

HD74HC4060

14-stage Binary Counter

REJ03D0650-0200
(Previous ADE-205-537)
Rev.2.00
Mar 30, 2006

Description

The HD74HC4060 is a 14 stage counter, this device increments on the falling edge (negative transition) of the input clock, and all their outputs are reset to a low level by applying a logical high on their reset input. The HD74HC4060 also has two additional inputs to enable easy connection of either an RC or crystal oscillator.

Features

- High Speed Operation: t_{pd} (Clock to Q_4) = 41.5 ns typ (C_L = 50 pF)
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: V_{CC} = 2 to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max (T_a = 25°C)
- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74HC4060P	DILP-16 pin	PRDP0016AE-B (DP-16FV)	P	—
HD74HC4060FPEL	SOP-16 pin (JEITA)	PRSP0016DH-B (FP-16DAV)	FP	EL (2,000 pcs/reel)

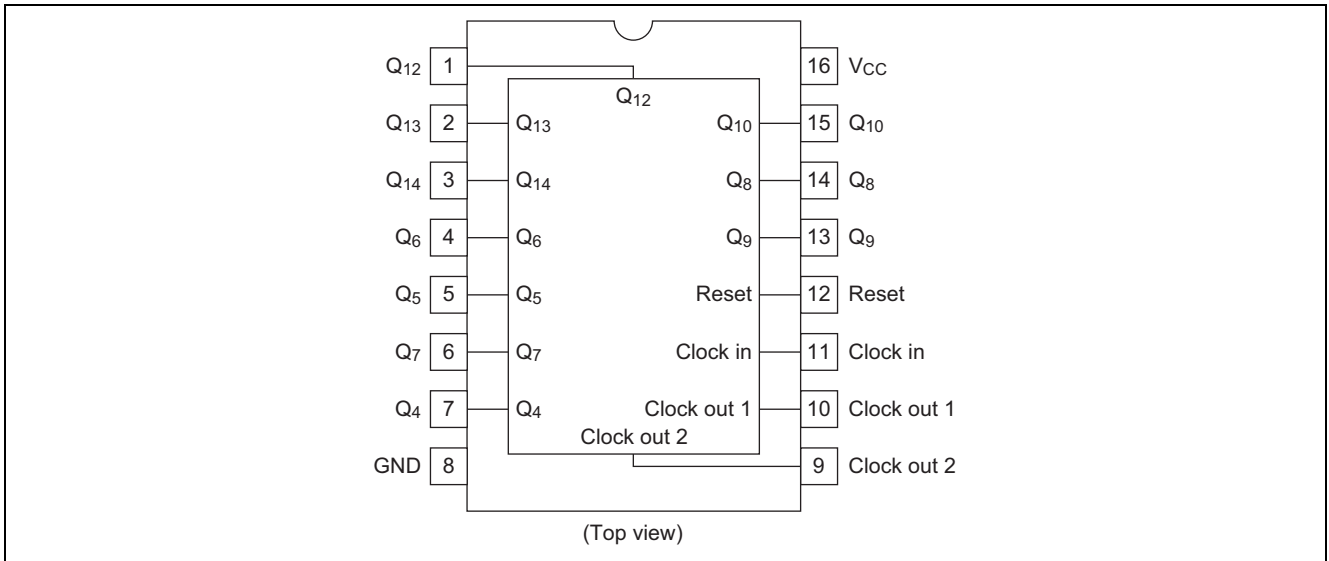
Note: Please consult the sales office for the above package availability.

