

HEX BUFFER/CONVERTER (INVERTING)

- 
- DIP**
- SOP**

ORDER CODES

PACKAGE	TUBE	T & R
DIP	HCF4049UBEY	
SOP	HCF4049UBM1	HCF4049UM013TR

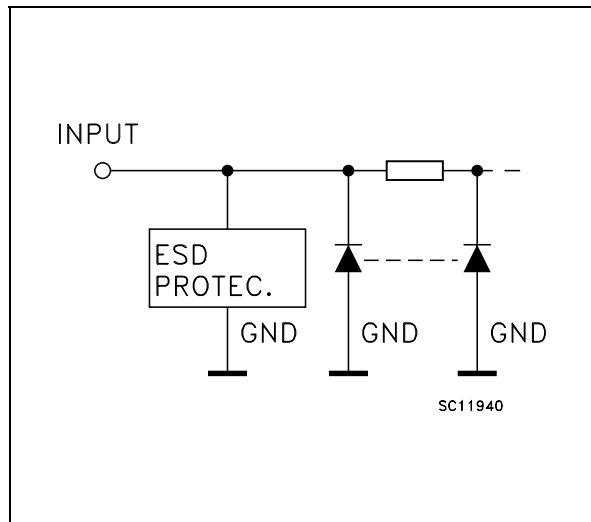
for logic level conversions. This device is intended for use as CMOS to DTL/TTL converters and can drive directly two DTL/TTL loads ($V_{DD} = 5V$, $V_{OL} \leq 0.4V$ and $I_{OL} \leq 3.2mA$).

Diagram of the CS05130 component, showing its 16 pins and internal logic structure. The component is a 16-pin device with pins 1 through 8 on the left and pins 16 through 9 on the right. The internal logic consists of four inverters, each represented by a triangle with a circle at its input. The inverters are connected as follows: Pin 2 to Pin 15, Pin 3 to Pin 14, Pin 4 to Pin 13, and Pin 5 to Pin 12. The output of each inverter is connected to a pin on the right side of the device. The pin connections are as follows:

Pin	Signal
1	V_{DD}
2	$G = \bar{A}$
3	A
4	$H = \bar{B}$
5	B
6	$I = \bar{C}$
7	C
8	V_{SS}
9	D
10	$J = \bar{D}$
11	E
12	$K = \bar{E}$
13	NC
14	F
15	$L = \bar{F}$
16	NC

CS05130

INPUT EQUIVALENT CIRCUIT



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, 16	NC	Not Connected
8	V _{SS}	Negative Supply Voltage
1	V _{DD}	Positive Supply Voltage

TRUTH TABLE

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

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DD}	Supply Voltage	-0.5 to +22	V
V _I	DC Input Voltage	-0.5 to +18	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.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V _{DD}	Supply Voltage	3 to 20	V
V _I	Input Voltage	-0.5 to 15V	V
T _{op}	Operating Temperature	-55 to 125	°C

DC SPECIFICATIONS

Symbol	Parameter	Test Condition				Value							Unit
		V _I (V)	V _O (V)	I _O (μA)	V _{DD} (V)	T _A = 25°C			-40 to 85°C		-55 to 125°C		
						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	4			4		4		V
			1/9	<1	10	8			8		8		
			1.5/13.5	<1	15	12			12		12		
V _{IL}	Low Level Input Voltage		4.5/0.5	<1	5			1		1		1	V
			9/1	<1	10			2		2		2	
			13.5/1.5	<1	15			3		3		3	
I _{OH}	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 _{OL}	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 _I	Input Leakage Current	0/18	Any Input		18		±10 ⁻⁵	±0.1		±1		±1	μA
C _I	Input Capacitance		Any Input				5	7.5					pF

