

High-Speed CMOS Logic Dual 4-Input Multiplexer

November 1997 - Revised October 2003

Features

- Common Select Inputs
- Separate Output-Enable Inputs
- Three-State Outputs
- Fanout (Over Temperature Range)
 - Standard Outputs 10 LSTTL Loads
 - Bus Driver Outputs 15 LSTTL Loads
- Wide Operating Temperature Range . . . -55°C to 125°C
- Balanced Propagation Delay and Transition Times
- Significant Power Reduction Compared to LSTTL Logic ICs
- HC Types
 - 2V to 6V Operation
 - High Noise Immunity: $N_{IL} = 30\%$, $N_{IH} = 30\%$ of V_{CC} at $V_{CC} = 5V$
- HCT Types
 - 4.5V to 5.5V Operation
 - Direct LSTTL Input Logic Compatibility, $V_{IL} = 0.8V$ (Max), $V_{IH} = 2V$ (Min)
 - CMOS Input Compatibility, $I_I \leq 1\mu A$ at V_{OL} , V_{OH}

Description

The CD74HC253 and CD74HCT253 are dual 4-to-1 line selector/multiplexers having three-state outputs. One of four sources for each section is selected by the common select inputs, S0 and S1. When the output enable (1OE, 2OE) is HIGH, the output is in the high-impedance state.

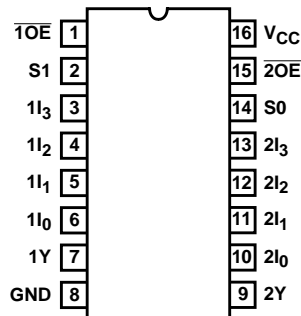
Ordering Information

| PART NUMBER | TEMP. RANGE (°C) | PACKAGE |
|---------------|------------------|------------|
| CD74HC253E | -55 to 125 | 16 Ld PDIP |
| CD74HC253M | -55 to 125 | 16 Ld SOIC |
| CD74HC253MT | -55 to 125 | 16 Ld SOIC |
| CD74HC253M96 | -55 to 125 | 16 Ld SOIC |
| CD74HCT253E | -55 to 125 | 16 Ld PDIP |
| CD74HCT253M | -55 to 125 | 16 Ld SOIC |
| CD74HCT253MT | -55 to 125 | 16 Ld SOIC |
| CD74HCT253M96 | -55 to 125 | 16 Ld SOIC |

NOTE: When ordering, use the entire part number. The suffix 96 denotes tape and reel. The suffix T denotes a small-quantity reel of 250.

