

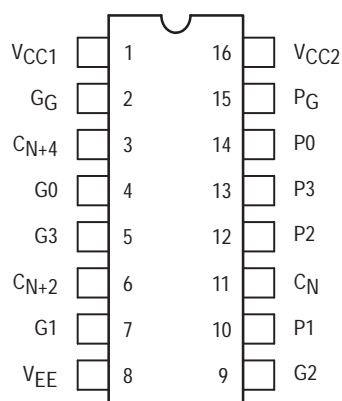
# MC10H179

## Look-Ahead Carry Block

The MC10H179 is a functional/pinout duplication of the standard MECL 10K part, with 100% improvement in propagation delay and no increase in power supply current.

- Power Dissipation, 300 mW Typical
- Improved Noise Margin 150 mV (Over Operating Voltage and Temperature Range)
- Voltage Compensated
- MECL 10K-Compatible

### DIP PIN ASSIGNMENT



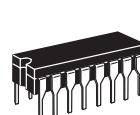
Pin assignment is for Dual-in-Line Package.  
For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).



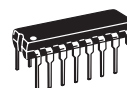
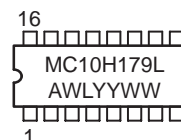
**ON Semiconductor**

<http://onsemi.com>

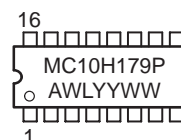
### MARKING DIAGRAMS



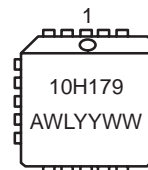
**CDIP-16  
L SUFFIX  
CASE 620**



**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      |
|------------|---------|---------------|
| MC10H179L  | CDIP-16 | 25 Units/Rail |
| MC10H179P  | PDIP-16 | 25 Units/Rail |
| MC10H179FN | PLCC-20 | 46 Units/Rail |

# MC10H179

## MAXIMUM RATINGS

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

## ELECTRICAL CHARACTERISTICS ( $V_{EE} = -5.2\text{ V} \pm 5\%$ ) (See Note 1.)

| Symbol    | Characteristic                     | 0°    |       | 25°   |       | 75°   |        | Unit          |
|-----------|------------------------------------|-------|-------|-------|-------|-------|--------|---------------|
|           |                                    | Min   | Max   | Min   | Max   | Min   | Max    |               |
| $I_E$     | Power Supply Current               | –     | 79    | –     | 72    | –     | 79     | mA            |
| $I_{inH}$ | Input Current High<br>Pins 5 and 9 | –     | 465   | –     | 275   | –     | 275    | $\mu\text{A}$ |
|           | Pins 4, 7 and 11                   | –     | 545   | –     | 320   | –     | 320    |               |
|           | Pin 14                             | –     | 705   | –     | 415   | –     | 415    |               |
|           | Pin 12                             | –     | 790   | –     | 465   | –     | 465    |               |
|           | Pins 10 and 13                     | –     | 870   | –     | 510   | –     | 510    |               |
| $I_{inL}$ | Input Current Low                  | 0.5   | –     | 0.5   | –     | 0.3   | –      | $\mu\text{A}$ |
| $V_{OH}$  | High Output Voltage                | -1.02 | -0.84 | -0.98 | -0.81 | -0.92 | -0.735 | Vdc           |
| $V_{OL}$  | Low Output Voltage                 | -1.95 | -1.63 | -1.95 | -1.63 | -1.95 | -1.60  | Vdc           |
| $V_{IH}$  | High Input Voltage                 | -1.17 | -0.84 | -1.13 | -0.81 | -1.07 | -0.735 | Vdc           |
| $V_{IL}$  | Low Input Voltage                  | -1.95 | -1.48 | -1.95 | -1.48 | -1.95 | -1.45  | Vdc           |

