



# HCF4556B

## DUAL BINARY TO 1 OF 4 DECODER/DEMULTIPLEXER OUTPUT LOW ON SELECT

- EXPANDABLE WITH MULTIPLE PACKAGES
- STANDARDIZED SYMMETRICAL OUTPUT CHARACTERISTICS
- 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

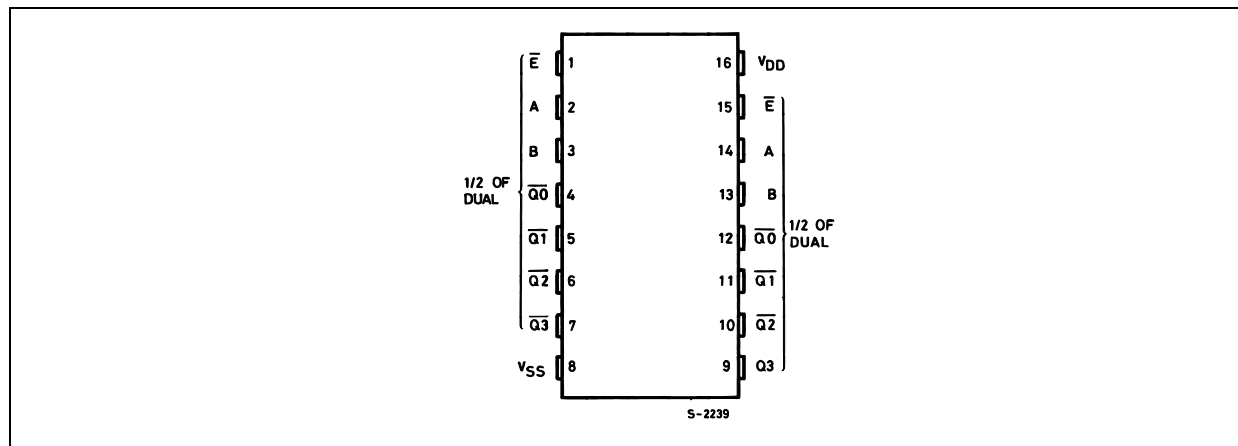
PACKAGE	TUBE	T & R
DIP	HCF4556BEY	
SOP	HCF4556BM1	HCF4556M013TR

### DESCRIPTION

The HCF4556B is a monolithic integrated circuit fabricated in Metal Oxide Semiconductor technology available in DIP and SOP packages. The HCF4556B is a dual 1 of 4 decoder/demultiplexer. Each decoder has two select inputs (A and B), an Enable input ( $\bar{E}$ ), and four mutually

exclusive outputs. On the HCF4556B the outputs are low on select. When the Enable input is high, the outputs is high regardless of the state of the select inputs A and B.

