



AiP7905/08/12/15 Negative-Supply Voltage Regulators

Product Specification

Specification Revision History:

Version	Date	Description
2021-01-A1	2021-01	New
2023-03-B1	2023-03	Update the template
2024-01-B2	2024-01	Add TO252 package form
2025-09-B3	2025-09	Modify the output current parameters
2026-01-B4	2026-01	Modify short-circuit current parameter; add ESD and thermal resistance for TO-252



Contents

1、General Description.....	1
2、Block Diagram And Pin Description	3
2.1、Block Diagram	3
2.2、Pin Configurations.....	3
2.3、Pin Description.....	3
3、Electrical Parameter	4
3.1、Absolute Maximum Ratings.....	4
3.2、Recommended Operating Conditions.....	4
3.3、Electrical Characteristics	5
3.3.1、AiP7905 Electrical Characteristics	5
3.3.2、AiP7908 Electrical Characteristics	5
3.3.3、AiP7912 Electrical Characteristics	6
3.3.4、AiP7915 Electrical Characteristics	6
4、Testing Circuit	7
5、Typical Application	7
6、Package Information	8
6.1、TO-220	8
6.2、TO-263	9
6.3、TO-252	10
7、Statements And Notes	11
7.1、The name and content of Hazardous substances or Elements in the product	11
7.2、Notes	11



1、General Description

AiP7905/08/12/15 are three-terminal negative-supply voltage regulators. All circuits in this series can drive output current of up to 1A, with built-in over-current protection and thermal shutdown functions to readily protect the circuit during overload operation. By adding external components, these voltage regulators can also achieve adjustable output voltage and current, making them widely used as voltage regulators in various electronic instruments and equipment.

Features:

- Output current: 1A
- Few external components
- Built-in over-temperature protection and over-current protection
- Built-in output transistor safety area compensation
- Packaging information: TO-220/TO-263/TO-252

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP7905JE220.TB	TO-220	AiP7905	50 PCS/tube	20 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 10.0mm×8.7mm Pin spacing: 2.54mm
AiP7908JE220.TB	TO-220	AiP7908	50 PCS/tube	20 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 10.0mm×8.7mm Pin spacing: 2.54mm
AiP7912JE220.TB	TO-220	AiP7912	50 PCS/tube	20 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 10.0mm×8.7mm Pin spacing: 2.54mm
AiP7915JE220.TB	TO-220	AiP7915	50 PCS/tube	20 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 10.0mm×8.7mm Pin spacing: 2.54mm
AiP7905JG252.TB	TO-252	AiP7905	80 PCS/tube	50 tube/box	4000 PCS/box	Dimensions of plastic enclosure: 6.6mm×6.1mm Pin spacing: 2.3mm
AiP7908JG252.TB	TO-252	AiP7908	80 PCS/tube	50 tube/box	4000 PCS/box	Dimensions of plastic enclosure: 6.6mm×6.1mm Pin spacing: 2.3mm



AiP7912JG252.TB	TO-252	AiP7912	80 PCS/tube	50 tube/box	4000 PCS/box	Dimensions of plastic enclosure: 6.6mm×6.1mm Pin spacing: 2.3mm
AiP7915JG252.TB	TO-252	AiP7915	80 PCS/tube	50 tube/box	4000 PCS/box	Dimensions of plastic enclosure: 6.6mm×6.1mm Pin spacing: 2.3mm

Reel packing specifications:

