

5A Dropout Linear Regulator

General Description

The CP1084 is a series of low dropout positive voltage regulators with a maximum dropout of 1.5V at 5A of load current.

The series features on-chip thermal limiting which provides protection against any combination of overload and ambient temperatures that would create excessive junction temperatures. It also includes a trimmed band-gap reference and a current limiting circuit.

The CP1084 is available in 1.5V, 1.8V, 2.5V, 3.3V, and 5.0V versions. The fixed versions integrate the adjust resistors. It is also available in an adjustable version which can set the output voltage with two external resistors.

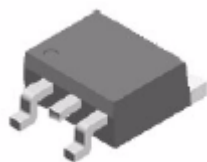
The CP1084 series is available in standard packages of TO-263-2L, TO-252.

Features

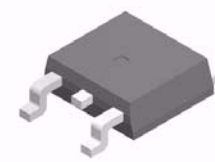
- Low Dropout Voltage: 1.3V Typically at 5A
- Current Limiting and Thermal Protection
- Output Current: 5A
- Current Limit: 6.5A
- Operating Junction Temperature Range: 0 to 125°C
- Line Regulation: 0.015% (Typical)
- Load Regulation: 0.2% (Typical)

Applications

- High Efficiency Linear Regulators
- Battery Chargers
- Post Regulation for Switching Supply
- Microprocessor Supply
- Desktop PCs, RISC and Embedded Processors' Supply



TO-263-2L



TO-252

Figure 1. Package Types of CP1084

* All specs and applications shown above subject to change without prior notice.

Pin Configuration

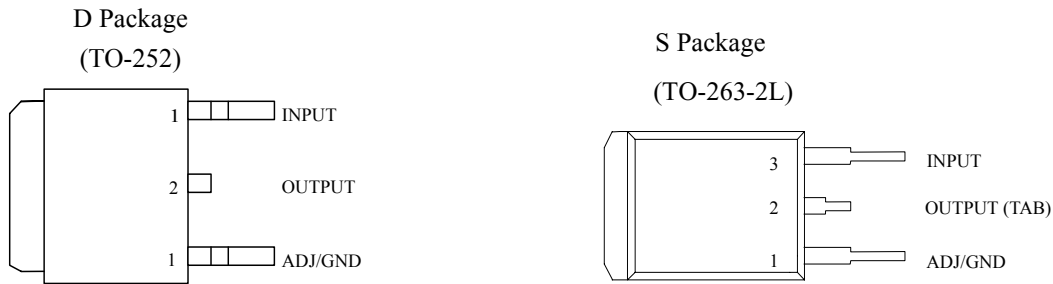


Figure 2. Pin Configuration of CP1084 (Top View)

