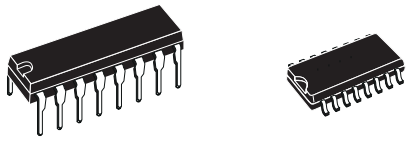
HCF4010B

HEX BUFFER/CONVERTER (NON INVERTING)

- PROPAGATION DELAY TIME:
  t_{PD} = 50ns (Typ.) at V_{DD} = 10V C_L = 50pF
- HIGH TO LOW LEVEL LOGIC CONVERSION
- MULTIPLEXER: 1 TO 6 OR 6 TO 1
- HIGH "SINK" AND "SOURCE" CURRENT CAPABILITY
- QUIESCENT CURRENT SPECIFIED UP TO 20V
- 5V, 10V AND 15V PARAMETRIC RATINGS
- INPUT LEAKAGE CURRENT
  I_I = 100nA (MAX) AT V_{DD} = 18V T_A = 25°C
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC JESD13B "STANDARD SPECIFICATIONS FOR DESCRIPTION OF B SERIES CMOS DEVICES"



DIP **SOP**

Table 1: Order Codes

PACKAGE	TUBE	T & R
DIP	HCF4010BEY	
SOP	HCF4010BM1	HCF4010M013TR

DESCRIPTION

The HCF4010B is a monolithic integrated circuit fabricated in Metal Oxide Semiconductor technology available in DIP and SOP packages.

It is an non inverting Hex Buffer/Converter and can be used as CMOS to TTL logic level converter as current "sink" or "source" driver or as multiplexer (1 to 6).
It is a preferred replacement of HCF4050B in buffer applications.

Figure 1: Pin Connection

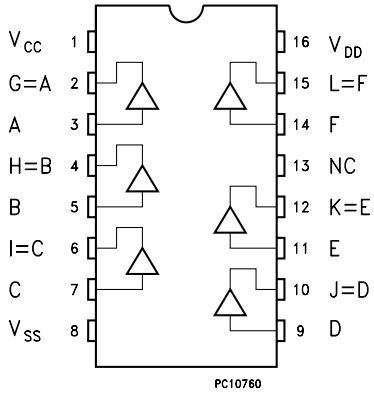


Figure 2: Input Equivalent Circuit

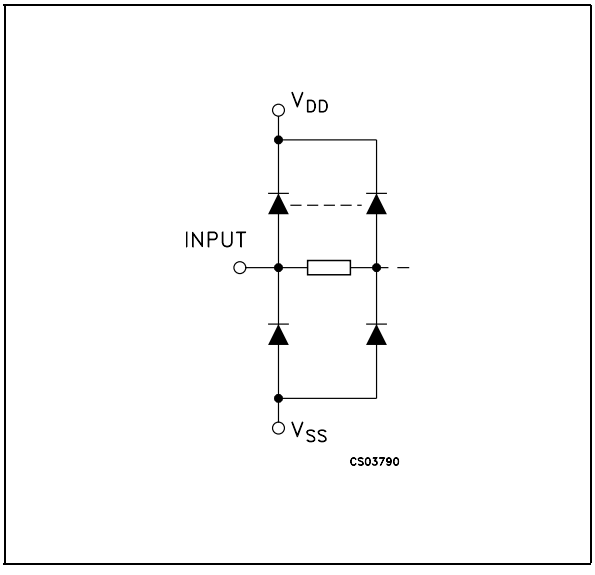


Table 2: Pin Description

PIN N°	SYMBOL	NAME AND FUNCTION
3, 5, 7, 9, 11, 14	A, B, C, D, E, F	Data Inputs
2, 4, 6, 10, 12, 15	G, H, I, J, K, L	Data Outputs
13	NC	Not Connected
1	V_{CC}	Positive Supply Voltage
8	V_{SS}	Negative Supply Voltage
16	V_{DD}	Positive Supply Voltage

Table 3: Truth Table

INPUTS	OUTPUTS
A, B, C, D, E, F	**G, H, I, J, K, L**
L	L
H	H

Table 4: Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage	-0.5 to +22	V
V_I	DC Input Voltage	-0.5 to V_{DD} + 0.5	V
I_I	DC Input Current	± 10	mA
P_D	Power Dissipation per Package	200	mW
	Power Dissipation per Output Transistor	100	mW
T_{op}	Operating Temperature	-55 to +125	°C
T_{stg}	Storage Temperature	-65 to +150	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.
All voltage values are referred to V_{SS} pin voltage.

