

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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# HD74HCT640

Octal Bus Transceivers (with inverted 3-state outputs)  
 Octal Bus Transceivers (with 3-state outputs)

REJ03D0672-0300  
 (Previous ADE-205-562A)  
 Rev.3.00  
 Mar 30, 2006

## Description

The HD74HCT640 has one active low enable input ( $\overline{G}$ ), and a direction control (DIR). When the DIR input is high, data flows from the A inputs to the B outputs. When DIR is low, data flows from B to A.

The HD74HCT640 transfers inverted data from one bus to the other.

## Features

- LSTTL Output Logic Level Compatibility as well as CMOS Output Compatibility
- High Speed Operation:  $t_{pd}$  (A to B) = 14.5 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  $\mu$ A max
- Low Quiescent Supply Current:  $I_{CC}$  (static) = 4  $\mu$ A max ( $T_a = 25^\circ\text{C}$ )
- Ordering Information

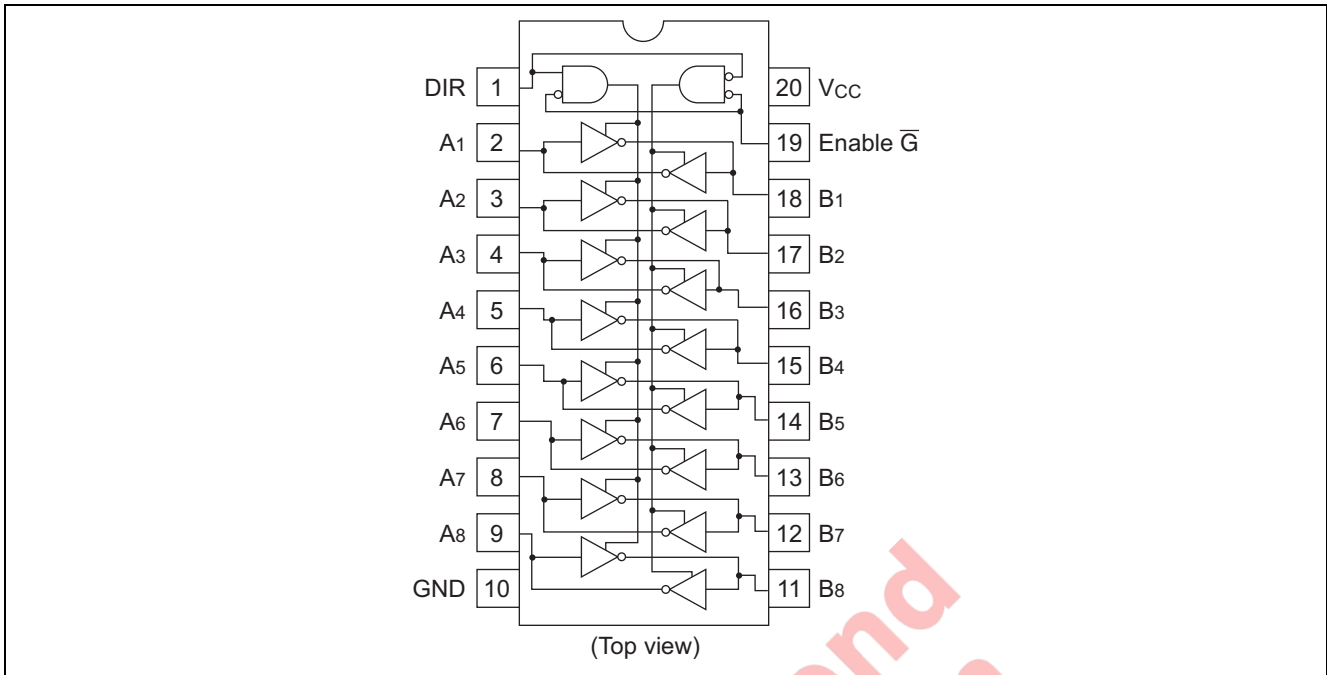
Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74HCT640P	DIP-20 pin	PRDP0020AC-B (DP-20NEV)	P	—
HD74HCT640FPEL	SOP-20 pin (JEITA)	PRSP0020DD-B (FP-20DAV)	FP	EL (2,000 pcs/reel)
HD74HCT640RPEL	SOP-20 pin (JEDEC)	PRSP0020DC-A (FP-20DBV)	RP	EL (1,000 pcs/reel)

