

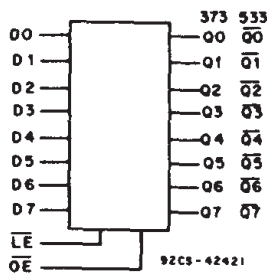


# THE DATASHEET OF CD74AC373E

# CD54/74AC373, CD54/74AC533 CD54/74ACT373, CD54/74ACT533



Data sheet acquired from Harris Semiconductor  
SCHS289



FUNCTIONAL DIAGRAM

## Octal Transparent Latch, 3-State

CD54/74AC/ACT373 - Non-Inverting

CD54/74AC/ACT533 - Inverting

### Type Features:

- Buffered inputs
- Typical propagation delay:  
4.3 ns @  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ ,  $C_L = 50\text{ pF}$

The RCA-CD54/74AC373 and CD54/74AC533 and the CD54/74ACT373 and CD54/74ACT533 octal transparent 3-state latches use the RCA ADVANCED CMOS technology. The outputs are transparent to the inputs when the Latch Enable ( $\overline{LE}$ ) is HIGH. When the Latch Enable ( $\overline{LE}$ ) goes LOW, the data is latched. The Output Enable ( $\overline{OE}$ ) controls the 3-state outputs. When the Output Enable ( $\overline{OE}$ ) is HIGH, the outputs are in the high-impedance state. The latch operation is independent of the state of the Output Enable.

The CD74AC/ACT373 and CD74AC/ACT533 are supplied in 20-lead dual-in-line plastic packages (E suffix) and in 20-lead dual-in-line small-outline plastic packages (M suffix). Both package types are operable over the following temperature ranges: Commercial (0 to  $70^\circ\text{C}$ ); Industrial ( $-40$  to  $+85^\circ\text{C}$ ); and Extended Industrial/Military ( $-55$  to  $+125^\circ\text{C}$ ).

The CD54AC/ACT373 and CD54AC/ACT533, available in chip form (H suffix), are operable over the  $-55$  to  $+125^\circ\text{C}$  temperature range.

### Family Features:

- Exceeds 2-kV ESD Protection - MIL-STD-883, Method 3015
- SCR-Latchup-resistant CMOS process and circuit design
- Speed of bipolar FAST<sup>®</sup>/AS/S with significantly reduced power consumption
- Balanced propagation delays
- AC types feature 1.5-V to 5.5-V operation and balanced noise immunity at 30% of the supply
- $\pm 24\text{-mA}$  output drive current
  - Fanout to 15 FAST<sup>®</sup> ICs
  - Drives 50-ohm transmission lines

\*FAST is a Registered Trademark of Fairchild Semiconductor Corp.

TRUTH TABLE

| Output Enable | Latch Enable | Data | AC/ACT373 Output | AC/ACT533 Output |
|---------------|--------------|------|------------------|------------------|
| L             | H            | H    | H                | L                |
| L             | H            | L    | L                | H                |
| L             | L            | I    | L                | H                |
| L             | L            | h    | H                | L                |
| H             | X            | X    | Z                | Z                |

Note:

L = Low voltage level  
H = High voltage level  
I = Low voltage level one set-up time prior to the high to low latch enable transition

h = High voltage level one set-up time prior to the high to low latch enable transition.  
X = Don't Care  
Z = High Impedance State

# Technical Data

## CD54/74AC373, CD54/74AC533 CD54/74ACT373, CD54/74ACT533

### MAXIMUM RATINGS, Absolute-Maximum Values:

|                                                                                                       |                                                     |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| DC SUPPLY-VOLTAGE ( $V_{CC}$ )                                                                        | -0.5 to 6 V                                         |
| DC INPUT DIODE CURRENT, $I_{IK}$ (for $V_i < -0.5$ V or $V_i > V_{CC} + 0.5$ V)                       | $\pm 20$ mA                                         |
| DC OUTPUT DIODE CURRENT, $I_{OK}$ (for $V_o < -0.5$ V or $V_o > V_{CC} + 0.5$ V)                      | $\pm 50$ mA                                         |
| DC OUTPUT SOURCE OR SINK CURRENT per Output Pin, $I_o$ (for $V_o > -0.5$ V or $V_o < V_{CC} + 0.5$ V) | $\pm 50$ mA                                         |
| DC $V_{CC}$ or GROUND CURRENT ( $I_{CC}$ or $I_{GND}$ )                                               | $\pm 100$ mA*                                       |
| POWER DISSIPATION PER PACKAGE ( $P_D$ ):                                                              |                                                     |
| For $T_A = -55$ to $+100^\circ\text{C}$ (PACKAGE TYPE E)                                              | 500 mW                                              |
| For $T_A = +100$ to $+125^\circ\text{C}$ (PACKAGE TYPE E)                                             | Derate Linearly at 8 mW/ $^\circ\text{C}$ to 300 mW |
| For $T_A = -55$ to $+70^\circ\text{C}$ (PACKAGE TYPE M)                                               | 400 mW                                              |
| For $T_A = +70$ to $+125^\circ\text{C}$ (PACKAGE TYPE M)                                              | Derate Linearly at 6 mW/ $^\circ\text{C}$ to 70 mW  |
| OPERATING-TEMPERATURE RANGE ( $T_A$ )                                                                 | -55 to $+125^\circ\text{C}$                         |
| STORAGE TEMPERATURE ( $T_{stg}$ )                                                                     | -65 to $+150^\circ\text{C}$                         |
| LEAD TEMPERATURE (DURING SOLDERING):                                                                  |                                                     |
| At distance 1/16 $\pm$ 1/32 in. (1.59 $\pm$ 0.79 mm) from case for 10 s maximum                       | $+265^\circ\text{C}$                                |
| Unit inserted into PC board min. thickness 1/16 in. (1.59 mm) with solder contacting lead tips only   | $+300^\circ\text{C}$                                |