Functional Block Diagram

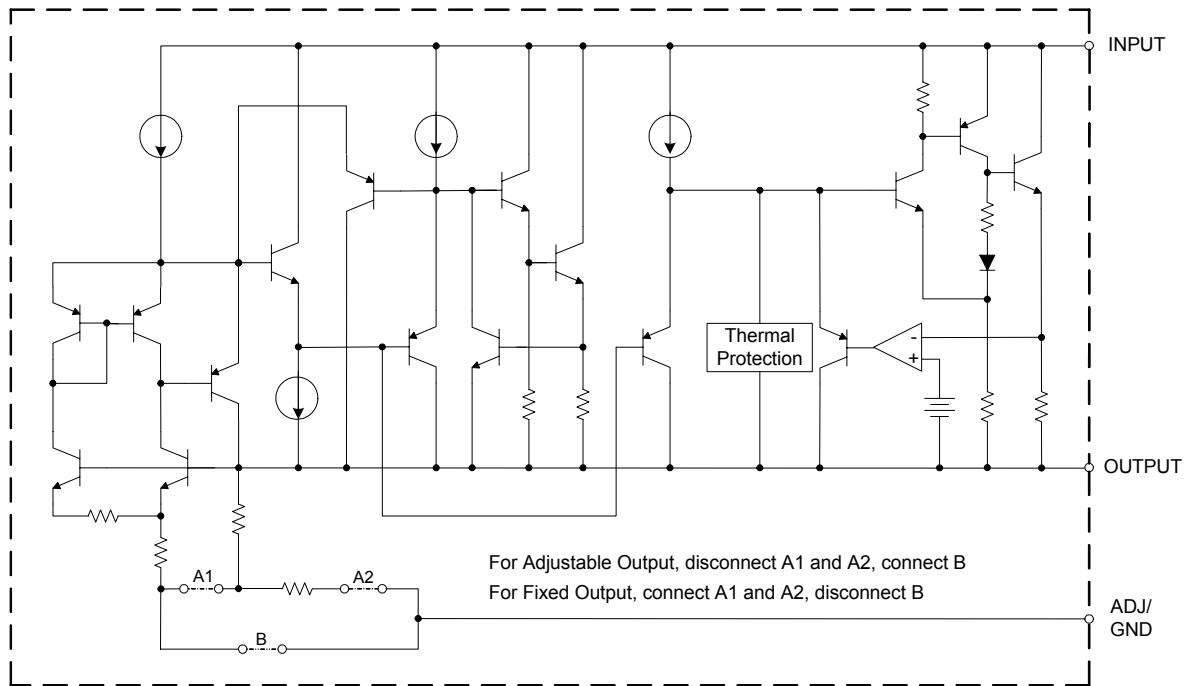


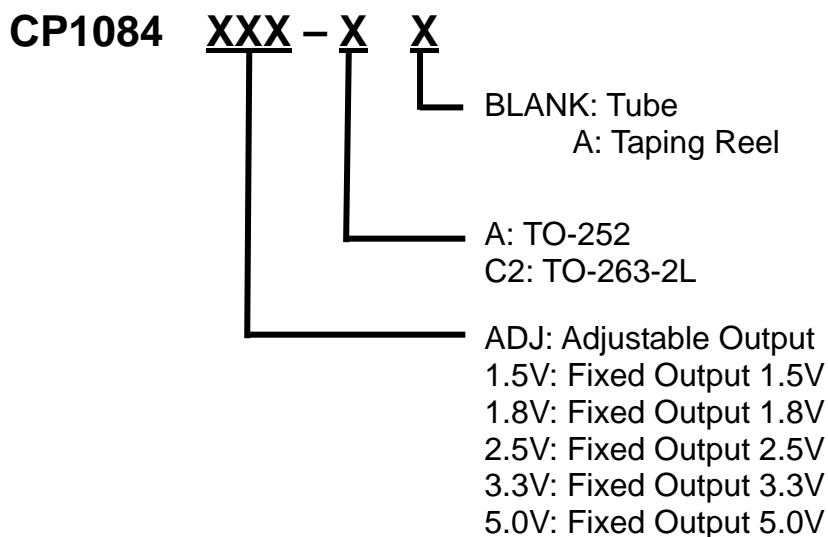
Figure 3. Functional Block Diagram of CP1084

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5A Dropout Linear Regulator

Order Information

Package	Temperature Range	Part Number	Marking
TO-252	0 ~125	CP1084 ADJ-A	CP1084 ADJ
		CP1084 1.5-A	CP1084 1.5
		CP1084 1.8-A	CP1084 1.8
		CP1084 2.5-A	CP1084 2.5
		CP1084 3.3-A	CP1084 3.3
		CP1084 5.0-A	CP1084 5.0
TO-263-2L		CP1084 ADJ-C2	CP1084 ADJ
		CP1084 1.5-C2	CP1084 1.5
		CP1084 1.8-C2	CP1084 1.8
		CP1084 2.5-C2	CP1084 2.5
		CP1084 3.3-C2	CP1084 3.3
		CP1084 5.0-C2	CP1084 5.0



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5A Dropout Linear Regulator

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Min	Max	Unit
Operating Junction Temperature Range	T_J		150	°C
Storage Temperature Range	T_S	-65	150	°C
Lead Temperature (Soldering, 10 sec.)	T_{LEAD}		300	°C
ESD (Human Body Model)	ESD		2000	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Input Voltage	V_{IN}		12	V
Operating Junction Temperature Range	T_J	0	125	°C

