HX4066-S 四双向模拟开关

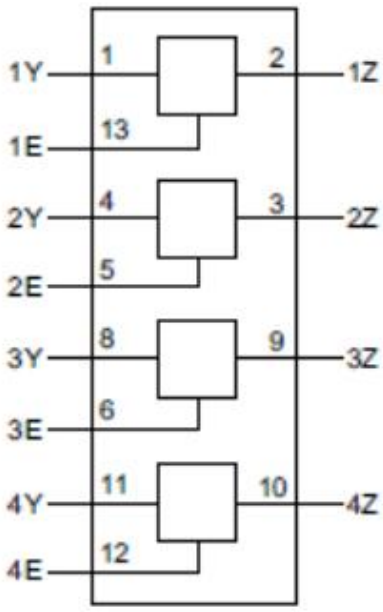
概况

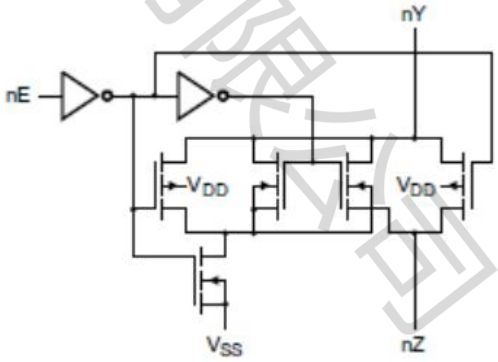
HX4066-S 提供四个单极、单掷模拟开关功能。每个开关都有两个输入/输出端子（nY 和 nZ）和一个主动的 HIGH 启用输入（nE）。当 nE 较低时，模拟开关被关闭。

主要特点

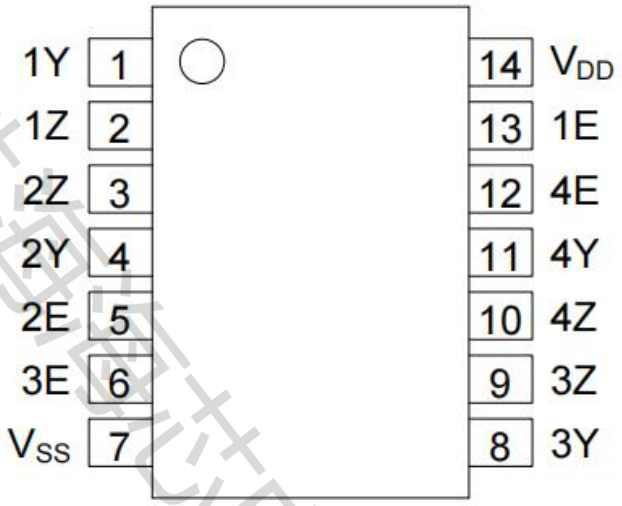
宽电源电压范围从 3V 到 9V
全静态运行
5 V 和 9V 参数额定值
标准化对称输出特性
指定从-40℃到+125℃

逻辑图





Pin Configurations



Pin No.	Pin Name	Description
1	1Y	independent input or output
2	1Z	independent input or output
3	2Z	independent input or output
4	2Y	independent input or output
5	2E	enable input (active HIGH)
6	3E	enable input (active HIGH)
7	V_{SS}	ground (0V)
8	3Y	independent input or output
9	3Z	independent input or output
10	4Z	independent input or output
11	4Y	independent input or output
12	4E	enable input (active HIGH)
13	1E	enable input (active HIGH)
14	V_{DD}	supply voltage

Function Table

Input	Switch
nE	
H	ON
L	OFF

Note: H=HIGH voltage level; L=LOW voltage level.

Electrical Parameter

Absolute Maximum Ratings

(Voltages are referenced to V_{SS} (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{DD}	-	-0.5	+12	V
input voltage	V_I	-	-0.5	V_{DD}+0.5	V
input clamping current	I_{IK}	V_I<0.5V or V_I>V_{DD}+0.5V	-	±10	mA
input/output current	$I_{I/O}$	-	-	±10	mA
storage temperature	T_{stg}	-	-65	+150	℃
total power dissipation	P_{tot}	-	-	500	mW
device dissipation	P	per output transistor	-	100	mW