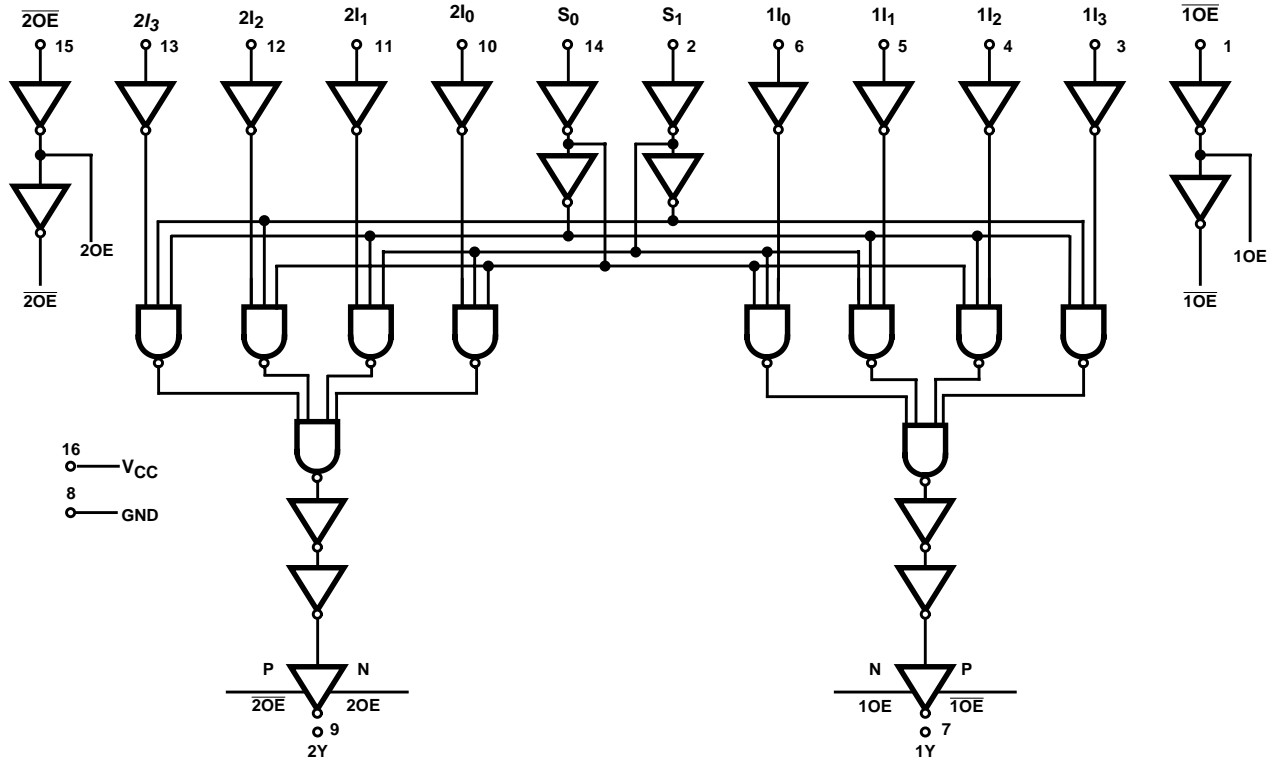
Pinout

CD74HC253, CD74HCT253
(PDIP, SOIC)
TOP VIEW



CD74HC253, CD74HCT253

Functional Diagrams



TRUTH TABLE

| SELECT INPUTS (Note 1) | | DATA INPUTS | | | | OUTPUT ENABLE | OUTPUT |
|---------------------------|----|----------------|----------------|----------------|----------------|------------------|--------|
| S1 | S0 | I ₀ | I ₁ | I ₂ | I ₃ | \overline{OE} | Y |
| X | X | X | X | X | X | H | Z |
| L | L | L | X | X | X | L | L |
| L | L | H | X | X | X | L | H |
| L | H | X | L | X | X | L | L |
| L | H | X | H | X | X | L | H |
| H | L | X | X | L | X | L | L |
| H | L | X | X | H | X | L | H |
| H | H | X | X | X | L | L | L |
| H | H | X | X | X | H | L | H |

H = High Voltage Level, L = Low Voltage Level, X = Don't Care, Z = High Impedance (Off).

NOTE:

1. Select inputs S1 and S0 are common to both sections.

CD74HC253, CD74HCT253

Absolute Maximum Ratings

| | |
|--|-------------|
| DC Supply Voltage, V_{CC} | -0.5V to 7V |
| DC Input Diode Current, I_{IK} | |
| For $V_I < -0.5V$ or $V_I > V_{CC} + 0.5V$ | $\pm 20mA$ |
| DC Output Diode Current, I_{OK} | |
| For $V_O < -0.5V$ or $V_O > V_{CC} + 0.5V$ | $\pm 20mA$ |
| DC Drain Current, per Output, I_O | |
| For $-0.5V < V_O < V_{CC} + 0.5V$ | $\pm 35mA$ |
| DC Output Source or Sink Current per Output Pin, I_O | |
| For $V_O > -0.5V$ or $V_O < V_{CC} + 0.5V$ | $\pm 25mA$ |
| DC V_{CC} or Ground Current, I_{CC} | $\pm 50mA$ |