### PIN CONNECTION



**INPUT EQUIVALENT CIRCUIT**



**PIN DESCRIPTION**

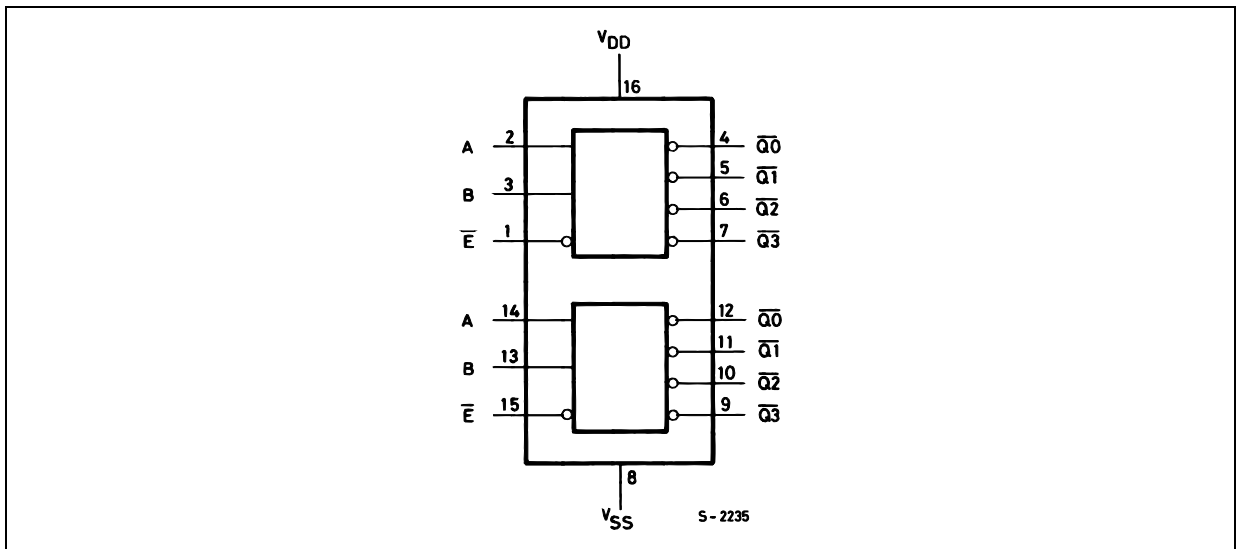
PIN No	SYMBOL	NAME AND FUNCTION
2, 3	A, B	Select Inputs (1/2 of dual)
1	$\overline{E}$	Enable Input (1/2 of dual)
4, 5, 6, 7	Q0 to Q3	Outputs (1/2 of dual)
14, 13	A, B	Select Inputs (1/2 of dual)
15	E	Enable Input (1/2 of dual)
12, 11, 10, 9	Q0 to Q3	Outputs (1/2 of dual)
8	$V_{SS}$	Negative Supply Voltage
16	$V_{DD}$	Positive Supply Voltage

**TRUTH TABLE**

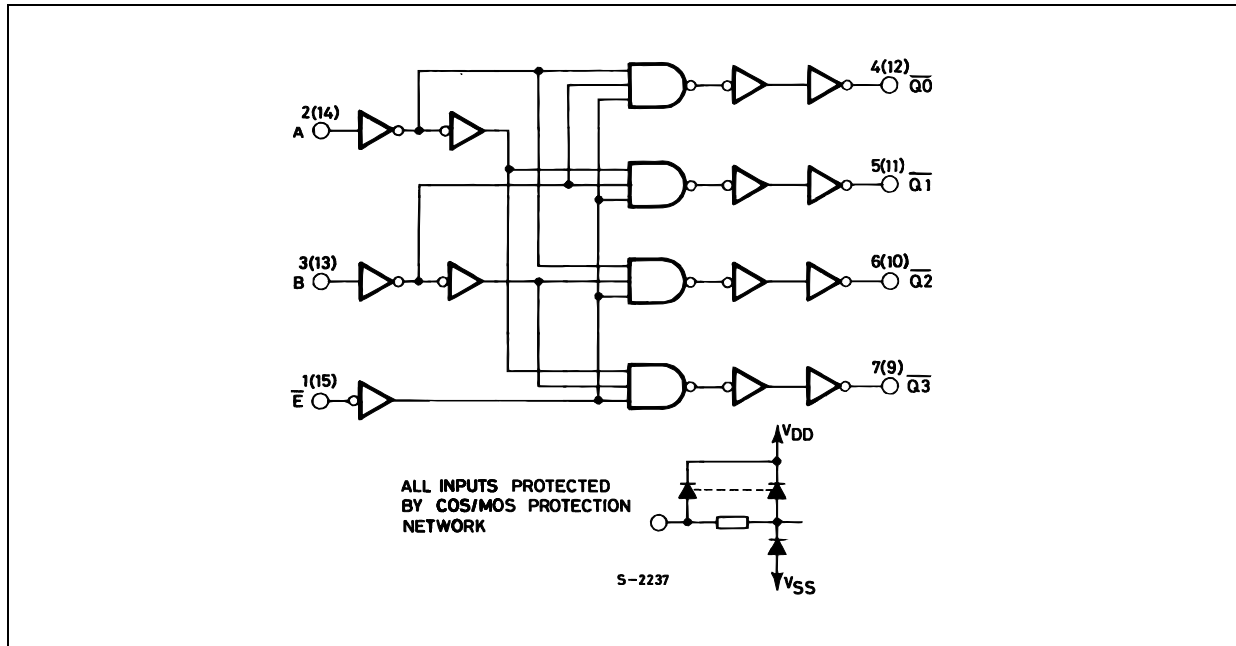
INPUTS ENABLE SELECT			OUTPUTS			
$\overline{E}$	B	A	$\overline{Q3}$	$\overline{Q2}$	$\overline{Q1}$	$\overline{Q0}$
L	L	L	H	H	H	L
L	L	H	H	H	L	H
L	H	L	H	L	H	H
L	H	H	L	H	H	H
H	X	X	H	H	H	H