Table 5: Recommended Operating Conditions

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage	3 to 20	V
V_I	Input Voltage	0 to V_{DD}	V
T_{op}	Operating Temperature	-55 to 125	°C

Table 6: DC Specifications

Symbol	Parameter	Test Condition				Value							Unit
						T_A = 25°C			-40 to 85°C		-55 to 125°C		
		V_I (V)	V_O (V)	$\|I_O\|$ (μA)	V_{DD} = V_{CC} (V)	Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
I_L	Quiescent Current	0/5			5		0.02	1		30		30	μA
		0/10			10		0.02	2		60		60	
		0/15			15		0.02	4		120		120	
		0/20			20		0.04	20		600		600	
V_{OH}	High Level Output Voltage	0/5		<1	5	4.95			4.95		4.95		V
		0/10		<1	10	9.95			9.95		9.95		
		0/15		<1	15	14.95			14.95		14.95		
V_{OL}	Low Level Output Voltage	5/0		<1	5		0.05			0.05		0.05	V
		10/0		<1	10		0.05			0.05		0.05	
		15/0		<1	15		0.05			0.05		0.05	
V_{IH}	High Level Input Voltage		0.5/4.5	<1	5	3.5			3.5		3.5		V
			1/9	<1	10	7			7		7		
			1.5/13.5	<1	15	11			11		11		
V_{IL}	Low Level Input Voltage		4.5/0.5	<1	5			1.5		1.5		1.5	V
			9/1	<1	10			3		3		3	
			13.5/1.5	<1	15			4		4		4	
I_{OH}	Output Drive Current	0/5	2.5	<1	5	-0.8	-1.6		-0.65		-0.65		mA
		0/5	4.6	<1	5	-0.2	-0.4		-0.18		-0.18		
		0/10	9.5	<1	10	-0.45	-0.9		-0.38		-0.38		
		0/15	13.5	<1	15	-1.5	-3		-1.25		-1.25		
I_{OL}	Output Sink Current	0/5	0.4	<1	5	3	4		2.4		2.4		mA
		0/10	0.5	<1	10	8	10		6.4		6.4		
		0/15	1.5	<1	15	24	36		19		19		
I_I	Input Leakage Current	0/18	Any Input		18		$\pm 10^{-5}$	±0.1		±1		±1	μA
C_I	Input Capacitance		Any Input				5	7.5					pF

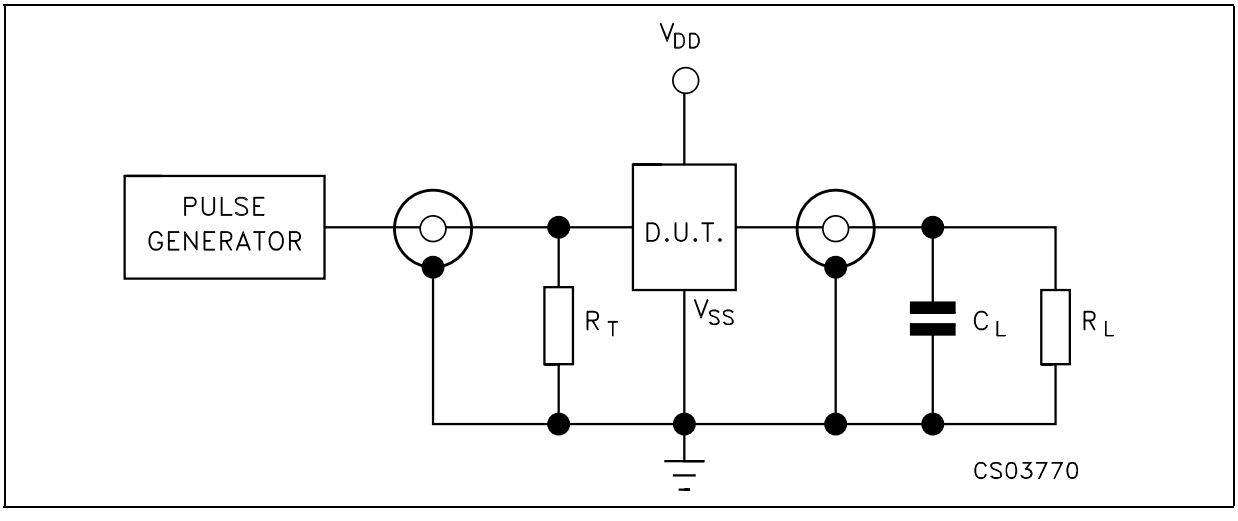
The Noise Margin for both "1" and "0" level is: 1V min. with V_{DD}=5V, 2V min. with V_{DD}=10V, 2.5V min. with V_{DD}=15V