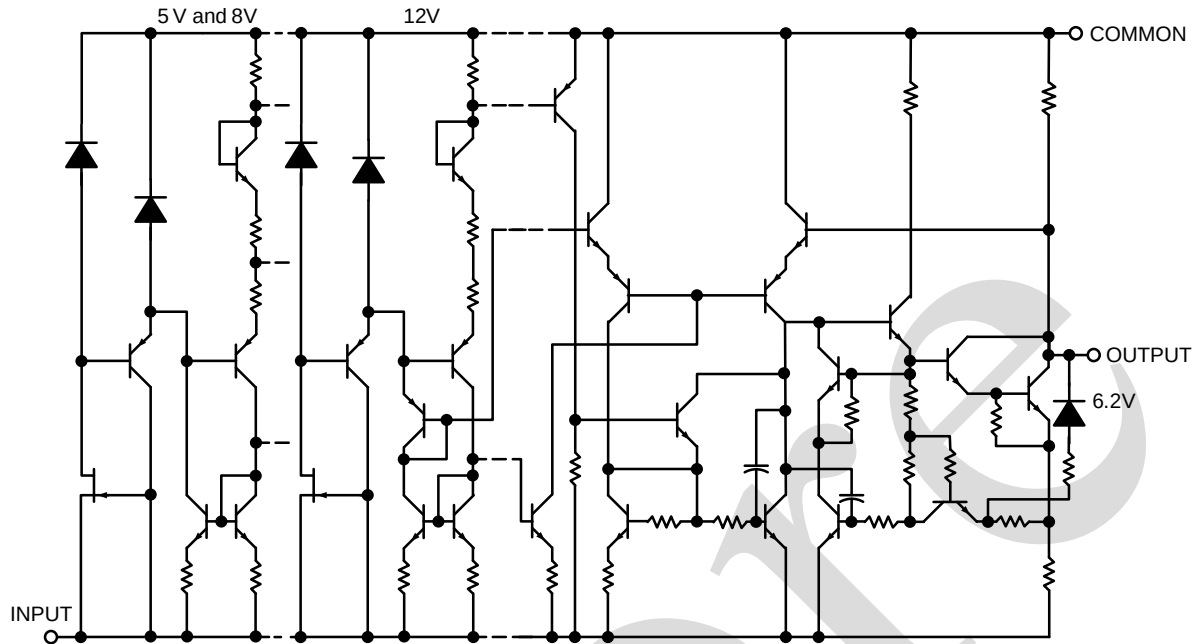
Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP7905JI263.TR	TO-263	AiP7905	800PCS/reel	800PCS/box	Dimensions of plastic enclosure: 10.15mm×8.70mm Pin spacing: 2.54mm
AiP7908JI263.TR	TO-263	AiP7908	800PCS/reel	800PCS/box	Dimensions of plastic enclosure: 10.15mm×8.70mm Pin spacing: 2.54mm
AiP7912JI263.TR	TO-263	AiP7912	800PCS/reel	800PCS/box	Dimensions of plastic enclosure: 10.15mm×8.70mm Pin spacing: 2.54mm
AiP7915JI263.TR	TO-263	AiP7915	800PCS/reel	800PCS/box	Dimensions of plastic enclosure: 10.15mm×8.70mm Pin spacing: 2.54mm
AiP7905JG252.TR	TO-252	AiP7905	2500PCS/reel	2500PCS/box	Dimensions of plastic enclosure: 6.6mm×6.1mm Pin spacing: 2.3mm
AiP7908JG252.TR	TO-252	AiP7908	2500PCS/reel	2500PCS/box	Dimensions of plastic enclosure: 6.6mm×6.1mm Pin spacing: 2.3mm
AiP7912JG252.TR	TO-252	AiP7912	2500PCS/reel	2500PCS/box	Dimensions of plastic enclosure: 6.6mm×6.1mm Pin spacing: 2.3mm
AiP7915JG252.TR	TO-252	AiP7915	2500PCS/reel	2500PCS/box	Dimensions of plastic enclosure: 6.6mm×6.1mm Pin spacing: 2.3mm

