



**THE DATASHEET OF
HCF40107M013TR**



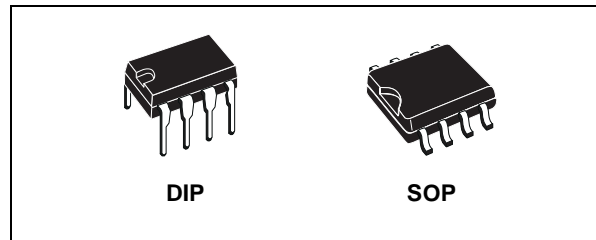


DUAL 2-INPUT NAND BUFFER/DRIVER

- 32 TIMES STANDARD B-SERIES OUTPUT CURRENT DRIVE SINKING CAPABILITY - 136 mA TYP. AT $V_{DD} = 10V$, $V_{DS} = 1V$
- QUIESCENT CURRENT SPECIF. UP TO 20V
- 5V, 10V AND 15V PARAMETRIC RATINGS
- INPUT LEAKAGE CURRENT
 $I_l = 100nA$ (MAX) AT $V_{DD} = 18V$ $T_A = 25^\circ C$
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC JESD13B "STANDARD SPECIFICATIONS FOR DESCRIPTION OF B SERIES CMOS DEVICES"

DESCRIPTION

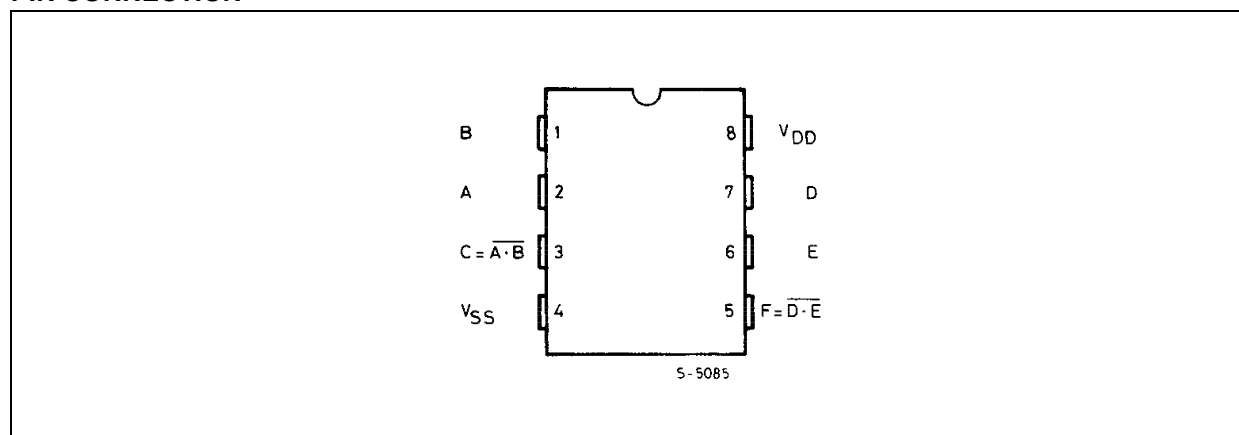
HCF40107B is a monolithic integrated circuit fabricated in Metal Oxide Semiconductor technology available in DIP and SOP packages. HCF40107B is a dual 2-input NAND buffer/driver containing two independent 2-input NAND buffers with open-drain single n-channel transistor outputs. This device features a wired-OR capability and high output sink current capability (136 mA typ. at $V_{DD} = 10V$, $V_{DS} = 1V$).