Thermal Information

| | |
|--|--|
| Thermal Resistance (Typical, Note 2) | θ_{JA} ($^{\circ}C/W$) |
| E (PDIP) Package | 67 |
| M (SOIC) Package | 73 |
| Maximum Junction Temperature | 150 $^{\circ}C$ |
| Maximum Storage Temperature Range | -65 $^{\circ}C$ to 150 $^{\circ}C$ |
| Maximum Lead Temperature (Soldering 10s) | 300 $^{\circ}C$ (SOIC - Lead Tips Only) |

Operating Conditions

| | |
|--|------------------------------------|
| Temperature Range, T_A | -55 $^{\circ}C$ to 125 $^{\circ}C$ |
| Supply Voltage Range, V_{CC} | |
| HC Types | .2V to 6V |
| HCT Types | 4.5V to 5.5V |
| DC Input or Output Voltage, V_I, V_O | 0V to V_{CC} |
| Input Rise and Fall Time | |
| 2V | 1000ns (Max) |
| 4.5V | 500ns (Max) |
| 6V | 400ns (Max) |

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

- The package thermal impedance is calculated in accordance with JESD 51-7.

DC Electrical Specifications

| PARAMETER | SYMBOL | TEST CONDITIONS | | V_{CC} (V) | 25 $^{\circ}C$ | | | -40 $^{\circ}C$ TO 85 $^{\circ}C$ | | -55 $^{\circ}C$ TO 125 $^{\circ}C$ | | UNITS | |
|---|----------|----------------------|------------|--------------|----------------|------|-----------|-----------------------------------|---------|------------------------------------|---------|---------|---|
| | | V_I (V) | I_O (mA) | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | | |
| HC TYPES | | | | | | | | | | | | | |
| High Level Input Voltage | V_{IH} | - | - | 2 | 1.5 | - | - | 1.5 | - | 1.5 | - | V | |
| | | | | 4.5 | 3.15 | - | - | 3.15 | - | 3.15 | - | V | |
| | | | | 6 | 4.2 | - | - | 4.2 | - | 4.2 | - | V | |
| Low Level Input Voltage | V_{IL} | - | - | 2 | - | - | 0.5 | - | 0.5 | - | 0.5 | V | |
| | | | | 4.5 | - | - | 1.35 | - | 1.35 | - | 1.35 | V | |
| | | | | 6 | - | - | 1.8 | - | 1.8 | - | 1.8 | V | |
| High Level Output Voltage CMOS Loads | V_{OH} | V_{IH} or V_{IL} | -0.02 | 2 | 1.9 | - | - | 1.9 | - | 1.9 | - | V | |
| | | | | 4.5 | 4.4 | - | - | 4.4 | - | 4.4 | - | V | |
| | | | | 6 | 5.9 | - | - | 5.9 | - | 5.9 | - | V | |
| High Level Output Voltage TTL Loads | V_{OH} | V_{IH} or V_{IL} | - | - | - | - | - | - | - | - | - | V | |
| | | | | -6 | 4.5 | 3.98 | - | - | 3.84 | - | 3.7 | - | V |
| | | | | -7.8 | 6 | 5.48 | - | - | 5.34 | - | 5.2 | - | V |
| Low Level Output Voltage CMOS Loads | V_{OL} | V_{IH} or V_{IL} | 0.02 | 2 | - | - | 0.1 | - | 0.1 | - | 0.1 | V | |
| | | | | 4.5 | - | - | 0.1 | - | 0.1 | - | 0.1 | V | |
| | | | | 6 | - | - | 0.1 | - | 0.1 | - | 0.1 | V | |
| Low Level Output Voltage TTL Loads | V_{OL} | V_{IH} or V_{IL} | - | - | - | - | - | - | - | - | - | V | |
| | | | | -6 | 4.5 | - | - | 0.26 | - | 0.33 | - | 0.4 | V |
| | | | | -7.8 | 6 | - | - | 0.26 | - | 0.33 | - | 0.4 | V |
| Input Leakage Current | I_I | V_{CC} or GND | - | 6 | - | - | ± 0.1 | - | ± 1 | - | ± 1 | μA | |