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

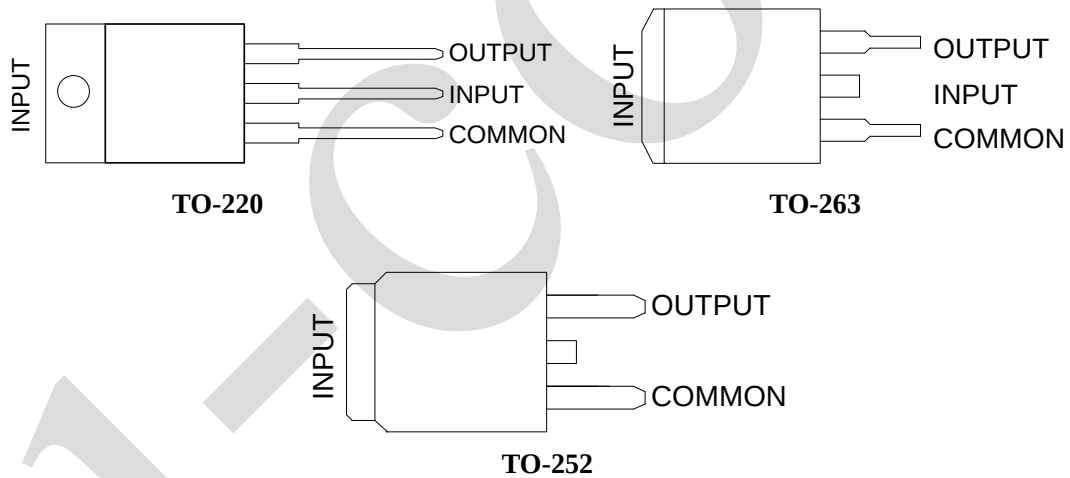


2、Block Diagram And Pin Description

2.1、Block Diagram



2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	COMMON	Common
2	INPUT	Input
3	OUTPUT	Output



3、Electrical Parameter

3.1、Absolute Maximum Ratings

(Voltages are referenced to GND (ground=0V), unless otherwise specified)

Parameter	Symbol	Conditions		Ratings	Unit
Input voltage	V_I	-		-35	V
Output current	I_O	-		1.5	A
Thermal resistance (junction-to-case)	θ_{JC}	TO-220		17	°C/W
		TO-263		18	
		TO-252		19	
Thermal resistance (junction-to-ambient)	θ_{JA}	TO-220		19	
		TO-263		25.3	
		TO-252		38	
Junction temperature	T_J	-		150	°C
Storage temperature	T_{stg}	-		-65 to 150	°C
Soldering temperature	T_L	10s	TO220/TO263	245	°C
			TO252	260	
electrostatic discharge	ESD	HBM		4000	V

Note:

The maximum power dissipation is a function of $T_{J(max)}$, θ_{JA} and T_{amb} , and the maximum allowable power consumption is $P_D = (T_{J(max)} - T_{amb}) / \theta_{JA}$ at any allowable ambient temperature. Operating at the maximum junction temperature $T_J(150^\circ\text{C})$ will affect the reliability.

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Max.	Unit
Input voltage	V_I	AiP7905	-7	-25	V
		AiP7908	-10.5	-25	V
		AiP7912	-14.5	-30	V
		AiP7915	-17.5	-33	V
Output current	I_O	-	-	1	A
Junction temperature	T_J	-	-40	125	°C
Ambient temperature	T_{amb}	-	-40	85	°C



3.3、Electrical Characteristics

3.3.1、AiP7905 Electrical Characteristics

($T_J = -40^{\circ}\text{C}$ to 125°C , $V_I = -10\text{V}$, $I_O = 500\text{mA}$, $C_I = 2.2\mu\text{F}$, $C_O = 1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output voltage	V_O	$T_J = 25^{\circ}\text{C}$	-4.8	-5	-5.2	V
		$I_O = -5\text{mA}$ to -1A , $P_O \leq 15\text{W}$, $V_I = -8\text{V}$ to -20V	-4.75	-5	-5.25	V
Linear regulation	ΔV_O	$V_I = -7\text{V}$ to -25V , $T_J = 25^{\circ}\text{C}$	-	-	100	mV
		$V_I = -8\text{V}$ to -12V , $T_J = 25^{\circ}\text{C}$	-	-	50	
Load regulation	ΔV_O	$I_O = 5\text{mA}$ to 1.5A , $T_J = 25^{\circ}\text{C}$	-	-	100	mV
		$I_O = 250\text{mA}$ to 750mA , $T_J = 25^{\circ}\text{C}$	-	-	50	
Quiescent current	I_d	$T_J = 25^{\circ}\text{C}$	-	-	3	mA
Quiescent current variation	ΔI_d	$I_O = 5\text{mA}$ to 1A	-	-	0.5	mA
		$V_I = -8\text{V}$ to -25V	-	-	1.3	
Output voltage drift	$\Delta V_O / \Delta V_T$	$I_O = 5\text{mA}$	-	-0.4	-	mV/ $^{\circ}\text{C}$
Output noise voltage	eN	$B = 10\text{Hz}$ to 100kHz , $T_J = 25^{\circ}\text{C}$	-	100	-	μV
Power supply rejection ratio	SVR	$\Delta V_I = 10\text{V}$, $f = 120\text{Hz}$	54	60	-	dB
Voltage drop	V_d	$I_O = 1\text{A}$, $T_J = 25^{\circ}\text{C}$ $\Delta V_O = 100\text{mV}$	-	1.4	-	V
Short-circuit current	I_{SC}	-	-	1.7	-	A