Recommended Operating Conditions

(T_{amb}=25℃; R_L=10kΩ; C_L=50pF; nE=V_{DD}; Vis=V_{DD}=5V.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{DD}	-	3	5	9	V
ambient temperature	T_{amb}	in free air	-40	-	+125	℃
input voltage	V_I	-	0	-	V_{DD}	V
Disable output time （High level→turnoff）	t_{PHZ}	nE to nZ ornE tonY	-	80	160	ns
Disable output time （Low level→turnoff）	t_{PLZ}	nE to nZ ornE tonY	-	80	160	ns
Enable output time （turnoff→high/low level）	t_{PZH}, t_{PZL}	-	-	45	90	ns
input capacitance	C_I	-	-	-	7.5	pF

Electrical Characteristics

DC Characteristics 1

(T_{amb}=25℃, voltages are referenced to V_{SS} (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions (V)		T_{amb}=25℃			Unit
				Min.	Typ.	Max.	
supply current	I_{DD}	V_I=V_{DD} or V_{SS}, I_O=0A	V_{DD}=5V	-	-	1.0	uA
			V_{DD}=9V	-	-	2.0	uA
HIGH-level input voltage	V_{IH}	$\|I_O\|$<1uA	V_{DD}=5V, V_O=0.5V or 4.5V	3.5	-	-	V
			V_{DD}=9V, V_O=0.5V or 8V	7.0	-	-	V
LOW-level input voltage	V_{IL}	$\|I_O\|$<1uA	V_{DD}=5V, V_O=0.5V or 4.5V	-	-	1.5	V
			V_{DD}=9V, V_O=0.5V or 8V	-	-	3.0	V
input leakage current	I_I	V_I=0V or 9V, V_{DD}=9V		-	-	1.0	uA
		V_I=0V to V_{DD}-V_{EE}	V_{DD}-V_{EE}=5V	-	350	2500	Ω
			V_{DD}-V_{EE}=9V	-	80	245	Ω

ON resistance (rail)	R_{ON}	V_I=0V	V_{DD}-V_{EE}=5V	-	115	340	Ω
			V_{DD}-V_{EE}=9V	-	50	160	Ω
		V_I=V_{DD}-V_{EE}	V_{DD}-V_{EE}=5V	-	120	365	Ω
			V_{DD}-V_{EE}=9V	-	65	200	Ω
ON resistance mismatch between channels	△ R_{ON}	V_I=0V to V_{DD}-V_{EE}	V_{DD}-V_{EE}=5V	-	25	-	Ω
			V_{DD}-V_{EE}=9V	-	10	-	Ω

DC Characteristics 2

(T_{amb}=-40℃ to +85℃, voltages are referenced to V_{SS} (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions (V)		T_{amb}=-40℃		T_{amb}=+85℃		Unit
				Min.	Max.	Min.	Max.	
supply current	I_{DD}	V_I=V_{DD} or V_{SS}, I_O=0A	V_{DD}=5V	-	1.0	-	7.5	uA
			V_{DD}=9V	-	2.0	-	15.0	uA
HIGH-level input voltage	V_{IH}	$\|I_O\|$<1uA	V_{DD}=5V, V_O=0.5V or 4.5V	3.5	-	3.5	-	V
			V_{DD}=9V, V_O=0.5V or 8V	7.0	-	7.0	-	V
LOW-level input voltage	V_{IL}	$\|I_O\|$<1uA	V_{DD}=5V, V_O=0.5V or 4.5V	-	1.5	-	1.5	V
			V_{DD}=9V, V_O=0.5V or 8V	-	3.0	-	3.0	V
input leakage current	I_I	V_I=0V or 9V, V_{DD}=9V		-	-	-	1.0	uA

DC Characteristics 3

(T_{amb}=-40℃ to +125℃, voltages are referenced to V_{SS} (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions (V)		T_{amb}=-40℃		T_{amb}=+125℃		Unit
				Min.	Max.	Min.	Max.	
supply current	I_{DD}	V_I=V_{DD} or V_{SS}, I_O=0A	V_{DD}=5V	-	1.0	-	7.5	uA
			V_{DD}=9V	-	2.0	-	15.0	uA

HIGH-level input voltage	V_{IH}	$\|I_O\|$<1uA	V_{DD}=5V, V_O=0.5V or 4.5V	3.5	-	3.5	-	V
			V_{DD}=9V, V_O=0.5V or 8V	7.0	-	7.0	-	V
LOW-level input voltage	V_{IL}	$\|I_O\|$<1uA	V_{DD}=5V, V_O=0.5V or 4.5V	-	1.5	-	1.5	V
			V_{DD}=9V, V_O=0.5V or 8V	-	3.0	-	3.0	V
input leakage current	I_I	V_I=0V or 9V, V_{DD}=9V		-	-	-	1.0	uA

