

16 x 4 Bit Register File (RAM)

The MC10H145 is a 16 x 4 bit register file. The active-low chip select allows easy expansion.

The operating mode of the register file is controlled by the \overline{WE} input. When \overline{WE} is "low" the device is in the write mode, the outputs are "low" and the data present at D_n input is stored at the selected address, when \overline{WE} is "high," the device is in the read mode — the data state at the selected location is present at the Q_n outputs.

- Address Access Time, 4.5 ns Typical
- Power Dissipation, 700 mW Typical
- Improved Noise Margin 150 mV (Over Operating Voltage and Temperature Range)
- Voltage Compensated
- MECL 10K-Compatible

MAXIMUM RATINGS

| Characteristic | Symbol | Rating | Unit |
|--|-----------|----------------------------|------|
| Power Supply ($V_{CC} = 0$) | V_{EE} | -8.0 to 0 | Vdc |
| Input Voltage ($V_{CC} = 0$) | V_I | 0 to V_{EE} | Vdc |
| Output Current — Continuous — Surge | I_{out} | 50 100 | mA |
| Operating Temperature Range | T_A | 0 to +75 | °C |
| Storage Temperature Range — Plastic — Ceramic | T_{stg} | -55 to +150 -55 to +165 | °C |

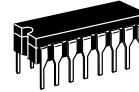
ELECTRICAL CHARACTERISTICS ($V_{EE} = -5.2 \text{ V} \pm 5\%$) (See Note)

| Characteristic | Symbol | 0° | | 25° | | 75° | | Unit |
|----------------------|-----------|-------|-------|-------|-------|-------|--------|---------------|
| | | Min | Max | Min | Max | Min | Max | |
| Power Supply Current | I_E | — | 160 | — | 163 | — | 165 | mA |
| Input Current High | I_{inH} | — | 375 | — | 220 | — | 220 | μA |
| Input Current Low | I_{inL} | 0.5 | — | 0.5 | — | 0.3 | — | μA |
| High Output Voltage | V_{OH} | -1.02 | -0.84 | -0.98 | -0.81 | -0.92 | -0.735 | Vdc |
| Low Output Voltage | V_{OL} | -1.95 | -1.63 | -1.95 | -1.63 | -1.95 | -1.60 | Vdc |
| High Input Voltage | V_{IH} | -1.17 | -0.84 | -1.13 | -0.81 | -1.07 | -0.735 | Vdc |
| Low Input Voltage | V_{IL} | -1.95 | -1.48 | -1.95 | -1.48 | -1.95 | -1.45 | Vdc |

NOTE:

Each MECL 10H series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 lfm is maintained. Outputs are terminated through a 50-ohm resistor to -2.0 volts.

MC10H145



L SUFFIX
CERAMIC PACKAGE
CASE 620-10



P SUFFIX
PLASTIC PACKAGE
CASE 648-08



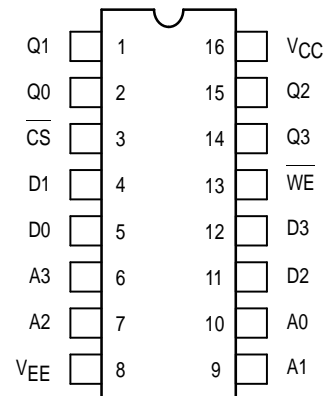
FN SUFFIX
PLCC
CASE 775-02

TRUTH TABLE

| MODE | INPUT | | | OUTPUT |
|-----------|-------|----|-------|--------|
| | CS | WE | D_n | Q_n |
| Write "0" | L | L | L | L |
| Write "1" | L | L | H | L |
| Read | L | H | X | Q |
| Disabled | H | X | X | L |

Q-State of Addressed Cell

DIP PIN ASSIGNMENT



Pin assignment is for Dual-in-Line Package. For PLCC pin assignment, see the Pin Conversion Tables on page 6-11 of the Motorola MECL Data Book (DL122/D).

