

Low Output Voltage, 500mA Low Dropout Linear Regulator

FEATURES

- Low Dropout Voltage of 900mV at 500mA Output Current (3.0V Output Version).
- Guaranteed 500mA Output Current.
- Internal 1.5Ω P-MOSFET Draws no Base Current.
- Low Ground Current at $65\mu\text{A}$.
- 2% Accuracy Output Voltage of 1.8V/ 2.0V/ 2.5V/ 2.7V/ 3.0V.
- Input Voltage Range up to 12V.
- Needs only $4.7\mu\text{F}$ for Stability.
- Current and Thermal Limiting.

APPLICATIONS

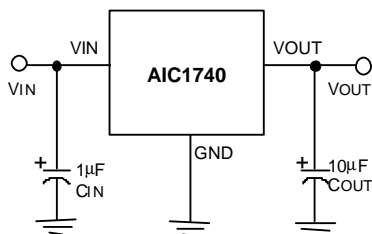
- Voltage Regulator for CD-ROM Drivers.
- Voltage Regulator for LAN Cards.
- Voltage Regulator for Monitor Microprocessor.
- Voltage Regulator for RAM Module.
- Wireless Communication Systems.
- Battery Powered Systems.

DESCRIPTION

The AIC1740 is a 3-pin low dropout linear regulator. The superior characteristics of the AIC1740 include zero base current loss, very low dropout voltage, and 2% accuracy output voltage. Typical ground current remains approximately $65\mu\text{A}$, from no load to maximum loading conditions. Dropout voltage is exceptionally low. Output current limiting and thermal limiting are built in to provide maximal protection to the AIC1740 against fault conditions.

The AIC1740 comes in the popular SOT-223, TO-251 and TO-252 packages.

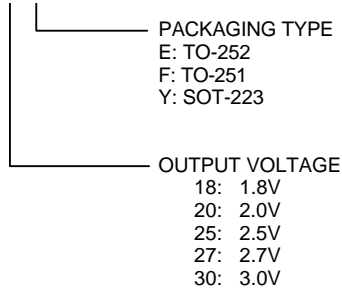
TYPICAL APPLICATION CIRCUIT

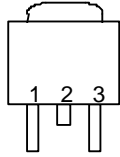
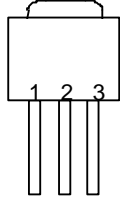
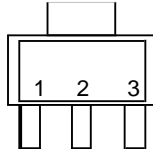


Low Dropout Linear Regulator

ORDERING INFORMATION

AIC1740-XCX



| ORDER NUMBER | PIN CONFIGURATION | |
|---|---|---|
| AIC1740-18CE AIC1740-20CE AIC1740-25CE AIC1740-27CE AIC1740-30CE (TO-252) | FRONT VIEW 1: VOUT 2: GND 3: VIN |  |
| AIC1740-18CF AIC1740-20CF AIC1740-25CF AIC1740-27CF AIC1740-30CF (TO-251) | FRONT VIEW 1: VOUT 2: GND 3: VIN |  |
| AIC1740-18CY AIC1740-20CY AIC1740-25CY AIC1740-27CY AIC1740-30CY (SOT-223) | FRONT VIEW 1: VOUT 2: GND 3: VIN |  |

ABSOLUTE MAXIMUM RATINGS

| | | |
|--------------------------------------|------------------------------|-------------|
| Input Supply Voltage | | -0.3~12V |
| Operating Junction Temperature Range | | -40°C~ 85°C |
| Storage Temperature Range | | -65°C~150°C |
| Power Dissipation | | 0.85W |
| Thermal Resistance θ_{JC} | TO-251, TO-252 Package | 12.5°C/W |
| | SOT-223 Package | 15°C/W |

TEST CIRCUIT

Refer to the TYPICAL APPLICATION CIRCUIT

ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$, $C_{IN}=1\text{mF}$, $C_{OUT}=10\text{mF}$, unless otherwise specified.)

