

## FEATURES

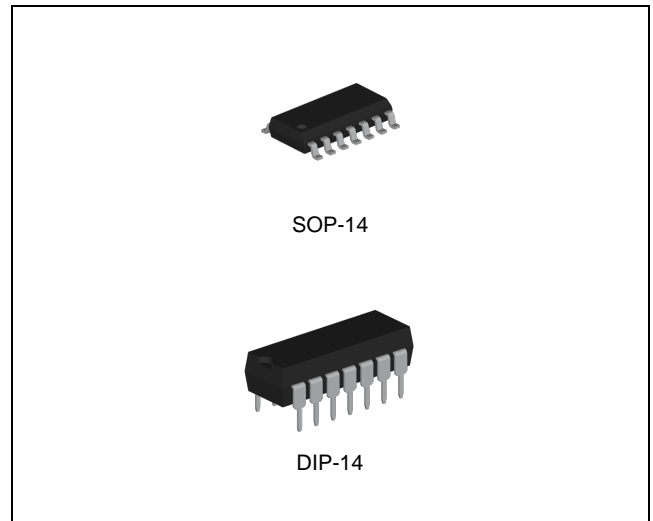
- Wide Operating Voltage Range of 3.0V to 18.0V
- Maximum Input Current of 1 $\mu$ A at 18V over Full Package-Temperature range, 100nA at 18V and 25°C
- Standardized Symmetrical Output Characteristics
- Noise Margin
  - 1.0V min @ 5.0V supply
  - 2.0V min @ 10.0V supply
  - 2.5V min @ 15.0V supply

## DESCRIPTION

The CD4066B device is a quad bilateral switch intended for the transmission or multiplexing of analog or digital signals. In addition, the on-state resistance is relatively constant over the full signal input range.

The CD4066B device consists of four bilateral switches, each with independent controls. Both the p and the n devices in a given switch are biased on or off switch is tied to either the input (when the switch is on) or to  $V_{SS}$  (when the switch is off). This configuration eliminates the variation of the switch-transistor threshold voltage with input signal and, thus, keeps the on-state resistance low over the full operating-signal range.

The advantages over single-channel switches include peak input-signal voltage swings equal to the full supply voltage and more constant on-state impedance over the input-signal range.



## ORDERING INFORMATION

Device	Package
CD4066BD	SOP-14
CD4066BN	DIP-14

## ABSOLUTE MAXIMUM RATINGS (Note 1)

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
DC Supply Voltage (Referenced to $V_{SS}$ )	$V_{DD}$	-0.5	20	V
Digital Input Voltage (Referenced to $V_{SS}$ )	$V_{IN}$	-0.5	$V_{DD} + 0.5$	V
Analog Input Voltage (Referenced to $V_{SS}$ )	$V_{IS}$	-0.5	$V_{DD} + 0.5$	V
Analog Output Voltage (Referenced to $V_{SS}$ )	$V_{OS}$	-0.5	$V_{DD} + 0.5$	V
DC Input Current	$I_{IN}$	-	$\pm 10$	mA
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.

