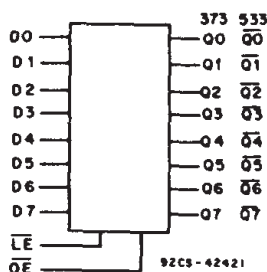


# CD54/74AC373, CD54/74AC533 CD54/74ACT373, CD54/74ACT533



Data sheet acquired from Harris Semiconductor  
SCHS289



## Octal Transparent Latch, 3-State

CD54/74AC/ACT373 - Non-Inverting

CD54/74AC/ACT533 - Inverting

### Type Features:

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

### FUNCTIONAL DIAGRAM

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:

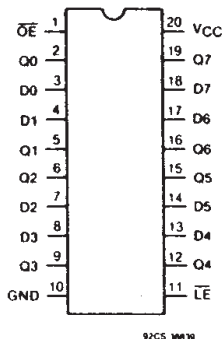
For maximum reliability, normal operating conditions should be selected so that operation is always within the following ranges:

| 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 |

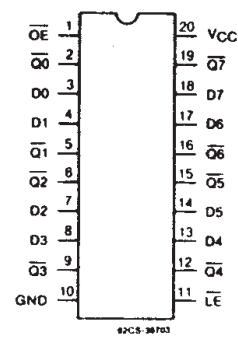
\*Unless otherwise specified, all voltages are referenced to ground.

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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 Data to LE | t <sub>su</sub> | 5                      | 2                                         | —    | 2           | —    | ns    |
| Hold Time 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

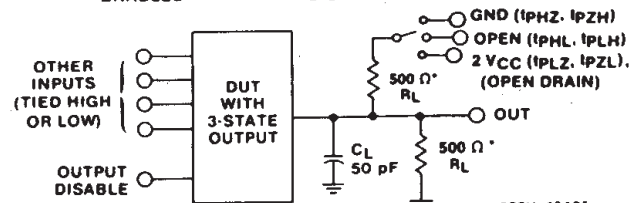
§C<sub>PD</sub> is used to determine the dynamic power consumption, per latch.

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

9

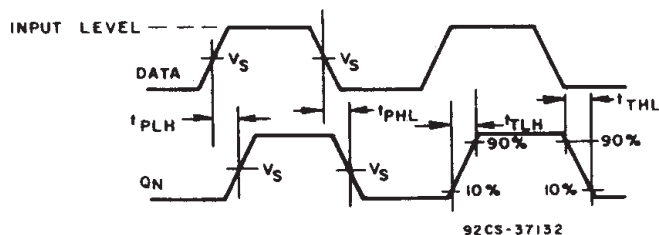
The diagram shows two sets of waveforms. The top set, labeled "OTHER OUTPUTS", shows a solid line switching between  $V_{OH}$  and  $V_{OL}$  levels, with dashed lines indicating the transition region. The bottom set, labeled "OUTPUT UNDER TEST", shows a solid line with a glitch during a transition, with dashed lines indicating the expected levels  $V_{OLP}$  and  $V_{OL}$ .

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:  
 $PRR \leq 1 \text{ MHz}$ ,  $t_r = 3 \text{ ns}$ ,  $t_f = 3 \text{ ns}$ ,  $SKW \leq 1 \text{ ns}$ .
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.



92CM-42405

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

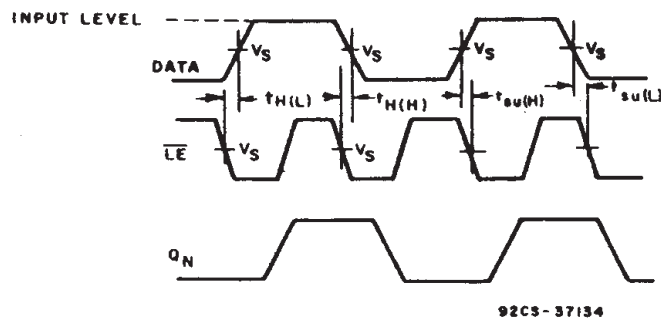


The timing diagram illustrates the relationship between the Input Level, Data, and the output  $Q_N$ . The Input Level signal is shown as a series of pulses. The Data signal is shown as a signal that changes during the pulse of the Input Level. The output  $Q_N$  is shown as a signal that changes at the rising and falling edges of the Input Level. The timing parameters are defined as follows:

- $t_W$ : Width of the Input Level pulse.
- $t_{PLH}$ : Propagation delay from the rising edge of the Input Level to the rising edge of  $Q_N$ .
- $t_{PHL}$ : Propagation delay from the falling edge of the Input Level to the falling edge of  $Q_N$ .

