



AiP8071/AiP8072/AiP8074

100MHz, High Voltage, Rail-to-Rail Output Amplifier

Product Specification

Specification Revision History:

Version	Date	Description
2024-05-A0	2024-05	New
2024-11-A1	2024-11	Modify parameters
2025-04-A2	2025-04	Modify parameters



Contents

1、General Description.....	1
2、Pin Configurations And Pin Description.....	3
2.1、Pin Configurations (TOP VIEW)	3
2.2、Pin Description.....	4
3、Electrical Parameter	5
3.1、Absolute Maximum Ratings.....	5
3.2、Recommended Operating Conditions.....	5
3.3、Electrical Characteristics (VS=5V)	5
3.4、Electrical Characteristics (VS=±6V)	6
4、Function Description	8
5、Package Information	9
5.1、SOT23-5.....	9
5.2、SOP8	10
5.3、MSOP8.....	11
5.4、SOP14	12
5.5、TSSOP14.....	13
6、Statements And Notes	14
6.1、The name and content of Hazardous substances or Elements in the product.....	14
6.2、Notes	14



1、General Description

The AiP807X series are 100 MHz high-voltage rail-to-rail output operational amplifiers. AiP8071, AiP8072 and AiP8074 correspond to single-channel, dual-channel and quad-channel op amps respectively. This series is suitable for applications such as active filters, ADC interfaces, portable video equipment, digital cameras and set-top boxes.

Features:

- Small-signal bandwidth: 100MHz
- Gain bandwidth product: 62MHz
- Slew rate: 115V/us
- Noise: 115nV/ $\sqrt{\text{Hz}}$ (@1kHz)
- Input common-mode voltage range: VSN-0.1V to VSP-2V
- Quiescent current/amplifier: 2.9mA
- Supply voltage: 3.5V to 12V
- Operating temperature range: -40°C to 125°C
- Substrate connected to VSN (for bare die)
- Package form:
 - AiP8071: SOT23-5/SOP8/MSOP8
 - AiP8072: SOP8/MSOP8
 - AiP8074: SOP14/TSSOP14

**Ordering Information:****Reel packing specifications:**

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP8071GB235.TR	SOT23-5	8071XX	3000PCS/reel	30000PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing: 0.95mm
AiP8071SA8.TR	SOP8	AiP8071	4000PCS/reel	8000PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 1.27mm
AiP8071MA8.TR	MSOP8	AiP8071	5000PCS/reel	10000PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing: 0.65mm
AiP8072SA8.TR	SOP8	AiP8072	4000PCS/reel	8000PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 1.27mm
AiP8072MA8.TR	MSOP8	AiP8072	5000PCS/reel	10000PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing: 0.65mm
AiP8074SA14.TR	SOP14	AiP8074	4000PCS/reel	8000PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
AiP8074TA14.TR	TSSOP14	AiP8074	5000PCS/reel	10000PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm

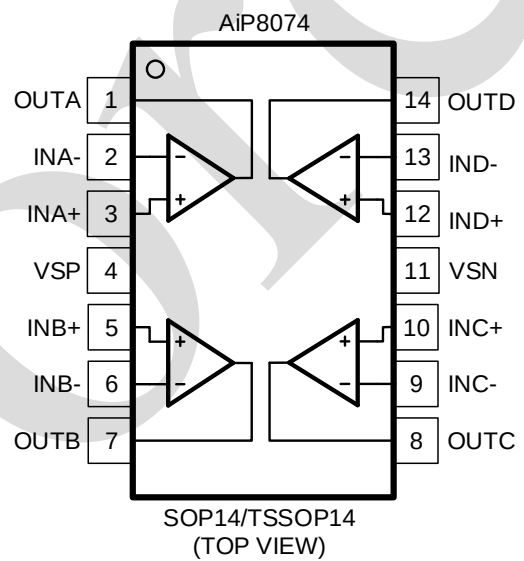
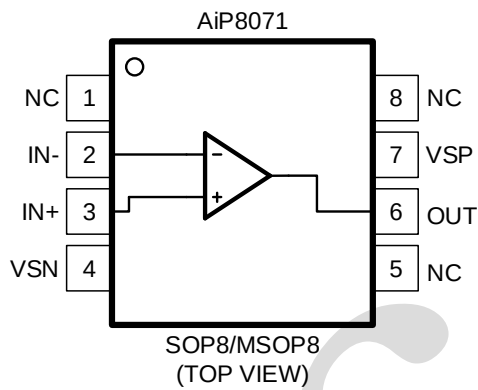
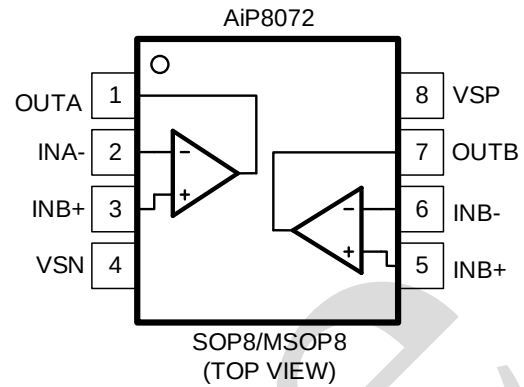
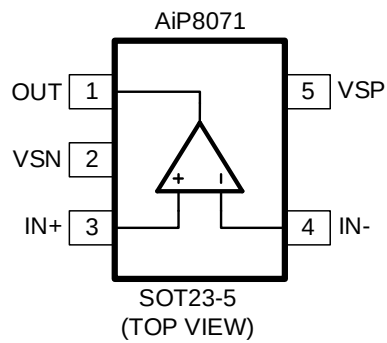
Note 1: "XX" refers to variable content, meaning package batch serial number.

Note 2: If the physical information is inconsistent with the ordering information, please refer to the actual product.



2、Pin Configurations And Pin Description

2.1、Pin Configurations (TOP VIEW)





2.2、Pin Description

AiP8071: SOT23-5

Pin No.	Pin Name	Description
1	OUT	Amplifier output
2	VSN	Ground (negative power supply)
3	IN+	Amplifier positive input
4	IN-	Amplifier negative input
5	VSP	Positive power supply

AiP8071: SOP8, MSOP8

Pin No.	Pin Name	Description	Pin No.	Pin Name	Description
1	NC	Not connected	5	NC	Not connected
2	IN-	Amplifier negative input	6	OUT	Amplifier output
3	IN+	Amplifier positive input	7	VSP	Positive power supply
4	VSN	Ground (negative power supply)	8	NC	Not connected

AiP8072: SOP8, MSOP8

Pin No.	Pin Name	Description	Pin No.	Pin Name	Description
1	OUTA	Amplifier A output	5	INB+	Amplifier B positive input
2	INA-	Amplifier A negative input	6	INB-	Amplifier B negative input
3	INA+	Amplifier A positive input	7	OUTB	Amplifier B output
4	VSN	Ground (negative power supply)	8	VSP	Positive power supply

AiP8044: SOP14, TSSOP14

Pin No.	Pin Name	Description	Pin No.	Pin Name	Description
1	OUTA	Amplifier A output	8	OUTC	Amplifier C output
2	INA-	Amplifier A negative input	9	INC-	Amplifier C negative input
3	INA+	Amplifier A positive input	10	INC+	Amplifier C positive input
4	VSP	Positive power supply	11	VSN	Ground (negative power supply)
5	INB+	Amplifier B positive input	12	IND+	Amplifier D positive input
6	INB-	Amplifier B negative input	13	IND-	Amplifier D negative input
7	OUTB	Amplifier B output	14	OUTD	Amplifier D output



3、Electrical Parameter

3.1、Absolute Maximum Ratings

($T_{amb}=25^{\circ}\text{C}$, unless otherwise specified)