## RECOMMENDED OPERATING CONDITIONS (Note 2)

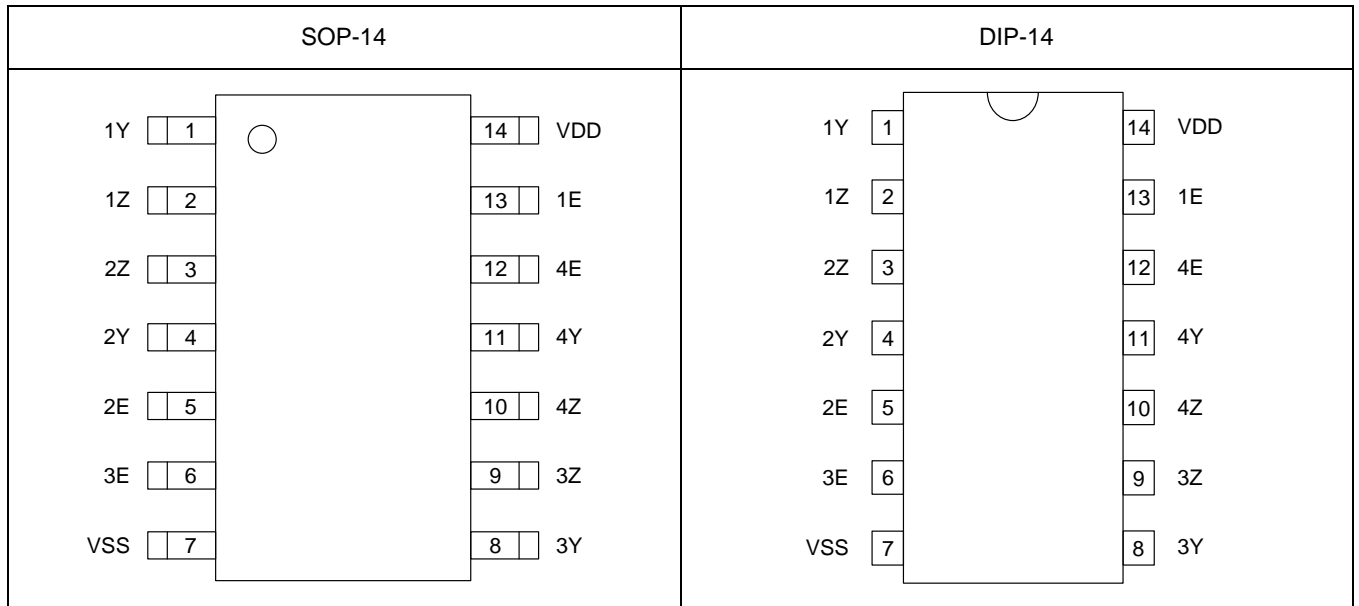
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage (Referenced to $V_{SS}$ )	$V_{DD}$	3	18	V
Digital Input Voltage (Referenced to $V_{SS}$ )	$V_{IN}$	0	$V_{DD}$	V
Analog Input Voltage (Referenced to $V_{SS}$ )	$V_{IS}$	0	$V_{DD}$	V
Operating Free-Air Temperature Range	$T_A$	-55	125	°C

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

## ORDERING INFORMATION

Package	Order No.	Description	Supplied As	Status
SOP-14	CD4066BD	Quad Bilateral Switch	Tape & Reel	Active
DIP-14	CD4066BN	Quad Bilateral Switch	Tube	Active

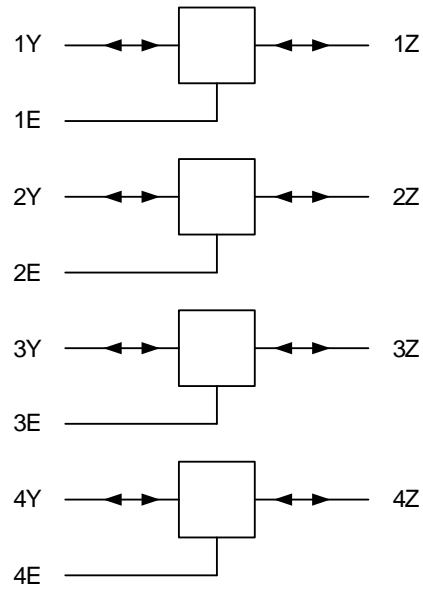
## PIN CONFIGURATION



## PIN DESCRIPTION

Pin No.		Pin Name	Pin Function
SOP-14	DIP-14		
1	1	1Y	Analog Input/Output for Switch 1
2	2	1Z	Analog Output/Input for Switch 1
3	3	2Z	Analog Output/Input for Switch 2
4	4	2Y	Analog Input/Output for Switch 2
5	5	2E	ON/OFF (Enable) Control for Switch 2
6	6	3E	ON/OFF (Enable) Control for Switch 3
7	7	VSS	Low Power Supply
8	8	3Y	Analog Input/Output for Switch 3
9	9	3Z	Analog Output/Input for Switch 3
10	10	4Z	Analog Output/Input for Switch 4
11	11	4Y	Analog Input/Output for Switch 4
12	12	4E	ON/OFF (Enable) Control for Switch 4
13	13	1E	ON/OFF (Enable) Control for Switch 1
14	14	VDD	Power Supply

