



AiP239/AiP339 Quad Differential Comparators

Product Specification

Specification Revision History:

Version	Date	Description
2021-07-A1	2021-07	New
2021-12-A2	2021-12	Modify ordering information; Modify supply voltage range
2023-10-B1	2023-10	Update the template



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1、General Description

AiP239/AiP339 consists of four independent voltage comparators that are designed to operate from a single power supply over a wide range of voltages. Operation from dual supplies also is possible, as long as the difference between the two supplies is 2V to 36V, and V_{CC} is at least 1.5V more positive than the input common mode voltage. Current drain is independent of the supply voltage. The outputs can be connected to other open-collector outputs to achieve wired-AND relationships.

Features:

- Wide supply voltage:
single supply: 2V to 36V
dual supply: $\pm 1V$ to $\pm 18V$
- Low supply current independent of supply voltage: 0.8mA (typical)
- Low input bias current: 25nA (typical)
- Low input offset voltage: 2mV (typical)
- Common-mode input voltage range includes ground
- Differential input voltage range equal to maximum rated supply voltage: $\pm 36V$
- Low output saturation voltage
- Output compatible with TTL, MOS and CMOS
- Packaging information: SOP14/DIP14/TSSOP14

**Ordering Information:****Tube packing specifications:**

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP239SA14.TB	SOP14	AiP239	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
AiP339SA14.TB	SOP14	AiP339	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
AiP239DA14.TB	DIP14	AiP239	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
AiP339DA14.TB	DIP14	AiP339	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
AiP239TA14.TB	TSSOP14	AiP239	96 PCS/tube	200 tube/box	19200 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
AiP339TA14.TB	TSSOP14	AiP339	96 PCS/tube	200 tube/box	19200 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm



Reel packing specifications:

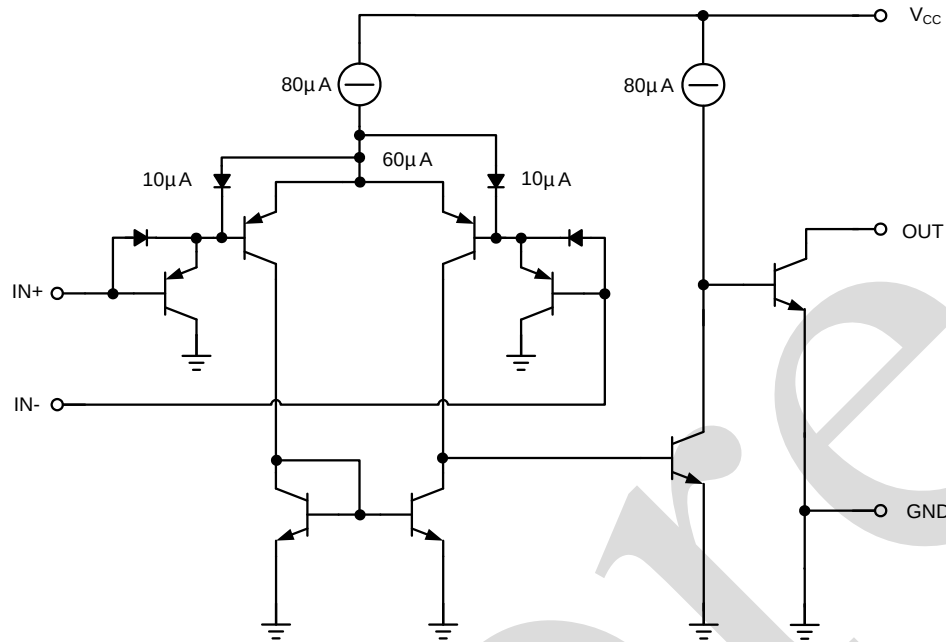
Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP239SA14.TR	SOP14	AiP239	4000PCS/reel	8000PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing:1.27mm
AiP339SA14.TR	SOP14	AiP339	4000PCS/reel	8000PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing:1.27mm
AiP239TA14.TR	TSSOP14	AiP239	5000PCS/reel	10000PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing:0.65mm
AiP339TA14.TR	TSSOP14	AiP339	5000PCS/reel	10000PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing:0.65mm

