

# 5A Low Dropout Positive Regulator

## FEATURES

- Dropout Voltage 1.3V at 5A Output Current.
- Fast Transient Response.
- Extremely Tight Line and Load Regulation.
- Current Limiting and Thermal Protection.
- Adjustable Output Voltage or Fixed 1.5V, 1.8V, 2.5V, 3.3V.
- Standard 3-Pin Power Packages.

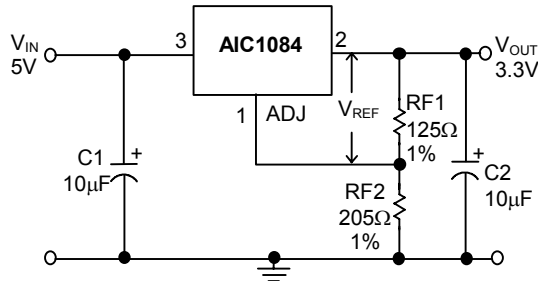
## APPLICATIONS

- Mother Board I/O Power Supplies.
- Microprocessor Power Supplies.
- High Current Regulator.
- Post Regulator for Switching Supply.

## DESCRIPTION

The AIC1084 is a low dropout three terminal regulator with 5A output current capability. The output voltage is adjustable with the use of a resistor divider or fixed 1.5V, 1.8V, 2.5V and 3.3V. Dropout voltage is guaranteed to be at maximum of 1.4V with the maximum output current. Its low dropout voltage and fast transient response make it ideal for low voltage microprocessor applications. Current limit and thermal protection provide protection against any overload condition that would create excessive junction temperatures.

## TYPICAL APPLICATION CIRCUIT



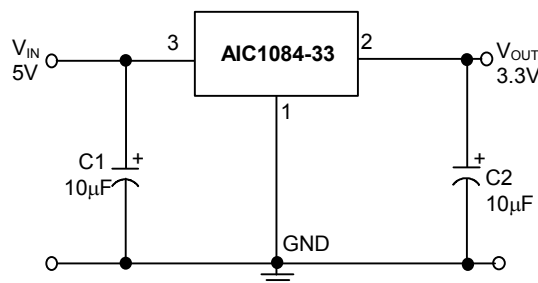
**Adjustable Voltage Regulator**

$$V_{REF} = V_{OUT} - V_{ADJ} = 1.25V \text{ (typ.)}$$

$$V_{OUT} = V_{REF} \times (1 + R_{F2}/R_{F1}) + I_{ADJ} \times R_{F2}$$

$$I_{ADJ} = 55\mu A \text{ (typ.)}$$

- (1) C1 needed if device is far away from filter capacitors.
- (2) C2 required for stability.



**Fixed Voltage Regulator**

## ORDERING INFORMATION

AIC1084-XXXXXX

PACKING TYPE  
 TB: TUBE  
 TR: TAPING & REEL

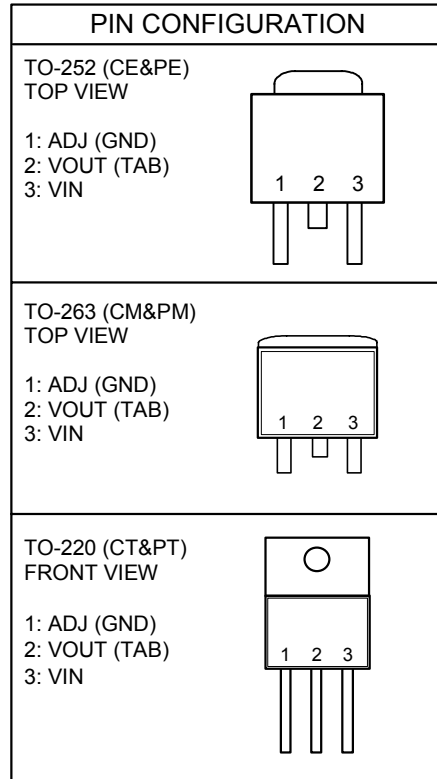
PACKAGING TYPE  
 E: TO-252  
 M: TO-263  
 T: TO-220

C: COMMERCIAL  
 P: LEAD FREE COMMERCIAL

OUTPUT VOLTAGE  
 DEFAULT: ADJUSTABLE  
 15: 1.5V  
 18: 1.8V  
 25: 2.5V  
 33: 3.3V

Example: AIC1084-15CETR  
 → 1.5V version in TO-252 Package & Taping & Reel Packing Type

Example: AIC1084-15PMTR  
 → 1.5V version in TO-263 Lead Free Package & Taping & Reel Packing Type



## ABSOLUTE MAXIMUM RATINGS

VIN pin to ADJ/GND pin .....	7V
Operating Temperature Range .....	-40°C to 85°C
Maximum Junction Temperature .....	125°C
Storage Temperature Range .....	- 65°C ~ 150°C
Lead Temperature (Soldering) 10 sec. ....	260°C
Thermal Resistance Junction to Case TO-252 .....	12.5°C/W
TO-263, TO-220 .....	3°C /W
Thermal Resistance Junction to Ambient TO-252 .....	100°C/W
(Assume no ambient airflow, no heatsink) TO-263 .....	60°C /W
TO-220 .....	50°C /W

**Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.**

## ■ TEST CIRCUIT

Refer to TYPICAL APPLICATION CIRCUIT.

