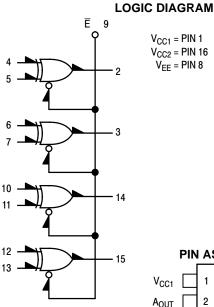
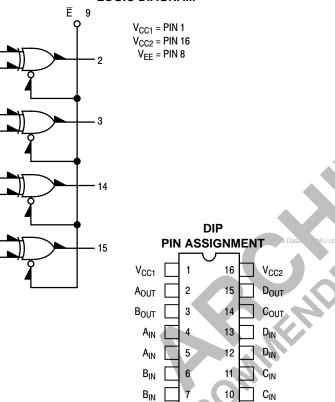
Quad Exclusive OR Gate

The MC10113 is a quad Exclusive OR gate, with an enable common to all four gates. The outputs may be wire-ORed together to perform a 4—bit comparison function (A = B). The enable is active low.

- $P_D = 175 \text{ mW typ/pkg (No Load)}$
- $t_{pd} = 2.5 \text{ ns typ}$
- t_r , $t_f = 2.0$ ns typ (20%–80%)

ON Semiconductor http://onsemi.com





Pin assignment is for Dual-in-Line Package. For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).

9

ENABLE

MARKING DIAGRAMS



CDIP-16 **L SUFFIX CASE 620**





PDIP-16 P SUFFIX **CASE 648**





PLCC-20 **FN SUFFIX CASE 775**



= Assembly Location

WL = Wafer Lot YY = Year WW = Work Week

ORDERING INFORMATION

| Device | Package | Shipping |
|-----------|---------|-----------------|
| MC10113L | CDIP-16 | 25 Units / Rail |
| MC10113P | PDIP-16 | 25 Units / Rail |
| MC10113FN | PLCC-20 | 46 Units / Rail |

TRUTH TABLE

 V_{EE}

| | TRUTH TABLE | | | | | |
|-----|-------------|---|---|--------|--|--|
| . 5 | Ē | ٧ | Ē | OUTPUT | | |
| | L | L | L | L | | |
| | L | Н | L | Н | | |
| | Н | L | L | Н | | |
| | Н | Н | L | L | | |
| | Χ | Χ | Н | L | | |
| O. | | | | | | |

ELECTRICAL CHARACTERISTICS

| | | Pin | Test Limits -30°C +25°C +85°C | | | | 4 | | | |
|---------------------------------|--|------------------------|--------------------------------|------------------|------------------|------------|------------------|------------------|------------------|-----|
| | | Under | | _ | | +25°C | | | ı | - |
| Characteristic | Symbol | Test | Min | Max | Min | Тур | Max | Min | Max | Un |
| Power Supply Drain Current | Ι _Ε | 8 | | 46 | | | 42 | | 46 | mAd |
| Input Current | I _{inH} | 4,7,10,13 5,6,11,12 | | 425 350 | | | 265 220 | | 265 220 | μΑσ |
| | | 9 | | 870 | | | 545 | | 545 | |
| | I _{inL} | * | 0.5 | | 0.5 | | | 0.3 | | μΑσ |
| Output Voltage Logic 1 | V _{OH} | 2 | -1.060 | -0.890 | -0.960 | | -0.810 | -0.890 | -0.700 | Vd |
| | | 3 14 | -1.060 -1.060 | -0.890 -0.890 | -0.960 -0.960 | | -0.810 -0.810 | -0.890 -0.890 | -0.700 -0.700 | |
| | | 15 | -1.060 -1.060 | -0.890 -0.890 | -0.960 -0.960 | | -0.810 -0.810 | -0.890 -0.890 | -0.700 -0.700 | |
| Output Voltage Logic 0 | V _{OL} | 2 | -1.890 | -1.675 | -1.850 | | -1.650 | -1.825 | -1.615 | Vd |
| | | 3 | -1.890 | -1.675 | -1.850 | | -1.650 | -1.825 | -1.615 | |
| | | 14 15 | -1.890 -1.890 | -1.675 -1.675 | -1.850 -1.850 | | -1.650 -1.650 | -1.825 -1.825 | -1.615 -1.615 | |
| Threshold Voltage Logic 1 | V _{OHA} | 2 | -1.080 | | -0.980 | | | -0.910 | | Vd |
| | | 3 | -1.080 | | -0.980 | | | -0.910 -0.910 | | |
| | | 14 15 | -1.080 -1.080 | | -0.980 -0.980 | | | -0.910 -0.910 | | |
| Threshold Voltage Logic 0 | V _{OLA} | 2 | | -1.655 | | | -1.630 | | -1.595 | Vd |
| | | 3 | | -1.655 | | | -1.630 | · | -1.595 | |
| | | 14 15 | | -1.655 -1.655 | | | -1.630 -1.630 | | -1.595 -1.595 | |
| Switching Times (50Ω Load) | | | | | Min | Тур | Max | | | ns |
| Propagation Delay | t ₄₊₂₊ | 2 | 1.1 | 4.7 | 1.3 | 2.6 | 4.5 | 1.3 | 5.0 | |
| | t ₄₋₂₋ | 2 | 1.1 | 4.7 | 1.3 | 2.6 | 4.5 | 1.3 | 5.0 | |
| | t ₉₊₂₋ t ₉₋₂₊ | 2 2 | 1.3 1.3 | 5.2 5.2 | 1.5 1.5 | 3.4 3.4 | 5.0 5.0 | 1.5 1.5 | 5.5 5.5 | |
| Rise Time (20 to 80%) | t ₂₊ | 2 | 1.1 | 4.2 | 1.1 | 2.5 | 3.9 | 1.1 | 4.4 | |
| Fall Time (20 to 80%) | t ₂₋ | 2 | 1.1 | 4.2 | 1.1 | 2.5 | 3.9 | 1.1 | 4.4 | |
| Individually test each input ap | _ | | | | | | | | | |