CD74HC253, CD74HCT253

DC Electrical Specifications (Continued)

| PARAMETER | SYMBOL | TEST CONDITIONS | | V _{CC} (V) | 25°C | | | -40°C TO 85°C | | -55°C TO 125°C | | UNITS |
|--|------------------------------|------------------------------------|---|---------------------|------|-----|------|---------------|------|----------------|-----|-------|
| | | V _I (V) | I _O (mA) | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| Quiescent Device Current | I _{CC} | V _{CC} or GND | 0 | 6 | - | - | 8 | - | 80 | - | 160 | μA |
| HCT TYPES | | | | | | | | | | | | |
| High Level Input Voltage | V _{IH} | - | - | 4.5 to 5.5 | 2 | - | - | 2 | - | 2 | - | V |
| Low Level Input Voltage | V _{IL} | - | - | 4.5 to 5.5 | - | - | 0.8 | - | 0.8 | - | 0.8 | V |
| High Level Output Voltage CMOS Loads | V _{OH} | V _{IH} or V _{IL} | -0.02 | 4.5 | 4.4 | - | - | 4.4 | - | 4.4 | - | V |
| High Level Output Voltage TTL Loads | | | -4 | 4.5 | 3.98 | - | - | 3.84 | - | 3.7 | - | V |
| Low Level Output Voltage CMOS Loads | V _{OL} | V _{IH} or V _{IL} | 0.02 | 4.5 | - | - | 0.1 | - | 0.1 | - | 0.1 | V |
| Low Level Output Voltage TTL Loads | | | 4 | 4.5 | - | - | 0.26 | - | 0.33 | - | 0.4 | V |
| Input Leakage Current | I _I | V _{CC} and GND | 0 | 5.5 | - | - | ±0.1 | - | ±1 | - | ±1 | μA |
| Quiescent Device Current | I _{CC} | V _{CC} or GND | 0 | 5.5 | - | - | 8 | - | 80 | - | 160 | μA |
| Additional Quiescent Device Current Per Input Pin: 1 Unit Load | ΔI _{CC} (Note 3) | V _{CC} -2.1 | - | 4.5 to 5.5 | - | 100 | 360 | - | 450 | - | 490 | μA |
| Three-State Leakage Current | I _{OZ} | V _{IL} or V _{IH} | V _O = V _{CC} or GND | 5.5 | - | - | ±0.5 | - | ±5 | - | ±10 | μA |

NOTE:

3. For dual-supply systems theoretical worst case (V_I = 2.4V, V_{CC} = 5.5V) specification is 1.8mA.

HCT Input Loading Table

| INPUT | UNIT LOADS |
|--|------------|
| 1I _O - 1I ₃ , 2I _O -2I ₃ | 0.4 |
| 1E _O , 2E _O , S ₀ , S ₁ | 1 |

NOTE: Unit Load is ΔI_{CC} limit specified in DC Electrical Table, e.g., 360μA max at 25°C.

Switching Specifications Input t_p, t_f = 6ns

| PARAMETER | SYMBOL | TEST CONDITIONS | V _{CC} (V) | 25°C | | | -40°C TO 85°C | | -55°C TO 125°C | | UNITS |
|--|--|-----------------------|---------------------|------|-----|-----|---------------|-----|----------------|-----|-------|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| HC TYPES | | | | | | | | | | | |
| Propagation Delay Select to Outputs | t _{PLH} , t _{PHL} | C _L = 50pF | 2 | - | - | 175 | - | 220 | - | 265 | ns |
| | | | 4.5 | - | - | 35 | - | 44 | - | 53 | ns |
| | | C _L = 15pF | 5 | - | 14 | - | - | - | - | - | ns |
| | | C _L = 50pF | 6 | - | - | 30 | - | 37 | - | 45 | ns |

