



AiP74HC/HCT48751

8-channel Analog Multiplexer/Demultiplexer

Product Specification

Specification Revision History:

Version	Date	Description
2025-03-A0	2025-03	New
2025-05-A1	2025-05	Modify the parameters



Contents

1、General Description.....	4
2、Block Diagram And Pin Description	6
2.1、Block Diagram	6
2.2、Pin Configurations.....	7
2.3、Pin Description.....	8
2.4、Function Table.....	8
3、Electrical Parameter	9
3.1、Absolute Maximum Ratings.....	9
3.2、Recommended Operating Conditions.....	9
3.3、Electrical Characteristics.....	10
3.3.1、DC Characteristics 1	10
3.3.2、DC Characteristics 2	11
3.3.3、DC Characteristics 3.....	13
3.3.4、AC Characteristics 1	14
3.3.5、AC Characteristics 2.....	16
3.3.6、AC Characteristics 3.....	17
3.3.7、AC Characteristics 4.....	18
4、Testing Circuit	19
4.1、DC Testing Circuit 1	19
4.2、DC Testing Circuit 2	20
4.3、AC Testing Waveforms.....	20
4.4、AC Testing Circuit 1	21
4.5、Test Data	22
4.6、AC Testing Circuit 2	22
5、Package Information	25
5.1、SOP16	25
5.2、SSOP16	26
5.3、TSSOP16.....	27
5.4、QFN16.....	28
6、Statements And Notes	29
6.1、The name and content of Hazardous substances or Elements in the product.....	29



i-core



1、General Description

The AiP74HC/HCT48751 is a single-pole octal-throw analog switch (SP8T) suitable for use in analog or digital 8:1 multiplexer/demultiplexer applications. The switch features three digital select inputs (S0, S1 and S2), eight independent inputs/outputs (Yn), a common input/output (Z) and a digital enable input ($\bar{E}$).

When $\bar{E}$ is HIGH, the switches are turned off.

Features:

- Wide supply voltage range
AiP74HC48751: from 3V to 9V
AiP74HCT48751: from 4.5V to 5.5V
- Low ON resistance:
 - 80 Ω (typical) at $V_{CC} = 4.5\text{ V}$
 - 70 Ω (typical) at $V_{CC} = 6.0\text{ V}$
 - 60 Ω (typical) at $V_{CC} = 9.0\text{ V}$
- Logic level translation: to enable 5 V logic to communicate with $\pm 5\text{ V}$ analog signals
- Typical “break before make” built-in
- Specified from -40°C to $+125^{\circ}\text{C}$
- Packaging information: SOP16/SSOP16/TSSOP16/QFN16

Applications:

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



Ordering Information:

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74HC48751SA16.TR	SOP16	74HC48751	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
AiP74HCT48751SA16.TR	SOP16	74HCT48751	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
AiP74HC48751VB16.TR	SSOP16	74HC48751	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 0.635mm
AiP74HCT48751VB16.TR	SSOP16	74HCT48751	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 0.635mm
AiP74HC48751TA16.TR	TSSOP16	74HC48751	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
AiP74HCT48751TA16.TR	TSSOP16	74HCT48751	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
AiP74HC48751QA16.TR	QFN16	74HC48751	6000 PCS/reel	12000 PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing: 0.5mm
AiP74HCT48751QA16.TR	QFN16	HCT48751	6000 PCS/reel	12000 PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing: 0.5mm

Note: If the physical information is inconsistent with the ordering information, please refer to the actual product.



2、Block Diagram And Pin Description

2.1、Block Diagram

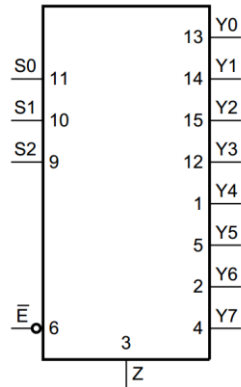


Figure 1. Logic symbol

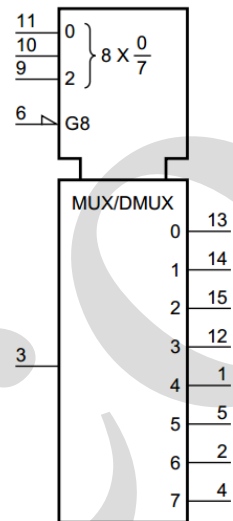


Figure 2. IEC logic symbol

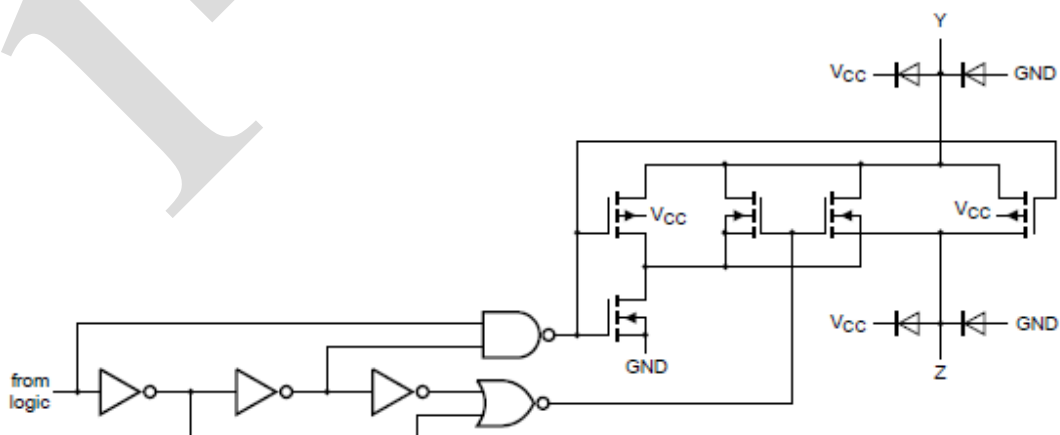


Figure 3. Schematic diagram (one switch)

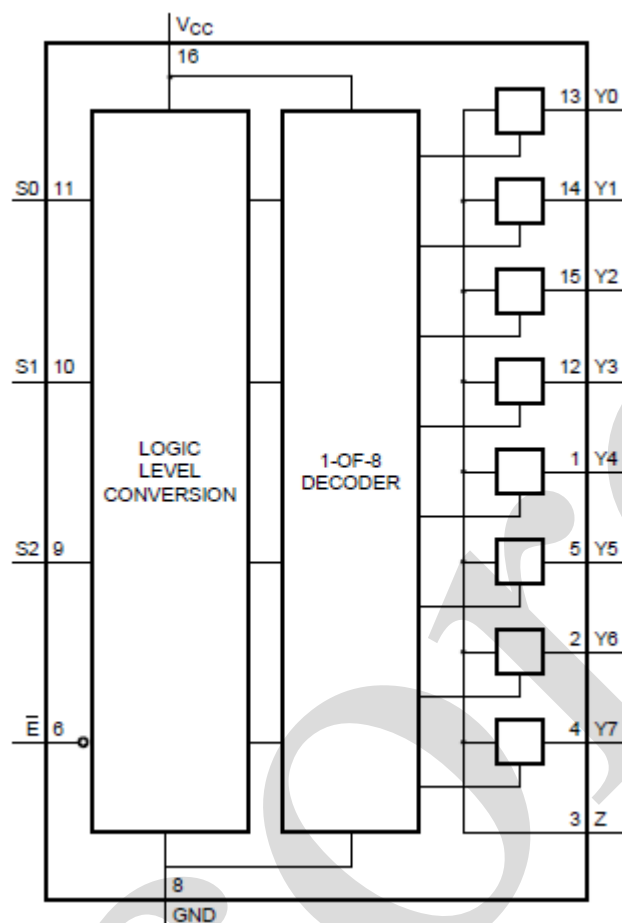
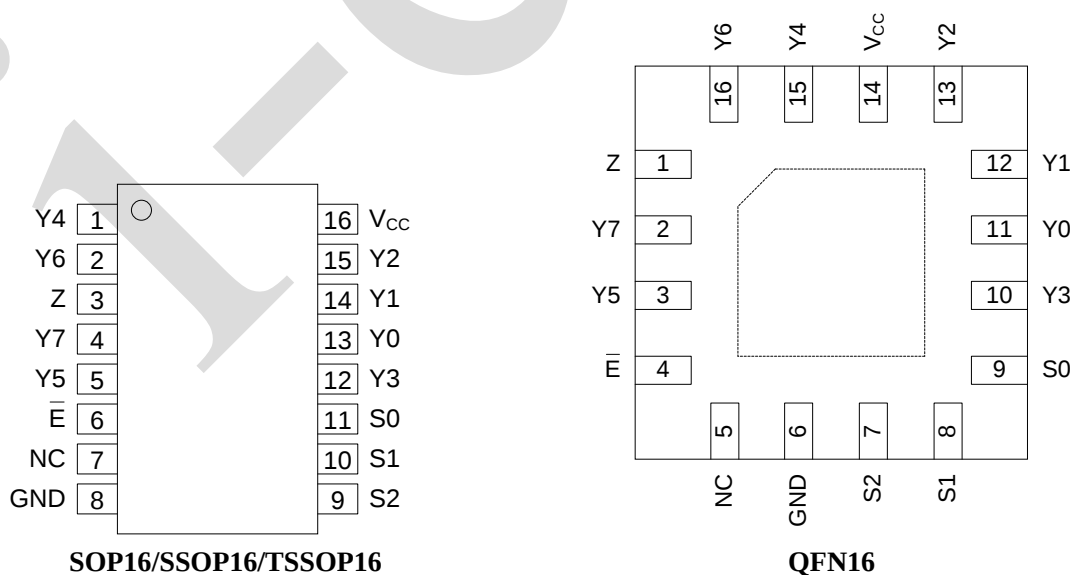