## BLOCK DIAGRAM



## 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, ON/OFF Control Inputs	$R_{ON} = \text{Per Spec}$	5 V	3.5	3.5	3.5	V	
			10 V	7	7	7		
			15 V	11	11	11		
$V_{IL}$	Maximum Low-Level Input Voltage, ON/OFF Control Inputs	$R_{ON} = \text{Per Spec}$	5 V	1	1	1	V	
			10 V	2	2	2		
			15 V	2	2	2		
$I_{IN}$	Maximum Input Leakage Current, On/Off Control Inputs	$V_{IN} = V_{DD} \text{ or } V_{SS}$	18 V	$\pm 0.1$	$\pm 0.1$	$\pm 1.0$	$\mu\text{A}$	
$I_{DD}$	Maximum Quiescent Supply Current (Per Package)	$V_{IN} = V_{DD} \text{ or } V_{SS}$	5 V	0.25	0.25	7.5	$\mu\text{A}$	
			10 V	0.5	0.5	15		
			15 V	1.0	1.0	30		
			20 V	5.0	5.0	150		
$R_{ON}$	Maximum On-State Resistance	$V_{IN} = V_{DD}$ , $R_L = 10\text{k}\Omega$ returned to $(V_{DD} - V_{SS})/2$ , $V_{IS} = V_{SS}$ to $V_{DD}$	5 V	800	1050	1300	$\Omega$	
			10 V	310	400	550		
			15 V	200	240	320		
$\Delta R_{ON}$	Maximum Difference in On-State Resistance between Any Two Channels	$V_{IN} = V_{DD}$ , $R_L = 10\text{k}\Omega$	5 V	-	15	-	$\Omega$	
			10 V	-	10	-		
			15 V	-	5	-		
$I_{OFF}$	Maximum Off-Channel Leakage Current	$V_{IN} = V_{SS}$ , $ V_{IS} - V_{OS}  = V_{DD} - V_{SS}$	18 V	$\pm 0.1$	$\pm 0.1$	$\pm 1.0$	$\mu\text{A}$	
$I_{ON}$	Maximum On-Channel Leakage Current	$V_{IN} = V_{DD}$ , $V_{IS} = V_{DD} \text{ or } V_{SS}$	18 V	$\pm 0.1$	$\pm 0.1$	$\pm 1.0$	$\mu\text{A}$	
$V_{OS}$	Switch Output Voltage	$V_{IS} = V_{SS}$	5 V	-	-	0.4	V	
			10 V	-	-	0.5		
			15 V	-	-	1.5		
			$V_{IS} = V_{DD}$	5 V	4.6	-	-	V
				10 V	9.5	-	-	
				15 V	13.5	-	-	
$I_{IS}$	Switch Input Current	$V_{IS} = V_{SS}$	5 V	0.64	0.51	0.36	mA	
			10 V	1.6	1.3	0.9		
			15 V	4.2	3.4	2.4		
			$V_{IS} = V_{DD}$	5 V	-0.64	-0.51	-0.36	mA
				10 V	-1.6	-1.3	-0.9	
				15 V	-4.2	-3.4	-2.4	

## AC ELECTRICAL CHARACTERISTICS

Voltages referenced to  $V_{SS}$ ,  $C_L = 50$  pF,  $R_L = 200$  k $\Omega$ , Input  $t_r = t_f = 20$  ns

SYMBOL	PARAMETER	$V_{DD}$	Limit			UNIT
			-55°C	25°C	125°C	
$t_{PLH}$ , $t_{PHL}$	Maximum Propagation Delay, Analog Input to Analog Output (Figure 1)	5 V	40	40	80	ns
		10 V	20	20	40	
		15 V	15	15	30	
$t_{PLZ}$ , $t_{PHZ}$ , $t_{PZL}$ , $t_{PZH}$	Maximum Propagation Delay, ON/OFF Control to Analog Output (Figure 2)	5 V	70	70	140	ns
		10 V	40	40	80	
		15 V	30	30	60	
$C_{IO}$	Capacitance	ON/OFF Control Input	-	-	15	pF
		Analog I/O (Control Input = $V_{SS}$ )	-	-	7.5	
		Feedthrough (Control Input = $V_{SS}$ )	-	-	0.6	

## ADDITIONAL DYNAMIC CHARACTERISTICS

Voltages referenced to GND and  $T_A = 25^\circ\text{C}$  unless otherwise noted. Guaranteed by design.

