



MCM6641 MCM66L41

Advance Information

4096-BIT STATIC RANDOM ACCESS MEMORIES

The MCM6641 series 4096 \times 1-bit Random Access Memory is fabricated with high density, high reliability N-channel silicon-gate technology. For ease of use, the device operates from a single 5-volt power supply, is directly compatible with TTL and DTL, and requires no clocks or refreshing because of fully static operation. The fully static operation allows chip selects to be tied low, further simplifying system timing. Data access is particularly simple, since address setup times are not required. The output data has the same polarity as the data input.

The MCM6641 is designed for memory applications where simple interfacing is the design objective, and is assembled in 18-pin dual-in-line packages with the industry standard pin-outs.

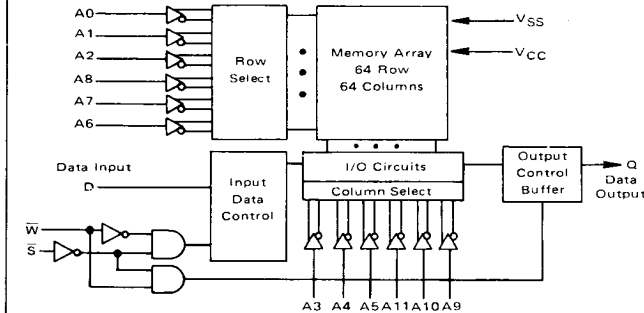
- Single $\pm 10\%$ +5 V Supply
- Fully Static Operation — No Clock, Timing Strobe, Pre-Charge, or Refresh Required
- Industry Standard 18-Pin Configuration
- Fully TTL Compatible
- Common Data Input and Output Capability
- Three-State Outputs for OR-Tie Capability
- Power Dissipation MCM6641 Less Than 550 mW (Maximum)
MCM66L41 Less Than 385 mW (Maximum)
- Standby Power Dissipation Less Than 125 mW (Typical)
- Plug-In Replacement For TMS4044

SRAM

MAXIMUM ACCESS TIME/MINIMUM CYCLE TIME

MCM6641-20	200 ns	MCM6641-30	300 ns
MCM66L41-20		MCM66L41-30	
MCM6641-25	250 ns	MCM6641-45	450 ns
MCM66L41-25		MCM66L41-45	

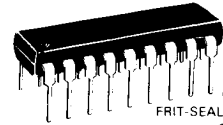
BLOCK DIAGRAM



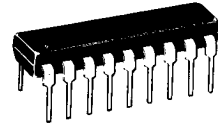
This document contains information on a new product. Specifications and information herein are subject to change without notice.

MOS (N-CHANNEL, SILICON-GATE)

4096-BIT STATIC RANDOM ACCESS MEMORIES

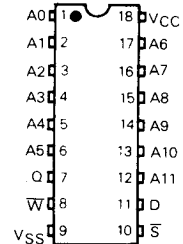


C SUFFIX
FRIT-SEAL CERAMIC PACKAGE
CASE 707-01



P SUFFIX
PLASTIC PACKAGE
CASE 707

PIN ASSIGNMENT



PIN NAMES

A0-A11	Address Input
D	Data Input
Q	Data Output
S	Chip Select
VCC	Power Supply (+5 V)
VSS	Ground
W	Write Enable

TRUTH TABLE

S	W	D	Q	Mode
H	X	X	High Z	Not Selected
L	L	L	High Z	Write '0'
L	L	H	High Z	Write '1'
L	H	X	Output data	Read

ABSOLUTE MAXIMUM RATINGS (See Note)

Rating	Value	Unit
Temperature Under Bias	-10 to +80	°C
Voltage on Any Pin With Respect to V _{SS}	-0.5 to +7.0	Vdc
DC Output Current	20	mA
Power Dissipation	1.0	Watt
Operating Temperature Range	0 to +70	°C
Storage Temperature Range	-65 to +150	°C

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields; however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high-impedance circuit.

Note: Permanent device damage may occur if ABSOLUTE MAXIMUM RATINGS are exceeded. Functional operation should be restricted to RECOMMENDED OPERATING CONDITIONS. Exposure to higher than recommended voltages for extended periods of time could affect device reliability.

DC OPERATING CONDITIONS AND CHARACTERISTICS
(Full operating voltage and temperature range unless otherwise noted)

RECOMMENDED DC OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V _{CC} V _{SS}	4.5 0	5.0 0	5.5 0	V
Logic 1 Voltage, All Inputs	V _{IH}	2.0	—	6.0	V
Logic 0 Voltage, All Inputs	V _{IL}	-0.5	—	0.8	V

DC CHARACTERISTICS

Parameter	Symbol	MCM6641			MCM66L41			Unit
		Min	Typ	Max	Min	Typ	Max	
Input Load Current (All Input Pins, V _{IN} = 0 to 5.5 V)	I _{LI}	—	—	10	—	—	10	µA
Output Leakage Current (CS = 2.4 V, V _{IN} = 0.4 to V _{CC})	I _{LO}	—	—	10	—	—	10	µA
Power Supply Current (V _{CC} = 5.5 V, I _{out} = 0 mA, T _A = 0°C)	I _{CC}	—	80	100	—	55	70	mA
Output Low Voltage, I _{OL} = 2.1 mA	V _{OL}	—	0.15	0.4	—	0.15	0.4	V
Output High Voltage, I _{OH} = 1.0 mA	V _{OH}	2.4	—	—	2.4	—	—	V
Output Short Circuit Current	I _{OS} *	—	—	40	—	—	40	mA

*Duration not to exceed 30 seconds.