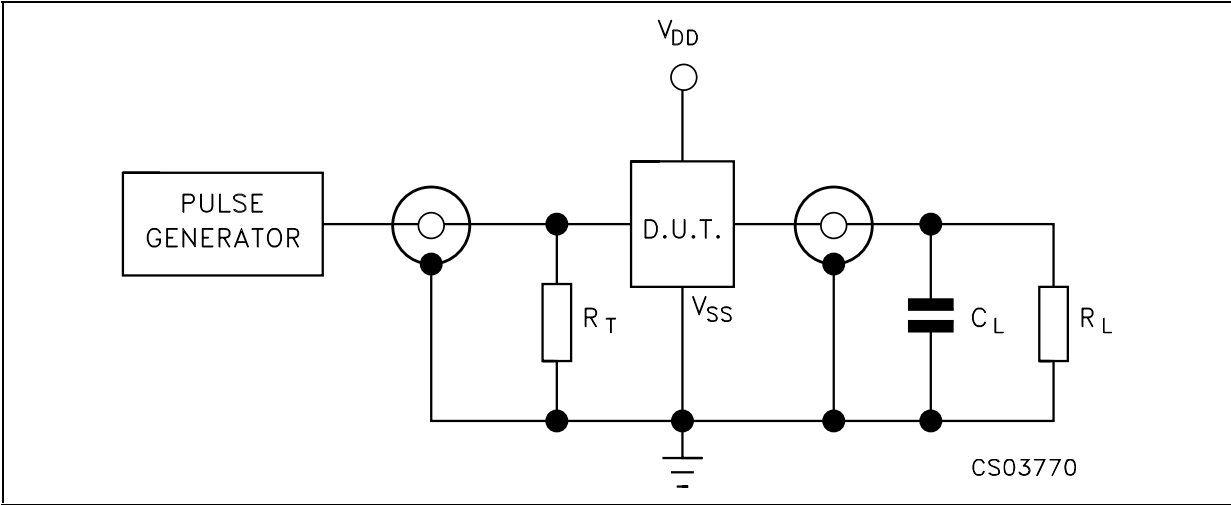
The Noise Margin for both "1" and "0" level is: 1V min. with V_{DD}=5V, 2V min. with V_{DD}=10V, 2.5V min. with V_{DD}=15V

DYNAMIC ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, C_L = 50pF, R_L = 200KΩ, t_r = t_f = 20 ns)

