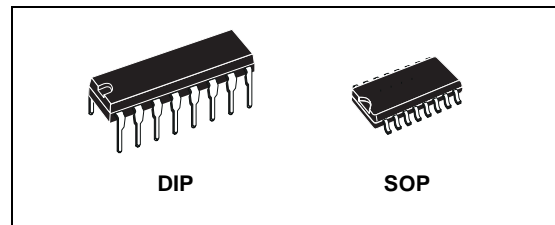


## HEX BUFFER/CONVERTER (NON INVERTING)

- PROPAGATION DELAY TIME :  
 $t_{PD} = 40\text{ns}$  (TYP.) at  $V_{DD} = 10\text{V}$   $C_L = 50\text{pF}$
- HIGH TO LOW LEVEL LOGIC CONVERSION
- HIGH "SINK" AND "SOURCE" CURRENT CAPABILITY
- QUIESCENT CURRENT SPECIFIED UP TO 20V
- 5V, 10V AND 15V PARAMETRIC RATINGS
- INPUT LEAKAGE CURRENT  
 $I_l = 100\text{nA}$  (MAX) AT  $V_{DD} = 18\text{V}$   $T_A = 25^\circ\text{C}$
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC JESD13B " STANDARD SPECIFICATIONS FOR DESCRIPTION OF B SERIES CMOS DEVICES"



### ORDER CODES

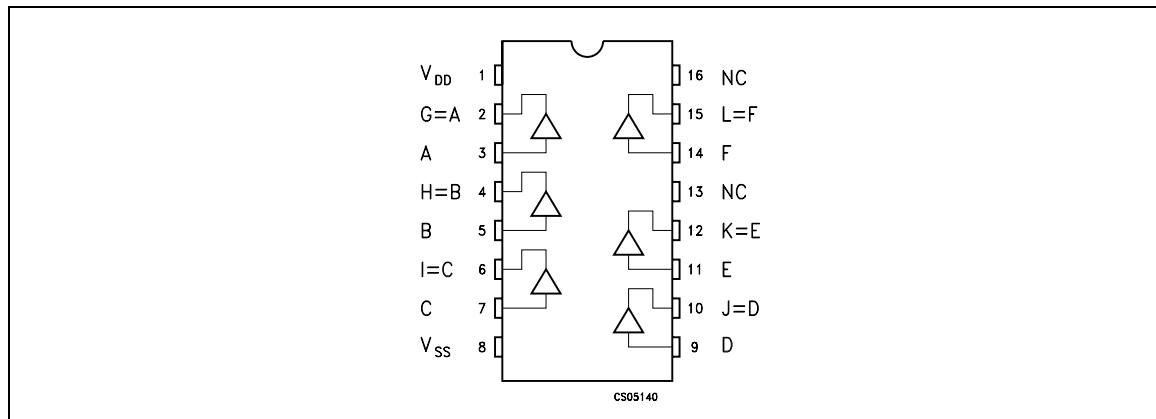
PACKAGE	TUBE	T & R
DIP	HCF4050BEY	
SOP	HCF4050BM1	HCF4050M013TR

### DESCRIPTION

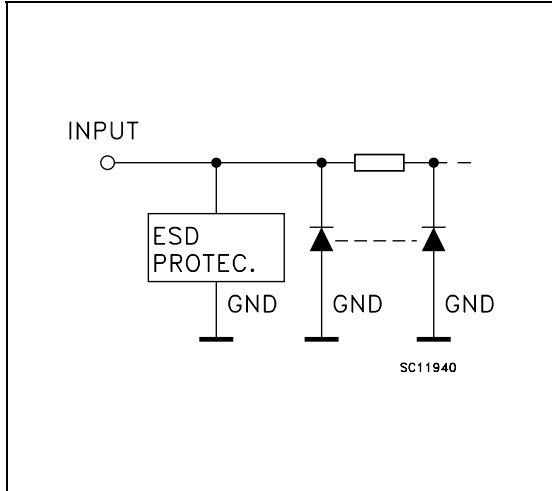
The HCF4050B is a monolithic integrated circuit fabricated in Metal Oxide Semiconductor technology available in DIP and SOP packages. It is a non inverting Hex Buffer/Converter and feature logic level conversions using only one supply voltage ( $V_{DD}$ ).

The input high level signal ( $V_{IH}$ ) can exceed the  $V_{DD}$  supply voltage when these devices are used for logic level conversions. This device is intended for use as CMOS to DTL/TTL converters and can drive directly two DTL/TTL loads ( $V_{DD}=5\text{V}$ ,  $V_{OL}\leq 0.4\text{V}$  and  $I_{OL}\leq 3.2\text{mA}$ ).

