

CD54/74HC533, CD54/74HCT533, CD54/74HC563, CD74HCT563

High-Speed CMOS Logic Octal Inverting Transparent Latch, Three-State Outputs

Features

- Common Latch-Enable Control
- Common Three-State Output Enable Control
- Buffered Inputs
- Three-State Outputs
- Bus Line Driving Capacity
- Typical Propagation Delay = 13ns at $V_{CC} = 5V$, $C_L = 15pF$, $T_A = 25^\circ C$ (Data to Output)
- Fanout (Over Temperature Range)
 - Standard Outputs 10 LSTTL Loads
 - Bus Driver Outputs 15 LSTTL Loads
- Wide Operating Temperature Range . . . $-55^\circ C$ to $125^\circ C$
- 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 'HC533, 'HCT533, 'HC563, and CD74HCT563 are high-speed Octal Transparent Latches manufactured with silicon gate CMOS technology. They possess the low power consumption of standard CMOS integrated circuits, as well as the ability to drive 15 LSTTL devices.

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 three-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.

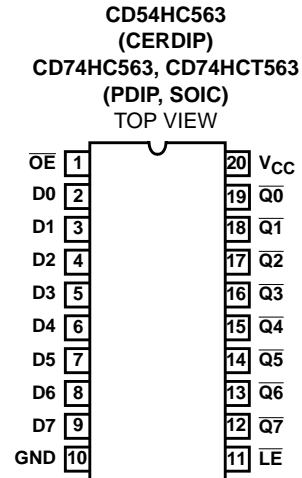
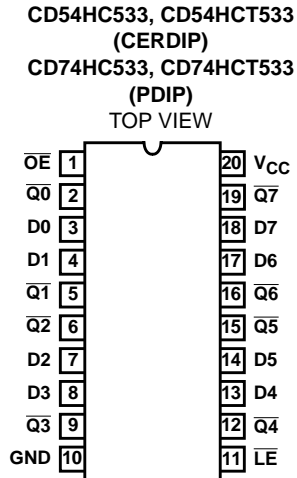
The 'HC533 and 'HCT533 are identical in function to the 'HC563 and CD74HCT563 but have different pinouts. The 'HC533 and 'HCT533 are similar to the 'HC373 and 'HCT373; the latter are non-inverting types.

Ordering Information

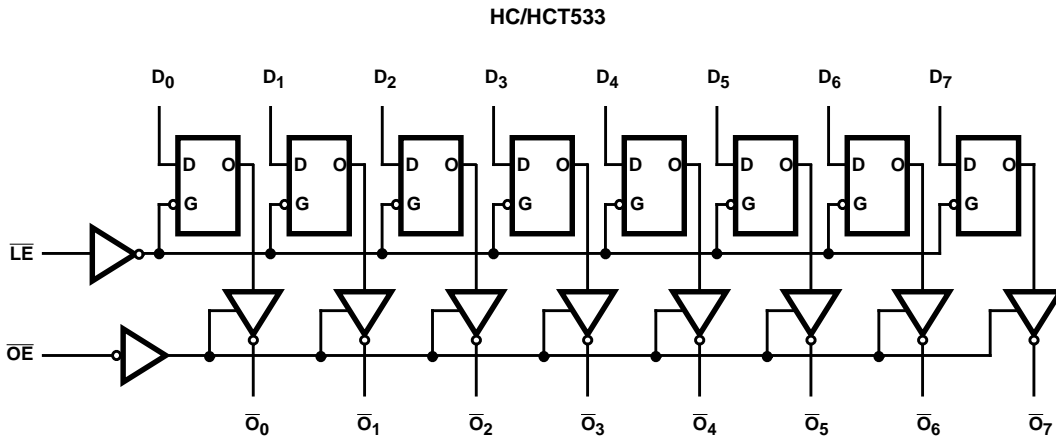
| PART NUMBER | TEMP. RANGE ($^\circ C$) | PACKAGE |
|---------------|-------------------------------|--------------|
| CD54HC533F3A | -55 to 125 | 20 Ld CERDIP |
| CD54HC563F3A | -55 to 125 | 20 Ld CERDIP |
| CD54HCT533F3A | -55 to 125 | 20 Ld CERDIP |
| CD74HC533E | -55 to 125 | 20 Ld PDIP |
| CD74HC563E | -55 to 125 | 20 Ld PDIP |
| CD74HC563M | -55 to 125 | 20 Ld SOIC |
| CD74HCT533E | -55 to 125 | 20 Ld PDIP |
| CD74HCT563E | -55 to 125 | 20 Ld PDIP |
| CD74HCT563M | -55 to 125 | 20 Ld SOIC |