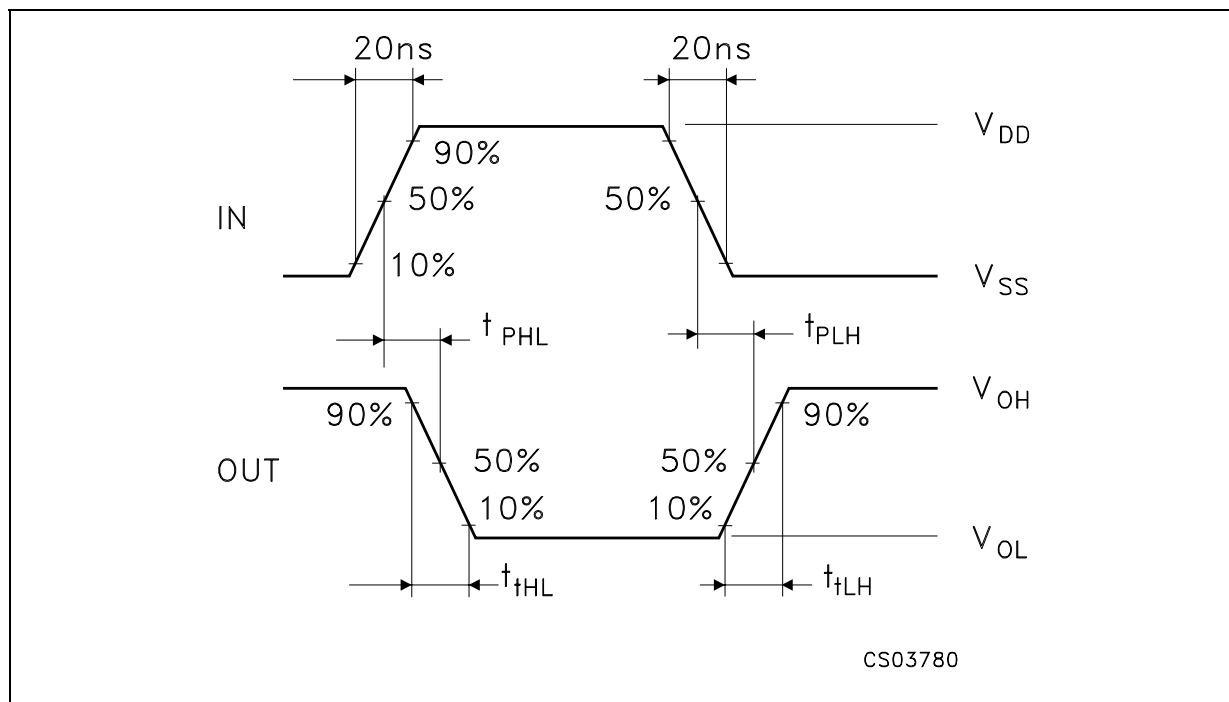
Symbol	Parameter	Test Condition			Value (*)			Unit
		V _{DD} (V)	V _I (V)		Min.	Typ.	Max.	
t _{TLH}	Output Transition Time	5	5			80	160	ns
		10	10			40	80	
		15	15			30	60	
t _{THL}	Output Transition Time	5	5			30	60	ns
		10	10			20	40	
		15	15			15	30	
t _{PLH}	Propagation Delay Time	5	5			60	120	ns
		10	10			32	65	
		5	10			45	90	
		15	15			25	50	
		5	15			45	90	
t _{PHL}	Propagation Delay Time	5	5			32	65	ns
		10	10			20	40	
		5	10			15	30	
		15	15			15	30	
		5	15			10	20	