Characteristic	Symbol	Conditions	Min.	Max.	Unit
supply voltage	VSP	-	-0.3	13.2	V
Differential input voltage	$V_{IN,DIFF}$	-	-2.5	+2.5	V
Ambient temperature	T_{amb}	-	-40	125	$^{\circ}\text{C}$
Storage temperature	T_{stg}	-	-65	150	$^{\circ}\text{C}$
Soldering temperature	T_L	10s	260		$^{\circ}\text{C}$

3.2、Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
supply voltage (single power supply)	VS	3.5	-	12	V
supply voltage (dual power supply)	VS	± 1.75	-	± 6	V
ambient temperature	T_{amb}	-40	-	125	$^{\circ}\text{C}$

3.3、Electrical Characteristics (VS=5V)

($T_{amb}=25^{\circ}\text{C}$, VS=5V, $V_{CM}=VS/2$, $V_{OUT}=VS/2$, $R_L=100\Omega$ and connected to $V_S/2$, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
DC Characteristics						
Quiescent current/CH	I_Q	$I_{out}=0\text{mA}$, AiP8071	-	2.8	6	mA
		$I_{out}=0\text{mA}$, AiP8072/4	-	2.7	6	mA
Input offset voltage	V_{OS}	-	-	5	-	mV
		-40°C to 125°C	-25	-	25	mV
Input offset voltage drift	$\Delta V_{OS}/\Delta T$	-40°C to 125°C	-	12	-	$\mu\text{V}/^{\circ}\text{C}$
Input bias current	I_B	-	-	20	-	pA
Input offset current	I_{OS}	-	-	5	-	pA
Input capacitance	C_{IN}	differential mode	-	1	-	pF
		common mode	-	2	-	pF
Common-mode voltage range	V_{CM}	-	-0.1	-	3	V
Open-loop gain	A_{OL}	$R_L=50\Omega$, $1.3\text{V}\leq V_{out}\leq 3.7\text{V}$	-	92	-	dB
		$R_L=150\Omega$, $0.6\text{V}\leq V_{out}\leq 4.4\text{V}$	-	95	-	dB
		$R_L=2\text{k}\Omega$, $0.4\text{V}\leq V_{out}\leq 4.6\text{V}$	-	95	-	dB
Power supply rejection ratio	PSRR	VS=3.5V to 13.2V	65	80	-	dB
Common-mode rejection ratio	CMRR	$V_{CM}=-0.1\text{V}$ to 3V	58	90	-	dB
High output voltage swing from rail	V_{OH}	$R_L=2\text{k}\Omega$ to VS/2	-	26	-	mV
		$R_L=150\Omega$ to VS/2	-	320	-	mV
		$R_L=75\Omega$ to VS/2	-	560	-	mV
		$R_L=75\Omega$ to ground	-	1.3	-	V
Low output voltage	V_{OL}	$R_L=2\text{k}\Omega$ to VS/2	-	15	-	mV



swing from rail		RL=150Ω to VS/2	-	175	-	mV
		RL=75Ω to VS/2	-	320	-	mV
		RL=75Ω to ground	-	1	-	mV
Output current	I _{OUT}	RL=75Ω to VS, sink	-	56	-	mA
		RL=75Ω to ground, source	-	46	-	mA
Output short-circuit current	I _{SC}	RL=10Ω to VS, sink	-	106	-	mA
		RL=10Ω to ground, source	-	86	-	mA
AC Characteristics						
Small-signal -3dB bandwidth	BW _{SS}	G=+1, RL=2kΩ	-	100	-	MHz
Large-signal -3dB bandwidth	BW _{LS}	G=+1	-	75	-	MHz
Gain bandwidth product	GBP	G=+100	-	62	-	MHz
Crosstalk	X _{talk}	VIN=200mV _{P-P} , f=1kHz	-	92	-	dB
Overload recovery time	t _{ov}	f=1kHz	-	46	-	ns
Input voltage noise density	en	f=1kHz	-	115	-	nV/√Hz
		f=10kHz	-	55	-	nV/√Hz
		f = 100kHz	-	28	-	nV/√Hz
Slew rate	SR	f = 1kHz, Vo=2V _{P-P} , rising edge	-	115	-	V/us
		f = 1kHz, Vo=2V _{P-P} , falling edge	-	190	-	V/us
Settling time to 0.1%	t _s	f = 1kHz, Vo=1V _{P-P}	-	65	-	ns
Rise/fall time	t _R /t _F	f = 1kHz, Vo=100mV _{P-P}	-	7.8	-	ns
			-	7.8	-	ns