X : Don't Care

**FUNCTIONAL DIAGRAM**



**LOGIC DIAGRAM**



**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	$\pm 10$	mA
$P_D$	Power Dissipation per Package	200	mW
	Power Dissipation per Output Transistor	100	mW
$T_{op}$	Operating Temperature	-55 to +125	$^{\circ}C$
$T_{stg}$	Storage Temperature	-65 to +150	$^{\circ}C$

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	$^{\circ}C$

DC SPECIFICATIONS

Symbol	Parameter	Test Condition				Value						Unit	
		V <sub>I</sub> (V)	V <sub>O</sub> (V)	I <sub>ol</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		0.04	5		150		150	$\mu$ A
		0/10			10		0.04	10		300		300	
		0/15			15		0.04	20		600		600	
		0/20			20		0.08	100		3000		3000	
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	-1.36	-3.2		-1.1		-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 <sub>OL</sub>	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 <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

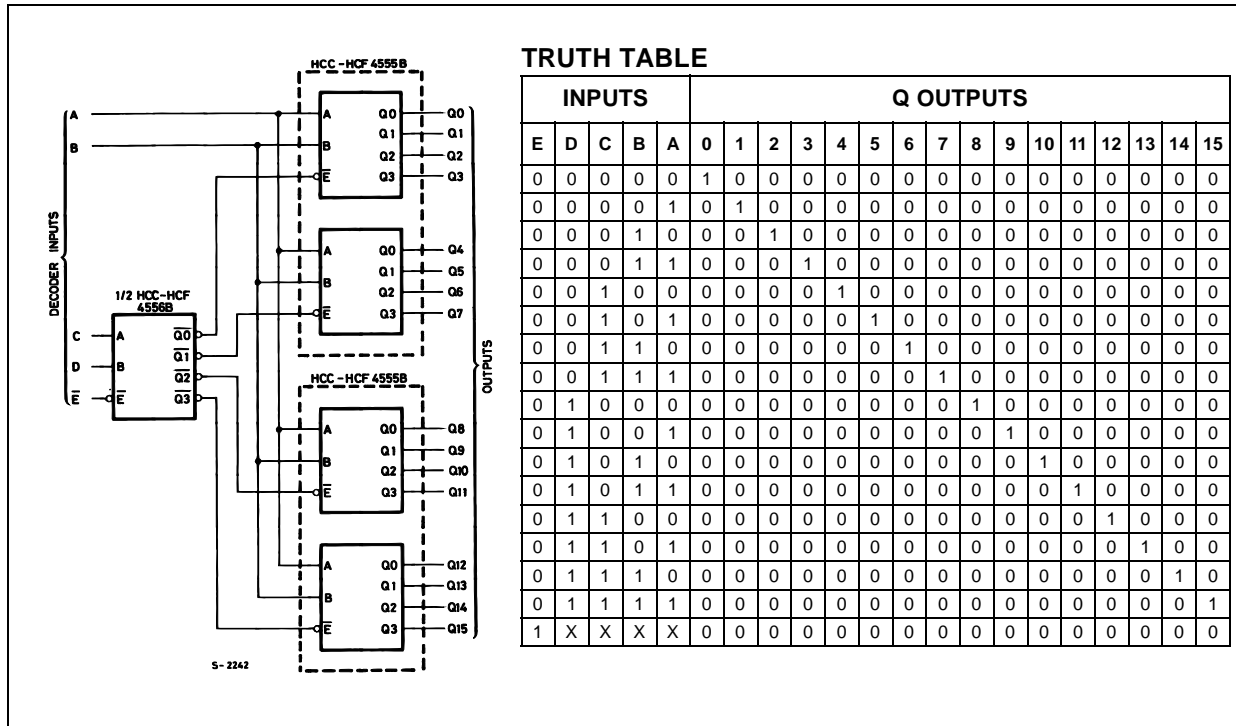
DYNAMIC ELECTRICAL CHARACTERISTICS (T<sub>amb</sub> = 25°C, C<sub>L</sub> = 50pF, R<sub>L</sub> = 200K $\Omega$ , t<sub>r</sub> = t<sub>f</sub> = 20 ns)

