

# HD74HCT563, HD74HCT573

## Octal Transparent Latches (with 3-state outputs)

REJ03D0669–0200  
 (Previous ADE-205-559)  
 Rev.2.00  
 Mar 30, 2006

### Description

When the latch enable (LE) input is high, the Q outputs of HD74HCT563 will follow the inversion of the D inputs and the Q outputs of HD74HCT573 will follow the D inputs. When the latch enable goes low, data at the D inputs will be retained at the outputs until latch enable returns high again. When a high logic level is applied to the output control input, all outputs go to a high impedance state, regardless of what signals are present at the other inputs and the state of the storage elements.

### Features

- LSTTL Output Logic Level Compatibility as well as CMOS Output Compatibility
- High Speed Operation:  $t_{pd}$  (Data to Q,  $\bar{Q}$ ) = 13 ns typ ( $C_L = 50$  pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage:  $V_{CC} = 4.5$  to  $5.5$  V
- Low Input Current:  $1 \mu\text{A}$  max
- Low Quiescent Supply Current:  $I_{CC}$  (static) =  $4 \mu\text{A}$  max ( $T_a = 25^\circ\text{C}$ )
- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74HCT573P	DILP-20 pin	PRDP0020AC-B (DP-20NEV)	P	—
HD74HCT563FPEL HD74HCT573FPEL	SOP-20 pin (JEITA)	PRSP0020DD-B (FP-20DAV)	FP	EL (2,000 pcs/reel)
HD74HCT563RPEL	SOP-20 pin (JEDEC)	PRSP0020DC-A (FP-20DBV)	RP	EL (1,000 pcs/reel)
HD74HCT573TELL	TSSOP-20 pin	PTSP0020JB-A (TTP-20DAV)	T	ELL (2,000 pcs/reel)

Note: Please consult the sales office for the above package availability.

### Function Table

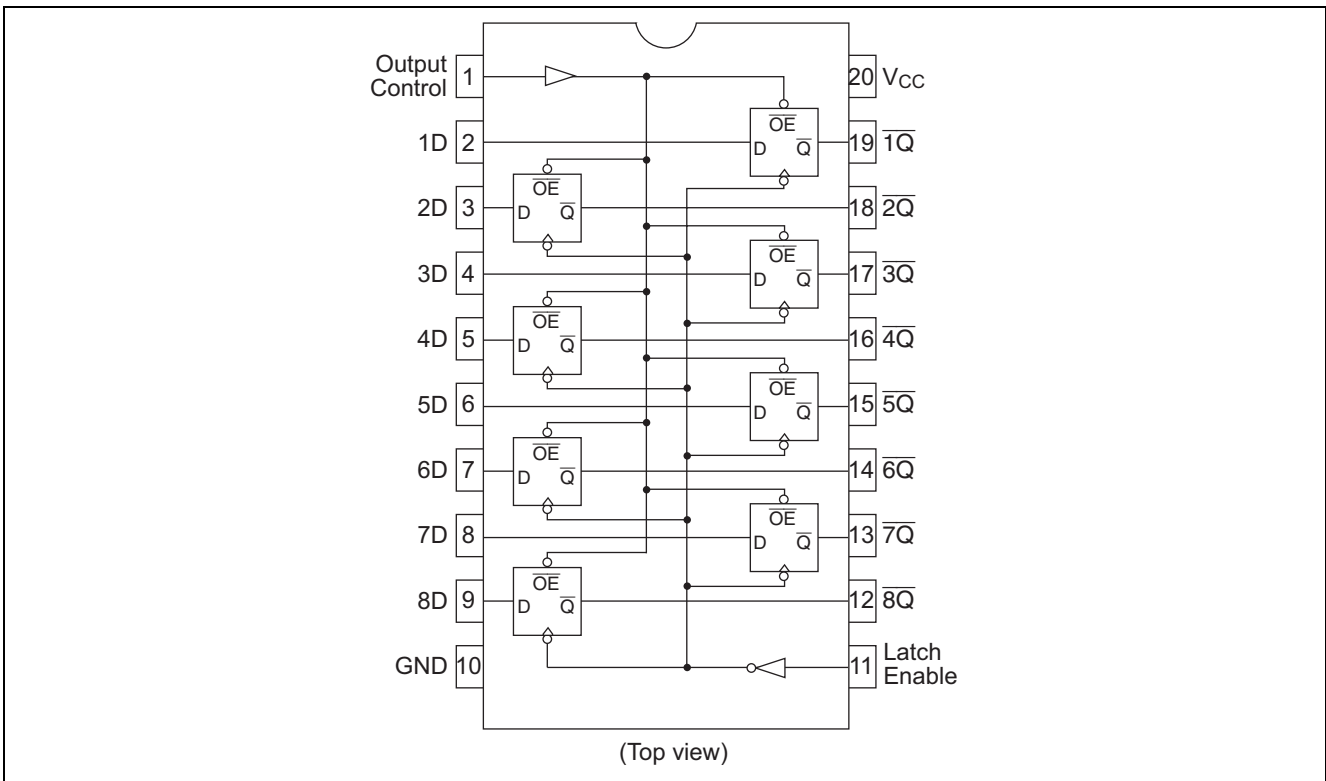
Inputs			Outputs	
Output Control	Latch Enable	Data	HD74HCT563	HD74HCT573
L	H	H	L	H
L	H	L	H	L
L	L	X	$Q_0$	$Q_0$
H	X	X	Z	Z

$Q_0$  : level of Q before the indicated Steady-state input conditions were established.