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

TEST CIRCUIT

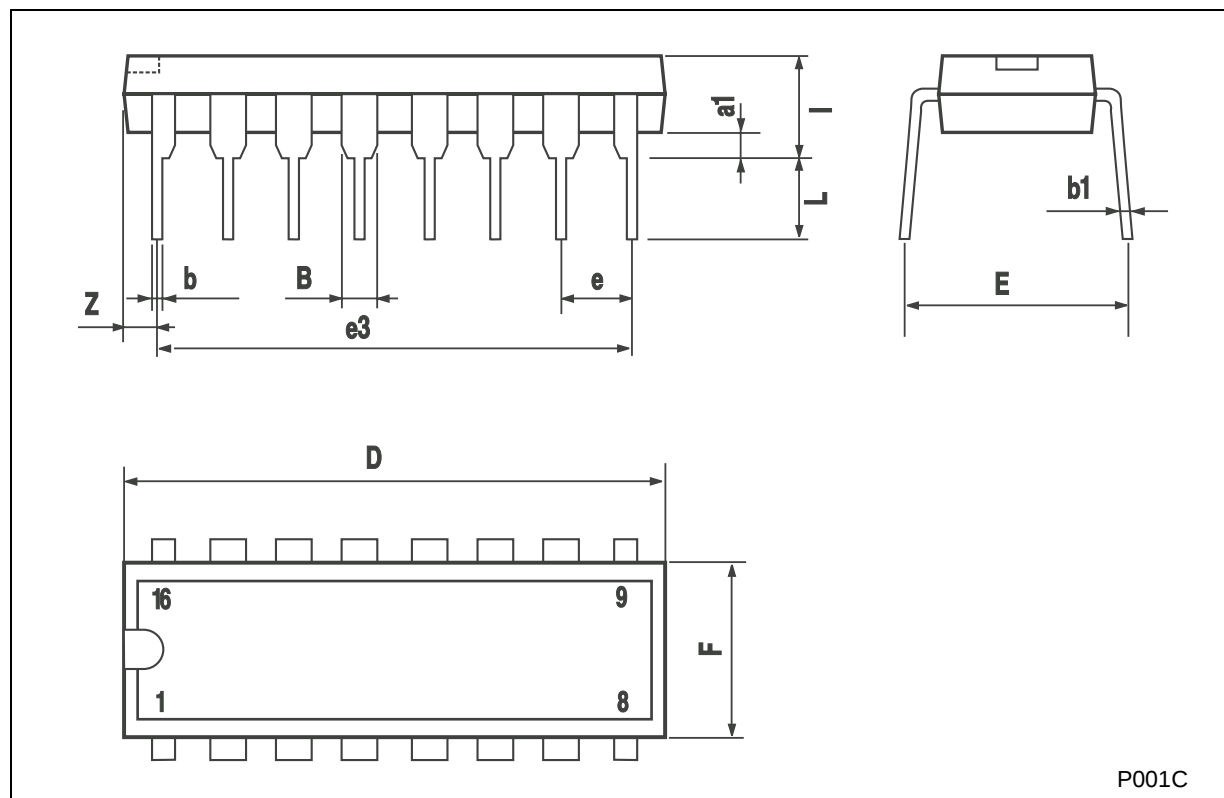


C_L = 50pF or equivalent (includes jig and probe capacitance)
R_L = 200KΩ
R_T = Z_{OUT} of pulse generator (typically 50Ω)

WAVEFORM: PROPAGATION DELAY TIMES ($f=1\text{MHz}$; 50% duty cycle)

