

MC10113

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.

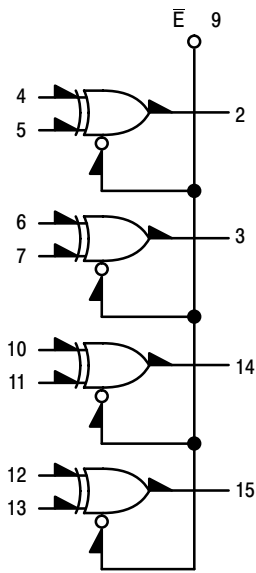
- $P_D = 175$ mW typ/pkg (No Load)
- $t_{pd} = 2.5$ ns typ
- $t_r, t_f = 2.0$ ns typ (20%–80%)



ON Semiconductor

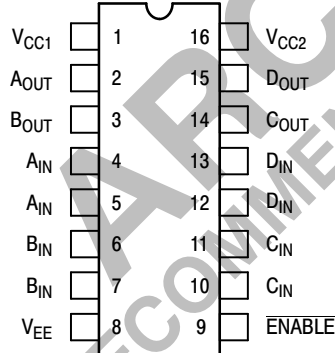
<http://onsemi.com>

LOGIC DIAGRAM



$V_{CC1} = \text{PIN } 1$
 $V_{CC2} = \text{PIN } 16$
 $V_{EE} = \text{PIN } 8$

DIP PIN ASSIGNMENT

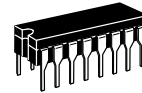


Pin assignment is for Dual-in-Line Package.
 For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).

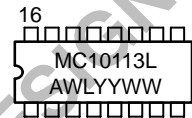
TRUTH TABLE

| IN | E | OUTPUT |
|----|---|--------|
| L | L | L |
| L | H | H |
| H | L | H |
| H | H | L |
| X | X | L |

MARKING DIAGRAMS



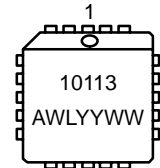
CDIP-16
 L SUFFIX
 CASE 620



PDIP-16
 P SUFFIX
 CASE 648



PLCC-20
 FN SUFFIX
 CASE 775



A = 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 |

MC10113

ELECTRICAL CHARACTERISTICS

| Characteristic | Symbol | Pin Under Test | Test Limits | | | | | | Unit | |
|------------------------------------|------------|-----------------------------|-------------|-------------------|------------|------------|-------------------|--------|-------------------|-----------|
| | | | -30°C | | +25°C | | | +85°C | | |
| | | | Min | Max | Min | Typ | Max | Min | | Max |
| Power Supply Drain Current | I_E | 8 | | 46 | | | 42 | | 46 | mAdc |
| Input Current | I_{inH} | 4,7,10,13 5,6,11,12 9 | | 425 350 870 | | | 265 220 545 | | 265 220 545 | μ Adc |
| | I_{inL} | * | 0.5 | | 0.5 | | | 0.3 | | μ Adc |
| Output Voltage Logic 1 | V_{OH} | 2 | -1.060 | -0.890 | -0.960 | | -0.810 | -0.890 | -0.700 | Vdc |
| | | 3 | -1.060 | -0.890 | -0.960 | | -0.810 | -0.890 | -0.700 | |
| | | 14 | -1.060 | -0.890 | -0.960 | | -0.810 | -0.890 | -0.700 | |
| | | 15 | -1.060 | -0.890 | -0.960 | | -0.810 | -0.890 | -0.700 | |
| Output Voltage Logic 0 | V_{OL} | 2 | -1.890 | -1.675 | -1.850 | | -1.650 | -1.825 | -1.615 | Vdc |
| | | 3 | -1.890 | -1.675 | -1.850 | | -1.650 | -1.825 | -1.615 | |
| | | 14 | -1.890 | -1.675 | -1.850 | | -1.650 | -1.825 | -1.615 | |
| | | 15 | -1.890 | -1.675 | -1.850 | | -1.650 | -1.825 | -1.615 | |
| Threshold Voltage Logic 1 | V_{OHA} | 2 | -1.080 | | -0.980 | | | -0.910 | | Vdc |
| | | 3 | -1.080 | | -0.980 | | | -0.910 | | |
| | | 14 | -1.080 | | -0.980 | | | -0.910 | | |
| | | 15 | -1.080 | | -0.980 | | | -0.910 | | |
| Threshold Voltage Logic 0 | V_{OLA} | 2 | | -1.655 | | | -1.630 | | -1.595 | Vdc |
| | | 3 | | -1.655 | | | -1.630 | | -1.595 | |
| | | 14 | | -1.655 | | | -1.630 | | -1.595 | |
| | | 15 | | -1.655 | | | -1.630 | | -1.595 | |
| Switching Times (50 Ω Load) | | | | | Min | Typ | 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-} | 2 | 1.3 | 5.2 | 1.5 | 3.4 | 5.0 | 1.5 | 5.5 | |
| | t_{9-2+} | 2 | 1.3 | 5.2 | 1.5 | 3.4 | 5.0 | 1.5 | 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 applying V_{IH} or V_{IL} to input under test.

