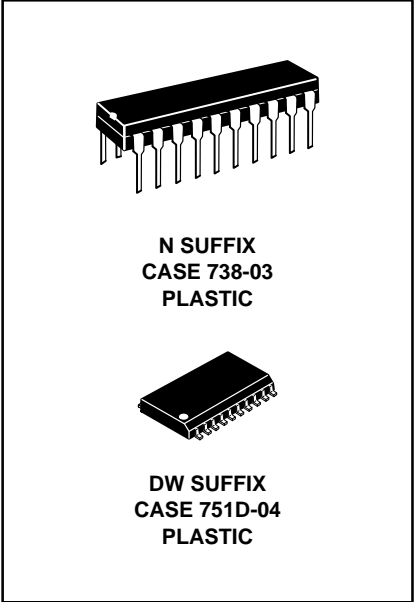




**MC74AC241**  
**MC74ACT241**

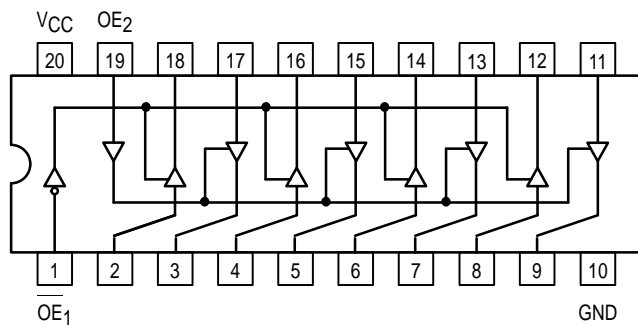
OCTAL BUFFER/LINE  
DRIVER WITH  
3-STATE OUTPUTS



## Octal Buffer/Line Driver with 3-State Outputs

The MC74AC241/74ACT241 is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus oriented transmitter or receiver which provides improved PC board density.

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Outputs Source/Sink 24 mA
- 'ACT241 Has TTL Compatible Inputs



### TRUTH TABLE

| Inputs          |   | Outputs               |
|-----------------|---|-----------------------|
| OE <sub>1</sub> | D | (Pins 12, 14, 16, 18) |
| L               | L | L                     |
| L               | H | H                     |
| H               | X | Z                     |

H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Immaterial  
Z = High Impedance

### TRUTH TABLE

| Inputs          |   | Outputs           |
|-----------------|---|-------------------|
| OE <sub>2</sub> | D | (Pins 3, 5, 7, 9) |
| H               | L | L                 |
| H               | H | H                 |
| L               | X | Z                 |

H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Immaterial  
Z = High Impedance

# MC74AC241 MC74ACT241

## MAXIMUM RATINGS\*

| Symbol           | Parameter  | Value                        | Unit |
|------------------|--|------------------------------|------|
| V <sub>CC</sub>  | DC Supply Voltage (Referenced to GND)            | -0.5 to +7.0                 | V    |
| V <sub>in</sub>  | DC Input Voltage (Referenced to GND)             | -0.5 to V <sub>CC</sub> +0.5 | V    |
| V <sub>out</sub> | DC Output Voltage (Referenced to GND)            | -0.5 to V <sub>CC</sub> +0.5 | V    |
| I <sub>in</sub>  | DC Input Current, per Pin                        | ±20                          | mA   |
| I <sub>out</sub> | DC Output Sink/Source Current, per Pin           | ±50                          | mA   |
| I <sub>CC</sub>  | DC V <sub>CC</sub> or GND Current per Output Pin | ±50                          | mA   |
| T <sub>stg</sub> | Storage Temperature                              | -65 to +150                  | °C   |

\* Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

## RECOMMENDED OPERATING CONDITIONS

| Symbol                             | Parameter   | Min                     | Typ | Max             | Unit |      |
|------------------------------------|---|-------------------------|-----|-----------------|------|------|
| V <sub>CC</sub>                    | Supply Voltage  | 'AC                     | 2.0 | 5.0             | 6.0  | V    |
|                                    |   | 'ACT                    | 4.5 | 5.0             | 5.5  |      |
| V <sub>in</sub> , V <sub>out</sub> | DC Input Voltage, Output Voltage (Ref. to GND)                          | 0                       |     | V <sub>CC</sub> | V    |      |
| t <sub>r</sub> , t <sub>f</sub>    | Input Rise and Fall Time (Note 1)<br>'AC Devices except Schmitt Inputs  | V <sub>CC</sub> @ 3.0 V |     | 150             |      | ns/V |
|                                    |   | V <sub>CC</sub> @ 4.5 V |     | 40              |      |      |
|                                    |   | V <sub>CC</sub> @ 5.5 V |     | 25              |      |      |
| t <sub>r</sub> , t <sub>f</sub>    | Input Rise and Fall Time (Note 2)<br>'ACT Devices except Schmitt Inputs | V <sub>CC</sub> @ 4.5 V |     | 10              |      | ns/V |
|                                    |   | V <sub>CC</sub> @ 5.5 V |     | 8.0             |      |      |
| T <sub>J</sub>                     | Junction Temperature (PDIP)   |                         |     | 140             | °C   |      |
| T <sub>A</sub>                     | Operating Ambient Temperature Range                                     | -40                     | 25  | 85              | °C   |      |
| I <sub>OH</sub>                    | Output Current — High   |                         |     | -24             | mA   |      |
| I <sub>OL</sub>                    | Output Current — Low  |                         |     | 24              | mA   |      |

1. V<sub>in</sub> from 30% to 70% V<sub>CC</sub>; see individual Data Sheets for devices that differ from the typical input rise and fall times.

2. V<sub>in</sub> from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

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## DC CHARACTERISTICS

| Symbol           | Parameter                            | V <sub>CC</sub><br>(V) | 74AC                   |                   | 74AC                               |    | Unit  | Conditions |
|------------------|--------------------------------------|------------------------|------------------------|-------------------|------------------------------------|----|---|------------|
|                  |                                      |                        | T <sub>A</sub> = +25°C |                   | T <sub>A</sub> =<br>-40°C to +85°C |    |   |            |
|                  |                                      |                        | Typ                    | Guaranteed Limits |                                    |    |   |            |
| V <sub>IH</sub>  | Minimum High Level<br>Input Voltage  | 3.0                    | 1.5                    | 2.1               | 2.1                                | V  | V <sub>OUT</sub> = 0.1 V<br>or V <sub>CC</sub> - 0.1 V  |            |
|                  |                                      | 4.5                    | 2.25                   | 3.15              | 3.15                               |    |   |            |
|                  |                                      | 5.5                    | 2.75                   | 3.85              | 3.85                               |    |   |            |
| V <sub>IL</sub>  | Maximum Low Level<br>Input Voltage   | 3.0                    | 1.5                    | 0.9               | 0.9                                | V  | V <sub>OUT</sub> = 0.1 V<br>or V <sub>CC</sub> - 0.1 V  |            |
|                  |                                      | 4.5                    | 2.25                   | 1.35              | 1.35                               |    |   |            |
|                  |                                      | 5.5                    | 2.75                   | 1.65              | 1.65                               |    |   |            |
| V <sub>OH</sub>  | Minimum High Level<br>Output Voltage | 3.0                    | 2.99                   | 2.9               | 2.9                                | V  | I <sub>OUT</sub> = -50 μA   |            |
|                  |                                      | 4.5                    | 4.49                   | 4.4               | 4.4                                |    |   |            |
|                  |                                      | 5.5                    | 5.49                   | 5.4               | 5.4                                |    |   |            |
|                  |                                      | 3.0                    |                        | 2.56              | 2.46                               | V  | *V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>-12 mA<br>I <sub>OH</sub> -24 mA<br>-24 mA   |            |
|                  |                                      | 4.5                    |                        | 3.86              | 3.76                               |    |   |            |
|                  |                                      | 5.5                    |                        | 4.86              | 4.76                               |    |   |            |
| V <sub>OL</sub>  | Maximum Low Level<br>Output Voltage  | 3.0                    | 0.002                  | 0.1               | 0.1                                | V  | I <sub>OUT</sub> = 50 μA  |            |
|                  |                                      | 4.5                    | 0.001                  | 0.1               | 0.1                                |    |   |            |
|                  |                                      | 5.5                    | 0.001                  | 0.1               | 0.1                                |    |   |            |
|                  |                                      | 3.0                    |                        | 0.36              | 0.44                               | V  | *V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>12 mA<br>I <sub>OL</sub> 24 mA<br>24 mA  |            |
|                  |                                      | 4.5                    |                        | 0.36              | 0.44                               |    |   |            |
|                  |                                      | 5.5                    |                        | 0.36              | 0.44                               |    |   |            |
| I <sub>IN</sub>  | Maximum Input<br>Leakage Current     | 5.5                    |                        | ±0.1              | ±1.0                               | μA | V <sub>I</sub> = V <sub>CC</sub> , GND  |            |
| I <sub>OZ</sub>  | Maximum<br>3-State<br>Current        | 5.5                    |                        | ±0.5              | ±5.0                               | μA | V <sub>I</sub> (OE) = V <sub>IL</sub> , V <sub>IH</sub><br>V <sub>I</sub> = V <sub>CC</sub> , GND<br>V <sub>O</sub> = V <sub>CC</sub> , GND |            |
| I <sub>OLD</sub> | †Minimum Dynamic<br>Output Current   | 5.5                    |                        |                   | 75                                 | mA | V <sub>OLD</sub> = 1.65 V Max   |            |
| I <sub>OHD</sub> |                                      | 5.5                    |                        |                   | -75                                | mA | V <sub>OHD</sub> = 3.85 V Min   |            |
| I <sub>CC</sub>  | Maximum Quiescent<br>Supply Current  | 5.5                    |                        | 8.0               | 80                                 | μA | V <sub>IN</sub> = V <sub>CC</sub> or GND  |            |

