



**MOTOROLA**

# MC74AC112 MC74ACT112

## Dual JK Negative Edge-Triggered Flip-Flop

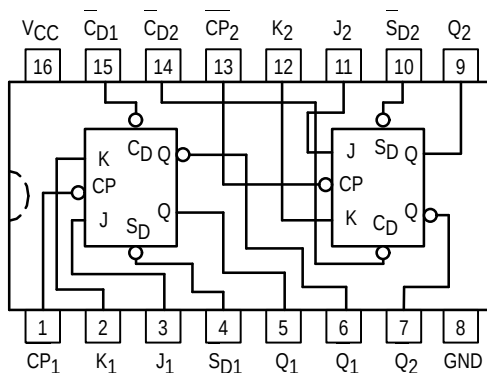
The MC74AC112/74ACT112 consists of two high-speed completely independent transition clocked JK flip-flops. The clocking operation is independent of rise and fall times of the clock waveform. The JK design allows operation as a D flip-flop (refer to MC74AC74/74ACT74 data sheet) by connecting the J and K inputs together.

Asynchronous Inputs:

- LOW input to  $\overline{S_D}$  (Set) sets Q to HIGH level
- LOW input to  $\overline{C_D}$  (Clear) sets Q to LOW level
- Clear and Set are independent of clock
- Simultaneous LOW on  $\overline{C_D}$  and  $\overline{S_D}$  makes both Q and  $\overline{Q}$  HIGH

- Outputs Source/Sink 24 mA
- 'ACT112 Has TTL Compatible Inputs

### CONNECTION DIAGRAM



### MODE SELECT — TRUTH TABLE

| Operating Mode   | Inputs           |                  |   |   | Outputs |                |
|------------------|------------------|------------------|---|---|---------|----------------|
|                  | $\overline{S_D}$ | $\overline{C_D}$ | J | K | Q       | $\overline{Q}$ |
| Set              | L                | H                | X | X | H       | L              |
| Reset (Clear)    | H                | L                | X | X | L       | H              |
| *Undetermined    | L                | L                | X | X | H       | H              |
| Toggle           | H                | H                | h | h | q       | q              |
| Load "0" (Reset) | H                | H                | l | h | L       | H              |
| Load "1" (Set)   | H                | H                | h | l | H       | L              |
| Hold             | H                | H                | l | l | q       | q              |

\*Both outputs will be HIGH while both  $\overline{S_D}$  and  $\overline{C_D}$  are LOW, but the output states are unpredictable if  $\overline{S_D}$  and  $\overline{C_D}$  go HIGH simultaneously.

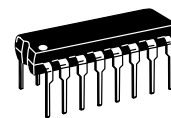
H, h = HIGH Voltage Level

L, l = LOW Voltage Level

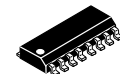
X = Don't Care

l, h (q) = Lower case letters indicate the state of the referenced input (or output) one set-up time prior to the HIGH to LOW clock transition.