Figure 4. Functional diagram

2.2、Pin Configurations





2.3、Pin Description

Pin No.		Pin Name	Description
SOP16/SSOP16/TSSOP16	QFN16		
1	15	Y4	independent input or output
2	16	Y6	independent input or output
3	1	Z	common output or input
4	2	Y7	independent input or output
5	3	Y5	independent input or output
6	4	$\bar{E}$	enable input (active LOW)
7	5	NC	not connect
8	6	GND	ground (0V)
9	7	S2	select input
10	8	S1	select input
11	9	S0	select input
12	10	Y3	independent input or output
13	11	Y0	independent input or output
14	12	Y1	independent input or output
15	13	Y2	independent input or output
16	14	V _{CC}	supply voltage

2.4、Function Table

Input				Channel ON
$\bar{E}$	S2	S1	S0	
L	L	L	L	Y0 to Z
L	L	L	H	Y1 to Z
L	L	H	L	Y2 to Z
L	L	H	H	Y3 to Z
L	H	L	L	Y4 to Z
L	H	L	H	Y5 to Z
L	H	H	L	Y6 to Z
L	H	H	H	Y7 to Z
H	X	X	X	switches off

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 GND=0V (ground), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	-	-0.5	+11	V
input clamping current	I_{IK}	$V_I < -0.5V$ or $V_I > V_{CC} + 0.5V$	-	± 20	mA
switch clamping current	I_{SK}	$V_{SW} < -0.5V$ or $V_{SW} > V_{CC} + 0.5V$	-	± 20	mA
switch current	I_{SW}	$-0.5V < V_{SW} < V_{CC} + 0.5V$	-	± 25	mA
supply current	I_{CC}	-	-	50	mA
ground current	I_{GND}	-	-	-50	mA
storage temperature	T_{stg}	-	-65	+150	°C
soldering temperature	T_L	10s	260		°C

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AiP74HC48751						
supply voltage	V _{CC}	V _{CC} -GND	3.0	5.0	9.0	V
input voltage	V _I	-	0	-	VCC	V
switch voltage	V _{SW}	-	0	-	VCC	V
ambient temperature	T _{amb}	in free air	-40	-	+125	°C
input transition rise and fall rate	Δt/ΔV	V _{CC} =4.5V	-	1.67	139	ns/V
		V _{CC} =6.0V	-	-	83	ns/V
		V _{CC} =9.0V	-	-	31	ns/V
AiP74HCT48751						
supply voltage	V _{CC}	V _{CC} -GND	4.5	5.0	5.5	V
		V _{CC}	3.0	5.0	9.0	V
input voltage	V _I	-	0	-	VCC	V
switch voltage	V _{SW}	-	0	-	VCC	V
ambient temperature	T _{amb}	in free air	-40	-	+125	°C
input transition rise and fall rate	Δt/ΔV	V _{CC} =4.5V	-	1.67	139	ns/V
		V _{CC} =6.0V	-	-	-	ns/V
		V _{CC} =9.0V	-	-	-	ns/V



3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

($T_{amb}=25^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
ON resistance (peak)	R _{ON(peak)}	V _{is} =0V to V _{CC} ; I _{SW} =1000uA	V _{CC} =4.5V	-	100	180	Ω
			V _{CC} =6.0V	-	90	160	Ω
			V _{CC} =9.0V	-	70	130	Ω
ON resistance (rail)	R _{ON(rail)}	V _{is} =0V; I _{SW} =1000uA	V _{CC} =4.5V	-	80	140	Ω
			V _{CC} =6.0V	-	70	120	Ω
			V _{CC} =9.0V	-	60	105	Ω
		V _{is} =V _{CC} ; I _{SW} =1000uA	V _{CC} =4.5V	-	90	160	Ω
			V _{CC} =6.0V	-	80	140	Ω
			V _{CC} =9.0V	-	65	120	Ω
ON resistance mismatch between channels	ΔR _{ON}	V _{is} =0V to V _{CC}	V _{CC} =4.5V	-	9	-	Ω
			V _{CC} =6.0V	-	8	-	Ω
			V _{CC} =9.0V	-	6	-	Ω
AiP74HC48751							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V		3.15	2.4	-	V
		V _{CC} =6.0V		4.2	3.2	-	V
		V _{CC} =9.0V		6.3	4.7	-	V
LOW-level input voltage	V _{IL}	V _{CC} =4.5V		-	2.1	1.35	V
		V _{CC} =6.0V		-	2.8	1.8	V
		V _{CC} =9.0V		-	4.3	2.7	V
input leakage current	I _I	V _I =V _{CC} or GND	V _{CC} =6.0V	-	-	±1.0	uA
			V _{CC} =9.0V	-	-	±1.0	uA
OFF-state leakage current	I _{S(OFF)}	V _{CC} =9.0V; V _I =V _{IH} or V _{IL} ; V _{SW} =V _{CC} ; see Figure 7	per channel	-	-	±1.0	uA
			all channels	-	-	±1.0	uA
ON-state leakage current	I _{S(ON)}	V _I =V _{IH} or V _{IL} ; V _{SW} =V _{CC} ;V _{CC} =9.0V; see Figure 8		-	-	±1.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; V _{is} =GND or V _{CC} ; V _{os} =V _{CC} or GND	V _{CC} =6.0V	-	-	8.0	uA
			V _{CC} =9.0V	-	-	16.0	uA
input capacitance	C _I	-		-	3.5	-	pF
switch capacitance	C _{SW}	independent pins Yn		-	5	-	pF
		common pins Z		-	25	-	pF
AiP74HCT48751							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V to 5.5V		2.0	1.6	-	V
LOW-level input voltage	V _{IL}	V _{CC} =4.5V to 5.5V		-	1.2	0.8	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =5.5V		-	-	±1.0	uA



OFF-state leakage current	I _{S(OFF)}	V _{CC} =9.0V; V _I =V _{IH} or V _{IL} ; V _{SW} =V _{CC} ; see Figure 7	per channel	-	-	±1.0	uA
			all channels	-	-	±1.0	uA
ON-state leakage current	I _{S(ON)}	V _{CC} =9.0V; V _I =V _{IH} or V _{IL} ; V _{SW} =V _{CC} ; see Figure 8		-	-	±1.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; V _{is} =GND or V _{CC} ; V _{os} =V _{CC} or GND	V _{CC} =5.5V	-	-	8.0	uA
			V _{CC} =9.0V	-	-	16.0	uA
additional supply current	ΔI _{CC}	per input; V _I =V _{CC} -2.1V; other inputs at V _{CC} or GND; V _{CC} =4.5V to 5.5V		-	50	180	uA
input capacitance	C _I	-		-	3.5	-	pF
switch capacitance	C _{SW}	independent pins Yn		-	5	-	pF
		common pins Z		-	25	-	pF

Note:

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

[2] V_{is} is the input voltage at a Yn or Z terminal, whichever is assigned as an input.

[3] V_{os} is the output voltage at a Yn or Z terminal, whichever is assigned as an output.