Table 7: Dynamic Electrical Characteristics (T_{amb} = 25°C, C_L = 50pF, R_L = 200KΩ, $t_r = t_f$ = 20 ns)

Symbol	Parameter	Test Condition				Value (*)			Unit
		V_{DD} (V)	V_I (V)	V_{CC} (V)		Min.	Typ.	Max.	
t_{TLH}	Output Transition Time	5	5	5			150	350	ns
		10	10	10			75	15	
		15	15	15			55	110	
t_{THL}	Output Transition Time	5	5	5			35	70	ns
		10	10	10			20	40	
		15	15	15			15	30	
t_{PLH}	Propagation Delay Time	5	5	5			100	200	ns
		10	10	10			50	100	
		10	10	5			50	100	
		15	15	15			35	70	
		15	15	5			35	70	
t_{PHL}	Propagation Delay Time	5	5	5			65	130	ns
		10	10	10			35	70	
		10	10	5			30	70	
		15	15	15			25	50	
		15	15	5			20	40	

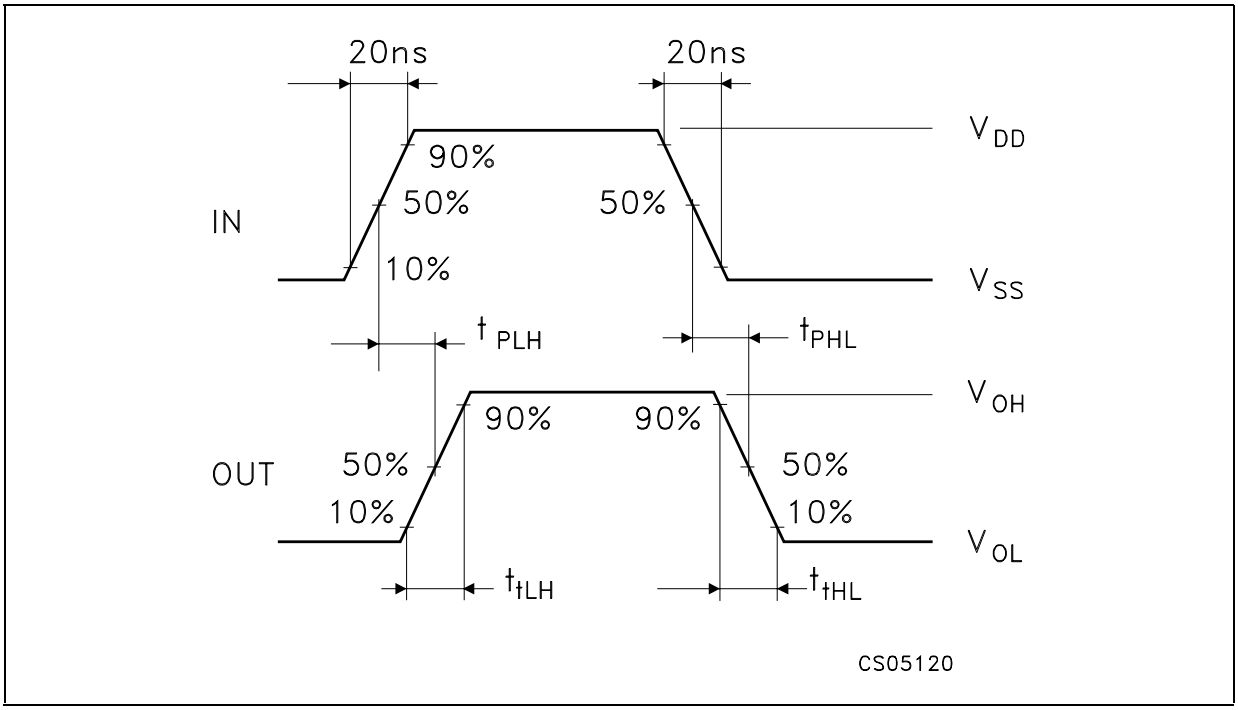
(*) Typical temperature coefficient for all V_{DD} value is 0.3%/°C.