\*For up to 4 outputs per device; add  $\pm 25$  mA for each additional output.

### RECOMMENDED OPERATING CONDITIONS:

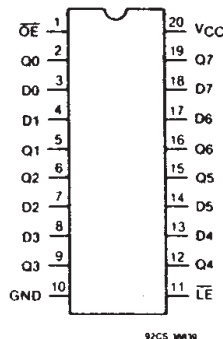
For maximum reliability, normal operating conditions should be selected so that operation is always within the following ranges:

| CHARACTERISTIC                                                                                                                        | LIMITS      |                | UNITS                |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------|----------------------|
|                                                                                                                                       | MIN.        | MAX.           |                      |
| Supply-Voltage Range, $V_{CC}$ *:<br>(For $T_A$ = Full Package-Temperature Range)<br>AC Types<br>ACT Types                            | 1.5<br>4.5  | 5.5<br>5.5     | V                    |
| DC Input or Output Voltage, $V_i$ , $V_o$                                                                                             | 0           | $V_{CC}$       | V                    |
| Operating Temperature, $T_A$                                                                                                          | -55         | +125           | $^\circ\text{C}$     |
| Input Rise and Fall Slew Rate, $dt/dv$<br>at 1.5 V to 3 V (AC Types)<br>at 3.6 V to 5.5 V (AC Types)<br>at 4.5 V to 5.5 V (ACT Types) | 0<br>0<br>0 | 50<br>20<br>10 | ns/V<br>ns/V<br>ns/V |

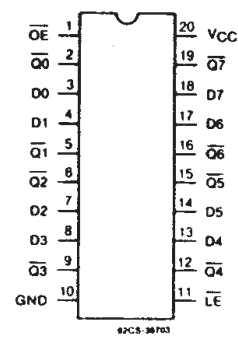
\*Unless otherwise specified, all voltages are referenced to ground.

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### TERMINAL ASSIGNMENT DIAGRAMS



