

# HD74HC240

## Octal Buffers/Line Drivers/Line Receivers (with inverted 3-state outputs)

REJ03D0594-0200  
(Previous ADE-205-471)  
Rev.2.00  
Jan 31, 2006

### Description

The HD74HC240 is an inverting buffer and has two active low enables ( $\overline{1G}$  and  $\overline{2G}$ ). Each enable independently controls 4 buffers. This device does not have schmitt trigger inputs.

### Features

- High Speed Operation:  $t_{pd} = 10$  ns typ ( $C_L = 50$  pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage:  $V_{CC} = 2$  to 6 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)
HD74HC240P	DILP-20 pin	PRDP0020AC-B (DP-20NEV)	P	—
HD74HC240FPEL	SOP-20 pin (JEITA)	PRSP0020DD-B (FP-20DAV)	FP	EL (2,000 pcs/reel)
HD74HC240RPEL	SOP-20 pin (JEDEC)	PRSP0020DC-A (FP-20DBV)	RP	EL (1,000 pcs/reel)
HD74HC240TELL	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		Output
$\overline{G}$	A	Y
H	X	Z
L	H	L
L	L	H

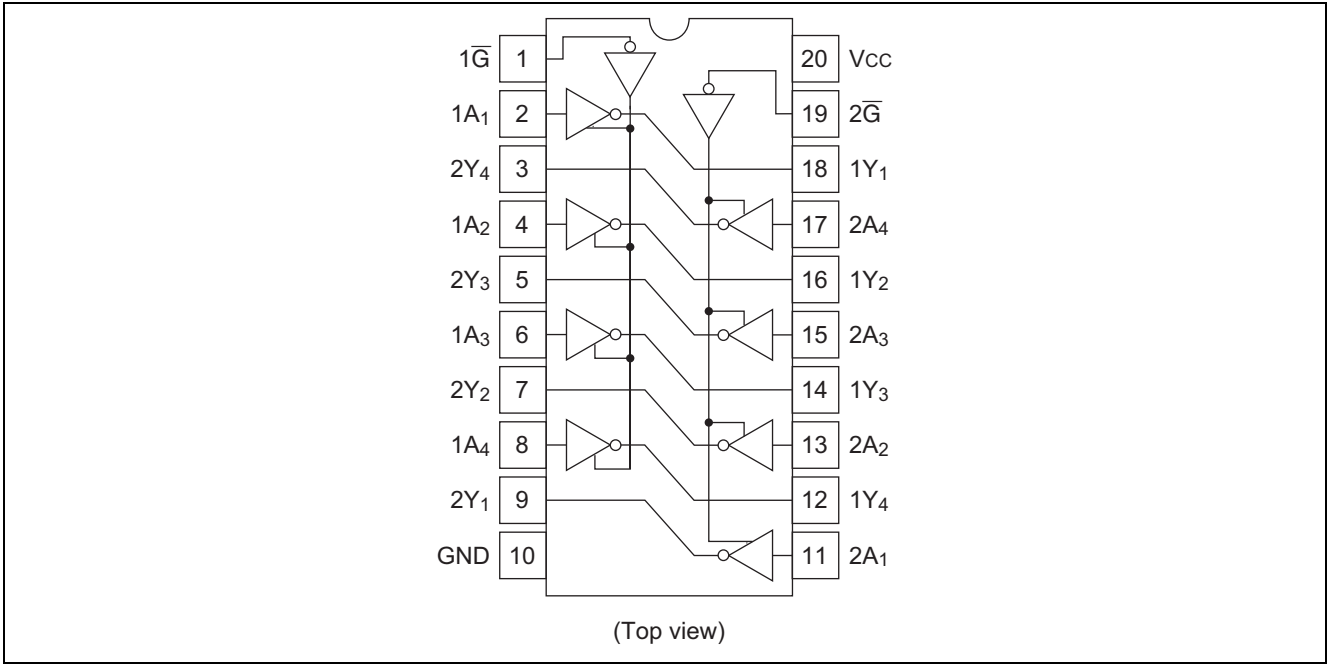
H : high level

L : low level

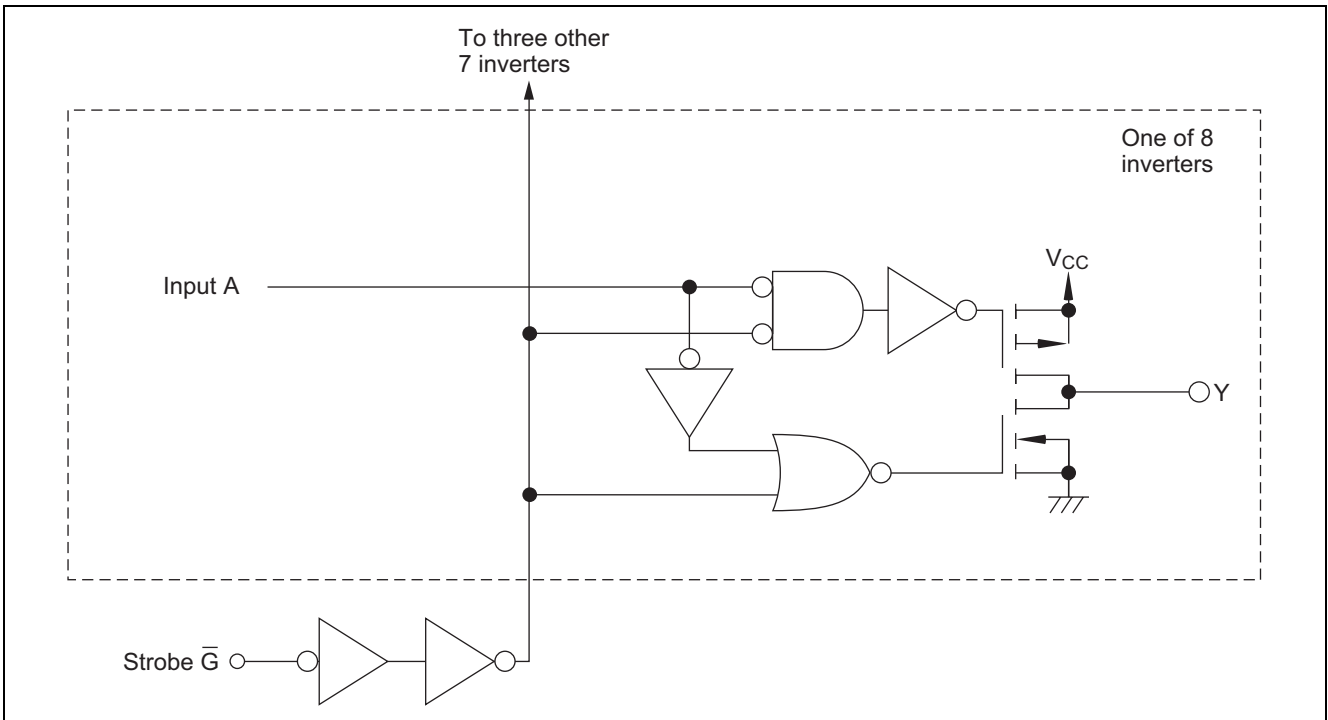
X : irrelevant

Z : off (high-impedance) state of a 3-state output

### 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	$I_O$	$\pm 35$	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	°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	$V_{CC}$	2 to 6	V	
Input / Output voltage	$V_{IN}, V_{OUT}$	0 to $V_{CC}$	V	
Operating temperature	$T_a$	-40 to 85	°C	
Input rise / fall time <sup>*1</sup>	$t_r, t_f$	0 to 1000	ns	$V_{CC} = 2.0$ V
		0 to 500		$V_{CC} = 4.5$ V
		0 to 400		$V_{CC} = 6.0$ V

Notes: 1. This item guarantees maximum limit when one input switches.  
Waveform: Refer to test circuit of switching characteristics.