\* All outputs loaded; thresholds on input associated with output under test.

† Maximum test duration 2.0 ms, one output loaded at a time.

Note: I<sub>IN</sub> and I<sub>CC</sub> @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V<sub>CC</sub>.

# MC74AC241 MC74ACT241

## AC CHARACTERISTICS (For Figures and Waveforms — See Section 3)

| Symbol           | Parameter                           | V <sub>CC</sub> * (V) | 74AC   |            |              | 74AC   |              | Unit | Fig. No. |
|------------------|-------------------------------------|-----------------------|--|------------|--------------|--|--------------|------|----------|
|                  |                                     |                       | T <sub>A</sub> = +25°C<br>C <sub>L</sub> = 50 pF |            |              | T <sub>A</sub> = -40°C<br>to +85°C<br>C <sub>L</sub> = 50 pF |              |      |          |
|                  |                                     |                       | Min  | Typ        | Max          | Min  | Max          |      |          |
| t <sub>PLH</sub> | Propagation Delay<br>Data to Output | 3.3<br>5.0            | 1.5<br>1.5                                       | 6.0<br>5.0 | 9.0<br>7.0   | 1.5<br>1.0   | 10.0<br>7.5  | ns   | 3-5      |
| t <sub>PHL</sub> | Propagation Delay<br>Data to Output | 3.3<br>5.0            | 1.5<br>1.5                                       | 6.0<br>4.5 | 9.0<br>7.0   | 1.0<br>1.0   | 10.5<br>7.5  | ns   | 3-5      |
| t <sub>PZH</sub> | Output Enable Time                  | 3.3<br>5.0            | 1.5<br>1.5                                       | 6.5<br>5.5 | 12.5<br>9.0  | 1.0<br>1.0   | 13.0<br>9.5  | ns   | 3-7      |
| t <sub>PZL</sub> | Output Enable Time                  | 3.3<br>5.0            | 1.5<br>1.5                                       | 7.0<br>5.5 | 12.0<br>9.0  | 1.5<br>1.0   | 13.0<br>9.5  | ns   | 3-8      |
| t <sub>PHZ</sub> | Output Disable Time                 | 3.3<br>5.0            | 2.0<br>1.5                                       | 8.0<br>6.5 | 12.0<br>10.0 | 2.0<br>1.0   | 12.5<br>10.5 | ns   | 3-7      |
| t <sub>PLZ</sub> | Output Disable Time                 | 3.3<br>5.0            | 1.5<br>1.5                                       | 7.0<br>6.0 | 12.5<br>10.0 | 1.0<br>1.0   | 13.5<br>10.5 | ns   | 3-8      |

\* Voltage Range 3.3 V is 3.3 V ± 0.3 V.