3.3.2、AiP7908 Electrical Characteristics

($T_J = -40^{\circ}\text{C}$ to 125°C , $V_I = -14\text{V}$, $I_O = 500\text{mA}$, $C_I = 2.2\mu\text{F}$, $C_O = 1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output voltage	V_O	$T_J = 25^{\circ}\text{C}$	-7.7	-8	-8.3	V
		$I_O = -5\text{mA}$ to -1A , $P_O \leq 15\text{W}$, $V_I = -11.5\text{V}$ to -23V	-7.6	-8	-8.4	V
Linear regulation	ΔV_O	$V_I = -10.5\text{V}$ to -25V , $T_J = 25^{\circ}\text{C}$	-	-	160	mV
		$V_I = -11\text{V}$ to -17V , $T_J = 25^{\circ}\text{C}$	-	-	80	
Load regulation	ΔV_O	$I_O = 5\text{mA}$ to 1.5A , $T_J = 25^{\circ}\text{C}$	-	-	160	mV
		$I_O = 250\text{mA}$ to 750mA , $T_J = 25^{\circ}\text{C}$	-	-	80	
Quiescent current	I_d	$T_J = 25^{\circ}\text{C}$	-	-	3	mA
Quiescent current variation	ΔI_d	$I_O = 5\text{mA}$ to 1A	-	-	0.5	mA
		$V_I = -11.5\text{V}$ to -25V	-	-	1	
Output voltage drift	$\Delta V_O / \Delta V_T$	$I_O = 5\text{mA}$	-	-0.6	-	mV/ $^{\circ}\text{C}$
Output noise voltage	eN	$B = 10\text{Hz}$ to 100kHz , $T_J = 25^{\circ}\text{C}$	-	175	-	μV
Power supply rejection ratio	SVR	$\Delta V_I = 10\text{V}$, $f = 120\text{Hz}$	54	60	-	dB



Voltage drop	V_d	$I_O=1A, T_J=25^{\circ}C$ $\Delta V_O=100mV$	-	1.1	-	V
Short-circuit current	I_{SC}	-	-	1.1	-	A