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

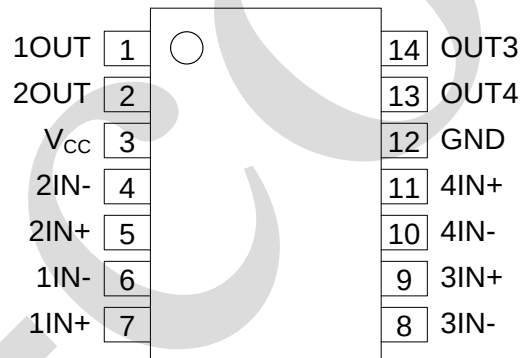


2、Block Diagram And Pin Description

2.1、Block Diagram



2.2、Pin Configurations





2.3、Pin Description

Pin No.	Pin Name	Description
1	1OUT	comparator 1 output
2	2OUT	comparator 2 output
3	V _{CC}	supply voltage
4	2IN ⁻	comparator 2 negative input
5	2IN ⁺	comparator 2 positive input
6	1IN ⁻	comparator 1 negative input
7	1IN ⁺	comparator 1 positive input
8	3IN ⁻	comparator 3 negative input
9	3IN ⁺	comparator 3 positive input
10	4IN ⁻	comparator 4 negative input
11	4IN ⁺	comparator 4 positive input
12	GND	ground
13	OUT4	comparator 4 output
14	OUT3	comparator 3 output

3、Electrical Parameter

3.1、Absolute Maximum Ratings

(T_{amb}=25℃, unless otherwise specified)

Characteristic		Symbol	Conditions		Value	Unit
supply voltage		V _{CC}	-		40	V
differential input voltage		V _{ID}	-		±40	V
input voltage		V _I	-		-0.3 to 40	V
input current		I _{IK}	-		-50	mA
output voltage		V _O	-		40	V
Thermal Resistance	DIP14	θ _{JA}	-		88	°C/W
	SOP14				131	
	TSSOP14				175	
output current		I _O	-		20	mA
junction temperature		T _J	-		150	°C
storage temperature		T _{stg}	-		-65 to 150	°C
soldering temperature		T _L	10s	DIP	245	°C
				SOP/TSSOP	260	

3.2、Recommended Operating Conditions

Characteristic	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V _{CC}	-	2	-	36	V
operating temperature	T _{amb}	AiP239	-40	-	125	℃
		AiP339	-40	-	85	℃

**3.3、Electrical Characteristics****3.3.1、DC Characteristics**(V_{CC}=5V, unless otherwise specified)

Parameter	Symbol	Conditions	T _{amb}	Min.	Typ.	Max.	Unit
input offset voltage	V _{IO}	V _{CC} =5V to 36V, V _{IC} =V _{ICRmin} , V _O =1.4V	25℃	-	2	5	mV
			full range	-	-	9	
input offset current	I _{IO}	V _O =1.4V	25℃	-	5	50	nA
			full range	-	-	150	
input bias current	I _{IB}	V _O =1.4V	25℃	-	-25	-250	nA
			full range	-	-	-400	
common-mode input voltage	V _{ICR}	-	25℃	0 to V _{CC} -1.5	-	-	V
			full range	0 to V _{CC} -2	-	-	
large-signal differential voltage amplification	A _{VD}	V _{CC} =18V, V _O =1.4 to 11.4V, R _L ≥15KΩ to V _{CC}	25℃	50	200	-	V/mV
High level output current	I _{OH}	V _{ID} =1V	25℃	-	0.1	50	nA
				-	0.1	20	
			full range	-	-	1	uA
Low level output voltage	V _{OL}	V _{ID} =-1V, I _{OL} =4mA	25℃	-	150	400	mV
			full range	-	-	700	
Low level output current	I _{OL}	V _{ID} =-1V, V _{OL} =1.5V	25℃	6	16	-	mA
supply current (four comparators)	I _{CC}	V _O =2.5V, no load	25℃	-	0.8	2	mA

3.3.2、AC Characteristics(T_{amb}=25℃, V_{CC}=5V, unless otherwise specified)

Parameter	Symbol		Typ.	Unit
response time	R _L connected to 5.1KΩ through 5V, C _L =15pF ⁽¹⁾⁽²⁾	100mV input step with 5mV overdrive	1.3	us
		TTL level input step	0.3	

