General Description

The CD4052 is a dual single- pole quad- throw analog switch (2 ×SP4 T) suitable for use in analog or digital 4 : 1 multiplexer/ demultiplexer applications. Each switch features four independent inputs/ outputs (nY0 , nY1 , nY2 and nY3) and a common input/output (nZ) . A digital enable input ($\overline{E}$) and two digital select inputs (S0 and S1) are common to both switches. When $\overline{E}$ is HIGH, the switches are turned off. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of V_{CC} .

Features

- Wide analog input voltage range from - 5 V to + 5 V
- Low ON resistance:
  80 Ω (typical) at VCC - VEE = 4 . 5 V
  70 Ω (typical) at VCC - VEE = 6 . 0 V
  60 Ω (typical) at VCC - VEE = 9 . 0 V
- Logic level translation: to enable 5 V logic to communicate with ± 5 V analog signals
- Typical " break before make" built- in
- Specified from -40C to + 105C
- Packaging information: DIP16/ SOP16/ SSOP16/ TSSOP16

Features

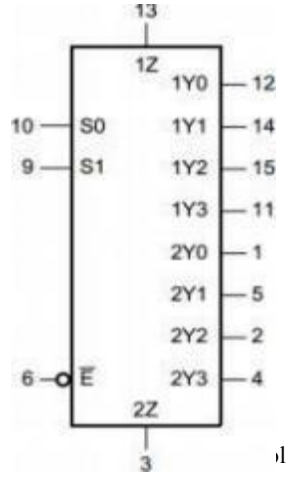
- Analog multiplexing and demultiplexing
- Digital multiplexing and demultiplexing
- Signal gating

Ordering Information

DEVICE	Package Type	MARKING	Packing	Packing QTY
CD4052BE	DIP-16	CD4052BE	Tube	1000/Box
CD4052BDTR	SOP-16	CD4052B	Tape	2500/Reel
CD4052BTDTR	TSSOP-16	CD4052B	Tape	3000/Reel

2、Block Diagram And Pin Description

2.1 Block Diagram



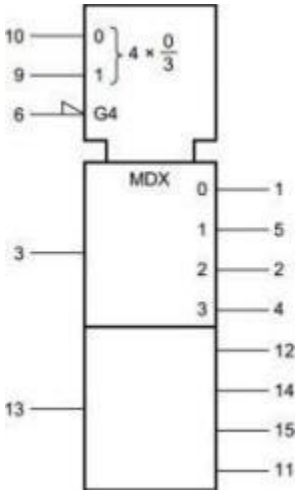


Figure 2 . IEC logic symbol

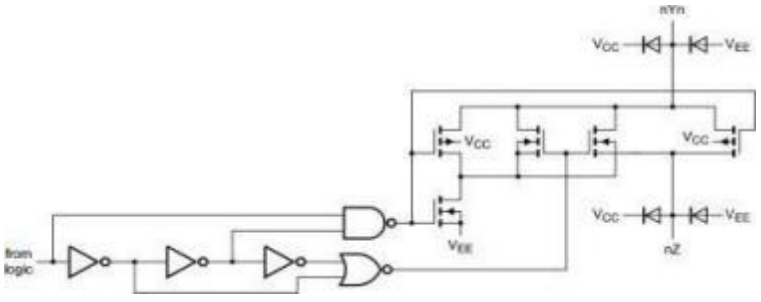


Figure 3 . Schematic diagram (one switch)

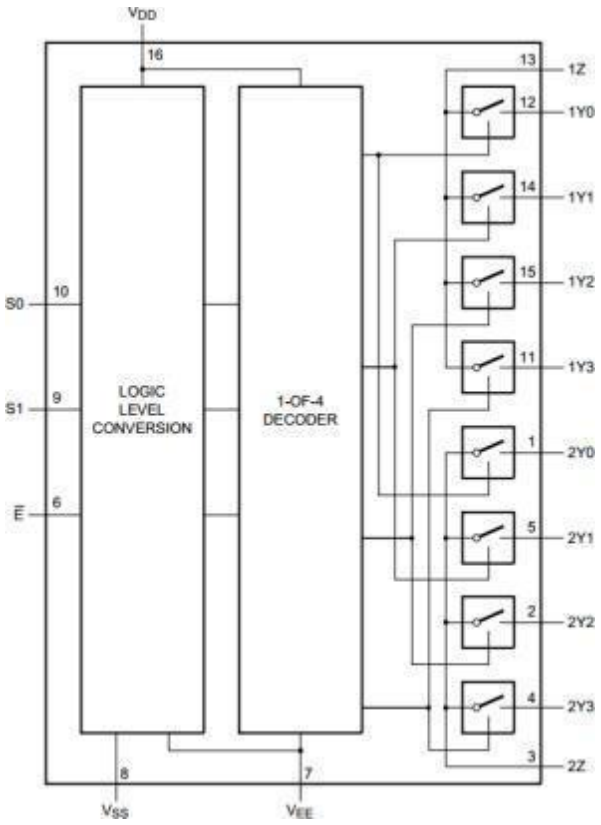
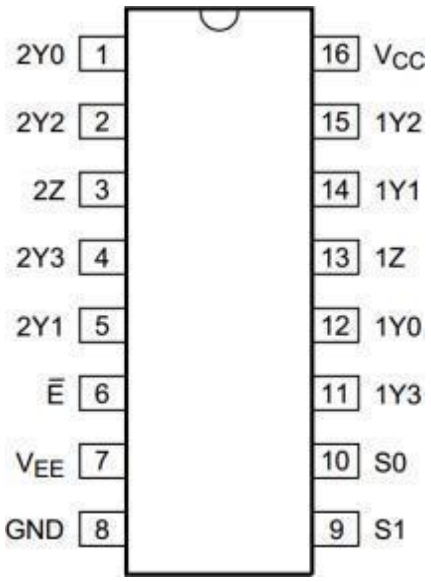


Figure 4 . Functional diagram

2 . 2 Pin Configurations



2.3 Pin Description

Pin No.	Pin Name	Description
1	2Y0	independent input or output
2	2Y2	independent input or output
3	2Z	common input or output
4	2Y3	independent input or output
5	2Y1	independent input or output
6	$\overline{E}$	enable input (active LOW)
7	V_{EE}	negative supply voltage
8	GND	ground supply voltage
9	S1	select logic input
10	S0	select logic input
11	1Y3	independent input or output
12	1Y0	independent input or output
13	1Z	common input or output
14	1Y1	independent input or output
15	1Y2	independent input or output
16	V_{CC}	positive supply voltage

2.4 Function Table

Input			Channel ON
$\overline{E}$	S1	S0	
L	L	L	nY0 and nZ
L	L	H	nY1 and nZ
L	H	L	nY2 and nZ
L	H	H	nY3 and nZ
H	X	X	none

Note: H= HIGH voltage level; L= LOW voltage level; X= don't care.