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

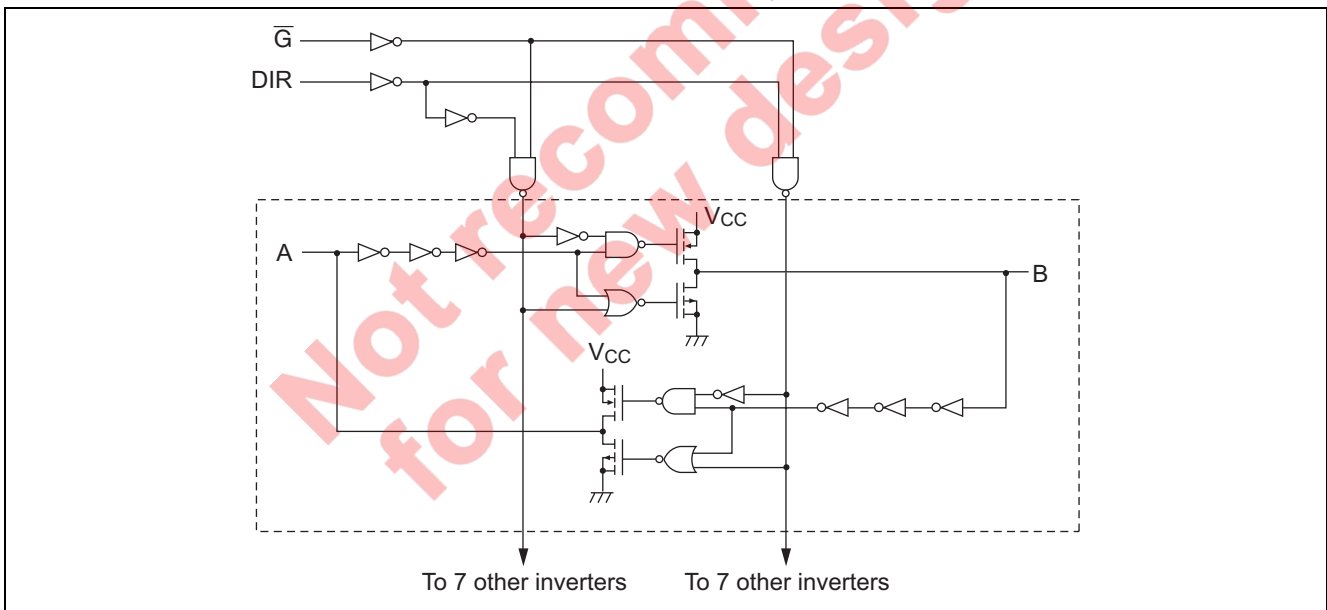
## Function Table

Control Input		Operation
$\overline{G}$	DIR	HD74HCT640
L	L	$\overline{B}$ data to A bus
L	H	$\overline{A}$ data to B bus
H	X	Isolation

Pin Arrangement



Logic Diagram



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	$I_{OUT}$	$\pm 35$	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 <sub>CC</sub>	4.5 to 5.5	V	
Input / Output voltage	V <sub>IN</sub> , V <sub>OUT</sub>	0 to V <sub>CC</sub>	V	
Operating temperature	Ta	-40 to 85	°C	
Input rise / fall time <sup>*1</sup>	t <sub>r</sub> , t <sub>f</sub>	0 to 500	ns	V <sub>CC</sub> = 4.5 V

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

Waveform: Refer to test circuit of switching characteristics.