CD54/74AC373, CD54/74ACT373



CD54/74AC533, CD54/74ACT533

# **CD54/74AC373, CD54/74AC533** **CD54/74ACT373, CD54/74ACT533**

**STATIC ELECTRICAL CHARACTERISTICS: AC Series**

| CHARACTERISTICS                                  | TEST CONDITIONS                                                                              |                        | V <sub>CC</sub><br>(V) | AMBIENT TEMPERATURE (T <sub>A</sub> ) - °C |      |            |      |             |      | UNITS |
|--------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------|------------------------|--------------------------------------------|------|------------|------|-------------|------|-------|
|                                                  |                                                                                              |                        |                        | +25                                        |      | -40 to +85 |      | -55 to +125 |      |       |
|                                                  | V <sub>I</sub><br>(V)                                                                        | I <sub>O</sub><br>(mA) |                        | MIN.                                       | MAX. | MIN.       | MAX. | MIN.        | MAX. |       |
| High-Level Input Voltage<br>V <sub>IH</sub>      |                                                                                              |                        | 1.5                    | 1.2                                        | —    | 1.2        | —    | 1.2         | —    | V     |
|                                                  |                                                                                              |                        | 3                      | 2.1                                        | —    | 2.1        | —    | 2.1         | —    |       |
|                                                  |                                                                                              |                        | 5.5                    | 3.85                                       | —    | 3.85       | —    | 3.85        | —    |       |
| Low-Level Input Voltage<br>V <sub>IL</sub>       |                                                                                              |                        | 1.5                    | —                                          | 0.3  | —          | 0.3  | —           | 0.3  | V     |
|                                                  |                                                                                              |                        | 3                      | —                                          | 0.9  | —          | 0.9  | —           | 0.9  |       |
|                                                  |                                                                                              |                        | 5.5                    | —                                          | 1.65 | —          | 1.65 | —           | 1.65 |       |
| High-Level Output Voltage<br>V <sub>OH</sub>     | V <sub>IH</sub><br>or<br>V <sub>IL</sub>                                                     | -0.05                  | 1.5                    | 1.4                                        | —    | 1.4        | —    | 1.4         | —    | V     |
|                                                  |                                                                                              | -0.05                  | 3                      | 2.9                                        | —    | 2.9        | —    | 2.9         | —    |       |
|                                                  |                                                                                              | -0.05                  | 4.5                    | 4.4                                        | —    | 4.4        | —    | 4.4         | —    |       |
|                                                  |                                                                                              | -4                     | 3                      | 2.58                                       | —    | 2.48       | —    | 2.4         | —    |       |
|                                                  |                                                                                              | -24                    | 4.5                    | 3.94                                       | —    | 3.8        | —    | 3.7         | —    |       |
|                                                  | #, *                                                                                         | -75                    | 5.5                    | —                                          | —    | 3.85       | —    | —           | —    |       |
|                                                  |                                                                                              | -50                    | 5.5                    | —                                          | —    | —          | —    | 3.85        | —    |       |
| Low-Level Output Voltage<br>V <sub>OL</sub>      | V <sub>IH</sub><br>or<br>V <sub>IL</sub>                                                     | 0.05                   | 1.5                    | —                                          | 0.1  | —          | 0.1  | —           | 0.1  | V     |
|                                                  |                                                                                              | 0.05                   | 3                      | —                                          | 0.1  | —          | 0.1  | —           | 0.1  |       |
|                                                  |                                                                                              | 0.05                   | 4.5                    | —                                          | 0.1  | —          | 0.1  | —           | 0.1  |       |
|                                                  |                                                                                              | 12                     | 3                      | —                                          | 0.36 | —          | 0.44 | —           | 0.5  |       |
|                                                  |                                                                                              | 24                     | 4.5                    | —                                          | 0.36 | —          | 0.44 | —           | 0.5  |       |
|                                                  | #, *                                                                                         | 75                     | 5.5                    | —                                          | —    | —          | 1.65 | —           | —    |       |
|                                                  |                                                                                              | 50                     | 5.5                    | —                                          | —    | —          | —    | —           | 1.65 |       |
| Input Leakage Current<br>I <sub>I</sub>          | V <sub>CC</sub><br>or<br>GND                                                                 |                        | 5.5                    | —                                          | ±0.1 | —          | ±1   | —           | ±1   | μA    |
| 3-State Leakage Current<br>I <sub>OZ</sub>       | V <sub>IH</sub><br>or<br>V <sub>IL</sub><br>V <sub>O</sub> =<br>V <sub>CC</sub><br>or<br>GND |                        | 5.5                    | —                                          | ±0.5 | —          | ±5   | —           | ±10  | μA    |
| Quiescent Supply Current, MSI<br>I <sub>CC</sub> | V <sub>CC</sub><br>or<br>GND                                                                 | 0                      | 5.5                    | —                                          | 8    | —          | 80   | —           | 160  | μA    |

#Test one output at a time for a 1-second maximum duration. Measurement is made by forcing current and measuring voltage to minimize power dissipation.

\*Test verifies a minimum 50-ohm transmission-line-drive capability at +85°C, 75 ohms at +125°C.

