

# 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.

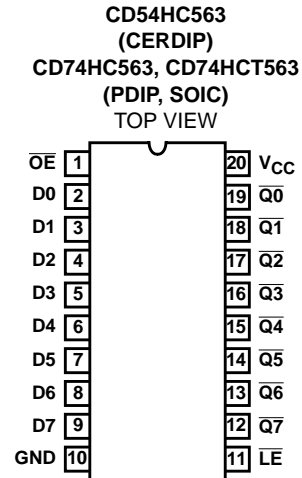
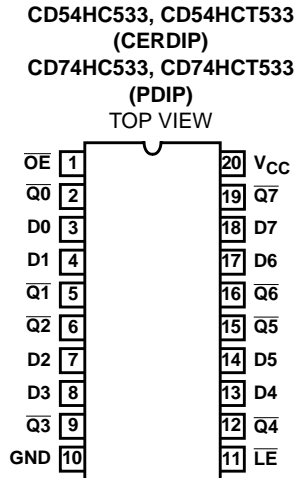
The 'HC533 and 'HCT533 are identical in function to the 'HC563 and CD74HCT563 but have different pinouts. The 'HC533 and 'HCT533 are similar to the 'HC373 and 'HCT373; the latter are non-inverting types.

### Ordering Information

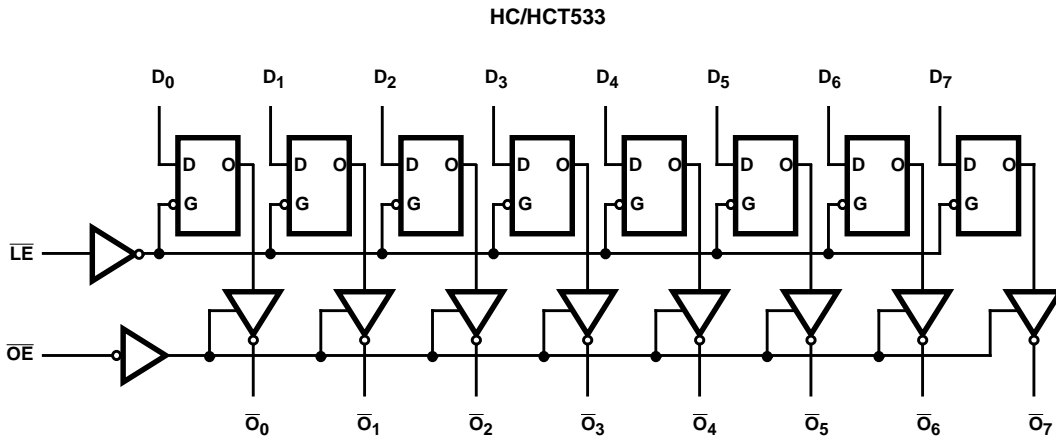
PART NUMBER	TEMP. RANGE ( $^\circ C$ )	PACKAGE
CD54HC533F3A	-55 to 125	20 Ld CERDIP
CD54HC563F3A	-55 to 125	20 Ld CERDIP
CD54HCT533F3A	-55 to 125	20 Ld CERDIP
CD74HC533E	-55 to 125	20 Ld PDIP
CD74HC563E	-55 to 125	20 Ld PDIP
CD74HC563M	-55 to 125	20 Ld SOIC
CD74HCT533E	-55 to 125	20 Ld PDIP
CD74HCT563E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

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

**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)	$\theta_{JA}$ ( $^{\circ}C/W$ )
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:

- 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		
<b>HC TYPES</b>													
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	-	-	$\pm 0.1$	-	$\pm 1$	-	$\pm 1$	$\mu A$	
Quiescent Device Current	$I_{CC}$	$V_{CC}$ or GND	0	6	-	-	8	-	80	-	160	$\mu A$	

