



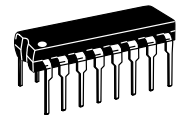
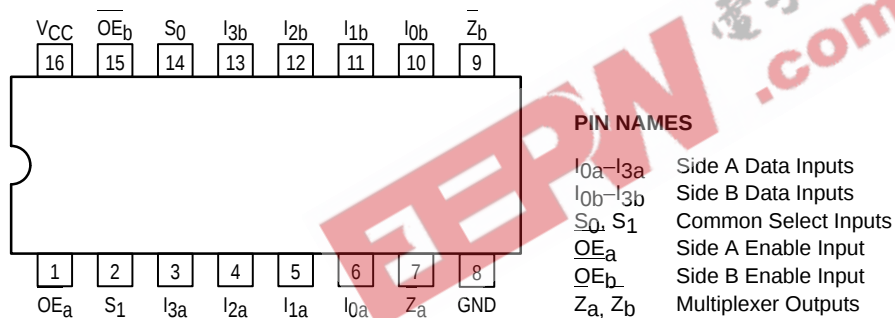
**MOTOROLA**

## MC74AC353 MC74ACT353

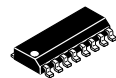
### Dual 4-Input Multiplexer with 3-State Outputs

The MC74AC353/74ACT353 is a dual 4-input multiplexer with 3-state outputs. It can select two bits of data from four sources using common Select inputs. The outputs may be individually switched to a high impedance state with a HIGH on the respective Output Enable (OE) inputs, allowing the outputs to interface directly with bus-oriented systems.

- Inverted Version of the MC74AC253/74ACT253
- Multifunction Capability
- Separate Enables for Each Multiplexer
- Outputs Source/Sink 24 mA
- 'ACT353 Has TTL Compatible Inputs



**N SUFFIX**  
CASE 648-08  
PLASTIC



**D SUFFIX**  
CASE 751B-05  
PLASTIC

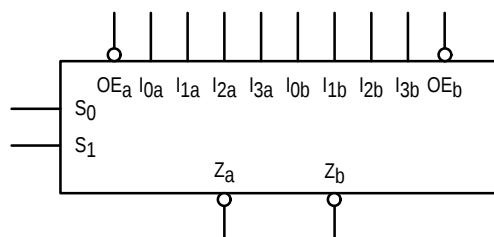
#### TRUTH TABLE

| Select Inputs |    | Data Inputs |    |    |    | Output Enable | Outputs |
|---------------|----|-------------|----|----|----|---------------|---------|
| S0            | S1 | I0          | I1 | I2 | I3 | OE            | Z       |
| X             | X  | X           | X  | X  | X  | H             | Z       |
| L             | L  | L           | X  | X  | X  | L             | H       |
| L             | L  | H           | X  | X  | X  | L             | L       |
| H             | L  | X           | L  | X  | X  | L             | H       |
| H             | L  | X           | H  | X  | X  | L             | L       |
| L             | H  | X           | X  | L  | X  | L             | H       |
| L             | H  | X           | X  | H  | X  | L             | L       |
| H             | H  | X           | X  | X  | L  | L             | H       |
| H             | H  | X           | X  | X  | H  | L             | L       |

Address inputs S0 and S1 are common to both sections.