Technical Data

# CD54/74AC373, CD54/74AC533 CD54/74ACT373, CD54/74ACT533

## STATIC ELECTRICAL CHARACTERISTICS: ACT Series

| CHARACTERISTICS                                                                     |                  | TEST CONDITIONS                                                               |                        | V <sub>CC</sub><br>(V) | AMBIENT TEMPERATURE (T <sub>A</sub> ) - °C |      |            |      |             |      | UNITS |
|-------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------|------------------------|------------------------|--------------------------------------------|------|------------|------|-------------|------|-------|
|                                                                                     |                  |                                                                               |                        |                        | +25                                        |      | -40 to +85 |      | -55 to +125 |      |       |
|                                                                                     |                  | V <sub>I</sub><br>(V)                                                         | I <sub>O</sub><br>(mA) |                        | MIN.                                       | MAX. | MIN.       | MAX. | MIN.        | MAX. |       |
| High-Level Input Voltage                                                            | V <sub>IH</sub>  |                                                                               |                        | 4.5 to 5.5             | 2                                          | —    | 2          | —    | 2           | —    | V     |
| Low-Level Input Voltage                                                             | V <sub>IL</sub>  |                                                                               |                        | 4.5 to 5.5             | —                                          | 0.8  | —          | 0.8  | —           | 0.8  | V     |
| High-Level Output Voltage                                                           | V <sub>OH</sub>  | V <sub>IH</sub> or V <sub>IL</sub><br># , * {                                 | -0.05                  | 4.5                    | 4.4                                        | —    | 4.4        | —    | 4.4         | —    | V     |
|                                                                                     |                  |                                                                               | -24                    | 4.5                    | 3.94                                       | —    | 3.8        | —    | 3.7         | —    |       |
|                                                                                     |                  |                                                                               | -75                    | 5.5                    | —                                          | —    | 3.85       | —    | —           | —    |       |
|                                                                                     |                  |                                                                               | -50                    | 5.5                    | —                                          | —    | —          | —    | 3.85        | —    |       |
| Low-Level Output Voltage                                                            | V <sub>OL</sub>  | V <sub>IH</sub> or V <sub>IL</sub><br># , * {                                 | 0.05                   | 4.5                    | —                                          | 0.1  | —          | 0.1  | —           | 0.1  | V     |
|                                                                                     |                  |                                                                               | 24                     | 4.5                    | —                                          | 0.36 | —          | 0.44 | —           | 0.5  |       |
|                                                                                     |                  |                                                                               | 75                     | 5.5                    | —                                          | —    | —          | 1.65 | —           | —    |       |
|                                                                                     |                  |                                                                               | 50                     | 5.5                    | —                                          | —    | —          | —    | —           | 1.65 |       |
| Input Leakage Current                                                               | I <sub>I</sub>   | V <sub>CC</sub> or GND                                                        |                        | 5.5                    | —                                          | ±0.1 | —          | ±1   | —           | ±1   | μA    |
| 3-State Leakage Current                                                             | I <sub>OZ</sub>  | V <sub>IH</sub> or V <sub>IL</sub><br>V <sub>O</sub> = V <sub>CC</sub> or GND |                        | 5.5                    | —                                          | ±0.5 | —          | ±5   | —           | ±10  | μA    |
| Quiescent Supply Current, MSI                                                       | I <sub>CC</sub>  | V <sub>CC</sub> or GND                                                        | 0                      | 5.5                    | —                                          | 8    | —          | 80   | —           | 160  | μA    |
| Additional Quiescent Supply Current per Input Pin<br>TTL Inputs High<br>1 Unit Load | ΔI <sub>CC</sub> | V <sub>CC</sub> -2.1                                                          |                        | 4.5 to 5.5             | —                                          | 2.4  | —          | 2.8  | —           | 3    | mA    |

#Test one output at a time for a 1-second maximum duration. Measurement is made by forcing current and measuring voltage to minimize power dissipation.

\*Test verifies a minimum 50-ohm transmission-line-drive capability at +85°C, 75 ohms at +125°C.

ACT INPUT LOADING TABLE

| INPUT           | UNIT LOAD* |        |
|-----------------|------------|--------|
|                 | ACT373     | ACT533 |
| $\overline{OE}$ | 0.87       | 0.87   |
| $\overline{Dn}$ | 0.5        | 0.5    |
| $\overline{LE}$ | 0.8        | 0.8    |

\*Unit load is  $\Delta I_{CC}$  limit specified in Static Characteristics Chart, e.g., 2.4 mA max. @ 25°C.

# **CD54/74AC373, CD54/74AC533** **CD54/74ACT373, CD54/74ACT533**

**PREREQUISITE FOR SWITCHING: AC Series**

| CHARACTERISTICS          | SYMBOL          | V <sub>CC</sub><br>(V) | AMBIENT TEMPERATURE (T <sub>A</sub> ) - °C |             |                |             | UNITS |
|--------------------------|-----------------|------------------------|--------------------------------------------|-------------|----------------|-------------|-------|
|                          |                 |                        | -40 to +85                                 |             | -55 to +125    |             |       |
|                          |                 |                        | MIN.                                       | MAX.        | MIN.           | MAX.        |       |
| LE Pulse Width           | t <sub>w</sub>  | 1.5<br>3.3*<br>5†      | 44<br>4.9<br>3.5                           | —<br>—<br>— | 50<br>5.6<br>4 | —<br>—<br>— | ns    |
| Setup Time<br>Data to LE | t <sub>su</sub> | 1.5<br>3.3<br>5        | 2<br>2<br>2                                | —<br>—<br>— | 2<br>2<br>2    | —<br>—<br>— | ns    |
| Hold Time<br>Data to LE  | t <sub>H</sub>  | 1.5<br>3.3<br>5        | 33<br>3.7<br>2.6                           | —<br>—<br>— | 38<br>4.2<br>3 | —<br>—<br>— | ns    |