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

**DC Electrical Specifications (Continued)**

PARAMETER	SYMBOL	TEST CONDITIONS		V <sub>CC</sub> (V)	25°C			-40°C TO 85°C		-55°C TO 125°C		UNITS
		V <sub>I</sub> (V)	I <sub>O</sub> (mA)		MIN	TYP	MAX	MIN	MAX	MIN	MAX	
Three-State Leakage Current	-	V <sub>IL</sub> or V <sub>IH</sub>	V <sub>O</sub> = V <sub>CC</sub> or GND	6	-	-	±0.5	-	±5	-	±10	μA
<b>HCT TYPES</b>												
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 CMOS Loads	V <sub>OH</sub>	V <sub>IH</sub> or V <sub>IL</sub>	-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 <sub>OL</sub>	V <sub>IH</sub> or V <sub>IL</sub>	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 <sub>I</sub>	V <sub>CC</sub> to GND	-	5.5	-	-	±0.1	-	±1	-	±1	μA
Quiescent Device Current	I <sub>CC</sub>	V <sub>CC</sub> or GND	0	5.5	-	-	8	-	80	-	160	μA
Three-State Leakage Current	-	V <sub>IL</sub> or V <sub>IH</sub>	V <sub>O</sub> = V <sub>CC</sub> or GND	5.5	-	-	±0.5	-	±5	-	±10	μA
Additional Quiescent Device Current Per Input Pin: 1 Unit Load	ΔI <sub>CC</sub> (Note 2)	V <sub>CC</sub> -2.1	-	4.5 to 5.5	-	100	360	-	450	-	490	μA

NOTE:

- For dual-supply systems theoretical worst case (V<sub>I</sub> = 2.4V, V<sub>CC</sub> = 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<sub>CC</sub> 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 <sub>CC</sub> (V)	25°C			-40°C TO 85°C		-55°C TO 125°C		UNITS
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
<b>HC TYPES</b>											
LE Pulse Width	t <sub>w</sub>	-	2	80	-	-	100	-	120	-	ns
			4.5	16	-	-	20	-	24	-	ns
			6	14	-	-	17	-	20	-	ns
Set-up Time Data to LE	t <sub>SU</sub>	-	2	50	-	-	65	-	75	-	ns
			4.5	10	-	-	13	-	15	-	ns
			6	9	-	-	11	-	13	-	ns
Hold Time, Data to LE (533)	t <sub>H</sub>	-	2	35	-	-	45	-	55	-	ns
			4.5	7	-	-	9	-	11	-	ns
			6	6	-	-	8	-	7	-	ns
Hold Time, Data to LE (563)	t <sub>H</sub>	-	2	4	-	-	4	-	4	-	ns
			4.5	4	-	-	4	-	4	-	ns
			6	4	-	-	4	-	4	-	ns
<b>HCT TYPES</b>											
LE Pulse Width	t <sub>w</sub>	-	4.5	16	-	-	20	-	24	-	ns
Set-up Time Data to LE	t <sub>w</sub>	-	4.5	10	-	-	13	-	15	-	ns
Hold Time, Data to LE (533)	t <sub>H</sub>	-	4.5	8	-	-	10	-	12	-	ns
Hold Time, Data to LE (563)	t <sub>H</sub>	-	4.5	5	-	-	5	-	5	-	ns

**Switching Specifications** Input t<sub>r</sub>, t<sub>f</sub> = 6ns

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

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

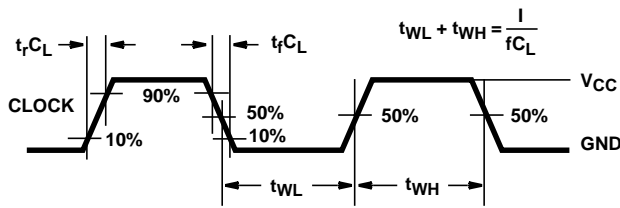
**Switching Specifications** Input  $t_r, t_f = 6\text{ns}$  (Continued)

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
<b>HCT TYPES</b>								
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:

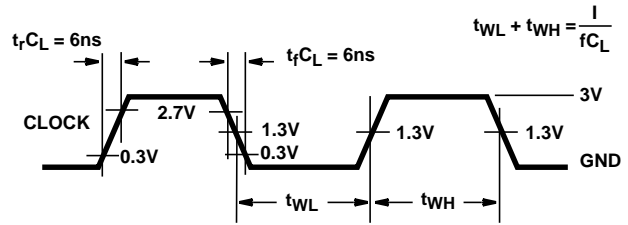
- $C_{PD}$  is used to determine the no-load dynamic power consumption, per latch.
- $P_D$  (total power per latch) =  $C_{PD} V_{CC}^2 f_i + \sum C_L V_{CC}^2 f_o$  where  $f_i$  = Input Frequency,  $f_o$  = Output Frequency,  $C_L$  = Output Load Capacitance,  $V_{CC}$  = Supply Voltage.