3.3.2、DC Characteristics 2

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
ON resistance (peak)	$R_{ON(peak)}$	$V_{is}=0V$ to V_{CC} ; $I_{SW}=1000\mu A$	$V_{CC}=4.5V$	-	-	225	Ω
			$V_{CC}=6.0V$	-	-	200	Ω
			$V_{CC}=9.0V$	-	-	165	Ω
ON resistance (rail)	$R_{ON(rail)}$	$V_{is}=0V$; $I_{SW}=1000\mu A$	$V_{CC}=4.5V$	-	-	175	Ω
			$V_{CC}=6.0V$	-	-	150	Ω
			$V_{CC}=9.0V$	-	-	130	Ω
		$V_{is}=V_{CC}$; $I_{SW}=1000\mu A$	$V_{CC}=4.5V$	-	-	200	Ω
			$V_{CC}=6.0V$	-	-	175	Ω
			$V_{CC}=9.0V$	-	-	150	Ω
AiP74HC48751							
HIGH-level input voltage	V_{IH}	$V_{CC}=4.5V$		3.15	-	-	V
		$V_{CC}=6.0V$		4.2	-	-	V
		$V_{CC}=9.0V$		6.3	-	-	V
LOW-level input voltage	V_{IL}	$V_{CC}=4.5V$		-	-	1.35	V
		$V_{CC}=6.0V$		-	-	1.8	V
		$V_{CC}=9.0V$		-	-	2.7	V
input leakage current	I_I	$V_I=V_{CC}$ or GND	$V_{CC}=6.0V$	-	-	± 1.0	μA
			$V_{CC}=9.0V$	-	-	± 2.0	μA



OFF-state leakage current	$I_{S(OFF)}$	$V_{CC}=9.0V$; $V_I=V_{IH}$ or V_{IL} ; $ V_{SW} =V_{CC}$; see Figure 7	per channel	-	-	± 1.0	μA
			all channels	-	-	± 4.0	μA
ON-state leakage current	$I_{S(ON)}$	$V_I=V_{IH}$ or V_{IL} ; $ V_{SW} =V_{CC}$; $V_{CC}=9.0V$; see Figure 8		-	-	± 4.0	μA
supply current	I_{CC}	$V_I=V_{CC}$ or GND; $V_{is}=GND$ or V_{CC} ; $V_{os}=V_{CC}$ or GND	$V_{CC}=6.0V$	-	-	80.0	μA
			$V_{CC}=9.0V$	-	-	160.0	μA
AiP74HCT48751							
HIGH-level input voltage	V_{IH}	$V_{CC}=4.5V$ to $5.5V$		2.0	-	-	V
LOW-level input voltage	V_{IL}	$V_{CC}=4.5V$ to $5.5V$		-	-	0.8	V
input leakage current	I_I	$V_I=V_{CC}$ or GND; $V_{CC}=5.5V$		-	-	± 1.0	μA
OFF-state leakage current	$I_{S(OFF)}$	$V_{CC}=9.0V$; $V_I=V_{IH}$ or V_{IL} ; $ V_{SW} =V_{CC}$; see Figure 7	per channel	-	-	± 1.0	μA
			all channels	-	-	± 4.0	μA
ON-state leakage current	$I_{S(ON)}$	$V_{CC}=9.0V$; $V_I=V_{IH}$ or V_{IL} ; $ V_{SW} =V_{CC}$; see Figure 8		-	-	± 4.0	μA
supply current	I_{CC}	$V_I=V_{CC}$ or GND; $V_{is}=GND$ or V_{CC} ; $V_{os}=V_{CC}$ or GND	$V_{CC}=5.5V$	-	-	80.0	μA
			$V_{CC}=9.0V$	-	-	160	μA
additional supply current	ΔI_{CC}	per input; $V_I=V_{CC}-2.1V$; other inputs at V_{CC} or GND; $V_{CC}=4.5V$ to $5.5V$		-	-	225	μA

Note:

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

[2] V_{is} is the input voltage at a Yn or Z terminal, whichever is assigned as an input.

[3] V_{os} is the output voltage at a Yn or Z terminal, whichever is assigned as an output.



3.3.3、DC Characteristics 3

($T_{amb} = -40^{\circ}\text{C}$ to 125°C , voltages are reference to GND (ground=0V), unless otherwise specified, unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
ON resistance (peak)	R _{ON(peak)}	V _{is} =0V to V _{CC} ; I _{SW} =1000uA	V _{CC} =4.5V	-	-	270	Ω
			V _{CC} =6.0V	-	-	240	Ω
			V _{CC} =9.0V	-	-	195	Ω
ON resistance (rail)	R _{ON(rail)}	V _{is} =0V; I _{SW} =1000uA	V _{CC} =4.5V	-	-	210	Ω
			V _{CC} =6.0V	-	-	180	Ω
			V _{CC} =9.0V	-	-	160	Ω
		V _{is} =V _{CC} ; I _{SW} =1000uA	V _{CC} =4.5V	-	-	240	Ω
			V _{CC} =6.0V	-	-	210	Ω
			V _{CC} =9.0V	-	-	180	Ω
AiP74HC48751							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V		3.15	-	-	V
		V _{CC} =6.0V		4.2	-	-	V
		V _{CC} =9.0V		6.3	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =4.5V		-	-	1.35	V
		V _{CC} =6.0V		-	-	1.8	V
		V _{CC} =9.0V		-	-	2.7	V
input leakage current	I _I	V _I =V _{CC} or GND	V _{CC} =6.0V	-	-	±1.0	uA
			V _{CC} =9.0V	-	-	±2.0	uA
OFF-state leakage current	I _{S(OFF)}	V _{CC} =9.0V; V _I =V _{IH} or V _{IL} ; V _{SW} =V _{CC} ; see Figure 7	per channel	-	-	±1.0	uA
			all channels	-	-	±4.0	uA
ON-state leakage current	I _{S(ON)}	V _I =V _{IH} or V _{IL} ; V _{SW} =V _{CC} ; V _{CC} =9.0V; see Figure 8		-	-	±4.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; V _{is} =0V or V _{CC} ; V _{os} =V _{CC} or 0V	V _{CC} =6.0V	-	-	160.0	uA
			V _{CC} =9.0V	-	-	320.0	uA
AiP74HCT48751							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V to 5.5V		2.0	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =4.5V to 5.5V		-	-	0.8	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =5.5 V		-	-	±1.0	uA
OFF-state leakage current	I _{S(OFF)}	V _{CC} =9.0V; V _I =V _{IH} or V _{IL} ; V _{SW} =V _{CC} ; see Figure 7	per channel	-	-	±1.0	uA
			all channels	-	-	±4.0	uA
ON-state leakage current	I _{S(ON)}	V _{CC} = 9.0V; V _I =V _{IH} or V _{IL} ; V _{SW} =V _{CC} ; see Figure 8		-	-	±4.0	uA



supply current	I_{CC}	$V_I=V_{CC}$ or GND; $V_{is}=0V$ or V_{CC} ; $V_{os}=V_{CC}$ or $0V$	$V_{CC}=5.5V$	-	-	160.0	μA
			$V_{CC}=9.0V$	-	-	320.0	μA
additional supply current	ΔI_{CC}	per input; $V_I=V_{CC}-2.1V$; other inputs at V_{CC} or GND; $V_{CC}=4.5V$ to $5.5V$	-	-	-	245	μA

Note:

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

[2] V_{is} is the input voltage at a Yn or Z terminal, whichever is assigned as an input.

[3] V_{os} is the output voltage at a Yn or Z terminal, whichever is assigned as an output.

3.3.4、AC Characteristics 1

($T_{amb}=25^{\circ}C$, GND=0V; $t_r=t_f=6ns$; $C_L=50pF$; unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
AiP74HC48751							
propagation delay	t _{pd}	V _{is} to V _{os} ; R _L =∞Ω; see Figure 9 ^[1]	V _{CC} =4.5V	-	5	12	ns
			V _{CC} =6.0V	-	4	10	ns
			V _{CC} =9.0V	-	4	8	ns
turn-on time	t _{on}	E̅ to V _{os} ; R _L =∞Ω; see Figure 10 ^[2]	V _{CC} =4.5V	-	29	69	ns
			V _{CC} =5.0V; C _L =15pF	-	22	-	ns
			V _{CC} =6.0V	-	21	59	ns
			V _{CC} =9.0V	-	18	51	ns
		Sn to V _{os} ; R _L =∞Ω; see Figure 10 ^[2]	V _{CC} =4.5V	-	28	69	ns
			V _{CC} =5.0V; C _L =15pF	-	20	-	ns
			V _{CC} =6.0V	-	19	59	ns
			V _{CC} =9.0V	-	16	51	ns
turn-off time	t _{off}	E̅ to V _{os} ; R _L =1kΩ; see Figure 10 ^[3]	V _{CC} =4.5V	-	31	58	ns
			V _{CC} =5.0V; C _L =15pF	-	18	-	ns
			V _{CC} =6.0V	-	17	49	ns
			V _{CC} =9.0V	-	18	42	ns
		Sn to V _{os} ; R _L =1kΩ; see Figure 10 ^[3]	V _{CC} =4.5V	-	25	58	ns
			V _{CC} =5.0V; C _L =15pF	-	19	-	ns
			V _{CC} =6.0V	-	18	49	ns
			V _{CC} =9.0V	-	18	42	ns
power dissipation capacitance	C _{PD}	per switch; V _I =GND to V _{CC} ^[4]		-	25	-	pF
AiP74HCT48751							
propagation delay	t _{pd}	V _{is} to V _{os} ; R _L =∞Ω; see Figure 9 ^[1]	V _{CC} =4.5V	-	5	12	ns
			V _{CC} =9.0V	-	4	8	ns
turn-on time	t _{on}	E̅ to V _{os} ;	V _{CC} =4.5V	-	26	55	ns