\*3.3 V: min. is @ 3 V

†5 V: min. is @ 4.5 V

**SWITCHING CHARACTERISTICS: AC Series; t<sub>r</sub>, t<sub>f</sub> = 3 ns, C<sub>L</sub> = 50 pF**

| CHARACTERISTICS                                                                                         | SYMBOL                               | V <sub>CC</sub><br>(V) | AMBIENT TEMPERATURE (T <sub>A</sub> ) - °C |                     |                 |                     | UNITS |
|---------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------|--------------------------------------------|---------------------|-----------------|---------------------|-------|
|                                                                                                         |                                      |                        | -40 to +85                                 |                     | -55 to +125     |                     |       |
|                                                                                                         |                                      |                        | MIN.                                       | MAX.                | MIN.            | MAX.                |       |
| Propagation Delays:<br>Data to Qn<br>373                                                                | t <sub>PLH</sub><br>t <sub>PHL</sub> | 1.5<br>3.3*<br>5†      | —<br>3.1<br>2.2                            | 96<br>10.8<br>7.7   | —<br>3<br>2.1   | 106<br>11.9<br>8.5  | ns    |
| 533                                                                                                     | t <sub>PLH</sub><br>t <sub>PHL</sub> | 1.5<br>3.3<br>5        | —<br>3.8<br>2.7                            | 119<br>13.4<br>9.5  | —<br>3.7<br>2.6 | 131<br>14.7<br>10.5 | ns    |
| LE on Qn<br>373                                                                                         | t <sub>PLH</sub><br>t <sub>PHL</sub> | 1.5<br>3.3<br>5        | —<br>4.3<br>3.1                            | 136<br>15.2<br>10.9 | —<br>4.2<br>3   | 150<br>16.8<br>12   | ns    |
| 533                                                                                                     | t <sub>PLH</sub><br>t <sub>PHL</sub> | 1.5<br>3.3<br>5        | —<br>4.3<br>3.1                            | 136<br>15.3<br>10.9 | —<br>4.2<br>3   | 150<br>16.8<br>12   | ns    |
| Output Enable Times                                                                                     | t <sub>PZL</sub><br>t <sub>PZH</sub> | 1.5<br>3.3<br>5        | —<br>4.1<br>2.7                            | 119<br>14.4<br>9.5  | —<br>4<br>2.6   | 131<br>15.8<br>10.5 | ns    |
| Output Disable Times                                                                                    | t <sub>PLZ</sub><br>t <sub>PHZ</sub> | 1.5<br>3.3<br>5        | —<br>3.7<br>3                              | 131<br>13.1<br>10.5 | —<br>3.6<br>2.9 | 144<br>14.4<br>11.5 | ns    |
| Power Dissipation Capacitance                                                                           | C <sub>PD</sub> §                    | —                      | 63 Typ.                                    |                     | 63 Typ.         |                     | pF    |
| Min. (Valley) V <sub>OH</sub><br>During Switching of Other Outputs<br>(Output Under Test Not Switching) | V <sub>OHV</sub><br>See Fig. 1       | 5                      | 4 Typ. @ 25°C                              |                     |                 |                     | V     |
| Max. (Peak) V <sub>OL</sub><br>During Switching of Other Outputs<br>(Output Under Test Not Switching)   | V <sub>OLP</sub><br>See Fig. 1       | 5                      | 1 Typ. @ 25°C                              |                     |                 |                     | V     |
| Input Capacitance                                                                                       | C <sub>I</sub>                       | —                      | —                                          | 10                  | —               | 10                  | pF    |
| 3-State Output Capacitance                                                                              | C <sub>O</sub>                       | —                      | —                                          | 15                  | —               | 15                  | pF    |

\*3.3 V: min. is @ 3.6 V  
max. is @ 3 V

†5 V: min. is @ 5.5 V  
max. is @ 4.5 V

§C<sub>PD</sub> is used to determine the dynamic power consumption, per latch.

P<sub>D</sub> = V<sub>CC</sub><sup>2</sup> f<sub>i</sub> (C<sub>PD</sub> + C<sub>L</sub>) where f<sub>i</sub> = input frequency

C<sub>L</sub> = output load capacitance

V<sub>CC</sub> = supply voltage.

Technical Data

# CD54/74AC373, CD54/74AC533 CD54/74ACT373, CD54/74ACT533

**PREREQUISITE FOR SWITCHING: ACT Series**

| CHARACTERISTICS          | SYMBOL          | V <sub>CC</sub><br>(V) | AMBIENT TEMPERATURE (T <sub>A</sub> ) -°C |      |             |      | UNITS |
|--------------------------|-----------------|------------------------|-------------------------------------------|------|-------------|------|-------|
|                          |                 |                        | -40 to +85                                |      | -55 to +125 |      |       |
|                          |                 |                        | MIN.                                      | MAX. | MIN.        | MAX. |       |
| LE Pulse Width           | t <sub>w</sub>  | 5†                     | 3.6                                       | —    | 4           | —    | ns    |
| Setup Time<br>Data to LE | t <sub>su</sub> | 5                      | 2                                         | —    | 2           | —    | ns    |
| Hold Time<br>Data to LE  | t <sub>H</sub>  | 5                      | 2.7                                       | —    | 3           | —    | ns    |