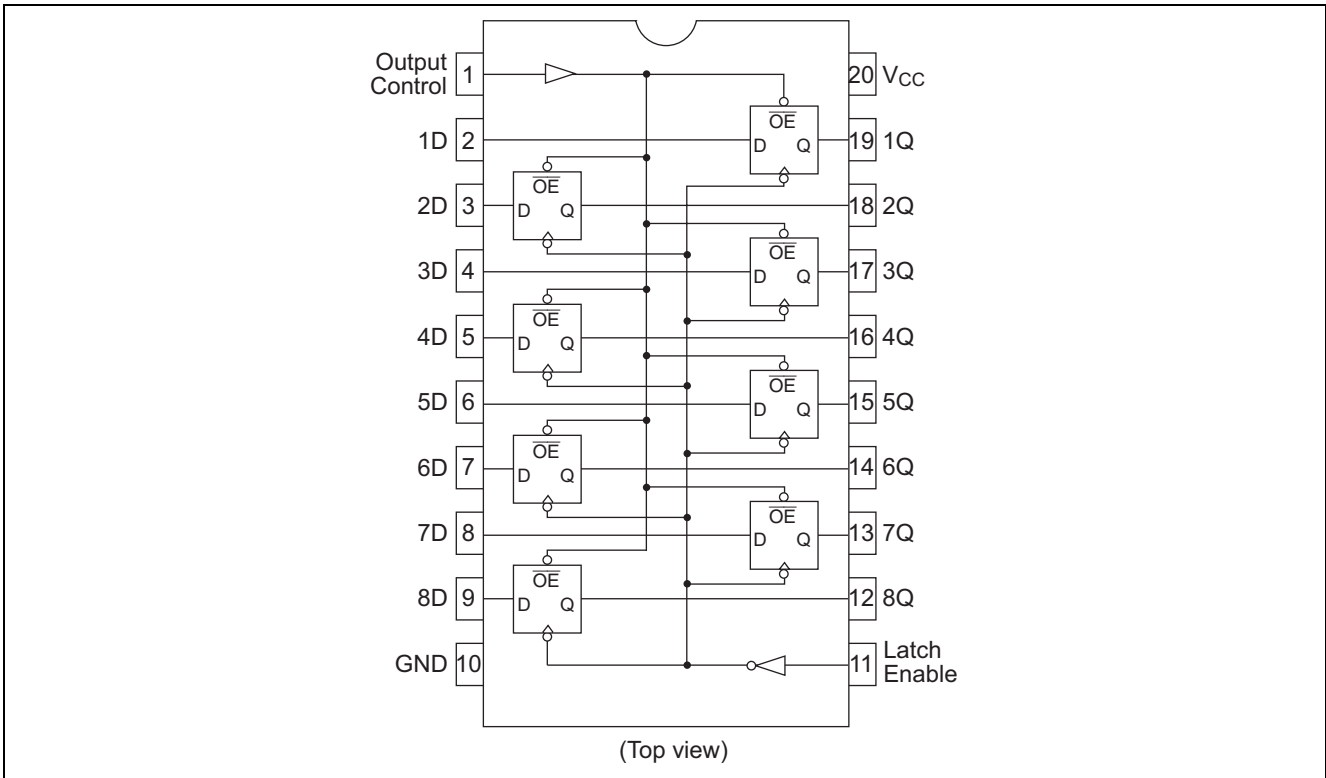
$\bar{Q}_0$  : complement of  $Q_0$  or level of  $\bar{Q}$  before the indicated Steady-state input conditions were established.