ELECTRICAL CHARACTERISTICS (continued)

| | | | | | TEST V | OLTAGE VAI | _UES (Volts) | | |
|----------------------|-------------|--|-----------------------------|---|--------------------|---------------------|---------------------|------------------|----------------------------------|
| | | @ Test Te | mperature | V _{IHmax} | V_{ILmin} | V _{IHAmin} | V _{ILAmax} | V _{EE} | |
| | | | -30°C | -0.890 | -1.890 | -1.205 | -1.500 | -5.2 | |
| | | +25°C | -0.810 | -1.850 | -1.105 | -1.475 | -5.2 | | |
| | | | +85°C | -0.700 | -1.825 | -1.035 | -1.440 | -5.2 | |
| | | | Pin | TEST VOLTAGE APPLIED TO PINS LISTED BELOW | | | | | |
| Characteristic | | Symbol | Under Test | V _{IHmax} | V _{ILmin} | V _{IHAmin} | V _{ILAmax} | V _{EE} | (V _{CC}) Gnd |
| Power Supply Drain C | Current | ΙE | 8 | | | | | 8 | 1, 16 |
| Input Current | | l _{inH} | 4,7,10,13 5,6,11,12 9 | * * 9 | | | | 8 8 8 | 1, 16 1, 16 1, 16 |
| | | I _{inL} | * | | * | | | 8 | 1, 16 |
| Output Voltage | Logic 1 | V _{OH} | 2 3 14 15 | 4 7 11 13 | | | | 8 8 8 | 1, 16 1, 16 1, 16 1, 16 |
| Output Voltage | Logic 0 | V _{OL} | 2 3 14 15 | | 4 7 11 13 | | W. | 8 8 8 8 | 1, 16 1, 16 1, 16 1, 16 |
| Threshold Voltage | Logic 1 | V _{OHA} | 2 3 14 15 | | | 4 6 10 12 | | 8 8 8 | 1, 16 1, 16 1, 16 1, 16 |
| Threshold Voltage | Logic 0 | V _{OLA} | 2 3 14 15 | X | | | 5 7 11 13 | 8 8 8 8 | 1, 16 1, 16 1, 16 1, 16 |
| Switching Times | (50Ω Load) | | | +1.11V | | Pulse In | Pulse Out | -3.2 V | +2.0 V |
| Propagation Delay | , | t ₄₊₂₊ t ₄₋₂₋ t ₉₊₂₋ t ₉₋₂₊ | 2 2 2 2 | 4 4 |) | 4 4 9 9 | 2 2 2 2 | 8 8 8 | 1, 16 1, 16 1, 16 1, 16 |
| Rise Time | (20 to 80%) | t ₂₊ | 2 | | | 4 | 2 | 8 | 1, 16 |
| Fall Time | (20 to 80%) | t ₂₋ | 2 | | | 4 | 2 | 8 | 1, 16 |

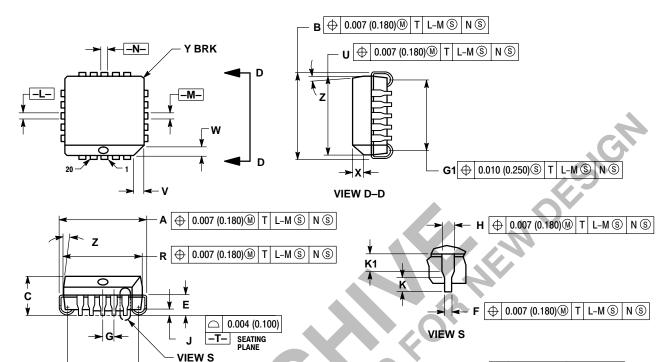
^{*} Individually test each input applying V_{IH} or V_{IL} to input under test.

