



## FEATURES

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

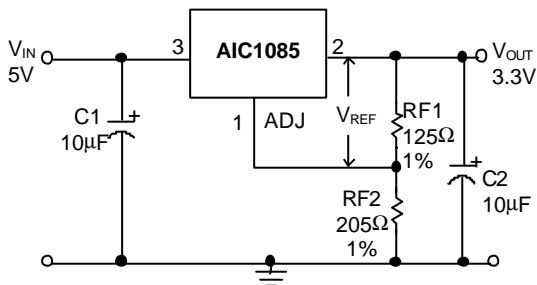
## APPLICATIONS

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

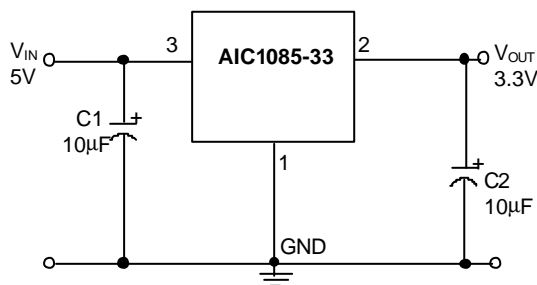
## DESCRIPTION

The AIC1085 is a low dropout three terminal regulator with 3A output current capability. The output voltage is adjustable with the use of a resistor divider or fixed 1.5V, 1.8V, and 3.3V. Dropout is guaranteed at a maximum of 1.4V at maximum output current. Its low dropout voltage and fast transient response make it ideal for low voltage microprocessor applications. Internal current and thermal limiting provides protection against any overload condition that would create excessive junction temperatures.

## TYPICAL APPLICATION CIRCUIT



Adjustable Voltage Regulator



Fixed Voltage Regulator

$$V_{REF} = V_{OUT} - V_{ADJ} = 1.25V \text{ (typ.)}$$
$$V_{OUT} = V_{REF} \times (1 + RF2/RF1) + I_{ADJ} \times RF2$$
$$I_{ADJ} = 55\mu A \text{ (typ.)}$$

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



### ORDERING INFORMATION

AIC1085-XXXX

PACKAGING TYPE

E: TO-252

M: TO-263

T: TO-220

TEMPERATURE RANGE

C: 0°C~70°C

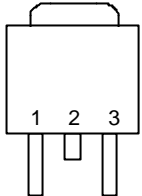
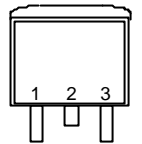
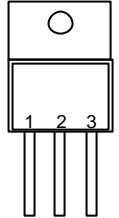
OUTPUT VOLTAGE

DEFAULT: ADJ.

15: 1.5V

18: 1.8V

33: 3.3V

| ORDER NUMBER          | PIN CONFIGURATION                                     |  |
|-----------------------|---|--|
| AIC1085CE<br>(TO-252) | FRONT VIEW<br>1: ADJ (GND)<br>2: VOUT (TAB)<br>3: VIN |   |
| AIC1085CM<br>(TO-263) | FRONT VIEW<br>1: ADJ (GND)<br>2: VOUT (TAB)<br>3: VIN |   |
| AIC1085CT<br>(TO-220) | FRONT VIEW<br>1: ADJ (GND)<br>2: VOUT (TAB)<br>3: VIN |  |

### ABSOLUTE MAXIMUM RATINGS

|   |                |
|---|----------------|
| Vin pin to ADJ/ GND pin .....                         | 7V             |
| Operating Junction Temperature Range .....            | 0°C~ 125°C     |
| Storage Temperature Range .....                       | - 65°C ~ 150°C |
| Thermal Resistance Junction to Case TO-252 .....      | 15°C/W         |
| TO-263, TO-220 .....                                  | 6°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        |
| Lead Temperature (Soldering) 10 sec. ....             | 260°C          |