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5A Dropout Linear Regulator

Electrical Characteristics

Typical and appearing in normal type apply for $T_J=25^\circ\text{C}$. Limits appearing in Boldface type apply over the entire operating junction temperature range.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Reference Voltage	V_{REF}	CP1084-ADJ, $I_{OUT}=10\text{mA}$, $V_{IN}-V_{OUT}=3\text{V}$, 10mA I_{OUT} 5A, 1.5V $V_{IN}-V_{OUT}$ 5V	1.225	1.250	1.270	V
Output Voltage	V_{OUT}	CP1084-1.5, $I_{OUT}=0\text{mA}$, $V_{IN}=4.5\text{V}$, 10mA I_{OUT} 5A, 3.4V V_{IN} 6V	1.47	1.5	1.53	V
		CP1084-1.8, $I_{OUT}=0\text{mA}$, $V_{IN}=4.8\text{V}$, 10mA I_{OUT} 5A, 3.4V V_{IN} 6V	1.764	1.8	1.836	V
		CP1084-2.5, $I_{OUT}=0\text{mA}$, $V_{IN}=5.5\text{V}$, 10mA I_{OUT} 5A, 4.1V V_{IN} 7V	2.45	2.5	2.55	V
		CP1084-3.3, $I_{OUT}=0\text{mA}$, $V_{IN}=6.3\text{V}$, 10mA I_{OUT} 5A, 4.9V V_{IN} 8V	3.234	3.3	3.366	V
		CP1084-5.0, $I_{OUT}=0\text{mA}$, $V_{IN}=8\text{V}$, 10mA I_{OUT} 5A, 6.6V V_{IN} 10V	4.9	5	5.1	V
Line Regulation	V_{OUT}	CP1084-ADJ, $I_{OUT}=10\text{mA}$, 2.85V V_{IN} 10V		0.035	0.2	%
		CP1084-1.5, $I_{OUT}=10\text{mA}$, 3.1V V_{IN} 10V		1	6	mV
		CP1084-1.8, $I_{OUT}=10\text{mA}$, 3.4V V_{IN} 10V		1	6	mV
		CP1084-2.5, $I_{OUT}=10\text{mA}$, 4.1V V_{IN} 10V		1	6	mV
		CP1084-3.3, $I_{OUT}=10\text{mA}$, 4.9V V_{IN} 10V		1	6	mV
		CP1084-5.0, $I_{OUT}=10\text{mA}$, 6.6V V_{IN} 10V		1	10	mV

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5A Dropout Linear Regulator

Electrical Characteristics (Continued)

Typical and appearing in normal type apply for $T_J=25^\circ\text{C}$. Limits appearing in Boldface type apply over the entire operating junction temperature range.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Line Regulation	V_{OUT}	CP1084-ADJ, 0mA $I_{OUT} \leq 5A$ $V_{IN} - V_{OUT} = 3V$		0.2	0.4	%
		CP1084-1.5, 0mA $I_{OUT} \leq 5A$ $V_{IN} - V_{OUT} = 3V$		7	20	mV
		CP1084-1.8, 0mA $I_{OUT} \leq 5A$ $V_{IN} - V_{OUT} = 3V$		7	20	mV
		CP1084-2.5, 0mA $I_{OUT} \leq 5A$ $V_{IN} - V_{OUT} = 3V$		7	20	mV
		CP1084-3.3, 0mA $I_{OUT} \leq 5A$ $V_{IN} - V_{OUT} = 3V$		7	20	mV
		CP1084-5.0, 0mA $I_{OUT} \leq 5A$ $V_{IN} - V_{OUT} = 3V$		10	35	mV
Dropout Voltage		$I_O=5A, V_{REF}, V_{OUT}=1\%$		1.3	1.5	V
Current Limit	I_{LIMIT}	$V_{IN}-V_{OUT}=3V$	5.5	6.5		A
Minimum Load Current		$V_{IN}=10V(\text{CP1084-ADJ})$		3	10	mA
Quiescent Current		$V_{IN}=10V(\text{CP1084})$		5	10	mA
Ripple Rejection		$f_{RIPPLE} = 120\text{Hz}, C_{OUT}=25 \mu\text{F Tantalum},$ $I_{OUT}=5A, V_{IN}-V_{OUT}=3V$	60	72		dB
Adjust Pin Current		$V_{IN}=4.25V, I_{OUT}=10\text{mA}$		55	120	μA
Adjust Pin Current Change		10mA $I_{OUT} \leq 5A,$ 1.5V $(V_{IN}-V_{OUT}) \leq 4.5V$		0.2	5	μA
Temperature Stability		$I_{OUT}=10\text{mA}, V_{IN}-V_{OUT}=1.5$		0.5		%
Long Term Stability		$T_A=125^\circ\text{C}, 1000\text{Hrs}$		0.5		%
RMS Noise (% of V_{OUT})		10Hz $f \leq 10\text{kHz}$		0.003		%
Thermal Resistance Junction-to-Case	θ_{JC}			3		$^{\circ}\text{C}/\text{W}$