ORDER CODES

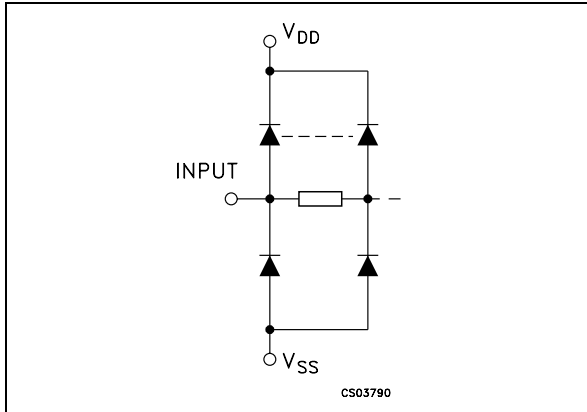
PACKAGE	TUBE	T & R
DIP	HCF40107BEY	
SOP	HCF40107BM1	HCF40107M013TR

PIN CONNECTION



HCF40107B

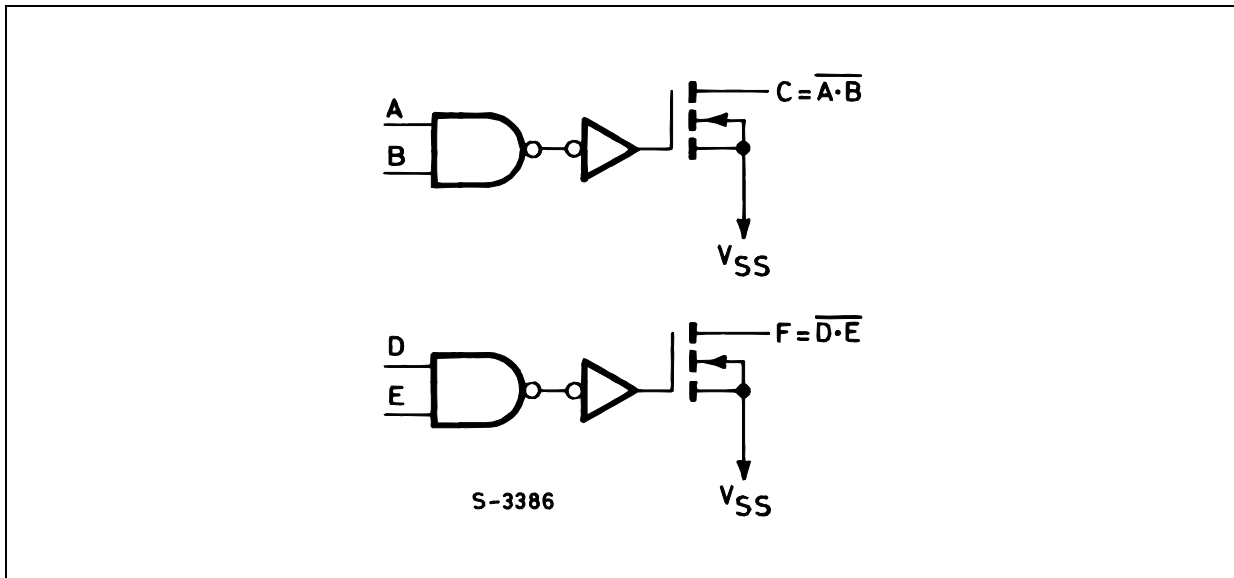
INPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
2, 1, 7, 6	A, B, D, E	Input
3, 5	C, F	Outputs
4	V_{SS}	Negative Supply Voltage
8	V_{DD}	Positive Supply Voltage