3 Electrical Parameter

3.1 Absolute Maximum Ratings

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

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	[1] -	-0 5	+ 11	V
input clamping current	I_{IK}	V_I < -0 .5 V or V_I > V_{CC} + 0 . 5 V	-	± 20	mA
switch clamping current	I_{SK}	V_{SW} < -0 . 5 V or V_{SW} > V_{CC} + 0 . 5 V	-	± 20	mA
switch current	I_{SW}	- 0 .5 V < V_{SW} < V_{CC} + 0.5 V	-	± 25	mA
supply current	I_{EE}	-	-	± 20	mA
supply current	I_{CC}	-	-	50	mA
ground current	I_{GND}	-	-	-50	mA
storage temperature	T_{stg}	-	-65	+ 150	C

total power dissipation	P_{tot}	[2] -	-	500	mW
power dissipation	P	per switch	-	100	mW
Soldering temperature	T_L	10s DIP	245		C
		10s SOP	250		C

Note:

[1] To avoid drawing V_{CC} current out of terminal nZ, when switch current flows into terminals nYn, the voltage drop across the bidirectional switch must not exceed 0 . 4 V. If the switch current flows into terminal nZ, no V_{CC} current will flow out of terminals nYn, and in this case there is no limit for the voltage drop across the switch, but the voltages at nYn and nZ may not exceed V_{CC} or V_{EE} .

[2] For DIP16 packages: above 70 C the value of P_{tot} derates linearly with 12 mW/ K.
For SOP16 packages: above 7 0 C the value of P_{tot} derates linearly with 8 mW/ K.
For (T) SSOP16 packages: above 60 C the value of P_{tot} derates linearly with 5 . 5mW/ K.

3 . 2 、 Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
CD4052						
supply voltage	V_{CC}	V_{CC} - GND	3.0	5.0	9.0	V
		V_{CC} - V_{EE}	3.0	5.0	9.0	V
input voltage	V_I	-	0	-	V_{CC}	V
switch voltage	V_{SW}	-	V_{EE}	-	V_{CC}	V
ambient temperature	T_{amb}	in free air	-40	-	+ 105	C
input transition rise and fall rate	Δ t/ΔV	V_{CC} = 4 . 5 V	-	1.67	139	ns/ V
		V_{CC} = 6 . 0 V	-	-	83	ns/ V
		V_{CC} = 9 . 0 V	-	-	31	ns/ V

3 . 3 、 Electrical Characteristics

3.3 . 1 、 DC Characteristics 1

(T_{amb} = - 40 C~ 85C, voltages are reference to GND (ground=0 V) , unless otherwise specified, unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ. [1]	Max.	Unit
ON resistance (peak)	$R_{ON(peak)}$	V_{is} = V_{CC} to V_{EE} ; I_{SW} = 1000 uA	V_{CC} = 4 . 5 V; V_{EE} = 0 V	-	100	225	Ω
			V_{CC} = 6 .0 V; V_{EE} = 0 V	-	90	200	Ω
			V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	70	165	Ω
		V_{is} = V_{EE} ; I_{SW} = 1000 uA	V_{CC} = 4 . 5 V; V_{EE} = 0 V	-	80	175	Ω
			V_{CC} = 6 .0 V; V_{EE} = 0 V	-	70	150	Ω
			V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	60	130	Ω

ON resistance (rail)	$R_{ON(rail)}$	V_{is} = V_{CC} ; I_{SW} = 1000 uA	V_{CC} = 4 . 5 V; V_{EE} = 0 V	-	90	200	Ω
			V_{CC} = 6 .0 V; V_{EE} = 0 V	-	80	175	Ω
			V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	65	150	Ω
ON resistance mismatch between channels	Δ R_{ON}	V_{is} = V_{CC} to V_{EE}	V_{CC} = 4 . 5 V; V_{EE} = 0 V	-	9	-	Ω
			V_{CC} = 6 .0 V; V_{EE} = 0 V	-	8	-	Ω
			V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	6	-	Ω
CD4052							
HIGH- level input voltage	V_{IH}	V_{CC} = 4 . 5 V		3. 15	2.4	-	V
		V_{CC} = 6 . 0 V		4.2	3.2	-	V
		V_{CC} = 9 . 0 V		6.3	4.7	-	V
LOW- level input voltage	V_{IL}	V_{CC} = 4 . 5 V		-	2 . 1	1.35	V
		V_{CC} = 6 . 0 V		-	2.8	1.8	V
		V_{CC} = 9 . 0 V		-	4.3	2.7	V
input leakage current	I_I	V_{EE} = 0 V; V_I = V_{CC} or GND	V_{CC} = 6 . 0 V	-	-	± 1.0	uA
			V_{CC} = 9 . 0 V	-	-	± 2.0	uA
OFF- state leakage current	$I_{S(OFF)}$	V_{CC}= 9 . 0 V;	per channel	-	-	± 1.0	uA
		V_{EE}= 0 V; V_I= V_{IH} or V_{IL} ; |V_{SW}| = V_{CC} - V_{EE} ; see Figure 7	all channels	-	-	± 2.0	uA
ON- state leakage current	$I_{S(ON)}$	V_I= V_{IH} or V_{IL} ; |V_{SW} | = V_{CC}- V_{EE} ; V_{CC}= 9 . 0 V;V_{EE}= 0 V; see Figure 8		-	-	± 2.0	uA
supply current	I_{CC}	V_{EE} = 0 V; V_I = V_{CC} or GND; V_{is} = V_{EE} or V_{CC} ; V_{os} = V_{CC} or V_{EE}	V_{CC} = 6 . 0 V	-	-	80.0	uA
			V_{CC} = 9 . 0 V	-	-	160.0	uA
input capacitance	C_I	-		-	3.5	-	pF
switch capacitance	C_{SW}	independent pins nYn		-	5	-	pF
		common pins nZ		-	12	-	pF

Note:

[1] All typical values are measured at T_{amb}= 25 C.

[2] V_I= V_{IH} or V_{IL} ; for test circuit see Figure 5 .

[3] V_{is} is the input voltage at a nYn or nZ terminal, whichever is assigned as an input.

[4] V_{os} is the output voltage at a nYn or nZ terminal, whichever is assigned as an output.