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ELECTRICAL CHARACTERISTICS (continued)

| | | | TEST VOLTAGE VALUES (Volts) | | | | | |
|----------------------------|--|------------------|---|--------------------|---------------------|---------------------|-----------------|---------------------------|
| | | | V _{IHmax} | V _{ILmin} | V _{IHAmin} | V _{ILAmax} | V _{EE} | |
| @ Test Temperature | | | | | | | | |
| -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 | |
| Characteristic | Symbol | Pin Under Test | TEST VOLTAGE APPLIED TO PINS LISTED BELOW | | | | | (V _{CC}) Gnd |
| | | | V _{IHmax} | V _{ILmin} | V _{IHAmin} | V _{ILAmax} | V _{EE} | |
| Power Supply Drain Current | I _E | 8 | | | | | 8 | 1, 16 |
| Input Current | I _{inH} | 4,7,10,13 | * | | | | 8 | 1, 16 |
| | | 5,6,11,12 | * | | | | 8 | 1, 16 |
| | | 9 | 9 | | | | 8 | 1, 16 |
| | I _{inL} | * | | * | | | 8 | 1, 16 |
| Output Voltage | Logic 1 | V _{OH} | 2 | 4 | | | 8 | 1, 16 |
| | | | 3 | 7 | | | 8 | 1, 16 |
| | | | 14 | 11 | | | 8 | 1, 16 |
| | | | 15 | 13 | | | 8 | 1, 16 |
| Output Voltage | Logic 0 | V _{OL} | 2 | | 4 | | 8 | 1, 16 |
| | | | 3 | | 7 | | 8 | 1, 16 |
| | | | 14 | | 11 | | 8 | 1, 16 |
| | | | 15 | | 13 | | 8 | 1, 16 |
| Threshold Voltage | Logic 1 | V _{OHA} | 2 | | 4 | | 8 | 1, 16 |
| | | | 3 | | 6 | | 8 | 1, 16 |
| | | | 14 | | 10 | | 8 | 1, 16 |
| | | | 15 | | 12 | | 8 | 1, 16 |
| Threshold Voltage | Logic 0 | V _{OLA} | 2 | | | 5 | 8 | 1, 16 |
| | | | 3 | | | 7 | 8 | 1, 16 |
| | | | 14 | | | 11 | 8 | 1, 16 |
| | | | 15 | | | 13 | 8 | 1, 16 |
| Switching Times (50Ω Load) | | | +1.1V | | 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 | | | 4 | 2 | 8 | 1, 16 |
| | | 2 | | | 4 | 2 | 8 | 1, 16 |
| | | 2 | 4 | | 9 | 2 | 8 | 1, 16 |
| | | 2 | 4 | | 9 | 2 | 8 | 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.

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PACKAGE DIMENSIONS

PLCC-20
FN SUFFIX
PLASTIC PLCC PACKAGE
CASE 775-02
ISSUE C



NOTES:

- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
- DIMENSIONING AND TOLERANCING PER ANSI 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).

| 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 | --- |

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PACKAGE DIMENSIONS

CDIP-16 L SUFFIX CERAMIC DIP PACKAGE CASE 620-10 ISSUE T



- 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 |

PDIP-16 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 |

Notes

ARCHIVE
DEVICE NOT RECOMMENDED FOR NEW DESIGN

Notes

ARCHIVE
DEVICE NOT RECOMMENDED FOR NEW DESIGN

ARCHIVE
RECOMMENDED FOR NEW DESIGN

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JAPAN: ON Semiconductor, Japan Customer Focus Center
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031
Phone: 81-3-5740-2700
Email: r14525@onsemi.com

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