FUNCTIONAL DIAGRAM

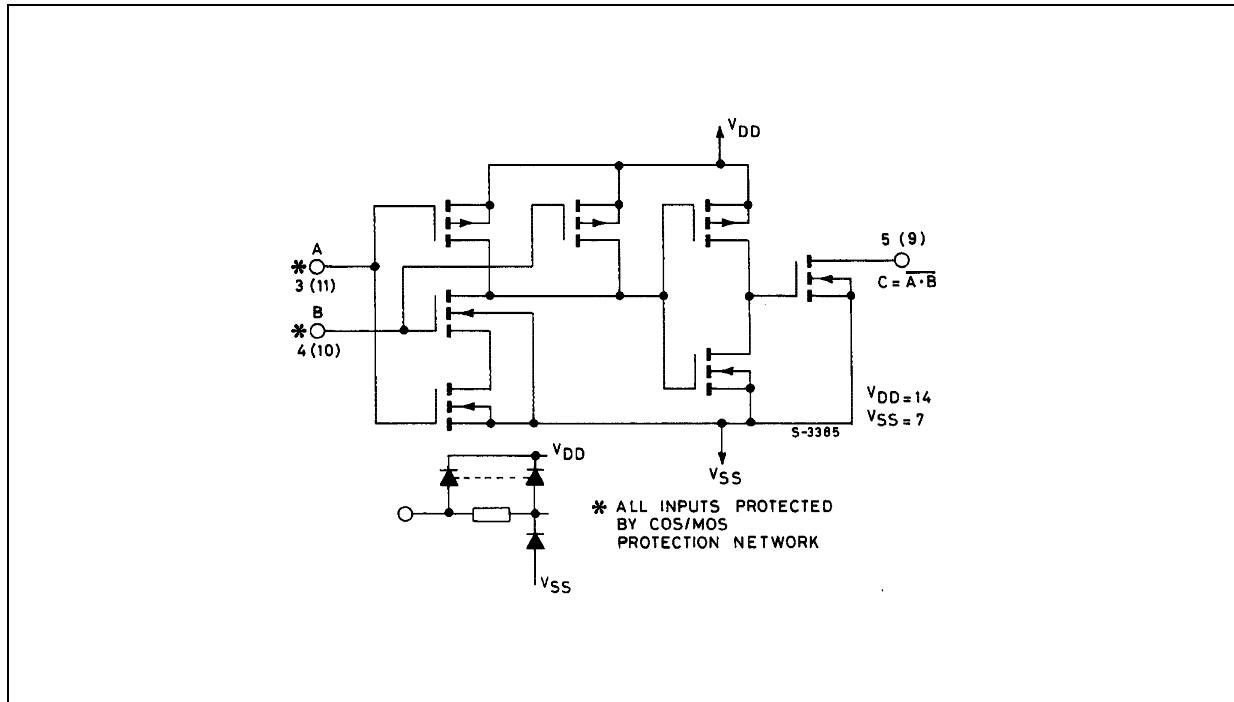


TRUTH TABLE

A	B	C	
L	L	H*	Z#
H	L	H*	Z#
L	H	H*	Z#
H	H	L	

* : Requires external and pull-up resistor (R_L) to V_{DD} .
 # : Without pull-up resistor (3-state).

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

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	$^{\circ}\text{C}$

DC SPECIFICATIONS

Symbol	Parameter	Test Condition				Value						Unit	
		V _I (V)	V _O (V)	I _{ol} (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	5		150		30	μA
		0/10			10		0.02	10		300		60	
		0/15			15		0.02	20		600		120	
		0/20			20		0.04	100		3000		600	
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 _{OL}	Output Sink Current	5	0.4		5	21	32		16		12		mA
		5	1		5	44	68		30		25		
		10	0.5		10	49	74		37		28		
		10	1		10	89	136		68		51		
		15	0.5		15	66	100		50		38		
I _{OH}	Output Drive Current	No Internal Pull-up Device										mA	
I _{IH} , I _{IL}	Input Leakage Current	0/18	Any Input		18		±10 ⁻⁵	±0.1		±0.1		±1	μA
I _{OH} , I _{OL} ***	3-State Output Leakage Current	0/18	18		18		±10 ⁻⁴	2		2		20	μA
C _I	Input Capacitance		Any Input				5	7.5					pF
C _O	Output Capacitance		Any Output				30						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

** Measured with external pull-up resistor, R_L = 10kΩ to V_{DD}.

*** Forced output disabled.

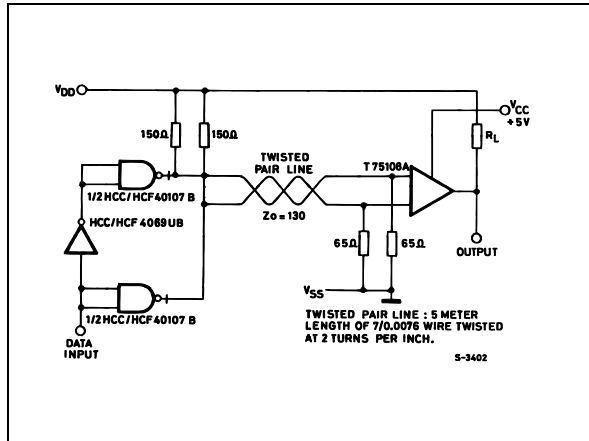
DYNAMIC ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, C_L = 50pF, R_L = 200KΩ, t_r = t_f = 20 ns)