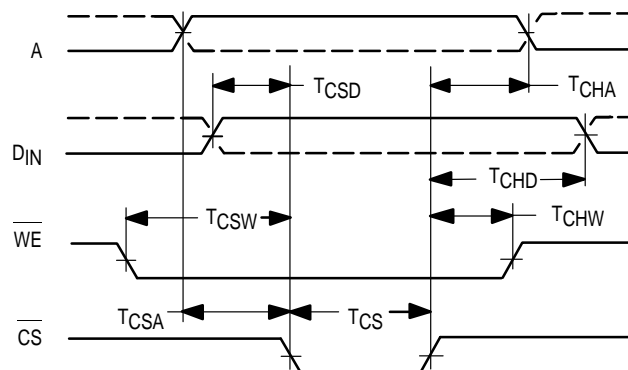


AC PARAMETERS

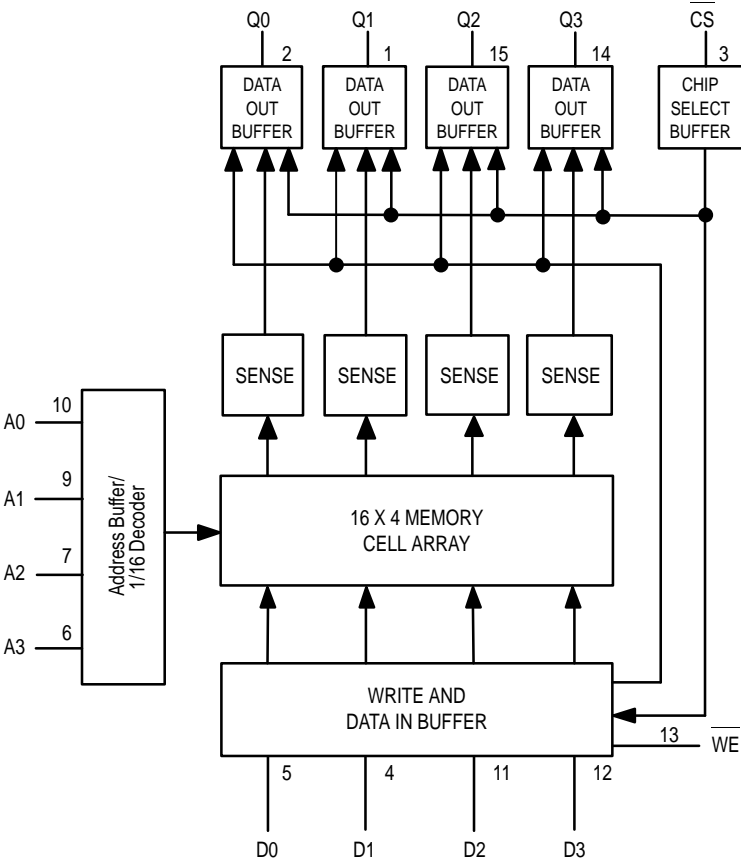
| Characteristics | Symbol | MC10H145 $T_A = 0 \text{ to } +75^\circ\text{C}$, $V_{EE} = -5.2 \text{ Vdc} \pm 5\%$ | | Unit | Conditions |
|--|------------|--|-----|------|--|
| | | Min | Max | | |
| Read Mode | | | | | |
| Chip Select Access Time | t_{ACS} | 0 | 4.0 | ns | Measured from 50% of input to 50% of output. See Note 2. |
| Chip Select Recovery Time | t_{RCS} | 0 | 4.0 | | |
| Address Access Time | t_{AA} | 0 | 6.0 | | |
| Write Mode | | | | | |
| Write Pulse Width | t_W | 6.0 | — | ns | $t_{WSA} = 3.5 \text{ ns}$ Measured at 50% of input to 50% of output. $t_{WV} = 6.0 \text{ ns}$. |
| Data Setup Time Prior to Write | t_{WSD} | 0 | — | | |
| Data Hold Time After Write | t_{WHD} | 1.5 | — | | |
| Address Setup Time Prior to Write | t_{WSA} | 3.5 | — | | |
| Address Hold Time After Write | t_{WHA} | 1.5 | — | | |
| Chip Select Setup Time Prior to Write | t_{WSCS} | 0 | — | | |
| Chip Select Hold Time After Write | t_{WHCS} | 1.5 | — | | |
| Write Disable Time | t_{WS} | 1.0 | 4.0 | | |
| Write Recovery Time | t_{WR} | 1.0 | 4.0 | | |
| Chip Enable Strobe Mode | | | | | |
| Data Setup Prior to Chip Select | t_{CSD} | 0 | — | ns | Guaranteed but not tested on standard product. See Figure 1. |
| Write Enable Setup Prior to Chip Select | t_{CSW} | 0 | — | | |
| Address Setup Prior to Chip Select | t_{CSA} | 0 | — | | |
| Data Hold Time After Chip Select | t_{CHD} | 1.0 | — | | |
| Write Enable Hold Time After Chip Select | t_{CHW} | 0 | — | | |
| Address Hold Time After Chip Select | t_{CHA} | 2.0 | — | | |
| Chip Select Minimum Pulse Width | t_{CS} | 4.0 | — | | |
| Rise and Fall Time | t_r, t_f | | | | |
| Address to Output | | 0.6 | 2.5 | ns | Measured between 20% and 80% points. |
| CS to Output | | 0.6 | 2.5 | | |
| Capacitance | | | | | |
| Input Capacitance | C_{in} | — | 6.0 | pF | Measured with a pulse technique. |
| Output Capacitance | C_{out} | — | 8.0 | | |