3 .3 .2 、 DC Characteristics 2

(T_{amb} = - 40 C~ 105 C, voltages are reference to GND (ground=0 V) , unless otherwise specified, unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ. [1]	Max.	Unit
ON resistance (peak)	$R_{ON(peak)}$	V_{is} = V_{CC} to V_{EE} ; I_{SW} = 1000 uA	V_{CC} = 4 . 5 V; V_{EE} = 0 V	-	-	270	Ω
			V_{CC} = 6 .0 V; V_{EE} = 0 V	-	-	240	Ω
			V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	-	195	Ω
ON resistance (rail)	$R_{ON(rail)}$	V_{is} = V_{EE} ; I_{SW} = 1000 uA	V_{CC} = 4 . 5 V; V_{EE} = 0 V	-	-	210	Ω
			V_{CC} = 6 .0 V; V_{EE} = 0 V	-	-	180	Ω
			V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	-	160	Ω
		V_{is} = V_{CC} ; I_{SW} = 1000 uA	V_{CC} = 4 . 5 V; V_{EE} = 0 V	-	-	240	Ω
			V_{CC} = 6 .0 V; V_{EE} = 0 V	-	-	210	Ω
			V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	-	180	Ω
CD4052							
HIGH- level input voltage	V_{IH}	V_{CC} = 4 . 5 V		3. 15	_	_	V
		V_{CC} = 6 . 0 V		4.2	_	_	V
		V_{CC} = 9 . 0 V		6.3	_	_	V
LOW- level input voltage	V_{IL}	V_{CC} = 4 . 5 V		_	_	1.35	V
		V_{CC} = 6 . 0 V		_	_	1.8	V
		V_{CC} = 9 . 0 V		_	_	2.7	V
input leakage current	I_I	V_{EE} = 0 V; V_I = V_{CC} or GND	V_{CC} = 6 . 0 V	-	-	± 1.0	uA
			V_{CC} = 9 . 0 V	-	-	± 2.0	uA
OFF- state leakage current	$I_{S(OFF)}$	V_{CC}= 9 . 0 V; V_{EE}= 0 V; V_I= V_{IH} or V_{IL} ; |V_{SW}| = V_{CC} - V_{EE} ;	per channel	-	-	± 1.0	uA
			all channels	-	-	± 2.0	uA
		see Figure 7					
ON- state leakage current	$I_{S(ON)}$	V_I= V_{IH} or V_{IL} ; | V_{SW} | = V_{CC}- V_{EE} ; V_{CC}= 9 . 0 V;V_{EE}= 0 V; see Figure 8		-	-	± 2.0	uA
supply current	I_{CC}	V_{EE} = 0 V; V_I = V_{CC} or GND; V_{is} = V_{EE} or V_{CC} ; V_{os} = V_{CC} or V_{EE}	V_{CC} = 6 . 0 V	-	-	160.0	uA
			V_{CC} = 9 . 0 V	-	-	320.0	uA

Note:

[1] All typical values are measured at T_{amb}= 25 C.

[2] V_I= V_{IH} or V_{IL} ; for test circuit see Figure 5 .

[3] V_{is} is the input voltage at a nYn or nZ terminal, whichever is assigned as an input.

[4] V_{os} is the output voltage at a nYn or nZ terminal, whichever is assigned as an output

3 .3 .3 AC Characteristics 1

(T_{amb}= -40C~+ 85C; GND = 0 V; t_r = t_f = 6 ns; C_L = 50 pF; unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ. [1]	Max.	Unit
CD4052							
propagation delay	t_{pd}	V_{is} to V_{os} ; R_L= ∞ Ω; see Figure 9 [2]	V_{CC} = 4 . 5 V; V_{EE} = 0 V	-	5	15	ns
			V_{CC} = 6 .0 V; V_{EE} = 0 V	-	4	13	ns
			V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	4	10	ns
turn- on time	t_{on}	E, Sn to V_{os} ; R_L= ∞ Ω; see Figure 10 [3]	V_{CC} = 4. 5 V; V_{EE} = 0 V	-	38	81	ns
			V_{CC} = 5.0 V; V_{EE} =0 V; C_L= 15pF	-	28	-	ns
			V_{CC} = 6.0 V; V_{EE} = 0 V	-	30	69	ns
			V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	26	58	ns
turn- off time	t_{off}	E, Sn to V_{os} ; R_L = 1 kΩ; see Figure 10 [4]	V_{CC} = 4. 5 V; V_{EE} = 0 V	-	27	63	ns
			V_{CC} = 5.0 V; V_{EE} =0 V; C_L= 15pF	-	21	-	ns
			V_{CC} = 6.0 V; V_{EE} = 0 V	-	22	54	ns
			V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	22	48	ns
power dissipation capacitance	C_{PD}	per switch; V_I = GND to V_{CC}[5]		-	57	-	pF
			V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	28	60	ns

Note:

[1] All typical values are measured at T_{amb}= 25 C.

[2] t_{pd} is the same as t_{PHL} and t_{PLH} .

[3] t_{on} is the same as t_{PZH} and t_{PZL} .

[4] t_{off} is the same as t_{PHZ} and t_{PLZ} .

[5] C_{PD} is used to determine the dynamic power dissipation (P_D in uW) .

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma \{(C_L + C_{SW}) \times V_{CC}^2 \times f_O\}$ where:

f_i = input frequency in MHz;

f_O = output frequency in MHz;

N = number of inputs switching;

Σ {(C_L+ C_{SW}) ×V_{CC}^2 × fo} = sum of outputs;

C_L = output load capacitance in pF;

C_{SW} = switch capacitance in pF;

V_{CC} = supply voltage in V.

[6] For test circuit see Figure 11.

[7] V_{is} is the input voltage at a nYn or nZ terminal, whichever is assigned as an input.

[8] V_{os} is the output voltage at a nYn or nZ terminal, whichever is assigned as an output.

3.3.4 AC Characteristics 2

(T_{amb}= -40C~+ 105C; GND = 0 V; t_r = t_f = 6 ns; C_L = 50 pF; unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ. [1]	Max.	Unit
CD4052							
propagation delay	t_{pd}	V_{is} to V_{os}; R_L= ∞ Ω; see Figure 9 [2]	V_{CC} = 4.5 V; V_{EE} = 0 V	-	-	18	ns
			V_{CC} = 6.0 V; V_{EE} = 0 V	-	-	15	ns
			V_{CC} = 4.5 V; V_{EE} = -4.5 V	-	-	12	ns
turn- on time	t_{on}	E, Sn to V_{os}; R_L= ∞ Ω; see Figure 10 [3]	V_{CC} = 4.5 V; V_{EE} = 0 V	-	-	98	ns
			V_{CC} = 6.0 V; V_{EE} = 0 V	-	-	83	ns
			V_{CC} = 4.5 V; V_{EE} = -4.5 V	-	-	69	ns
turn- off time	t_{off}	E, Sn to V_{os}; R_L = 1 kΩ; see Figure 10 [4]	V_{CC} = 4.5 V; V_{EE} = 0 V	-	-	75	ns
			V_{CC} = 6.0 V; V_{EE} = 0 V	-	-	64	ns
			V_{CC} = 4.5 V; V_{EE} = -4.5 V	-	-	57	ns

Note:

[1] All typical values are measured at T_{amb}= 25 C.

[2] t_{pd} is the same as t_{PHL} and t_{PLH}.

[3] t_{on} is the same as t_{PZH} and t_{PZL}.

[4] t_{off} is the same as t_{PHZ} and t_{PLZ}.