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

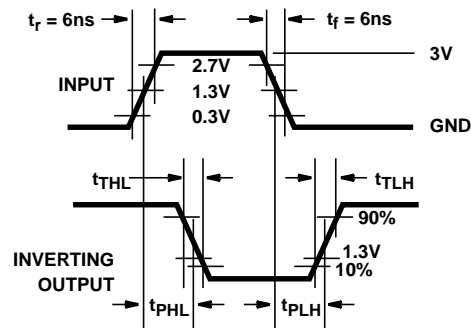


FIGURE 4. HCT TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC

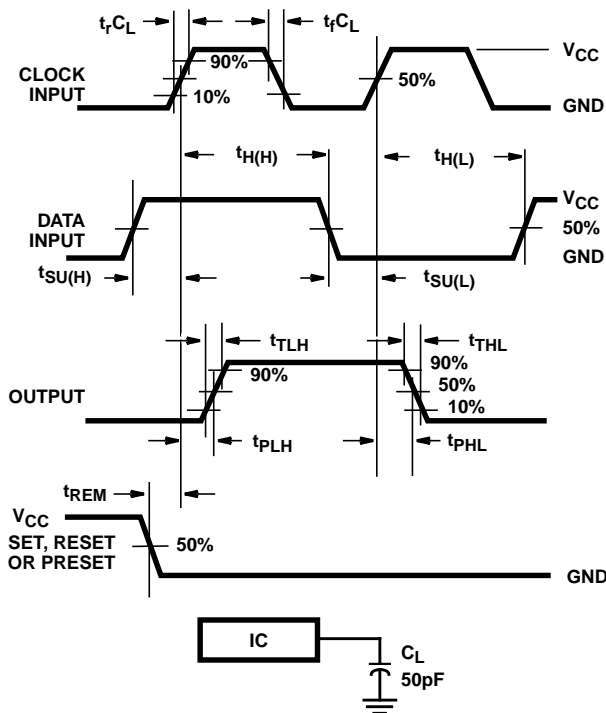


FIGURE 5. HC SETUP TIMES, HOLD TIMES, REMOVAL TIME, AND PROPAGATION DELAY TIMES FOR EDGE TRIGGERED SEQUENTIAL LOGIC CIRCUITS

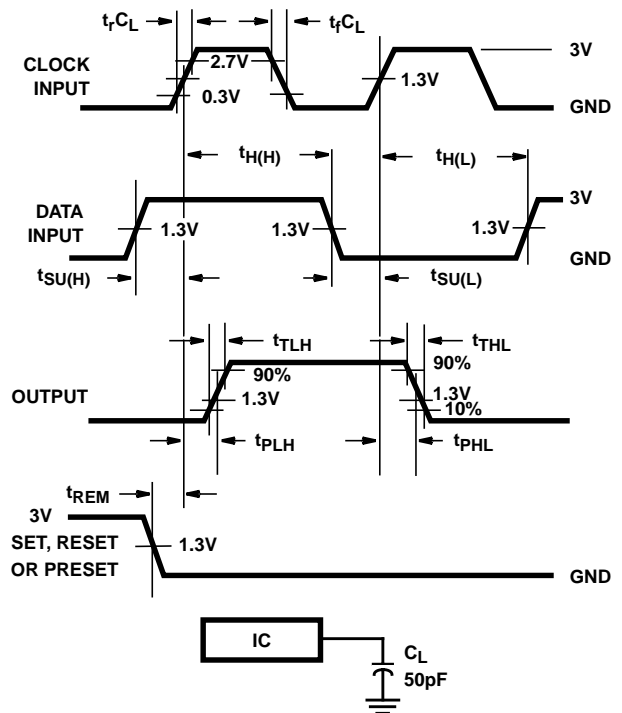


FIGURE 6. HCT SETUP TIMES, HOLD TIMES, REMOVAL TIME, AND PROPAGATION DELAY TIMES FOR EDGE TRIGGERED SEQUENTIAL LOGIC CIRCUITS