3.4、Electrical Characteristics (VS=±6V)

(T_{amb}=25℃, VS=±6V, V_{CM}=0V, V_{OUT}=0V, RL=100Ω and connected to ground, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
DC Characteristics						
Quiescent current/CH	I _Q	I _{out} =0mA, AiP8071	-	2.9	6.2	mA
		I _{out} =0mA, AiP8072/4	-	2.8	6.2	mA
Input offset voltage	V _{OS}	-	-	5	-	mV
		-40℃ to 125℃	-25	-	25	mV
Input offset voltage drift	ΔV _{OS} /ΔT	-40℃ to 125℃	-	12	-	μV/℃
Input bias current	I _B	-	-	50	-	pA
Input offset current	I _{OS}	-	-	10	-	pA
Input capacitance	C _{IN}	differential mode	-	1	-	pF
		common mode	-	2	-	pF
Common-mode voltage range	V _{CM}	-	-6.1	-	4	V
Open-loop gain	A _{OL}	RL=150Ω, -4.5V≤V _{out} ≤4.5V	-	100	-	dB
		RL=2kΩ, -4.9V≤V _{out} ≤4.9V	-	100	-	dB
Common-mode rejection ratio	CMRR	V _{CM} =-6.1V to 4V	68	95	-	dB



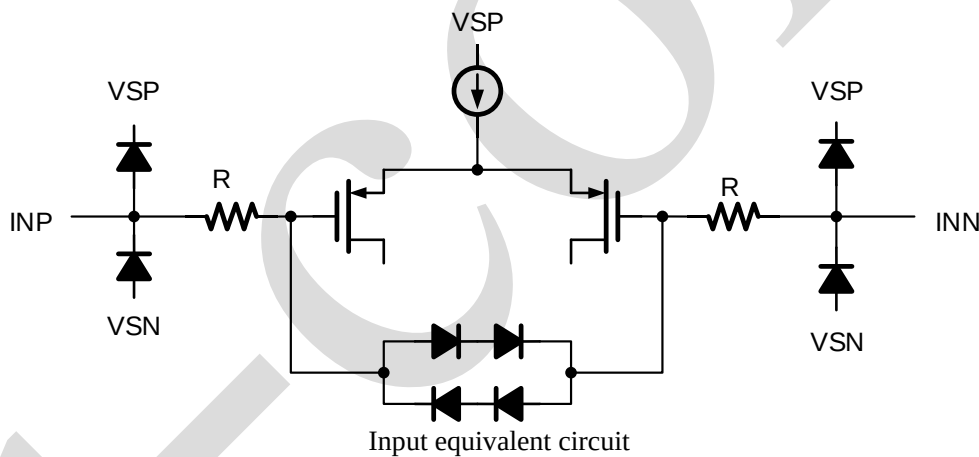
High output voltage swing from rail	V _{OH}	RL=2kΩ to ground	-	60	-	mV
		RL=150Ω to ground	-	780	-	mV
Low output voltage swing from rail	V _{OL}	RL=2kΩ to ground	-	35	-	mV
		RL=150Ω to ground	-	410	-	mV
Output current	I _{OUT}	RL=75Ω to VS, sink	-	120	-	mA
		RL=75Ω to -VS, source	-	105	-	mA
AC Characteristics						
Small-signal -3dB bandwidth	BW _{SS}	G=+1, RL=2kΩ	-	110	-	MHz
Large-signal -3dB bandwidth	BW _{LS}	G=+1	-	75	-	MHz
Gain bandwidth product	GBP	G=+100	-	65	-	MHz
Crosstalk	X _{talk}	VIN=200mV _{P-P} , f=1kHz	-	92	-	dB
Overload recovery time	t _{ov}	f=1kHz	-	42	-	ns
Input voltage noise density	en	f=1kHz	-	115	-	nV/√Hz
		f=10kHz	-	55	-	nV/√Hz
		f = 100kHz	-	28	-	nV/√Hz
Slew rate	SR	f = 1kHz, Vo=2V _{P-P} , rising edge	-	145	-	V/us
		f = 1kHz, Vo=2V _{P-P} , falling edge	-	145	-	V/us
Settling time to 0.1%	t _s	f = 1kHz, Vo=1V _{P-P}	-	65	-	ns
Rise/fall time	t _R /t _F	f = 1kHz, Vo=100mV _{P-P}	-	7	-	ns
			-	6.2	-	ns



