

MC10114

Triple Line Receiver

The MC10114 is a triple line receiver designed for use in sensing differential signals over long lines. An active current source and translated emitter follower inputs provide the line receiver with a common mode noise rejection limit of one volt in either the positive or the negative direction. This allows a large amount of common mode noise immunity for extra long lines.

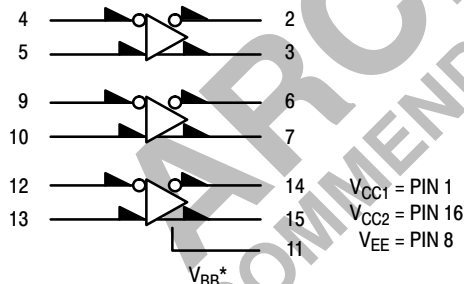
Another feature of the MC10114 is that the OR outputs go to a logic low level whenever the inputs are left floating. The outputs are each capable of driving 50 ohm transmission lines.

This device is useful in high speed central processors, minicomputers, peripheral controllers, digital communication systems, testing and instrumentation systems. The MC10114 can also be used for MOS to MECL interfacing and it is ideal as a sense amplifier for MOS RAM's.

A V_{BB} reference is provided which is useful in making the MC10114 a Schmit trigger, allowing single-ended driving of the inputs, or other applications where a stable reference voltage is necessary. See MECL Design Handbook (HB205) pages 226 and 228.

- $P_D = 145 \text{ mW typ/pkg}$
- $t_{pd} = 2.4 \text{ ns typ (Single Ended Input)}$
- $t_{pd} = 2.0 \text{ ns typ (Differential Input)}$
- $t_r, t_f = 2.1 \text{ ns typ (20\%–80\%)}$

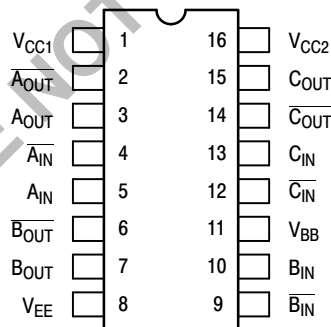
LOGIC DIAGRAM



* V_{BB} to be used to supply bias to the MC10114 only and bypassed (when used) with 0.01 μF to 0.1 μF capacitor to ground (0 V). V_{BB} can source < 1.0 mA.

When the input pin with the bubble goes positive, its respective output pin with bubble goes positive.

DIP PIN ASSIGNMENT



Pin assignment is for Dual-in-Line Package.

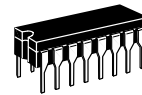
For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).



ON Semiconductor

<http://onsemi.com>

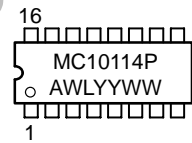
MARKING DIAGRAMS



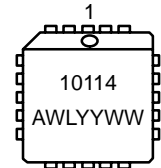
CDIP-16
L SUFFIX
CASE 620



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 |
|-----------|---------|-----------------|
| MC10114L | CDIP-16 | 25 Units / Rail |
| MC10114P | PDIP-16 | 25 Units / Rail |
| MC10114FN | PLCC-20 | 46 Units / Rail |

MC10114

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 | | 39 | | 28 | 35 | | 39 | mAdc |
| Input Current | I_{inH} | 4 | | 70 | | | 45 | | 45 | μ Adc |
| | I_{CBO} | 4 | | 1.5 | | | 1.0 | | 1.0 | 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 | |
| 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 | |
| Threshold Voltage Logic 1 | V_{OHA} | 2 | -1.080 | | -0.980 | | | -0.910 | | Vdc |
| | | 3 | -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 | |
| Reference Voltage | V_{BB} | 11 | -1.420 | -1.280 | -1.350 | | -1.230 | -1.295 | -1.150 | Vdc |
| Common Mode Rejection Test | 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 | |
| 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 | | |
| Switching Times (50 Ω Load) | | | Min | Max | Min | Typ | Max | Min | Max | ns |
| Propagation Delay | t_{4+2+} | 2 | 1.0 | 4.4 | 1.0 | 2.4 | 4.0 | 0.9 | 4.3 | |
| | t_{4-2-} | 2 | 1.0 | 4.4 | 1.0 | 2.4 | 4.0 | 0.9 | 4.3 | |
| | t_{4+3-} | 3 | 1.0 | 4.4 | 1.0 | 2.4 | 4.0 | 0.9 | 4.3 | |
| | t_{4-3+} | 3 | 1.0 | 4.4 | 1.0 | 2.4 | 4.0 | 0.9 | 4.3 | |
| Rise Time (20 to 80%) | t_{2+} | 2 | 1.5 | 3.8 | 1.5 | 2.1 | 3.5 | 1.5 | 3.7 | |
| | t_{3+} | 3 | 1.5 | 3.8 | 1.5 | 2.1 | 3.5 | 1.5 | 3.7 | |
| Fall Time (20 to 80%) | t_{2-} | 2 | 1.5 | 3.8 | 1.5 | 2.1 | 3.5 | 1.5 | 3.7 | |
| | t_{3-} | 3 | 1.5 | 3.8 | 1.5 | 2.1 | 3.5 | 1.5 | 3.7 | |