		$R_L=\infty\Omega$; see Figure 10 ^[2]	$V_{CC}=5.0V$; $C_L=15pF$	-	22	-	ns
			$V_{CC}=9.0V$	-	16	39	ns
		Sn to V_{os} ; $R_L=\infty\Omega$; see Figure 10 ^[2]	$V_{CC}=4.5V$	-	28	55	ns
			$V_{CC}=5.0V$; $C_L=15pF$	-	24	-	ns
			$V_{CC}=9.0V$	-	16	39	ns
turn-off time	t_{off}	$\bar{E}$ to V_{os} ; $R_L=1k\Omega$; see Figure 10 ^[3]	$V_{CC}=4.5V$	-	19	45	ns
			$V_{CC}=5.0V$; $C_L=15pF$	-	16	-	ns
			$V_{CC}=9.0V$	-	16	32	ns
		Sn to V_{os} ; $R_L=1k\Omega$; see Figure 10 ^[3]	$V_{CC}=4.5V$	-	23	45	ns
			$V_{CC}=5.0V$; $C_L=15pF$	-	20	-	ns
			$V_{CC}=9.0V$	-	16	32	ns

Note:

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

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

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

[4] For test circuit see Figure 11.

[5] V_{is} is the input voltage at a Yn or Z terminal, whichever is assigned as an input.

[6] V_{os} is the output voltage at a Yn or Z terminal, whichever is assigned as an output.



3.3.5、AC Characteristics 2

($T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$; $GND = 0V$; $t_r = t_f = 6\text{ns}$; $C_L = 50\text{pF}$; unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
AiP74HC48751							
propagation delay	t _{pd}	V _{is} to V _{os} ; R _L =∞Ω; see Figure 9 ^[1]	V _{CC} =4.5V	-	-	15	ns
			V _{CC} =6.0V	-	-	13	ns
			V _{CC} =9.0V	-	-	10	ns
turn-on time	t _{on}	E̅ to V _{os} ; R _L =∞Ω; see Figure 10 ^[2]	V _{CC} =4.5V	-	-	86	ns
			V _{CC} =6.0V	-	-	73	ns
			V _{CC} =9.0V	-	-	64	ns
		Sn to V _{os} ; R _L =∞Ω; see Figure 10 ^[2]	V _{CC} =4.5V	-	-	86	ns
			V _{CC} =6.0V	-	-	73	ns
			V _{CC} =9.0V	-	-	64	ns
turn-off time	t _{off}	E̅ to V _{os} ; R _L =1kΩ; see Figure 10 ^[3]	V _{CC} =4.5V	-	-	73	ns
			V _{CC} =6.0V	-	-	62	ns
			V _{CC} =9.0V	-	-	53	ns
		Sn to V _{os} ; R _L =1kΩ; see Figure 10 ^[3]	V _{CC} =4.5V	-	-	73	ns
			V _{CC} =6.0V	-	-	62	ns
			V _{CC} =9.0V	-	-	53	ns
AiP74HCT48751							
propagation delay	t _{pd}	V _{is} to V _{os} ; R _L =∞Ω; see Figure 9 ^[1]	V _{CC} =4.5V	-	-	15	ns
			V _{CC} =9.0V	-	-	10	ns
turn-on time	t _{on}	E̅ to V _{os} ; R _L =∞Ω; see Figure 10 ^[2]	V _{CC} =4.5V	-	-	69	ns
			V _{CC} =9.0V	-	-	49	ns
		Sn to V _{os} ; R _L =∞Ω; see Figure 10 ^[2]	V _{CC} =4.5V	-	-	69	ns
			V _{CC} =9.0V	-	-	49	ns
turn-off time	t _{off}	E̅ to V _{os} ; R _L =1kΩ; see Figure 10 ^[3]	V _{CC} =4.5V	-	-	56	ns
			V _{CC} =9.0V	-	-	40	ns
		Sn to V _{os} ; R _L =1kΩ; see Figure 10 ^[3]	V _{CC} =4.5V	-	-	56	ns
			V _{CC} =9.0V	-	-	40	ns

Note:

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

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

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

[4] For test circuit see Figure 11.

[5] V_{is} is the input voltage at a Yn or Z terminal, whichever is assigned as an input.

[6] V_{os} is the output voltage at a Yn or Z terminal, whichever is assigned as an output.



3.3.6、AC Characteristics 3

($T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$; $GND = 0V$; $t_r = t_f = 6\text{ns}$; $C_L = 50\text{pF}$; unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
AiP74HC48751							
propagation delay	t _{pd}	V _{is} to V _{os} ; R _L =∞Ω; see Figure 9 ^[1]	V _{CC} =4.5V	-	-	18	ns
			V _{CC} =6.0V	-	-	15	ns
			V _{CC} =9.0V	-	-	12	ns
turn-on time	t _{on}	E̅ to V _{os} ; R _L =∞Ω; see Figure 10 ^[2]	V _{CC} =4.5V	-	-	104	ns
			V _{CC} =6.0V	-	-	88	ns
			V _{CC} =9.0V	-	-	77	ns
		Sn to V _{os} ; R _L =∞Ω; see Figure 10 ^[2]	V _{CC} =4.5V	-	-	104	ns
			V _{CC} =6.0V	-	-	88	ns
			V _{CC} =9.0V	-	-	77	ns
turn-off time	t _{off}	E̅ to V _{os} ; R _L =1kΩ; see Figure 10 ^[3]	V _{CC} =4.5V	-	-	87	ns
			V _{CC} =6.0V	-	-	74	ns
			V _{CC} =9.0V	-	-	72	ns
		Sn to V _{os} ; R _L =1kΩ; see Figure 10 ^[3]	V _{CC} =4.5V	-	-	87	ns
			V _{CC} =6.0V	-	-	74	ns
			V _{CC} =9.0V	-	-	72	ns
AiP74HCT48751							
propagation delay	t _{pd}	V _{is} to V _{os} ; R _L =∞Ω; see Figure 9 ^[1]	V _{CC} =4.5V	-	-	18	ns
			V _{CC} =9.0V	-	-	12	ns
turn-on time	t _{on}	E̅ to V _{os} ; R _L =∞Ω; see Figure 10 ^[2]	V _{CC} =4.5V	-	-	83	ns
			V _{CC} =9.0V	-	-	59	ns
		Sn to V _{os} ; R _L =∞Ω; see Figure 10 ^[2]	V _{CC} =4.5V	-	-	83	ns
			V _{CC} =9.0V	-	-	59	ns
turn-off time	t _{off}	E̅ to V _{os} ; R _L =1kΩ; see Figure 10 ^[3]	V _{CC} =4.5V	-	-	68	ns
			V _{CC} =9.0V	-	-	48	ns
		Sn to V _{os} ; R _L =1kΩ; see Figure 10 ^[3]	V _{CC} =4.5V	-	-	68	ns
			V _{CC} =9.0V	-	-	48	ns

Note:

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

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

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

[4] For test circuit see Figure 11.

[5] V_{is} is the input voltage at a Yn or Z terminal, whichever is assigned as an input.

[6] V_{os} is the output voltage at a Yn or Z terminal, whichever is assigned as an output.



