



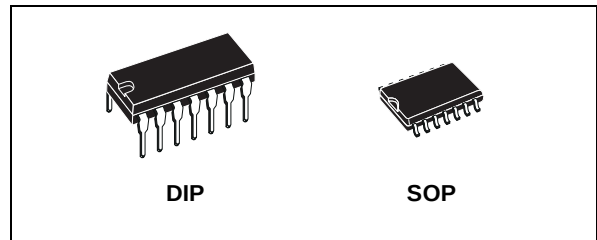
HCF4070B

QUAD EXCLUSIVE OR GATE

- MEDIUM-SPEED OPERATION
 $t_{PHL} = t_{PLH} = 70\text{ns}$ (Typ.) at $CL = 50\text{pF}$ and $V_{DD} = 10\text{V}$
- QUIESCENT CURRENT SPECIFIED UP TO 20V
- 5V, 10V AND 15V PARAMETRIC RATINGS
- INPUT LEAKAGE CURRENT
 $I_I = 100\text{nA}$ (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"

DESCRIPTION

The HCF4070B is a monolithic integrated circuit fabricated in Metal Oxide Semiconductor technology available in DIP and SOP packages. The HCF4070B contain four independent exclusive OR gates. This device provide the

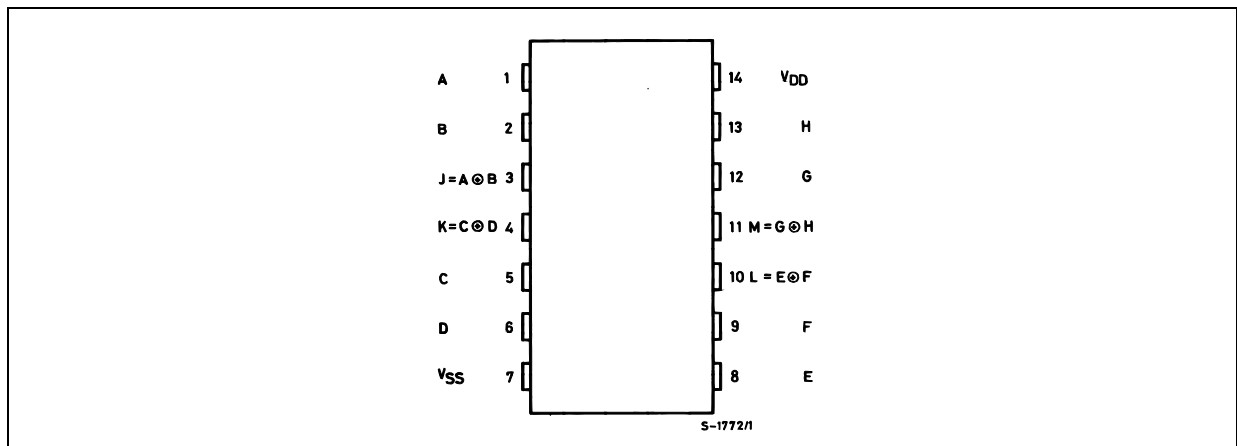


ORDER CODES

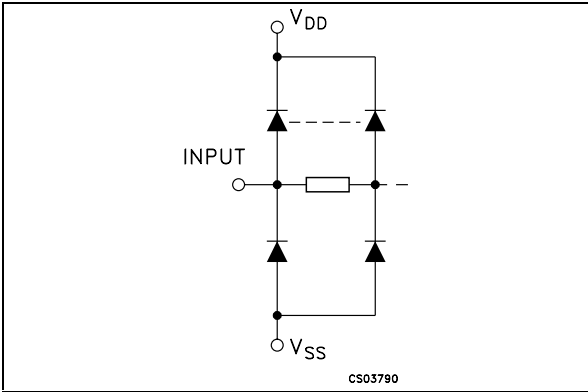
PACKAGE	TUBE	T & R
DIP	HCF4070BEY	
SOP	HCF4070BM1	HCF4070M013TR

system designer with a means for direct implementation of the exclusive-OR. For applications as logical comparators, adders/subtractors, parity generator and checkers.