## Pin Arrangement

### HD74HCT563

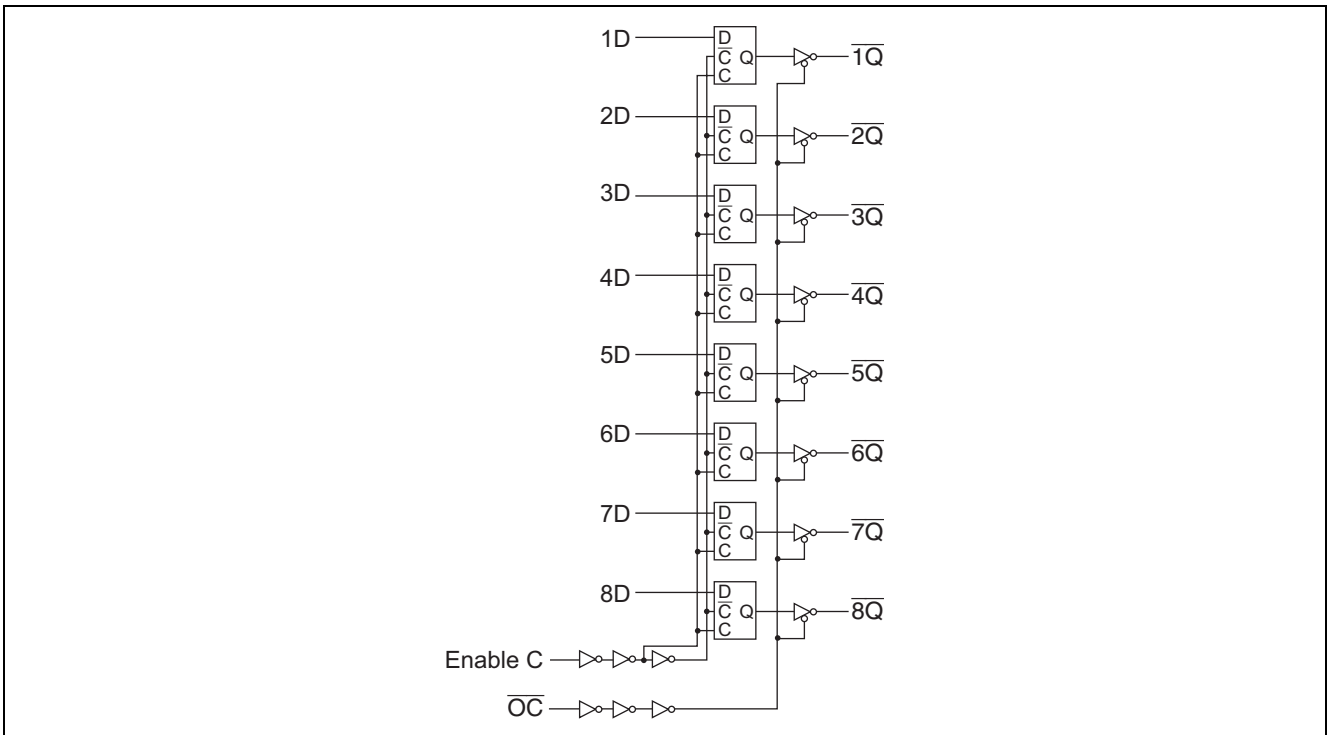


### HD74HCT573

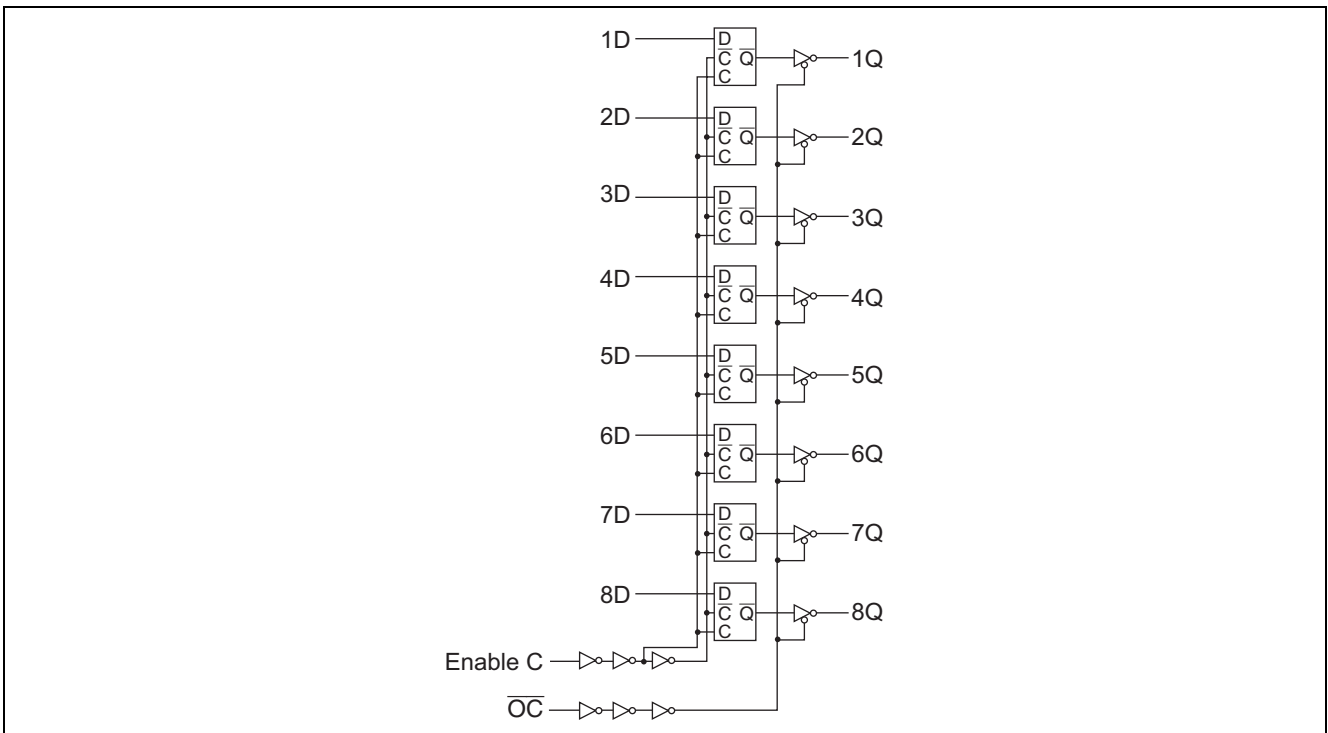


## Logic Diagram

### HD74HCT563



### HD74HCT573



### Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage range	$V_{CC}$	-0.5 to 7.0	V
Input / Output voltage	$V_{IN}, V_{OUT}$	-0.5 to $V_{CC} + 0.5$	V
Input / Output diode current	$I_{IK}, I_{OK}$	$\pm 20$	mA
Output current	$I_O$	$\pm 35$	mA
$V_{CC}$ , GND current	$I_{CC}$ or $I_{GND}$	$\pm 75$	mA
Power dissipation	$P_T$	500	mW
Storage temperature	$T_{stg}$	-65 to +150	$^{\circ}C$