3.3.7、AC Characteristics 4

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
sine-wave distortion	d_{sin}	$f_{\text{i}}=1\text{kHz};$ $R_{\text{L}}=10\text{k}\Omega;$ see Figure 12	$V_{\text{is}}=4.0\text{V (p-p)};$ $V_{\text{CC}}=4.5\text{V}$	-	0.04	-	%
			$V_{\text{is}}=8.0\text{V (p-p)};$ $V_{\text{CC}}=9.0\text{V}$	-	0.02	-	%
		$f_{\text{i}}=10\text{kHz};$ $R_{\text{L}}=10\text{k}\Omega;$ see Figure 12	$V_{\text{is}}=4.0\text{V (p-p)};$ $V_{\text{CC}}=4.5\text{V}$	-	0.12	-	%
			$V_{\text{is}}=8.0\text{V (p-p)};$ $V_{\text{CC}}=9.0\text{V}$	-	0.06	-	%
isolation (OFF-state)	α_{iso}	$R_{\text{L}}=600\Omega;$ $f_{\text{i}}=1\text{MHz};$ see Figure 13	$V_{\text{CC}}=4.5\text{V}^{[1]}$	-	-50	-	dB
			$V_{\text{CC}}=9.0\text{V}^{[1]}$	-	-50	-	dB
crosstalk voltage	V_{ct}	peak-to-peak value; between control and any switch; $R_{\text{L}}=600\Omega;$ $f_{\text{i}}=1\text{MHz};$ $\overline{\text{E}}$ or Sn square wave between V_{CC} and GND; $t_{\text{r}}=t_{\text{f}}=6\text{ns};$ see Figure 14	$V_{\text{CC}}=4.5\text{V}$	-	110	-	mV
			$V_{\text{CC}}=9.0\text{V}$	-	220	-	mV
-3dB frequency response	$f_{(-3\text{dB})}$	$R_{\text{L}}=50\Omega;$ see Figure 15	$V_{\text{CC}}=4.5\text{V}^{[2]}$	-	170	-	MHz
			$V_{\text{CC}}=9.0\text{V}^{[2]}$	-	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 Yn or Z terminal, whichever is assigned as an input.

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



4、Testing Circuit

4.1、DC Testing Circuit 1

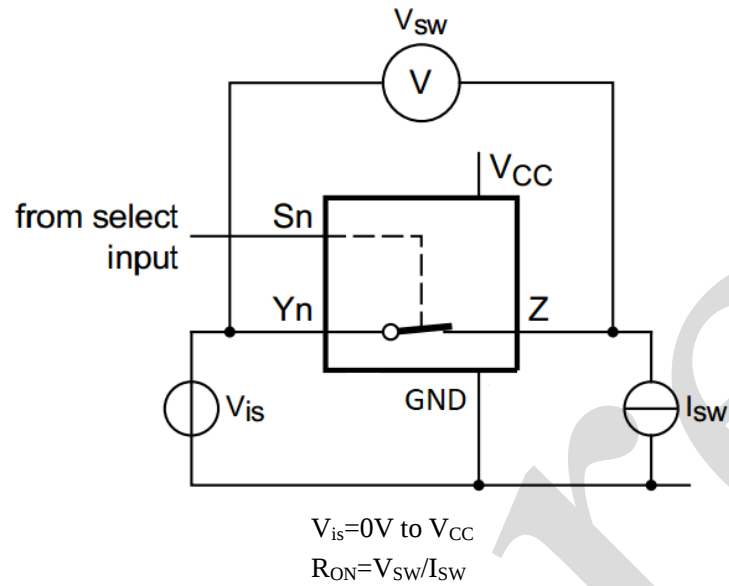
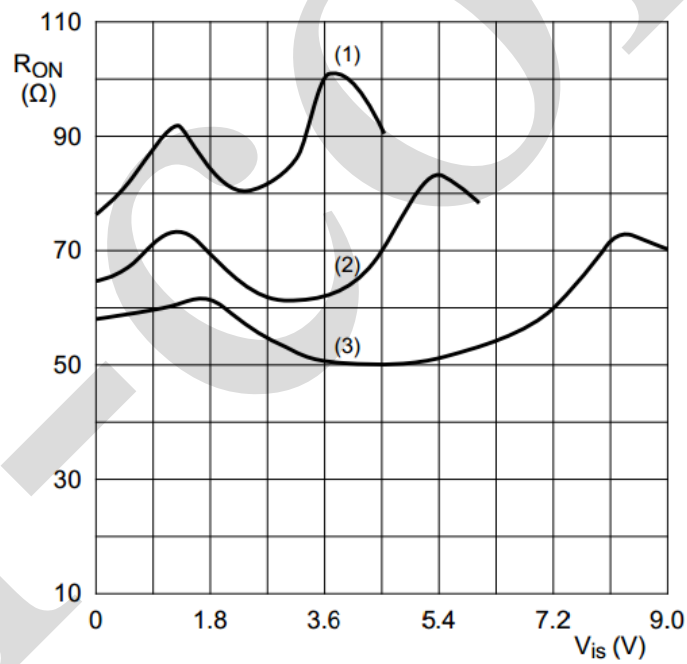


Figure 5. Test circuit for measuring R_{ON}



$V_{is}=0V \text{ to } V_{CC}$

(1) $V_{CC}=4.5V$

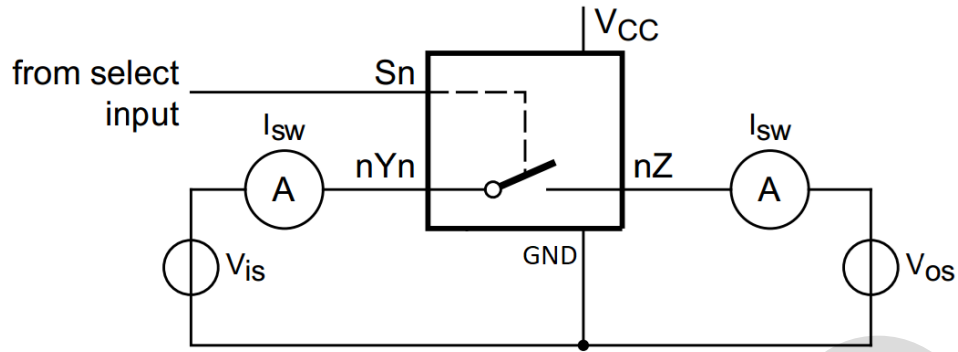
(2) $V_{CC}=6V$

(3) $V_{CC}=9V$

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



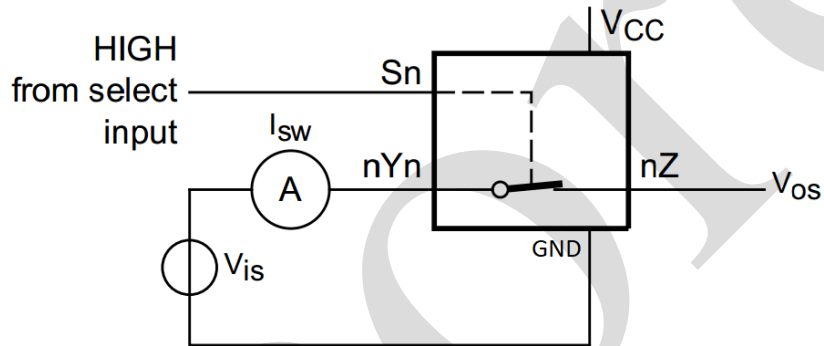
4.2、DC Testing Circuit 2



$V_{is}=V_{CC}$ and $V_{os}=0V$.

$V_{is}=0V$ and $V_{os}=V_{CC}$.

Figure 7. Test circuit for measuring OFF-state current



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

$V_{is}=0V$ and $V_{os}=\text{open-circuit}$.

