—	-840	mV	0°C
		-960	—	-810		25°C
		-900	—	-720		75°C
Output Low Voltage ( $V_{IN} = V_{INmax}$ or $V_{ILmin}$ )	$V_{OL}$	-1870	—	-1665	mV	0°C
		-1850	—	-1650		25°C
		-1830	—	-1625		75°C
Output High Voltage ( $V_{IN} = V_{IHmin}$ or $V_{ILmax}$ )	$V_{OHC}$	-1020	—	—	mV	0°C
		-980	—	—		25°C
		-920	—	—		75°C
Output Low Voltage ( $V_{IN} = V_{IHmin}$ or $V_{ILmax}$ )	$V_{OLC}$	—	—	-1645	mV	0°C
		—	—	-1630		25°C
		—	—	-1605		75°C
Input High Voltage (Guaranteed Input Voltage High for All Inputs)	$V_{IH}$	-1145	—	-840	mV	0°C
		-1105	—	-810		25°C
		-1045	—	-720		75°C
Input Low Voltage (Guaranteed Input Voltage Low for All Inputs)	$V_{IL}$	-1870	—	-1490	mV	0°C
		-1850	—	-1475		25°C
		-1830	—	-1450		75°C
* Input High Current ( $V_{IN} = V_{IHmax}$ )	$I_{IH}$	—	—	220	$\mu$ A	0° to 75°C
** Input Low Current ( $V_{IN} = V_{ILmin}$ )	$I_{IL}$	0.5	—	170	$\mu$ A	0° to 75°C
Power Supply Current (All Inputs and Output Open)	$I_{EE}$	-200	—	—	mA	0° to 75°C

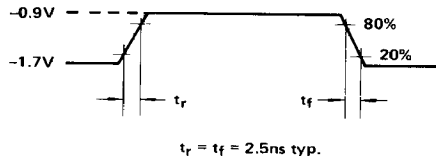
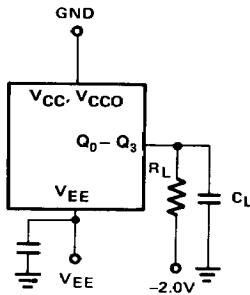
\*B Input High Current = 300 $\mu$ A(max)

\*\*B Input Low Current = 240 $\mu$ A(max)

**AC CHARACTERISTICS**

( $V_{CC} = V_{CCO} = 0V$ ,  $V_{EE} = -5.2V \pm 5\%$ ,  $T_A = 0^\circ$  to  $+75^\circ C$  with transverse airflow  $\geq 2.5$  m/s, Output Load =  $50\Omega$  to  $-2V$  and  $15$  pF to GND, unless otherwise noted.)

**Fig. 2 — AC TEST CONDITIONS**

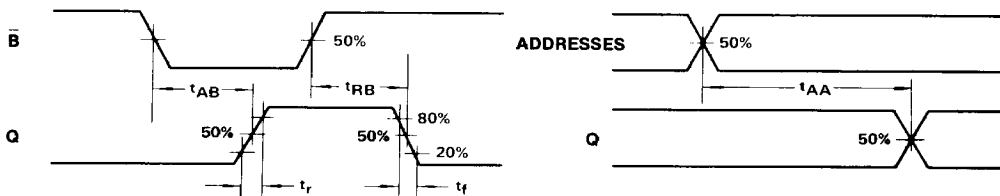


OUTPUT LOAD:  $R_L = 50\Omega$   
 $C_L = 15$  pF  
 (INCLUDING JIG AND STRAY CAPACITANCE)

**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

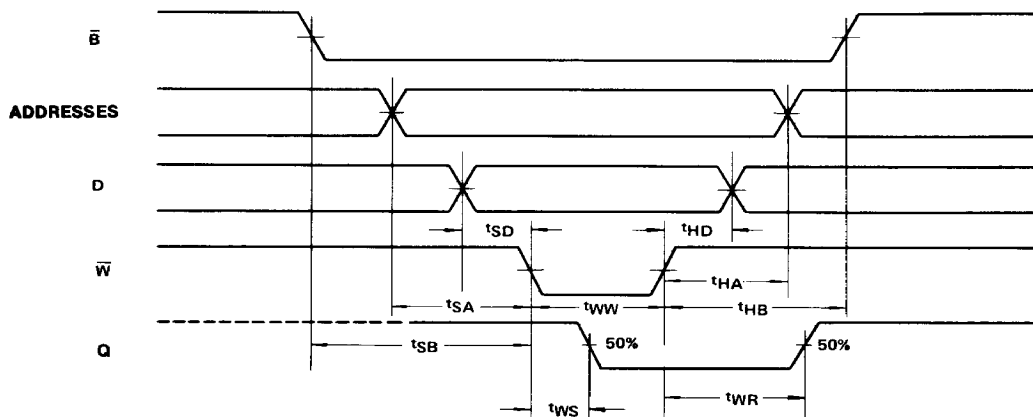
**READ CYCLE**



**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	
Output Rise Time	$t_r$	—	3.0	—	ns
Output Fall Time	$t_f$	—	3.0	—	ns

APPLICATION INFORMATION

The Fujitsu MB7072 E 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 il-

lustrates 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