### PIN CONNECTION



**INPUT EQUIVALENT CIRCUIT**



**PIN DESCRIPTION**

PIN No	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, 16	NC	Not Connected
8	V <sub>SS</sub>	Negative Supply Voltage
1	V <sub>DD</sub>	Positive Supply Voltage

**TRUTH TABLE**

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

**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>DD</sub>	Supply Voltage	-0.5 to +22	V
V <sub>I</sub>	DC Input Voltage	-0.5 to +18	V
I <sub>I</sub>	DC Input Current	± 10	mA
P <sub>D</sub>	Power Dissipation per Package	200	mW
	Power Dissipation per Output Transistor	100	mW
T <sub>op</sub>	Operating Temperature	-55 to +125	°C
T <sub>stg</sub>	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<sub>SS</sub> pin voltage.

**RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Value	Unit
V <sub>DD</sub>	Supply Voltage	3 to 20	V
V <sub>I</sub>	Input Voltage	-0.5 to 15V	V
T <sub>op</sub>	Operating Temperature	-55 to 125	°C

## DC SPECIFICATIONS

Symbol	Parameter	Test Condition				Value						Unit	
		V <sub>I</sub> (V)	V <sub>O</sub> (V)	I <sub>oI</sub>   ( $\mu$ A)	V <sub>DD</sub> (V)	T <sub>A</sub> = 25°C			-40 to 85°C		-55 to 125°C		
						Min.	Typ.	Max.	Min.	Max.	Min.		Max.
I <sub>L</sub>	Quiescent Current	0/5			5		0.02	1		30		30	$\mu$ A
		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 <sub>OH</sub>	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 <sub>OL</sub>	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 <sub>IH</sub>	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 <sub>IL</sub>	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 <sub>OH</sub>	Output Drive Current	0/5	2.5	<1	5	-1.25	-6.4		-0.42		-0.42		mA
		0/5	4.6	<1	5	-0.51	-1.6		-0.38		-0.38		
		0/10	9.5	<1	10	-1.25	-3.6		-1		-1		
		0/15	13.5	<1	15	-3.75	-12		-3		-3		
I <sub>OL</sub>	Output Sink Current	0/5	0.4	<1	5	3.2	6.4		2.6		2.6		mA
		0/10	0.5	<1	10	8	16		6.6		6.6		
		0/15	1.5	<1	15	24	48		19		19		
I <sub>I</sub>	Input Leakage Current	0/18	Any Input		18		$\pm 10^{-5}$	$\pm 0.1$		$\pm 1$		$\pm 1$	$\mu$ A
C <sub>I</sub>	Input Capacitance		Any Input				5	7.5					pF

The Noise Margin for both "1" and "0" level is: 1V min. with V<sub>DD</sub>=5V, 2V min. with V<sub>DD</sub>=10V, 2.5V min. with V<sub>DD</sub>=15V

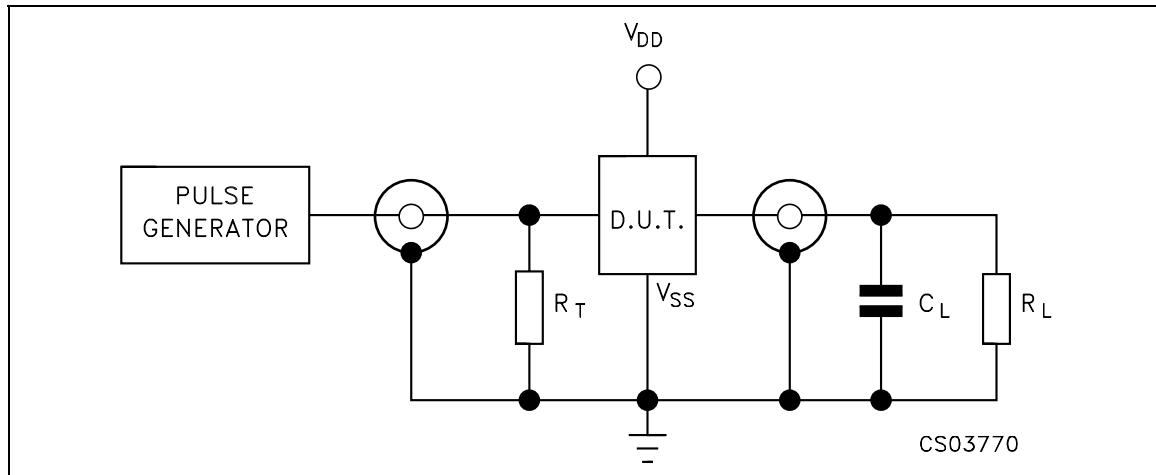
## HCF4050B

**DYNAMIC ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25^{\circ}\text{C}$ ,  $C_L = 50\text{pF}$ ,  $R_L = 200\text{K}\Omega$ ,  $t_r = t_f = 20\text{ ns}$ )