### Electrical Characteristics

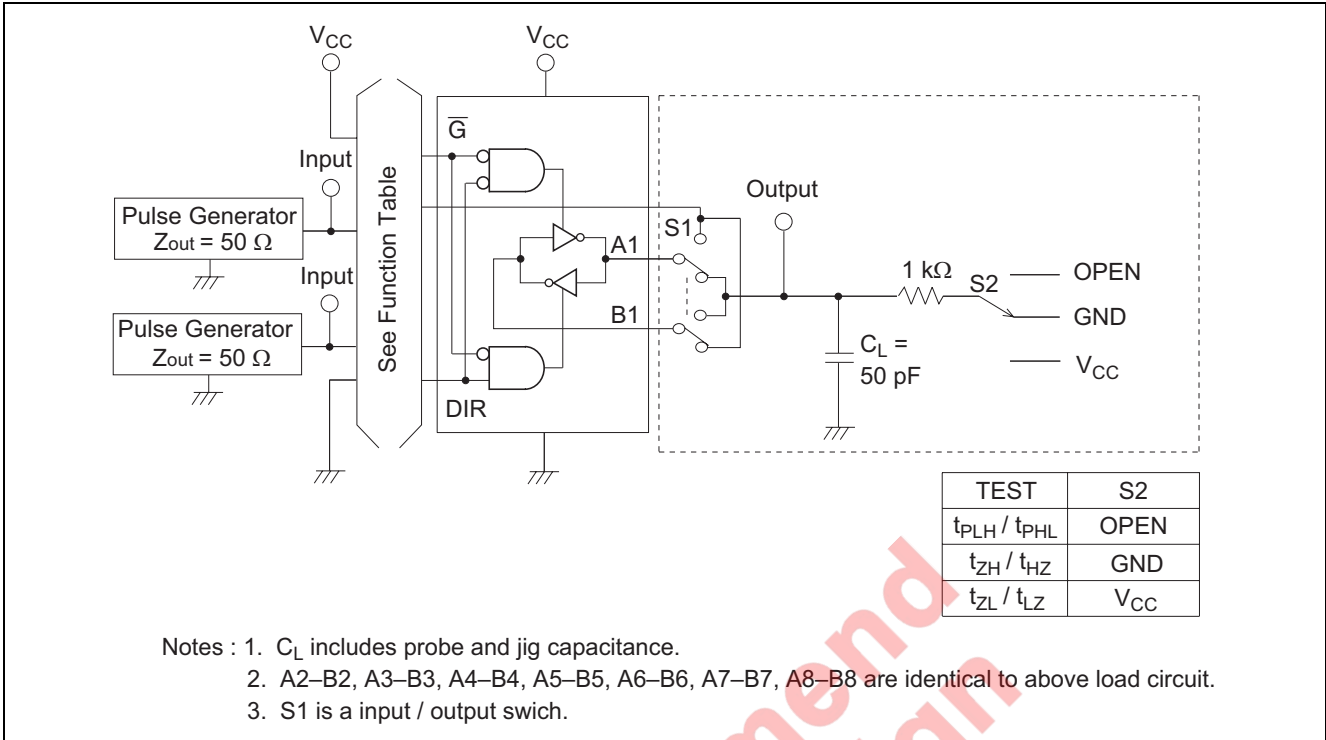
Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	V <sub>IH</sub>	4.5 to 5.5	2.0	—	—	2.0	—	V		
	V <sub>IL</sub>	4.5 to 5.5	—	—	0.8	—	0.8	V		
Output voltage	V <sub>OH</sub>	4.5	4.4	—	—	4.4	—	V	Vin = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -20 μA
		4.5	4.18	—	—	4.13	—	V		I <sub>OH</sub> = -6 mA
	V <sub>OL</sub>	4.5	—	—	0.1	—	0.1	V	Vin = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 20 μA
		4.5	—	—	0.26	—	0.33	V		I <sub>OL</sub> = 6 mA
Off-state output current	I <sub>OZ</sub>	5.5	—	—	±0.5	—	±5.0	μA	Vin = V <sub>IH</sub> or V <sub>IL</sub> , Vout = V <sub>CC</sub> or GND	
Input current	I <sub>in</sub>	5.5	—	—	±0.1	—	±1.0	μA	Vin = V <sub>CC</sub> or GND	
Quiescent supply current	I <sub>CC</sub>	5.5	—	—	4.0	—	40	μA	Vin = V <sub>CC</sub> or GND, Iout = 0 mA	

### Switching Characteristics

(C<sub>L</sub> = 50 pF, Input t<sub>r</sub> = t<sub>f</sub> = 6 ns)

Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Propagation delay time	t <sub>PLH</sub>	4.5	—	13	18	—	23	ns		
	t <sub>PHL</sub>	4.5	—	16	18	—	23			
Output enable time	t <sub>ZH</sub>	4.5	—	16	46	—	58	ns		
	t <sub>ZL</sub>	4.5	—	16	46	—	58			
Output disable time	t <sub>HZ</sub>	4.5	—	17	43	—	54	ns		
	t <sub>LZ</sub>	4.5	—	21	43	—	54			
Output rise/fall time	t <sub>TLH</sub> t <sub>THL</sub>	4.5	—	4	12	—	15	ns		
Input capacitance	C <sub>in</sub>	—	—	5	10	—	10	pF		

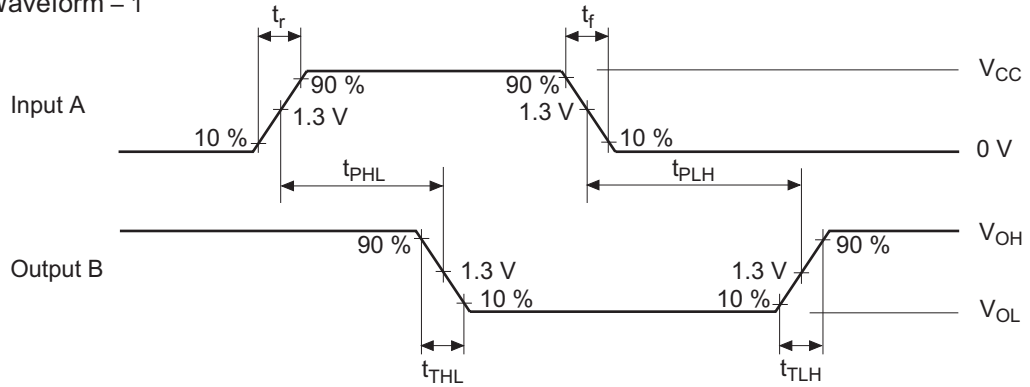
Test Circuit



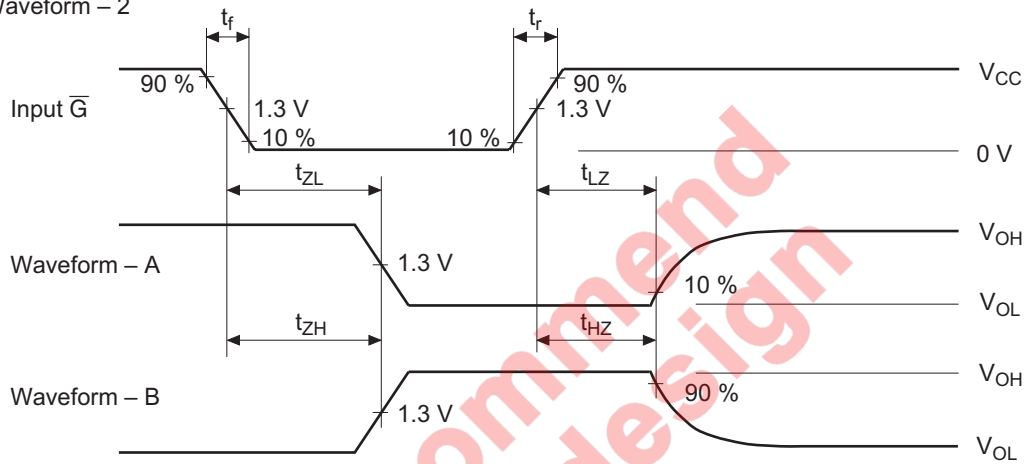
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Waveforms