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Typical Performance Characteristics

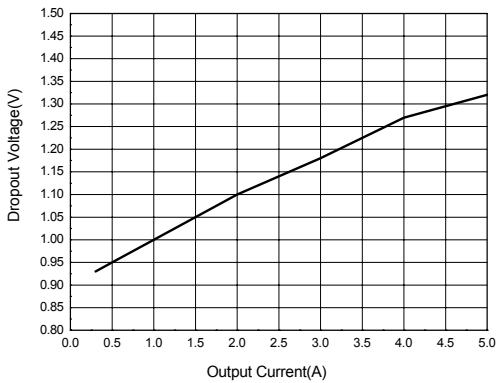


Figure 4. Dropout Voltage vs. Output Current

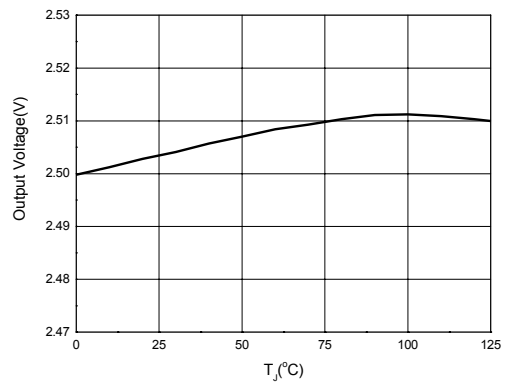


Figure 5. Output Voltage vs. Temperature

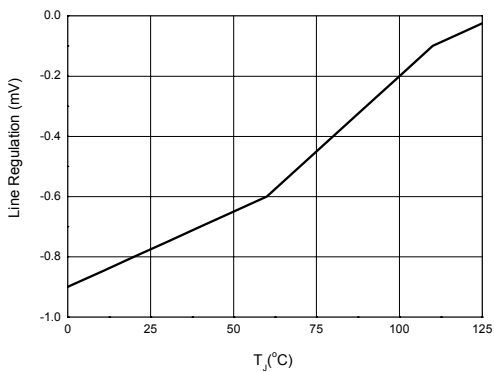


Figure 6. Line Regulation vs. Temperature

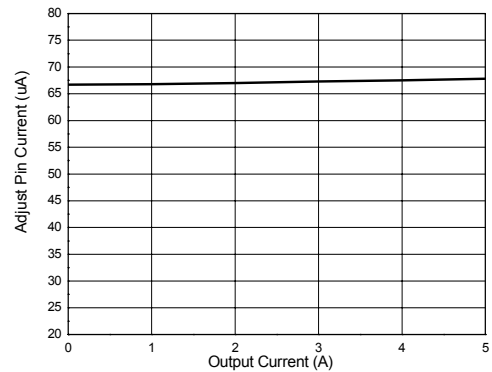


Figure 7. Adjust Pin Current vs. Output Current

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5A Dropout Linear Regulator

Typical Performance Characteristics (Continued)