†5 V: min. is @ 4.5 V

**SWITCHING CHARACTERISTICS: ACT Series; t<sub>r</sub>, t<sub>f</sub> = 3 ns, C<sub>L</sub> = 50 pF**

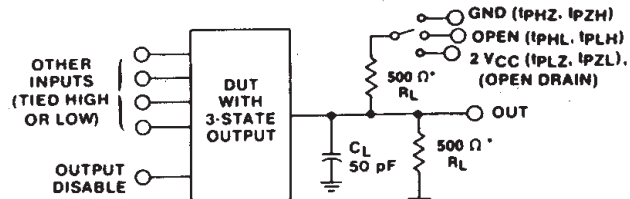
| CHARACTERISTICS                                                                                         | SYMBOL                               | V <sub>CC</sub><br>(V) | AMBIENT TEMPERATURE (T <sub>A</sub> ) -°C |      |             |      | UNITS |
|---------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------|-------------------------------------------|------|-------------|------|-------|
|                                                                                                         |                                      |                        | -40 to +85                                |      | -55 to +125 |      |       |
|                                                                                                         |                                      |                        | MIN.                                      | MAX. | MIN.        | MAX. |       |
| Propagation Delays:<br>Data to Q <sub>n</sub><br>373                                                    | t <sub>PLH</sub>                     | 5†                     | 2.7                                       | 9.5  | 2.6         | 10.4 | ns    |
| 533                                                                                                     | t <sub>PHL</sub>                     |                        | 3                                         | 10.4 | 2.9         | 11.4 |       |
| LE to Q <sub>n</sub><br>373<br>533                                                                      | t <sub>PLH</sub><br>t <sub>PHL</sub> | 5                      | 3.1                                       | 11.4 | 3           | 12.5 | ns    |
| Output Enable Times                                                                                     | t <sub>PZL</sub><br>t <sub>PZH</sub> | 5                      | 3.5                                       | 12.3 | 3.4         | 13.5 | ns    |
| Output Disable Times                                                                                    | t <sub>PLZ</sub><br>t <sub>PHZ</sub> | 5                      | 3.2                                       | 11.4 | 3.1         | 12.5 | ns    |
| Power Dissipation Capacitance                                                                           | C <sub>PD</sub> §                    | —                      | 63 Typ.                                   |      | 63 Typ.     |      | pF    |
| Min. (Valley) V <sub>OH</sub><br>During Switching of Other Outputs<br>(Output Under Test Not Switching) | V <sub>OHV</sub><br>See Fig. 1       | 5                      | 4 Typ. @ 25°C                             |      |             |      | V     |
| Max. (Peak) V <sub>OL</sub><br>During Switching of Other Outputs<br>(Output Under Test Not Switching)   | V <sub>OLP</sub><br>See Fig. 1       | 5                      | 1 Typ. @ 25°C                             |      |             |      | V     |
| Input Capacitance                                                                                       | C <sub>I</sub>                       | —                      | —                                         | 10   | —           | 10   | pF    |
| 3-State Output Capacitance                                                                              | C <sub>O</sub>                       | —                      | —                                         | 15   | —           | 15   | pF    |

†5 V: min. is @ 5.5 V  
max. is @ 4.5 V

§C<sub>PD</sub> is used to determine the dynamic power consumption, per latch.

$P_D = V_{CC}^2 f_i (C_{PD} + C_L) + V_{CC} \Delta I_{CC}$  where  $f_i$  = input frequency  
C<sub>L</sub> = output load capacitance  
V<sub>CC</sub> = supply voltage.

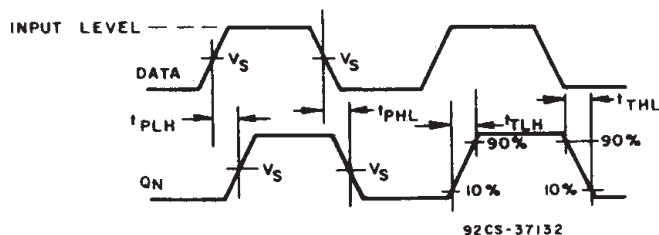
1.  $V_{OHV}$  AND  $V_{OLP}$  ARE MEASURED WITH RESPECT TO A GROUND REFERENCE NEAR THE OUTPUT UNDER TEST.
2. INPUT PULSES HAVE THE FOLLOWING CHARACTERISTICS:  
 $PRR \leq 1 \text{ MHz}$ ,  $t_r \leq 3 \text{ ns}$ ,  $t_f \leq 3 \text{ ns}$ , SKEW  $1 \text{ ns}$ .
3. R.F. FIXTURE WITH 700-MHz DESIGN RULES REQUIRED.  
 IC SHOULD BE SOLDERED INTO TEST BOARD AND BYPASSED WITH  $0.1 \mu\text{F}$  CAPACITOR. SCOPE AND PROBES REQUIRE 700-MHz BANDWIDTH.