Note: The absolute maximum ratings are values, which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

### Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	$V_{CC}$	4.5 to 5.5	V	
Input / Output voltage	$V_{IN}, V_{OUT}$	0 to $V_{CC}$	V	
Operating temperature	$T_a$	-40 to 85	$^{\circ}C$	
Input rise / fall time <sup>*1</sup>	$t_r, t_f$	0 to 500	ns	$V_{CC} = 4.5 V$

Notes: 1. This item guarantees maximum limit when one input switches.

Waveform: Refer to test circuit of switching characteristics.

### Electrical Characteristics

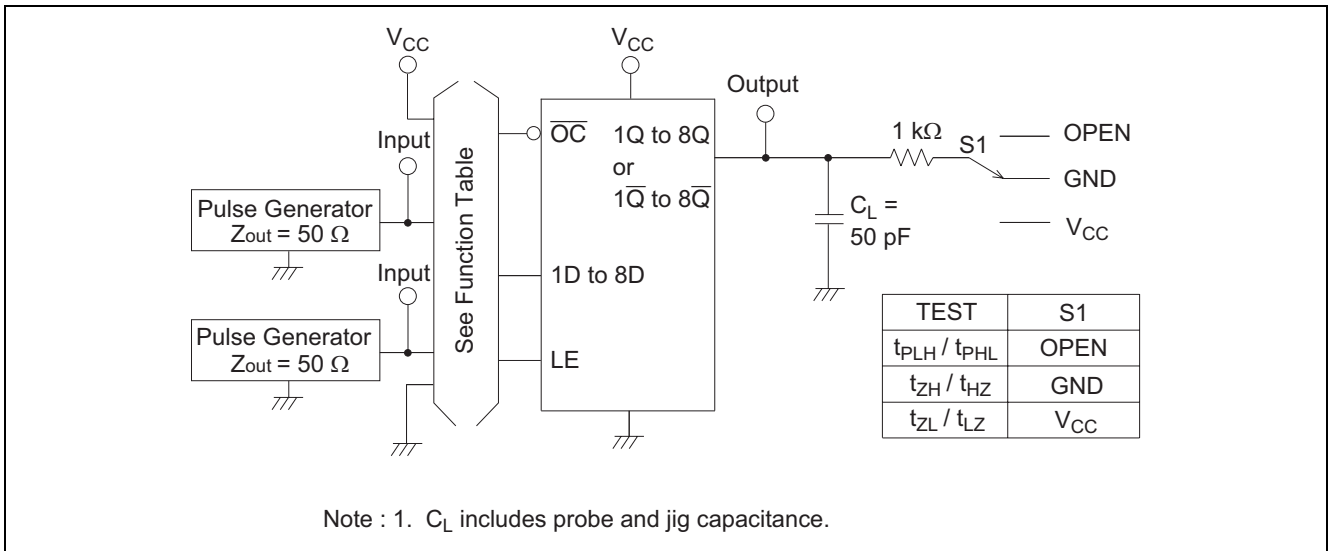
Item	Symbol	$V_{CC}$ (V)	$T_a = 25^{\circ}C$			$T_a = -40 \text{ to } +85^{\circ}C$		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	$V_{IH}$	4.5 to 5.5	2.0	—	—	2.0	—	V		
	$V_{IL}$	4.5 to 5.5	—	—	0.8	—	0.8	V		
Output voltage	$V_{OH}$	4.5	4.4	—	—	4.4	—	V	$V_{in} = V_{IH} \text{ or } V_{IL}$	$I_{OH} = -20 \mu A$
		4.5	4.18	—	—	4.13	—	V		$I_{OH} = -6 \text{ mA}$
	$V_{OL}$	4.5	—	—	0.1	—	0.1	V	$V_{in} = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 20 \mu A$
		4.5	—	—	0.26	—	0.33	V		$I_{OL} = 6 \text{ mA}$
Off-state output current	$I_{OZ}$	5.5	—	—	$\pm 0.5$	—	$\pm 5.0$	$\mu A$	$V_{in} = V_{IH} \text{ or } V_{IL}, V_{out} = V_{CC} \text{ or } GND$	
Input current	$I_{in}$	5.5	—	—	$\pm 0.1$	—	$\pm 1.0$	$\mu A$	$V_{in} = V_{CC} \text{ or } GND$	
Quiescent current	$I_{CC}$	5.5	—	—	4.0	—	40	$\mu A$	$V_{in} = V_{CC} \text{ or } GND, I_{out} = 0 \mu A$	

Switching Characteristics

( $C_L = 50\text{ pF}$ , Input  $t_r = t_f = 6\text{ ns}$ )

