

# TTL 576-BIT BIPOLAR RANDOM ACCESS MEMORY

## DESCRIPTION

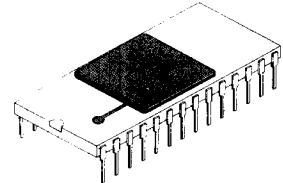
The Fujitsu MBM93419 is a high speed TTL read/write random-access memory, organized as 64 words by 9 bits, with open-collector outputs.

MBM93419 is packaged in a 28-pin dual-in-line package, and is plug-in replaceable with F93419. It

is ideally suited for scratchpad, small buffer and other applications where the number of required words is small and the number of required bits per word is relatively large. The ninth bit can provide parity for 8-bit word systems.

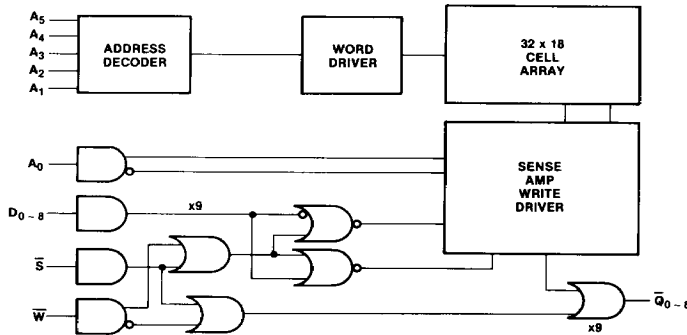
## FEATURES

- **Organization:**  
64 words x 9-bits
- **+5V Single Power Supply**
- **TTL Inputs and Outputs**
- **Open Collector Outputs**
- **Address Access Time:**  
45 ns Max.
- **Chip Select Access Time:**  
40 ns Max.
- **Power Dissipation:**  
1.3mW/bit Typ.
- **Compatible with F93419**

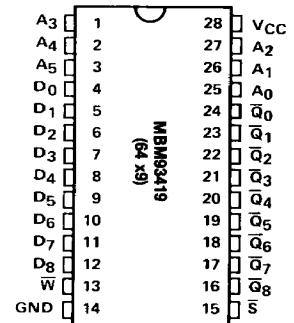


**CERAMIC PACKAGE  
DIP-28C-A01**

## MBM93419 BLOCK DIAGRAM



## PIN ASSIGNMENT



## TRUTH TABLE

INPUT			OUTPUT	MODE
$\bar{S}$	$\bar{W}$	D		
H	X	X	H	DISABLED
L	L	H	H	WRITE "H"
L	L	L	H	WRITE "L"
L	H	X	$\bar{D}_{OUT}$	READ

H = HIGH VOLTAGE LEVEL  
L = LOW VOLTAGE LEVEL  
X = DON'T CARE  
\* DATA OUTPUT IS THE  
COMPLEMENT OF DATA INPUT

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

**ABSOLUTE MAXIMUM RATINGS** (See Note)

Rating	Symbol	Value	Unit
Power Supply Voltage	$V_{CC}$	-0.5 to +7.0	V
Input Voltage (DC)	$V_{IN}$	-0.5 to +5.5	V
Input Current (DC)	$I_{IN}$	-12.0 to +5.0	mA
Output Voltage ( $V_{OUT} = "H"$ )	$V_{OUT}$	-0.5 to +5.5	V
Output Current (DC, $V_{OUT} = "L"$ )	$I_{OUT}$	+20.0	mA
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 RANGES**

Parameter	Symbol	Min	Typ	Max	Unit	Ambient Temperature
Power Supply Voltage	$V_{CC}$	4.75	5.0	5.25	V	0°C to +75°C
Input High Voltage	$V_{IH}$	2.1	—	—	V	
Input Low Voltage	$V_{IL}$	—	—	0.6	V	

**CAPACITANCE**

( $T_A = 25^\circ\text{C}$ ,  $V_{CC} = 5.0\text{V}$ ,  $V_{IN} = 2.0\text{V}$ ,  $f = 1\text{ MHz}$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input Pin Capacitance	$C_{IN}$	—	—	5.0	pF
Output Pin Capacitance	$C_{OUT}$	—	—	8.0	pF