Figure 8. Test circuit for measuring ON-state current

4.3、AC Testing Waveforms

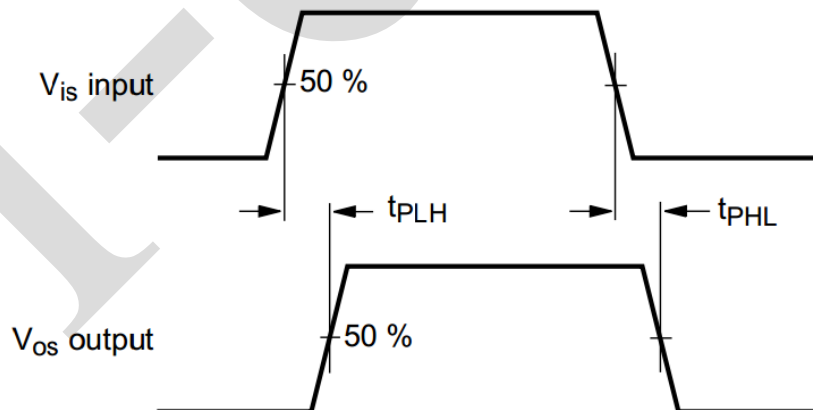
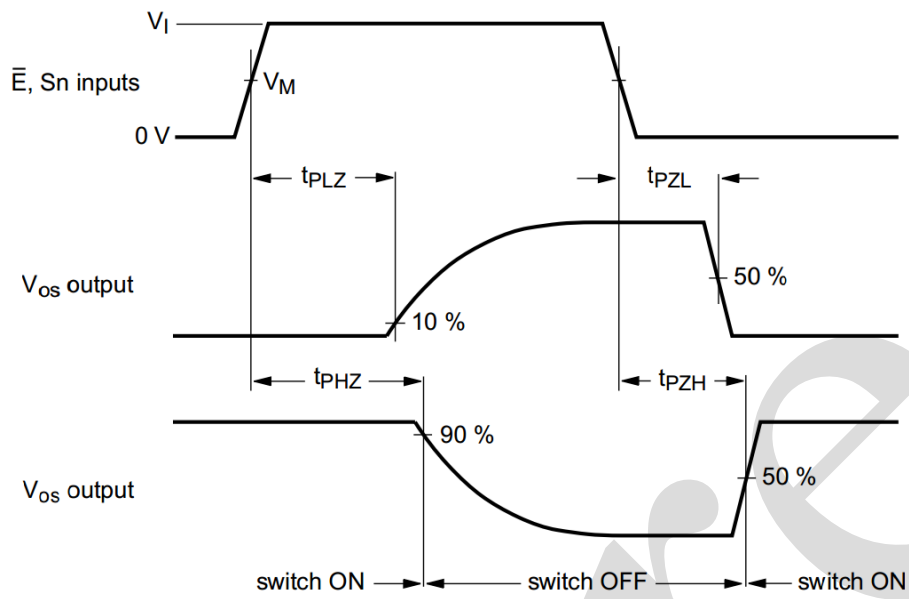


Figure 9. Input (V_{is}) to output (V_{os}) propagation delays



For AiP74HC48751: $V_M = 0.5 \times V_{CC}$.

For AiP74HCT48751: $V_M = 1.3V$.

Figure 10. Turn-on and turn-off times

4.4、AC Testing Circuit 1

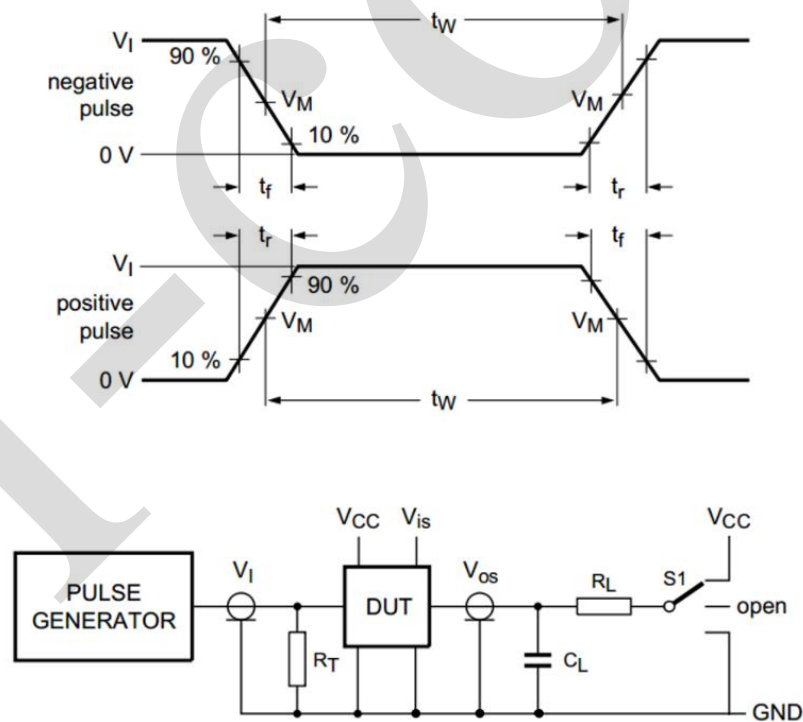


Figure 11. Test circuit for measuring switching times

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	GND
t _{PZL} , t _{PLZ}	[2]	GND	<2ns	6ns	50pF	1kΩ	V _{CC}

Note:

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

[2] V_I values:

For AiP74HC48751: $V_I = V_{CC}$.

For AiP74HCT48751: $V_I = 3V$.

4.6、AC Testing Circuit 2

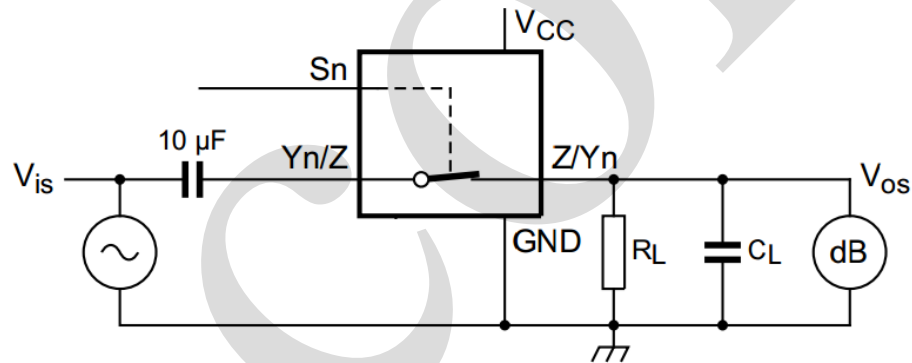
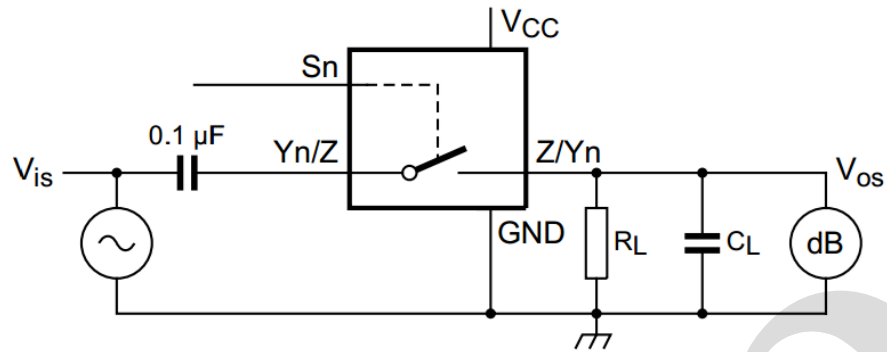
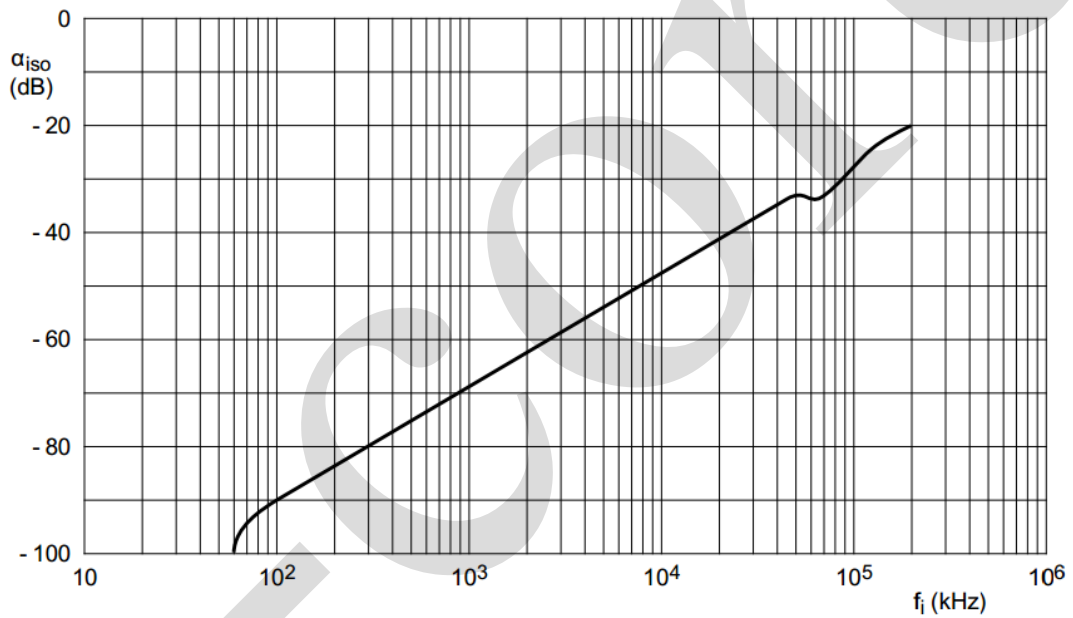


Figure 12. Test circuit for measuring sine-wave distortion



$V_{CC}=9.0V$; $GND=0V$; $R_L=600\Omega$; $R_S=1k\Omega$.