[5] For test circuit see Figure 11.

[6] V_{is} is the input voltage at a nYn or nZ terminal, whichever is assigned as an input.

[7] V_{os} is the output voltage at a nYn or nZ terminal, whichever is assigned as an output.

3 .3 .5 AC Characteristics 3

(T_{amb}= 25 C; GND = 0 V; C_L= 50 pF; recommended conditions and typical values.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
sine- wave distortion	d_{sin}	f_i = 1 kHz; R_L = 10 kΩ; see Figure 12	V_{is} = 4 .0 V (p-p) ; V_{CC} = 2 .25 V; V_{EE} = -2 .25 V	-	0.04	-	%
			V_{is} = 8 .0 V (p-p) ; V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	0.02	-	%
		f_i = 10 kHz; R_L = 10 kΩ; see Figure 12	V_{is} = 4 .0 V (p-p) ; V_{CC} = 2 .25 V; V_{EE} = -2 .25 V	-	0. 12	-	%
			V_{is} = 8 .0 V (p-p) ; V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	0.06	-	%
isolation (OFF- state)	α_{iso}	R_L= 600 Ω; f_i= 1 MHz; see Figure 13	V_{CC} = 2.25 V; [1] V_{EE} = -2 .25 V	-	-50	-	dB
			V_{CC} = 4.5 V; [1] V_{EE} = -4 .5 V	-	-50	-	dB
crosstalk	Xtalk	between two switches/ multiplexers; R_L= 600 Ω; f_i= 1 MHz; see Figure 14	V_{CC} = 2.25 V; [1] V_{EE} = -2 .25 V	-	-60	-	dB
			V_{CC} = 4.5 V; [1] V_{EE} = -4 .5 V	-	-60	-	dB
crosstalk voltage	V_{ct}	peak- to- peak value; between control and any switch; R_L= 600 Ω; f_i= 1MHz; – E or Sn square wave between V_{CC} and GND; t_r= t_f= 6 ns; see Figure 15	V_{CC} = 4 .5 V; V_{EE} = 0 V	-	110	-	mV
			V_{CC} = 4 . 5 V; V_{EE} = -4 .5 V	-	220	-	mV
-3 dB frequency response	$f_{(-3\ dB)}$	R_L = 50 Ω; see Figure 16	V_{CC} = 2.25 V; [2] V_{EE} = -2 .25 V	-	170	-	MHz
			V_{CC} = 4.5 V; [2] V_{EE} = -4 .5 V	-	180	-	MHz

Note:

[1] Adjust input voltage V_{is} to 0 dBm level (0 dBm = 1 mW into 600 Ω) .

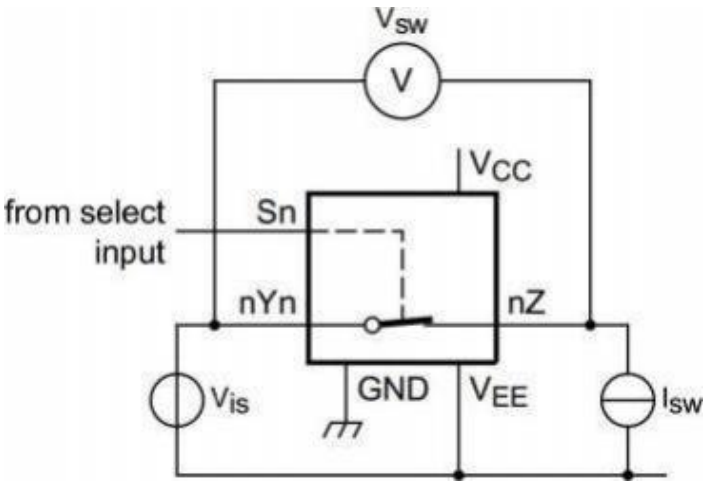
[2] Adjust input voltage V_{is} to 0 dBm level at V_{os} for 1 MHz (0 dBm = 1 mW into 50 Ω) .

[3] V_{is} is the input voltage at a nYn or nZ terminal, whichever is assigned as an input.

[4] V_{os} is the output voltage at a nYn or nZ terminal, whichever is assigned as an output.

4、Testing Circuit

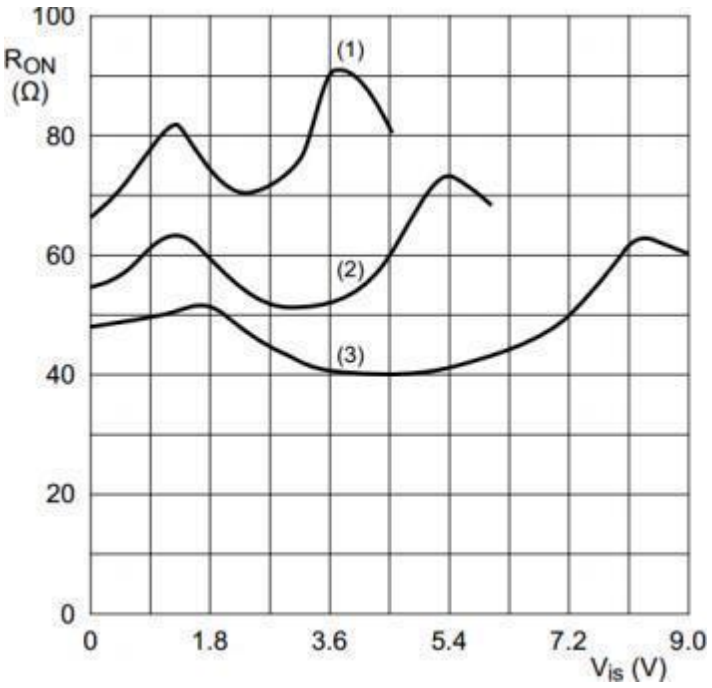
4.1 DC Testing Circuit 1



V_{is} = 0V to (V_{CC} - V_{EE})

R_{ON} = V_{SW}/ I_{SW}

Figure 5 . Test circuit for measuring R_{ON}



V_{is} = 0V to (V_{CC} - V_{EE})