## ■ ELECTRICAL CHARACTERISTICS

( $V_{IN}=5V$ ,  $T_J=25^\circ C$ ,  $I_O=10mA$ , unless otherwise specified) (Note1)

PARAMETER	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Reference Voltage	AIC1084 (ADJ)	1.238	1.25	1.262	V
Output Voltage	AIC1084-15, $V_{IN}=5V$	1.48	1.50	1.52	V
	AIC1084-18, $V_{IN}=5V$	1.78	1.80	1.82	
	AIC1084-25, $V_{IN}=5V$	2.47	2.50	2.53	
	AIC1084-33, $V_{IN}=5V$	3.26	3.30	3.34	
Line Regulation	ADJ : $2.65V \leq V_{IN} \leq 7V$ $V_{OUT}=1.25V$		0.015	0.2	%
	Fix : $V_{OUT}+1.4V \leq V_{IN} \leq 7V$				
Load Regulation	$10mA < I_O < 5A$			0.6	%
Dropout Voltage	$\Delta V_{OUT}, \Delta V_{REF}=1\%$ $10mA \leq I_O \leq 5A$		1.3	1.4	V
Current Limit		5	6		A
GND Current (Fix)	$2.65V \leq V_{IN} \leq 7V$		11.5	14	mA
Adjusted Pin Current	$2.65V \leq V_{IN} \leq 7V$		55	120	$\mu A$
Adjusted Pin Current Change ( $\Delta I_{ADJ}$ )	$2.65V \leq V_{IN} \leq 7V$		0.2	5	$\mu A$
Temperature Stability	$I_O=0.5A$		0.5		%
Minimum Load Current			5	10	mA
RMS Output Noise (% of $V_{OUT}$ )	$10Hz \leq f \leq 10KHz$		0.003		%
Ripple Rejection Ratio	120Hz input ripple $C_{OUT}=25\mu F$ $(V_{IN}-V_{OUT})=3V$	60	72		dB

**Note 1:** Specifications are production tested at  $T_A=25^\circ C$ . Specifications over the  $-40^\circ C$  to  $85^\circ C$  operating temperature range are assured by design, characterization and correlation with Statistical Quality Controls (SQC).