Figure 3: Test Circuit



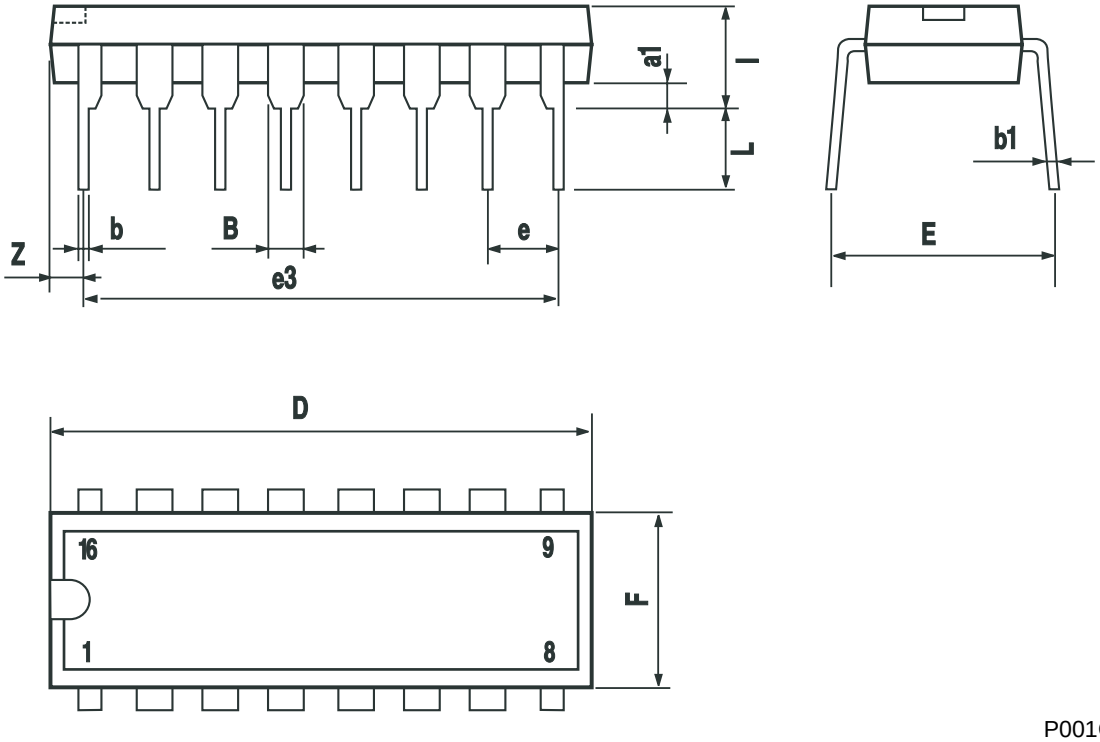
C_L = 50pF or equivalent (includes jig and probe capacitance)
R_L = 200KΩ
$R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

Figure 4: Waveform - Propagation Delay Times (f=1MHz; 50% duty cycle)



Plastic DIP-16 (0.25) MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050



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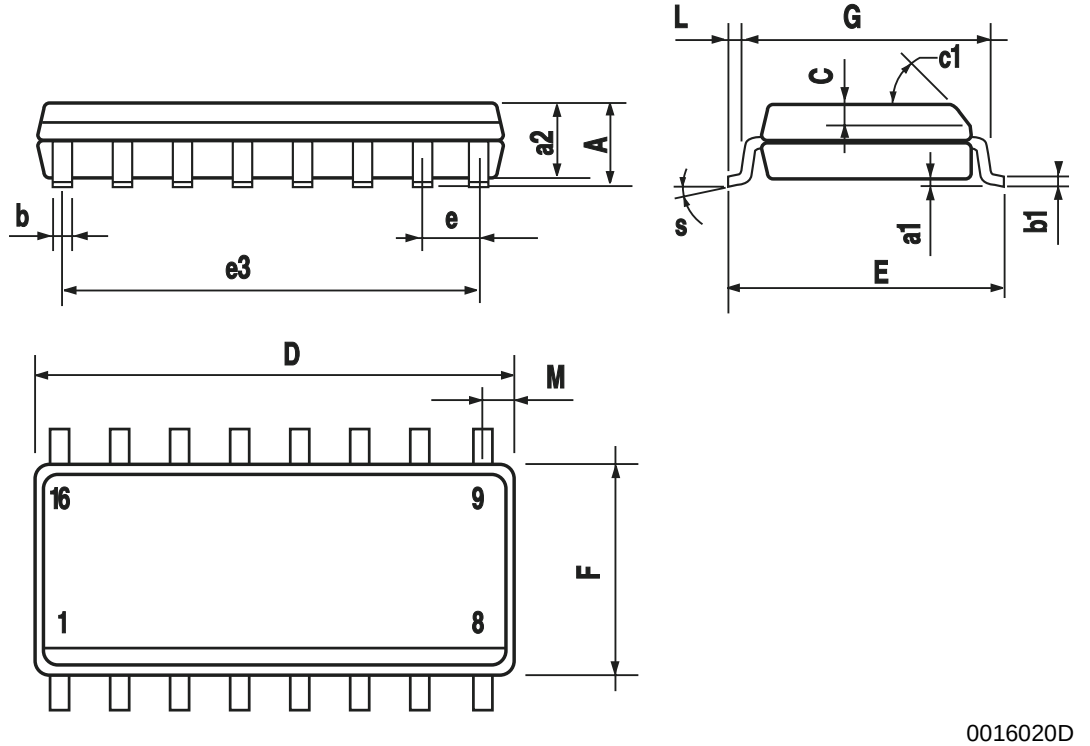
SO-16 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.25	0.004		0.010
a2			1.64			0.063
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10	0.385		0.393
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.62			0.024
S	8° (max.)					



