

# HD74HC682, HD74HC684

## 8-bit Magnitude Comparator

REJ03D0642-0200  
 (Previous ADE-205-528)  
 Rev.2.00  
 Mar 30, 2006

### Description

These magnitude comparators perform comparisons of two eight-bit binary or BCD words. All types provide  $\overline{P=Q}$  outputs and provide  $\overline{P>Q}$  outputs. The HD74HC682 features 20 k $\Omega$  pullup termination resistors on the Q inputs for analog or switch data.

Type	$\overline{P=Q}$	$\overline{P>Q}$	Output Enable	20 k $\Omega$ Pullup
HD74HC682	Yes	Yes	No	Yes
HD74HC684	Yes	Yes	No	No

### Features

- High Speed Operation
- High Output Current: Fanout of 10 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)
HD74HC682P HD74HC684P	DILP-20 pin	PRDP0020AC-B (DP-20NEV)	P	—
HD74HC682RPEL HD74HC684RPEL	SOP-20 pin (JEDEC)	PRSP0020DC-A (FP-20DBV)	RP	EL (1,000 pcs/reel)

### Function Table

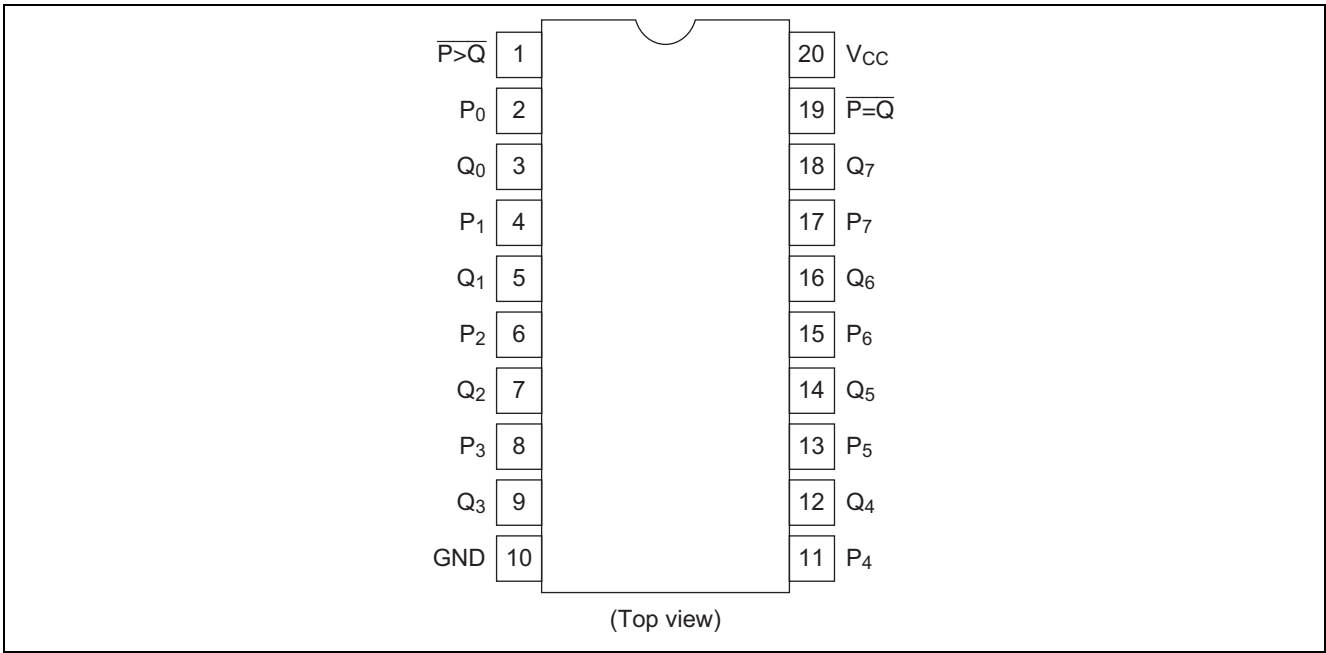
Input Data	Outputs	
P, Q	$\overline{P=Q}$	$\overline{P>Q}$
$P = Q$	L	H
$P > Q$	H	L
$P < Q$	H	H

Note: 1. The  $\overline{P<Q}$  function can be generated by applying the  $\overline{P=Q}$  and  $\overline{P>Q}$  Outputs to a 2-input NAND gate.