**TYPICAL PERFORMANCE CHARACTERISTICS**

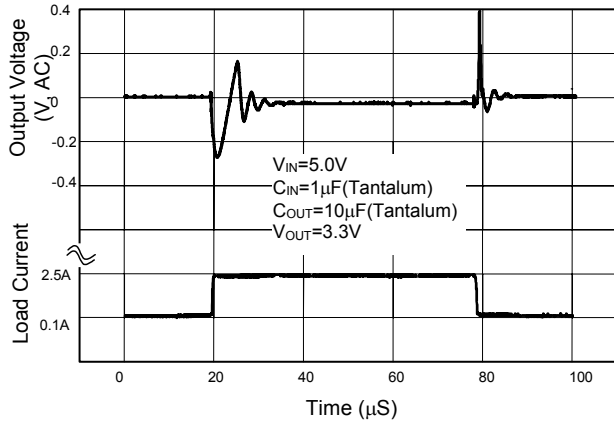


Fig. 1 Load Transient Response

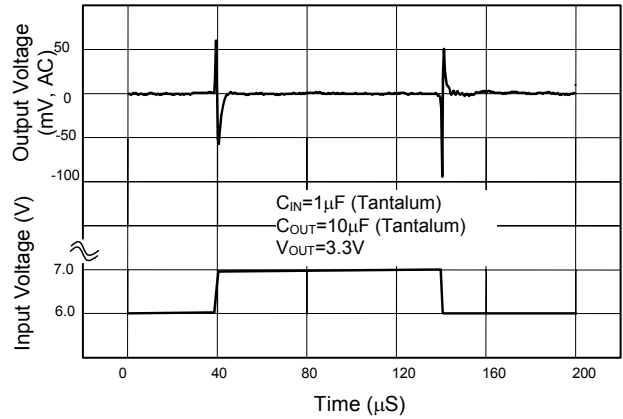


Fig. 2 Line Transient Response

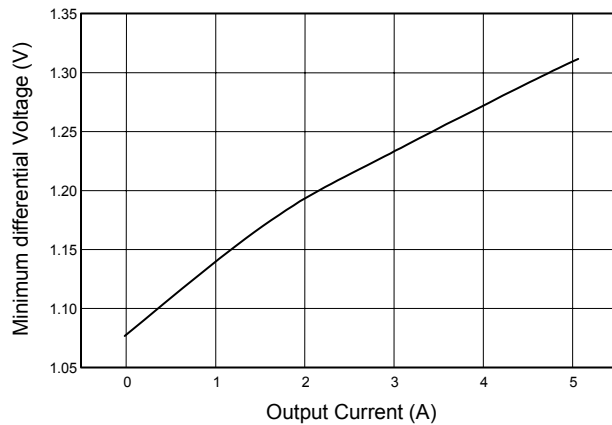


Fig. 3 Dropout Voltage ( $V_{OUT}=3.3V$ )