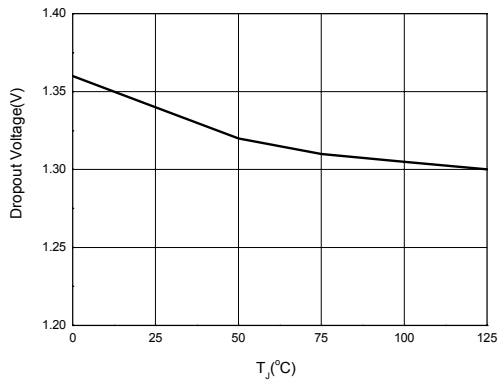


Figure 8. Dropout Voltage vs. Temperature

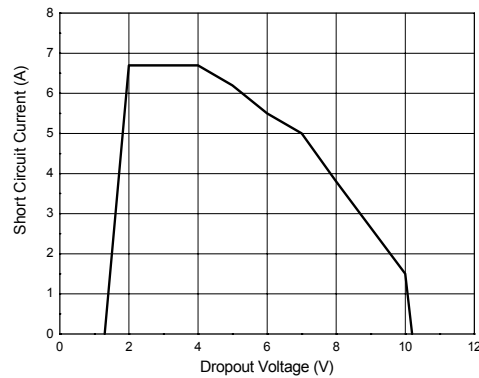


Figure 9. Short Circuit Current vs. Dropout Voltage

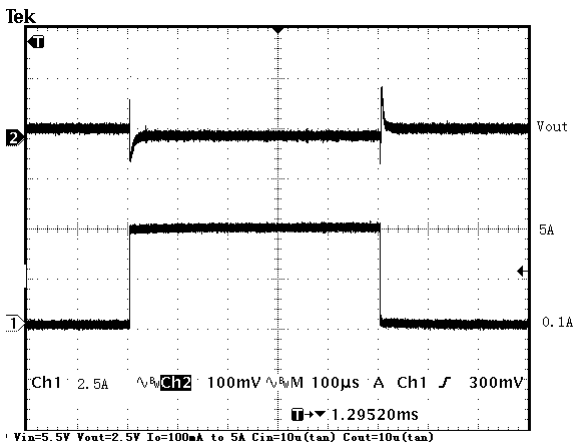


Figure 10. Load Transient Response

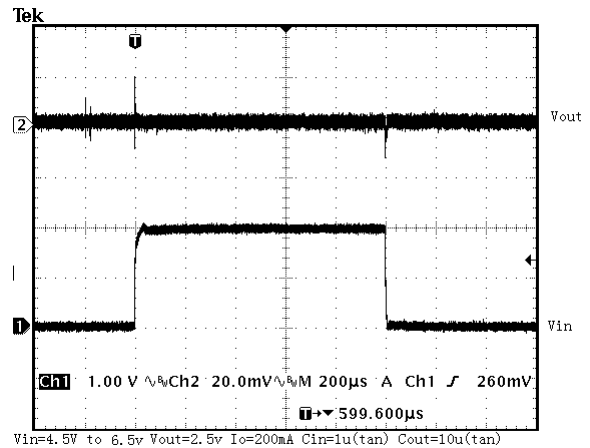