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Pinouts



Functional Block Diagram



TRUTH TABLE

| OUTPUT ENABLE | LATCH ENABLE | DATA | Q OUTPUT |
|---------------|--------------|------|----------|
| L | H | H | L |
| L | H | L | H |
| L | L | l | H |
| L | L | h | L |
| H | X | X | Z |

H = High Voltage Level, L = Low Voltage Level, X = Don't Care, Z = High Impedance State, l = 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.

CD54/74HC533, CD54/74HCT533, CD54/74HC563, CD74HCT563

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 1) | θ_{JA} ($^{\circ}C/W$) |
| E (PDIP) Package | 69 |
| M (SOIC) Package | 58 |
| 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:

1. 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 | -0.02 | 2 | 1.9 | - | - | 1.9 | - | 1.9 | - | V |
| | | | -0.02 | -0.02 | 4.5 | 4.4 | - | - | 4.4 | - | 4.4 | - | V |
| | | | -0.02 | -0.02 | 6 | 5.9 | - | - | 5.9 | - | 5.9 | - | V |
| High Level Output Voltage TTL Loads | V_{OH} | V_{IH} or V_{IL} | -6 | -6 | 4.5 | 3.98 | - | - | 3.84 | - | 3.7 | - | V |
| | | | -7.8 | -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 | 0.02 | 2 | - | - | 0.1 | - | 0.1 | - | 0.1 | V |
| | | | 0.02 | 0.02 | 4.5 | - | - | 0.1 | - | 0.1 | - | 0.1 | V |
| | | | 0.02 | 0.02 | 6 | - | - | 0.1 | - | 0.1 | - | 0.1 | V |
| Low Level Output Voltage TTL Loads | V_{OL} | V_{IH} or V_{IL} | 6 | 6 | 4.5 | - | - | 0.26 | - | 0.33 | - | 0.4 | V |
| | | | 7.8 | 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 | |
| Quiescent Device Current | I_{CC} | V_{CC} or GND | 0 | 6 | - | - | 8 | - | 80 | - | 160 | μA | |

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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 | |
| Three-State Leakage Current | - | V _{IL} or V _{IH} | V _O = V _{CC} or GND | 6 | - | - | ±0.5 | - | ±5 | - | ±10 | 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 | | | -6 | 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 | | | 6 | 4.5 | - | - | 0.26 | - | 0.33 | - | 0.4 | V |
| Input Leakage Current | I _I | V _{CC} to GND | - | 5.5 | - | - | ±0.1 | - | ±1 | - | ±1 | μA |
| Quiescent Device Current | I _{CC} | V _{CC} or GND | 0 | 5.5 | - | - | 8 | - | 80 | - | 160 | μA |
| Three-State Leakage Current | - | V _{IL} or V _{IH} | V _O = V _{CC} or GND | 5.5 | - | - | ±0.5 | - | ±5 | - | ±10 | μA |
| Additional Quiescent Device Current Per Input Pin: 1 Unit Load | ΔI _{CC} (Note 2) | V _{CC} -2.1 | - | 4.5 to 5.5 | - | 100 | 360 | - | 450 | - | 490 | μA |

NOTE:

- 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 |
|-----------------|------------|
| D0 - D7 | 0.15 |
| \overline{LE} | 0.30 |
| \overline{OE} | 0.55 |