### Electrical Characteristics

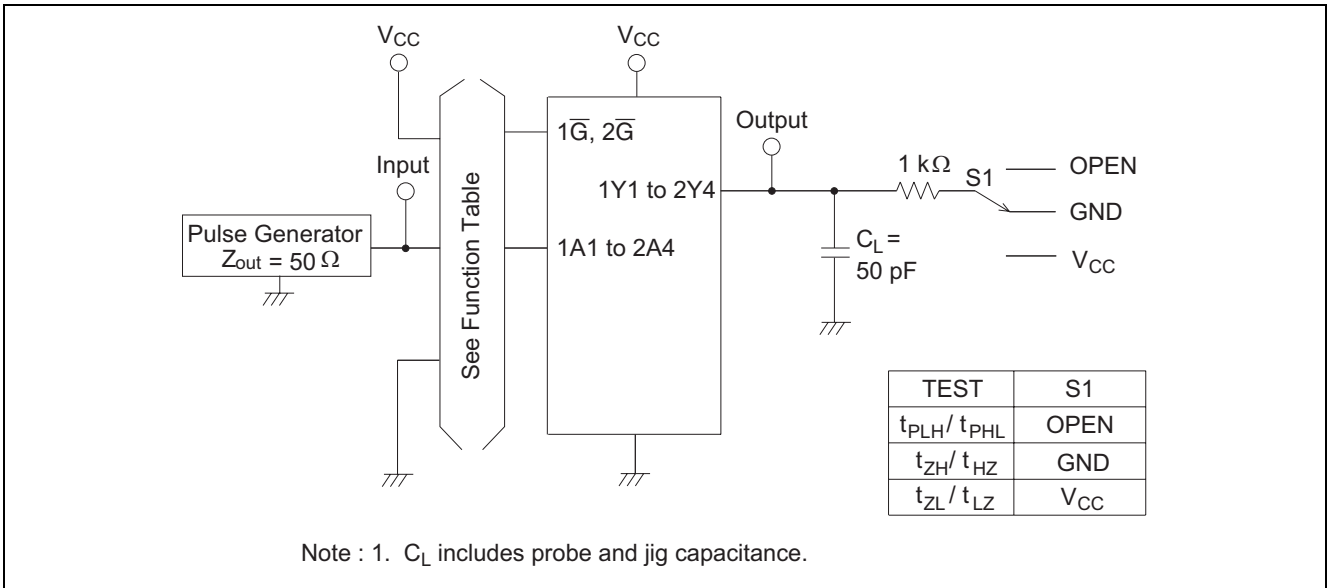
Item	Symbol	$V_{CC}$ (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } +85^\circ\text{C}$		Unit	Test Conditions		
			Min	Typ	Max	Min	Max				
Input voltage	$V_{IH}$	2.0	1.5	—	—	1.5	—	V			
		4.5	3.15	—	—	3.15	—				
		6.0	4.2	—	—	4.2	—				
	$V_{IL}$	2.0	—	—	0.5	—	0.5	V			
		4.5	—	—	1.35	—	1.35				
		6.0	—	—	1.8	—	1.8				
Output voltage	$V_{OH}$	2.0	1.9	2.0	—	1.9	—	V	$V_{in} = V_{IH}$ or $V_{IL}$	$I_{OH} = -20$ $\mu\text{A}$	
		4.5	4.4	4.5	—	4.4	—			$I_{OH} = -6$ mA	
		6.0	5.9	6.0	—	5.9	—			$I_{OH} = -7.8$ mA	
		4.5	4.18	—	—	4.13	—				
		6.0	5.68	—	—	5.63	—				
	$V_{OL}$	2.0	—	0.0	0.1	—	0.1	V	$V_{in} = V_{IH}$ or $V_{IL}$	$I_{OL} = 20$ $\mu\text{A}$	
		4.5	—	0.0	0.1	—	0.1				
		6.0	—	0.0	0.1	—	0.1				
		4.5	—	—	0.26	—	0.33				$I_{OL} = 6$ mA
		6.0	—	—	0.26	—	0.33				$I_{OL} = 7.8$ mA
Off-state output current	$I_{OZ}$	6.0	—	—	$\pm 0.5$	—	$\pm 5.0$	$\mu\text{A}$	$V_{in} = V_{IH}$ or $V_{IL}$ , $V_{out} = V_{CC}$ or GND		
Input current	$I_{in}$	6.0	—	—	$\pm 0.1$	—	$\pm 1.0$	$\mu\text{A}$	$V_{in} = V_{CC}$ or GND		
Quiescent supply current	$I_{CC}$	6.0	—	—	4.0	—	40	$\mu\text{A}$	$V_{in} = V_{CC}$ or GND, $I_{out} = 0$ $\mu\text{A}$		