MC10114

ELECTRICAL CHARACTERISTICS (continued)

| | | | TEST VOLTAGE VALUES (Volts) | | | | | Unit |
|----------------------------|-------------------|------------------|---|--------------------|---------------------|---------------------|-----------------|-------------|
| | | | V _{IHmax} | V _{ILmin} | V _{IHAmin} | V _{ILAmax} | V _{BB} | |
| @ Test Temperature | | | | | | | | |
| | | | -30°C | -0.890 | -1.890 | -1.205 | -1.500 | From Pin 11 |
| | | | +25°C | -0.810 | -1.850 | -1.105 | -1.475 | |
| | +85°C | -0.700 | -1.825 | -1.035 | -1.440 | | | |
| Characteristic | Symbol | Pin Under Test | TEST VOLTAGE APPLIED TO PINS LISTED BELOW | | | | | Unit |
| | | | V _{IHmax} | V _{ILmin} | V _{IHAmin} | V _{ILAmax} | V _{BB} | |
| Power Supply Drain Current | I _E | 8 | | 4, 9, 12 | | | 5, 10, 13 | mAdc |
| Input Current | I _{inH} | 4 | 4 | 9, 12 | | | 5, 10, 13 | μAdc |
| | I _{inL} | 4 | | 9, 12 | | | 5, 10, 13 | μAdc |
| Output Voltage | Logic 1 | V _{OH} | 2 | 4 | 9, 12 | | 5, 10, 13 | Vdc |
| | | | 3 | 9, 12 | 4 | | 5, 10, 13 | |
| Output Voltage | Logic 0 | V _{OL} | 2 | 9, 12 | 4 | | 5, 10, 13 | Vdc |
| | | | 3 | 4 | 9, 12 | | 5, 10, 13 | |
| Threshold Voltage | Logic 1 | V _{OHA} | 2 | | 9, 12 | 4 | 5, 10, 13 | Vdc |
| | | | 3 | 9, 12 | | 4 | 5, 10, 13 | |
| Threshold Voltage | Logic 0 | V _{OLA} | 2 | 9, 12 | | 4 | 5, 10, 13 | Vdc |
| | | | 3 | | 9, 12 | 4 | 5, 10, 13 | |
| Reference Voltage | V _{BB} | 11 | | | | | 5, 10, 13 | Vdc |
| Common Mode Rejection Test | V _{OH} | 2 | | | | | | Vdc |
| | | 3 | | | | | | |
| | V _{OL} | 2 | | | | | | Vdc |
| | | 3 | | | | | | |
| Switching Times | (50Ω Load) | | | | Pulse In | Pulse Out | | |
| Propagation Delay | t ₄₊₂₊ | 2 | | | 4 | 2 | 5, 10, 13 | ns |
| | t ₄₋₂₋ | 2 | | | 4 | 2 | 5, 10, 13 | |
| | t ₄₊₃₋ | 3 | | | 4 | 3 | 5, 10, 13 | |
| | t ₄₋₃₊ | 3 | | | 4 | 3 | 5, 10, 13 | |
| Rise Time | (20 to 80%) | t ₂₊ | 2 | | 4 | 2 | 5, 10, 13 | |
| | | t ₃₊ | 3 | | 4 | 3 | 5, 10, 13 | |
| Fall Time | (20 to 80%) | t ₂₋ | 2 | | 4 | 2 | 5, 10, 13 | |
| | | t ₃₋ | 3 | | 4 | 3 | 5, 10, 13 | |