### TEST CIRCUIT

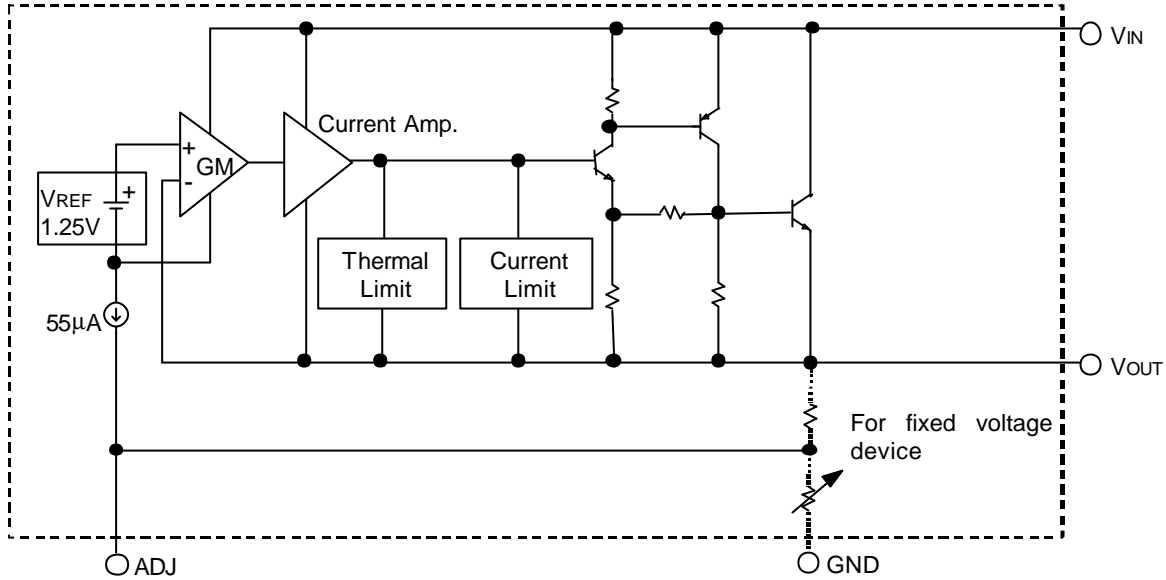
Refer to TYPICAL APPLICATION CIRCUIT.

**ELECTRICAL CHARACTERISTICS** ( $V_{IN}=5V$ ,  $T_A=25^\circ C$ ,  $I_O=10mA$ , Unless otherwise specified)

| PARAMETER  | TEST CONDITIONS  | MIN.                 | TYP.                 | MAX.                 | UNIT    |
|--|--|----------------------|----------------------|----------------------|---------|
| Reference Voltage ( $V_{OUT}-V_{ADJ}$ )          | AIC1085 (Adj.)<br>$T_A=25^\circ C$   | 1.238                | 1.25                 | 1.262                | V       |
| Output Voltage                                   | AIC1085-15 $V_{IN}=5V$<br>AIC1085-18 $V_{IN}=5V$<br>AIC1085-33 $V_{IN}=5V$                               | 1.48<br>1.78<br>3.26 | 1.50<br>1.80<br>3.30 | 1.52<br>1.82<br>3.34 | V       |
| Line Regulation                                  | Adj : $2.75V \leq V_{IN} \leq 5.25V$<br>Fix : $V_{OUT}+1V \leq V_{IN} \leq 7V$<br>$T_A=25^\circ C$       |                      | 0.015                | 0.2                  | %       |
| Load Regulation                                  | $10mA < I_O < 3A$<br>$T_A=25^\circ C$  |                      |                      | 0.6                  | %       |
| Dropout Voltage                                  | $\Delta V_{OUT}, \Delta V_{REF}=1\%$<br>$10mA \leq I_O \leq 3A$<br>$0^\circ C \leq T_J \leq 125^\circ C$ |                      | 1.3                  | 1.4                  | V       |
| Current Limit                                    | $V_{IN} = 5V$<br>$0^\circ C \leq T_J \leq 125^\circ C$   | 3                    | 4                    |                      | A       |
| Adjusted Pin Current ( $I_{ADJ}$ )               | $2.75V \leq V_{IN} \leq 7V$  |                      | 55                   | 120                  | $\mu A$ |
| Adjusted Pin Current Change ( $\Delta I_{ADJ}$ ) | $2.75V \leq V_{IN} \leq 7V$<br>$0^\circ C \leq T_J \leq 125^\circ C$                                     |                      | 0.2                  | 5                    | $\mu A$ |
| Temperature Stability                            | $I_O=0.5A$<br>$0^\circ C \leq T_J \leq 125^\circ C$  |                      | 0.5                  |                      | %       |
| Minimum Load Current                             | $0^\circ C \leq T_J \leq 125^\circ C$  |                      | 5                    | 10                   | mA      |
| RMS Output Noise (% of $V_{OUT}$ )               | $10Hz \leq f \leq 10KHz$   |                      | 0.003                |                      | %       |
| Ripple Rejection Ratio                           | 120Hz input ripple<br>$C_{OUT}=25\mu F$<br>$(V_{IN}-V_{OUT})=3V$   | 60                   | 72                   |                      | dB      |