\*FOR AC SERIES ONLY: WHEN  $V_{CC} = 1.5 \text{ V}$ ,  $R_L = 1 \text{ k}\Omega$

92CM-42405

**Fig. 2 - Three-state propagation delay waveforms and test circuit.**

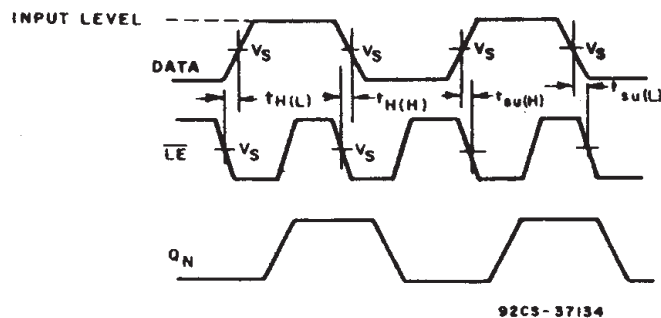


The timing diagram illustrates the relationship between the Input Level, Data, and the output signal  $Q_N$ . The Input Level signal is shown as a square wave with a high level  $V_S$  and a low level  $V$ . The Data signal is also a square wave with a high level  $V_S$  and a low level  $V$ . The output signal  $Q_N$  is a square wave that transitions from low to high when the Input Level transitions from low to high, and from high to low when the Input Level transitions from high to low. The timing parameters are defined as follows:

- $V_S$ : Supply voltage level.
- $V$ : Input signal level.
- $t_w$ : Width of the input pulse.
- $t_{PLH}$ : Propagation delay from the input rising edge to the output rising edge.
- $t_{PHL}$ : Propagation delay from the input falling edge to the output falling edge.

92CS-37133

**Fig. 4 - Latch enable propagation delays.**



|                                          | CD54/74AC           | CD54/74ACT          |
|------------------------------------------|---------------------|---------------------|
| Input Level                              | V <sub>CC</sub>     | 3 V                 |
| Input Switching Voltage, V <sub>s</sub>  | 0.5 V <sub>CC</sub> | 1.5 V               |
| Output Switching Voltage, V <sub>s</sub> | 0.5 V <sub>CC</sub> | 0.5 V <sub>CC</sub> |

## PACKAGING INFORMATION

| Orderable Device | Status<br>(1) | Package Type | Package<br>Drawing | Pins | Package<br>Qty | Eco Plan<br>(2)            | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|--------------------|------|----------------|----------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| CD54AC373F3A     | ACTIVE        | CDIP         | J                  | 20   | 1              | TBD                        | A42                     | N / A for Pkg Type   | -55 to 125   | CD54AC373F3A            | <a href="#">Samples</a> |
| CD54ACT373F3A    | ACTIVE        | CDIP         | J                  | 20   | 1              | TBD                        | A42                     | N / A for Pkg Type   | -55 to 125   | CD54ACT373F3A           | <a href="#">Samples</a> |
| CD74AC373E       | ACTIVE        | PDIP         | N                  | 20   | 20             | Pb-Free<br>(RoHS)          | CU NIPDAU               | N / A for Pkg Type   | -55 to 125   | CD74AC373E              | <a href="#">Samples</a> |
| CD74AC373M       | ACTIVE        | SOIC         | DW                 | 20   | 25             | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -55 to 125   | AC373M                  | <a href="#">Samples</a> |
| CD74AC373M96     | ACTIVE        | SOIC         | DW                 | 20   | 2000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -55 to 125   | AC373M                  | <a href="#">Samples</a> |
| CD74ACT373E      | ACTIVE        | PDIP         | N                  | 20   | 20             | Pb-Free<br>(RoHS)          | CU NIPDAU               | N / A for Pkg Type   | -55 to 125   | CD74ACT373E             | <a href="#">Samples</a> |
| CD74ACT373EE4    | ACTIVE        | PDIP         | N                  | 20   | 20             | Pb-Free<br>(RoHS)          | CU NIPDAU               | N / A for Pkg Type   | -55 to 125   | CD74ACT373E             | <a href="#">Samples</a> |
| CD74ACT373M      | ACTIVE        | SOIC         | DW                 | 20   | 25             | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -55 to 125   | ACT373M                 | <a href="#">Samples</a> |
| CD74ACT373M96    | ACTIVE        | SOIC         | DW                 | 20   | 2000           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -55 to 125   | ACT373M                 | <a href="#">Samples</a> |
| CD74ACT373MG4    | ACTIVE        | SOIC         | DW                 | 20   | 25             | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -55 to 125   | ACT373M                 | <a href="#">Samples</a> |