**Switching Characteristics**

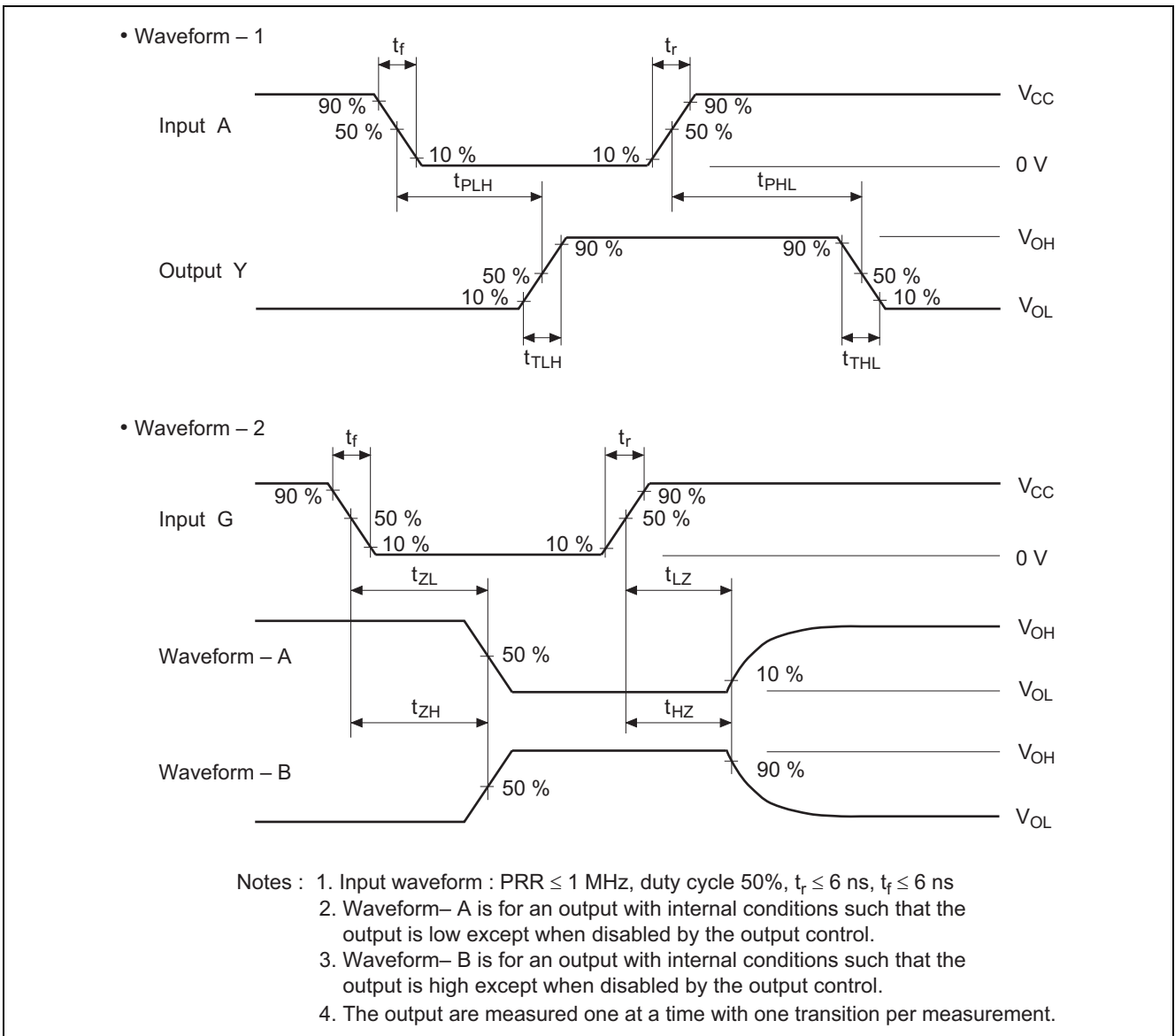
( $C_L = 50$  pF, Input  $t_r = t_f = 6$  ns)