Figure 11. Line Transient Response

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Typical Applications

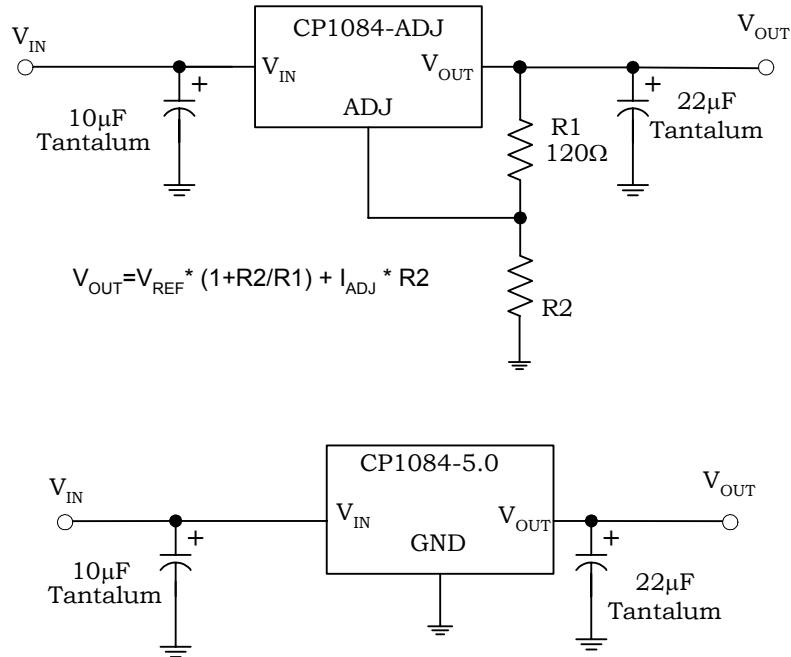


Figure 12. Typical Applications of CP1084

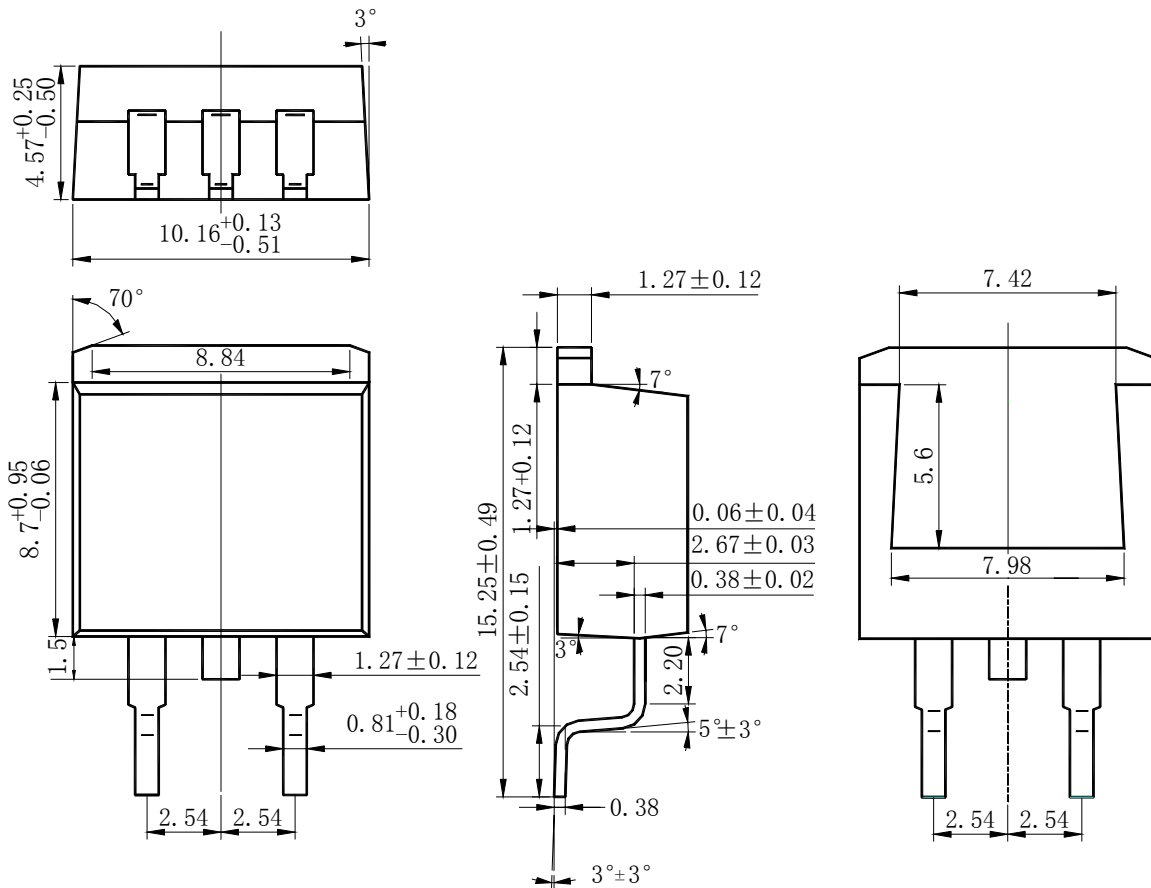
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Mechanical Dimensions (Continued)