### ■ 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.)

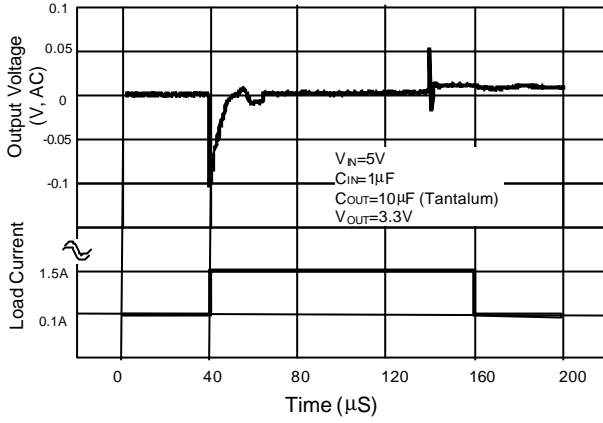
VOUT PIN - Adjustable output voltage.

VIN PIN - Power Input.

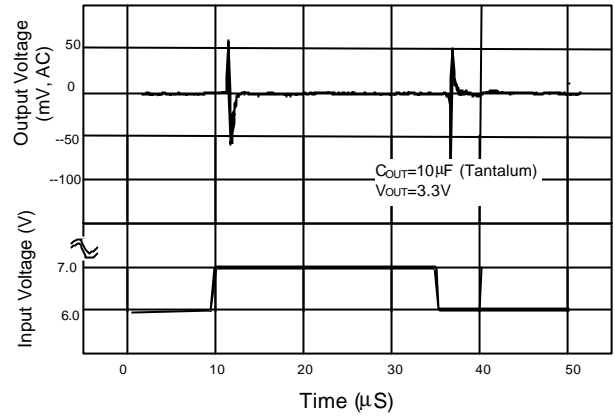


### TYPICAL PERFORMANCE CHARACTERISTICS

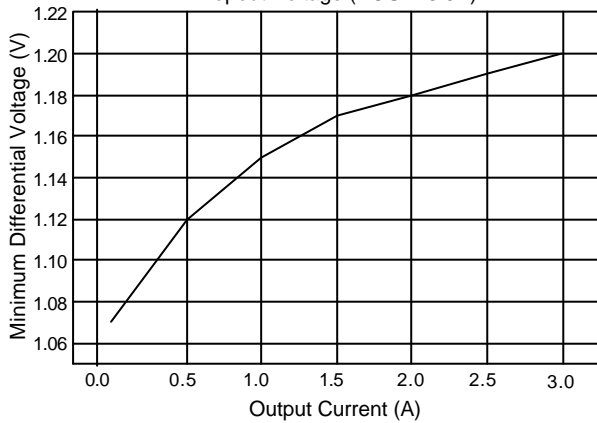
Load Transient Response



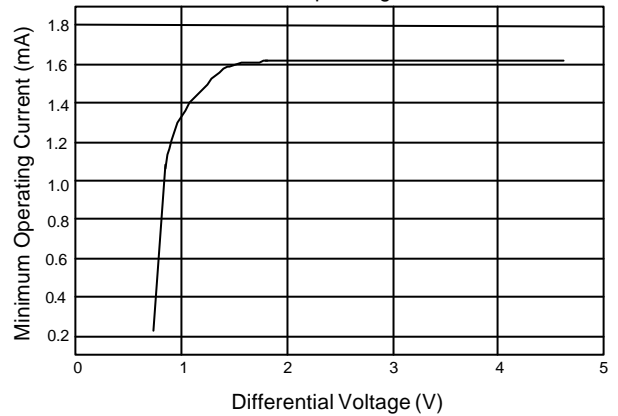
Line Transient Response



Dropout Voltage (VOUT=3.3V)