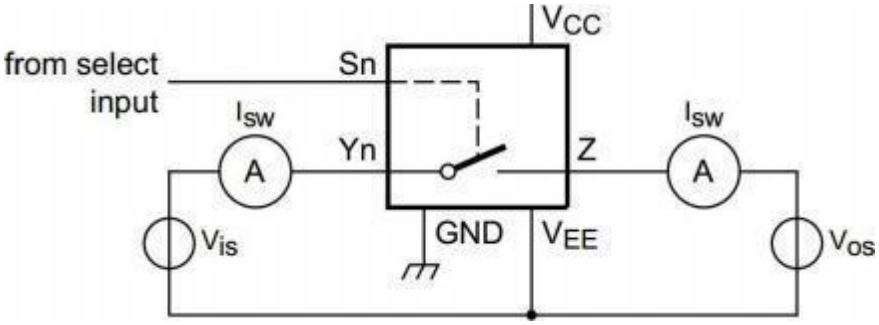
(1) V_{CC} = 4.5V

(2) V_{CC} = 6V

(3) V_{CC} = 9V

Figure 6 . Typical R_{ON} as a function of input voltage V_{is}

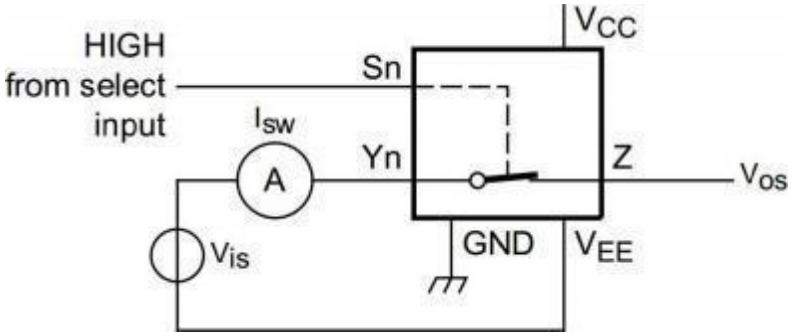
4.2 DC Testing Circuit 2



V_{is} = V_{CC} and V_{os}= V_{EE} .

V_{is} = V_{EE} and V_{os}= V_{CC} .

Figure 7 . Test circuit for measuring OFF- state current



V_{is}= V_{CC} and V_{os}= open- circuit.

V_{is}= V_{EE} and V_{os}= open- circuit.

Figure 8 . Test circuit for measuring ON- state current

4 .3 、 AC Testing Waveforms

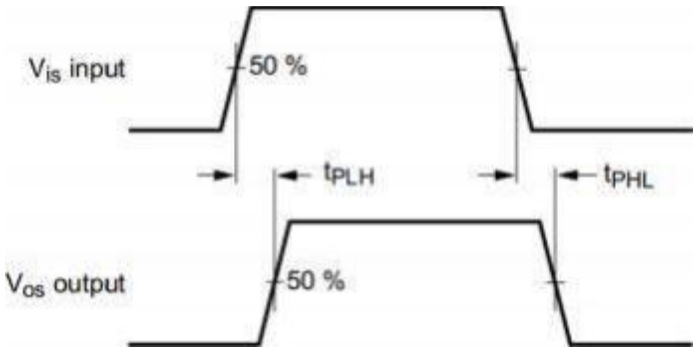
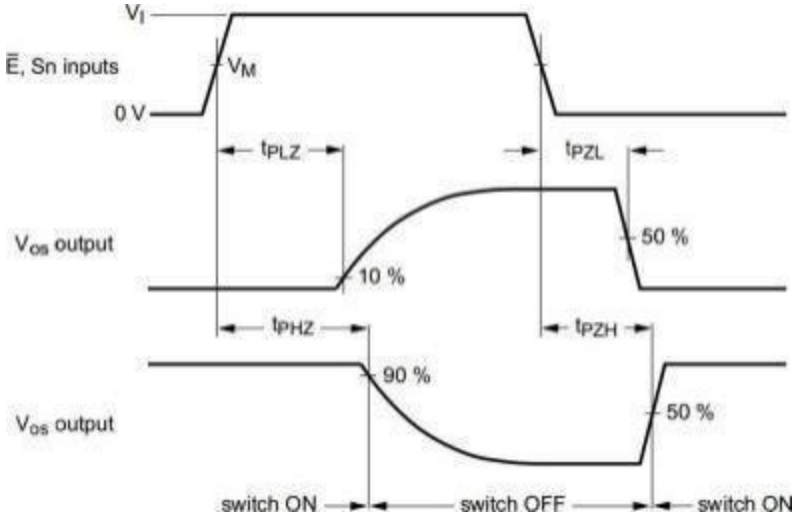


Figure 9 . Input (V_{is}) to output (V_{os}) propagation delays

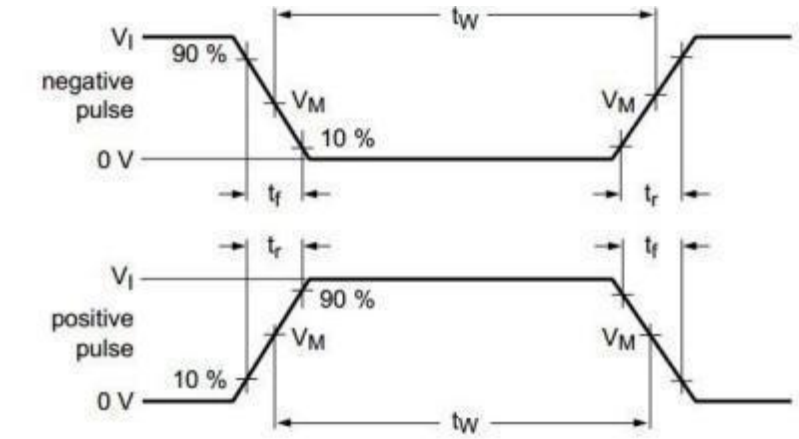


For CD4052：V_M = 0.5 ×V_{CC} .For

SN74HCT4052: V_M = 1.3 V.

Figure 10. Turn-on and turn-off times

4.4 AC Testing Circuit 1



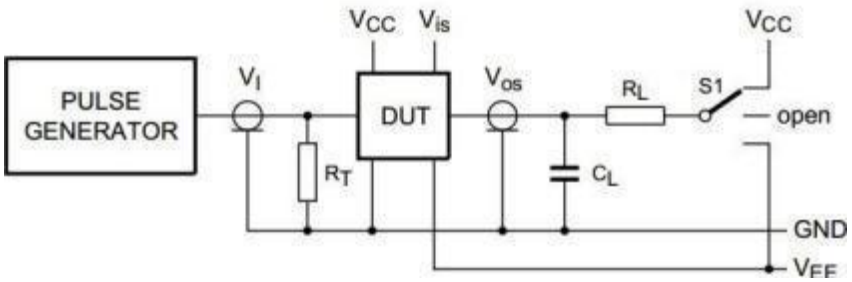


Figure 11. Test circuit for measuring switching times

Definitions for test circuit:

R_T = termination resistance should be equal to the output impedance Z_O of the pulse generator.

C_L = load capacitance including jig and probe capacitance.

R_L = load resistance.

S1 = Test selection switch.

4.5 Test Data

Test	Input				Load		S1 position
	V_I	V_{is}	t_r, t_f		C_L	R_L	
			at f_{max}	other[1]			
t_{PHL}, t_{PLH}	[2]	pulse	< 2ns	6ns	50pF	1kΩ	open
t_{PZH}, t_{PHZ}	[2]	V_{CC}	< 2ns	6ns	50pF	1kΩ	V_{EE}
t_{PZL}, t_{PLZ}	[2]	V_{EE}	< 2ns	6ns	50pF	1kΩ	V_{CC}

Note:

[1] $t_r = t_f =$ 6 ns; when measuring f_{max}, there is no constraint to t_r and t_f with 50 % duty factor.