Symbol	Parameter	Test Condition			Value (*)			Unit
		V _{DD} (V)			Min.	Typ.	Max.	
t _{PHL} t _{PLH}	Propagation Delay Time High to Low	5	R _L * = 120Ω			100	200	ns
		10			45	90		
		15			30	60		
	Low to High	5				100	200	ns
		10				60	120	
		15				50	100	
t _{THL} t _{TLH}	Transition Time High to Low	5	R _L * = 120Ω			50	100	ns
		10			20	40		
		15			10	20		
	Low to High	5				50	100	ns
		10				35	70	
		15				25	50	

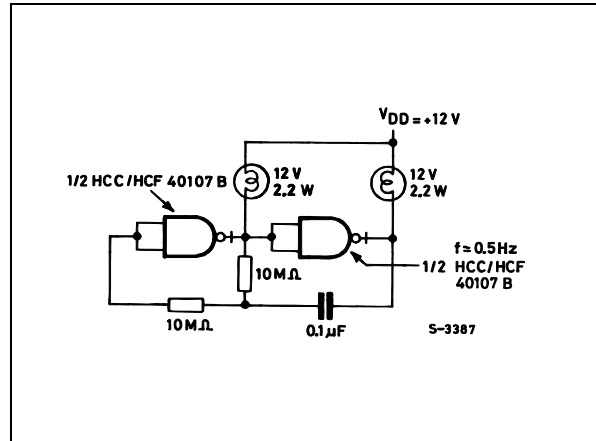
(*) R_L is external pull-up resistor to V_{DD}.

TYPICAL APPLICATIONS

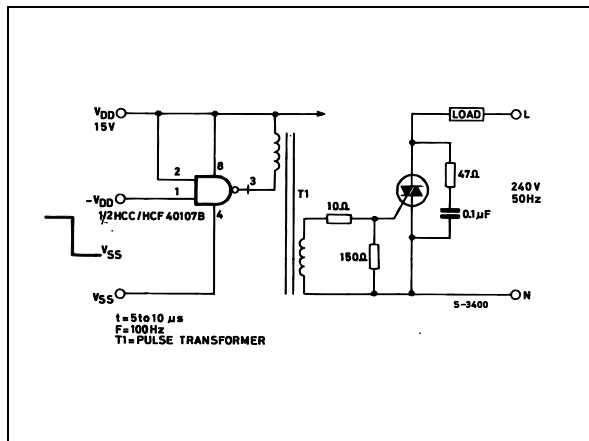
Line-driver Circuit.



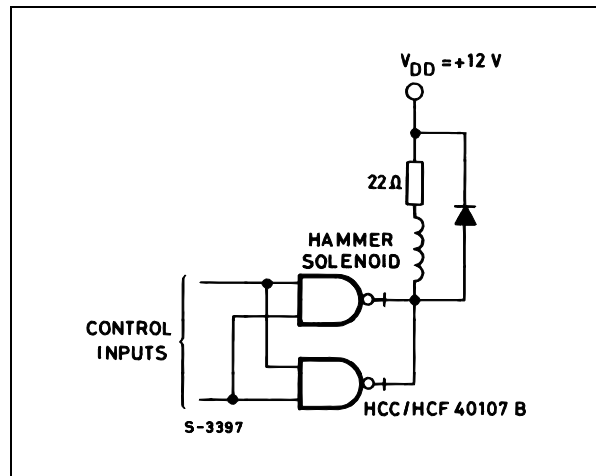
A 2.2-watt Incandescent Lamp-driver Circuit.