a. Test circuit



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

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

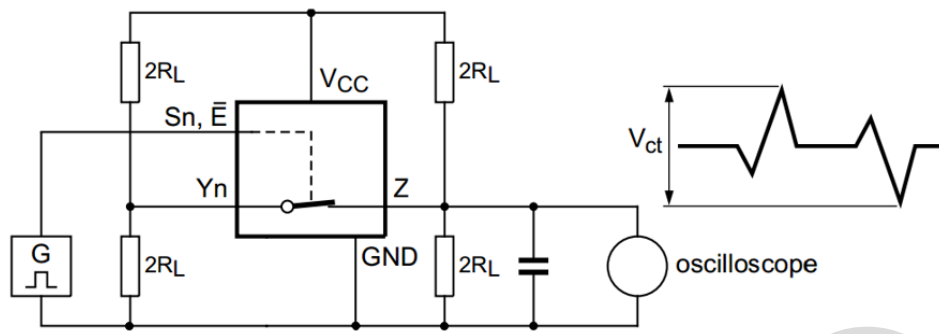
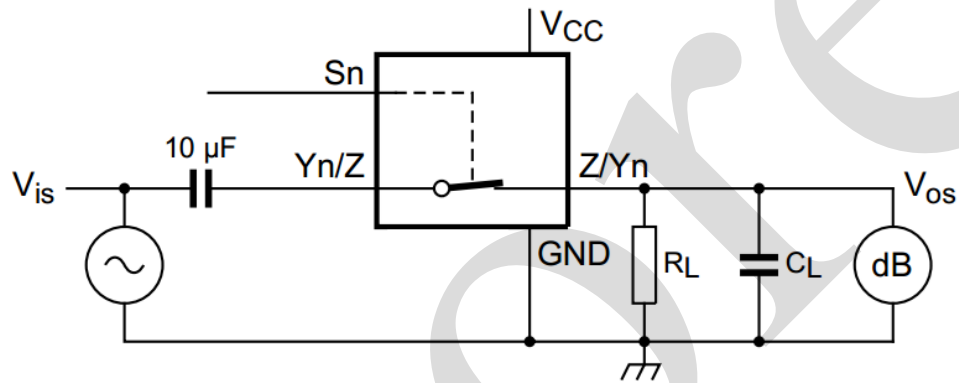
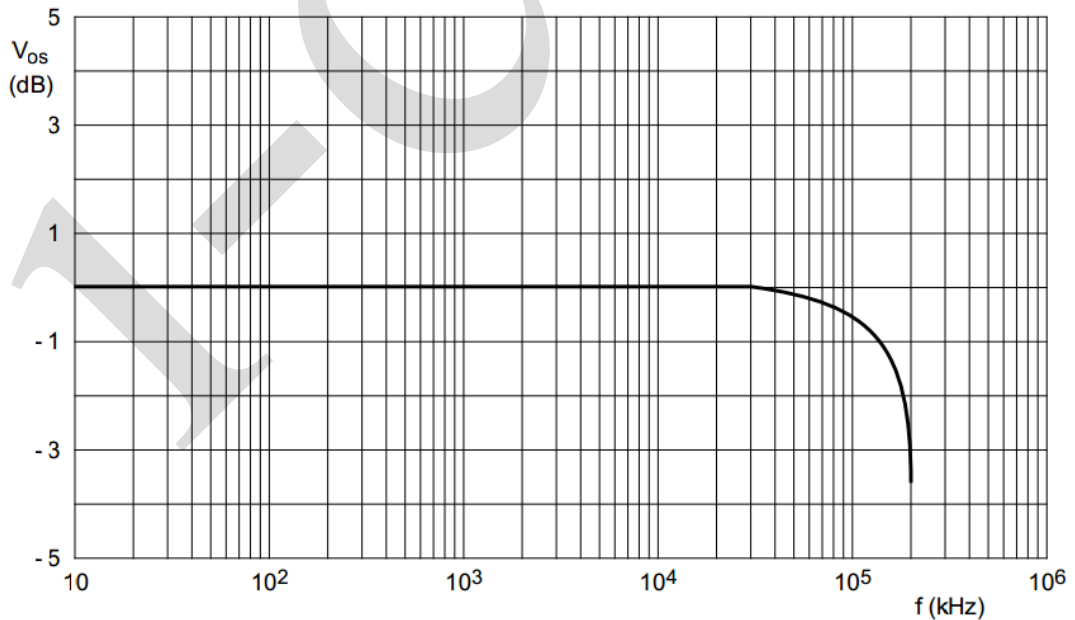


Figure 14. Test circuit for measuring crosstalk between control input and any switch



$V_{CC}=9.0V$; $GND=0V$; $R_L=50\Omega$; $R_S=1k\Omega$

a. Test circuit



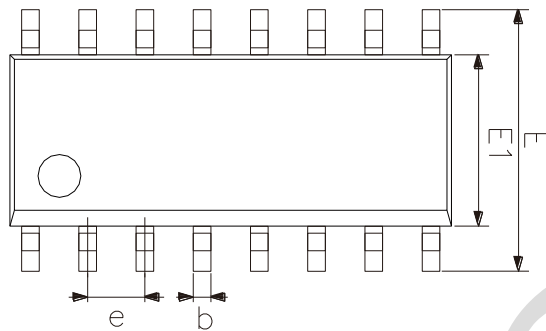
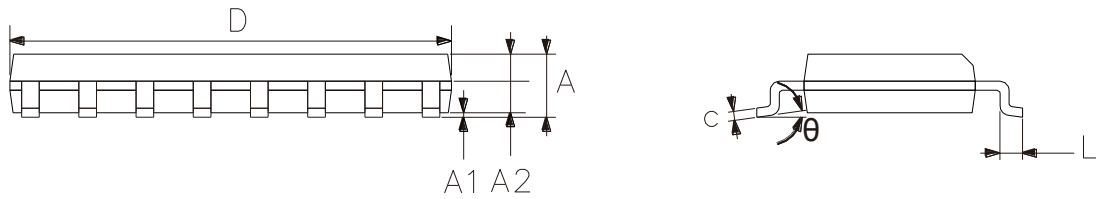
b. Typical frequency response

Figure 15. Test circuit for frequency response



5、Package Information

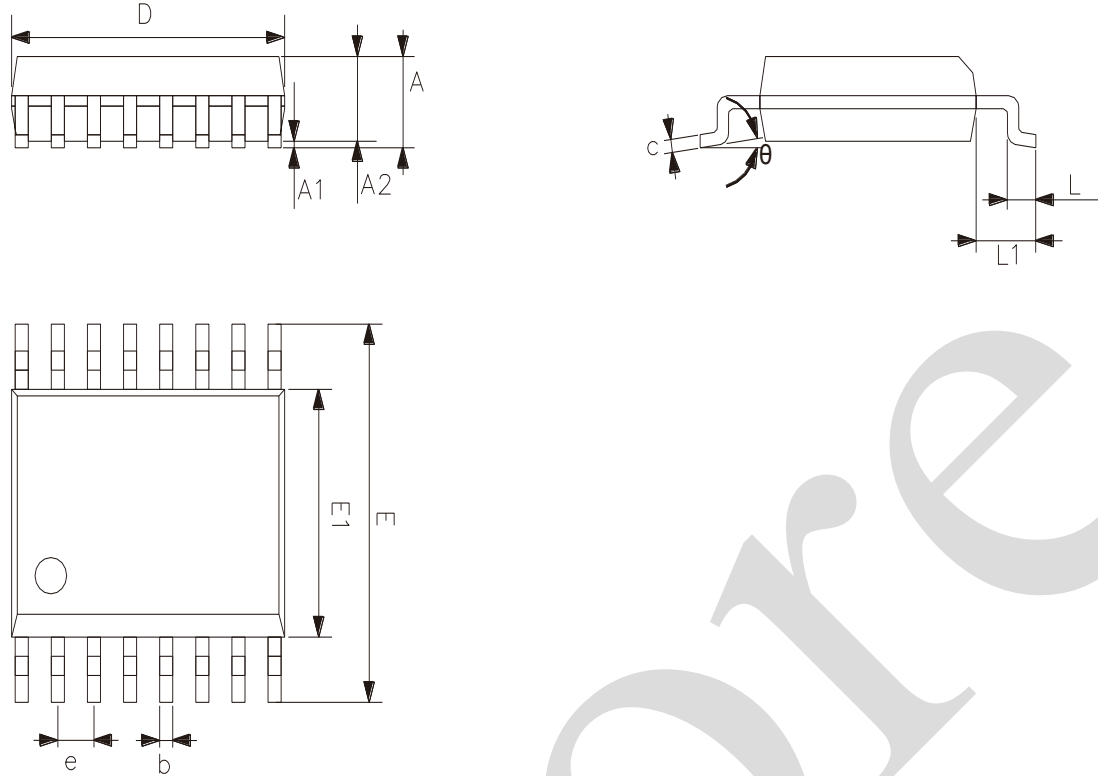
5.1、SOP16



2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	1.35	1.80
A1	0.10	0.25
A2	1.25	1.55
b	0.33	0.51
c	0.19	0.25
D	9.50	10.10
E	5.80	6.30
E1	3.70	4.10
e	1.27	
L	0.35	0.89
θ	0°	8°