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

CD54/74HC533, CD54/74HCT533, CD54/74HC563, CD74HCT563

Prerequisite For Switching Specifications

| 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 | | | | | | | | | | | |
| LE Pulse Width | t _w | - | 2 | 80 | - | - | 100 | - | 120 | - | ns |
| | | | 4.5 | 16 | - | - | 20 | - | 24 | - | ns |
| | | | 6 | 14 | - | - | 17 | - | 20 | - | ns |
| Set-up Time Data to LE | t _{SU} | - | 2 | 50 | - | - | 65 | - | 75 | - | ns |
| | | | 4.5 | 10 | - | - | 13 | - | 15 | - | ns |
| | | | 6 | 9 | - | - | 11 | - | 13 | - | ns |
| Hold Time, Data to LE (533) | t _H | - | 2 | 35 | - | - | 45 | - | 55 | - | ns |
| | | | 4.5 | 7 | - | - | 9 | - | 11 | - | ns |
| | | | 6 | 6 | - | - | 8 | - | 7 | - | ns |
| Hold Time, Data to LE (563) | t _H | - | 2 | 4 | - | - | 4 | - | 4 | - | ns |
| | | | 4.5 | 4 | - | - | 4 | - | 4 | - | ns |
| | | | 6 | 4 | - | - | 4 | - | 4 | - | ns |
| HCT TYPES | | | | | | | | | | | |
| LE Pulse Width | t _w | - | 4.5 | 16 | - | - | 20 | - | 24 | - | ns |
| Set-up Time Data to LE | t _w | - | 4.5 | 10 | - | - | 13 | - | 15 | - | ns |
| Hold Time, Data to LE (533) | t _H | - | 4.5 | 8 | - | - | 10 | - | 12 | - | ns |
| Hold Time, Data to LE (563) | t _H | - | 4.5 | 5 | - | - | 5 | - | 5 | - | ns |

Switching Specifications Input t_r, t_f = 6ns

| PARAMETER | SYMBOL | TEST CONDITIONS | V _{CC} (V) | 25°C | | -40°C TO 85°C | -55°C TO 125°C | UNITS |
|---------------------------------------|-------------------------------------|-----------------------|---------------------|------|-----|---------------|----------------|-------|
| | | | | TYP | MAX | MAX | MAX | |
| HC TYPES | | | | | | | | |
| Propagation Delay, Data to Qn (HC533) | t _{PLH} , t _{PHL} | C _L = 50pF | 2 | - | 165 | 205 | 250 | ns |
| | | | 4.5 | - | 33 | 41 | 50 | ns |
| | | C _L = 15pF | 6 | - | 28 | 35 | 43 | ns |
| | | | 5 | 13 | - | - | - | ns |
| Propagation Delay, Data to Qn (HC563) | t _{PLH} , t _{PHL} | C _L = 50pF | 2 | - | 150 | 190 | 225 | ns |
| | | | 4.5 | - | 30 | 38 | 45 | ns |
| | | C _L = 15pF | 6 | - | 26 | 33 | 38 | ns |
| | | | 5 | 12 | - | - | - | ns |
| Propagation Delay, LE to Qn (HC533) | t _{PLH} , t _{PHL} | C _L = 50pF | 2 | - | 175 | 220 | 265 | ns |
| | | | 4.5 | - | 35 | 44 | 53 | ns |
| | | C _L = 15pF | 6 | - | 30 | 37 | 45 | ns |
| | | | 5 | 14 | - | - | - | ns |
| Propagation Delay, LE to Qn (HC563) | t _{PLH} , t _{PHL} | C _L = 50pF | 2 | - | 165 | 205 | 250 | ns |
| | | | 4.5 | - | 33 | 41 | 50 | ns |
| | | C _L = 15pF | 6 | - | 28 | 35 | 43 | ns |
| | | | 5 | 13 | - | - | - | ns |