Voltage Range 5.0 V is 5.0 V ± 0.5 V.

## DC CHARACTERISTICS

| Symbol             | Parameter                              | V <sub>CC</sub> (V) | 74ACT                  |                   | 74ACT                           |    | Unit  | Conditions |
|--------------------|--|---------------------|------------------------|-------------------|---------------------------------|----|---|------------|
|                    |  |                     | T <sub>A</sub> = +25°C |                   | T <sub>A</sub> = -40°C to +85°C |    |   |            |
|                    |  |                     | Typ                    | Guaranteed Limits |                                 |    |   |            |
| V <sub>IH</sub>    | Minimum High Level<br>Input Voltage    | 4.5                 | 1.5                    | 2.0               | 2.0                             | V  | V <sub>OUT</sub> = 0.1 V<br>or V <sub>CC</sub> - 0.1 V  |            |
|                    |  | 5.5                 | 1.5                    | 2.0               | 2.0                             |    |   |            |
| V <sub>IL</sub>    | Maximum Low Level<br>Input Voltage     | 4.5                 | 1.5                    | 0.8               | 0.8                             | V  | V <sub>OUT</sub> = 0.1 V<br>or V <sub>CC</sub> - 0.1 V  |            |
|                    |  | 5.5                 | 1.5                    | 0.8               | 0.8                             |    |   |            |
| V <sub>OH</sub>    | Minimum High Level<br>Output Voltage   | 4.5                 | 4.49                   | 4.4               | 4.4                             | V  | I <sub>OUT</sub> = -50 μA   |            |
|                    |  | 5.5                 | 5.49                   | 5.4               | 5.4                             |    |   |            |
|                    |  | 4.5                 |                        | 3.86              | 3.76                            | V  | *V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>-24 mA<br>I <sub>OH</sub> -24 mA   |            |
| 5.5                |  | 4.86                | 4.76                   |                   |                                 |    |   |            |
| V <sub>OL</sub>    | Maximum Low Level<br>Output Voltage    | 4.5                 | 0.001                  | 0.1               | 0.1                             | V  | I <sub>OUT</sub> = 50 μA  |            |
|                    |  | 5.5                 | 0.001                  | 0.1               | 0.1                             |    |   |            |
|                    |  | 4.5                 |                        | 0.36              | 0.44                            | V  | *V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>24 mA<br>I <sub>OL</sub> 24 mA   |            |
| 5.5                |  | 0.36                | 0.44                   |                   |                                 |    |   |            |
| I <sub>IN</sub>    | Maximum Input<br>Leakage Current       | 5.5                 |                        | ±0.1              | ±1.0                            | μA | V <sub>I</sub> = V <sub>CC</sub> , GND  |            |
| ΔI <sub>CC</sub> T | Additional Max. I <sub>CC</sub> /Input | 5.5                 | 0.6                    |                   | 1.5                             | mA | V <sub>I</sub> = V <sub>CC</sub> - 2.1 V  |            |
| I <sub>OZ</sub>    | Maximum<br>3-State<br>Current          | 5.5                 |                        | ±0.5              | ±5.0                            | μA | V <sub>I</sub> (OE) = V <sub>IL</sub> , V <sub>IH</sub><br>V <sub>I</sub> = V <sub>CC</sub> , GND<br>V <sub>O</sub> = V <sub>CC</sub> , GND |            |
| I <sub>OLD</sub>   | †Minimum Dynamic<br>Output Current     | 5.5                 |                        |                   | 75                              | mA | V <sub>OLD</sub> = 1.65 V Max   |            |
| I <sub>OHD</sub>   |  | 5.5                 |                        |                   | -75                             | mA | V <sub>OHD</sub> = 3.85 V Min   |            |
| I <sub>CC</sub>    | Maximum Quiescent<br>Supply Current    | 5.5                 |                        | 8.0               | 80                              | μA | V <sub>IN</sub> = V <sub>CC</sub> or GND  |            |

\* All outputs loaded; thresholds on input associated with output under test.