**DC CHARACTERISTICS**

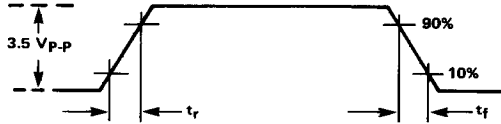
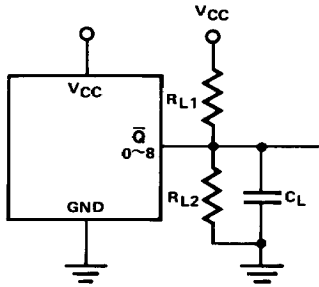
( $V_{CC} = 5\text{V} \pm 5\%$ ,  $T_A = 0^\circ\text{C}$  to  $75^\circ\text{C}$ , Air Flow  $\geq 2.5\text{m/sec}$ , After Warm-up  $\geq 2\text{ min.}$ )

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Output Low Voltage	$V_{OL}$	$V_{CC} = \text{Min}$ , $I_{OL} = 12\text{mA}$	—	0.4	0.5	V
Input High Voltage	$V_{IH}$	—	—	1.6	—	V
Input Low Voltage	$V_{IL}$	—	—	1.5	—	V
Input Low Current	$I_{IL}$	$V_{CC} = \text{Max}$ , $V_{IN} = 0.4\text{V}$	—	-250	-400	$\mu\text{A}$
Input High Current	$I_{IH1}$	$V_{CC} = \text{Max}$ , $V_{IN} = 4.5\text{V}$	—	1.0	40	$\mu\text{A}$
Input High Current	$I_{IH2}$	$V_{CC} = \text{Max}$ , $V_{IN} = 5.25\text{V}$	—	—	1.0	mA
Output Leakage Current	$I_{CEX}$	$V_{CC} = \text{Max}$ , $V_{OUT} = 4.5\text{V}$	—	1.0	100	$\mu\text{A}$
Input Clamp Diode Voltage	$V_{CD}$	$V_{CC} = \text{Max}$ , $V_{OUT} = 4.5\text{V}$	—	-1.0	-1.5	V
Power Supply Current	$I_{CC}$	$V_{CC} = \text{Max}$ , $T_A = 25^\circ\text{C}$ All Input GND	—	160	200	mA

# MBM93419

## AC CHARACTERISTICS

( $V_{CC} = 5V \pm 5\%$ ,  $T_A = 0^\circ C$  to  $75^\circ C$ , Air Flow  $\geq 2.5$  m/sec, After Warm-up  $\geq 2$  min.)

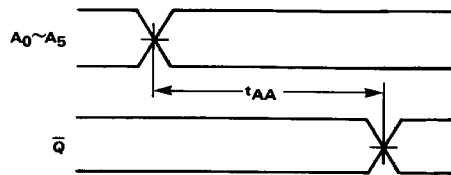
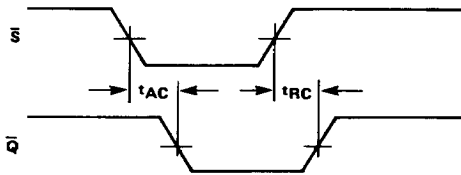


Input Pulse Voltage:  $3.5V_{p-p}$   
 Input Pulse Rise and Fall Time: 10ns  
 Output Load:  $R_{L1} = 450\Omega$   
 $R_{L2} = 750\Omega$   
 $C_L = 30pF$  (Including Jig)  
 Timing Measurement Levels: Input = 1.5V  
 Output = 1.5V

## READ CYCLE

Parameter	Symbol	Min	Typ	Max	Unit
Address Access Time	$t_{AA}$	—	26	45	ns
Chip Select Access Time	$t_{AC}$	—	18	40	ns
Chip Select Recovery Time	$t_{RC}$	—	18	40	ns

## READ CYCLE



**WRITE CYCLE**

Parameter	Symbol	Min	Typ	Max	Unit
Write Pulse Width	t <sub>WW</sub>	35	7	—	ns
Write Recovery Time	t <sub>WR</sub>	—	20	45	ns
Write Delayed Time	t <sub>WS</sub>	—	20	40	ns
Address Setup Time	t <sub>SA</sub>	5	0	—	ns
Chip Select Setup Time	t <sub>SC</sub>	5	0	—	ns
Data Setup Time	t <sub>SD</sub>	5	0	—	ns
Address Hold Time	t <sub>HA</sub>	5	0	—	ns
Chip Select Hold Time	t <sub>HC</sub>	5	0	—	ns
Data Hold Time	t <sub>HD</sub>	5	0	—	ns

**WRITE CYCLE**