4、Function Description

The AiP807X series are 100MHz high-voltage rail-to-rail output operational amplifiers operating over a supply voltage range of 3.5V to 12V and a temperature range of -40°C to 125°C . The amplifier employs P-type transistors for the input differential pair, offering an input common-mode voltage range of -0.1V to $\text{VSP}-2\text{V}$. Featuring a Class AB output stage, the devices deliver rail-to-rail output swing. This series is targeted at applications including active filters, ADC interfaces, portable video devices, digital cameras, and set-top boxes.

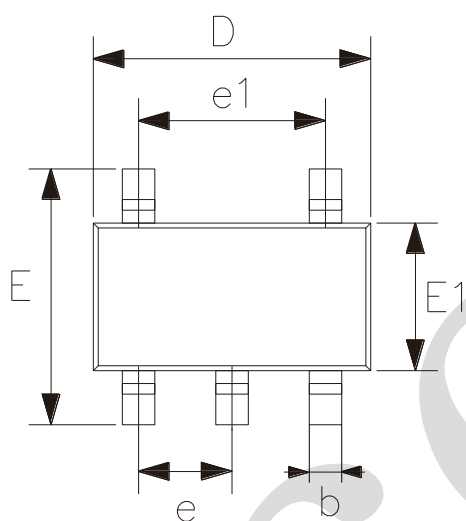
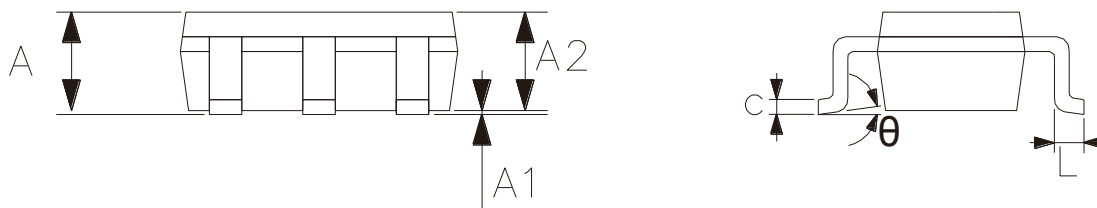
All input/output pins are protected against excessive voltages by ESD diodes connected to VSP and VSN rails. These diodes start conducting when the input/output pin voltage approaches 1 V_{be} beyond VSP or VSN. These diodes are normally reverse biased. Further protection of the differential input pair is provided by the two resistors (R), in conjunction with the string of anti-parallel diodes connected between the differential input terminals. When the differential input voltage exceeds 2 V_{be} , the diodes may conduct. As a consequence, input current increases and the differential input voltage is clamped. This occurs most commonly when the device is used as a comparator (or with little or no feedback) and the device inputs no longer follow each other. To limit the current through this protection circuit, extra series resistors can be placed. Together with the built-in series resistors, these external resistors can limit the input current to a safe number (less than 10mA). Be aware that these input series resistors may impact the switching speed of the device and could slow down the device.