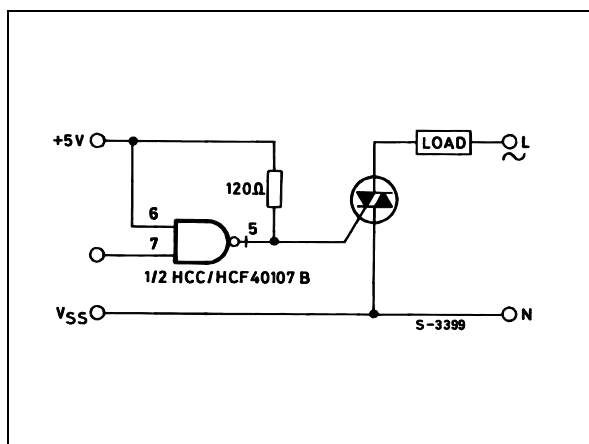
Interface of 40107B with Triac, with COS/MOS Component and Triac isolated.



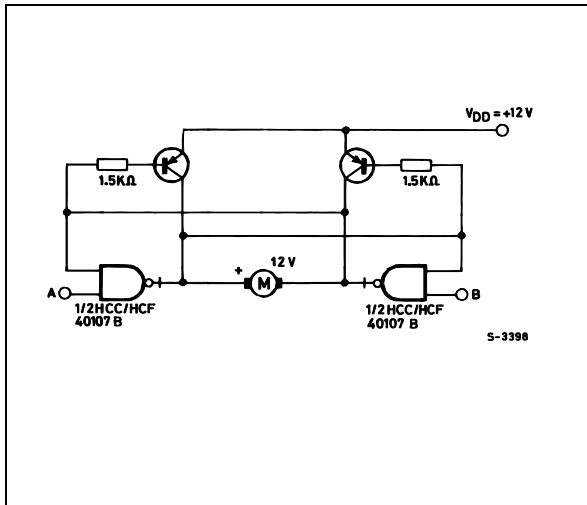
Solenoid Driver Circuit



Direct Dc Driver Interface of 40107B with a Triac.