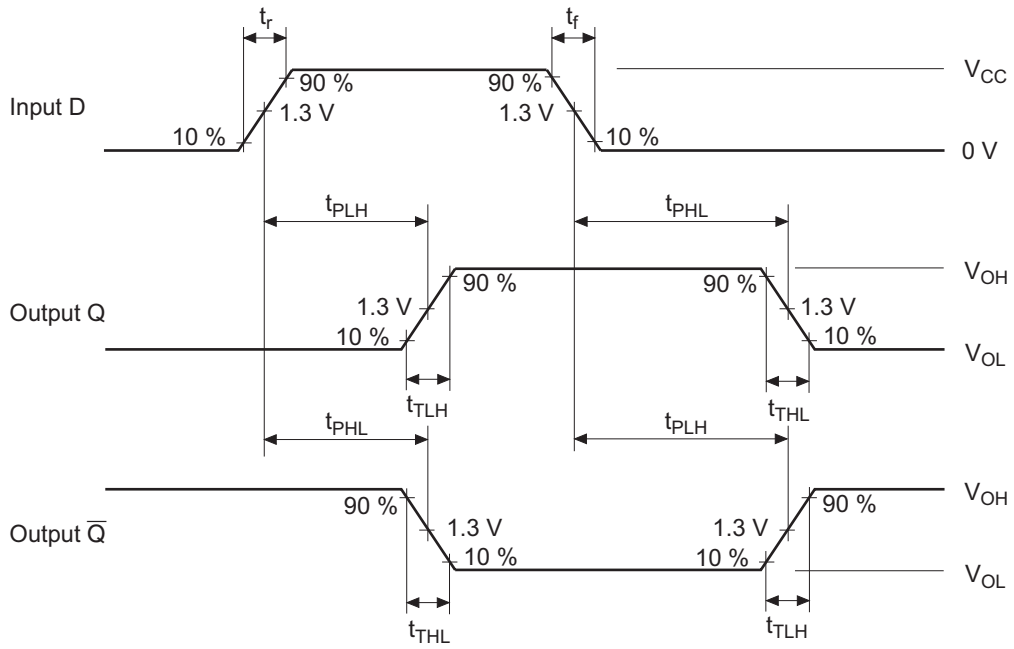
Item	Symbol	$V_{CC}$ (V)	$T_a = 25^\circ\text{C}$			$T_a = -40\text{ to }+85^\circ\text{C}$		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Propagation delay time	$t_{PLH}$	4.5	—	13	22	—	28	ns	Data to Q, $\bar{Q}$
	$t_{PHL}$	4.5	—	13	22	—	28		
	$t_{PLH}$	4.5	—	14	23	—	29	ns	Enable G to Q, $\bar{Q}$
	$t_{PHL}$	4.5	—	14	23	—	29		
Output enable time	$t_{ZL}$	4.5	—	14	30	—	38	ns	
	$t_{ZH}$	4.5	—	15	30	—	38		
Output disable time	$t_{LZ}$	4.5	—	16	30	—	38	ns	
	$t_{HZ}$	4.5	—	17	30	—	38		
Setup time	$t_{su}$	4.5	15	3	—	19	—	ns	
Hold time	$t_h$	4.5	5	-1	—	5	—	ns	
Pulse width	$t_w$	4.5	16	4	—	20	—	ns	
Output rise/fall time	$t_{TLH}$	4.5	—	4	12	—	15	ns	
	$t_{THL}$	4.5	—	4	12	—	15		
Input capacitance	$C_{in}$	—	—	5	10	—	10	pF	