CD74HC253, CD74HCT253

Switching Specifications Input t_r , $t_f = 6\text{ns}$ (Continued)

| PARAMETER | SYMBOL | TEST CONDITIONS | V_{CC} (V) | 25°C | | | -40°C TO 85°C | | -55°C TO 125°C | | UNITS |
|---|--------------------------|---------------------|---------------------|------|-----|-----|------------------|-----|-------------------|-----|-------|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| Data to Outputs | t_{PLH} , t_{PHL} | $C_L = 50\text{pF}$ | 2 | - | - | 175 | - | 220 | - | 265 | ns |
| | | | 4.5 | - | - | 35 | - | 44 | - | 53 | ns |
| | | $C_L = 15\text{pF}$ | 5 | - | 14 | - | - | - | - | - | ns |
| | | $C_L = 50\text{pF}$ | 6 | - | - | 30 | - | 37 | - | 45 | ns |
| Disable Delay Times | t_{PHZ} , t_{PLZ} | $C_L = 50\text{pF}$ | 2 | - | - | 150 | - | 190 | - | 225 | ns |
| | | | 4.5 | - | - | 30 | - | 38 | - | 45 | ns |
| | | $C_L = 15\text{pF}$ | 5 | - | 12 | - | - | - | - | - | ns |
| | | $C_L = 50\text{pF}$ | 6 | - | - | 26 | - | 33 | - | 38 | ns |
| Enable Delay Times | t_{PZH} , t_{PZL} | $C_L = 50\text{pF}$ | 2 | - | - | 110 | - | 140 | - | 165 | ns |
| | | | 4.5 | - | - | 22 | - | 28 | - | 33 | ns |
| | | $C_L = 15\text{pF}$ | 5 | - | 9 | - | - | - | - | - | ns |
| | | $C_L = 50\text{pF}$ | 6 | - | - | 19 | - | 24 | - | 28 | ns |
| Output Transition Times | t_{TLH} , t_{THL} | $C_L = 50\text{pF}$ | 2 | - | - | 60 | - | 75 | - | 90 | ns |
| | | | 4.5 | - | - | 12 | - | 15 | - | 18 | ns |
| | | | 6 | - | - | 10 | - | 13 | - | 15 | ns |
| Input Capacitance | C_I | - | - | - | 10 | - | 10 | - | 10 | pF | |
| Three-State Output Capacitance | C_O | - | - | - | 20 | - | 20 | - | 20 | pF | |
| Power Dissipation Capacitance (Notes 4, 5) | C_{PD} | - | 5 | - | 46 | - | - | - | - | pF | |
| HCT TYPES | | | | | | | | | | | |
| Propagation Delay Select to Outputs | t_{PLH} , t_{PHL} | $C_L = 50\text{pF}$ | 4.5 | - | - | 40 | - | 50 | - | 60 | ns |
| | | | $C_L = 15\text{pF}$ | 5 | - | 16 | - | - | - | - | ns |
| Data to Outputs | t_{PLH} , t_{PHL} | $C_L = 50\text{pF}$ | 4.5 | - | - | 38 | - | 48 | - | 57 | ns |
| | | | $C_L = 15\text{pF}$ | 5 | - | 16 | - | - | - | - | ns |
| Disable Delay Times | t_{PLH} , t_{PHL} | $C_L = 50\text{pF}$ | 4.5 | - | - | 30 | - | 38 | - | 45 | ns |
| | | | $C_L = 15\text{pF}$ | 5 | - | 12 | - | - | - | - | ns |
| Enable Delay Times | t_{PZH} , t_{PZL} | $C_L = 50\text{pF}$ | 4.5 | - | - | 30 | - | 38 | - | 45 | ns |
| | | | $C_L = 15\text{pF}$ | 5 | - | 12 | - | - | - | - | ns |
| Output Transition Time | t_{TLH} , t_{THL} | $C_L = 50\text{pF}$ | 4.5 | - | - | 12 | - | 15 | - | 18 | ns |
| Input Capacitance | C_{IN} | - | - | - | 10 | - | 10 | - | 10 | pF | |
| Three-State Output Capacitance | C_O | - | - | - | 20 | - | 20 | - | 20 | pF | |
| Power Dissipation Capacitance (Notes 4, 5) | C_{PD} | - | 5 | - | 52 | - | - | - | - | pF | |

NOTES:

4. C_{PD} is used to determine the dynamic power consumption, per multiplexer.
5. $P_D = V_{CC}^2 f_i (C_{PD} + C_L)$ where f_i = Input Frequency, C_L = Output Load Capacitance, V_{CC} = Supply Voltage.