• Waveform – 1

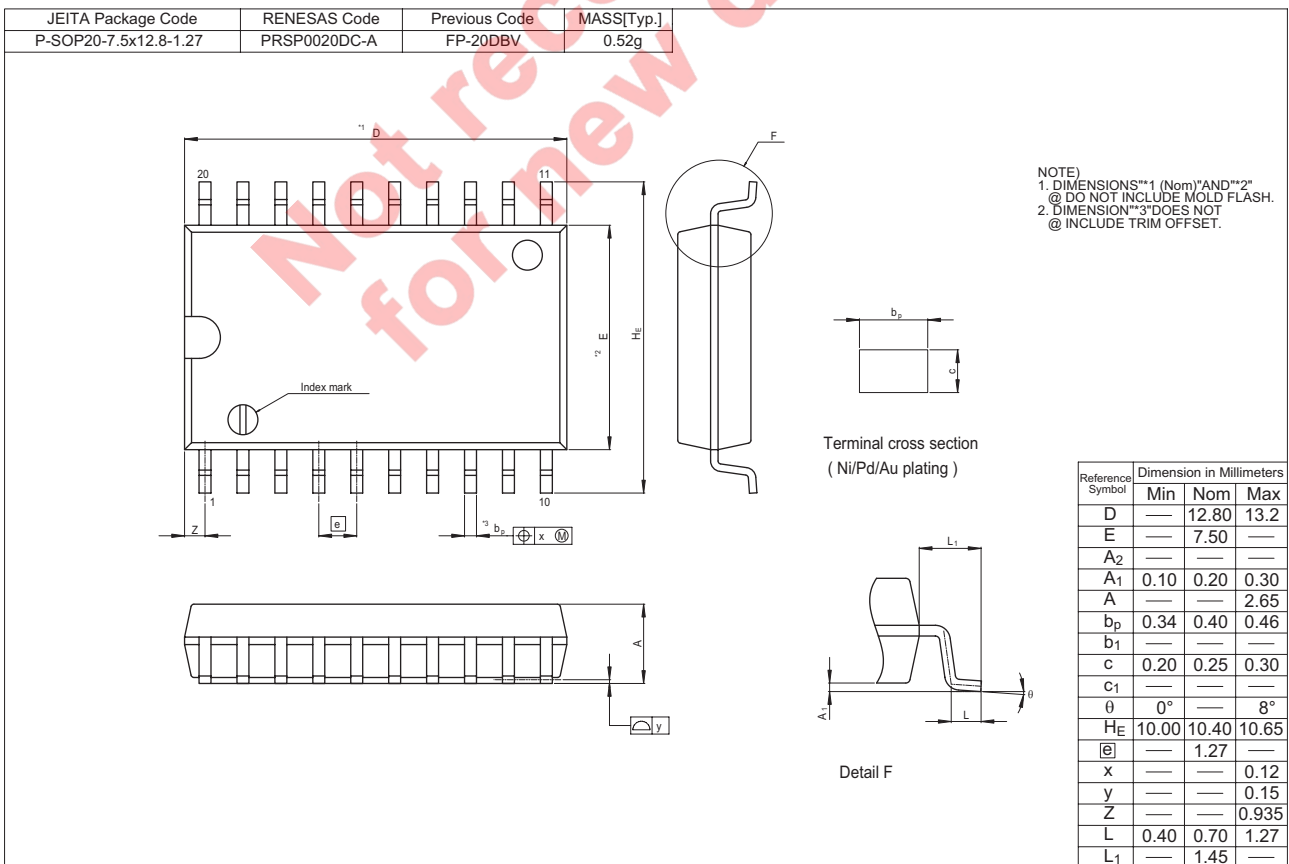
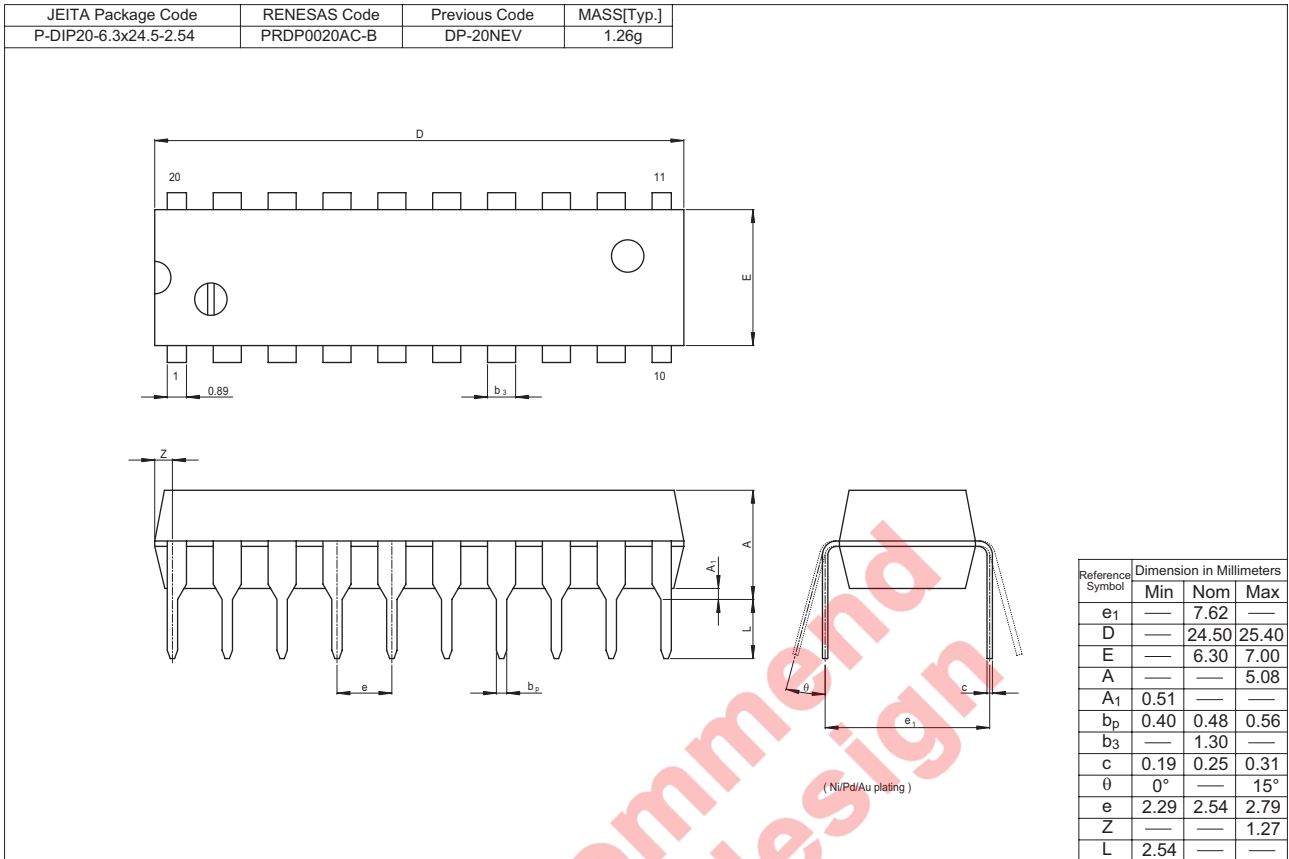