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

- <sup>(4)</sup> There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.
- <sup>(5)</sup> Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "-" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.
- <sup>(6)</sup> Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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**OTHER QUALIFIED VERSIONS OF CD54AC373, CD54ACT373, CD74AC373, CD74ACT373 :**

- Catalog: [CD74AC373](#), [CD74ACT373](#)
- Military: [CD54AC373](#), [CD54ACT373](#)

**NOTE: Qualified Version Definitions:**

- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

**TAPE AND REEL INFORMATION**


\*All dimensions are nominal

| Device        | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| CD74AC373M96  | SOIC         | DW              | 20   | 2000 | 330.0              | 24.4               | 10.8    | 13.0    | 2.7     | 12.0    | 24.0   | Q1            |
| CD74ACT373M96 | SOIC         | DW              | 20   | 2000 | 330.0              | 24.4               | 10.8    | 13.0    | 2.7     | 12.0    | 24.0   | Q1            |

## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

| Device        | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|---------------|--------------|-----------------|------|------|-------------|------------|-------------|
| CD74AC373M96  | SOIC         | DW              | 20   | 2000 | 367.0       | 367.0      | 45.0        |
| CD74ACT373M96 | SOIC         | DW              | 20   | 2000 | 367.0       | 367.0      | 45.0        |

J (R-GDIP-T\*\*)

14 LEADS SHOWN

# CERAMIC DUAL IN-LINE PACKAGE



| PINS **<br>DIM | 14                     | 16                     | 18                     | 20                     |
|----------------|------------------------|------------------------|------------------------|------------------------|
| A              | 0.300<br>(7,62)<br>BSC | 0.300<br>(7,62)<br>BSC | 0.300<br>(7,62)<br>BSC | 0.300<br>(7,62)<br>BSC |
| B MAX          | 0.785<br>(19,94)       | .840<br>(21,34)        | 0.960<br>(24,38)       | 1.060<br>(26,92)       |
| B MIN          | —                      | —                      | —                      | —                      |
| C MAX          | 0.300<br>(7,62)        | 0.300<br>(7,62)        | 0.310<br>(7,87)        | 0.300<br>(7,62)        |
| C MIN          | 0.245<br>(6,22)        | 0.245<br>(6,22)        | 0.220<br>(5,59)        | 0.245<br>(6,22)        |



4040083/F 03/03

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package is hermetically sealed with a ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
  - E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

## N (R-PDIP-T\*\*)

16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



| PINS **             | 14               | 16               | 18               | 20               |
|---------------------|------------------|------------------|------------------|------------------|
| DIM                 |                  |                  |                  |                  |
| A MAX               | 0.775<br>(19,69) | 0.775<br>(19,69) | 0.920<br>(23,37) | 1.060<br>(26,92) |
| A MIN               | 0.745<br>(18,92) | 0.745<br>(18,92) | 0.850<br>(21,59) | 0.940<br>(23,88) |
| MS-001<br>VARIATION | AA               | BB               | AC               | AD               |



14/18 Pin Only  
20 Pin vendor option

4040049/E 12/2002

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
  - The 20 pin end lead shoulder width is a vendor option, either half or full width.



4220724/A 05/2016

## NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm per side.
5. Reference JEDEC registration MS-013.

# EXAMPLE BOARD LAYOUT

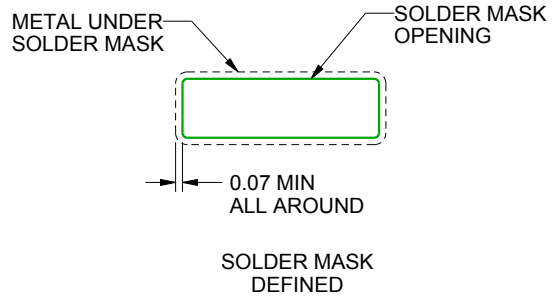
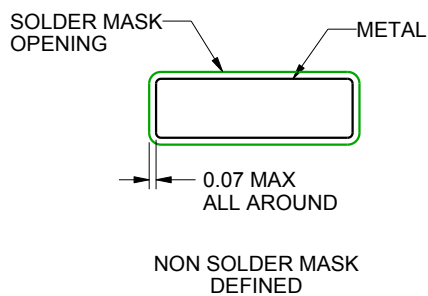
DW0020A

SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE  
SCALE:6X



SOLDER MASK DETAILS

4220724/A 05/2016

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

## EXAMPLE STENCIL DESIGN

DW0020A

SOIC - 2.65 mm max height

SOIC



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:6X

4220724/A 05/2016

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

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