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> |
| CD54ACT533F3A    | OBSOLETE      | CDIP         | J                  | 20   |                | TBD                     | Call TI                 | Call TI              | -55 to 125   |                         |                         |
| CD74AC373E       | ACTIVE        | PDIP         | N                  | 20   | 20             | Pb-Free (RoHS)          | CU NIPDAU               | N / A for Pkg Type   | -55 to 125   | CD74AC373E              | <a href="#">Samples</a> |
| CD74AC373M       | ACTIVE        | SOIC         | DW                 | 20   | 25             | Green (RoHS & 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 & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -55 to 125   | AC373M                  | <a href="#">Samples</a> |
| CD74AC373MG4     | ACTIVE        | SOIC         | DW                 | 20   | 25             | Green (RoHS & 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 (RoHS)          | CU NIPDAU               | N / A for Pkg Type   | -55 to 125   | CD74ACT373E             | <a href="#">Samples</a> |
| CD74ACT373EE4    | ACTIVE        | PDIP         | N                  | 20   | 20             | Pb-Free (RoHS)          | CU NIPDAU               | N / A for Pkg Type   | -55 to 125   | CD74ACT373E             | <a href="#">Samples</a> |
| CD74ACT373M      | ACTIVE        | SOIC         | DW                 | 20   | 25             | Green (RoHS & 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 & no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -55 to 125   | ACT373M                 | <a href="#">Samples</a> |
| CD74ACT373M96E4  | ACTIVE        | SOIC         | DW                 | 20   | 2000           | Green (RoHS & 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 & 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) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> 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 **<br>DIM      | 14               | 16               | 18               | 20               |
|---------------------|------------------|------------------|------------------|------------------|
| 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               |



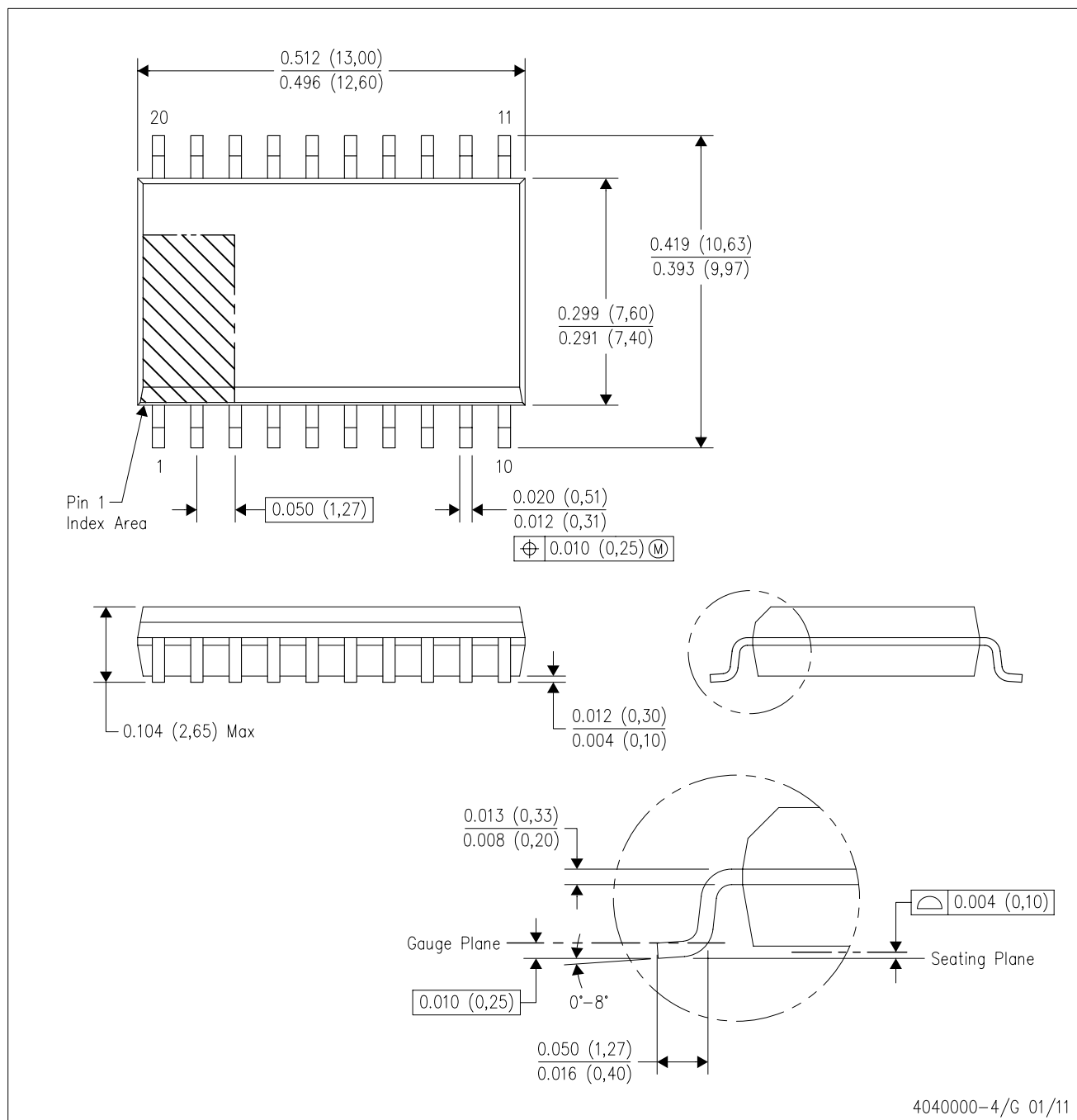
4040049/E 12/2002

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.