CD54/74HC533, CD54/74HCT533, CD54/74HC563, CD74HCT563

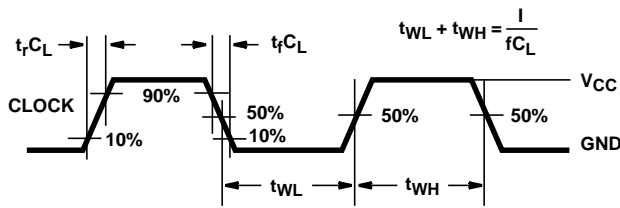
Switching Specifications Input $t_r, t_f = 6\text{ns}$ (Continued)

| PARAMETER | SYMBOL | TEST CONDITIONS | V_{CC} (V) | 25°C | | -40°C TO 85°C | -55°C TO 125°C | UNITS |
|--|--------------------------------------|---------------------|--------------|------|-----|---------------|----------------|-------|
| | | | | TYP | MAX | MAX | MAX | |
| Enable Times (HC533) | t_{PZH}, t_{PZL} | $C_L = 50\text{pF}$ | 2 | - | 150 | 190 | 225 | ns |
| | | | 4.5 | - | 30 | 38 | 45 | ns |
| | | | 6 | - | 26 | 33 | 38 | ns |
| | | $C_L = 15\text{pF}$ | 5 | 12 | - | - | - | ns |
| Disable Times (HC533) | t_{PHZ}, t_{PLZ} | $C_L = 50\text{pF}$ | 2 | - | 150 | 190 | 225 | ns |
| | | | 4.5 | - | 30 | 38 | 45 | ns |
| | | | 6 | - | 26 | 33 | 38 | ns |
| | | $C_L = 15\text{pF}$ | 5 | 12 | - | - | - | ns |
| Enable and Disable Times (HC563) | $t_{PZH}, t_{PZL}, t_{PHZ}, t_{PLZ}$ | $C_L = 50\text{pF}$ | 2 | - | 150 | 190 | 225 | ns |
| | | | 4.5 | - | 30 | 38 | 45 | ns |
| | | | 6 | - | 26 | 33 | 38 | ns |
| | | $C_L = 15\text{pF}$ | 5 | 12 | - | - | - | ns |
| Input Capacitance | C_I | - | - | - | 10 | 10 | 10 | pF |
| Three-State Output Capacitance | C_O | - | - | - | 20 | 20 | 20 | pF |
| Power Dissipation Capacitance (Notes 3, 4) | C_{PD} | - | 5 | 42 | - | - | - | pF |
| HCT TYPES | | | | | | | | |
| Propagation Delay, Data to Qn (HC/HCT533) | t_{PLH}, t_{PHL} | $C_L = 50\text{pF}$ | 4.5 | - | 34 | 43 | 51 | ns |
| | | $C_L = 15\text{pF}$ | 5 | 14 | - | - | - | ns |
| Propagation Delay, Data to Qn (HC/HCT563) | t_{PLH}, t_{PHL} | $C_L = 50\text{pF}$ | 4.5 | - | 30 | 38 | 45 | ns |
| | | $C_L = 15\text{pF}$ | 5 | 12 | - | - | - | ns |
| Propagation Delay, \overline{LE} to Qn (HC/HCT533) | t_{PLH}, t_{PHL} | $C_L = 50\text{pF}$ | 4.5 | - | 38 | 48 | 57 | ns |
| | | $C_L = 15\text{pF}$ | 5 | 16 | - | - | - | ns |
| Propagation Delay, \overline{LE} to Qn (HC/HCT563) | t_{PZL}, t_{PZH} | $C_L = 50\text{pF}$ | 4.5 | - | 35 | 44 | 53 | ns |
| | | $C_L = 15\text{pF}$ | 5 | 14 | - | - | - | ns |
| Enable Times (HC/HCT533) | t_{PLZ}, t_{PZH} | $C_L = 50\text{pF}$ | 4.5 | - | 35 | 44 | 53 | ns |
| | | $C_L = 15\text{pF}$ | 5 | 14 | - | - | - | ns |
| Disable Times (HC/HCT533) | t_{TLH}, t_{THL} | $C_L = 50\text{pF}$ | 4.5 | - | 30 | 38 | 45 | ns |
| | | $C_L = 15\text{pF}$ | 5 | 12 | - | - | - | ns |
| Enable and Disable Times (HC/HCT563) | $t_{PZH}, t_{PZL}, t_{PHZ}, t_{PLZ}$ | $C_L = 50\text{pF}$ | 4.5 | - | 35 | 44 | 53 | ns |
| | | $C_L = 15\text{pF}$ | 5 | 14 | - | - | - | ns |
| Input Capacitance | C_I | - | - | - | 10 | 10 | 10 | pF |
| Power Dissipation Capacitance (Notes 3, 4) | C_{PD} | - | 5 | 42 | - | - | - | pF |