[2] V_I values:

For CD4052 : $V_I = V_{CC}$ .For

SN74HCT4052: V_I = 3V.

4 .6 、 AC Testing Circuit 2

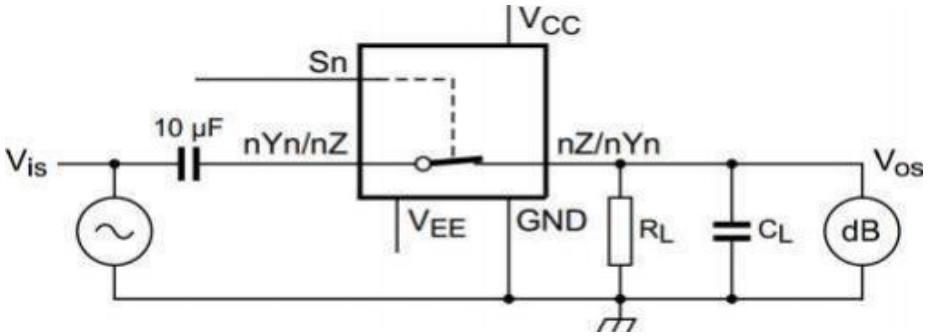
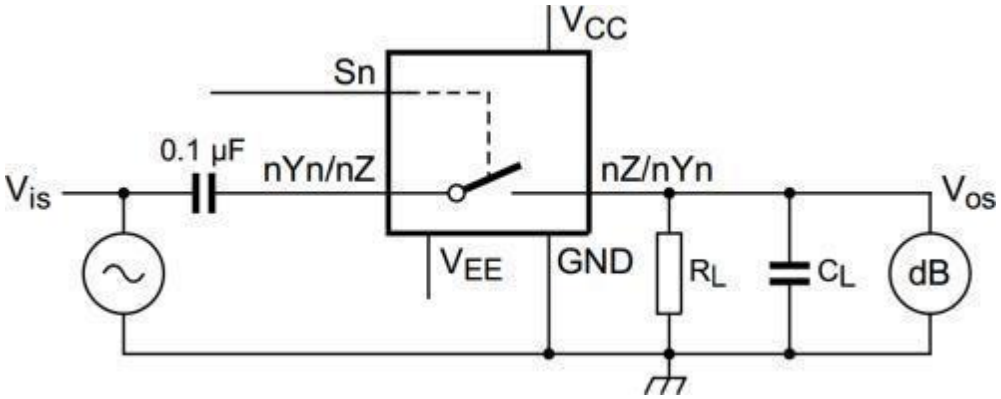
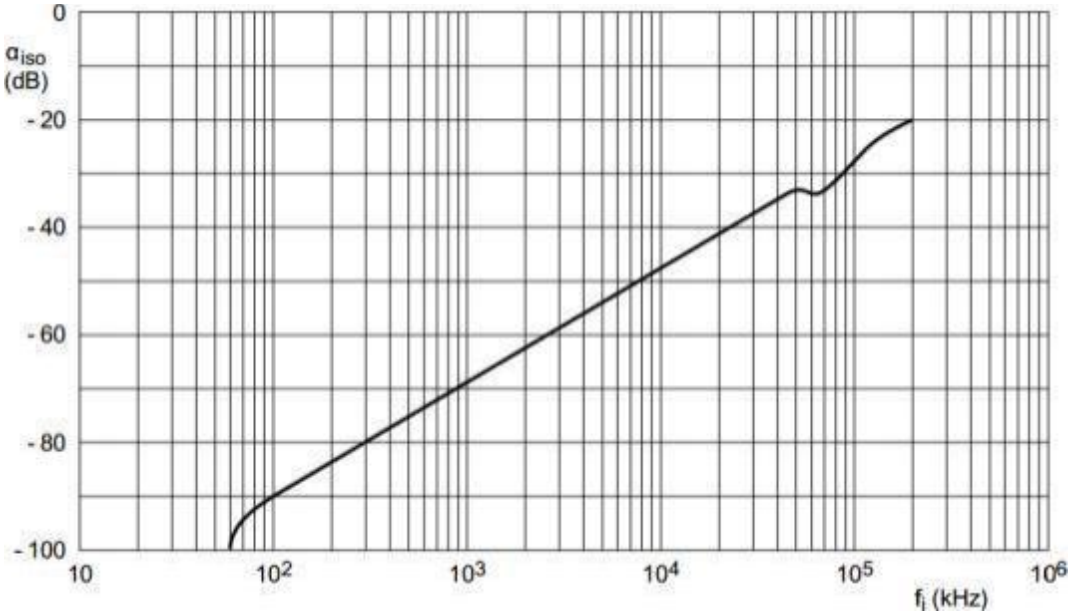


Figure 12 . Test circuit for measuring sine- wave distortion



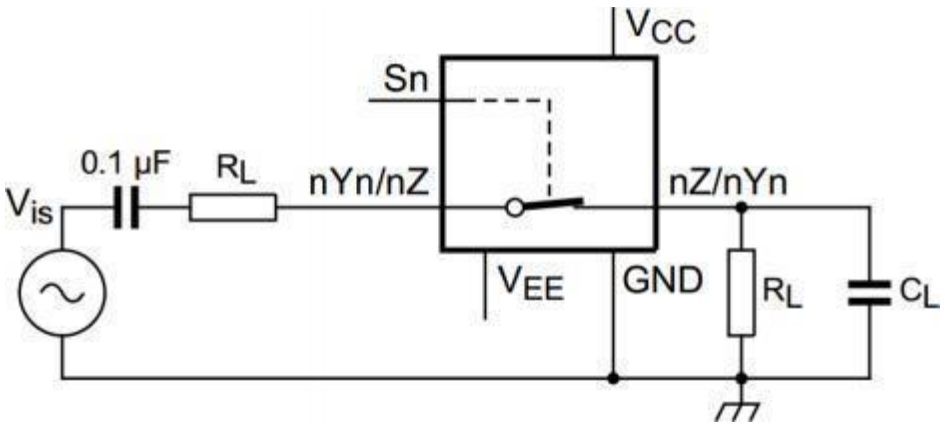
V_{CC} = 4 . 5 V; GND = 0 V; V_{EE} = -4 .5 V; R_L = 600 Ω; R_S = 1 kΩ .

a. Test circuit



b. Isolation (OFF- state) as a function of frequency

Figure 13 . Test circuit for measuring isolation (OFF- state)