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>PHL</sub>	2.0	—	—	90	—	115	ns	
		4.5	—	10	18	—	23		
		6.0	—	—	15	—	20		
	t <sub>PLH</sub>	2.0	—	—	90	—	115	ns	
		4.5	—	10	18	—	23		
		6.0	—	—	15	—	20		
Output enable time	t <sub>ZL</sub>	2.0	—	—	150	—	190	ns	
		4.5	—	11	30	—	38		
		6.0	—	—	26	—	33		
	t <sub>ZH</sub>	2.0	—	—	150	—	190	ns	
		4.5	—	12	30	—	38		
		6.0	—	—	26	—	33		
Output disable time	t <sub>LZ</sub>	2.0	—	—	150	—	190	ns	
		4.5	—	16	30	—	38		
		6.0	—	—	26	—	33		
	t <sub>HZ</sub>	2.0	—	—	150	—	190	ns	
		4.5	—	19	30	—	38		
		6.0	—	—	26	—	33		
Output rise/fall time	t <sub>TLH</sub>	2.0	—	—	60	—	75	ns	
	t <sub>THL</sub>	4.5	—	4	12	—	15		
	t <sub>THL</sub>	6.0	—	—	10	—	13		
Input capacitance	C <sub>in</sub>	—	—	5	10	—	10	pF	