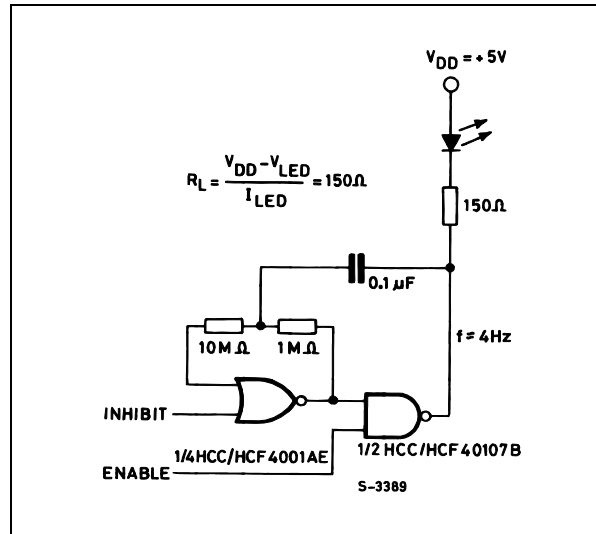


Motor-controller Circuit



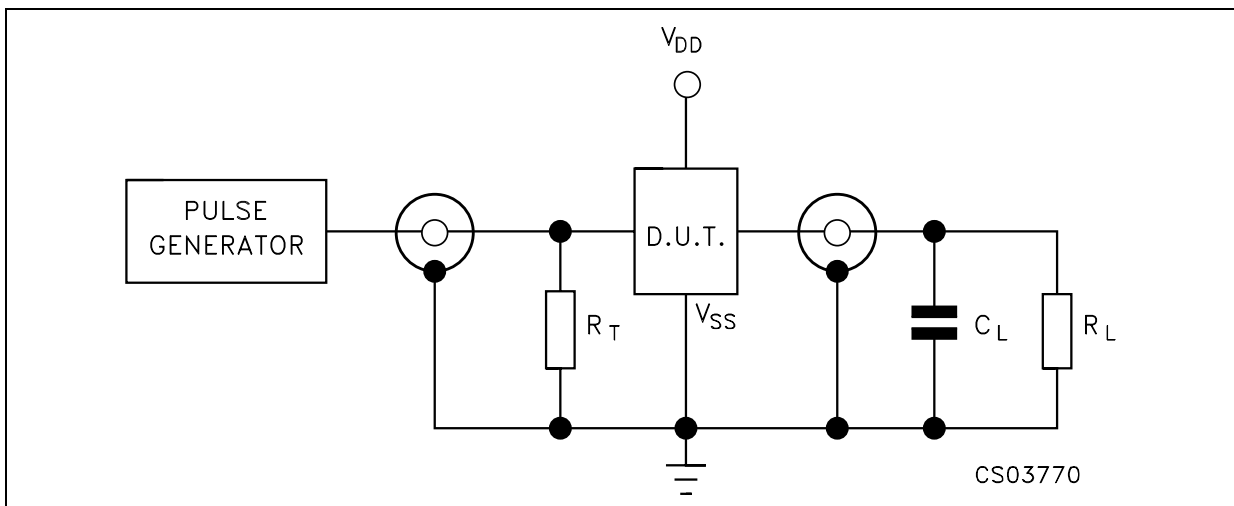
A	B	MOTOR FUNCTION
L	L	OFF
H	L	COUNTER CLOCKWISE
H	H	AS PREVIOUS STATE
L	H	CLOCKWISE
H	H	AS PREVIOUS STATE