MC10114

ELECTRICAL CHARACTERISTICS (continued)

| @ Test Temperature -30°C +25°C +85°C | | | TEST VOLTAGE VALUES (Volts) | | | | | (V _{CC}) Gnd |
|---|-------------------|----------------|---|--------------------|--------------------|--------------------|-----------------|---------------------------|
| | | | V _{IHH} * | V _{ILH} * | V _{IHL} * | V _{ILL} * | V _{EE} | |
| | | | +0.110 | -0.890 | -1.890 | -2.890 | -5.2 | |
| | | | +0.190 | -0.850 | -1.810 | -2.850 | -5.2 | |
| | | | TEST VOLTAGE APPLIED TO PINS LISTED BELOW | | | | | (V _{CC}) Gnd |
| Characteristic | Symbol | Pin Under Test | V _{IHH} * | V _{ILH} * | V _{IHL} * | V _{ILL} * | V _{EE} | |
| Power Supply Drain Current | I _E | 8 | | | | | 8 | 1, 16 |
| Input Current | I _{inH} | 4 | | | | | 8 | 1, 16 |
| | I _{inL} | 4 | | | | | 8, 4 | 1, 16 |
| Output Voltage Logic 1 | V _{OH} | 2 | | | | | 8 | 1, 16 |
| | | 3 | | | | | 8 | 1, 16 |
| Output Voltage Logic 0 | V _{OL} | 2 | | | | | 8 | 1, 16 |
| | | 3 | | | | | 8 | 1, 16 |
| Threshold Voltage Logic 1 | V _{OHA} | 2 | | | | | 8 | 1, 16 |
| | | 3 | | | | | 8 | 1, 16 |
| Threshold Voltage Logic 0 | V _{OLA} | 2 | | | | | 8 | 1, 16 |
| | | 3 | | | | | 8 | 1, 16 |
| Reference Voltage | V _{BB} | 11 | | | | | 8 | 1, 16 |
| Common Mode Rejection Test | V _{OH} | 2 | 4 | 5 | | | 8 | 1, 16 |
| | | 3 | | | 5 | 4 | 8 | 1, 16 |
| | V _{OL} | 2 | | | 5 | 4 | 8 | 1, 16 |
| | | 3 | 4 | 5 | | | 8 | 1, 16 |
| Switching Times (50Ω Load) | | | | | | | -3.2 V | +2.0 V |
| Propagation Delay | t ₄₊₂₊ | 2 | | | | | 8 | 1, 16 |
| | t ₄₋₂₋ | 2 | | | | | 8 | 1, 16 |
| | t ₄₊₃₋ | 3 | | | | | 8 | 1, 16 |
| | t ₄₋₃₊ | 3 | | | | | 8 | 1, 16 |
| Rise Time (20 to 80%) | t ₂₊ | 2 | | | | | 8 | 1, 16 |
| | t ₃₊ | 3 | | | | | 8 | 1, 16 |
| Fall Time (20 to 80%) | t ₂₋ | 2 | | | | | 8 | 1, 16 |
| | t ₃₋ | 3 | | | | | 8 | 1, 16 |

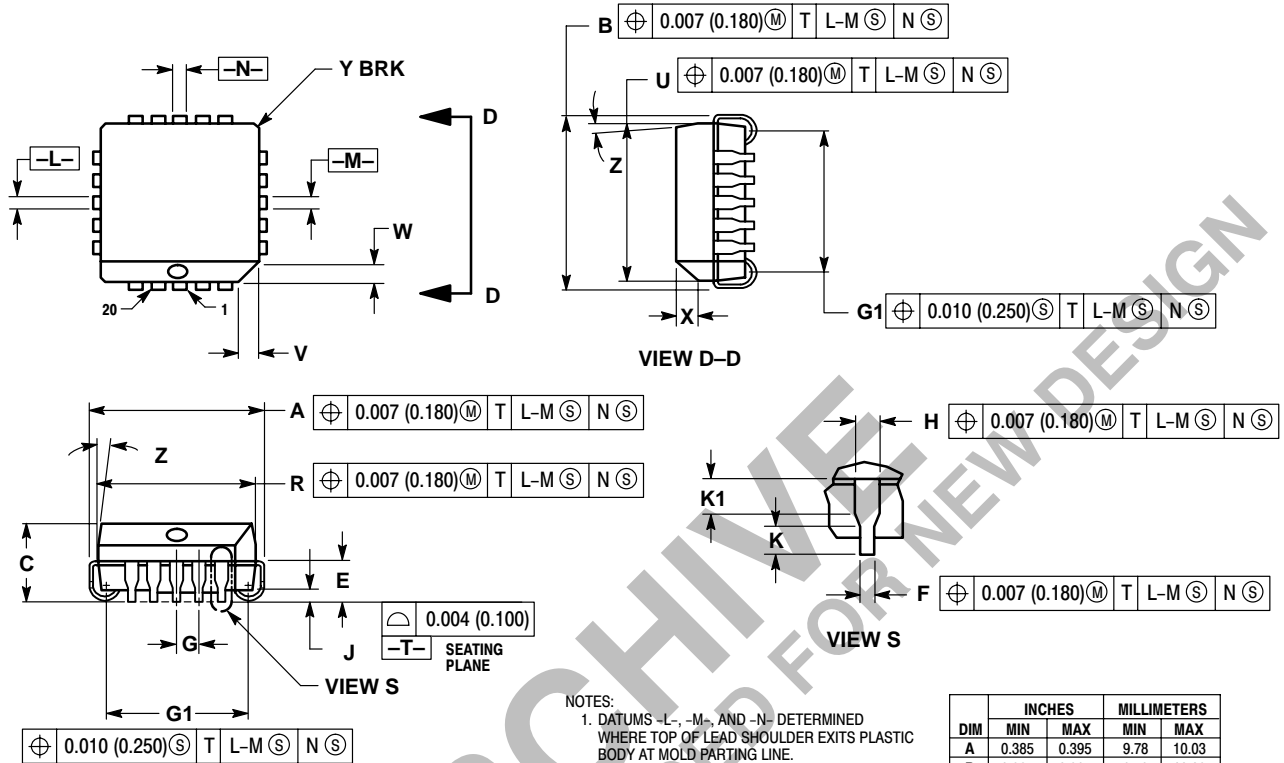
- * V_{IHH} = Input Logic 1 level shifted positive one volt for common mode rejection tests
- V_{ILH} = Input Logic 0 level shifted positive one volt for common mode rejection tests
- V_{IHL} = Input Logic 1 level shifted negative one volt for common mode rejection tests
- V_{ILL} = Input Logic 0 level shifted negative one volt for common mode rejection tests