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

#### LOGIC SYMBOL



## MC74AC353 MC74ACT353

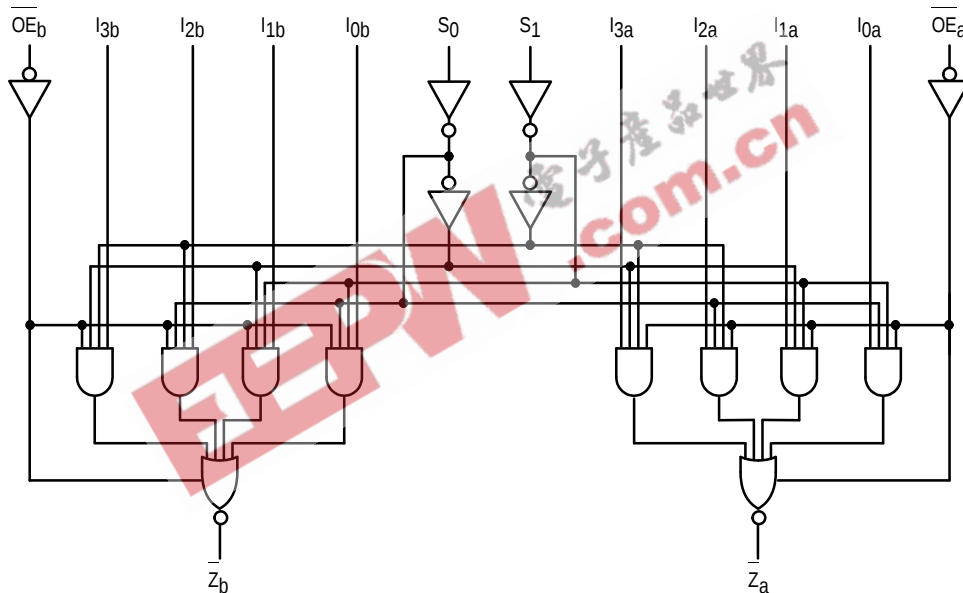
### FUNCTIONAL DESCRIPTION

The MC74AC353/74ACT353 contains two identical 4-input multiplexers with 3-state outputs. They select two bits from four sources selected by common Select inputs ( $S_0, S_1$ ). The 4-input multiplexers have individual Output Enable ( $\overline{OE}_a, \overline{OE}_b$ ) inputs which, when HIGH, force the outputs to a high impedance (High Z) state. The logic equations for the outputs are shown below:

$$\begin{aligned}\overline{Z}_a &= \overline{OE}_a \cdot (I_{0a} \cdot \overline{S_1} \cdot S_0 + I_{1a} \cdot \overline{S_1} \cdot S_0 + \\ &\quad I_{2a} \cdot S_1 \cdot S_0 + I_{3a} \cdot S_1 \cdot S_0) \\ \overline{Z}_b &= \overline{OE}_b \cdot (I_{0b} \cdot \overline{S_1} \cdot S_0 + I_{1b} \cdot \overline{S_1} \cdot S_0 + \\ &\quad I_{2b} \cdot S_1 \cdot S_0 + I_{3b} \cdot S_1 \cdot S_0)\end{aligned}$$

If the outputs of 3-state devices are tied together, all but one device must be in the high impedance state to avoid high currents that would exceed the maximum ratings. Designers should ensure that Output Enable signals to 3-state devices whose outputs are tied together are designed so that there is no overlap.

### LOGIC DIAGRAM



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

## MC74AC353 MC74ACT353

### 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                 | ±20                    | mA   |
| $I_{out}$ | DC Output Sink/Source Current, per Pin    | ±50                    | mA   |
| $I_{CC}$  | DC $V_{CC}$ or GND Current per Output Pin | ±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  | $V_{CC} @ 3.0\text{ V}$ | 150 |          | ns/V |
|                   |                                                                         | $V_{CC} @ 4.5\text{ V}$ | 40  |          |      |
|                   |                                                                         | $V_{CC} @ 5.5\text{ V}$ | 25  |          |      |
| $t_r, t_f$        | Input Rise and Fall Time (Note 2)<br>'ACT Devices except Schmitt Inputs | $V_{CC} @ 4.5\text{ V}$ | 10  |          | ns/V |
|                   |                                                                         | $V_{CC} @ 5.5\text{ V}$ | 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.

# MC74AC353 MC74ACT353

## 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>.

## MC74AC353 MC74ACT353

### 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          |      |             |
| t <sub>PLH</sub> | Propagation Delay<br>S <sub>N</sub> to Z <sub>N</sub> | 3.3<br>5.0               | 3.0<br>3.0                                       |     | 15.5<br>11.0 | 2.0<br>2.0                                                   | 17.5<br>12.5 | ns   | 3-6         |
| t <sub>PHL</sub> | Propagation Delay<br>S <sub>N</sub> to Z <sub>N</sub> | 3.3<br>5.0               | 3.0<br>3.0                                       |     | 16.0<br>11.5 | 2.0<br>2.0                                                   | 18.0<br>13.0 | ns   | 3-6         |
| t <sub>PLH</sub> | Propagation Delay<br>I <sub>N</sub> to Z <sub>N</sub> | 3.3<br>5.0               | 2.0<br>2.0                                       |     | 14.5<br>10.0 | 1.0<br>1.0                                                   | 17.0<br>11.5 | ns   | 3-6         |
| t <sub>PHL</sub> | Propagation Delay<br>I <sub>N</sub> to Z <sub>N</sub> | 3.3<br>5.0               | 2.0<br>2.0                                       |     | 13.0<br>9.5  | 1.0<br>1.0                                                   | 15.0<br>11.0 | ns   | 3-6         |
| t <sub>PZH</sub> | Output Enable Time                                    | 3.3<br>5.0               | 1.0<br>1.0                                       |     | 8.0<br>6.0   | 0.5<br>0.5                                                   | 8.5<br>6.5   | ns   | 3-7         |
| t <sub>PZL</sub> | Output Enable Time                                    | 3.3<br>5.0               | 1.0<br>1.0                                       |     | 8.0<br>6.0   | 0.5<br>0.5                                                   | 9.0<br>7.0   | ns   | 3-8         |
| t <sub>PHZ</sub> | Output Disable Time                                   | 3.3<br>5.0               | 2.0<br>2.0                                       |     | 9.5<br>8.0   | 1.0<br>1.0                                                   | 10.0<br>8.5  | ns   | 3-7         |
| t <sub>PLZ</sub> | Output Disable Time                                   | 3.3<br>5.0               | 2.0<br>2.0                                       |     | 8.0<br>7.0   | 1.0<br>1.0                                                   | 9.0<br>7.5   | 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.