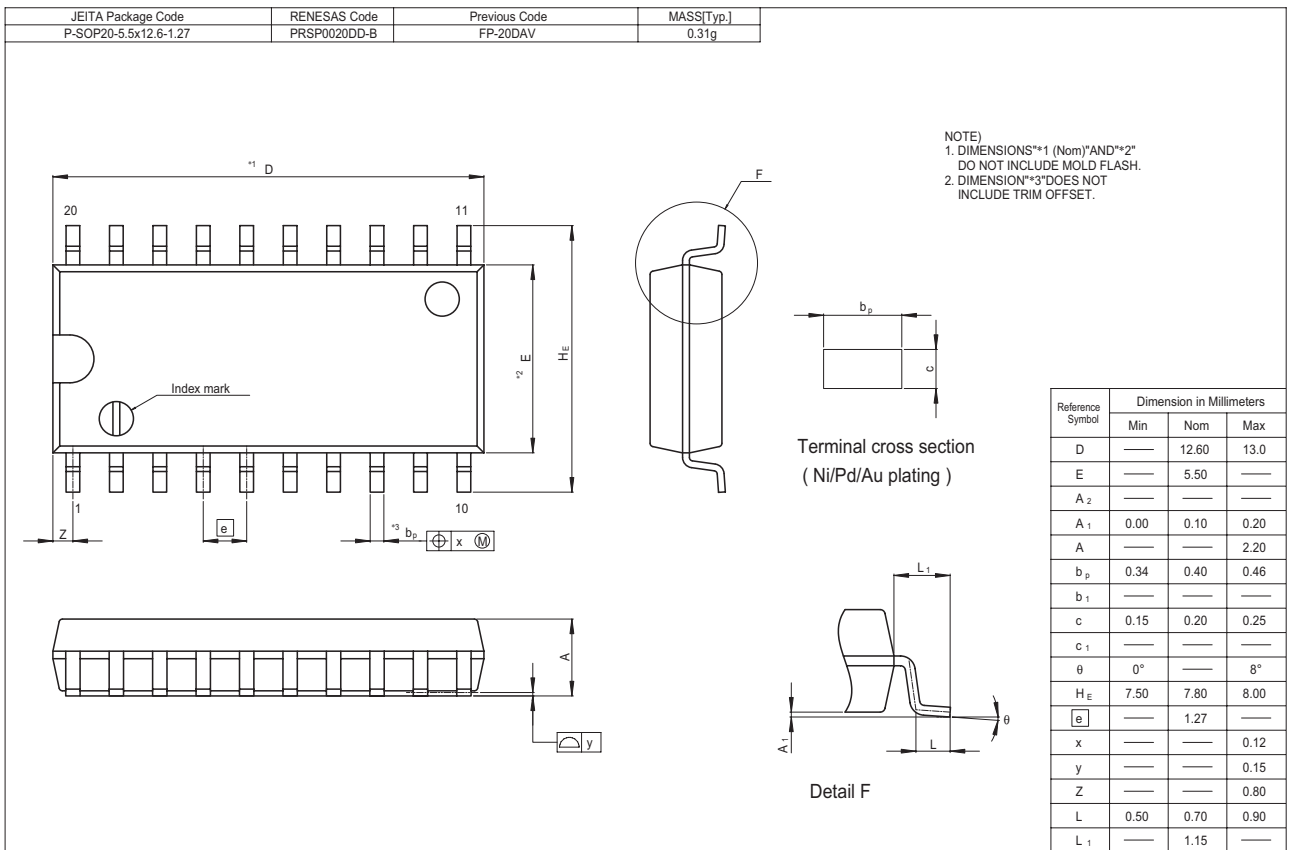
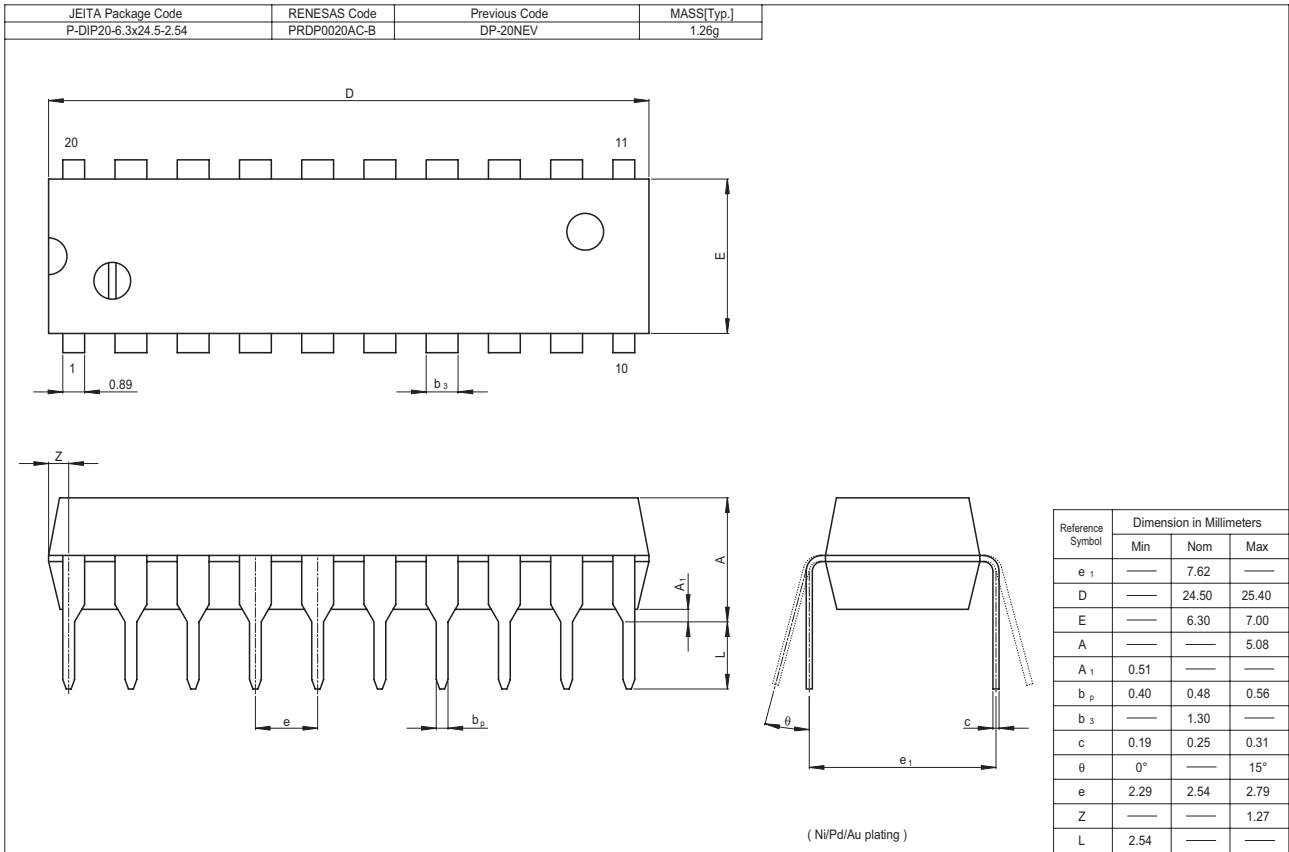
Test Circuit