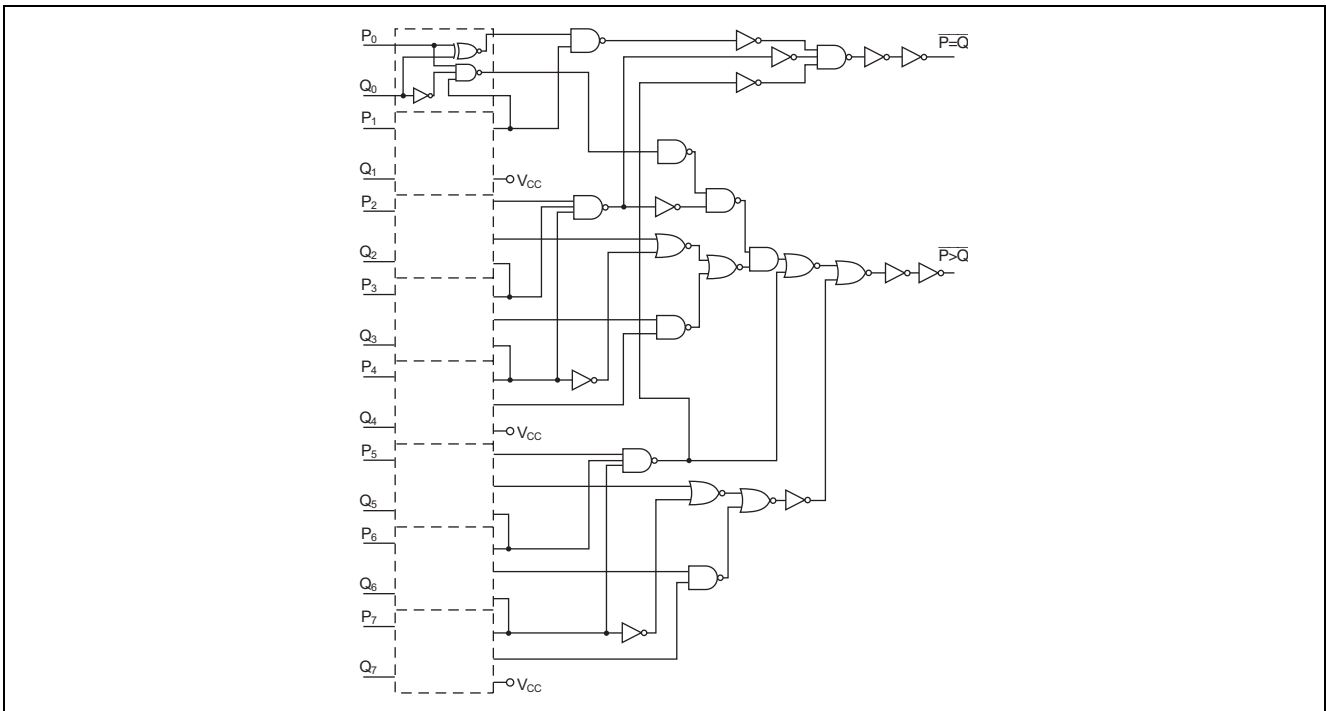
H : high level

L : low level

### 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	$I_{OUT}$	$\pm 25$	mA
$V_{CC}$ , GND current	$I_{CC}$ or $I_{GND}$	$\pm 50$	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