Symbol	Parameter	Test Condition		Value (*)			Unit
		V <sub>DD</sub> (V)		Min.	Typ.	Max.	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time	5	A or B Input to any Output		220	440	ns
		10			95	190	
		15			70	140	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time	5	$\bar{E}$ Input to any Output		200	400	ns
		10			85	170	
		15			65	130	
t <sub>TLH</sub> t <sub>THL</sub>	Transition Time	5			100	200	ns
		10			50	100	
		15			40	80	

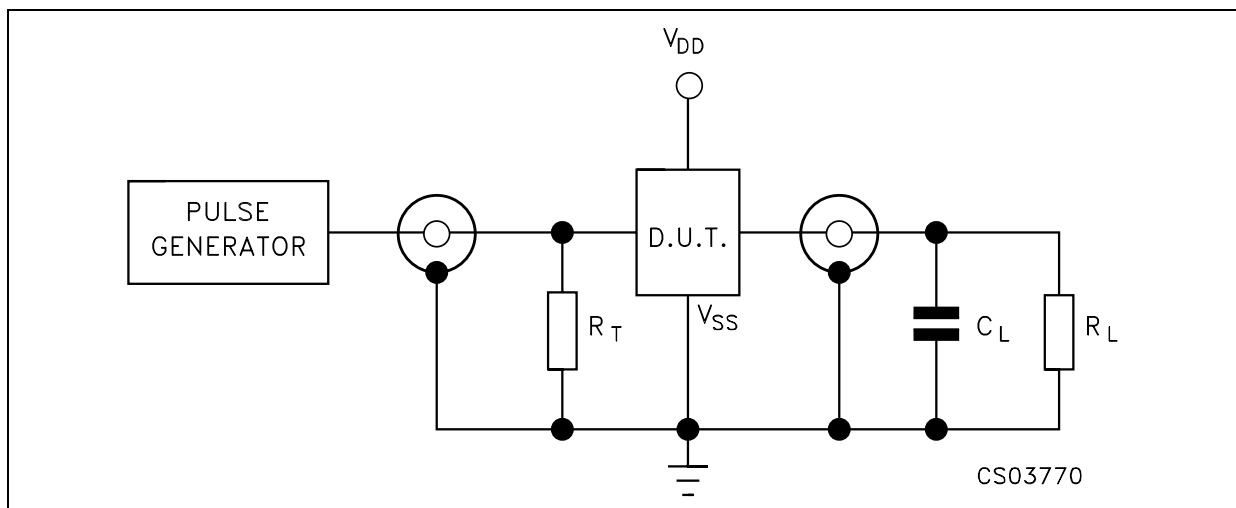
(\*) Typical temperature coefficient for all V<sub>DD</sub> value is 0.3 %/°C.

