



AiP317

1.5A Low-Dropout Adjustable Regulator

Product Specification

Specification Revision History:

Version	Date	Description
2023-03-A1	2023-03	New
2023-06-A2	2023-06	Add SOT223 and TO252 package forms
2024-05-A3	2024-05	Modify the content; add package form
2024-09-A4	2024-09	Modify the content
2025-01-A5	2025-01	Add the package form for SOP8
2025-04-A6	2025-04	Add the thermal resistance of SOT223 and SOP8
2025-04-A7	2025-04	Modify the content
2026-08-A8	2026-08	Update SOT223 package information



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1、General Description

The AiP317 is a monolithic three-terminal adjustable voltage stabilizing integrated circuit. It is intended for use as positive adjustable voltage regulators. It is designed to supply more than 1.5A of load current with an output voltage adjustable over a 1.2 to 37V range. The output voltage is adjusted or selected by dividing the voltage with two external resistor. Besides, the linear regulation and load regulation of this circuit are better than most fixed regulators.

Features:

- Output voltage range: 1.2 to 37V
- Output current in excess of 1.5A
- Built-in short-circuit protection
- Built-in overheat protection
- Built-in overpower protection
- Package information: TO220/SOT223/TO252/TO263/SOP8

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

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP317JE220.TB	TO220	AiP317	50 PCS/tube	20 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 10.0mm×8.7mm Pin spacing: 2.54mm
AiP317JG252.TB	TO252	AiP317	80 PCS/tube	50 tube/box	4000 PCS/box	Dimensions of plastic enclosure: 6.6mm×6.1mm Pin spacing: 2.3mm

Reel packing specifications:

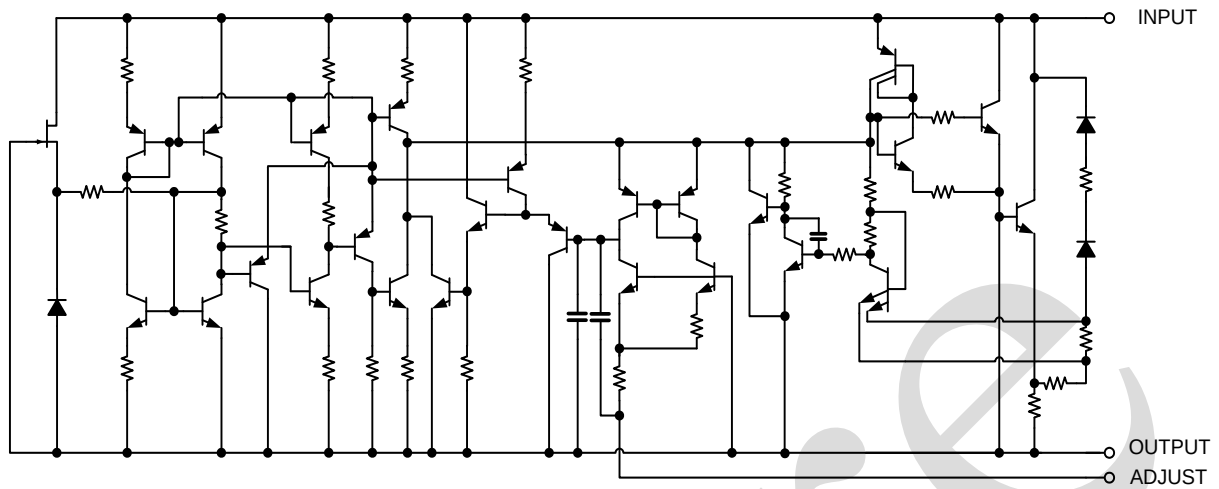
Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP317GH223.TR	SOT223	AiP317	2500 PCS/reel	2500 PCS/box	Dimensions of plastic enclosure: 6.5mm×3.5mm Pin spacing: 2.3mm
AiP317JG252.TR	TO252	AiP317	2500 PCS/reel	2500 PCS/box	Dimensions of plastic enclosure: 6.6mm×6.1mm Pin spacing: 2.3mm
AiP317JI263.TR	TO263	AiP317	800 PCS/reel	800 PCS/box	Dimensions of plastic enclosure: 10.15mm×8.7mm Pin spacing: 2.54mm
AiP317SA8.TR	SOP8	AiP317	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 1.27mm