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

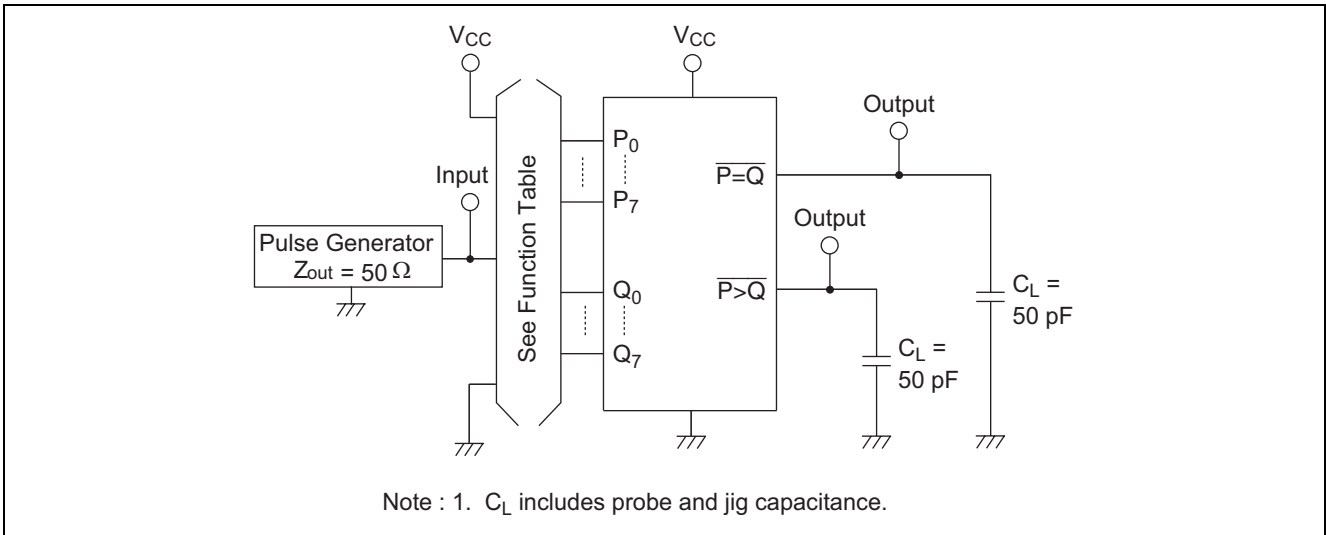
**Electrical Characteristics**

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>	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V <sub>IL</sub>	2.0	—	—	0.5	—	0.5	V		
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V <sub>OH</sub>	2.0	1.9	2.0	—	1.9	—	V	V <sub>in</sub> = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OH</sub> = -20 μA	
		4.5	4.4	4.5	—	4.4	—			
		6.0	5.9	6.0	—	5.9	—			
		4.5	4.18	—	—	4.13	—			I <sub>OH</sub> = -4 mA
		6.0	5.68	—	—	5.63	—			I <sub>OH</sub> = -5.2 mA
	V <sub>OL</sub>	2.0	—	0.0	0.1	—	0.1	V	V <sub>in</sub> = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OL</sub> = 20 μA	
		4.5	—	0.0	0.1	—	0.1			
		6.0	—	0.0	0.1	—	0.1			
		4.5	—	—	0.26	—	0.33			I <sub>OL</sub> = 4 mA
		6.0	—	—	0.26	—	0.33			I <sub>OL</sub> = 5.2 mA
Input current (HC684)	I <sub>in</sub>	6.0	—	—	±0.1	—	±1.0	μA	V <sub>in</sub> = V <sub>CC</sub> or GND	
Quiescent supply current (HC684)	I <sub>CC</sub>	6.0	—	—	4.0	—	40	μA	V <sub>in</sub> = V <sub>CC</sub> or GND, I <sub>out</sub> = 0 μA	
Input current (HD682)	I <sub>in</sub>	6.0	—	—	±0.1	—	±1.0	μA	V <sub>in</sub> = V <sub>CC</sub>	
			—	—	-0.6	—	-0.7	mA	I <sub>in</sub> = GND	
Quiescent supply current (HC682)	I <sub>CC</sub>	6.0	—	—	4.8	—	5.6	mA	Q <sub>n</sub> = GND, other inputs = V <sub>CC</sub> or GND I <sub>out</sub> = 0 μA	
			—	—	4.0	—	40	μA	Q <sub>n</sub> = V <sub>CC</sub> , other inputs = V <sub>CC</sub> or GND I <sub>out</sub> = 0 μA	