Each MECL 10,000 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 linear fpm is maintained. Outputs are terminated through a 50–ohm resistor to –2.0 volts. Test procedures are shown for only one gate. The other gates are tested in the same manner.

PACKAGE DIMENSIONS

PLCC-20 **FN SUFFIX**

PLASTIC PLCC PACKAGE CASE 775-02 ISSUE C



NOTES:

G1 ⊕ 0.010 (0.250)③ T L-M ⑤ N ⑤

OF VICE NOT PRESCO

- IOTES:

 1. DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.

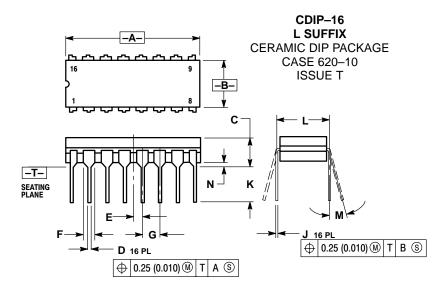
 2. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.

 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.
- Y14.5M, 1982. CONTROLLING DIMENSION: INCH.
- 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.
- 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).

| | INC | HES | MILLIN | IETERS |
|-----|-------|-------|--------|--------|
| DIM | MIN | MAX | MIN | MAX |
| Α | 0.385 | 0.395 | 9.78 | 10.03 |
| В | 0.385 | 0.395 | 9.78 | 10.03 |
| C | 0.165 | 0.180 | 4.20 | 4.57 |
| Е | 0.090 | 0.110 | 2.29 | 2.79 |
| F | 0.013 | 0.019 | 0.33 | 0.48 |
| G | 0.050 | BSC | 1.27 | BSC |
| Н | 0.026 | 0.032 | 0.66 | 0.81 |
| 7 | 0.020 | | 0.51 | |
| K | 0.025 | | 0.64 | |
| R | 0.350 | 0.356 | 8.89 | 9.04 |
| 5 | 0.350 | 0.356 | 8.89 | 9.04 |
| ٧ | 0.042 | 0.048 | 1.07 | 1.21 |
| W | 0.042 | 0.048 | 1.07 | 1.21 |
| Х | 0.042 | 0.056 | 1.07 | 1.42 |
| Υ | | 0.020 | | 0.50 |
| Z | 2° | 10° | 2 ° | 10 ° |
| G1 | 0.310 | 0.330 | 7.88 | 8.38 |
| K1 | 0.040 | | 1.02 | |

PACKAGE DIMENSIONS



NOTES:

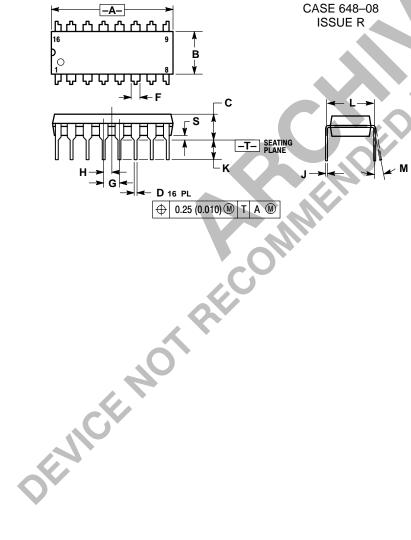
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 CONTROLLING DIMENSION: INCH.
 DIMENSION LTO CENTER OF LEAD WHEN CONTROLLING DIMENSION LTO CENTER OF LEAD WHEN

- FORMED PARALLEL

 DIMENSION F MAY NARROW TO 0.76 (0.030)
 WHERE THE LEAD ENTERS THE CERAMIC
 BODY.

| | INC | HES | MILLIMETERS | | |
|-----|-------|-------|-------------|-------|--|
| DIM | MIN | MAX | MIN | MAX | |
| Α | 0.750 | 0.785 | 19.05 | 19.93 | |
| В | 0.240 | 0.295 | 6.10 | 7.49 | |
| С | | 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 | | |
| Н | 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 | |





- 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

| | INC | HES | MILLIN | IETERS |
|-----|-------|-------|--------|--------|
| DIM | MIN | MAX | MIN | MAX |
| Α | 0.740 | 0.770 | 18.80 | 19.55 |
| В | 0.250 | 0.270 | 6.35 | 6.85 |
| С | 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 |
| Н | 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 |

Notes



Notes





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