5、Package Information

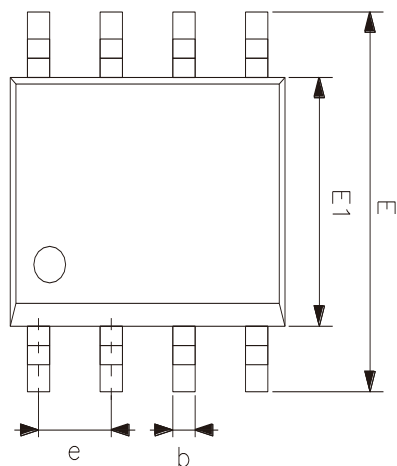
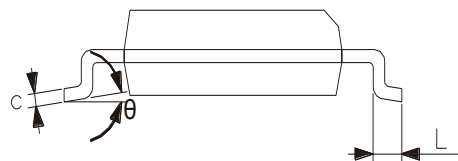
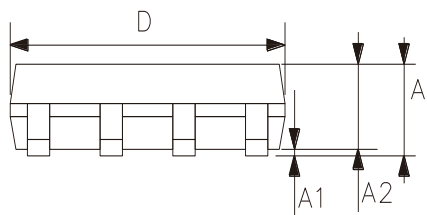
5.1、SOT23-5



2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	—	1.26
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°



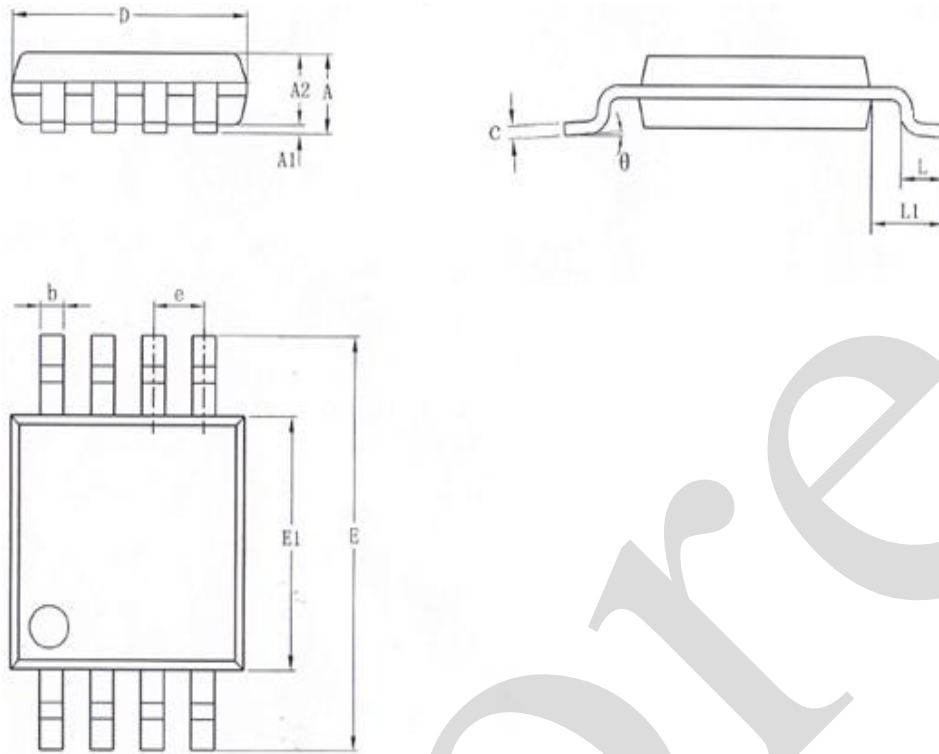
5.2、SOP8



2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	1.35	1.80
A1	0.05	0.25
A2	1.25	1.55
D	4.70	5.10
E	5.80	6.30
E1	3.70	4.10
b	0.306	0.51
c	0.19	0.25
e	1.27	
L	0.40	0.89
θ	0°	8°