# MC74AC353 MC74ACT353

## 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 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 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 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 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 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>OZ</sub>   | Maximum 3-State 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 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 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.

## MC74AC353 MC74ACT353

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

| Symbol           | Parameter                                             | V <sub>CC</sub> *<br>(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>S <sub>N</sub> to Z <sub>N</sub> | 5.0                      | 3.0                                              |     | 10.0 | 2.5                                                          | 11.5 | ns   | 3-6      |
| t <sub>PHL</sub> | Propagation Delay<br>S <sub>N</sub> to Z <sub>N</sub> | 5.0                      | 3.0                                              |     | 10.0 | 2.5                                                          | 11.5 | ns   | 3-6      |
| t <sub>PLH</sub> | Propagation Delay<br>I <sub>N</sub> to Z <sub>N</sub> | 5.0                      | 2.0                                              |     | 10.0 | 1.5                                                          | 11.0 | ns   | 3-6      |
| t <sub>PHL</sub> | Propagation Delay<br>I <sub>N</sub> to Z <sub>N</sub> | 5.0                      | 2.0                                              |     | 8.0  | 1.5                                                          | 9.0  | ns   | 3-6      |
| t <sub>PZH</sub> | Output Enable Time, OE <sub>N</sub> to Z <sub>N</sub> | 5.0                      | 1.0                                              |     | 7.0  | 1.0                                                          | 8.0  | ns   | 3-7      |
| t <sub>PZL</sub> | Output Enable Time                                    | 5.0                      | 1.0                                              |     | 7.5  | 1.0                                                          | 8.0  | ns   | 3-8      |
| t <sub>PHZ</sub> | Output Disable Time                                   | 5.0                      | 1.0                                              |     | 9.0  | 1.0                                                          | 10   | ns   | 3-7      |
| t <sub>PLZ</sub> | Output Disable Time                                   | 5.0                      | 1.0                                              |     | 7.0  | 1.0                                                          | 9.0  | ns   | 3-8      |

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

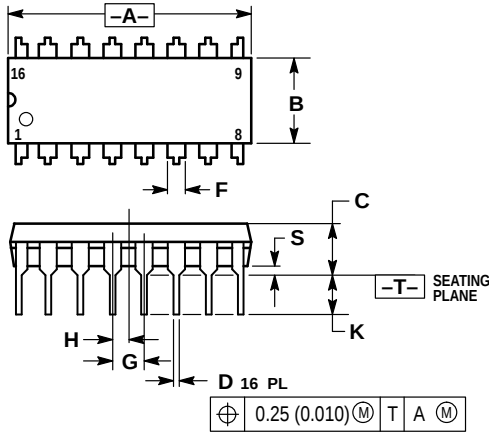
### CAPACITANCE

| 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 | 50           | pF   | V <sub>CC</sub> = 5.0 V |

# MC74AC353 MC74ACT353

## OUTLINE DIMENSIONS

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

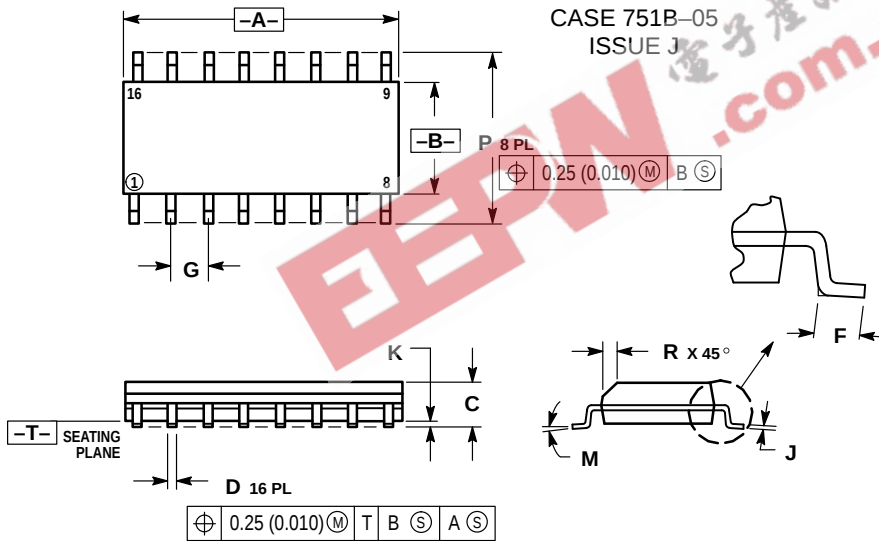


#### NOTES:

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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