Function Table

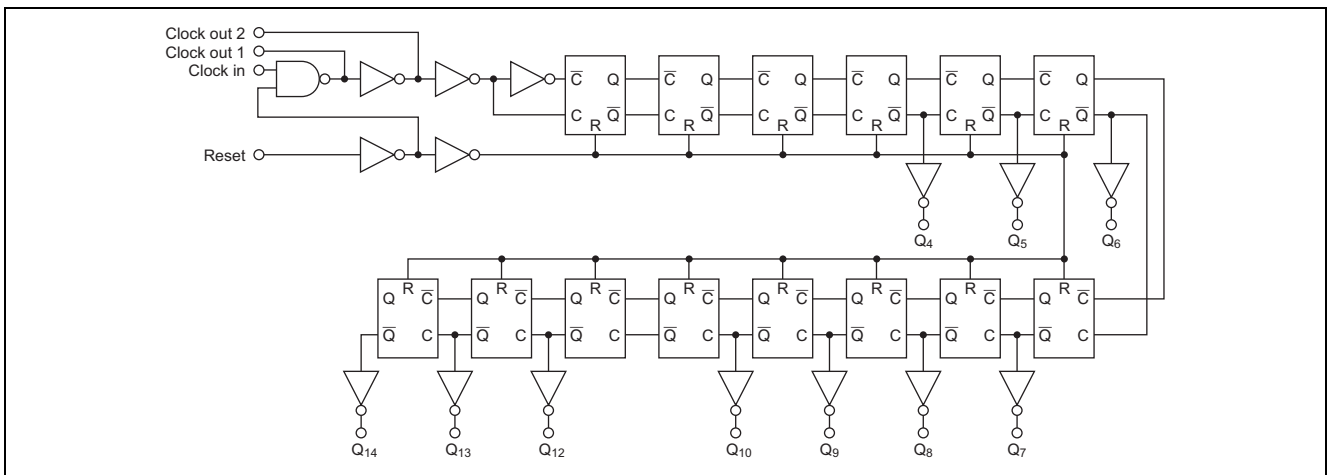
Clock in	Reset	Outputs State
	L	No change
	L	Advance to next stage
X	H	All outputs are low

X: Irrelevant

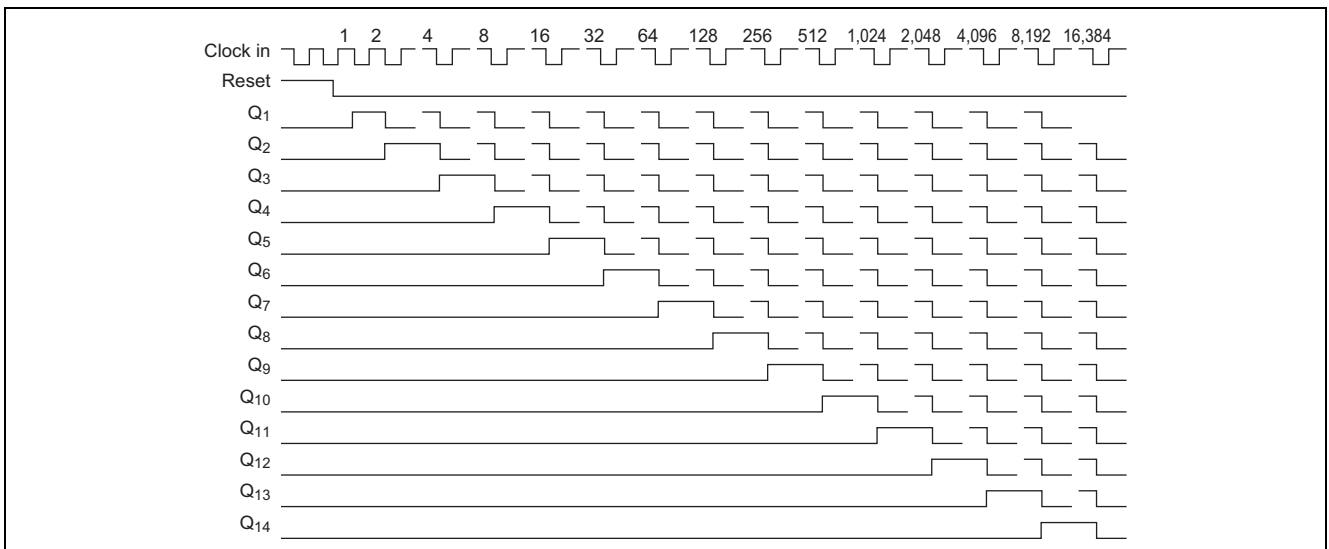
Pin Arrangement



Block Diagram



Timing 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}	± 20	mA
Output current	I_{OUT}	± 25	mA
V_{CC} , GND current	I_{CC} or I_{GND}	± 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 ^{*1}	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.