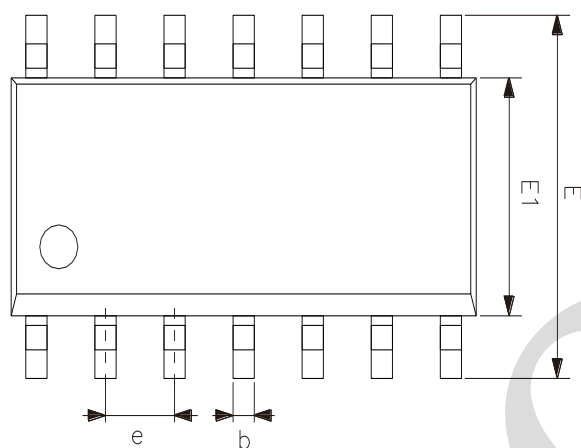
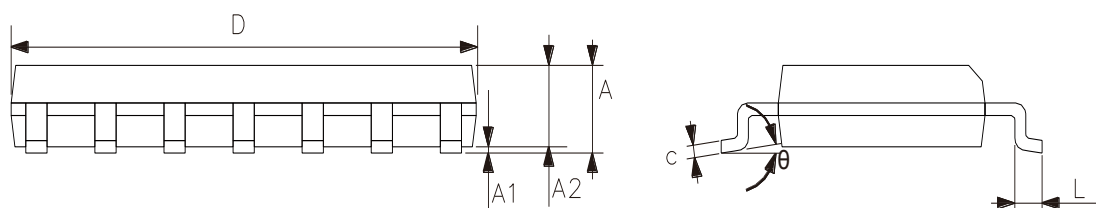
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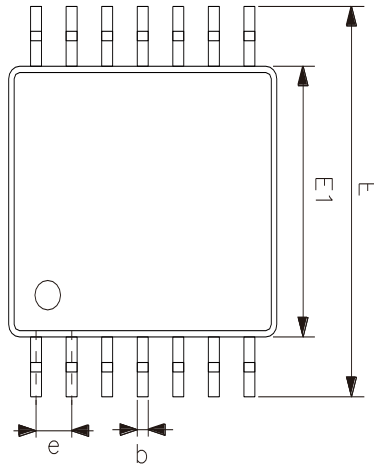
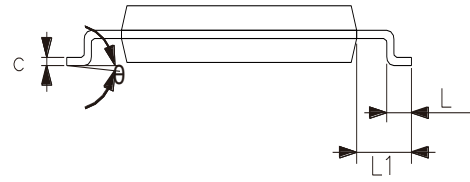
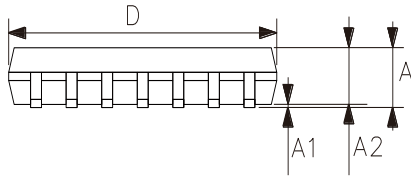
2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	—	1.10
A1	0.05	0.15
A2	0.75	0.95
b	0.22	0.38
c	0.08	0.23
D	2.90	3.10
E	4.70	5.10
E1	2.90	3.10
e	0.65	
L	0.40	0.80
L1	0.95	
θ	0°	8°



5.4、SOP14



2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	1.50	1.75
A1	0.05	0.25
A2	1.30	—
b	0.33	0.50
c	0.19	0.25
D	8.43	8.76
E	5.80	6.25
E1	3.75	4.00
e	1.27	
L	0.40	0.89
θ	0°	8°

**5.5、TSSOP14**

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
L1	1.00	
θ	0°	8°



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.

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