Symbol	Parameter	Test Condition			Value (*)			Unit
		$V_{DD}$ (V)	$V_I$ (V)		Min.	Typ.	Max.	
$t_{TLH}$	Output Transition Time	5	5			80	160	ns
		10	10			40	80	
		15	15			30	60	
$t_{THL}$	Output Transition Time	5	5			30	60	ns
		10	10			20	40	
		15	15			15	30	
$t_{PLH}$	Propagation Delay Time	5	5			70	140	ns
		10	10			40	80	
		5	10			45	90	
		15	15			30	60	
		5	15			40	80	
$t_{PHL}$	Propagation Delay Time	5	5			55	110	ns
		10	10			22	55	
		5	10			50	100	
		15	15			15	30	
		5	15			50	100	

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

### TEST CIRCUIT



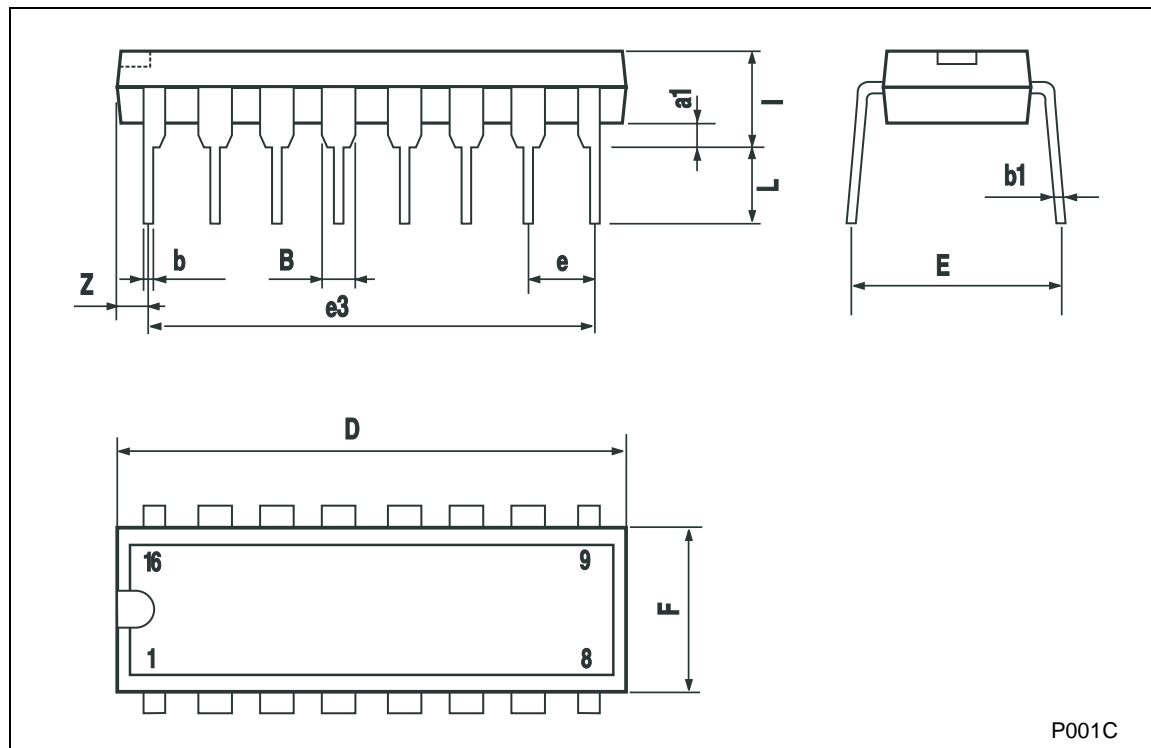
$C_L = 50\text{pF}$  or equivalent (includes jig and probe capacitance)

$R_L = 200\text{K}\Omega$

$R_T = Z_{OUT}$  of pulse generator (typically  $50\Omega$ )

**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



P001C