DUAL JK NEGATIVE  
EDGE-TRIGGERED  
FLIP-FLOP

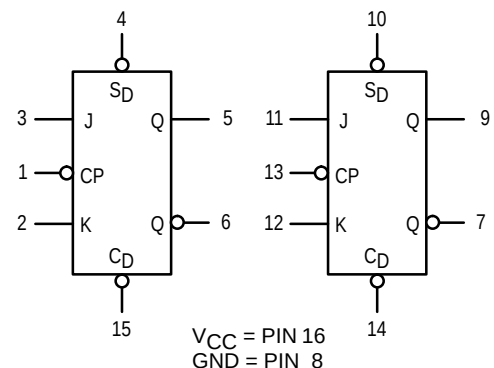


N SUFFIX  
CASE 648-08  
PLASTIC



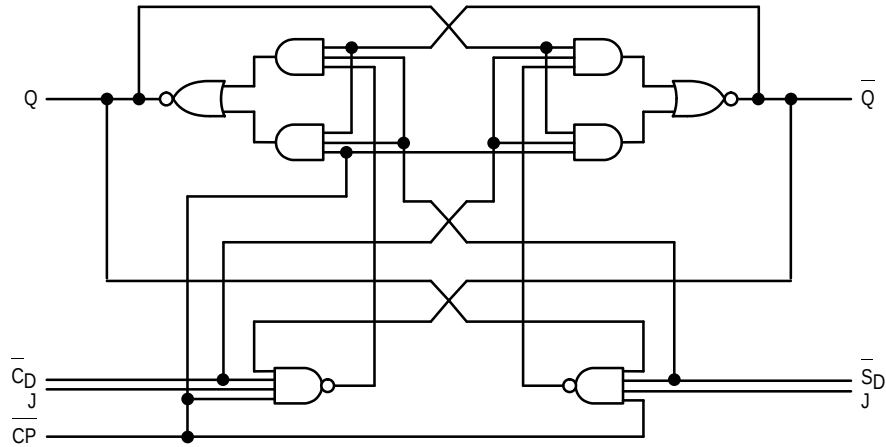
D SUFFIX  
CASE 751B-05  
PLASTIC

### LOGIC SYMBOL



# MC74AC112 MC74ACT112

## LOGIC DIAGRAM (one half shown)



### MAXIMUM RATINGS\*

| Symbol    | Parameter                                 | Value                  | Unit |
|-----------|-------------------------------------------|------------------------|------|
| $V_{CC}$  | DC Supply Voltage (Referenced to GND)     | -0.5 to +7.0           | V    |
| $V_{in}$  | DC Input Voltage (Referenced to GND)      | -0.5 to $V_{CC} + 0.5$ | V    |
| $V_{out}$ | DC Output Voltage (Referenced to GND)     | -0.5 to $V_{CC} + 0.5$ | V    |
| $I_{in}$  | DC Input Current, per Pin                 | $\pm 20$               | mA   |
| $I_{out}$ | DC Output Sink/Source Current, per Pin    | $\pm 50$               | mA   |
| $I_{CC}$  | DC $V_{CC}$ or GND Current per Output Pin | $\pm 50$               | mA   |
| $T_{stg}$ | 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 |
|-------------------|-------------------------------------------------------------------------|------------------|-----|----------|------|
| $V_{CC}$          | Supply Voltage                                                          | 'AC              | 2.0 | 5.0      | V    |
|                   |                                                                         | 'ACT             | 4.5 | 5.0      |      |
| $V_{in}, V_{out}$ | DC Input Voltage, Output Voltage (Ref. to GND)                          | 0                |     | $V_{CC}$ | V    |
| $t_r, t_f$        | Input Rise and Fall Time (Note 1)<br>'AC Devices except Schmitt Inputs  | $V_{CC} @ 3.0 V$ | 150 |          | ns/V |
|                   |                                                                         | $V_{CC} @ 4.5 V$ | 40  |          |      |
|                   |                                                                         | $V_{CC} @ 5.5 V$ | 25  |          |      |
| $t_r, t_f$        | Input Rise and Fall Time (Note 2)<br>'ACT Devices except Schmitt Inputs | $V_{CC} @ 4.5 V$ | 10  |          | ns/V |
|                   |                                                                         | $V_{CC} @ 5.5 V$ | 8.0 |          |      |
| $T_J$             | Junction Temperature (PDIP)                                             |                  |     | 140      | °C   |
| $T_A$             | Operating Ambient Temperature Range                                     | -40              | 25  | 85       | °C   |
| $I_{OH}$          | Output Current — High                                                   |                  |     | -24      | mA   |
| $I_{OL}$          | Output Current — Low                                                    |                  |     | 24       | mA   |

1.  $V_{in}$  from 30% to 70%  $V_{CC}$ ; see individual Data Sheets for devices that differ from the typical input rise and fall times.

2.  $V_{in}$  from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

# MC74AC112 MC74ACT112

## 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>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                    |                        | 4.0               | 40                                 | 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>.

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

| Symbol           | Parameter                                                                                     | V <sub>CC</sub> *<br>(V) | 74AC                                             |     |              | 74AC                                                         |              | Unit | Fig.<br>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          |      |             |
| f <sub>max</sub> | Maximum Clock<br>Frequency                                                                    | 3.3<br>5.0               | 145<br>145                                       |     |              | 125<br>125                                                   |              | MHz  | 3-3         |
| t <sub>PLH</sub> | Propagation Delay<br>CP <sub>N</sub> to Q <sub>N</sub> or Q <sub>N</sub>                      | 3.3<br>5.0               | 1.0<br>1.0                                       |     | 16.0<br>13.0 | 1.0<br>1.0                                                   | 17.0<br>13.5 | ns   | 3-6         |
| t <sub>PHL</sub> | Propagation Delay<br>CP <sub>N</sub> to Q <sub>N</sub> or Q <sub>N</sub>                      | 3.3<br>5.0               | 1.0<br>1.0                                       |     | 16.0<br>13.0 | 1.0<br>1.0                                                   | 16.5<br>13.5 | ns   | 3-6         |
| t <sub>PLH</sub> | Propagation Delay —<br>C <sub>DN</sub> or S <sub>DN</sub> to Q <sub>N</sub> or Q <sub>N</sub> | 3.3<br>5.0               | 1.0<br>1.0                                       |     | 11.0<br>9.5  | 1.0<br>1.0                                                   | 11.5<br>10.0 | ns   | 3-6         |
| t <sub>PHL</sub> | Propagation Delay —<br>C <sub>DN</sub> or S <sub>DN</sub> to Q <sub>N</sub> or Q <sub>N</sub> | 3.3<br>5.0               | 1.0<br>1.0                                       |     | 11.0<br>9.5  | 1.0<br>1.0                                                   | 11.5<br>10.0 | ns   | 3-6         |

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

Voltage Range 5.0 V is 5.0 V ±0.5 V.