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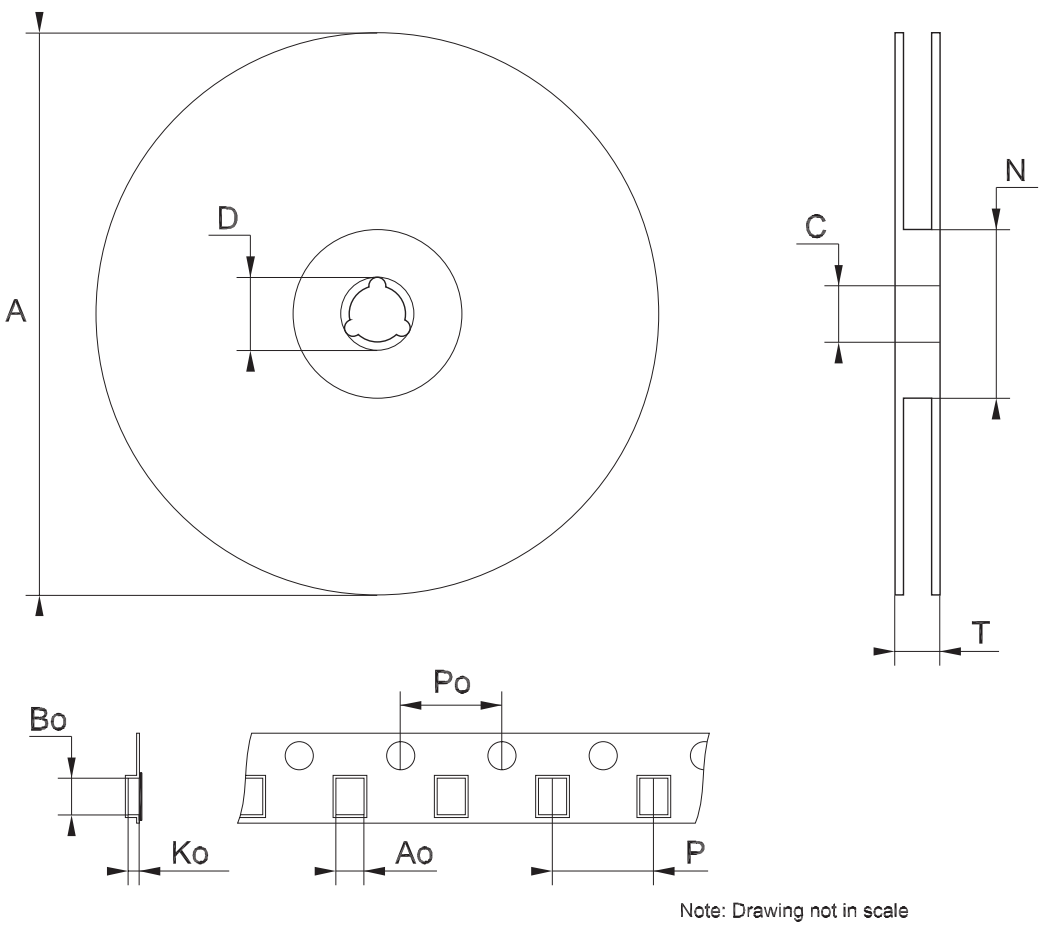
Tape & Reel SO-16 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			330			12.992
C	12.8		13.2	0.504		0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	6.45		6.65	0.254		0.262
Bo	10.3		10.5	0.406		0.414
Ko	2.1		2.3	0.082		0.090
Po	3.9		4.1	0.153		0.161
P	7.9		8.1	0.311		0.319



Note: Drawing not in scale

Table 8: Revision History

Date	Revision	Description of Changes
16-Mar-2005	3	Add V_{CC} on Table 6.