TO-263-2L

Unit: mm



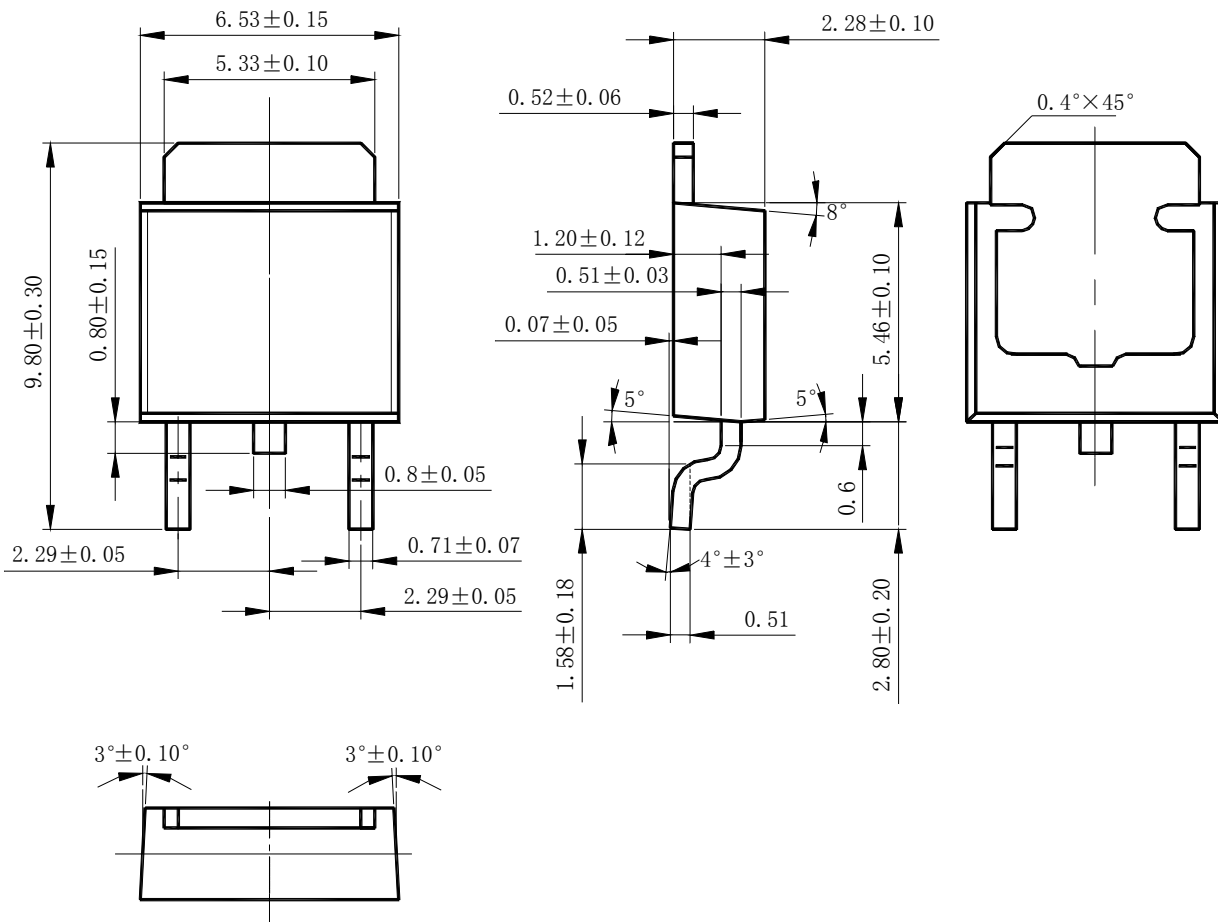
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5A Dropout Linear Regulator

Mechanical Dimensions (Continued)

TO-252

Unit: mm



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