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.

MC10114

PACKAGE DIMENSIONS

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



NOTES:

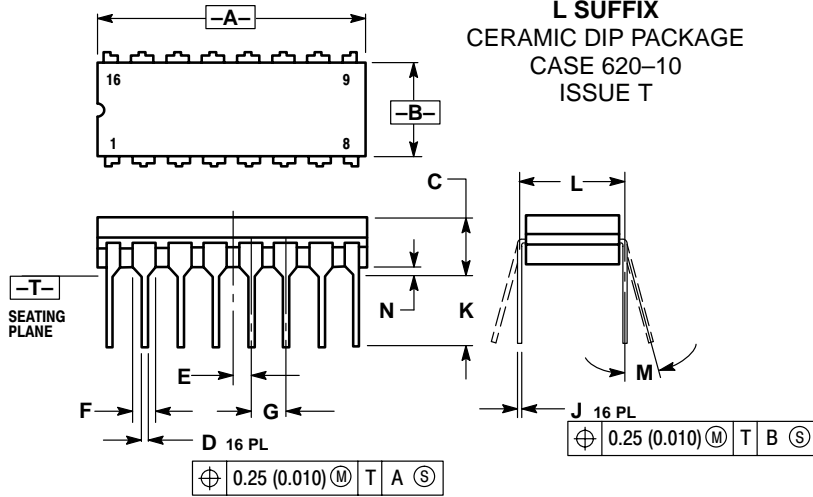
- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
- DIMENSIONING AND TOLERANCING 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° | |
| G1 | 0.310 | 0.330 | 7.88 | 8.38 |
| K1 | 0.040 | --- | 1.02 | --- |

MC10114

PACKAGE DIMENSIONS

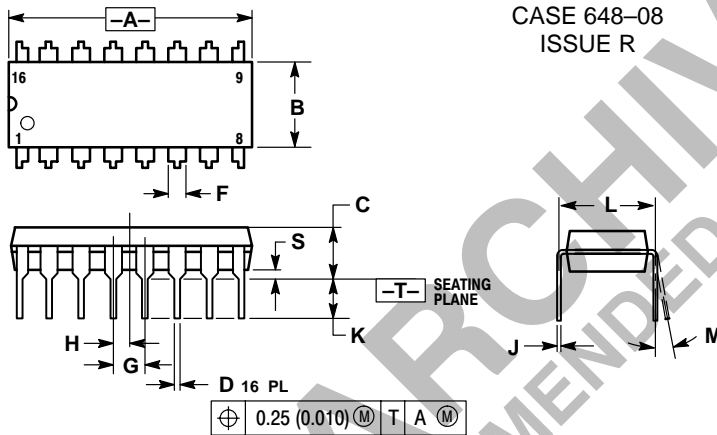
CDIP-16 L SUFFIX CERAMIC DIP PACKAGE CASE 620-10 ISSUE T



- 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

ARCHIVE
RECOMMENDED FOR NEW DESIGN

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