3.3.3、AiP7912 Electrical Characteristics

($T_J=-40^{\circ}C$ to $125^{\circ}C$, $V_I=-19V$, $I_O=500mA$, $C_I=2.2\mu F$, $C_O=1\mu F$, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output voltage	V_O	$T_J=25^{\circ}C$	-11.5	-12	-12.5	V
		$I_O=-5mA$ to $-1A$, $P_O \leq 15W$, $V_I=-15.5V$ to $-27V$	-11.4	-12	-12.6	V
Linear regulation	ΔV_O	$V_I=-14.5V$ to $-30V$, $T_J=25^{\circ}C$	-	-	240	mV
		$V_I=-16V$ to $-22V$, $T_J=25^{\circ}C$	-	-	120	
Load regulation	ΔV_O	$I_O=5mA$ to $1.5A$, $T_J=25^{\circ}C$	-	-	240	mV
		$I_O=250mA$ to $750mA$, $T_J=25^{\circ}C$	-	-	120	
Quiescent current	I_d	$T_J=25^{\circ}C$	-	-	3	mA
Quiescent current variation	ΔI_d	$I_O=5mA$ to $1A$	-	-	0.5	mA
		$V_I=-15V$ to $-30V$	-	-	1	
Output voltage drift	$\Delta V_O/\Delta V_T$	$I_O=5mA$	-	-0.8	-	mV/ $^{\circ}C$
Output noise voltage	eN	$B=10Hz$ to $100kHz$, $T_J=25^{\circ}C$	-	200	-	μV
Power supply rejection ratio	SVR	$\Delta V_I=10V$, $f=120Hz$	54	60	-	dB
Voltage drop	V_d	$I_O=1A$, $T_J=25^{\circ}C$, $\Delta V_O=100mV$	-	1.1	-	V
Short-circuit current	I_{SC}	-	-	0.5	-	A

3.3.4、AiP7915 Electrical Characteristics

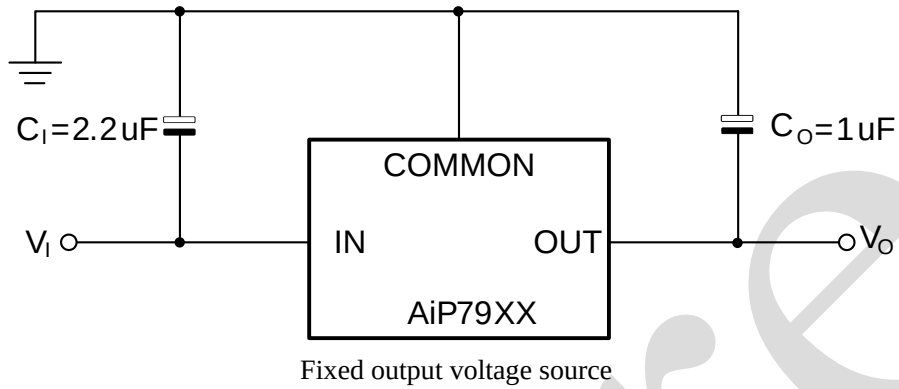
($T_J=-40^{\circ}C$ to $125^{\circ}C$, $V_I=-23V$, $I_O=500mA$, $C_I=2.2\mu F$, $C_O=1\mu F$, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output voltage	V_O	$T_J=25^{\circ}C$	-14.4	-15	-15.6	V
		$I_O=-5mA$ to $-1A$, $P_O \leq 15W$, $V_I=-18.5V$ to $-30V$	-14.3	-15	-15.7	V
Linear regulation	ΔV_O	$V_I=-17.5V$ to $-30V$, $T_J=25^{\circ}C$	-	-	300	mV
		$V_I=-20V$ to $-26V$, $T_J=25^{\circ}C$	-	-	150	
Load regulation	ΔV_O	$I_O=5mA$ to $1.5A$, $T_J=25^{\circ}C$	-	-	300	mV
		$I_O=250mA$ to $750mA$, $T_J=25^{\circ}C$	-	-	150	
Quiescent current	I_d	$T_J=25^{\circ}C$	-	-	3	mA
Quiescent current variation	ΔI_d	$I_O=5mA$ to $1A$	-	-	0.5	mA
		$V_I=-18.5V$ to $-30V$	-	-	1	
Output voltage drift	$\Delta V_O/\Delta V_T$	$I_O=5mA$	-	-0.9	-	mV/ $^{\circ}C$
Output noise voltage	eN	$B=10Hz$ to $100kHz$, $T_J=25^{\circ}C$	-	250	-	μV
Power supply rejection ratio	SVR	$\Delta V_I=10V$, $f=120Hz$	54	60	-	dB