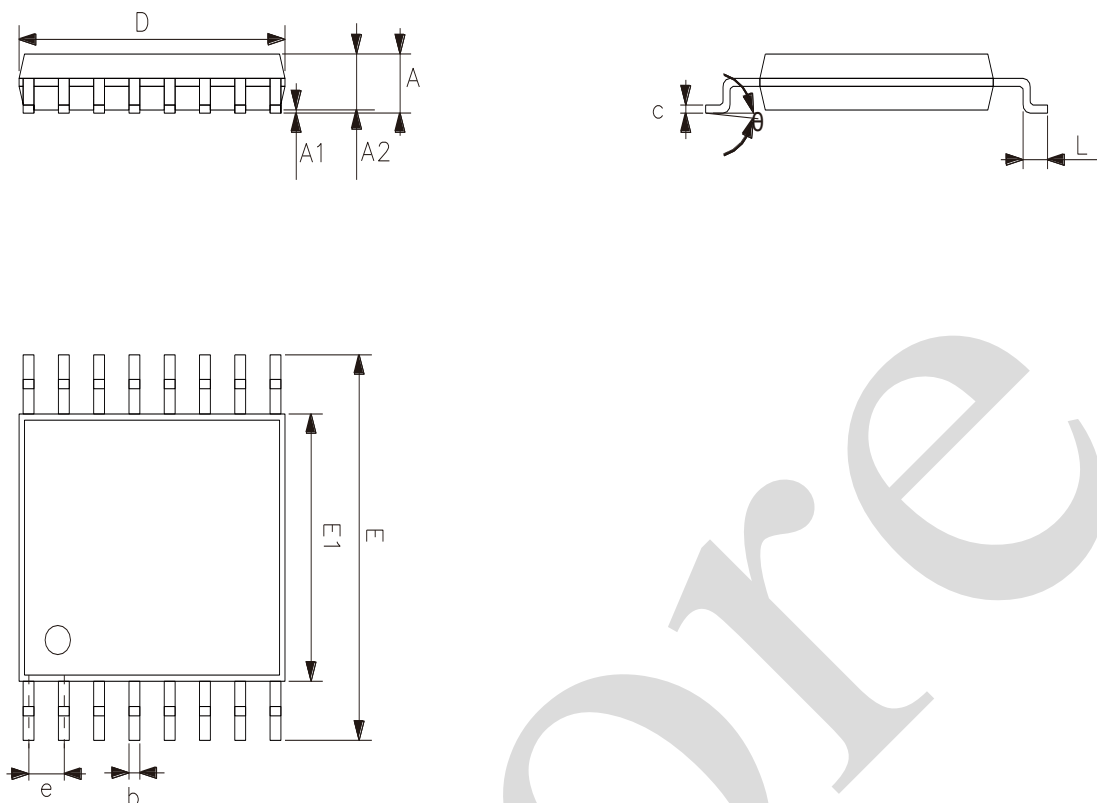
5.2、SSOP16



2023/12/A Symbol	Dimensions In Millimeters	
	Min	Max
A	—	1.75
A1	0.02	0.23
A2	1.30	1.50
b	0.23	0.31
c	0.20	0.24
D	4.70	5.10
E	5.80	6.25
E1	3.80	4.02
e	0.635	
L	0.45	0.80
L1	1.05	
θ	0°	8°



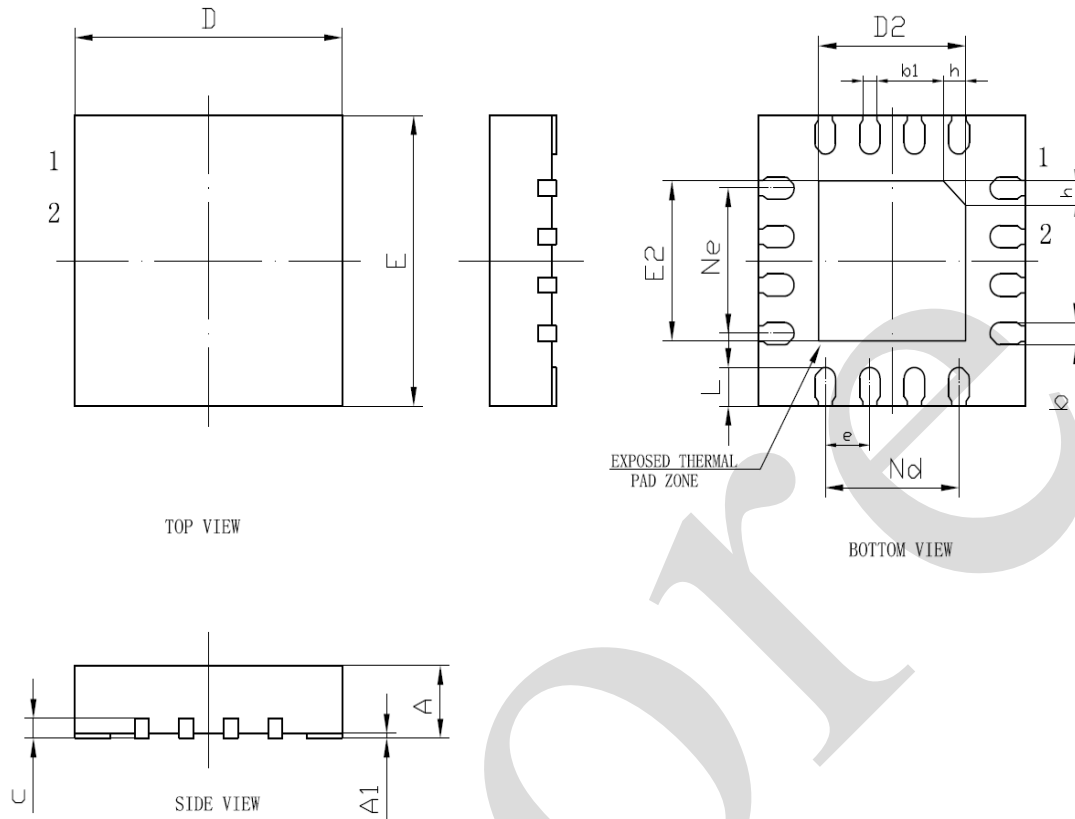
5.3、TSSOP16



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	—	1.20
A1	0.05	0.15
A2	0.80	1.05
b	0.19	0.30
c	0.09	0.20
D	4.90	5.10
E1	4.30	4.50
E	6.20	6.60
e	0.65	
L	0.45	0.75
θ	0°	8°



5.4、QFN16



2024/01/B	Dimensions In Millimeters	
Symbol	Min	Max
A	0.70	0.80
A1	0	0.05
b	0.18	0.30
b1	0.16	
c	0.18	0.25
D	2.90	3.10
D2	1.55	1.80
e	0.50	
Ne	1.50	
Nd	1.50	
E	2.90	3.10
E2	1.55	1.80
L	0.30	0.50
h	0.20	0.45



6、Statements And Notes

6.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

6.2、Notes

We recommend you to read this chapter carefully before using this product.

The information in this chapter is provided for reference only and i-Core disclaims any express or implied warranties, including but not limited to applicability, special application or non-infringement of third party rights.

This product is not suitable for critical equipment such as life-saving, life-sustaining or safety equipment. It is also not suitable for applications that may result in personal injury, death, or serious property or environmental damage due to product malfunction or failure. I-Core will not be liable for any damages incurred by the customers at their own risk for such applications.

The customer is responsible for conducting all necessary tests i-Core's application to avoid failure in the application or the application of the customer's third party users. I-Core does not accept any liability.

The Company reserves the right to change or improve the information published in this chapter at any time. The information in this chapter are subject to change without notice. We recommend the customer to consult our sales staff before purchasing.

Please obtain related materials from i-Core's regular channels and we are not responsible for its content if it is provided by sources other than our company.

In case of any conflict between the Chinese and English version, the version is subject to the Chinese one.