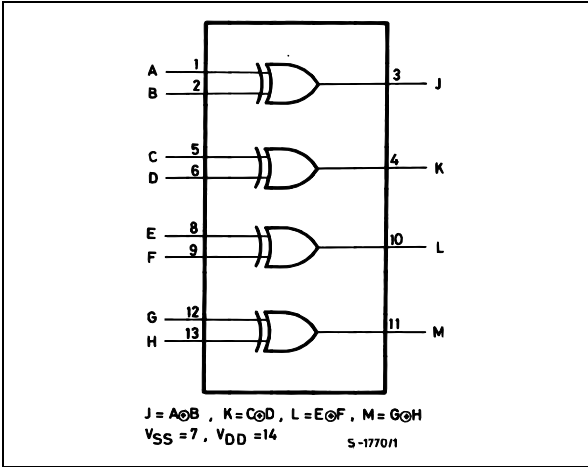
PIN CONNECTION



INPUT EQUIVALENT CIRCUIT



LOGIC DIAGRAM



PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1, 5, 8, 12	A, C, E, G	Data Inputs
2, 6, 9, 13	B, D, F, H	Data inputs
3, 4, 10, 11	J, K, L, M	Data Outputs
7	V _{SS}	Negative Supply Voltage
14	V _{DD}	Positive Supply Voltage

TRUTH TABLE

INPUTS		OUTPUT
A, C, E, G	B, D, F, H	J, K, L, M
L	L	L
L	H	H
H	L	H
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 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.

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

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	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	-1.36	-3.2		-1.15		-1.1		mA	
		0/5	4.6	<1	5	-0.44	-1		-0.36		-0.36			
		0/10	9.5	<1	10	-1.1	-2.6		-0.9		-0.9			
		0/15	13.5	<1	15	-3.0	-6.8		-2.4		-2.4			
I _{OL}	Output Sink Current	0/5	0.4	<1	5	0.44	1		0.36		0.36		mA	
		0/10	0.5	<1	10	1.1	2.6		0.9		0.9			
		0/15	1.5	<1	15	3.0	6.8		2.4		2.4			
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	

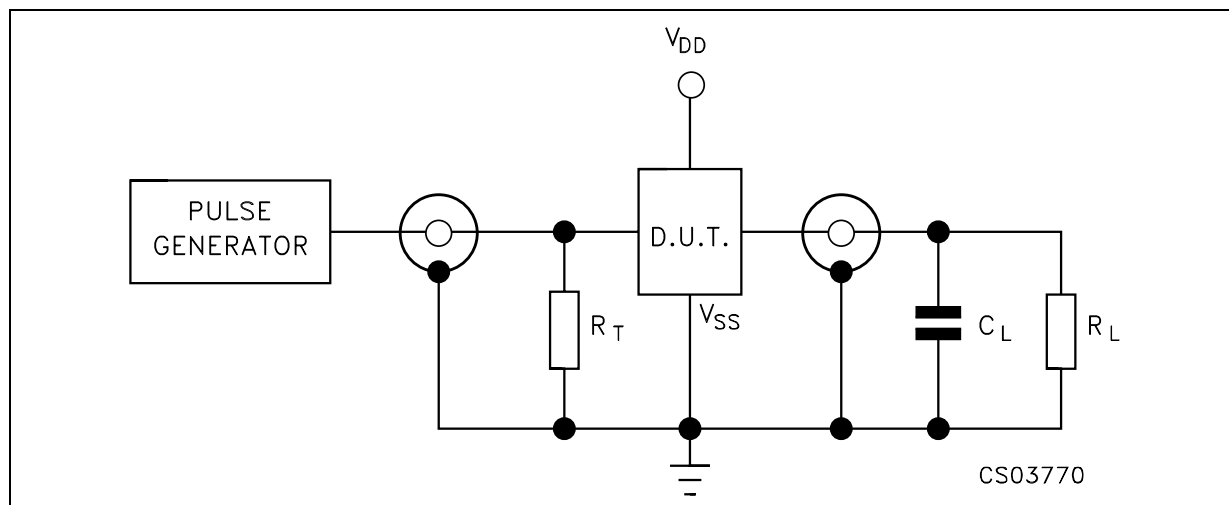
The Noise Margin for both "1" and "0" level is: 1V min. with V_{DD}=5V, 2V min. with V_{DD}=10V, 2.5V min. with V_{DD}=15V

