

### Description :

The CD4081 consist of four AND gate circuits. Each circuit functions as a two-input AND gate. The outputs are fully buffered for highest noise immunity and pattern insensitivity to output impedance variations. It operates over a recommended  $V_{DD}$  power supply range of 3V to 15V referenced to  $V_{SS}$ . Unused inputs must be connected to  $V_{DD}$ ,  $V_{SS}$ , or another input. Unused outputs must be left open.

### Features :

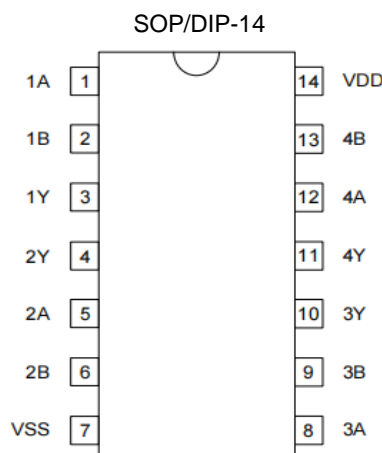
- Wide Operating Voltage Range of 3.0V to 18.0V
- Maximum Input Current of 1 $\mu$ A at 18V over Full Package-Temperature range, 100nA at 18V and 25°C
- Standardized Symmetrical Output Characteristics
- Noise Margin
  - 1.0V min @ 5.0V supply
  - 2.0V min @ 10.0V supply
  - 2.5V min @ 15.0V supply

### Absolute Maximum Ratings:

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
DC Supply Voltage (Referenced to $V_{SS}$ )	$V_{DD}$	-0.5	20	V
DC Input Voltage (Referenced to $V_{SS}$ )	$V_{IN}$	-0.5	$V_{DD} + 0.5$	V
DC Input Current	$I_{IN}$	-	$\pm 10$	mA
Maximum Junction Temperature	$T_J$	-	150	°C
Storage Temperature	$T_{STG}$	-65	150	°C

Note1. Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

### Pin Assignment :



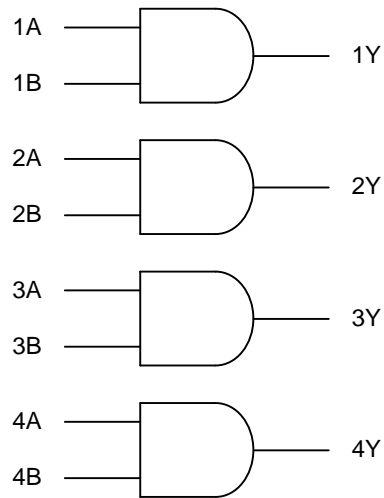
Pin No.		Pin Name	Pin Function
SOP-14	DIP-14		
1	1	1A	Input 1A
2	2	1B	Input 1B
3	3	1Y	Output 1
4	4	2Y	Output 2
5	5	2A	Input 2A
6	6	2B	Input 2B
7	7	VSS	Ground
8	8	3A	Input 3A
9	9	3B	Input 3B
10	10	3Y	Output 3
11	11	4Y	Output 4
12	12	4A	Input 4A
13	13	4B	Input 4B
14	14	VDD	Power Supply

### Recommended operating conditions

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	$V_{DD}$	3	18	V
DC Input Voltage	$V_{IN}$	0	$V_{DD}$	V
DC Output Voltage	$V_{OUT}$	0	$V_{DD}$	V
Operating Free-Air Temperature Range	$T_A$	-55	125	°C

Note 2. The device is not guaranteed to function outside its operating ratings.

### BLOCK DIAGRAM



### FUNCTION TABLE

Input (A)	Input (B)	Output (Y)
L	L	L
L	H	L
H	L	L
H	H	H

### DC ELECTRICAL CHARACTERISTICS

Voltages referenced to  $V_{SS}$ .

SYMBOL	PARAMETER	TEST CONDITION	$V_{DD}$	Limit			UNIT	
				-55°C	25°C	125°C		
$V_{IH}$	Minimum High-Level Input Voltage	$V_{OUT} = 0.5V$ or $V_{DD} - 0.5V$	5 V	3.5	3.5	3.5	V	
		$V_{OUT} = 1.0V$ or $V_{DD} - 1.0V$	10 V	7	7	7		
		$V_{OUT} = 1.5V$ or $V_{DD} - 1.5V$	15 V	11	11	11		
$V_{IL}$	Maximum Low-Level Input Voltage	$V_{OUT} = 0.5V$	5 V	1.5	1.5	1.5	V	
		$V_{OUT} = 1.0V$	10 V	3	3	3		
		$V_{OUT} = 1.5V$	15 V	4	4	4		
$V_{OH}$	Minimum High-Level Output Voltage	$V_{IN} = V_{DD}$	5 V	4.95	4.95	4.95	V	
			10 V	9.95	9.95	9.95		
			15 V	14.95	14.95	14.95		
$V_{OL}$	Maximum Low-Level Output Voltage	$V_{IN} = V_{DD}$ or $V_{SS}$	5 V	0.05	0.05	0.05	V	
			10 V	0.05	0.05	0.05		
			15 V	0.05	0.05	0.05		
$I_{IN}$	Maximum Input Leakage Current	$V_{IN} = V_{DD}$ or $V_{SS}$	18 V	±0.1	±0.1	±1.0	µA	
$I_{CC}$	Maximum Quiescent Supply Current	$V_{IN} = V_{DD}$ or $V_{SS}$	5 V	0.25	0.25	7.5	µA	
			10 V	0.5	0.5	15		
			15 V	1.0	1.0	30		
			20 V	5.0	5.0	150		
$I_{OL}$	Minimum Output Low (Sink) Current	$V_{IN} = V_{DD}$ or $V_{SS}$	$V_{OL} = 0.4V$	5 V	0.64	0.51	0.36	mA
			$V_{OL} = 0.5V$	10 V	1.6	1.3	0.9	
			$V_{OL} = 1.5V$	15 V	4.2	3.4	2.4	
$I_{OH}$	Minimum Output High (Source) Current	$V_{IN} = V_{DD}$ or $V_{SS}$	$V_{OH} = 2.5V$	5 V	-2.0	-1.6	-1.15	mA
			$V_{OH} = 4.6V$	5 V	-0.64	-0.51	-0.36	
			$V_{OH} = 9.5V$	10 V	-1.6	-1.3	-0.9	
			$V_{OH} = 13.5V$	15 V	-4.2	-3.4	-2.4	