AC Characteristics 1

(T_{amb}=25℃, V_{EE}=V_{SS}=0V, t_r, t_f≤20ns, C_L=50pF, R_L=10kΩ, unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH to LOW propagation delay time	t_{PHL}	nY to nZ; nZ tonY; see Figure 4	V_{DD}=5V	-	10	20	ns
			V_{DD}=9V	-	5	10	ns
LOW to HIGH propagation delay	t_{PLH}	nY to nZ; nZ tonY; see Figure 4	V_{DD}=5V	-	10	20	ns
			V_{DD}=9V	-	5	10	ns
HIGH to OFF-state propagation delay	t_{PHZ}	nE tonY, nZ; see Figure 5	V_{DD}=5V	-	80	160	ns
			V_{DD}=9V	-	65	130	ns
LOW to OFF-state propagation delay	t_{PLZ}	nE tonY, nZ; see Figure 5	V_{DD}=5V	-	80	160	ns
			V_{DD}=9V	-	70	140	ns
OFF-state to HIGH propagation delay	t_{PZH}	nE tonY, nZ; see Figure 5	V_{DD}=5V	-	40	80	ns
			V_{DD}=9V	-	20	40	ns
OFF-state to LOW propagation	t_{PZL}	nE tonY, nZ; see	V_{DD}=5V	-	45	90	ns
			V_{DD}=9V	-	20	40	ns

delay		Figure 5					

AC Characteristics 2

(T_{amb}=25℃, V_{EE}=V_{SS}=0V, V_I=0.5V_{DD} (p-p), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Square wave distortion	d_{sin}	see Figure 6; R_L=10kΩ; C_L=15pF; channel ON; f_i=1kHz	V_{DD}=5V	0.25	-	-	%
			V_{DD}=9V	0.04	-	-	%
any two channel crosstalk	f_{ct}	V_{DD}=9V, see note2		1	-	-	MHz
crosstalk voltage (nE to nY to nZ)	V_{ct}	see Figure 7; R_L=10kΩ; C_L=15pF; $\overline{E}$ or Sn=V_{DD} (square-wave)		50	-	-	mV
OFF frequency	f_{OFF}	V_{DD}=9V, see note3		1	-	-	MHz
conduction frequency	f_{ON}	V_{DD}=5V, see note4		-	-	-	MHz
		V_{DD}=9V, see note4		90	-	-	MHz

Note:

[1] f_i is biased at 0.5V_{DD}; V_I=0.5V_{DD} (p-p).

[2] R_L=1kΩ; 20logVos/Vis=-50dB, see Figure 8.

[3] R_L=1kΩ; C_L=5pF, channel off, 20logVos/Vis=-50dB, see Figure 6.

[4] R_L=1kΩ; C_L=5pF, channel on, 20logVos/Vis=-3dB, see Figure 6.

Testing Circuit

AC Testing Circuit 1

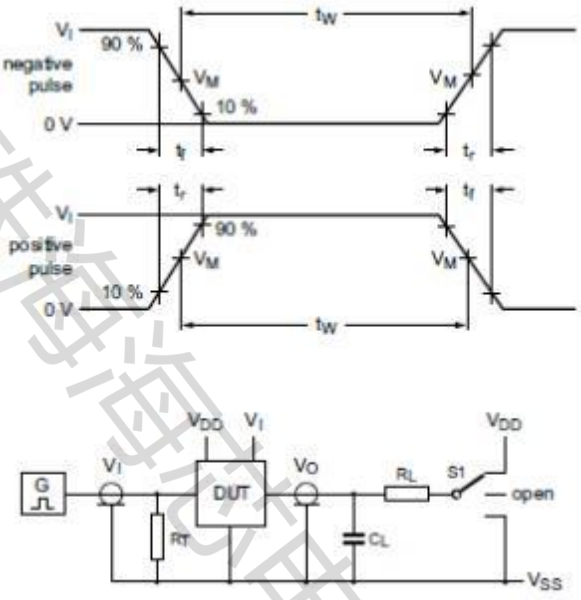


Figure 3. Test circuit for switching times

Definitions for test circuit:
DUT=Device Under Test.

C_L=Load capacitance including jig and probe capacitance.

R_T=Termination resistance should be equal to the output impedance Z_o of the pulse generator. R_L=Load resistance.