NOTES:

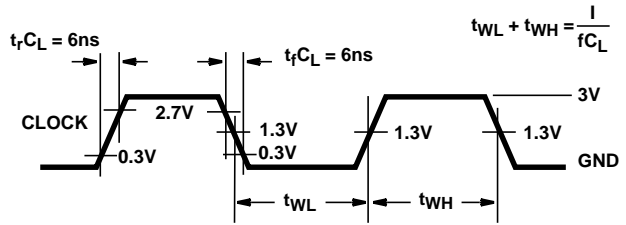
- C_{PD} is used to determine the no-load dynamic power consumption, per latch.
- P_D (total power per latch) = $C_{PD} V_{CC}^2 f_i + \sum C_L V_{CC}^2 f_o$ where f_i = Input Frequency, f_o = Output Frequency, C_L = Output Load Capacitance, V_{CC} = Supply Voltage.

Test Circuits and Waveforms



NOTE: Outputs should be switching from 10% V_{CC} to 90% V_{CC} in accordance with device truth table. For f_{MAX} , input duty cycle = 50%.

FIGURE 1. HC CLOCK PULSE RISE AND FALL TIMES AND PULSE WIDTH



NOTE: Outputs should be switching from 10% V_{CC} to 90% V_{CC} in accordance with device truth table. For f_{MAX} , input duty cycle = 50%.

FIGURE 2. HCT CLOCK PULSE RISE AND FALL TIMES AND PULSE WIDTH



FIGURE 3. HC TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC



FIGURE 4. HCT TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC

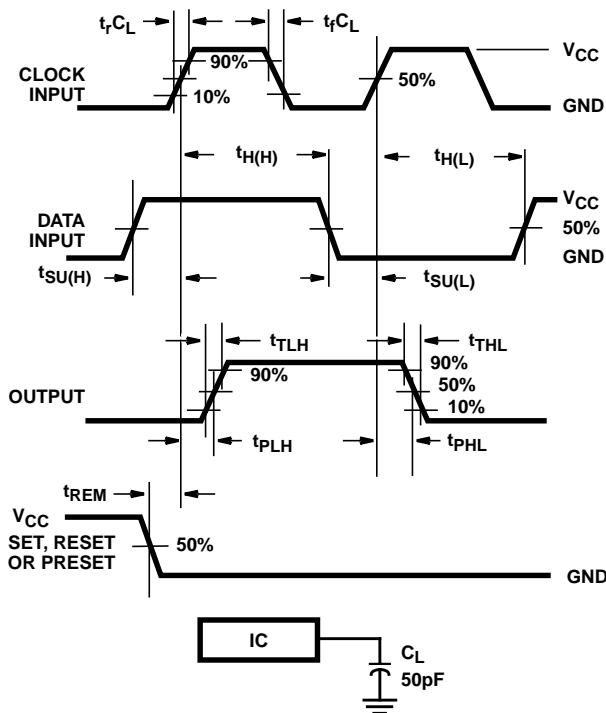


FIGURE 5. HC SETUP TIMES, HOLD TIMES, REMOVAL TIME, AND PROPAGATION DELAY TIMES FOR EDGE TRIGGERED SEQUENTIAL LOGIC CIRCUITS