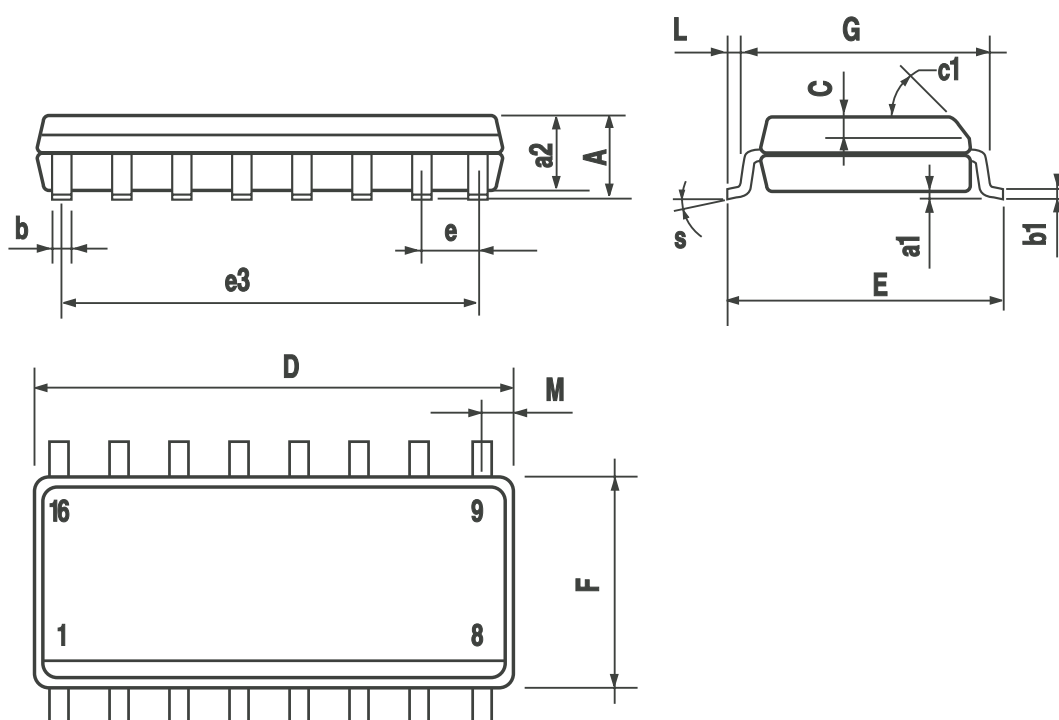
Plastic DIP-16 (0.25) MECHANICAL DATA

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



SO-16 MECHANICAL DATA

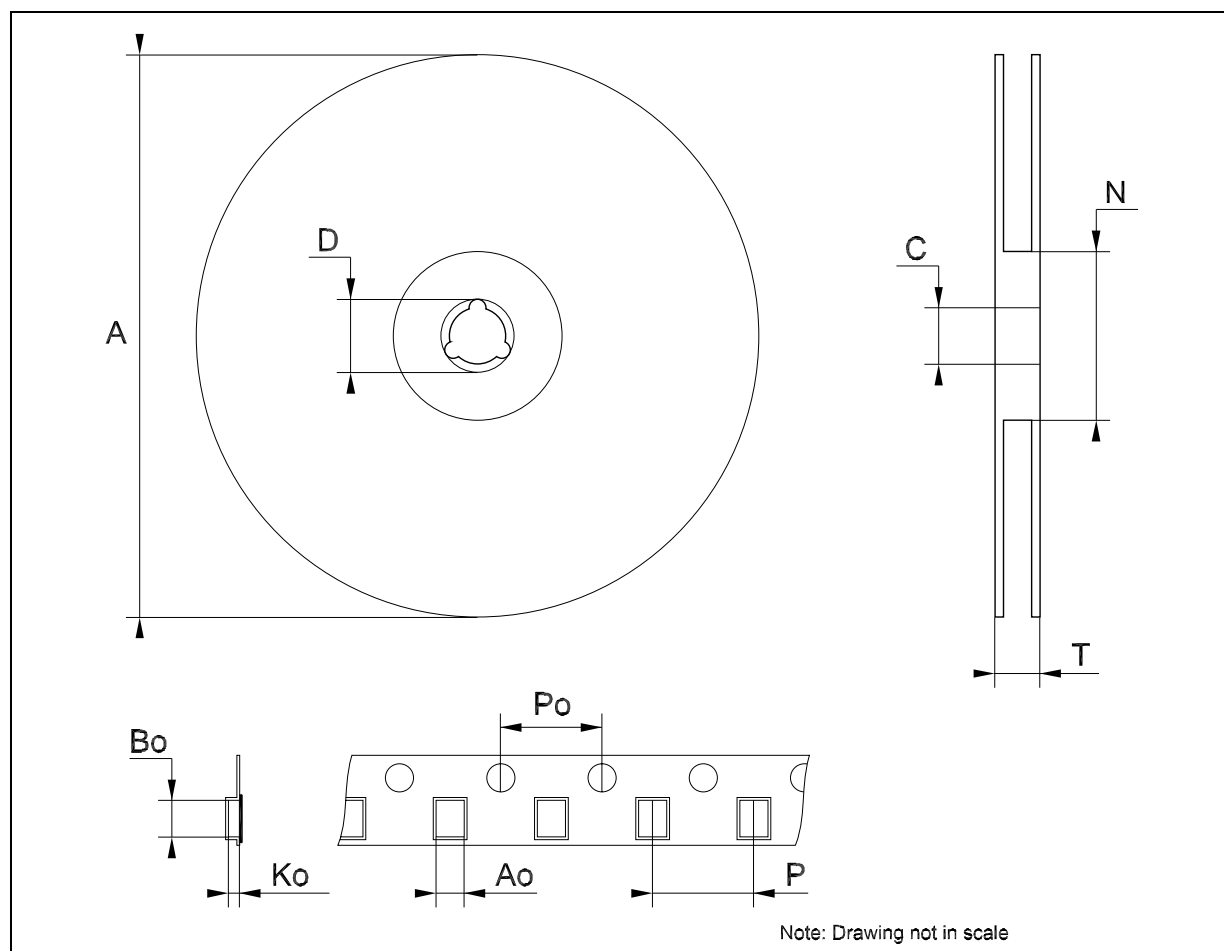
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.004		0.008
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10	0.385		0.393
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.149		0.157
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.)					



PO13H

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



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