CAPACITANCE (f = 1.0 MHz, T_A = 25°C, V_{CC} = 5.0 V, periodically sampled rather than 100% tested)

Characteristic	Symbol	Max	Unit
Input Capacitance (V _{IN} = 0 V)	C _{in}	5.0	pF
Output Capacitance (V _{OUT} = 0 V)	C _{out}	10	pF

Capacitance measured with a Boonton Meter or effective capacitance calculated from the equation: C = IΔt/ΔV.

STANDBY OPERATION

(Typical Supply Values)

Device	Supply	Operating	Standby	Max Standby Power	I _{SB}
MCM6641	V _{CC}	+5 V	+2.4 V	225 mW	95 mA
MCM66L41	V _{CC}	+5 V	(+2.4 V)	150 mW	65 mA

MAX. P_{SD}
6.5



AC OPERATING CONDITIONS AND CHARACTERISTICS

(Full operating voltage and temperature range unless otherwise noted)

Input Pulse Levels.....0.8 Volt to 2.0 Volts
 Input Rise and Fall Times.....10 ns

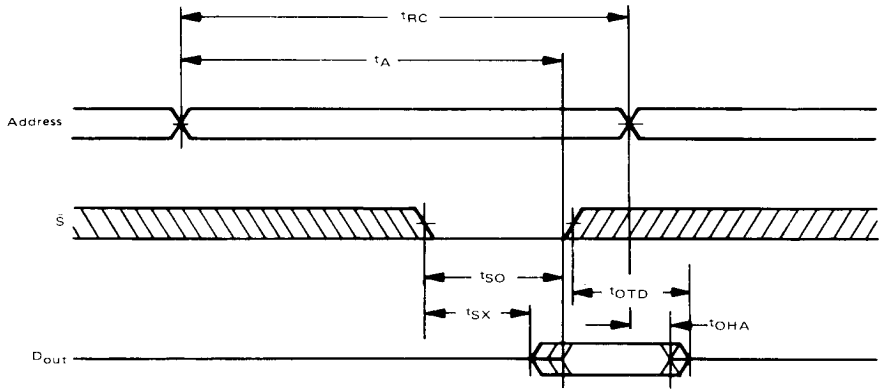
Input and Output Timing Levels.....1.5 Volts
 Output Load.....1 TTL Gate and $C_L = 100$ pF

READ (NOTE 1), WRITE (NOTE 2) CYCLES

Parameter	Symbol	MCM6641-20 MCM66L41-20		MCM6641-25 MCM66L41-25		MCM6641-30 MCM66L41-30		MCM6641-45 MCM66L41-45		Units
		Min	Max	Min	Max	Min	Max	Min	Max	
Read Cycle Time	t_{RC}	200	—	250	—	300	—	450	—	ns
Access Time	t_A	—	200	—	250	—	300	—	450	ns
Chip Selection to Output Valid	t_{SO}	—	70	—	85	—	100	—	120	ns
Chip Selection to Output Active	t_{SX}	10	—	10	—	10	—	10	—	ns
Output 3-State From Deselection	t_{OTD}	—	40	—	60	—	80	—	100	ns
Output Hold From Address Change	t_{OHA}	50	—	50	—	50	—	50	—	ns
Write Cycle Time	t_{WC}	200	—	250	—	300	—	450	—	ns
Write Time	t_W	100	—	125	—	150	—	200	—	ns
Write Release Time	t_{WR}	0	—	0	—	0	—	0	—	ns
Output 3-State From Write	t_{OTW}	—	40	—	60	—	80	—	100	ns
Data to Write Time Overlap	t_{DW}	100	—	125	—	150	—	200	—	ns
Data Hold From Write Time	t_{DH}	0	—	0	—	0	—	0	—	ns

SRAM

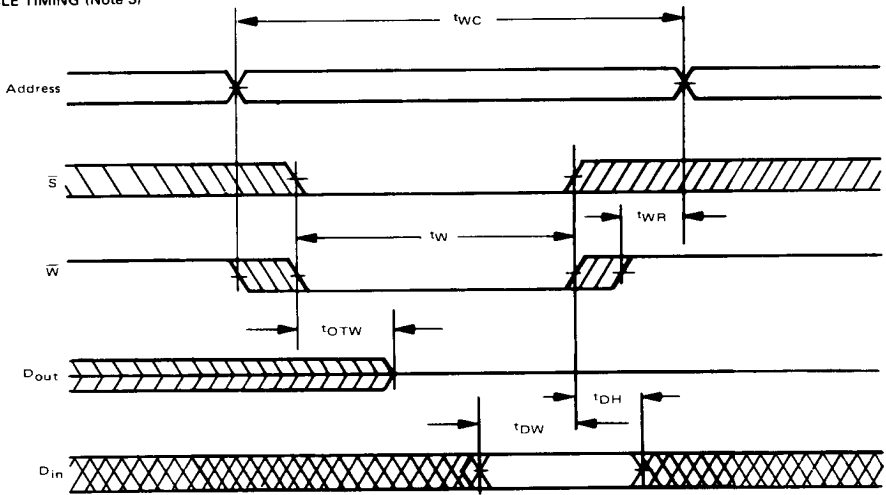
READ CYCLE TIMING
 (W HELD HIGH)



NOTES:

1. A Read occurs during the overlap of a low \bar{S} and a high \bar{W} .
2. A Write occurs during the overlap of a low \bar{S} and a low \bar{W} .
3. If the \bar{S} low transition occurs simultaneously with the \bar{W} low transition, the output buffers remain in a high-impedance state.

WRITE CYCLE TIMING (Note 3)



SRAM