DW (R-PDSO-G20)

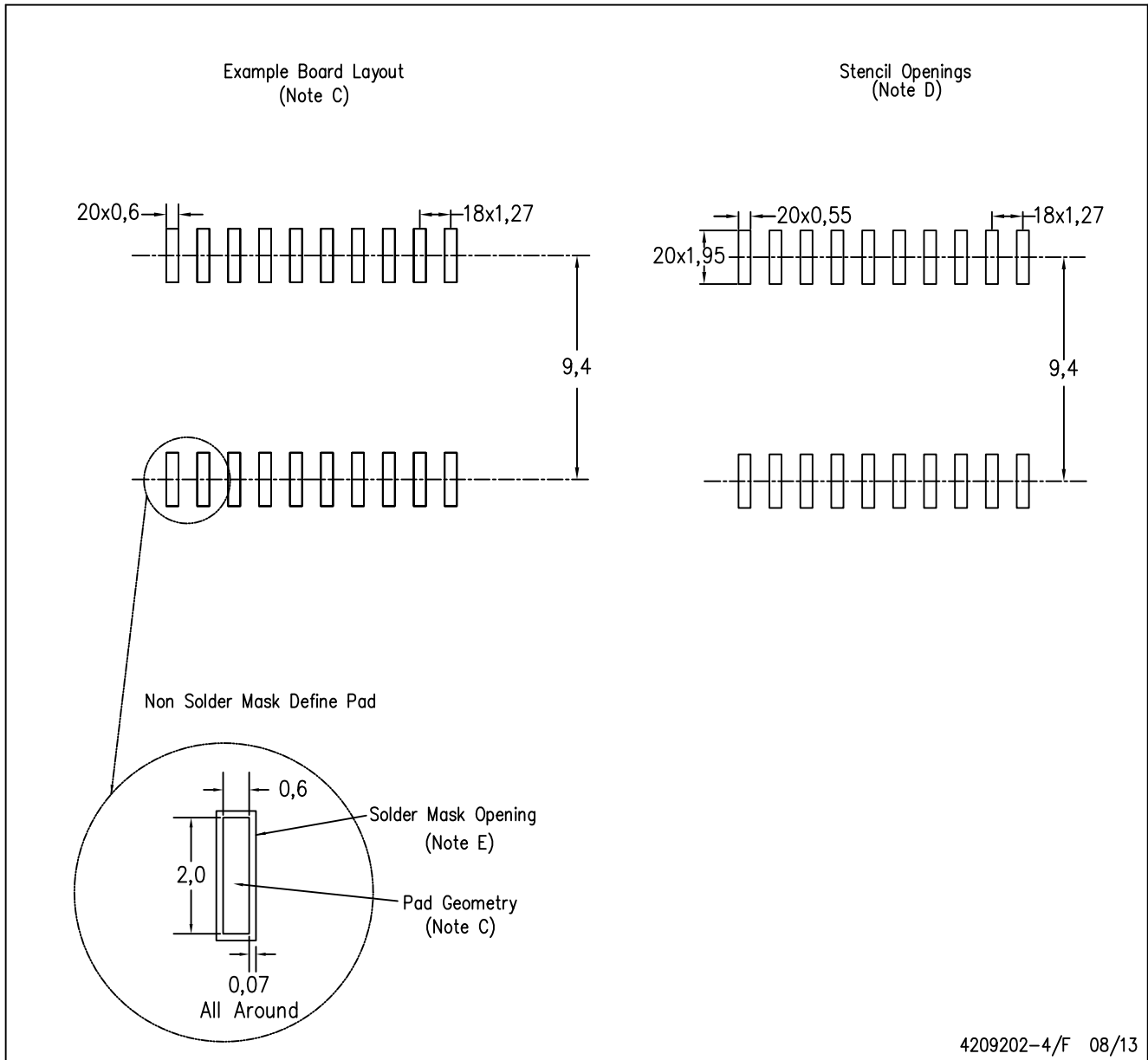
PLASTIC SMALL OUTLINE



- NOTES:
- All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.
  - This drawing is subject to change without notice.
  - Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - Falls within JEDEC MS-013 variation AC.

DW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Refer to IPC7351 for alternate board design.
  - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525
  - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

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