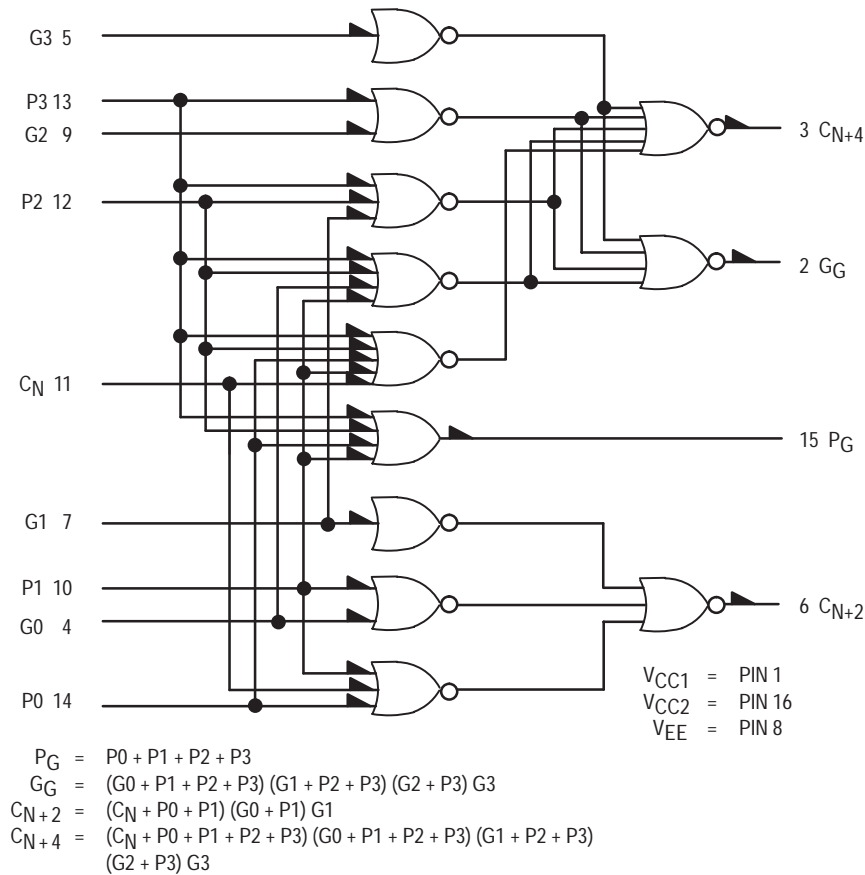
## AC PARAMETERS

|          |   |     |     |     |     |     |     |    |
|----------|---|-----|-----|-----|-----|-----|-----|----|
| $t_{pd}$ | Propagation Delay<br>P to $P_G$<br>G, P, $C_N$ to<br>$C_N$ or $G_G$ | 0.4 | 1.4 | 0.4 | 1.5 | 0.5 | 1.7 | ns |
|          |   | 0.6 | 2.3 | 0.7 | 2.4 | 0.8 | 2.6 |    |
| $t_r$    | Rise Time   | 0.5 | 1.7 | 0.5 | 1.8 | 0.5 | 1.9 | ns |
| $t_f$    | Fall Time   | 0.5 | 1.7 | 0.5 | 1.8 | 0.5 | 1.9 | ns |

- 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 lfpm is maintained. Outputs are terminated through a 50-ohm resistor to -2.0 volts.

# MC10H179

## LOGIC DIAGRAM



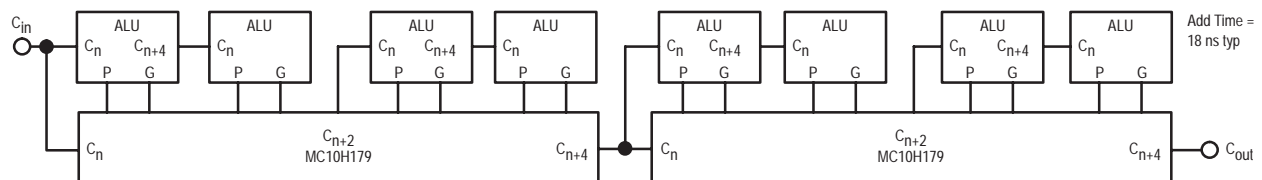
## TYPICAL APPLICATIONS

The MC10H179 is a high-speed, low-power, standard MECL complex function that is designed to perform the look-ahead carry function. This device can be used with the MC10H181 4-bit ALU directly, or with the MC10H180 dual arithmetic unit in any computer, instrumentation or digital communication application requiring high speed arithmetic operation on long words.

When used with the MC10H181, the MC10H179 performs a second order or higher look-ahead. Figure 2