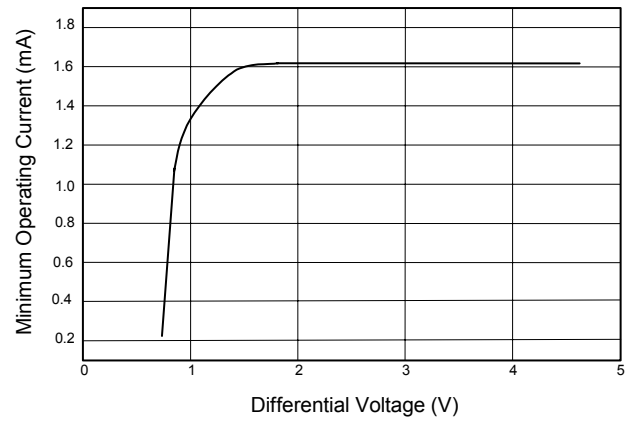


Fig. 4 Minimum Operating Current

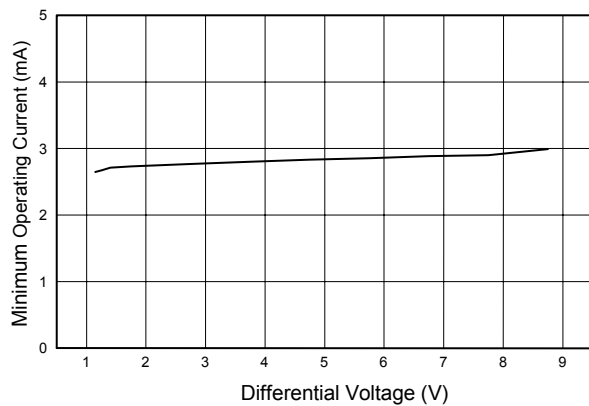


Fig. 5 Minimum Operating Current

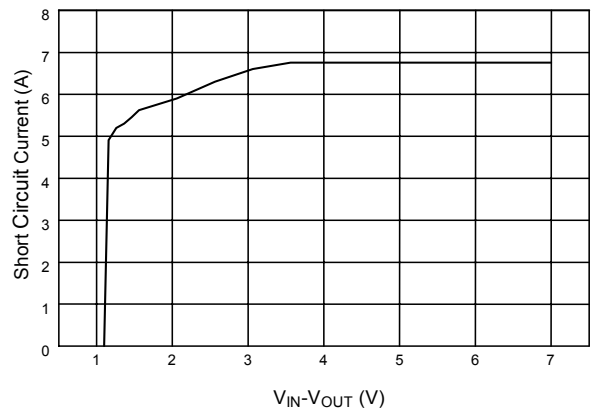


Fig. 6 AIC1084 (ADJ.) Short Circuit Current

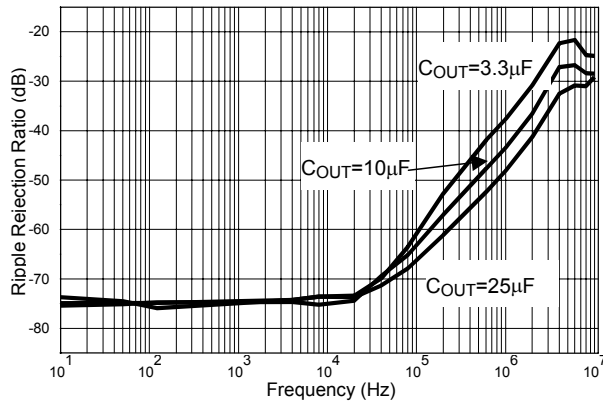
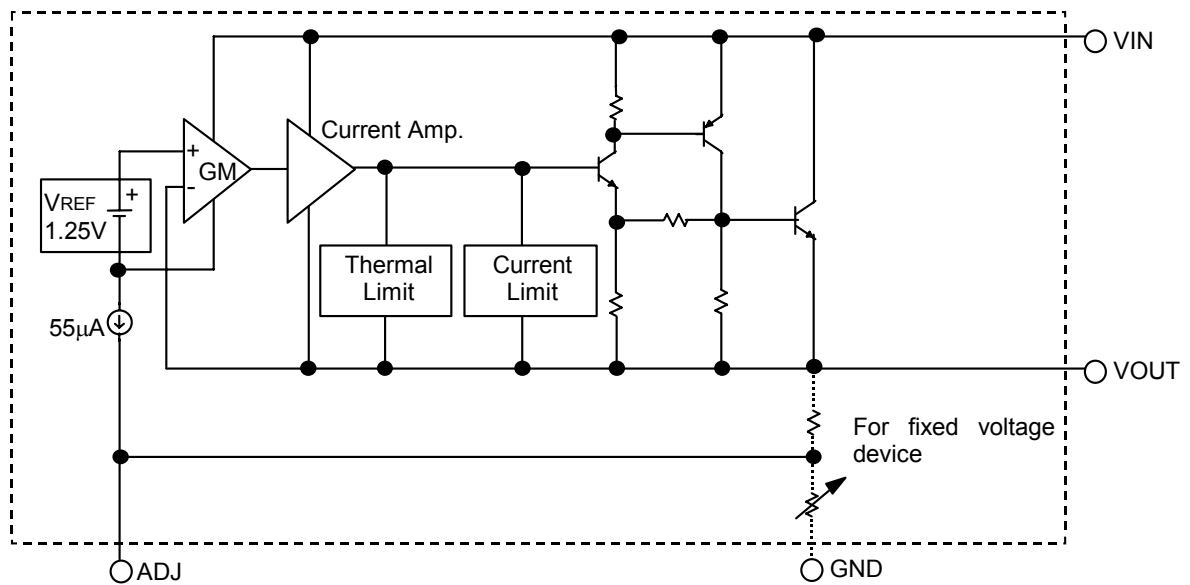
**TYPICAL PERFORMANCE CHARACTERISTICS (Continued)**


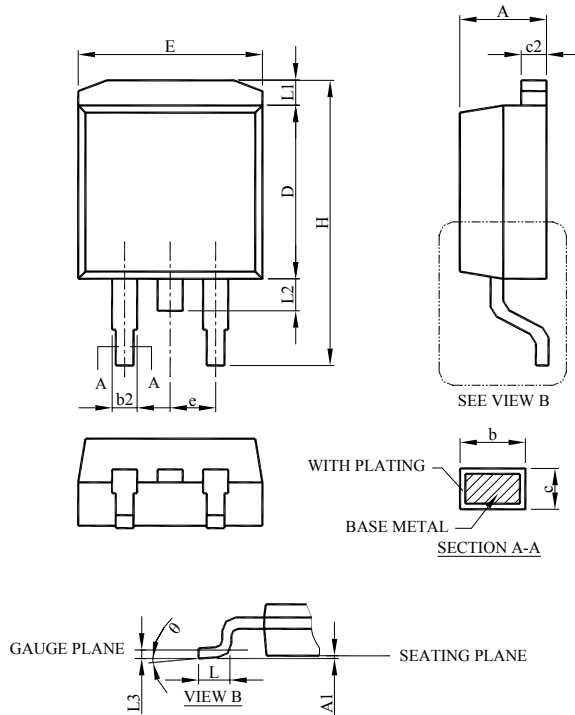
Fig. 7 AIC1084 (ADJ.) Ripple Rejection

**BLOCK DIAGRAM**

**PIN DESCRIPTIONS**

- ADJ PIN - Providing  $V_{REF}=1.25V$  (typ.) for adjustable  $V_{OUT}$ .  $V_{REF}=V_{OUT}-V_{ADJ}$  and  $I_{ADJ}=55\mu A$  (typ.)
- GND PIN- Power ground.
- VOUT PIN - Adjustable output voltage.
- VIN PIN - Power Input.



- TO-263 (unit: mm)



SYMBOL	TO-263-3L	
	MILLIMETERS	
	MIN.	MAX.
A	4.06	4.83
A1	0.00	0.25
b	0.51	0.99
b2	1.14	1.78
c	0.38	0.74
c2	1.14	1.65
D	8.38	9.65
E	9.65	10.67
e	2.54 BSC	
H	14.61	15.88
L	1.78	2.79
L1	--	1.68
L2	--	1.78
L3	0.25 BSC	
θ	0°	8°

**Note:**

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