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

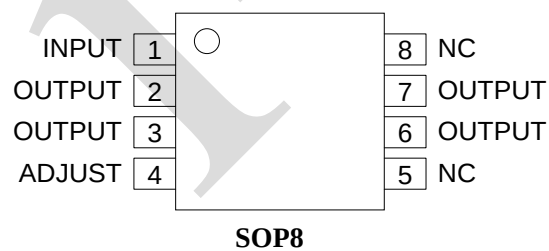
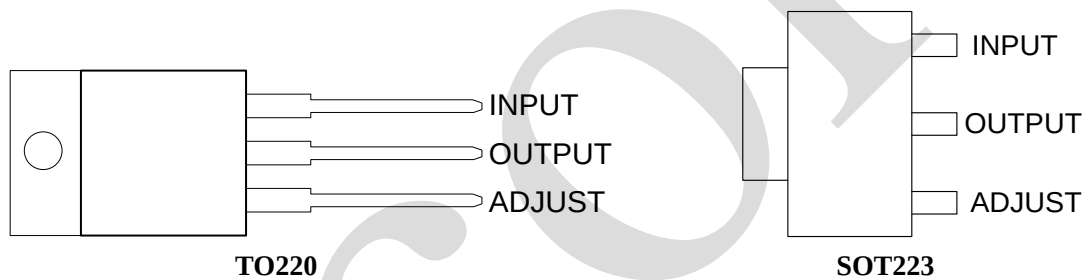


2、Block Diagram And Pin Description

2.1、Block Diagram



2.2、Pin Configurations





2.3、Pin Description

Pin No.		Pin Name	Description
TO220/SOT223/TO252/TO263	SOP8		
1	4	ADJUST	Adjustable terminal
2	2, 3, 6, 7	OUTPUT	Output terminal
3	1	INPUT	Input terminal
-	5, 8	NC	Not connected

3、Electrical Parameter

3.1、Absolute Maximum Ratings

Characteristic		Symbol	Conditions	Value	Unit
input-output differential voltage		V _{IN-OUT}	-	40	V
output current		I _{OUT}	-	internally limited	-
junction temperature		T _J	-	150	°C
storage temperature		T _{stg}	-	-65~150	°C
Thermal resistance		θ _{JA}	TO220	64.8	°C/W
			SOT223	70	°C/W
			TO252	84.54	°C/W
			TO263	71.2	°C/W
			SOP8	160	°C/W
soldering temperature	T _L	10s	TO220/TO263	245	°C
			SOT223/TO252/SOP8	260	°C

Note:

Maximum power dissipation can be calculated through: $P_D = (T_J - T_{amb}) / \theta_{JA}$, $T_{J(max)}$ is 150°C, T_{amb} is the ambient temperature of the circuit.

3.2、Recommended Operating Conditions

Characteristic	Symbol	Conditions	MIN	MAX	Unit
input-output differential voltage	V_{IN-OUT}	-	3	37	V
output current	I_{OUT}	-	0.01	1.5	A
ambient temperature	T_{amb}	-	-40	125	°C



3.2、Electrical Characteristics

($T_{amb}=-40^{\circ}\text{C}$ to 125°C , $V_{IN}-V_{OUT}=5\text{V}$, $I_{OUT}=500\text{mA}$, $I_{MAX}=1.5\text{A}$ and $P_{MAX}=20\text{W}$, unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
line regulation	ΔV_{OUT}	$V_{OUT}=5V$	$T_{amb}=25^{\circ}C$	-	2.5	10	mV
		$V_{IN}-V_{OUT}=3$ to $40V$	Full temp	-	5	17.5	mV
load regulation	ΔV_{OUT}	$V_{OUT}\leq 5V,$	$T_{amb}=25^{\circ}C$	-	5	25	mV
		$I_{OUT}=10mA$ to I_{MAX}	Full temp	-	20	70	mV
		$V_{OUT}\geq 5V,$	$T_{amb}=25^{\circ}C$	-	0.1	0.5	%Vo
		$I_{OUT}=10mA$ to I_{MAX}	Full temp	-	0.3	1.5	%Vo
ADJUST pin current	I_{ADJ}	-		-	50	100	uA
ADJUST pin current	ΔI_{ADJ}	$V_{IN}-V_{OUT}=2.5$ to $40V$ $I_{OUT}=10mA$ to I_{MAX}		-	0.2	5	uA
reference voltage	V_{REF}	$V_{IN}-V_{OUT}=2.5$ to $40V$ $I_{OUT}=10mA$ to I_{MAX} $P_D\leq P_{MAX}$		1.2	1.25	1.3	V
Output voltage temperature stability	$\Delta V_{OUT}/V_{OUT}$	-		-	1	-	%
minimum load current	$I_{OUT(min)}$	$V_{IN}-V_{OUT}=40V$		-	3.5	10	Ma
maximum load current	$I_{OUT(max)}$	$V_{IN}-V_{OUT}\leq 15V, P_D<P_{MAX}$		1.5	2.2	-	A
		$V_{IN}-V_{OUT}=40V, P_D<P_{MAX}, T_{amb}=25^{\circ}C$		-	0.4	-	A
output noise voltage (percentance of V_O)	e_N	$B=10Hz$ to $10KHz$ $T_{amb}=25^{\circ}C$		-	0.003	-	%
supply voltage rejection ^[1]	SVR	$T_{amb}=25^{\circ}C$	$C_{ADJ}=0$	-	65	-	dB
		$f=120Hz$	$C_{ADJ}=10mF$	66	80	-	dB