† Maximum test duration 2.0 ms, one output loaded at a time.

# MC74AC241 MC74ACT241

## AC CHARACTERISTICS (For Figures and Waveforms — See Section 3)

| Symbol           | Parameter                           | V <sub>CC</sub> * (V) | 74ACT  |     |      | 74ACT  |      | Unit | Fig. No. |
|------------------|-------------------------------------|-----------------------|--|-----|------|--|------|------|----------|
|                  |                                     |                       | T <sub>A</sub> = +25°C<br>C <sub>L</sub> = 50 pF |     |      | T <sub>A</sub> = -40°C<br>to +85°C<br>C <sub>L</sub> = 50 pF |      |      |          |
|                  |                                     |                       | Min  | Typ | Max  | Min  | Max  |      |          |
| t <sub>PLH</sub> | Propagation Delay<br>Data to Output | 5.0                   | 1.5  | 6.5 | 9.0  | 1.5  | 10.0 | ns   | 3-5      |
| t <sub>PHL</sub> | Propagation Delay<br>Data to Output | 5.0                   | 1.5  | 7.0 | 9.0  | 1.5  | 10.0 | ns   | 3-5      |
| t <sub>pZH</sub> | Output Enable Time                  | 5.0                   | 1.5  | 6.0 | 9.0  | 1.0  | 10.0 | ns   | 3-7      |
| t <sub>pZL</sub> | Output Enable Time                  | 5.0                   | 1.5  | 7.0 | 10.0 | 1.5  | 11.0 | ns   | 3-8      |
| t <sub>PHZ</sub> | Output Disable Time                 | 5.0                   | 1.5  | 8.0 | 10.5 | 1.5  | 11.5 | ns   | 3-7      |
| t <sub>PLZ</sub> | Output Disable Time                 | 5.0                   | 2.0  | 7.0 | 10.5 | 1.5  | 11.5 | ns   | 3-8      |

\* Voltage Range 5.0 V is 5.0 V ±0.5 V.

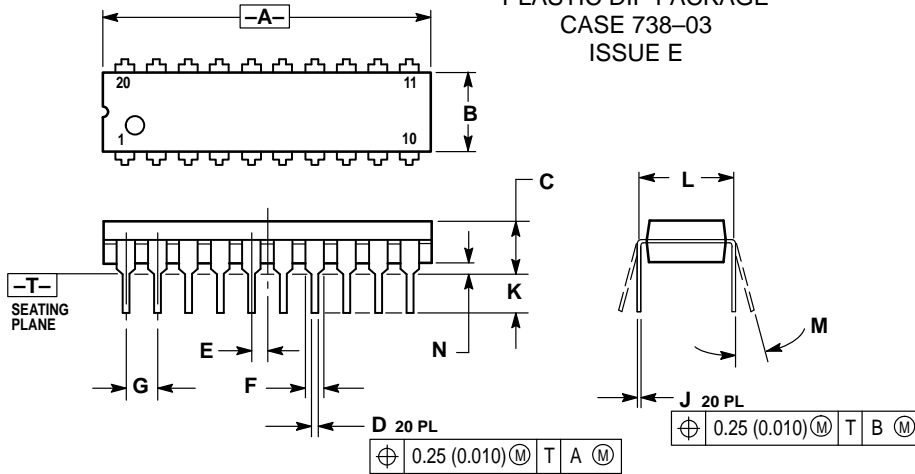
## CAPACITANCE

| Symbol          | Parameter                     | Value<br>Typ | Unit | Test Conditions         |
|-----------------|-------------------------------|--------------|------|-------------------------|
| C <sub>IN</sub> | Input Capacitance             | 4.5          | pF   | V <sub>CC</sub> = 5.0 V |
| C <sub>PD</sub> | Power Dissipation Capacitance | 45           | pF   | V <sub>CC</sub> = 5.0 V |