# MC74AC112 MC74ACT112

## AC OPERATING REQUIREMENTS

| Symbol           | Parameter                                                                       | V <sub>CC</sub> *<br>(V) | 74AC                                             |                    | 74AC                                                         | Unit | Fig.<br>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 |      |             |
|                  |                                                                                 |                          | Typ                                              | Guaranteed Minimum |                                                              |      |             |
| t <sub>s</sub>   | Set-up Time, HIGH or LOW<br>J <sub>N</sub> or K <sub>N</sub> to CP <sub>N</sub> | 3.3<br>5.0               |                                                  | 6.5<br>4.5         | 7.5<br>5.0                                                   | ns   | 3-9         |
| t <sub>h</sub>   | Hold Time, HIGH or LOW<br>J <sub>N</sub> or K <sub>N</sub> to CP <sub>N</sub>   | 3.3<br>5.0               |                                                  | 0<br>0             | 0<br>0                                                       | ns   | 3-9         |
| t <sub>w</sub>   | Pulse Width<br>CP <sub>N</sub>                                                  | 3.3<br>5.0               |                                                  | 6.0<br>5.0         | 6.5<br>5.5                                                   | ns   | 3-6         |
| t <sub>w</sub>   | Pulse Width<br>C <sub>DN</sub> or S <sub>DN</sub>                               | 3.3<br>5.0               |                                                  | 6.5<br>5.0         | 7.5<br>5.5                                                   | ns   | 3-6         |
| t <sub>rec</sub> | Recovery Time<br>C <sub>DN</sub> or S <sub>DN</sub> to CP                       | 3.3<br>5.0               |                                                  | 0<br>0             | 0<br>0                                                       | ns   | 3-9         |

\* 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><br>(V) | 74ACT                  |                   | 74ACT                              | 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    | 4.5<br>5.5             | 1.5<br>1.5             | 2.0<br>2.0        | 2.0<br>2.0                         | V    | V <sub>OUT</sub> = 0.1 V<br>or V <sub>CC</sub> – 0.1 V                                    |
| V <sub>IL</sub>   | Maximum Low Level<br>Input Voltage     | 4.5<br>5.5             | 1.5<br>1.5             | 0.8<br>0.8        | 0.8<br>0.8                         | V    | V <sub>OUT</sub> = 0.1 V<br>or V <sub>CC</sub> – 0.1 V                                    |
| V <sub>OH</sub>   | Minimum High Level<br>Output Voltage   | 4.5<br>5.5             | 4.49<br>5.49           | 4.4<br>5.4        | 4.4<br>5.4                         | V    | I <sub>OUT</sub> = –50 μA                                                                 |
|                   |                                        | 4.5<br>5.5             |                        | 3.86<br>4.86      | 3.76<br>4.76                       | V    | *V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>–24 mA<br>I <sub>OH</sub> –24 mA |
| V <sub>OL</sub>   | Maximum Low Level<br>Output Voltage    | 4.5<br>5.5             | 0.001<br>0.001         | 0.1<br>0.1        | 0.1<br>0.1                         | V    | I <sub>OUT</sub> = 50 μA                                                                  |
|                   |                                        | 4.5<br>5.5             |                        | 0.36<br>0.36      | 0.44<br>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   |
| 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>CCT</sub> | 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>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                    |                        | 4.0               | 40                                 | 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.

# MC74AC112 MC74ACT112

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

| Symbol           | Parameter                                                                                     | V <sub>CC</sub> *<br>(V) | 74ACT                                            |     |      | 74ACT                                                        |      | Unit | Fig.<br>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  |      |             |
| f <sub>max</sub> | Maximum Clock<br>Frequency                                                                    | 5.0                      | 145                                              |     |      | 125                                                          |      | MHz  | 3-3         |
| t <sub>PLH</sub> | Propagation Delay<br>CP <sub>n</sub> to Q <sub>n</sub> or Q <sub>n</sub>                      | 5.0                      | 1.0                                              |     | 14.0 | 1.0                                                          | 15.0 | ns   | 3-6         |
| t <sub>PHL</sub> | Propagation Delay<br>CP <sub>n</sub> to Q <sub>n</sub> or Q <sub>n</sub>                      | 5.0                      | 1.0                                              |     | 14.0 | 1.0                                                          | 14.5 | ns   | 3-6         |
| t <sub>PLH</sub> | Propagation Delay —<br>C <sub>Dn</sub> or S <sub>Dn</sub> to Q <sub>n</sub> or Q <sub>n</sub> | 5.0                      | 1.0                                              |     | 12.0 | 1.0                                                          | 12.5 | ns   | 3-6         |
| t <sub>PHL</sub> | Propagation Delay —<br>C <sub>Dn</sub> or S <sub>Dn</sub> to Q <sub>n</sub> or Q <sub>n</sub> | 5.0                      | 1.0                                              |     | 12.5 | 1.0                                                          | 13.0 | ns   | 3-6         |