Note: [1] C_{ADJ} is connected between pin 1 and ground.



4、Typical Application Circuit

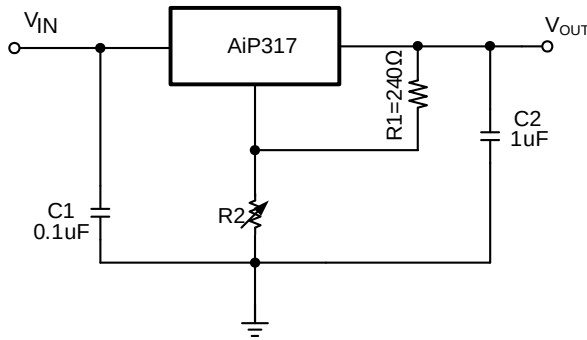


Figure 5. Programmable voltage regulator
With Improved Ripple Rejection

NOTE:

- 1、C1 is required when regulator is located an appreciated distance.
- 2、C2 used to improve transient response.
- 3、 $V_{OUT} = 1.25V * (1 + R2/R1) + I_{ADJ} * R2$.

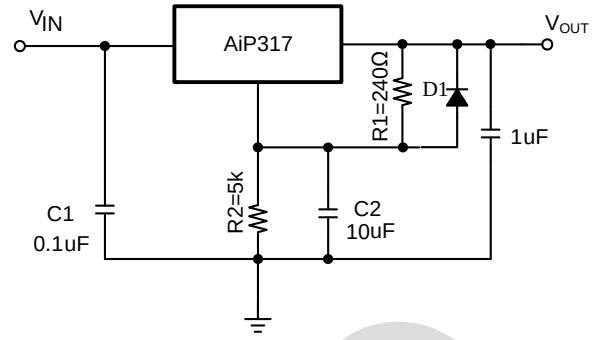


Figure 6. Adjustable Regulator Circuit

NOTE:

- 1、D1 discharges C2 when output shorted to ground.

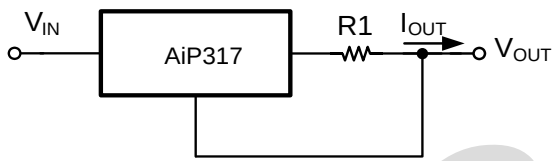


Figure 7. Constant Current Application

NOTE:

- 1、 $I_{O(MAX)} = (V_{ref}/R1) + I_{ADJ} = 1.25V/R1$
- 2、 $I_{O(MIN)} = (V_{ref}/(R1+R2)) + I_{ADJ} = 1.25V/(R1+R2)$
- 3、 $I_{OUT} \geq 5mA$