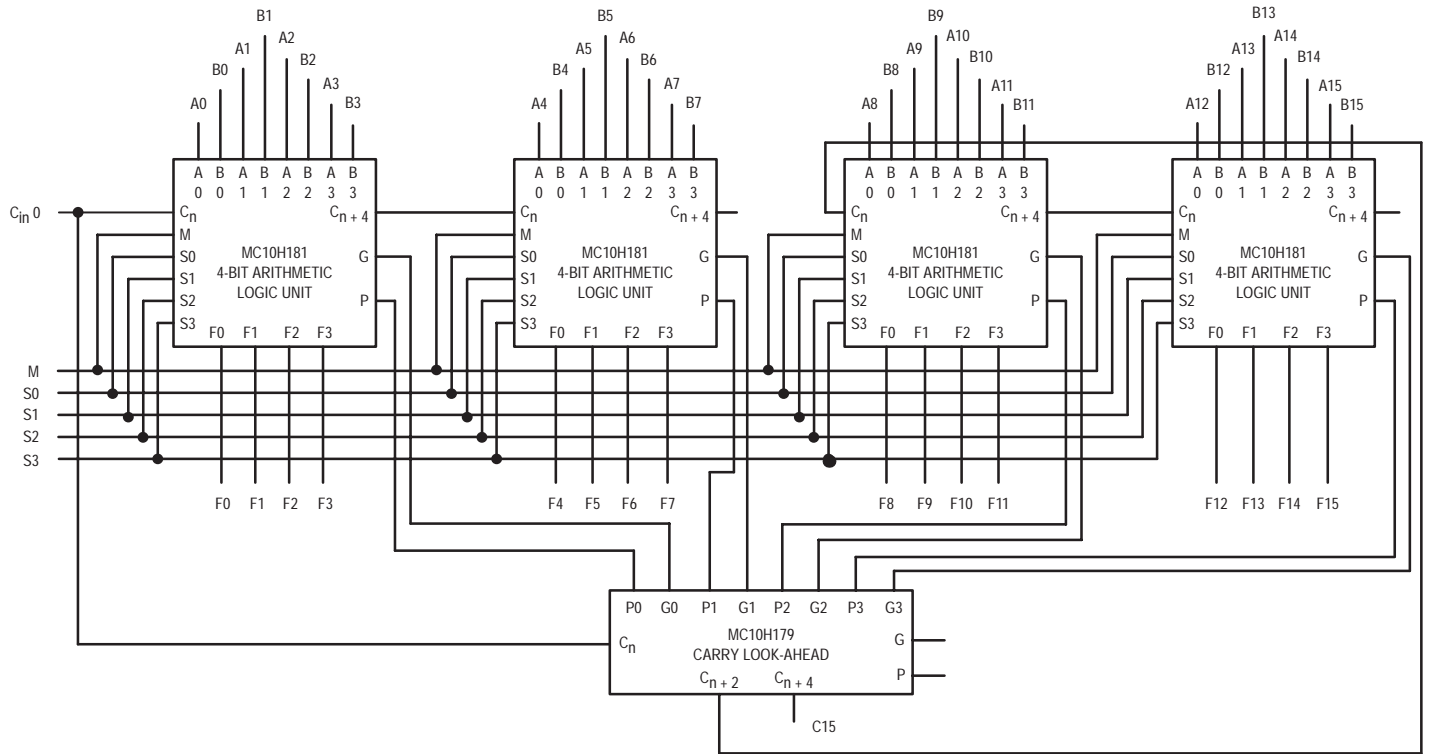
shows a 16-bit look-ahead carry arithmetic unit. Second order carry is valuable for longer binary words. As an example, addition of two 32-bit words is improved from 30 nanoseconds with ripple-carry techniques. A block diagram of a 32-bit ALU is shown in Figure 1. The MC10H179 may also be used in many other applications. It can, for example, reduce system package count when used to generate functions of several variables.