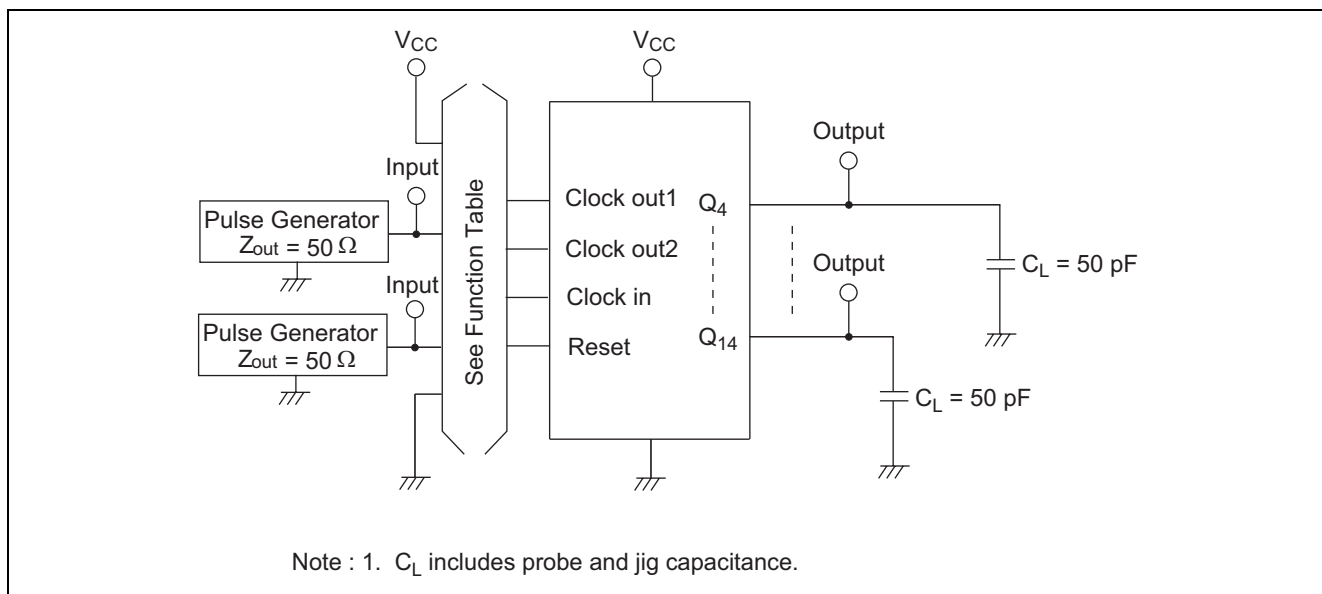
Electrical Characteristics

Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to+85°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	Vin = V _{IH} or V _{IL}	I _{OH} = -20 μA
		4.5	4.4	4.5	—	4.4	—			I _{OH} = -4 mA
		6.0	5.9	6.0	—	5.9	—			I _{OH} = -5.2 mA
		4.5	4.18	—	—	4.13	—			
		6.0	5.68	—	—	5.63	—			
	V _{OL}	2.0	—	0.0	0.1	—	0.1	V	Vin = V _{IH} or V _{IL}	I _{OL} = 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 _{OH} = 4 mA
		6.0	—	—	0.26	—	0.33			I _{OH} = 5.2 mA
Input current	I _{in}	6.0	—	—	±0.1	—	±1.0	μA	Vin = V _{CC} or GND	
Quiescent supply current	I _{CC}	6.0	—	—	4.0	—	40	μA	Vin = V _{CC} or GND, I _{out} = 0 μA	