- NOTES: 1. Test circuit characteristics: $R_T = 50 \, \Omega$, MC10H145. $C_L \leq 5.0 \text{ pF}$ (including jig and Stray Capacitance). Delay should be derated 30 ps/pF for capacitive loads up to 50 pF.
2. The maximum Address Access Time is guaranteed to be the worst-case bit in the memory.
3. For proper use of MECL in a system environment, consult MECL System Design Handbook.

FIGURE 1 — CHIP ENABLE STROBE MODE

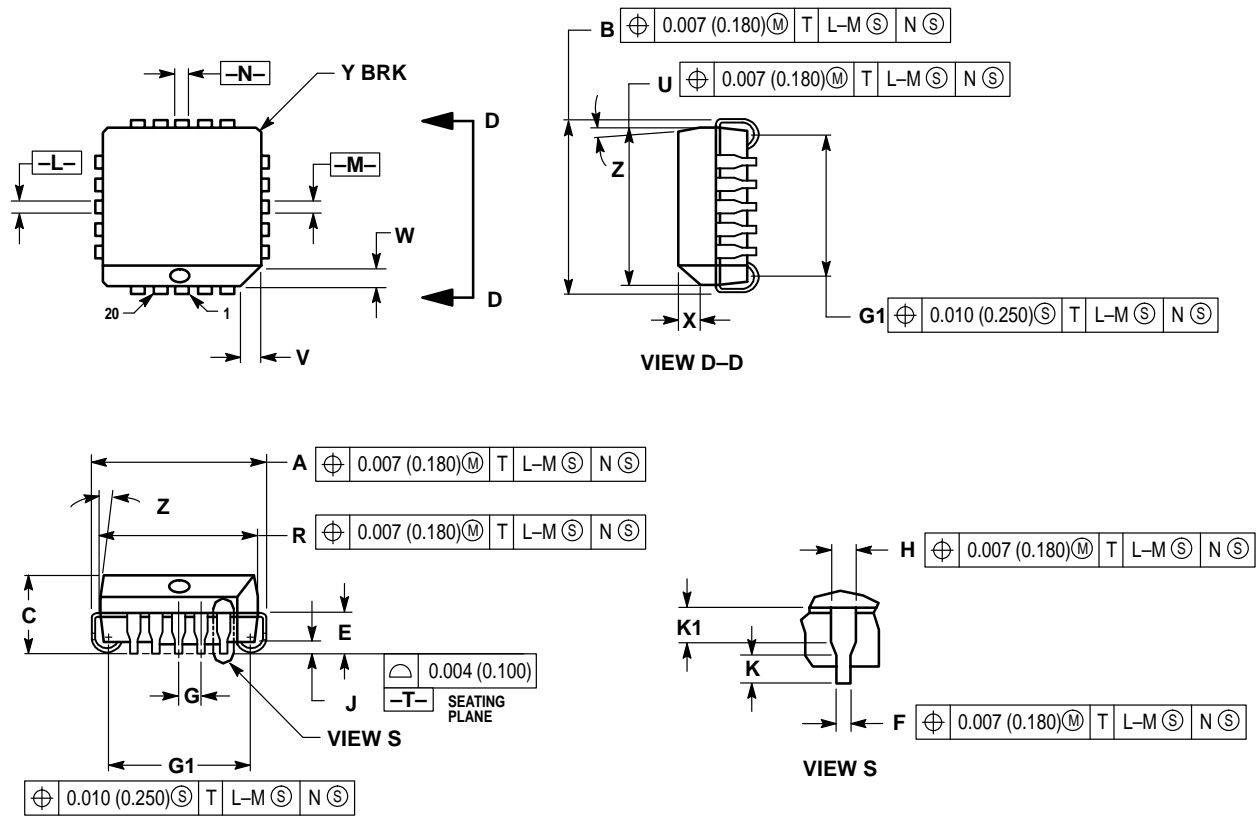


BLOCK DIAGRAM



OUTLINE DIMENSIONS

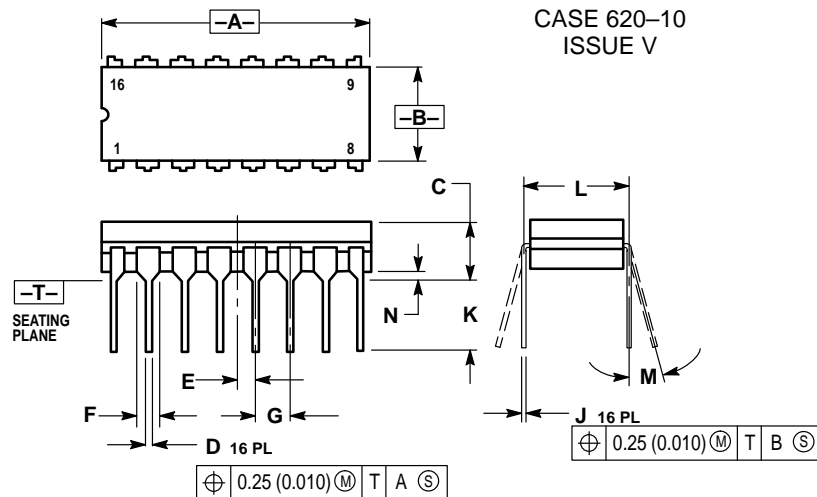
FN SUFFIX
PLASTIC PLCC PACKAGE
CASE 775-02
ISSUE C



- NOTES:
1. DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
 2. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
 3. DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
 4. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 5. CONTROLLING DIMENSION: INCH.
 6. THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012 (0.300). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
 7. DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE GREATER THAN 0.037 (0.940). THE DAMBAR INTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025 (0.635).