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

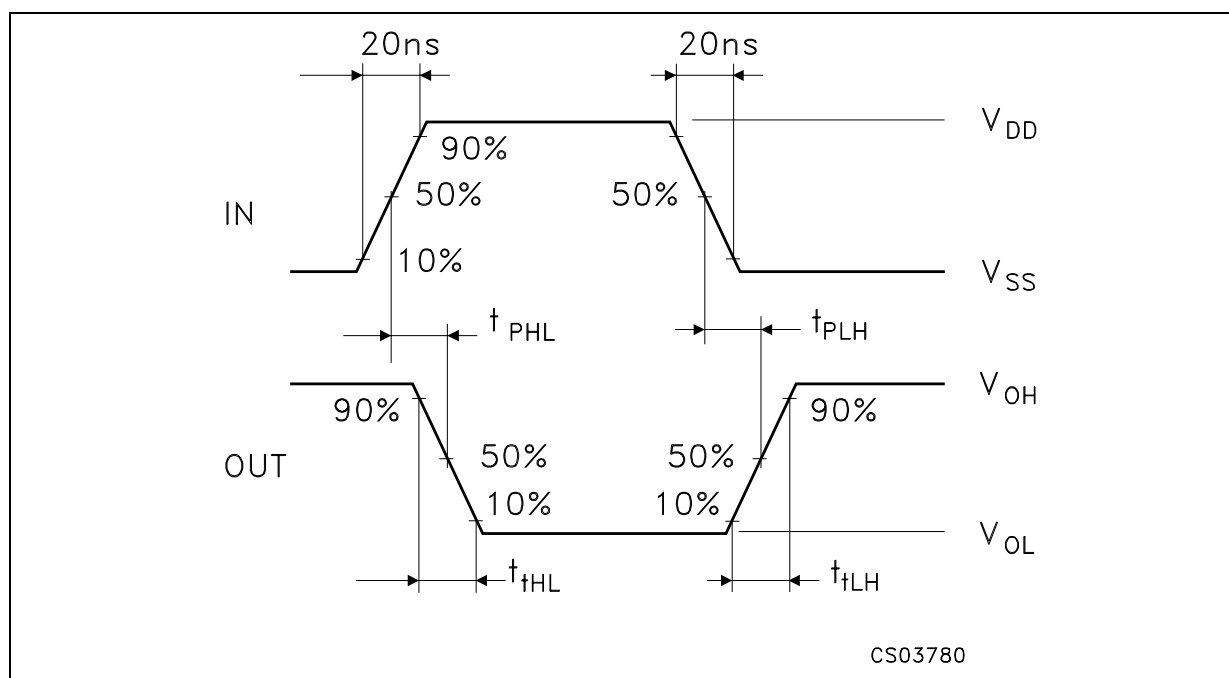
Symbol	Parameter	Test Condition		Value (*)			Unit
		V _{DD} (V)		Min.	Typ.	Max.	
t _{PLH} t _{PHL}	Propagation Delay Time	5			140	280	ns
		10			70	130	
		15			50	100	
t _{TLH} t _{THL}	Output Transition Time	5			100	200	ns
		10			50	100	
		15			40	80	