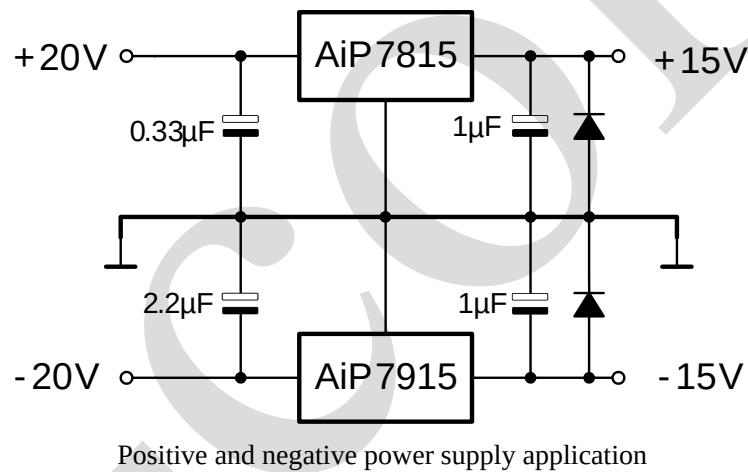


Voltage drop	V_d	$I_O=1A, T_J=25^{\circ}C$ $\Delta V_O=100\text{ mV}$	-	1.1	-	V
Short-circuit current	I_{SC}	-	-	0.2	-	A