Waveforms

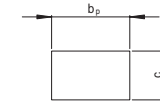
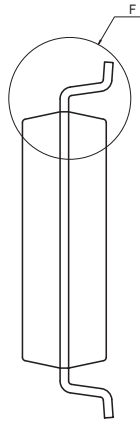
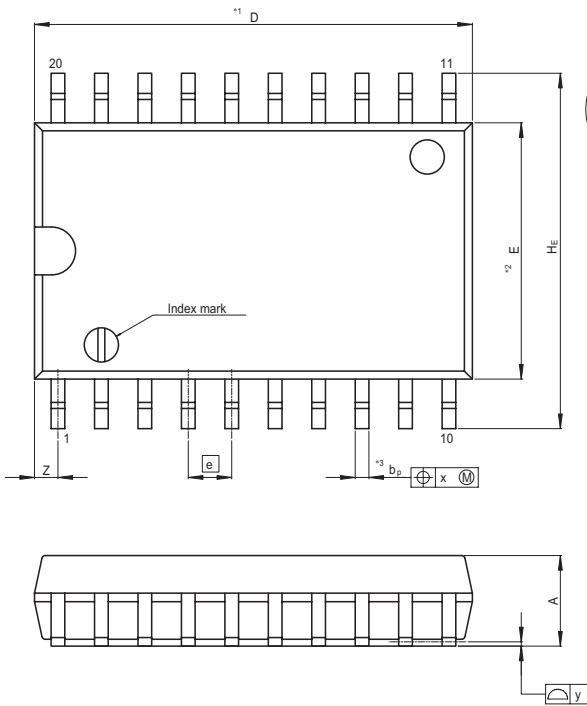


Package Dimensions

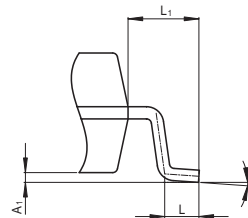


# HD74HC240

JEITA Package Code P-SOP20-7.5x12.8-1.27	RENESAS Code PRSP0020DC-A	Previous Code FP-20DBV	MASS[Typ.] 0.52g
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Terminal cross section  
( Ni/Pd/Au plating )

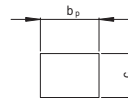
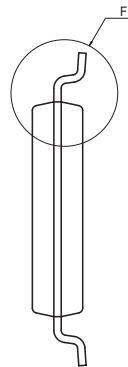
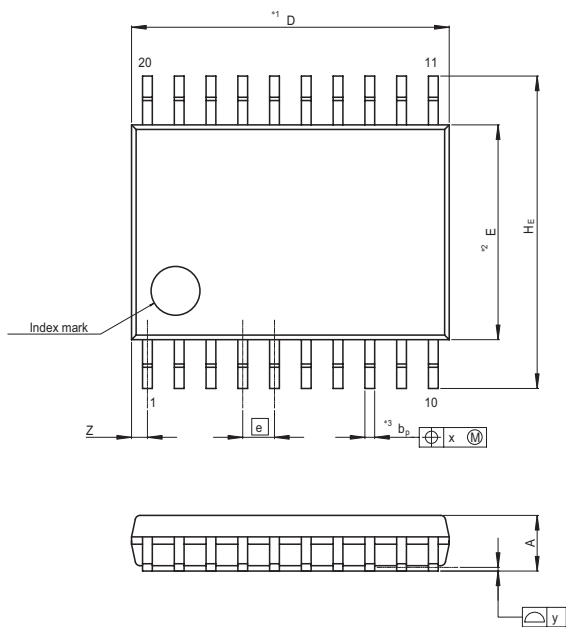


Detail F

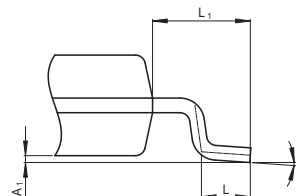
NOTE)  
1. DIMENSIONS\*\*1 (Nom)\*\*AND\*\*2\*  
@ DO NOT INCLUDE MOLD FLASH.  
2. DIMENSION\*\*3\*DOES NOT  
@ INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	12.80	13.2
E	—	7.50	—
A <sub>2</sub>	—	—	—
A <sub>1</sub>	0.10	0.20	0.30
A	—	—	2.65
b <sub>p</sub>	0.34	0.40	0.46
b <sub>1</sub>	—	—	—
c	0.20	0.25	0.30
c <sub>1</sub>	—	—	—
θ	0°	—	8°
H <sub>E</sub>	10.00	10.40	10.65
e	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.935
L	0.40	0.70	1.27
L <sub>1</sub>	—	1.45	—

JEITA Package Code P-TSSOP20-4.4x6.5-0.65	RENESAS Code PTSP0020JB-A	Previous Code TTP-20DAV	MASS[Typ.] 0.07g
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Terminal cross section  
( Ni/Pd/Au plating )



Detail F

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
e	—	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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