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

TEST CIRCUIT

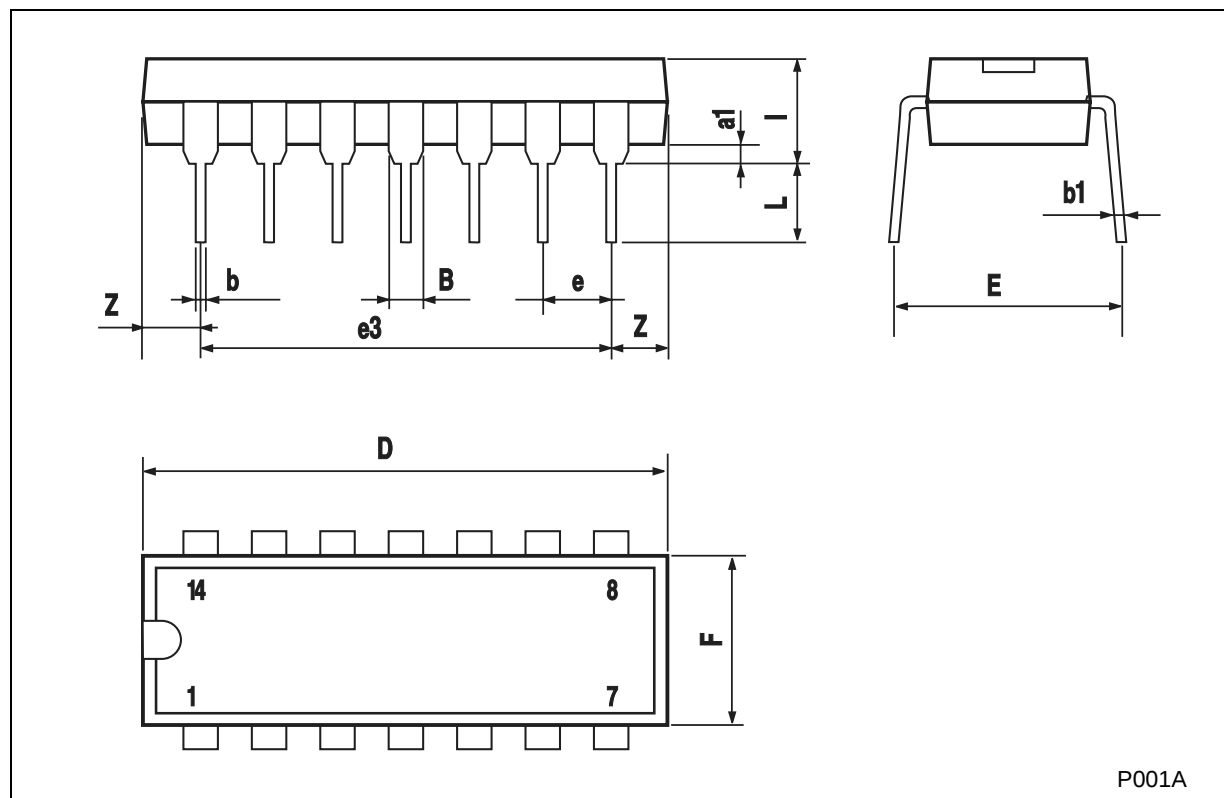


$C_L = 50\text{pF}$ or equivalent (includes jig and probe capacitance)
 $R_L = 200\text{K}\Omega$
 $R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

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

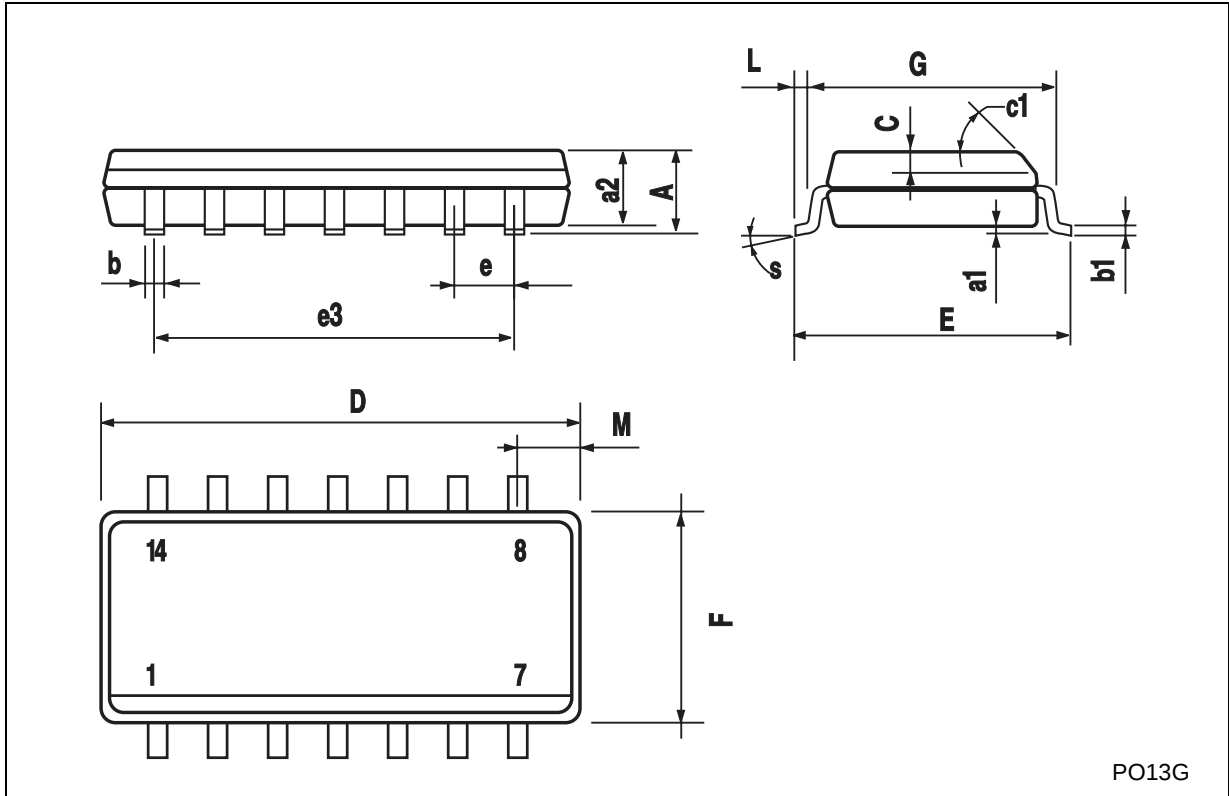
Plastic DIP-14 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	1.39		1.65	0.055		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		15.24			0.600	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z	1.27		2.54	0.050		0.100



SO-14 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.003		0.007
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	8.55		8.75	0.336		0.344
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		7.62			0.300	
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			0.68			0.026
S	8° (max.)					



PO13G



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