AC Testing Waveforms

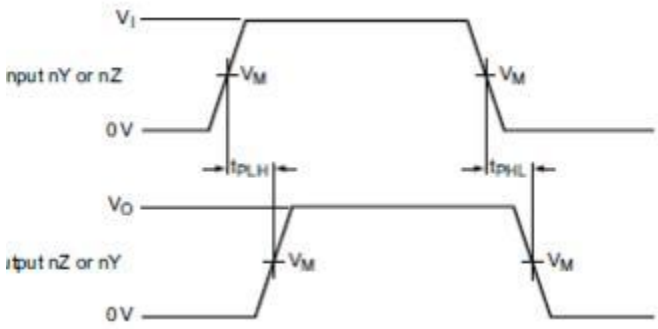


Figure 4. nY or nZ to nZ or nY propagation delays

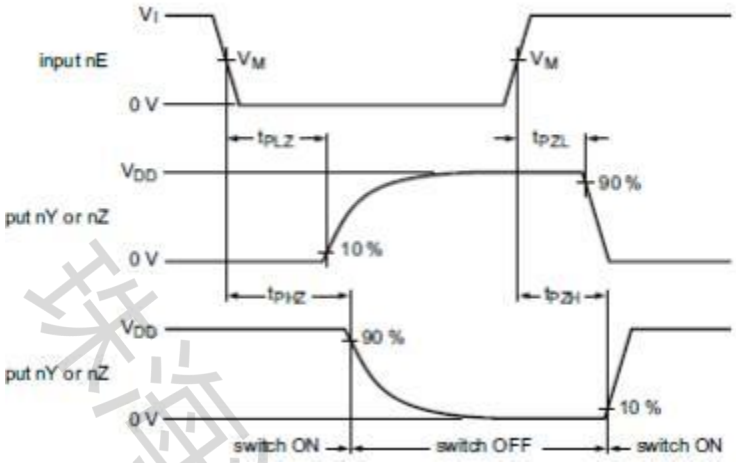
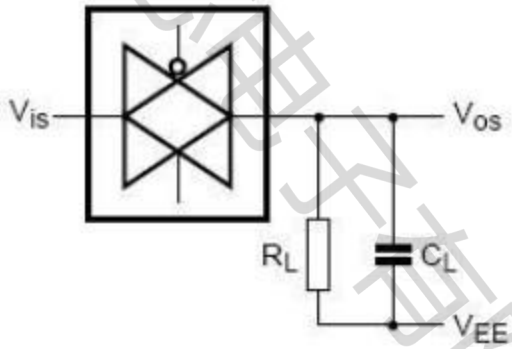


Figure 5. Enable and disable times

AC Testing Circuit 2



Square wave distortion degree of cut-off frequency and conduction frequency test pattern