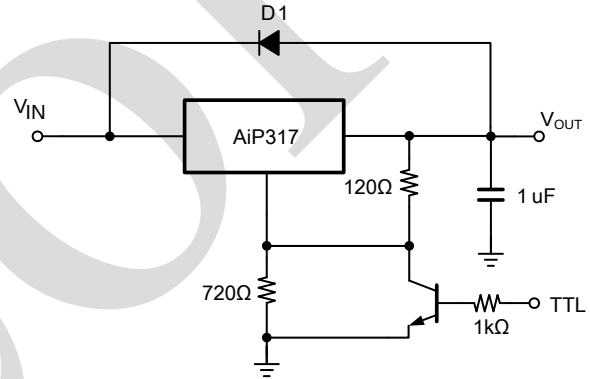
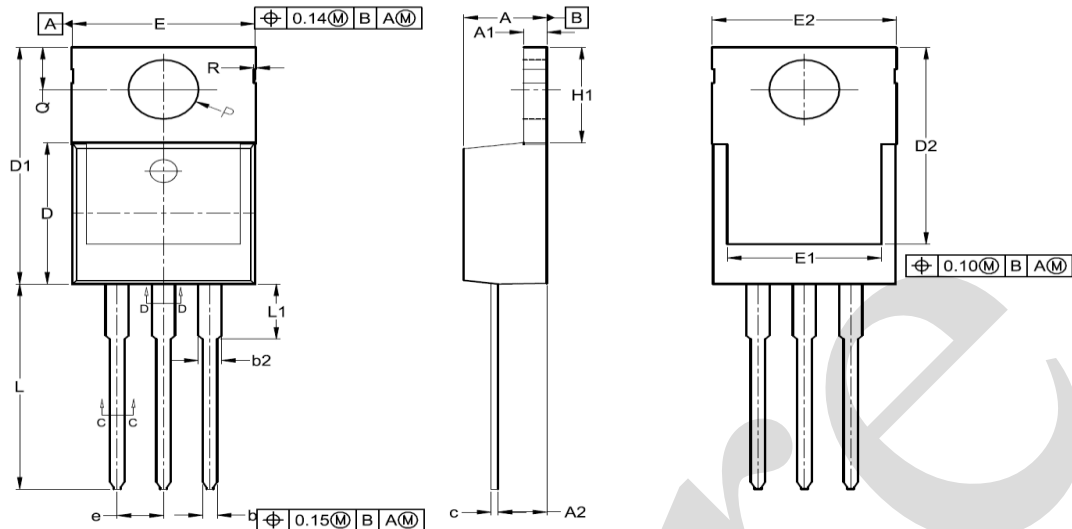