**Test Circuits and Waveforms** (Continued)

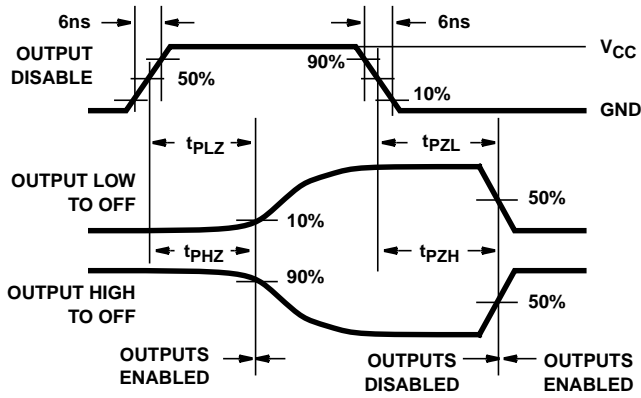


FIGURE 7. HC THREE-STATE PROPAGATION DELAY WAVEFORM

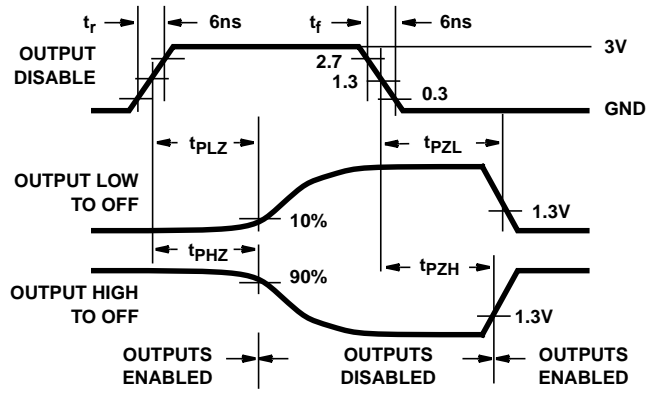
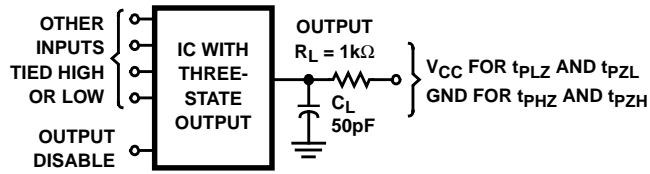


FIGURE 8. HCT THREE-STATE PROPAGATION DELAY WAVEFORM



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 part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
<a href="#">5962-8606201RA</a>	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8606201RA CD54HC563F3A
<a href="#">5962-8681301RA</a>	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8681301RA CD54HC533F3A
<a href="#">CD54HC533F3A</a>	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8681301RA CD54HC533F3A
CD54HC533F3A.A	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8681301RA CD54HC533F3A
<a href="#">CD54HC563F3A</a>	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8606201RA CD54HC563F3A
CD54HC563F3A.A	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8606201RA CD54HC563F3A
<a href="#">CD54HCT533F3A</a>	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	CD54HCT533F3A
CD54HCT533F3A.A	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	CD54HCT533F3A
<a href="#">CD74HC533E</a>	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD74HC533E
CD74HC533E.A	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD74HC533E
<a href="#">CD74HC563E</a>	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD74HC563E
CD74HC563E.A	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD74HC563E
<a href="#">CD74HCT533E</a>	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD74HCT533E
CD74HCT533E.A	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD74HCT533E
<a href="#">CD74HCT563E</a>	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD74HCT563E
CD74HCT563E.A	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD74HCT563E
<a href="#">CD74HCT563M</a>	Active	Production	SOIC (DW)   20	25   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HCT563M
CD74HCT563M.A	Active	Production	SOIC (DW)   20	25   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	HCT563M

(1) **Status:** For more details on status, see our [product life cycle](#).

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

(4) **Lead finish/Ball material:** Parts 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.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

**Important Information and Disclaimer:** The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

**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
CD74HC533E.A	N	PDIP	20	20	506	13.97	11230	4.32
CD74HC563E	N	PDIP	20	20	506	13.97	11230	4.32
CD74HC563E.A	N	PDIP	20	20	506	13.97	11230	4.32
CD74HCT533E	N	PDIP	20	20	506	13.97	11230	4.32
CD74HCT533E.A	N	PDIP	20	20	506	13.97	11230	4.32
CD74HCT563E	N	PDIP	20	20	506	13.97	11230	4.32
CD74HCT563E.A	N	PDIP	20	20	506	13.97	11230	4.32
CD74HCT563M	DW	SOIC	20	25	507	12.83	5080	6.6
CD74HCT563M.A	DW	SOIC	20	25	507	12.83	5080	6.6

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.

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.



## IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on [ti.com](#) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265

Copyright © 2025, Texas Instruments Incorporated