Test Circuit



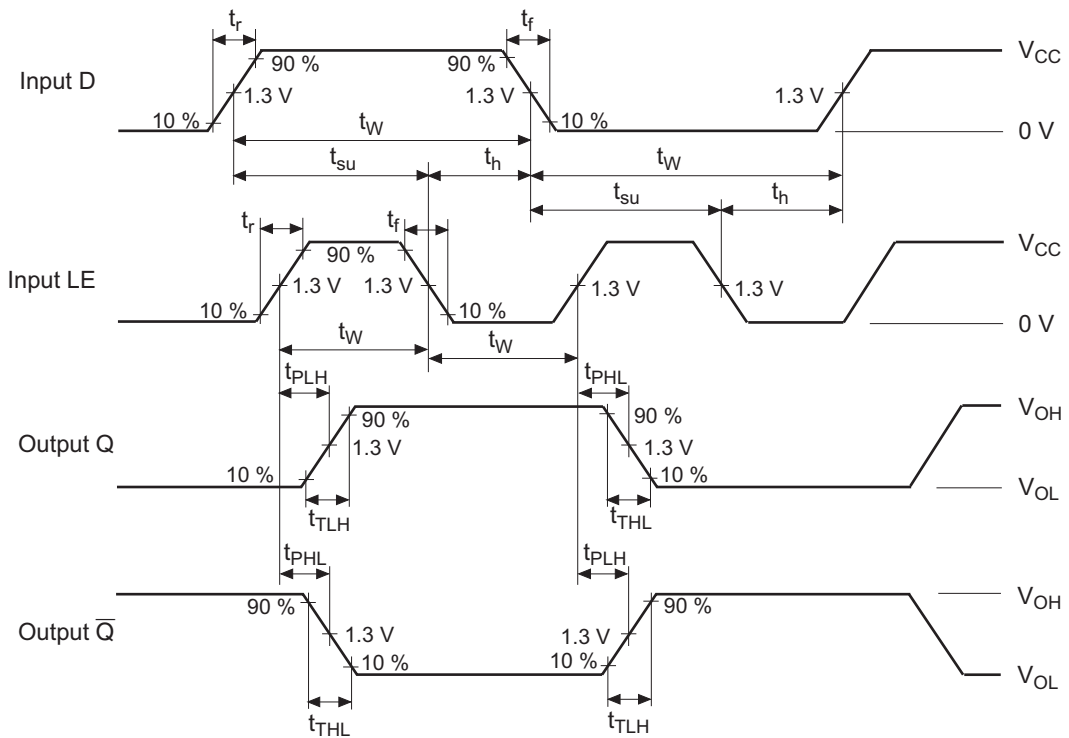
Waveforms

• Waveform – 1



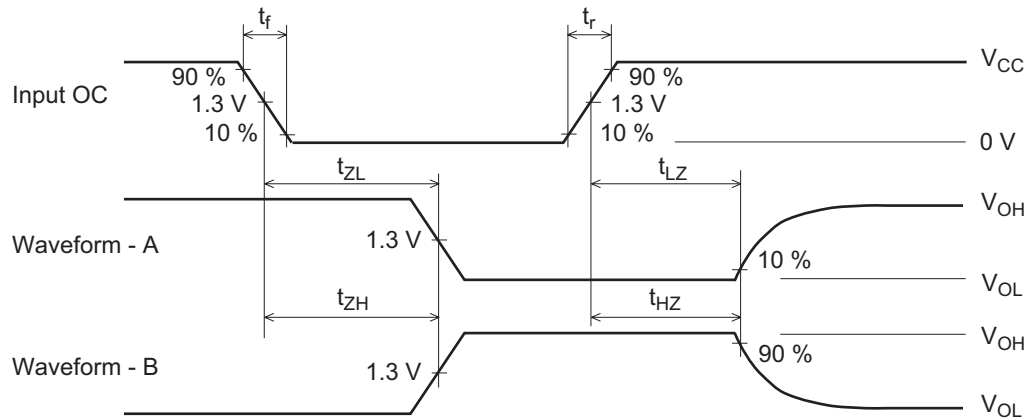
Notes : 1. Input waveform : PRR  $\leq$  1 MHz, duty cycle 50%,  $t_r \leq$  6 ns,  $t_f \leq$  6 ns