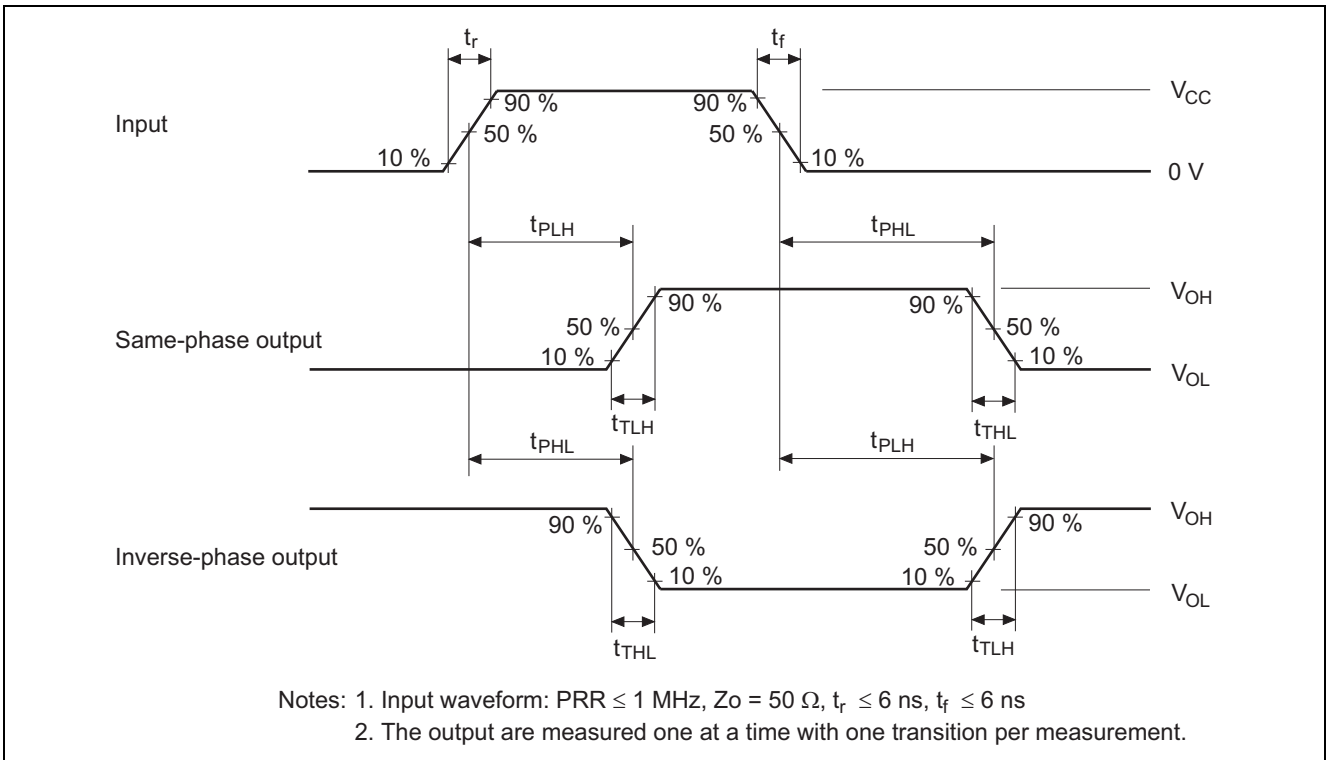
**Switching Characteristics (C<sub>L</sub> = 50 pF, Input t<sub>r</sub> = t<sub>f</sub> = 6 ns)**