| PARAMETER | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT | |
|---|--|-----------------------------|-------|---------------|-----------------------|-------|
| Output Voltage | No Load | | | | V | |
| | AIC1740-30 | $V_{IN}=4.0\sim 12\text{V}$ | 2.940 | 3.0 | | 3.060 |
| | AIC1740-27 | $V_{IN}=4.0\sim 12\text{V}$ | 2.646 | 2.7 | | 2.754 |
| | AIC1740-25 | $V_{IN}=4.0\sim 12\text{V}$ | 2.450 | 2.5 | | 2.550 |
| | AIC1740-20 | $V_{IN}=4.0\sim 12\text{V}$ | 1.960 | 2.0 | | 2.040 |
| | AIC1740-18 | $V_{IN}=4.0\sim 12\text{V}$ | 1.764 | 1.8 | | 1.836 |
| Output Voltage Temperature Coefficiency | (Note 1) | | 50 | | PPM/ $^\circ\text{C}$ | |
| Line Regulation | $I_L=1\text{mA}$, $V_{IN}=4.0\sim 12\text{V}$ | | 3 | 10 | mV | |
| Load Regulation (Note 2) | $V_{IN}=5\text{V}$, $I_L=0.1\sim 500\text{mA}$ | | 20 | 50 | mV | |
| Current Limit (Note 3) | $V_{IN}=5\text{V}$, $V_{OUT}=0\text{V}$ | | 650 | | mA | |
| Dropout Voltage (Note 4) | AIC1740s | $I_L=0.1\text{mA}$ | 0.2 | 10 | mV | |
| | AIC1740-30 | $I_L=500\text{mA}$ | 900 | 1050 | mV | |
| | AIC1740-27 | | 950 | 1100 | | |
| | AIC1740-25 | | 1000 | 1150 | | |
| | AIC1740-20 | | 1260 | 1410 | | |
| | AIC1740-18 | | 1370 | 1520 | | |
| Ground Current | $I_O=0.1\text{mA}\sim I_{MAX}$, $V_{IN}=4\text{V}\sim 12\text{V}$ | 65 | 90 | μA | | |

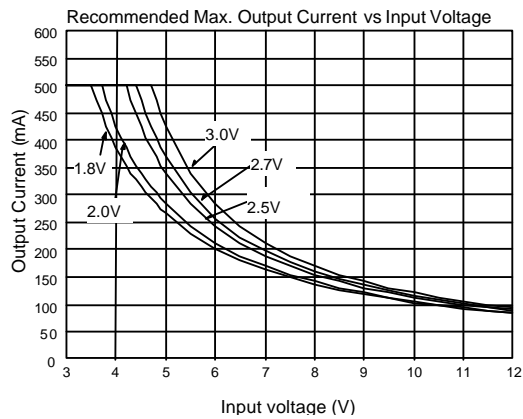
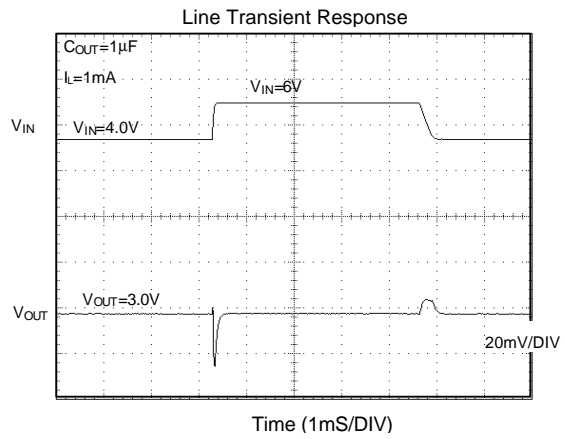
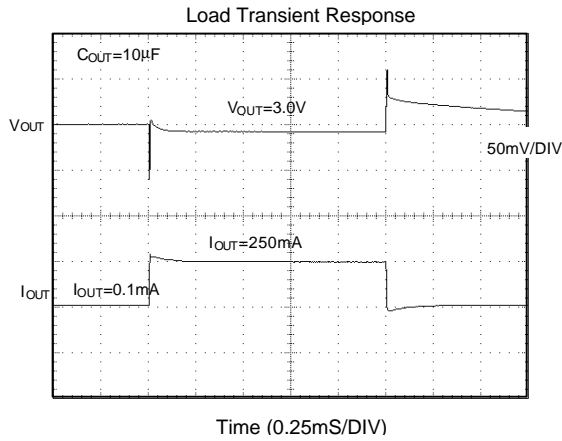
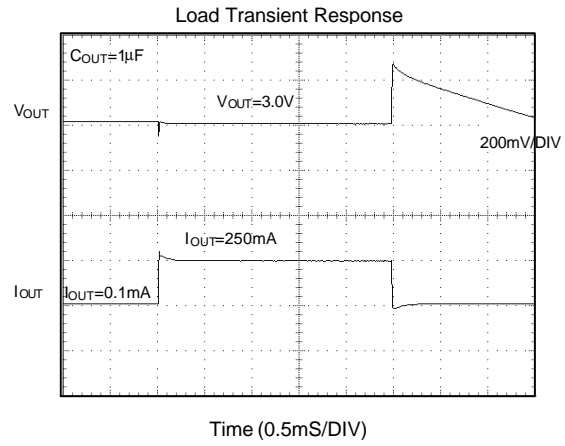
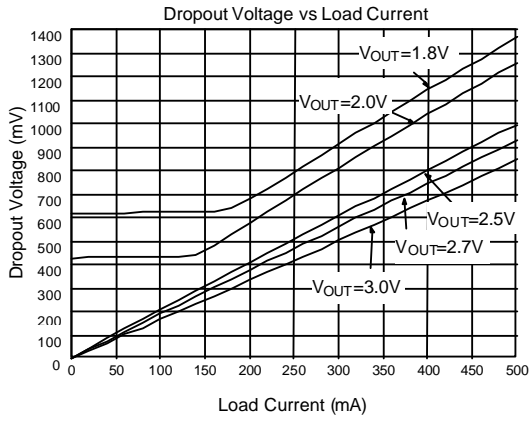
Note 1: Guaranteed by design.