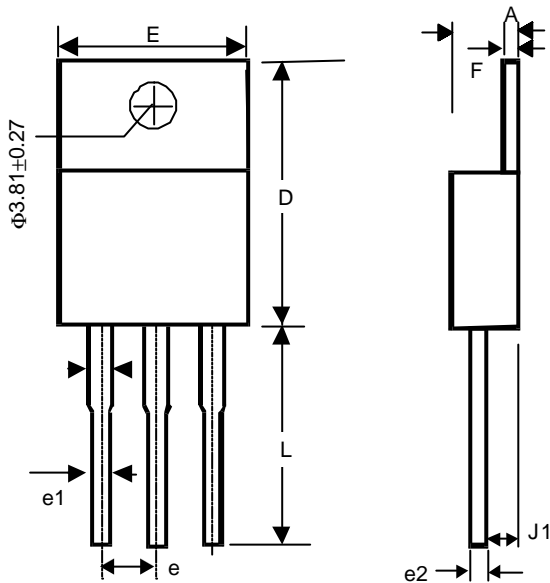
Minimum Operating Current





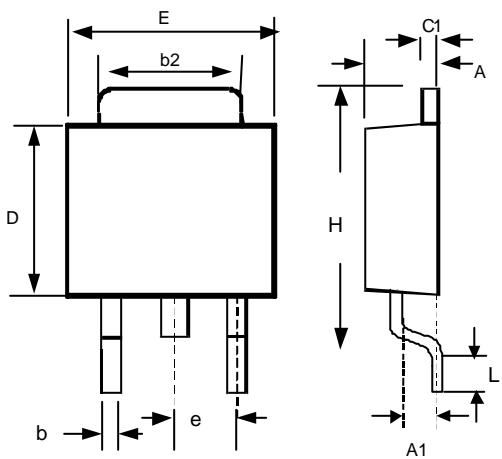
**PHYSICAL DIMENSIONS**

- TO-220 (unit: mm)



| SYMBOL | MIN   | MAX   |
|--------|-------|-------|
| A      | 3.56  | 4.82  |
| D      | 14.23 | 16.51 |
| E      | 9.66  | 10.66 |
| e      | 2.29  | 2.79  |
| e1     | 0.50  | 1.15  |
| e2     | -     | 1.10  |
| F      | 0.51  | 1.39  |
| J1     | 2.04  | 2.92  |
| L      | 12.70 | 14.73 |

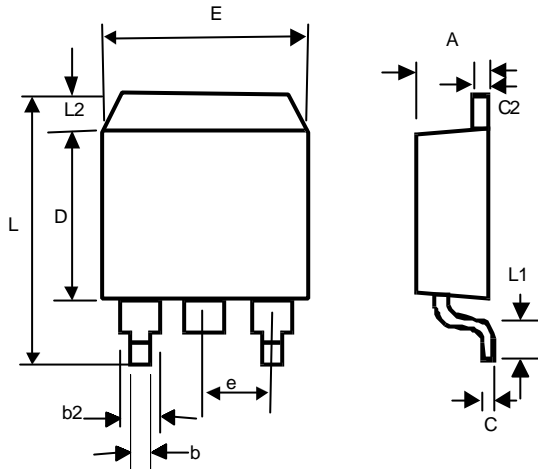
- TO-252 (unit: mm)



| SYMBOL | MIN         | MAX   |
|--------|-------------|-------|
| A      | 2.19        | 2.38  |
| A1     | 1.02        | 1.27  |
| b      | 0.64        | 0.88  |
| b2     | 5.21        | 5.46  |
| C1     | 0.46        | 0.58  |
| D      | 5.33        | 5.59  |
| E      | 6.35        | 6.73  |
| e      | 2.28 (TYP.) |       |
| H      | 9.40        | 10.42 |
| L      | 0.51        | -     |



● TO-263 (unit: mm)



| SYMBOL | MIN         | MAX   |
|--------|-------------|-------|
| A      | 4.06        | 4.83  |
| b      | 0.50        | 1.00  |
| b2     | 1.14        | 1.40  |
| C      | -           | 0.7   |
| c2     | 1.14        | 1.40  |
| D      | 8.63        | 9.66  |
| E      | 9.65        | 10.29 |
| e      | 2.54 (TYP.) |       |
| L      | 14.60       | 15.88 |
| L1     | 2.28        | 2.80  |
| L2     | -           | 1.40  |

UNIT: mm