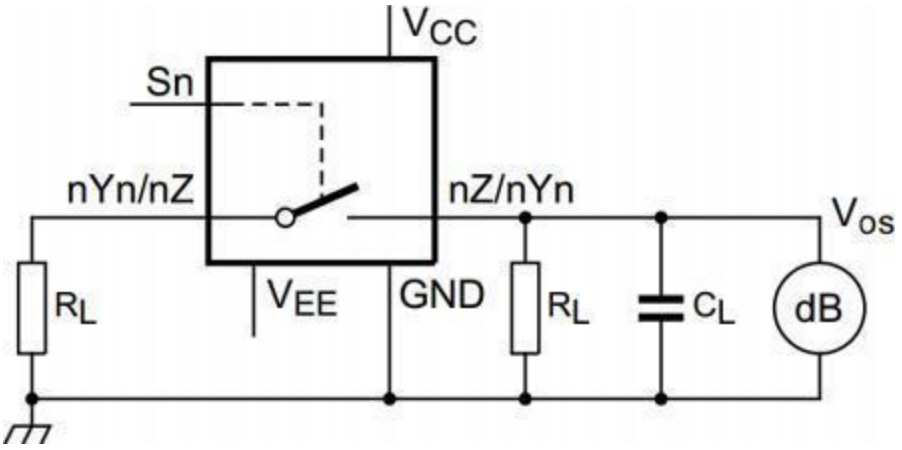


Figure 14 . Test circuits for measuring crosstalk between any two switches/ multiplexers

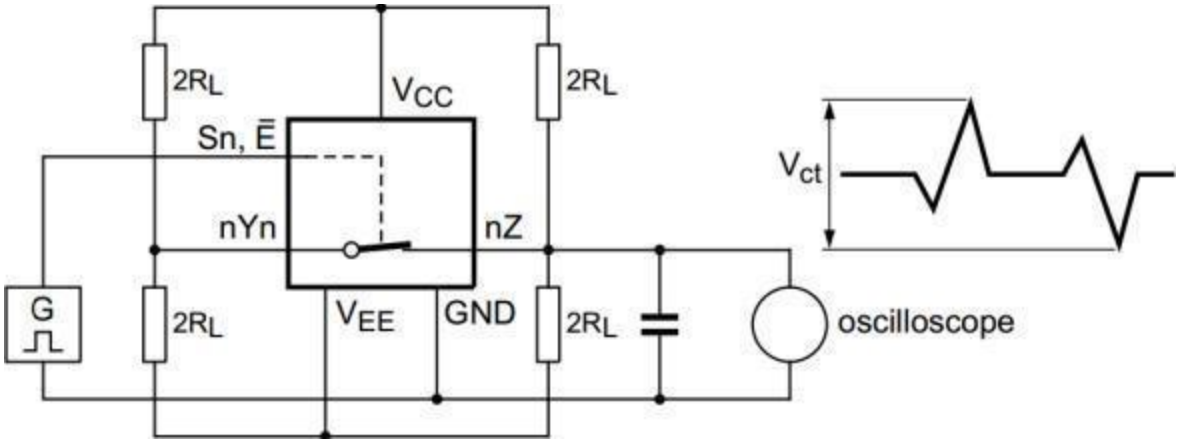
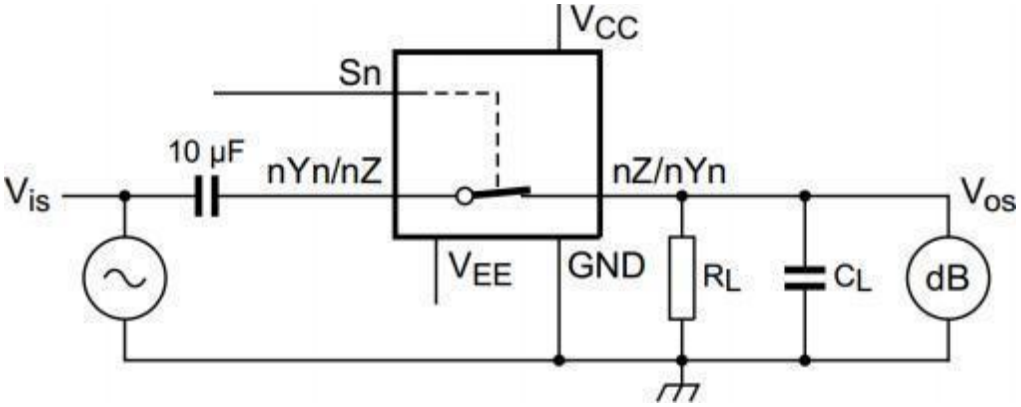
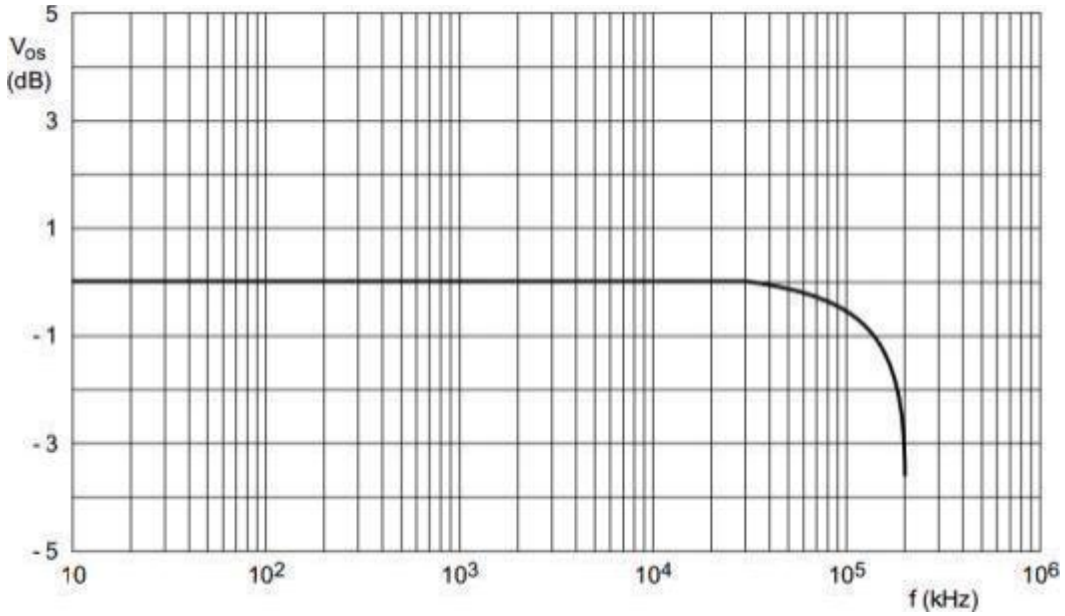


Figure 15. Test circuit for measuring crosstalk between control input and any switch