Note:

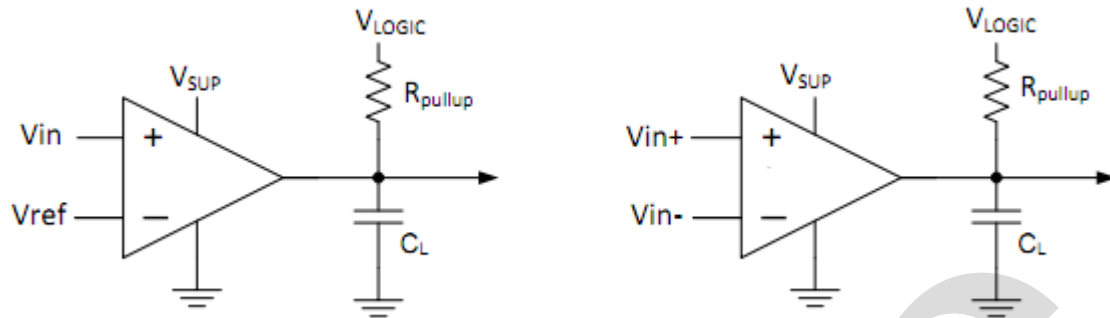
(1) C_L includes probe and jig capacitance.

(2) Response time is the interval between the input step function and the instant when the output crosses 1.4V.



4、Typical Application Circuit And Application Note

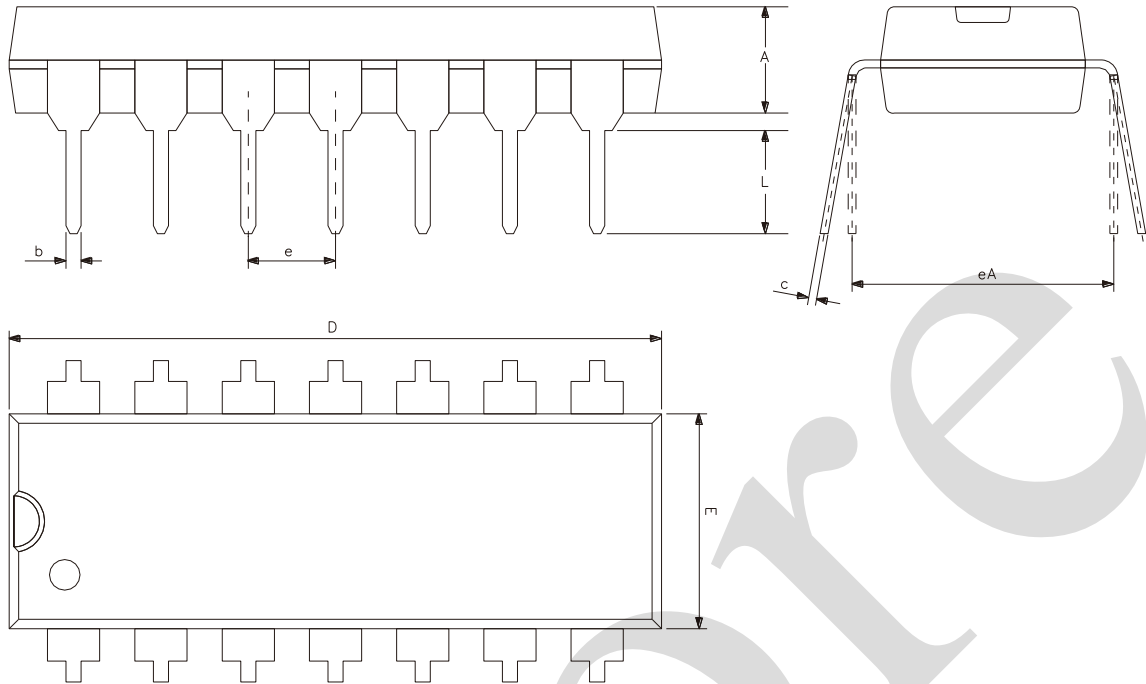
4.1、Single-ended and Differential Comparator Configurations