Figure 8. Regulator with On-off control



5、Package Information

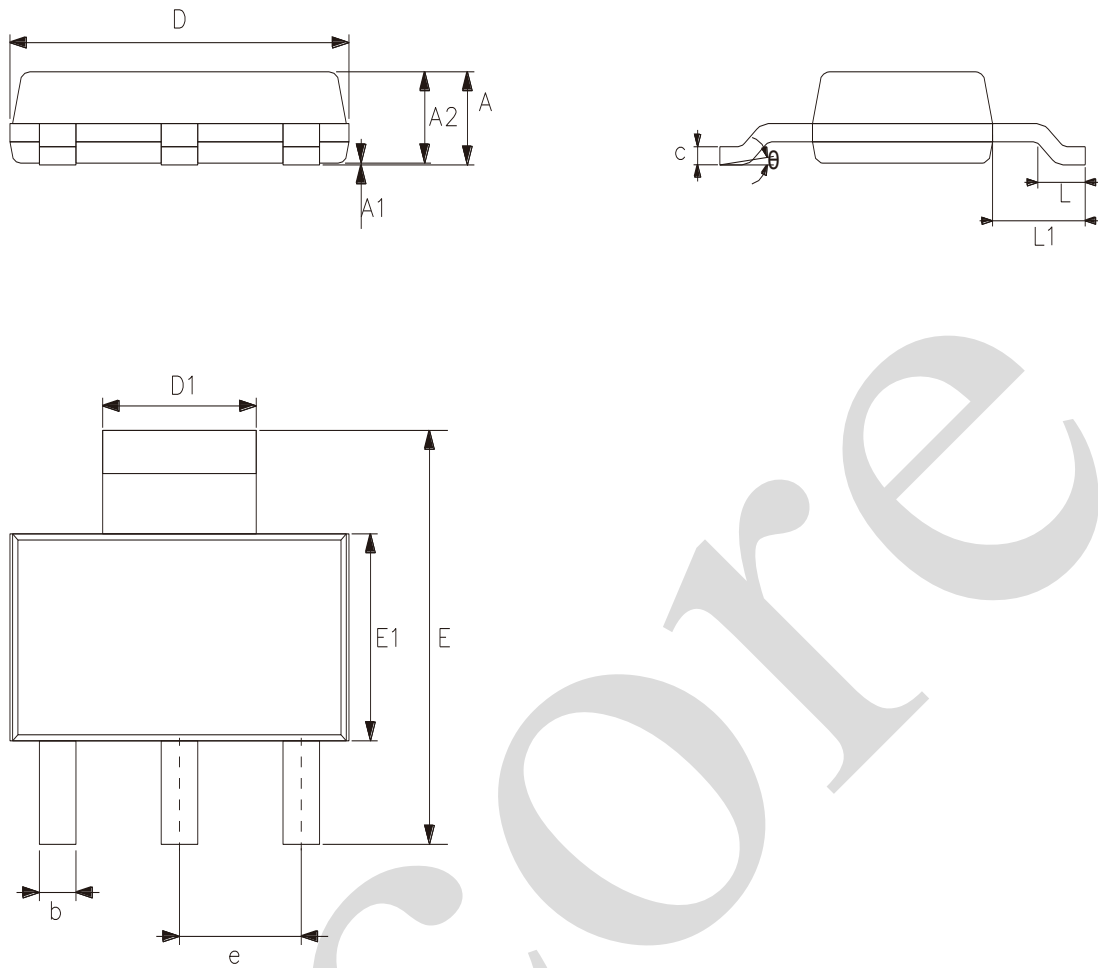
5.1、TO220



2024/02/B	Dimensions In Millimeters	
Symbol	Min	Max
A	4.45	4.67
A1	1.17	1.41
A2	2.28	2.88
b	0.70	0.94
b2	1.17	1.47
c	0.31	0.60
E	9.90	10.40
D	8.50	9.60
D1	14.65	15.60
D2	8.76	13.01
E1	8.24	8.64
E2	9.90	10.40
e	2.54	
Q	2.44	3.04
L	12.95	13.80
L1	3.20	3.96
P	3.73	3.94



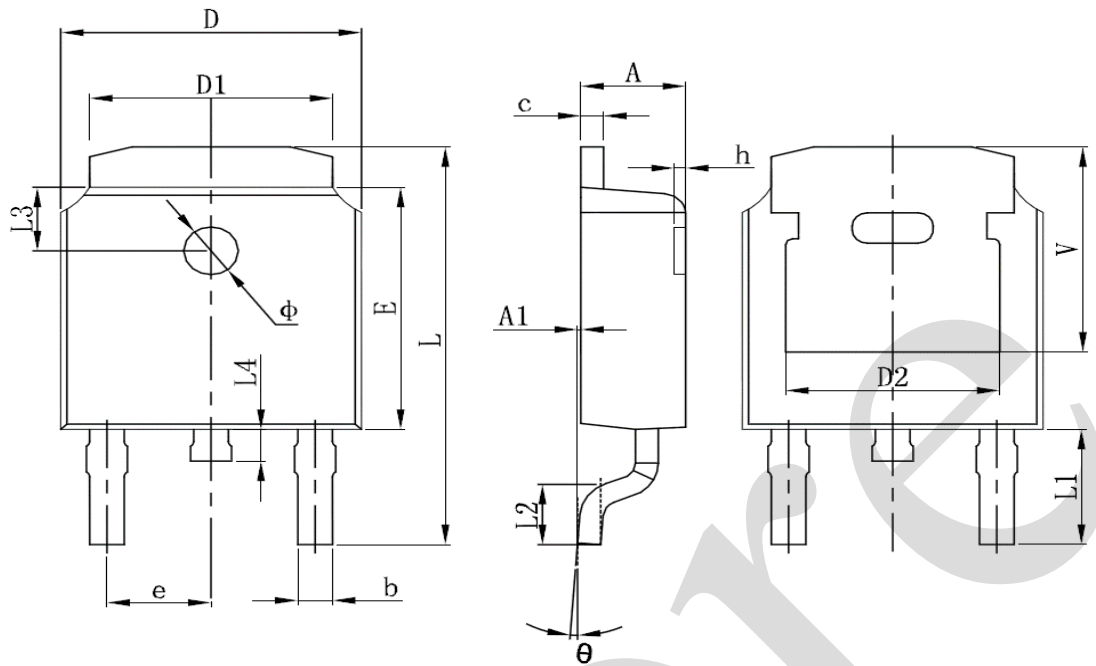
5.2、SOT223



2025/07/B Symbol	Dimensions In Millimeters	
	Min.	Max.
A	1.50	1.80
A1	0.02	0.15
A2	1.45	1.70
D	6.30	6.70
D1	2.90	3.10
E	6.70	7.30
E1	3.30	3.70
b	0.66	0.84
c	0.20	0.35
e	2.30	
L	0.75	1.16
L1	1.70	1.80
θ	0°	8°