V_{CC} = 4.5 V; GND = 0 V; V_{EE} = -4.5 V; R_L = 50 Ω; R_S = 1 kΩ

a. Test circuit

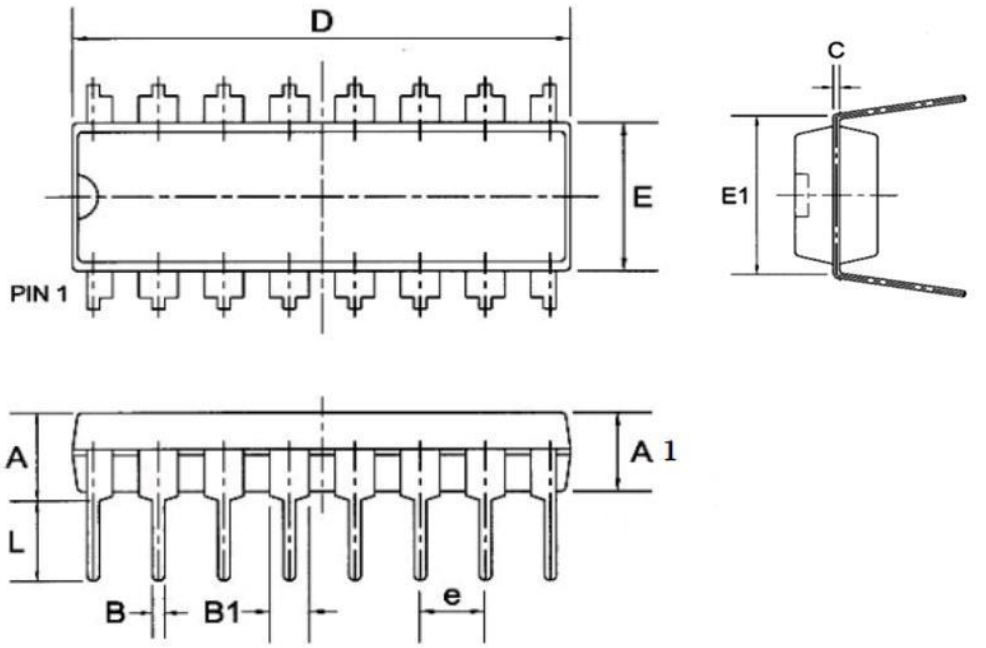


b. Typical frequency response

Figure 16. Test circuit for frequency response

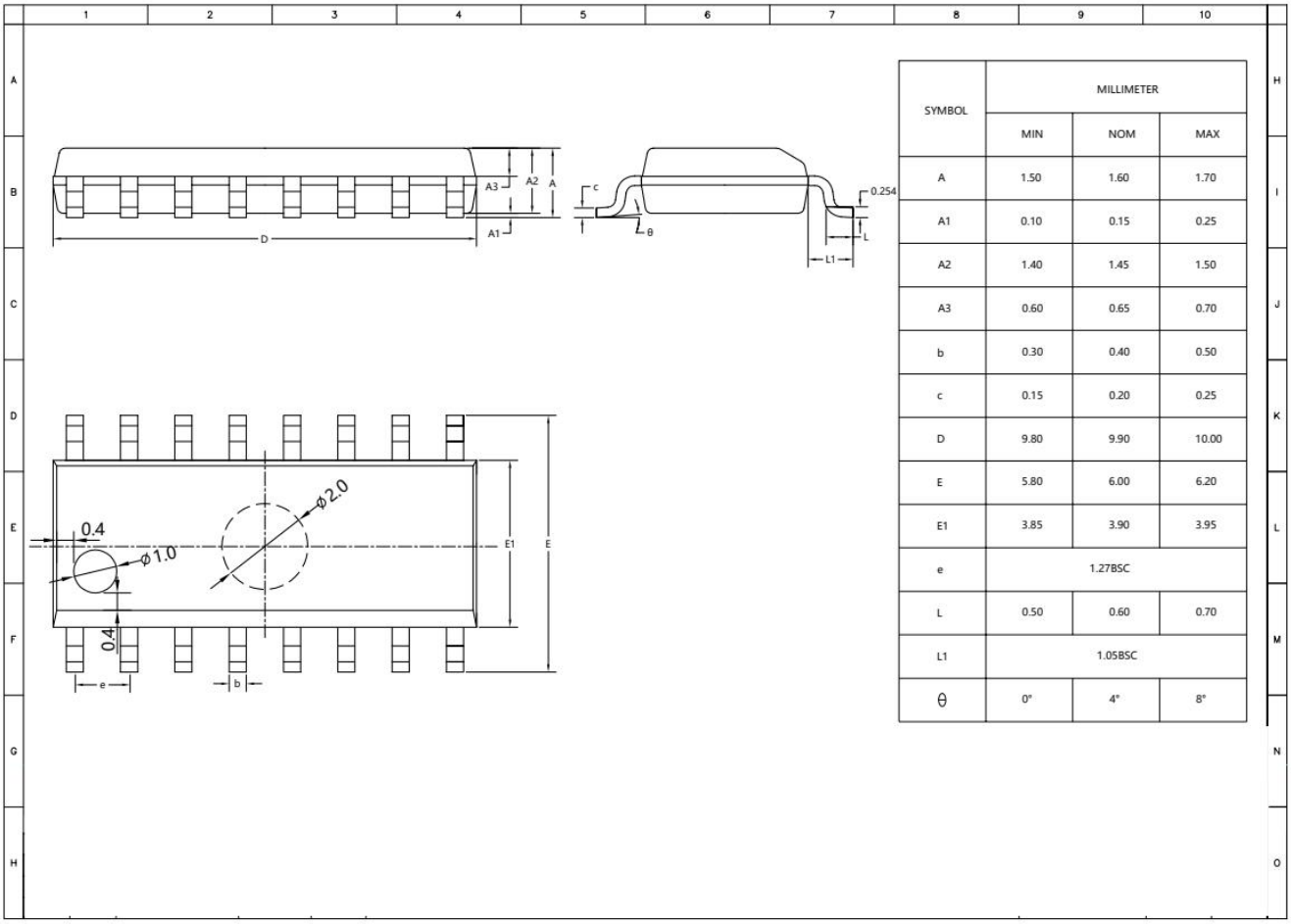
5、Package Information

5.1、DIP16



Symbol	Dimensions in Millimeters		
	Min	Nom	Max
A	--	--	4.31
A1	3.15	3.30	3.65
B	--	0.50	--
B1	--	1.6	--
C	--	0.27	--
D	19.00	19.20	19.60
E	6.20	6.50	6.60
E1	--	8.0	--
e	--	2.3	--
L	3.00	3.20	3.60

5.2 SOP16



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	1.50	1.60	1.70
A1	0.10	0.15	0.25
A2	1.40	1.45	1.50
A3	0.60	0.65	0.70
b	0.30	0.40	0.50
c	0.15	0.20	0.25
D	9.80	9.90	10.00
E	5.80	6.00	6.20
E1	3.85	3.90	3.95
e	1.27BSC		
L	0.50	0.60	0.70
L1	1.05BSC		
θ	0°	4°	8°

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