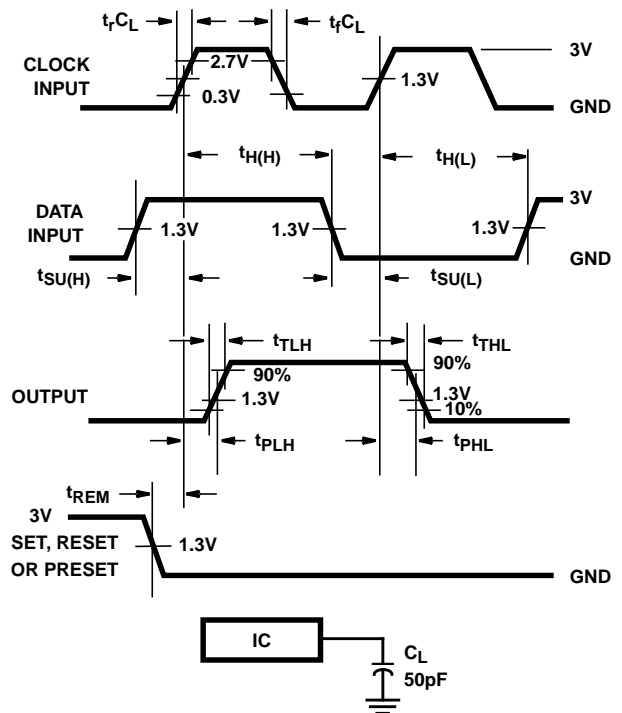


FIGURE 6. HCT SETUP TIMES, HOLD TIMES, REMOVAL TIME, AND PROPAGATION DELAY TIMES FOR EDGE TRIGGERED SEQUENTIAL LOGIC CIRCUITS

Test Circuits and Waveforms (Continued)

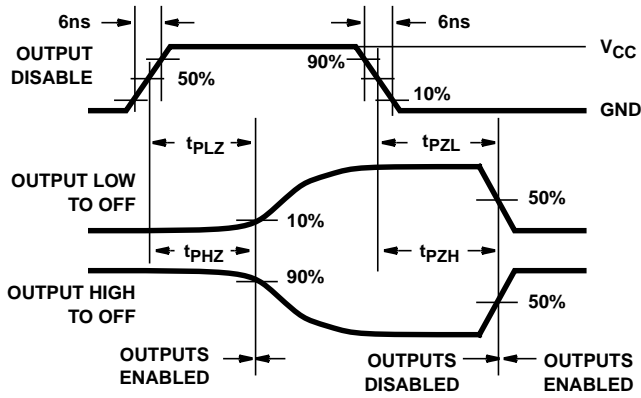


FIGURE 7. HC THREE-STATE PROPAGATION DELAY WAVEFORM

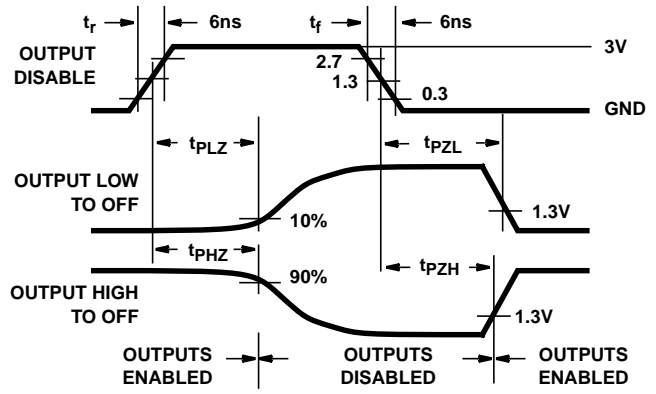
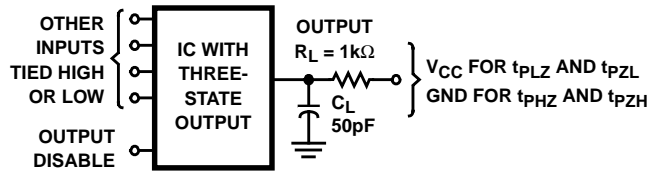


FIGURE 8. HCT THREE-STATE PROPAGATION DELAY WAVEFORM



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 $R_L = 1k\Omega$ to V_{CC} , $C_L = 50pF$.