FIGURE 1 – 32-BIT ALU WITH CARRY LOOK-AHEAD



# MC10H179

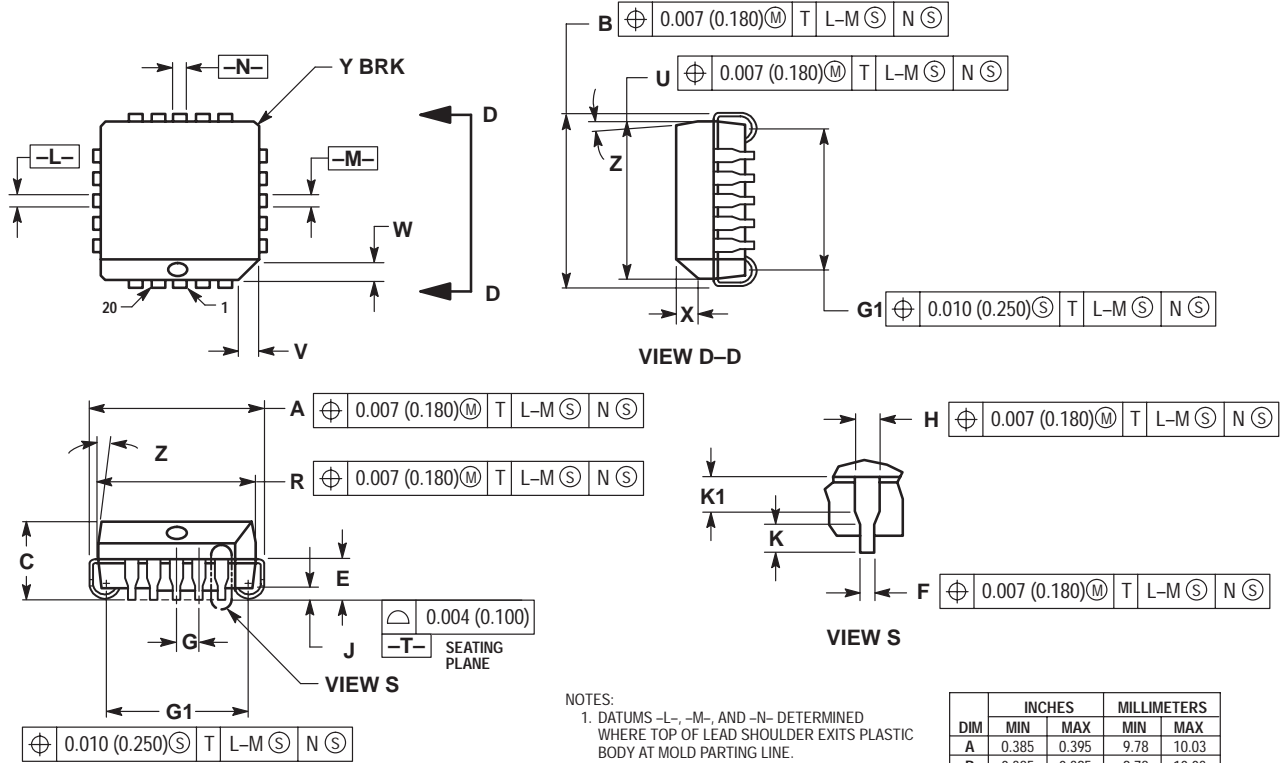
FIGURE 2 – 16-BIT FULL LOOK-AHEAD CARRY ARITHMETIC LOGIC UNIT



# MC10H179

## PACKAGE DIMENSIONS

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



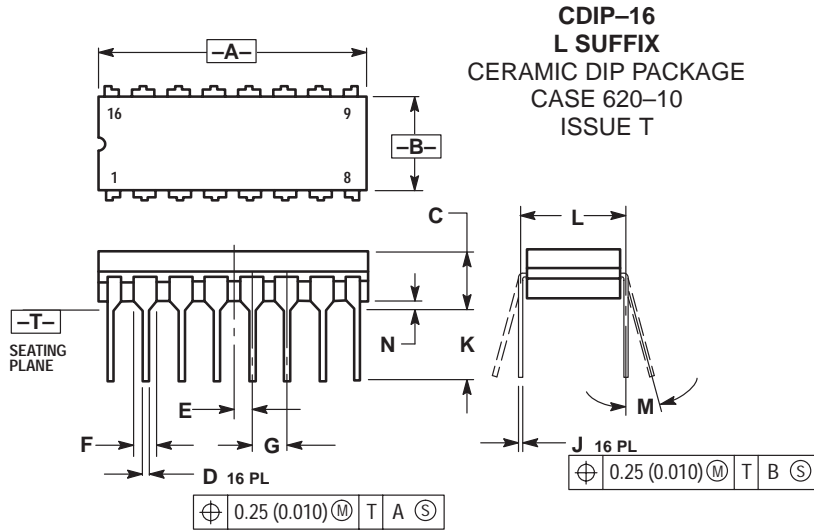
### NOTES:

- 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        | ---   |

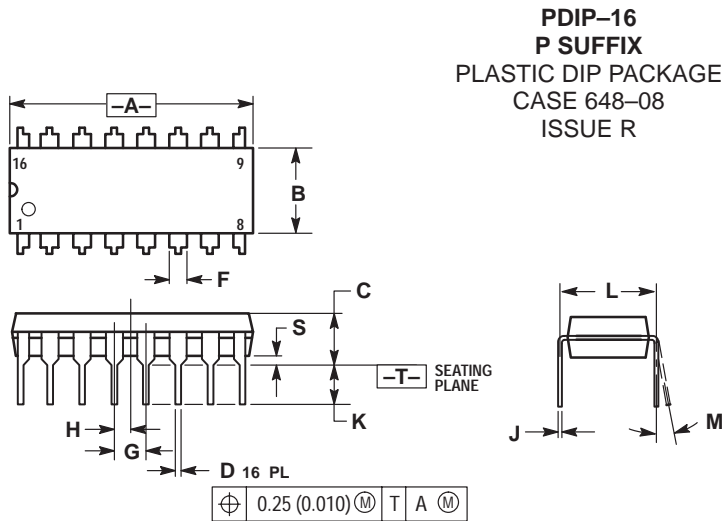
# MC10H179

## PACKAGE DIMENSIONS



- 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  |



- 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**

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