• Waveform – 2



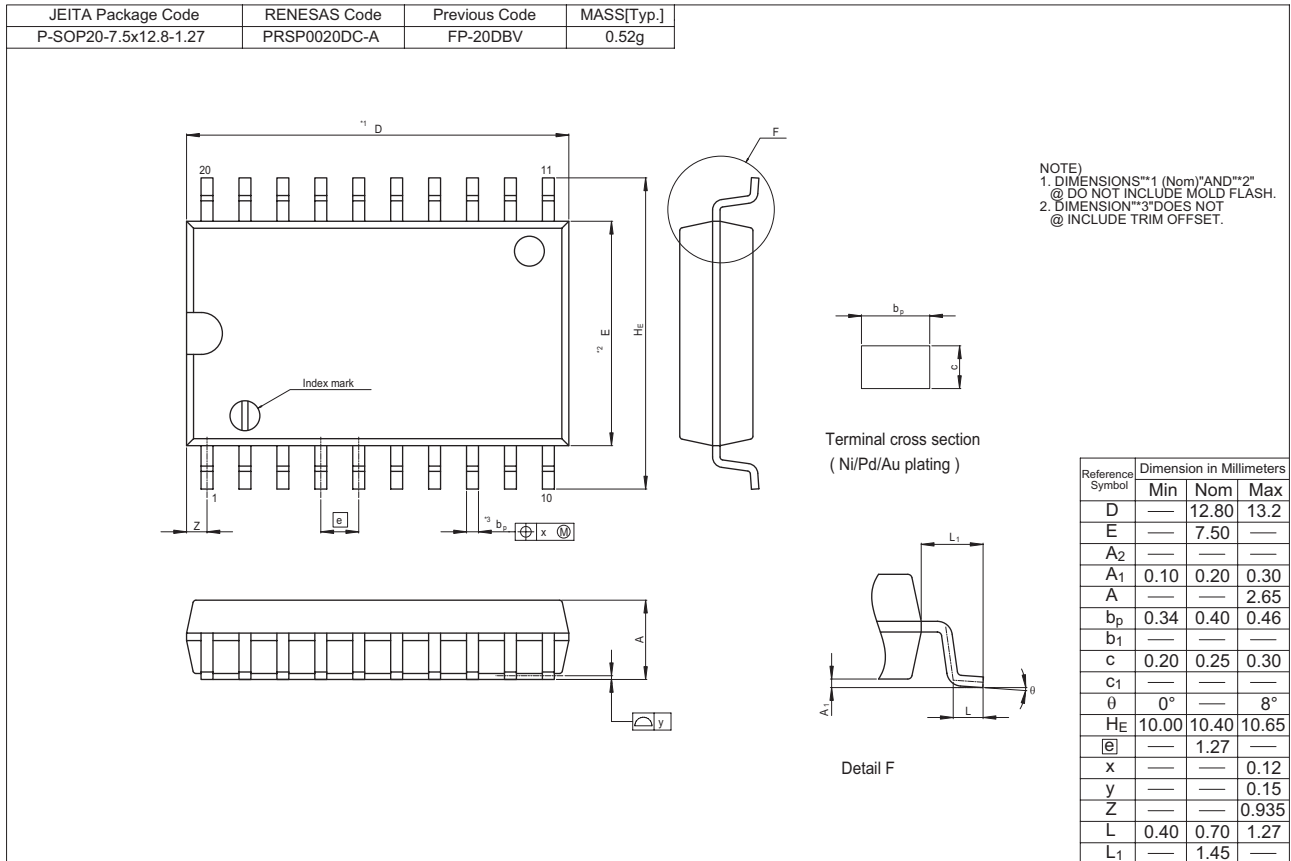
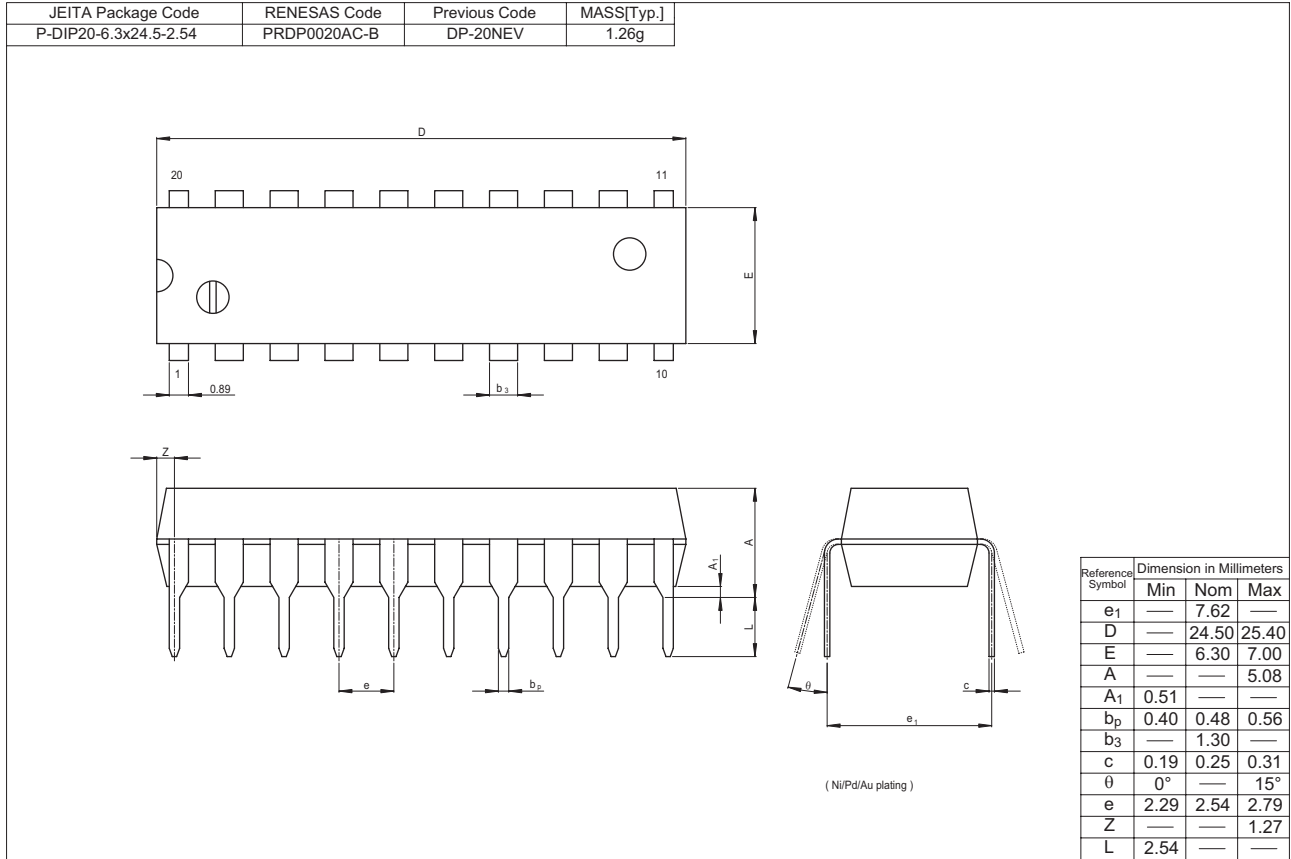
Notes : 1. Input waveform : PRR  $\leq$  1 MHz, duty cycle 50%,  $t_r \leq$  6 ns,  $t_f \leq$  6 ns

• Waveform – 3



- Notes :
1. Input waveform :  $PRR \leq 1 \text{ MHz}$ , duty cycle 50%,  $t_r \leq 6 \text{ ns}$ ,  $t_f \leq 6 \text{ ns}$
  2. Waveform- A is for an output with internal conditions such that the output is low except when disabled by the output control.
  3. Waveform- B is for an output with internal conditions such that the output is high except when disabled by the output control.
  4. The output are measured one at a time with one transition per measurement.