Led Driver Circuit



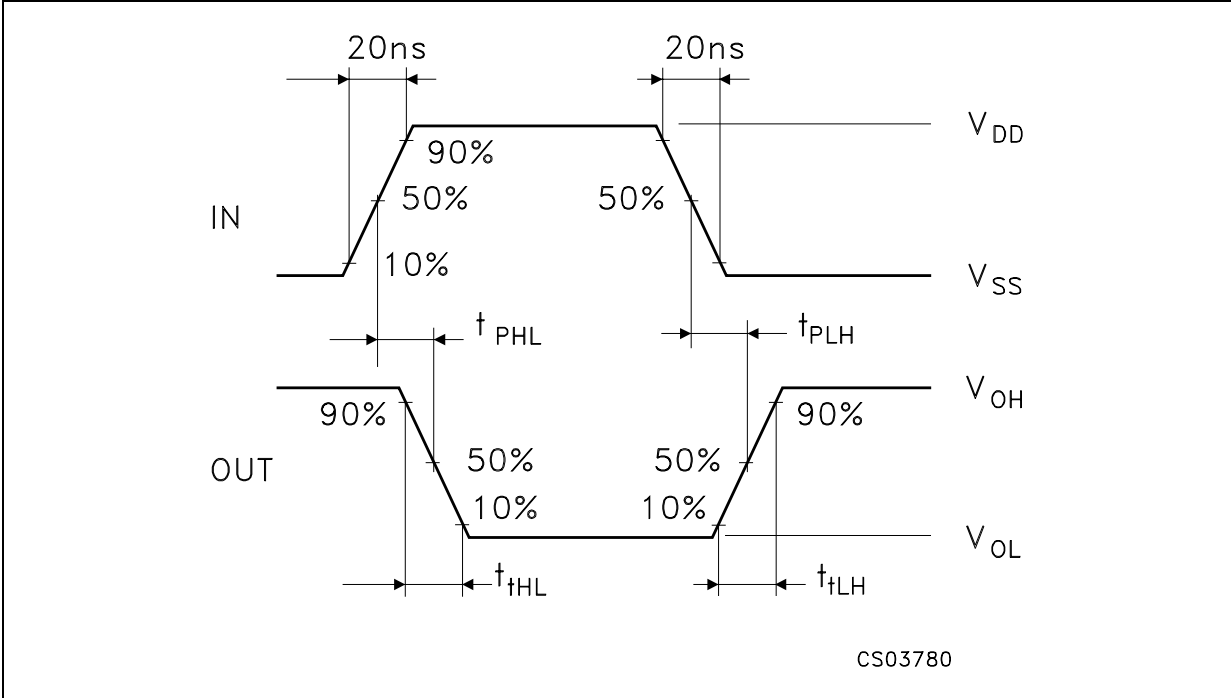
INHIBIT	ENABLE	OUTPUT
L	L	OFF
H	L	OFF
L	H	OFF
L	H	ON

TEST CIRCUIT



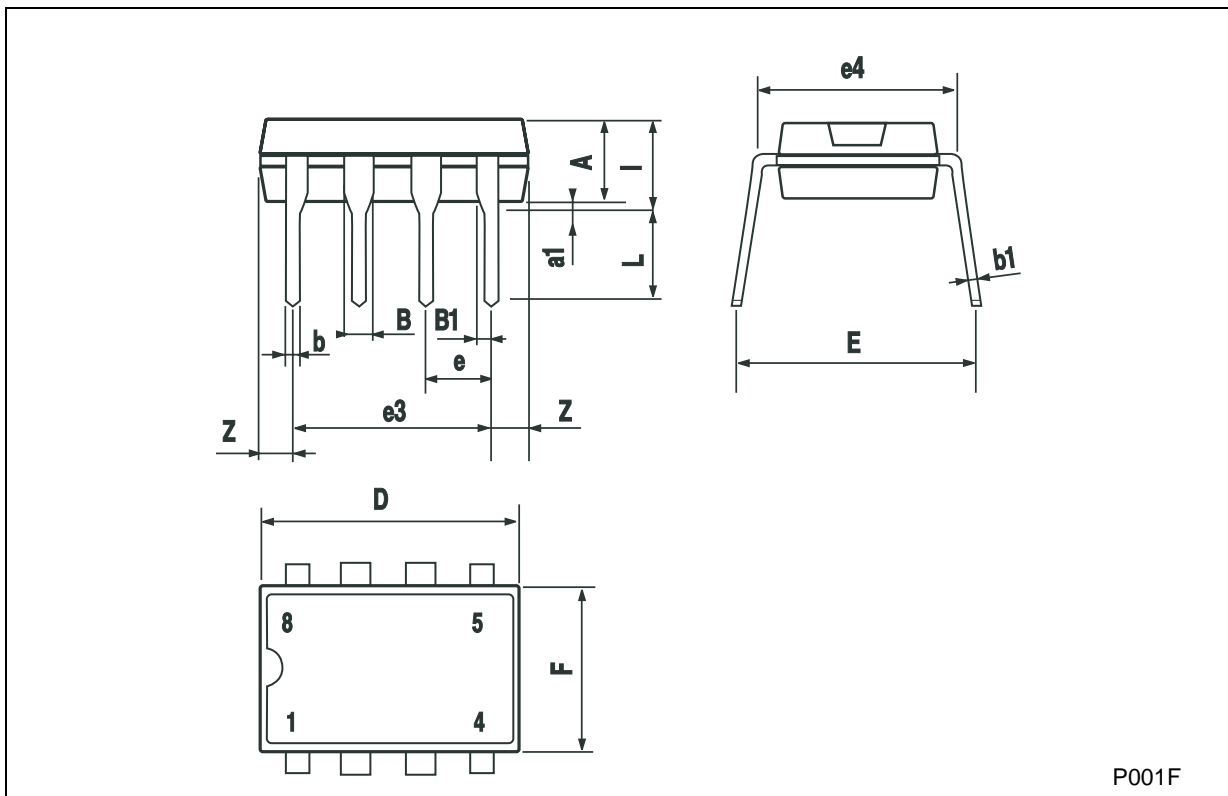
$C_L = 50\text{pF}$ or equivalent (includes jig and probe capacitance)
 $R_L = 200\text{K}\Omega$
 $R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

WAVEFORM : PROPAGATION DELAY TIMES (f=1MHz; 50% duty cycle)