Test Circuits and Waveforms



FIGURE 1. HC AND HCT TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC



FIGURE 2. HCT TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC

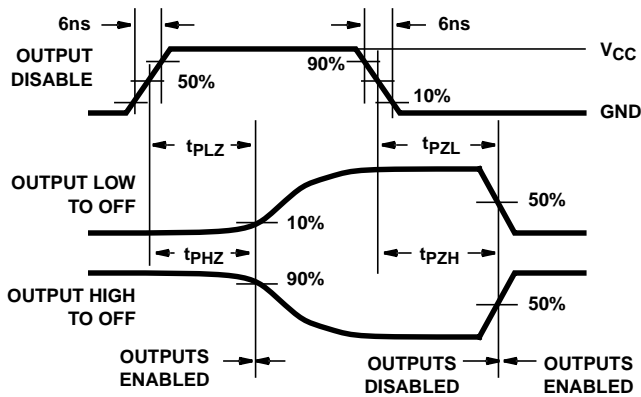


FIGURE 3. HC THREE-STATE PROPAGATION DELAY WAVEFORM

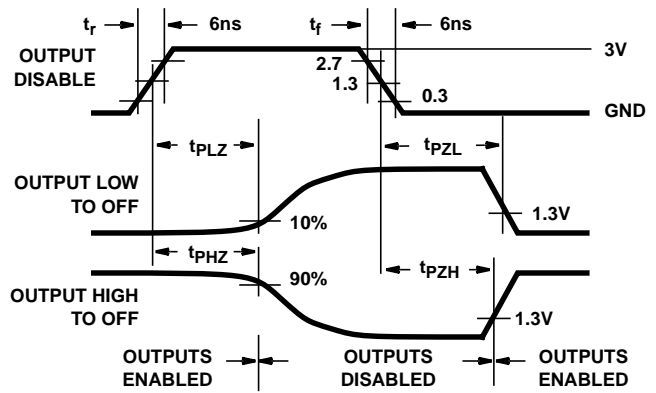


FIGURE 4. HCT THREE-STATE PROPAGATION DELAY WAVEFORM



NOTE: Open drain waveforms t_{PLZ} and t_{PZL} are the same as those for three-state shown on the left. The test circuit is Output $R_L = 1k\Omega$ V_{CC} , $C_L = 50pF$.

FIGURE 5. HC AND HCT THREE-STATE PROPAGATION DELAY TEST CIRCUIT

PACKAGING INFORMATION

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| CD74HC253E | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| CD74HC253EE4 | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| CD74HC253M | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HC253ME4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HC253MG4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HC253MT | ACTIVE | SOIC | D | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HC253MTE4 | ACTIVE | SOIC | D | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HC253MTG4 | ACTIVE | SOIC | D | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HCT253E | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| CD74HCT253EE4 | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| CD74HCT253M | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HCT253M96 | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HCT253M96E4 | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HCT253M96G4 | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HCT253ME4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HCT253MG4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HCT253MT | ACTIVE | SOIC | D | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HCT253MTE4 | ACTIVE | SOIC | D | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CD74HCT253MTG4 | ACTIVE | SOIC | D | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |

⁽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)

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

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TAPE AND REEL INFORMATION



QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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 |
|---------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| CD74HCT253M96 | SOIC | D | 16 | 2500 | 330.0 | 16.4 | 6.5 | 10.3 | 2.1 | 8.0 | 16.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---------------|--------------|-----------------|------|------|-------------|------------|-------------|
| CD74HCT253M96 | SOIC | D | 16 | 2500 | 333.2 | 345.9 | 28.6 |

D (R-PDSO-G16)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 (0,15) per end.
 - D. Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.
 - E. Reference JEDEC MS-012 variation AC.

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



4040049/E 12/2002

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

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