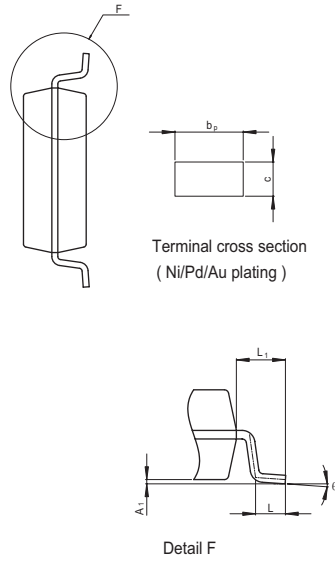
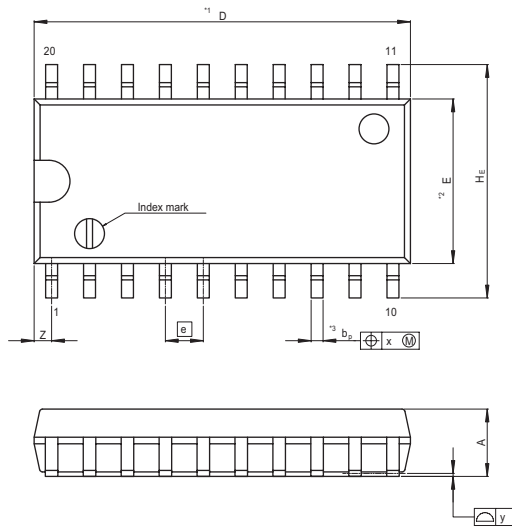
Package Dimensions





# HD74HCT563, HD74HCT573

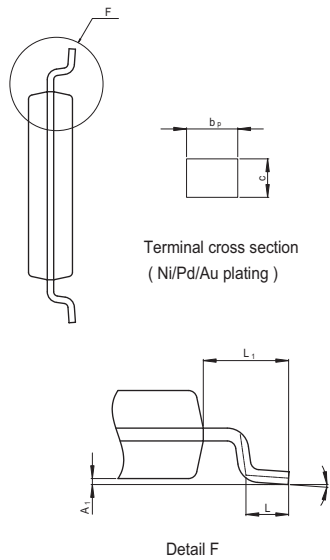
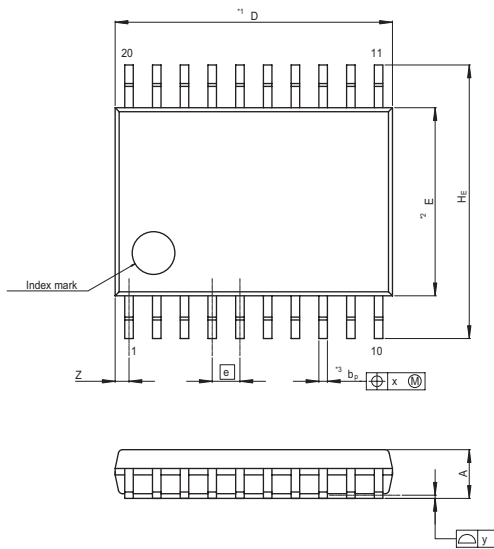
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP20-5.5x12.6-1.27	PRSP0020DD-B	FP-20DAV	0.31g



NOTE)  
 1. DIMENSIONS\*\*1 (Nom)\*\*AND\*\*2\*  
 DO NOT INCLUDE MOLD FLASH.  
 2. DIMENSION\*\*3\*DOES NOT  
 INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	12.60	13.0
E	—	5.50	—
A <sub>2</sub>	—	—	—
A <sub>1</sub>	0.00	0.10	0.20
A	—	—	2.20
b <sub>p</sub>	0.34	0.40	0.46
b <sub>1</sub>	—	—	—
c	0.15	0.20	0.25
c <sub>1</sub>	—	—	—
θ	0°	—	8°
H <sub>E</sub>	7.50	7.80	8.00
Ⓜ	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.80
L	0.50	0.70	0.90
L <sub>1</sub>	—	1.15	—

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-TSSOP20-4.4x6.5-0.65	PTSP0020JB-A	TTP-20DAV	0.07g



NOTE)  
 1. DIMENSIONS\*\*1 (Nom)\*\*AND\*\*2\*  
 DO NOT INCLUDE MOLD FLASH.  
 2. DIMENSION\*\*3\*DOES NOT  
 INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	6.50	6.80
E	—	4.40	—
A <sub>2</sub>	—	—	—
A <sub>1</sub>	0.03	0.07	0.10
A	—	—	1.10
b <sub>p</sub>	0.15	0.20	0.25
b <sub>1</sub>	—	—	—
c	0.10	0.15	0.20
c <sub>1</sub>	—	—	—
θ	0°	—	8°
H <sub>E</sub>	6.20	6.40	6.60
Ⓜ	—	0.65	—
x	—	—	0.13
y	—	—	0.10
Z	—	—	0.65
L	0.4	0.5	0.6
L <sub>1</sub>	—	1.0	—

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