• Waveform – 2



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

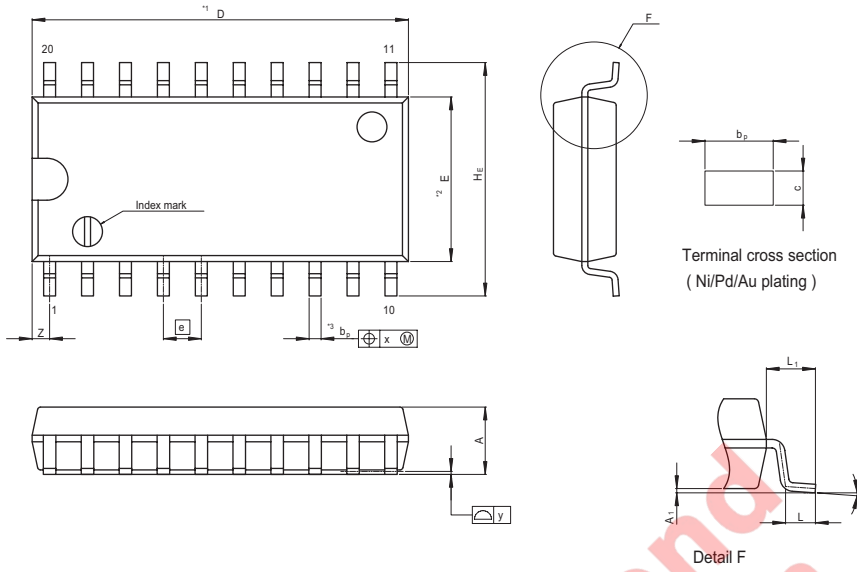
Package Dimensions





# HD74HCT640

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>	—	—	—
$\theta$	0°	—	8°
H <sub>E</sub>	7.50	7.80	8.00
$\text{[e]}$	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.80
L	0.50	0.70	0.90
L <sub>1</sub>	—	1.15	—

Not recommended for new design

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