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.385 | 0.395 | 9.78 | 10.03 |
| B | 0.385 | 0.395 | 9.78 | 10.03 |
| C | 0.165 | 0.180 | 4.20 | 4.57 |
| E | 0.090 | 0.110 | 2.29 | 2.79 |
| F | 0.013 | 0.019 | 0.33 | 0.48 |
| G | 0.050 BSC | | 1.27 BSC | |
| H | 0.026 | 0.032 | 0.66 | 0.81 |
| J | 0.020 | — | 0.51 | — |
| K | 0.025 | — | 0.64 | — |
| R | 0.350 | 0.356 | 8.89 | 9.04 |
| U | 0.350 | 0.356 | 8.89 | 9.04 |
| V | 0.042 | 0.048 | 1.07 | 1.21 |
| W | 0.042 | 0.048 | 1.07 | 1.21 |
| X | 0.042 | 0.056 | 1.07 | 1.42 |
| Y | — | 0.020 | — | 0.50 |
| Z | 2 ° | 10 ° | 2 ° | 10 ° |
| G1 | 0.310 | 0.330 | 7.88 | 8.38 |
| K1 | 0.040 | — | 1.02 | — |

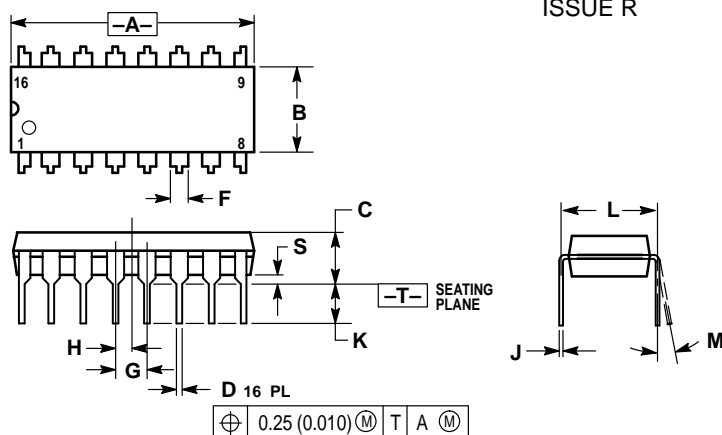
OUTLINE DIMENSIONS

L SUFFIX
CERAMIC DIP PACKAGE
CASE 620-10
ISSUE V


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
4. DIMENSION F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.


| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.750 | 0.785 | 19.05 | 19.93 |
| B | 0.240 | 0.295 | 6.10 | 7.49 |
| C | — | 0.200 | — | 5.08 |
| D | 0.015 | 0.020 | 0.39 | 0.50 |
| E | 0.050 BSC | | 1.27 BSC | |
| F | 0.055 | 0.065 | 1.40 | 1.65 |
| G | 0.100 BSC | | 2.54 BSC | |
| H | 0.008 | 0.015 | 0.21 | 0.38 |
| K | 0.125 | 0.170 | 3.18 | 4.31 |
| L | 0.300 BSC | | 7.62 BSC | |
| M | 0° | 15° | 0° | 15° |
| N | 0.020 | 0.040 | 0.51 | 1.01 |

P SUFFIX
PLASTIC DIP PACKAGE
CASE 648-08
ISSUE R


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.740 | 0.770 | 18.80 | 19.55 |
| B | 0.250 | 0.270 | 6.35 | 6.85 |
| C | 0.145 | 0.175 | 3.69 | 4.44 |
| D | 0.015 | 0.021 | 0.39 | 0.53 |
| F | 0.040 | 0.70 | 1.02 | 1.77 |
| G | 0.100 BSC | | 2.54 BSC | |
| H | 0.050 BSC | | 1.27 BSC | |
| J | 0.008 | 0.015 | 0.21 | 0.38 |
| K | 0.110 | 0.130 | 2.80 | 3.30 |
| L | 0.295 | 0.305 | 7.50 | 7.74 |
| M | 0° | 10° | 0° | 10° |
| S | 0.020 | 0.040 | 0.51 | 1.01 |

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