FIGURE 9. 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 finish/ Ball material (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|------------------|--------------------------------------|----------------------|--------------|--------------------------------|-------------------------|
| 5962-8606201RA | ACTIVE | CDIP | J | 20 | 20 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | 5962-8606201RA CD54HC563F3A | Samples |
| 5962-8681301RA | ACTIVE | CDIP | J | 20 | 20 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | 5962-8681301RA CD54HC533F3A | Samples |
| CD54HC533F3A | ACTIVE | CDIP | J | 20 | 20 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | 5962-8681301RA CD54HC533F3A | Samples |
| CD54HC563F3A | ACTIVE | CDIP | J | 20 | 20 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | 5962-8606201RA CD54HC563F3A | Samples |
| CD54HCT533F3A | ACTIVE | CDIP | J | 20 | 20 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | CD54HCT533F3A | Samples |
| CD74HC533E | ACTIVE | PDIP | N | 20 | 20 | RoHS & Non-Green | NIPDAU | N / A for Pkg Type | -55 to 125 | CD74HC533E | Samples |
| CD74HC563E | ACTIVE | PDIP | N | 20 | 20 | RoHS & Non-Green | NIPDAU | N / A for Pkg Type | -55 to 125 | CD74HC563E | Samples |
| CD74HCT533E | ACTIVE | PDIP | N | 20 | 20 | RoHS & Non-Green | NIPDAU | N / A for Pkg Type | -55 to 125 | CD74HCT533E | Samples |
| CD74HCT563E | ACTIVE | PDIP | N | 20 | 20 | RoHS & Non-Green | NIPDAU | N / A for Pkg Type | -55 to 125 | CD74HCT563E | Samples |
| CD74HCT563M | ACTIVE | SOIC | DW | 20 | 25 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | -55 to 125 | HCT563M | Samples |

(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.
- (4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.
- (5) 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.
- (6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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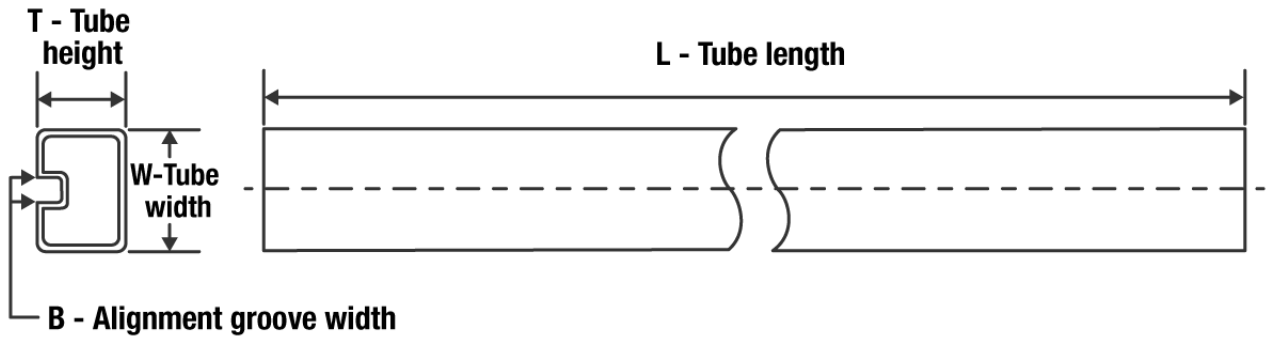
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OTHER QUALIFIED VERSIONS OF CD54HC533, CD54HC563, CD54HCT533, CD74HC533, CD74HC563, CD74HCT533 :

- Catalog : [CD74HC533](#), [CD74HC563](#), [CD74HCT533](#)
- Military : [CD54HC533](#), [CD54HC563](#), [CD54HCT533](#)

NOTE: Qualified Version Definitions:

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

TUBE


*All dimensions are nominal

| Device | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (μm) | B (mm) |
|-------------|--------------|--------------|------|-----|--------|--------|--------|--------|
| CD74HC533E | N | PDIP | 20 | 20 | 506 | 13.97 | 11230 | 4.32 |
| CD74HC563E | N | PDIP | 20 | 20 | 506 | 13.97 | 11230 | 4.32 |
| CD74HCT533E | N | PDIP | 20 | 20 | 506 | 13.97 | 11230 | 4.32 |
| CD74HCT563E | N | PDIP | 20 | 20 | 506 | 13.97 | 11230 | 4.32 |
| CD74HCT563M | DW | SOIC | 20 | 25 | 507 | 12.83 | 5080 | 6.6 |

J (R-GDIP-T**)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



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



4040083/F 03/03

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

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.

DW0020A



PACKAGE OUTLINE

SOIC - 2.65 mm max height

SOIC



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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