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

## AC OPERATING REQUIREMENTS

| Symbol           | Parameter                                                                       | V <sub>CC</sub> *<br>(V) | 74ACT                                            |                    | 74ACT                                                        | Unit | Fig.<br>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 |      |             |
|                  |                                                                                 |                          | Typ                                              | Guaranteed Minimum |                                                              |      |             |
| t <sub>s</sub>   | Set-up Time, HIGH or LOW<br>J <sub>N</sub> or K <sub>N</sub> to CP <sub>N</sub> | 5.0                      |                                                  | 2.0                | 2.5                                                          | ns   | 3-9         |
| t <sub>h</sub>   | Hold Time, HIGH or LOW<br>J <sub>N</sub> or K <sub>N</sub> to CP <sub>N</sub>   | 5.0                      |                                                  | 2.0                | 2.0                                                          | ns   | 3-9         |
| t <sub>w</sub>   | Pulse Width<br>CP <sub>N</sub>                                                  | 5.0                      |                                                  | 5.0                | 6.0                                                          | ns   | 3-6         |
| t <sub>w</sub>   | Pulse Width<br>C <sub>DN</sub> or S <sub>DN</sub>                               | 5.0                      |                                                  | 5.5                | 6.0                                                          | ns   | 3-6         |
| t <sub>rec</sub> | Recovery Time<br>C <sub>DN</sub> or S <sub>DN</sub> to CP                       | 5.0                      |                                                  | 0                  | 0                                                            | ns   | 3-9         |

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

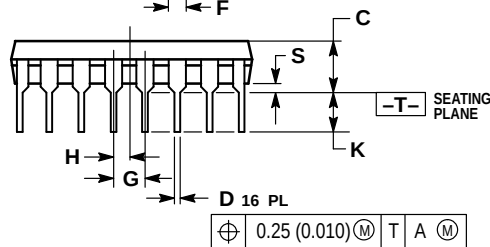
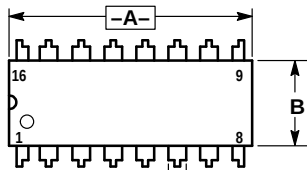
## CAPACITANCE

| 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 | 35           | pF   | V <sub>CC</sub> = 5.0 V |

# MC74AC112 MC74ACT112

## OUTLINE DIMENSIONS

### N SUFFIX PLASTIC DIP PACKAGE CASE 648-08 ISSUE R

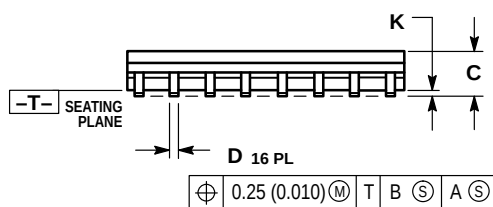
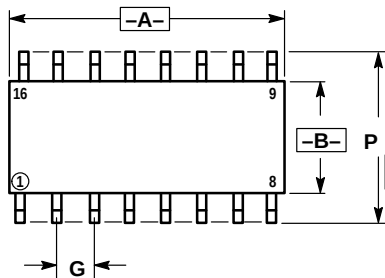


#### NOTES:

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  |

### D SUFFIX PLASTIC SOIC PACKAGE CASE 751B-05 ISSUE J



#### 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 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | 9.80        | 10.00 | 0.386     | 0.393 |
| B   | 3.80        | 4.00  | 0.150     | 0.157 |
| C   | 1.35        | 1.75  | 0.054     | 0.068 |
| D   | 0.35        | 0.49  | 0.014     | 0.019 |
| F   | 0.40        | 1.25  | 0.016     | 0.049 |
| G   | 1.27 BSC    |       | 0.050 BSC |       |
| J   | 0.19        | 0.25  | 0.008     | 0.009 |
| K   | 0.10        | 0.25  | 0.004     | 0.009 |
| M   | 0°          | 7°    | 0°        | 7°    |
| P   | 5.80        | 6.20  | 0.229     | 0.244 |
| R   | 0.25        | 0.50  | 0.010     | 0.019 |

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