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>	2.0	—	—	175	—	220	ns	P or Q to $\overline{P=Q}$
		4.5	—	—	35	—	44		
		6.0	—	—	30	—	37		
	t <sub>PHL</sub>	2.0	—	—	200	—	250	ns	P or Q to $\overline{P>Q}$
		4.5	—	—	40	—	50		
		6.0	—	—	34	—	43		
Output rise/fall time	t <sub>TLH</sub>	2.0	—	—	60	—	75	ns	
		4.5	—	—	12	—	15		
		6.0	—	—	10	—	13		
Input capacitance	C <sub>in</sub>	—	—	5	10	—	10	pF	

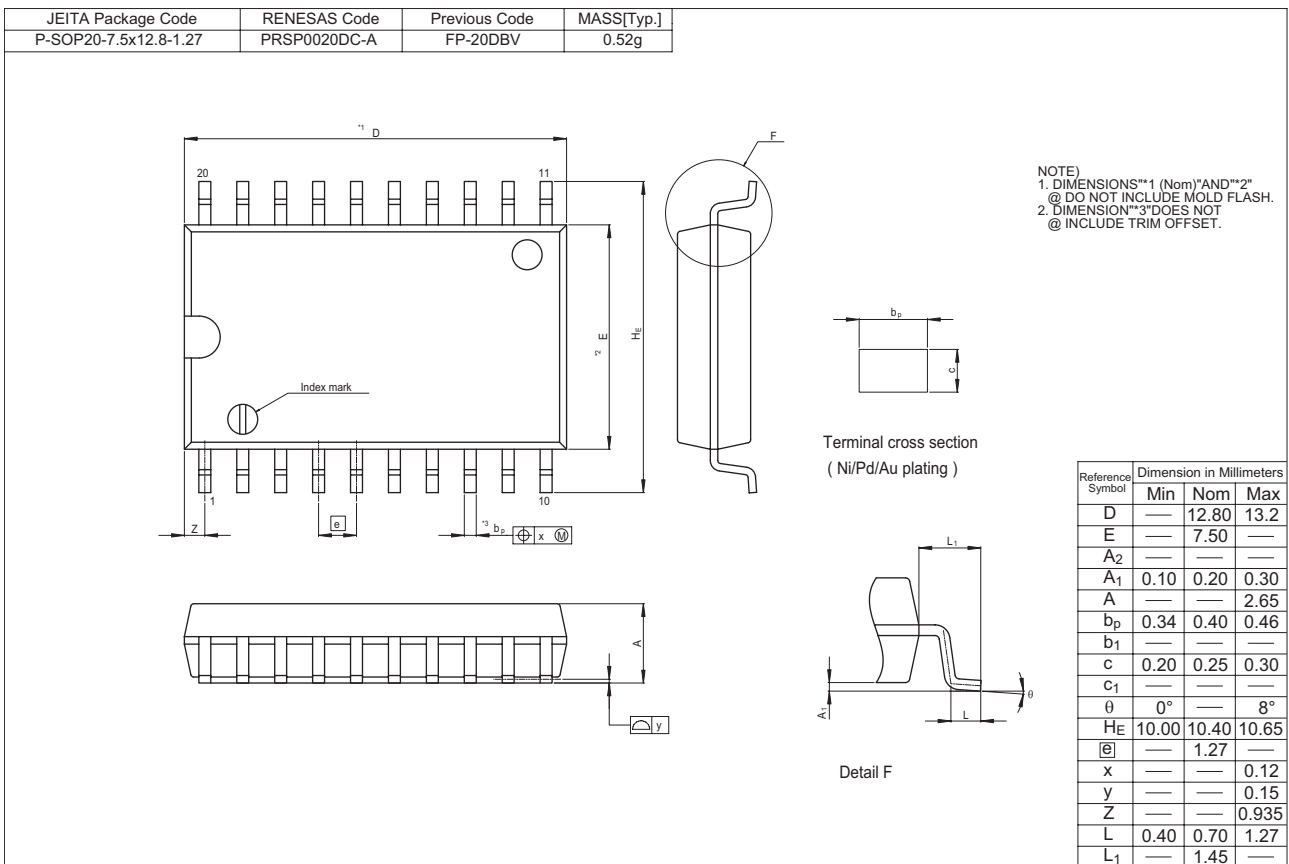
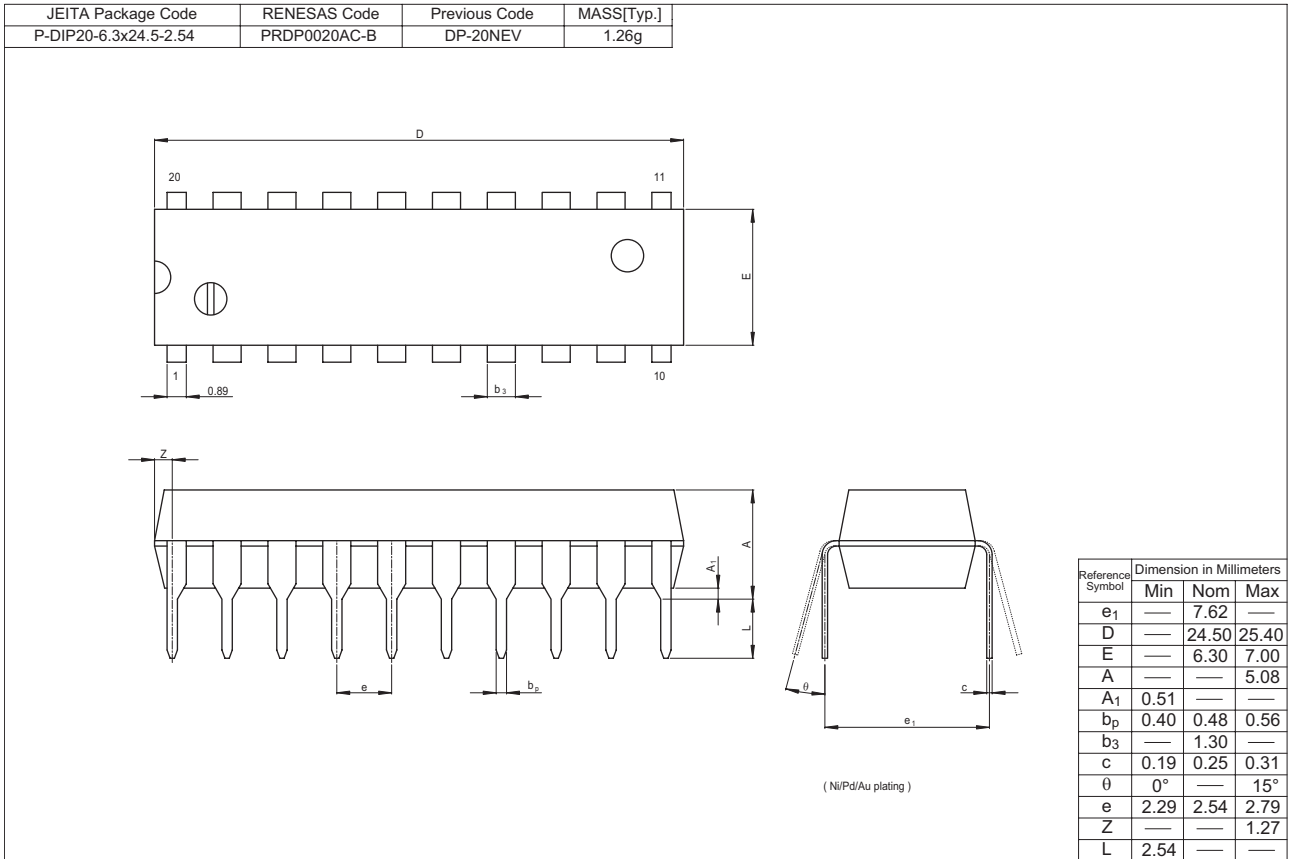
Test Circuit



Waveforms



Package Dimensions



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