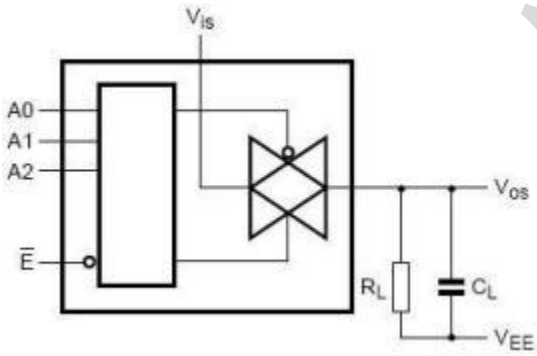


Figure 7. Crosstalk logical input/output test

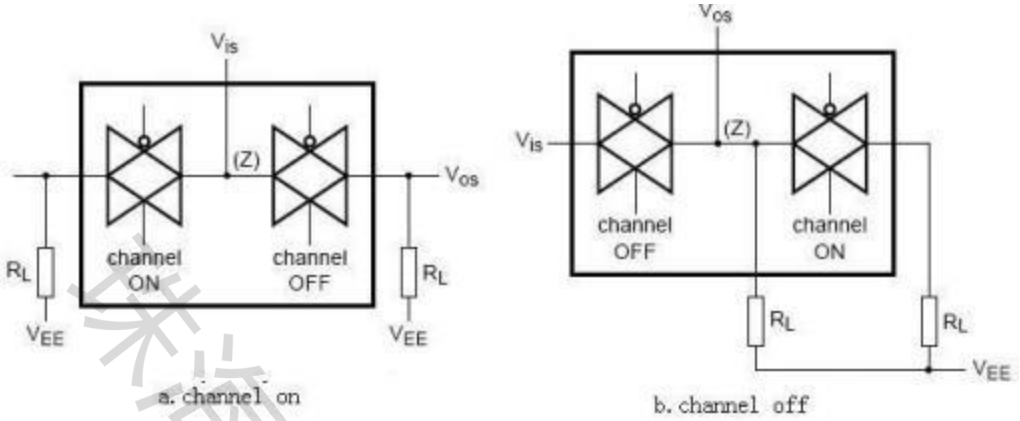


Figure 8. Inter channel Crosstalk

On Resistance Waveform And Test Circuit

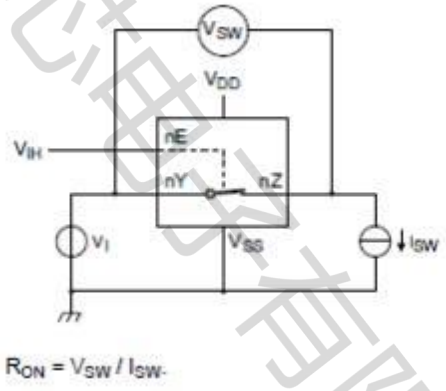


Figure 9. Test circuit for measuring R_{ON}

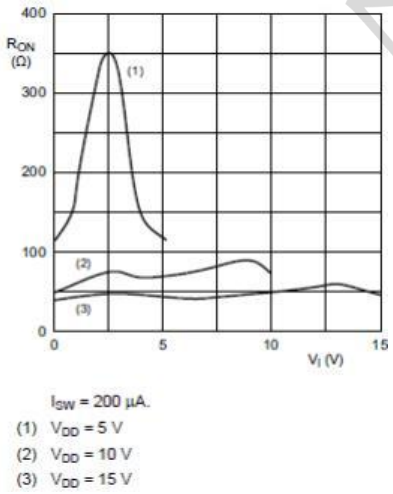
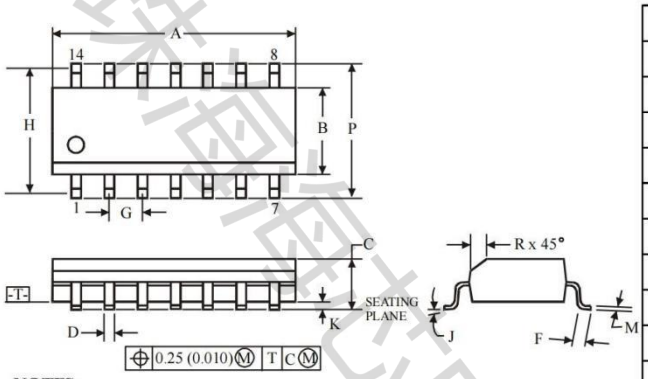


Figure 10. Typical R_{ON} as a function of input voltage

封装

SOP14 (Package Outline Dimensions)

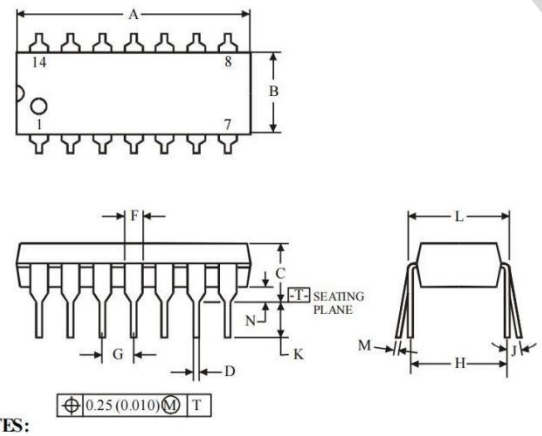


NOTES:

1. Dimensions A and B do not include mold flash or protrusion.
2. Maximum mold flash or protrusion 0.15 mm (0.006) per side for A; for B - 0.25 mm (0.010) per side.

	Dimension, mm	
Symbol	MIN	MAX
A	8.55	8.75
B	3.8	4
C	1.35	1.75
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	5.27	
J	0°	8°
K	0.1	0.25
M	0.19	0.25
P	5.8	6.2
R	0.25	0.5

DIP14 (Package Outline Dimensions)



NOTES:

1. Dimensions "A", "B" do not include mold flash or protrusions.
   Maximum mold flash or protrusions 0.25 mm (0.010) per side.

	Dimension, mm	
Symbol	MIN	MAX
A	18.67	19.69
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

Part Number	Package Type	Package	quantity
HX4066-S	SOP-14	Taping	2500