5、Package Information

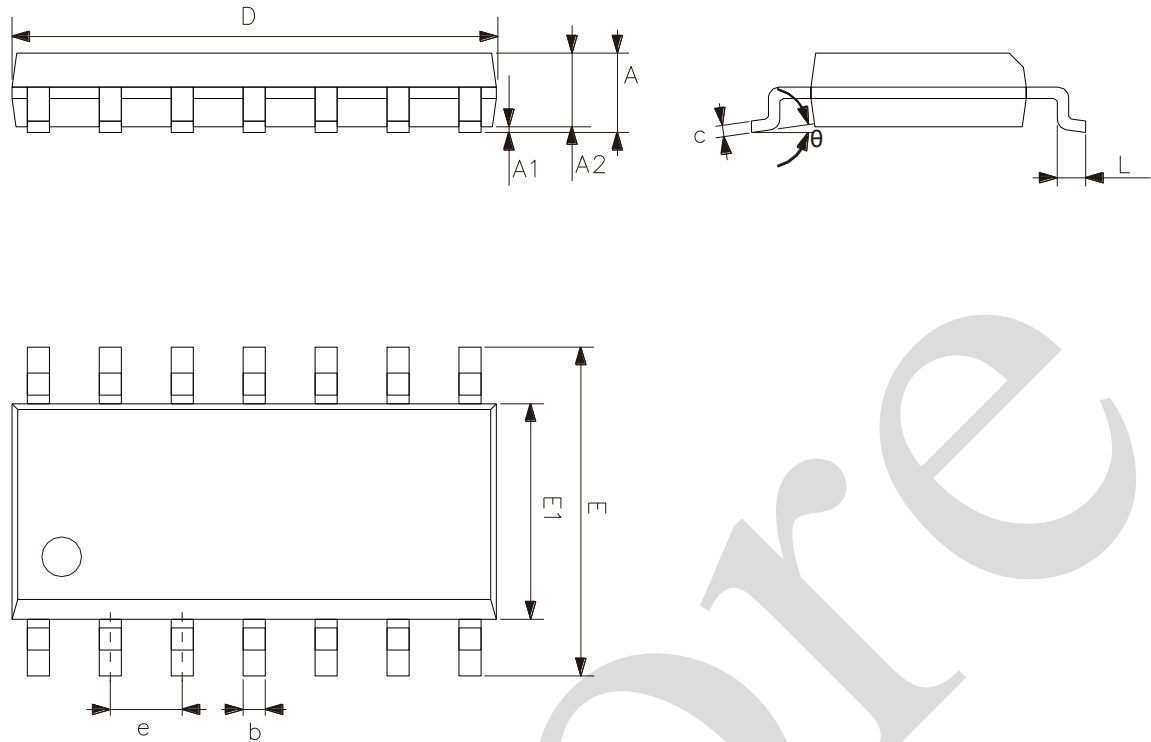
5.1、DIP14



Symbol	Dimensions (mm)	
	Min.	Max.
A	3.05	3.60
b	0.33	0.56
c	0.20	0.36
D	18.80	19.40
E	6.20	6.60
e	2.54	
eA	7.62	10.90
L	2.92	—



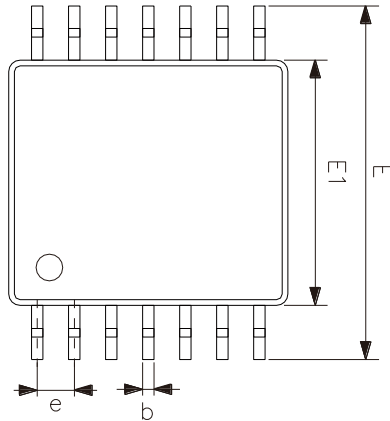
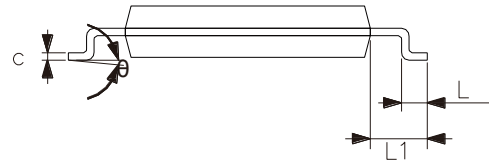
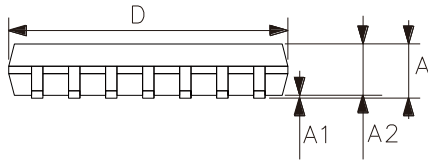
5.2、SOP14



Symbol	Dimensions (mm)	
	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 °



5.3、TSSOP14



Symbol	Dimensions (mm)	
	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

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