TYPICAL APPLICATIONS

1 OF 16 DECODER USING HCF4555B AND HCF4556B

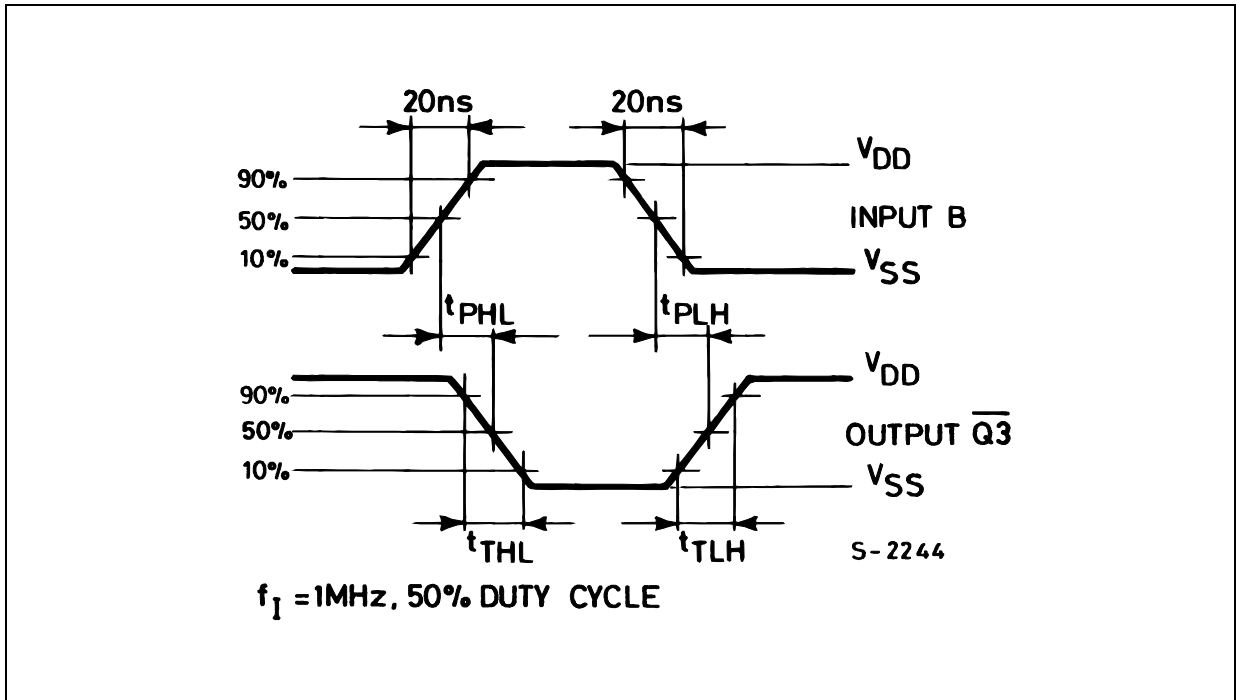


TEST CIRCUIT

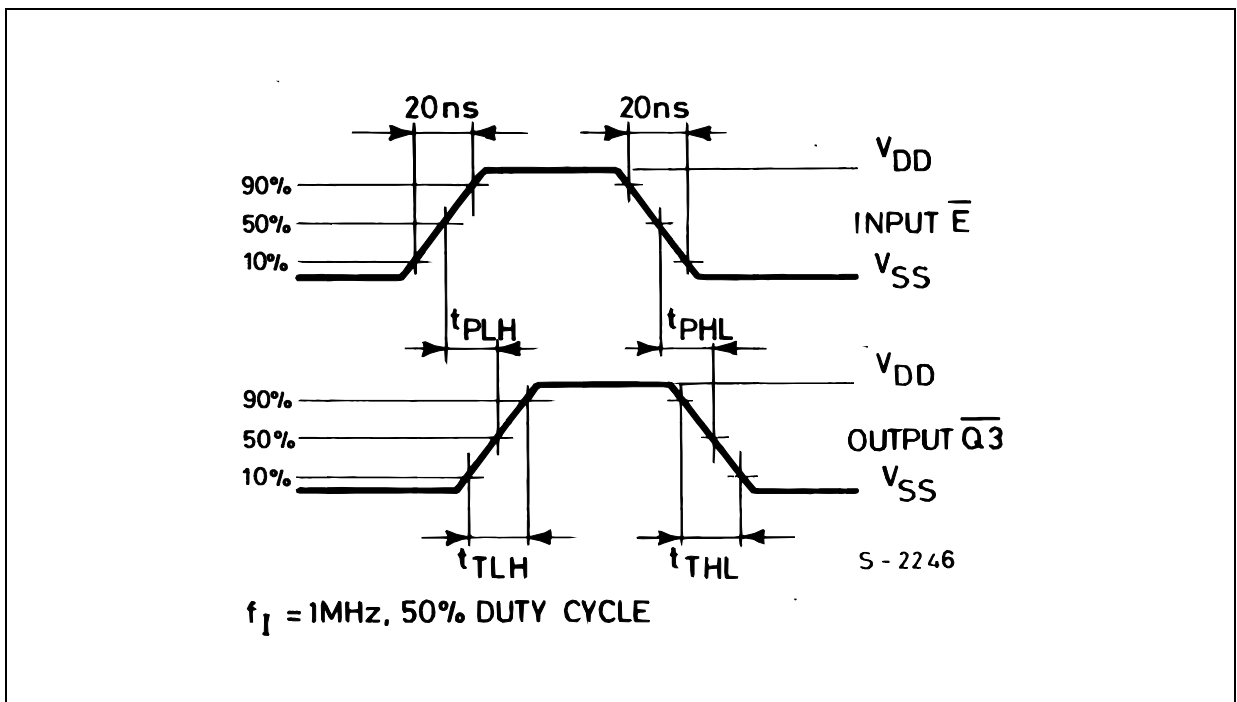


$C_L = 50\text{pF}$  or equivalent (includes jig and probe capacitance)  
 $R_L = 200\text{K}\Omega$   
 $R_T = Z_{OUT}$  of pulse generator (typically  $50\Omega$ )