SYMBOL	PARAMETER	TEST CONDITION	$V_{DD}$	TYP	UNIT
THD	Total Harmonic Distortion	$V_{IN} = V_{DD}$ , $V_{SS} = -5V$ , $R_L = 10$ k $\Omega$ , $f_{IS} = 1$ kHz sine wave	5 V	0.4	%
-	-3dB Cutoff Frequency (Switch On)	$V_{IN} = V_{DD}$ , $V_{SS} = -5V$ , $R_L = 1$ k $\Omega$	5 V	40	MHz
-	-50dB Feedthrough Frequency (Switch Off)	$V_{IN} = GND$ , $V_{IS} = 5V$ , $R_L = 1$ k $\Omega$	10 V	1	MHz
-	-50dB Crosstalk Frequency	$V_{IN(A)} = V_{DD} = 5V$ , $V_{IN(B)} = V_{SS} = -5V$ , $V_{IS(A)} = 5V_{p-p}$ , 50 $\Omega$ source, $R_L = 1$ k $\Omega$	5 V	8	MHz
-	Crosstalk (Control Input to Signal Output)	$V_{IN} = 10V$ (square wave), $R_L = 10$ k $\Omega$ , $t_r, t_f = 20$ ns	10 V	50	mV
-	Maximum Control Input Repetition Rate	$V_{IS} = V_{DD}$ , $V_{SS} = GND$ , $R_L = 1$ k $\Omega$ , $C_L = 50$ pF, $V_{IN} = 10V$ (square wave centered on 5V), $t_r, t_f = 20$ ns, $V_{OS} = 1/2 V_{OS}$ at 1 kHz	5 V	6	MHz
			10 V	9	
			15 V	9.5	

## FUNCTION TABLE

ON/OFF Control	Switch
L	OFF (Hi-Z)
H	ON

## SWITCHING CHARACTERISTICS

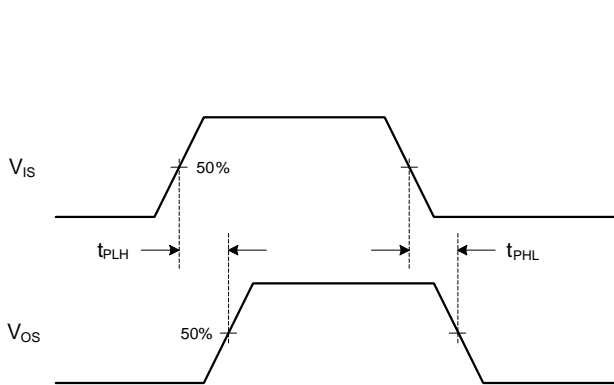


Fig. 1. Analog In to Analog Out

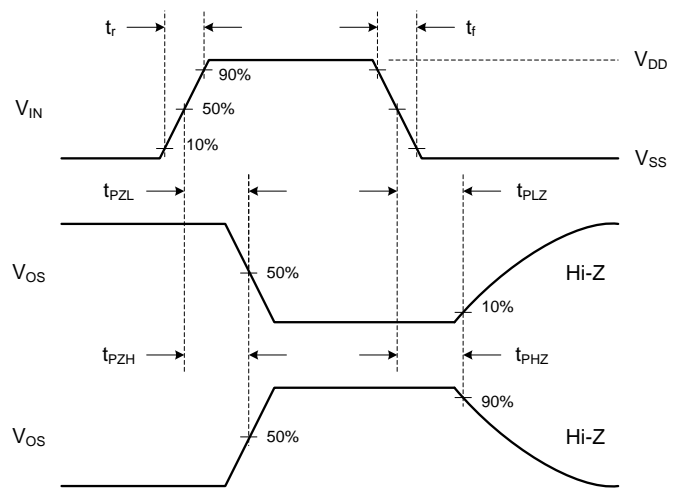


Fig. 2. ON/OFF Control to Analog Out

## TYPICAL OPERATING CHARACTERISTICS

T.B.D.



## REVISION NOTICE

The description in this datasheet is subject to change without any notice to describe its electrical characteristics properly.

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