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

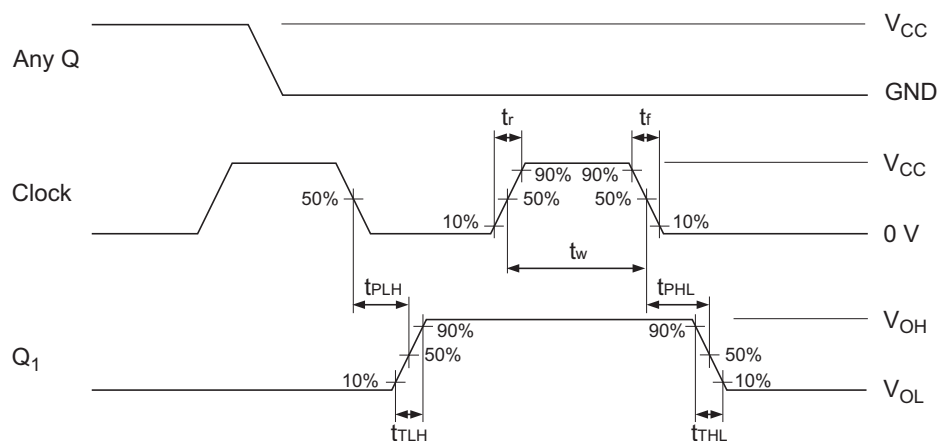
Item	Symbol	$V_{CC} \text{ (V)}$	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } +85^\circ\text{C}$		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Maximum clock frequency	$f_{\max}$	2.0	—	—	4	—	3	MHz	
		4.5	—	—	20	—	16		
		6.0	—	—	24	—	19		
Propagation delay time	t_{PLH}	2.0	—	—	300	—	375	ns	Clock to Q_4
		4.5	—	42	60	—	75		
		6.0	—	—	51	—	63		
	t_{PHL}	2.0	—	—	300	—	375	ns	Clock to Q_4
		4.5	—	41	60	—	75		
		6.0	—	—	51	—	63		
	t_{PHL}	2.0	—	—	240	—	300	ns	Reset to output
		4.5	—	16	48	—	60		
		6.0	—	—	41	—	51		
Removal time	t_{rem}	2.0	100	—	—	125	—	ns	
		4.5	20	10	—	25	—		
		6.0	17	—	—	21	—		
Pulse width	t_w	2.0	80	—	—	100	—	ns	
		4.5	16	7	—	20	—		
		6.0	14	—	—	17	—		
Output rise/fall time	t_{TLH} t_{THL}	2.0	—	—	75	—	95	ns	
		4.5	—	5	15	—	19		
		6.0	—	—	13	—	16		
Input capacitance	C_{in}	—	—	5	10	—	10	pF	