# MC74AC241 MC74ACT241

## OUTLINE DIMENSIONS

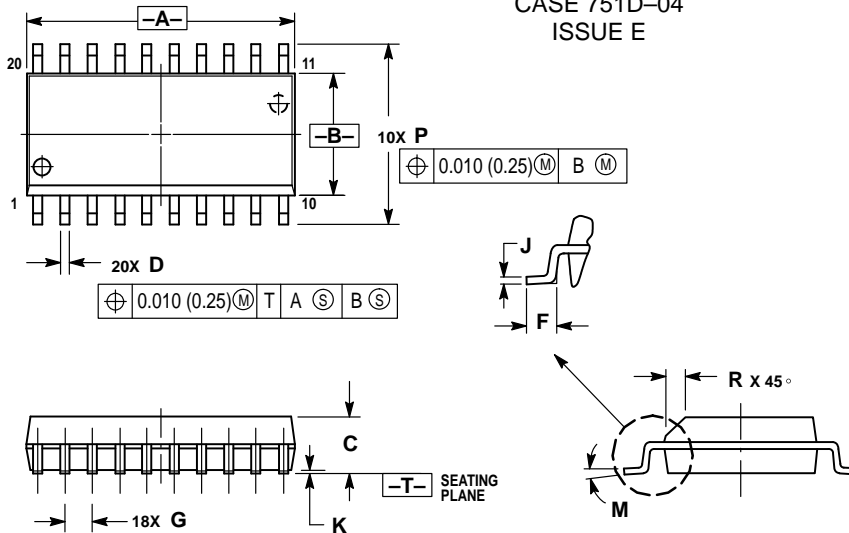
### N SUFFIX PLASTIC DIP PACKAGE CASE 738-03 ISSUE E



- 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 B DOES NOT INCLUDE MOLD FLASH.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 1.010     | 1.070 | 25.66       | 27.17 |
| B   | 0.240     | 0.260 | 6.10        | 6.60  |
| C   | 0.150     | 0.180 | 3.81        | 4.57  |
| D   | 0.015     | 0.022 | 0.39        | 0.55  |
| E   | 0.050 BSC |       | 1.27 BSC    |       |
| F   | 0.050     | 0.070 | 1.27        | 1.77  |
| G   | 0.100 BSC |       | 2.54 BSC    |       |
| J   | 0.008     | 0.015 | 0.21        | 0.38  |
| K   | 0.110     | 0.140 | 2.80        | 3.55  |
| L   | 0.300 BSC |       | 7.62 BSC    |       |
| M   | 0° 15°    |       | 0° 15°      |       |
| N   | 0.020     | 0.040 | 0.51        | 1.01  |

### DW SUFFIX PLASTIC SOIC PACKAGE CASE 751D-04 ISSUE E



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: MILLIMETER.
  3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
  4. MAXIMUM MOLD PROTRUSION 0.150 (0.006) PER SIDE.
  5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF D DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | 12.65       | 12.95 | 0.499     | 0.510 |
| B   | 7.40        | 7.60  | 0.292     | 0.299 |
| C   | 2.35        | 2.65  | 0.093     | 0.104 |
| D   | 0.35        | 0.49  | 0.014     | 0.019 |
| F   | 0.50        | 0.90  | 0.020     | 0.035 |
| G   | 1.27 BSC    |       | 0.050 BSC |       |
| J   | 0.25        | 0.32  | 0.010     | 0.012 |
| K   | 0.10        | 0.25  | 0.004     | 0.009 |
| M   | 0° 7°       |       | 0° 7°     |       |
| P   | 10.05       | 10.55 | 0.395     | 0.415 |
| R   | 0.25        | 0.75  | 0.010     | 0.029 |

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