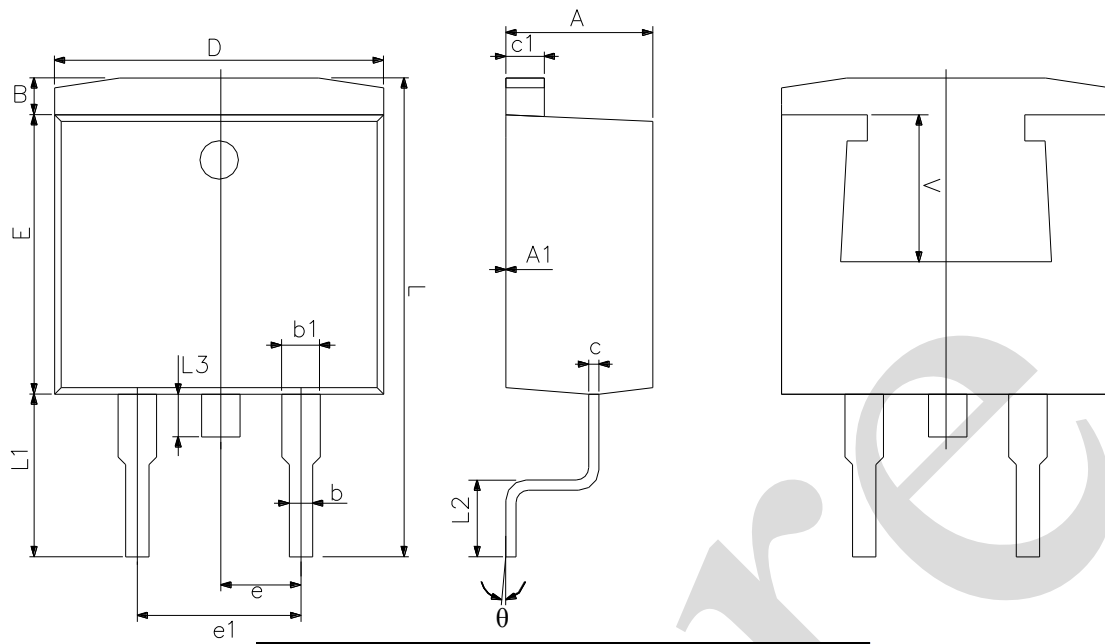
5.3、TO252



2024/06/B	Dimensions In Millimeters	
	Min	Max
Symbol		
A	2.2	2.4
A1	0	0.13
b	0.58	0.9
c	0.45	0.65
D	6.4	6.7
D1	5.1	5.53
D2	4.8	5.3
V	5.2	5.8
E	6	6.23
e	2.186	2.386
L	9.7	10.4
L1	2.5	3.05
L2	0.7	1.73
L3	1.6	1.8
L4	0.6	1
ϕ	0.9	1.3
θ	0°	8°



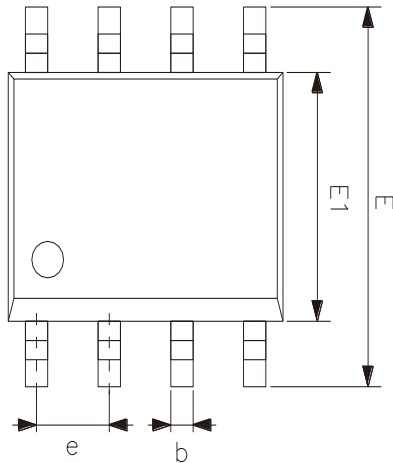
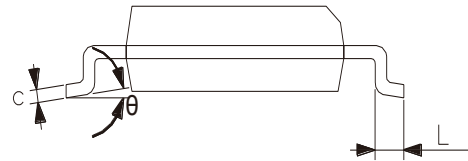
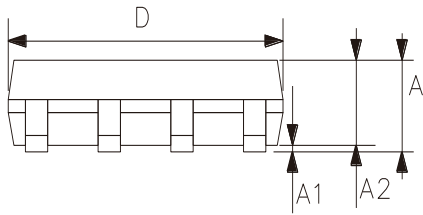
5.4、TO263



2024/04/B	Dimensions In Millimeters	
Symbol	Min	Max
A	4.45	4.67
A1	0.00	0.15
B	1.06	1.46
b	0.71	0.95
b1	1.17	1.41
c	0.31	0.53
c1	1.17	1.41
D	9.90	10.31
E	8.50	9.30
e	2.54	
e1	4.98	5.18
L	14.94	15.70
L1	4.95	5.45
L2	2.34	2.74
L3	1.30	1.70
V	5.60	6.55
θ	0°	8°



5.5、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°



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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