Test Circuit



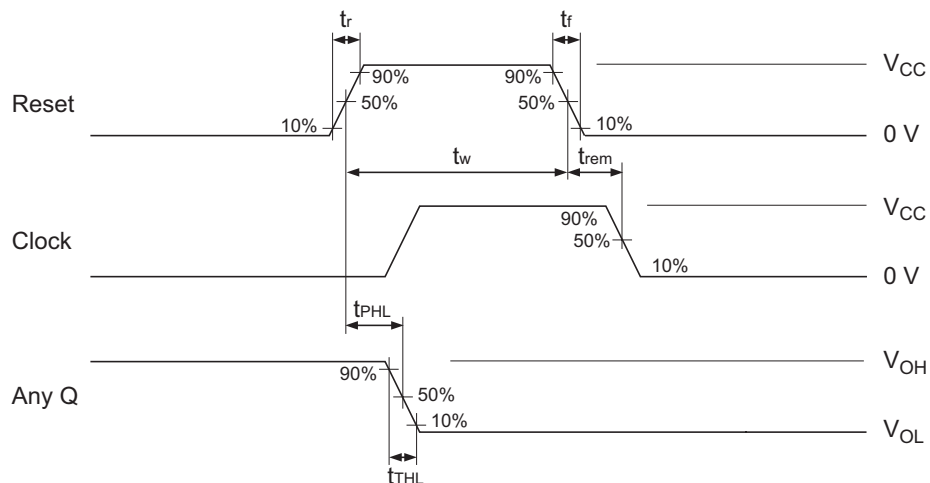
Waveforms

• Waveform – 1



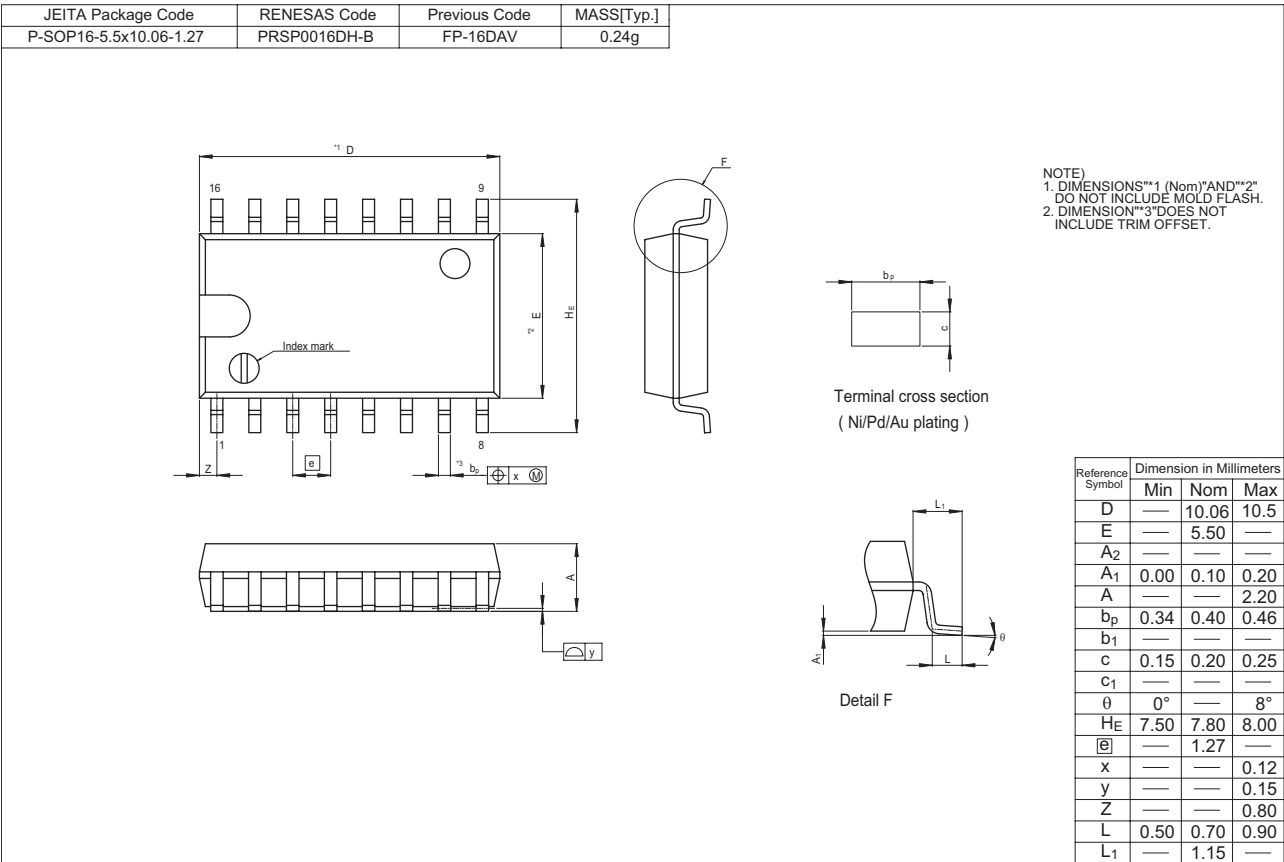
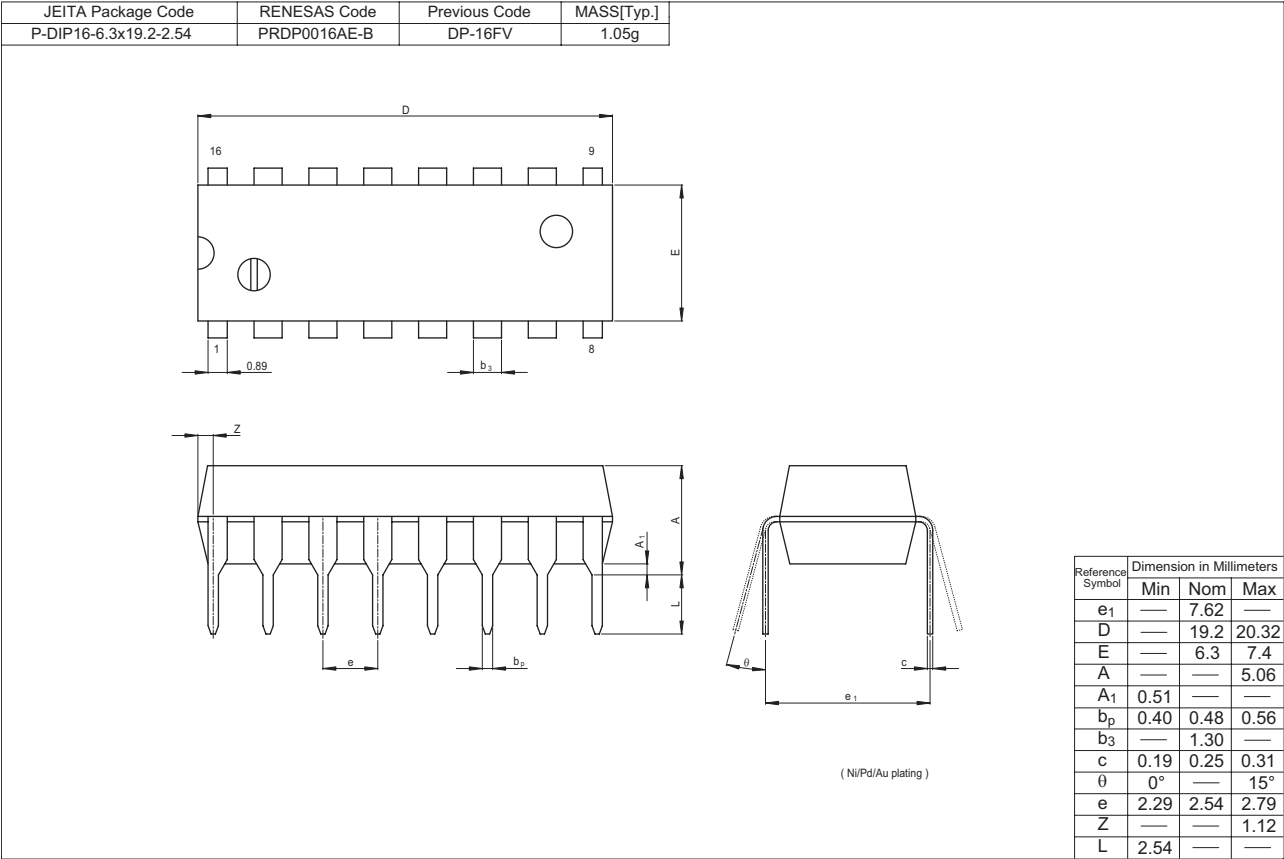
Note : 1. Input waveform : PRR $\leq$ 1 MHz, Z_o = 50 Ω , t_r $\leq$ 6 ns, t_f $\leq$ 6 ns

• Waveform – 2



Note : 1. Input waveform : PRR $\leq$ 1 MHz, Z_o = 50 Ω , t_r $\leq$ 6 ns, t_f $\leq$ 6 ns

Package Dimensions



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