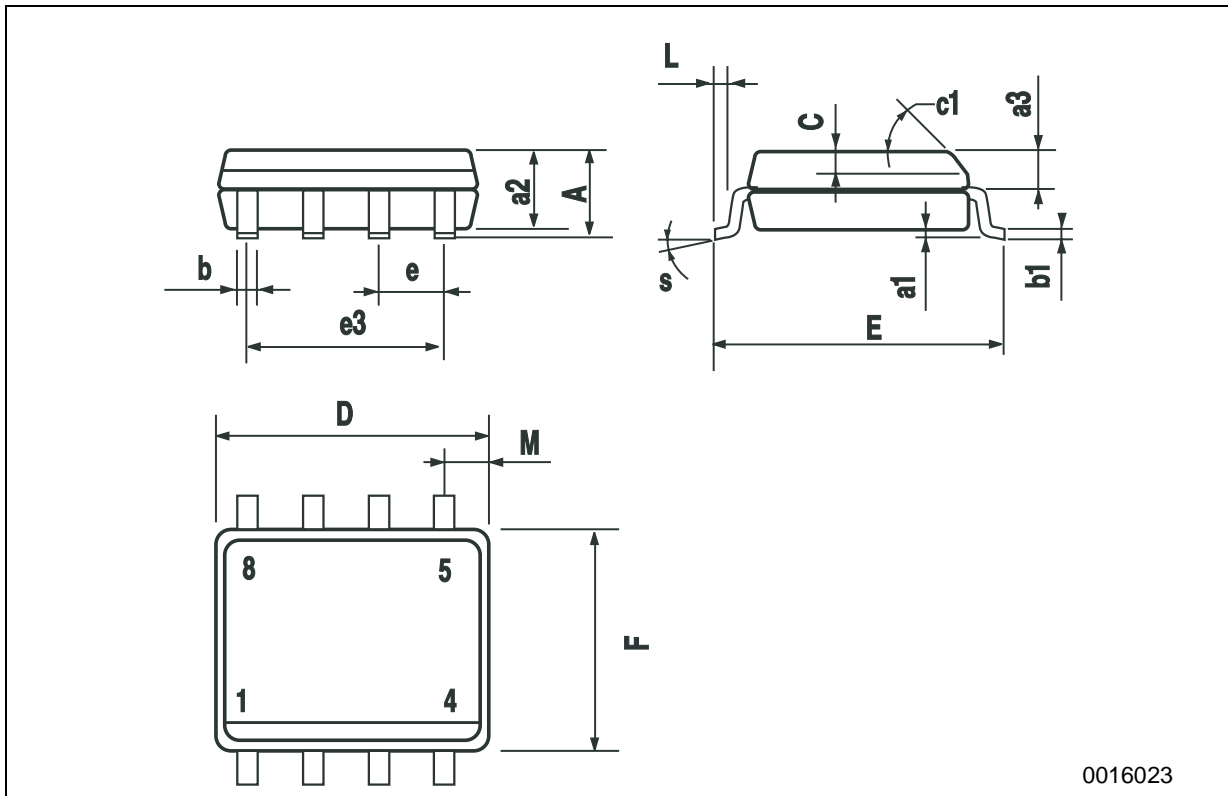
Plastic DIP-8 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		3.3			0.130	
a1	0.7			0.028		
B	1.39		1.65	0.055		0.065
B1	0.91		1.04	0.036		0.041
b		0.5			0.020	
b1	0.38		0.5	0.015		0.020
D			9.8			0.386
E		8.8			0.346	
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			7.1			0.280
I			4.8			0.189
L		3.3			0.130	
Z	0.44		1.6	0.017		0.063



SO-8 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.25	0.003		0.009
a2			1.65			0.064
a3	0.65		0.85	0.025		0.033
b	0.35		0.48	0.013		0.018
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.019
c1	45° (typ.)					
D	4.8		5.0	0.189		0.196
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.149		0.157
L	0.4		1.27	0.015		0.050
M			0.6			0.023
S	8° (max.)					



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