4、Testing Circuit



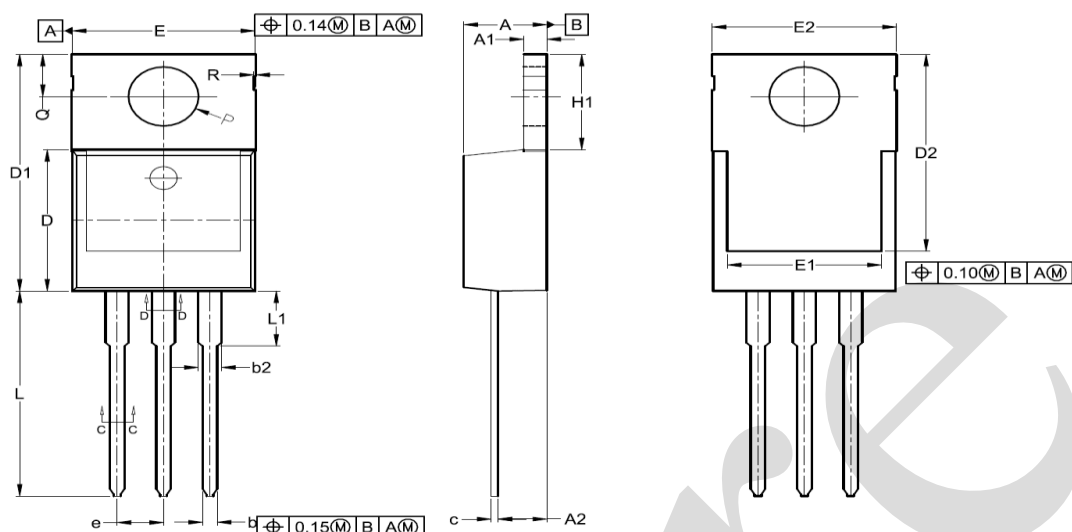
5、Typical Application





6、Package Information

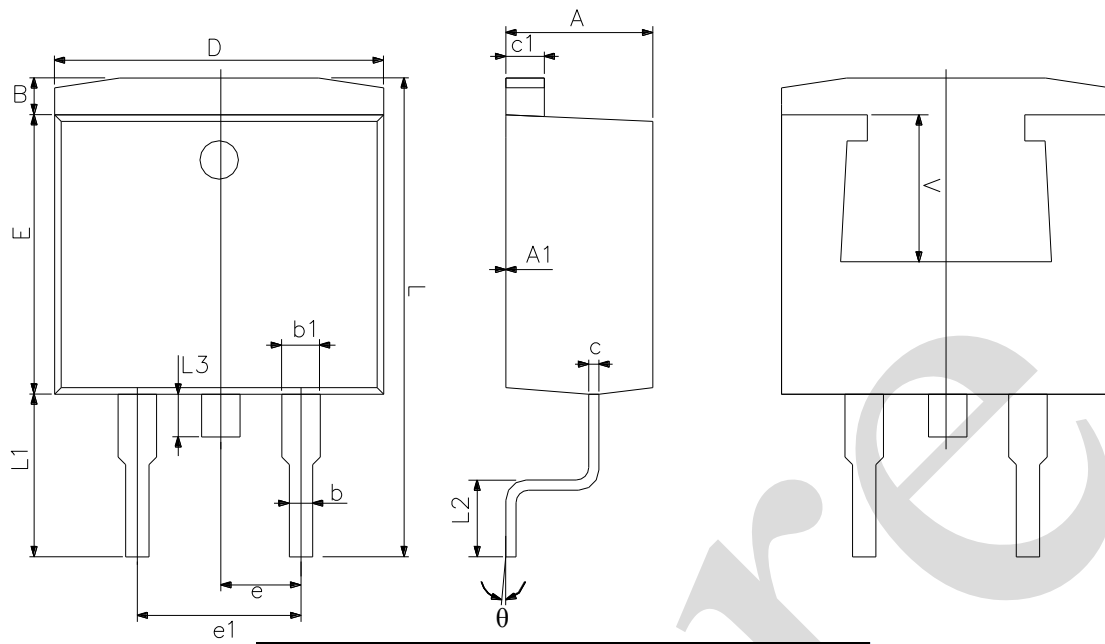
6.1、TO-220



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



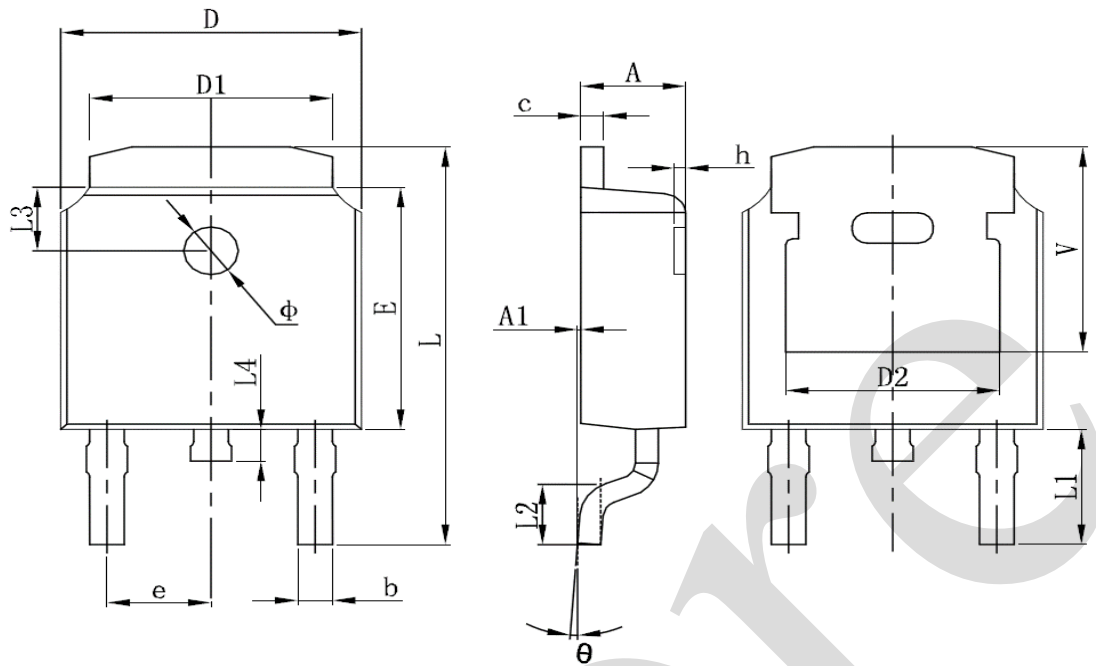
6.2、TO-263



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°



6.3、TO-252



2024/06/B	Dimensions In Millimeters	
Symbol	Min	Max
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°



7、Statements And Notes

7.1、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.									

7.2、Notes

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

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