### AC ELECTRICAL CHARACTERISTICS

$C_L = 50 \text{ pF}$ ,  $R_L = 200\text{k}\Omega$ , Input  $t_r = t_f = 20 \text{ ns}$

SYMBOL	PARAMETER	VDD	Limit			UNIT
			-55°C	25°C	125°C	
$t_{PLH}$ , $t_{PHL}$	Maximum Propagation Delay, Input A or Input B to Output Y (Figure 1)	5 V	250	250	500	ns
		10 V	120	120	240	
		15 V	90	90	180	
$t_{TLH}$ , $t_{THL}$	Maximum Output Transition Time, Any Output (Figure 1)	5 V	200	200	400	ns
		10 V	100	100	200	
		15 V	80	80	160	
$C_{IN}$	Maximum Input Capacitance	—		7.5		pF

### SWITCHING CHARACTERISTICS

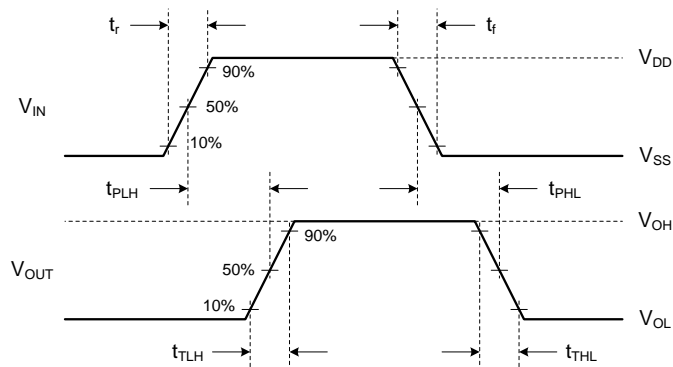
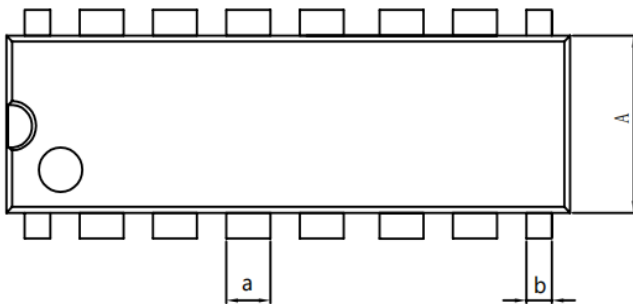
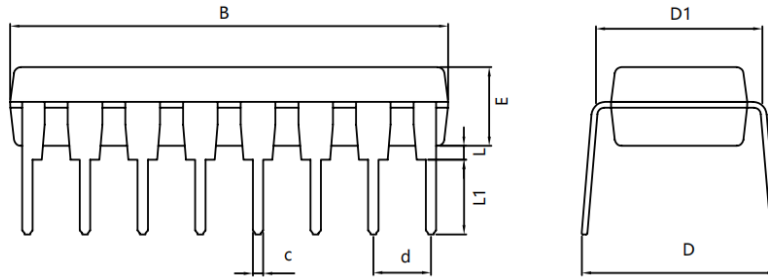


Fig. 1. Switching Time Waveforms

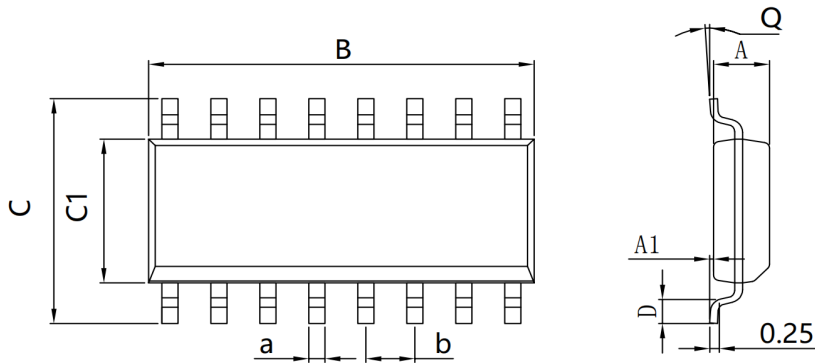
### PACKAGE MECHANICAL DATA

#### DIP16



Dimensions In Millimeters					
Symbol :	Min :	Max :	Symbol :	Min :	Max :
A	6.100	6.680	L	0.500	0.800
B	18.940	19.560	a	1.524 TYP	
D	8.200	9.200	b	0.889 TYP	
D1	7.42	7.820	c	0.457 TYP	
E	3.100	3.550	d	2.540 TYP	
L	0.500	0.800			

#### SOP16



Dimensions In Millimeters					
Symbol :	Min :	Max :	Symbol :	Min :	Max :
A	1.225	1.570	D	0.400	0.950
A1	0.100	0.250	Q	0°	8°
B	9.800	10.00	a	0.420 TYP	
C	5.800	6.250	b	1.270 TYP	
C1	3.800	4.000			