WAVEFORM 1 : PROPAGATION DELAY TIMES (INPUT TO  $\overline{Q3}$  OUTPUT) ( $f=1\text{MHz}$ ; 50% duty cycle)

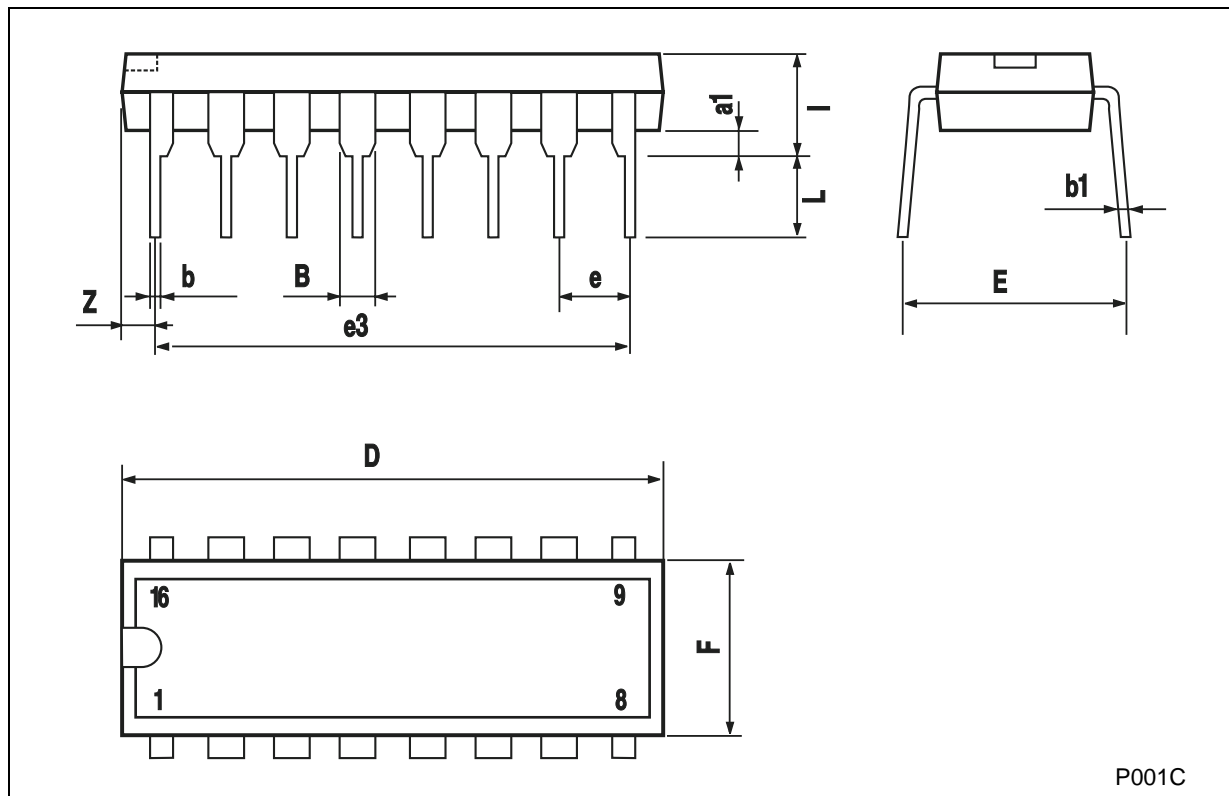


WAVEFORM 2 : PROPAGATION DELAY TIMES ( $\overline{E}$  INPUT TO  $\overline{Q3}$  OUTPUT) ( $f=1\text{MHz}$ ; 50% duty cycle)



### 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	0.003		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	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



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