Note 2: Regulation is measured at constant junction temperature, using pulse testing with a low ON time.

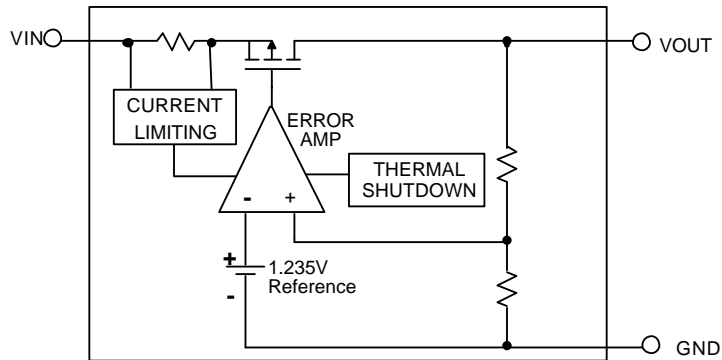
Note 3: Current limit is measured by pulsing a short time.

Note 4: Dropout voltage is defined as the input to output differential at which the output voltage drops 100mV below the value measured with a 1V differential.

TYPICAL PERFORMANCE CHARACTERISTICS



■ BLOCK DIAGRAM



■ PIN DESCRIPTION

- VOUT PIN - Output pin.
- GND PIN - Power GND.
- VIN PIN - Power Supply Input.

■ APPLICATION INFORMATIONS

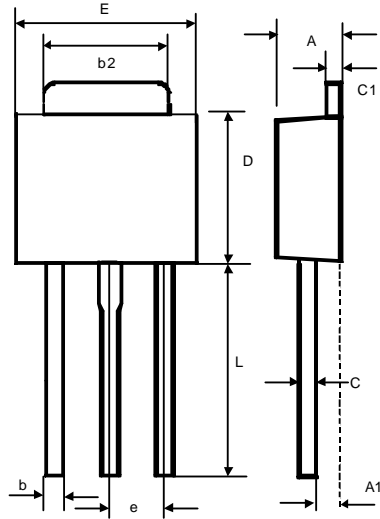
A 4.7 μ F (or greater) capacitor is required between the AIC1740 output and ground for stability. Without this capacitor the part will oscillate. Even though most types of capacitor may work, the equivalent series resistance (ESR) should be held to 5 Ω or less if Aluminum electrolytic type is used. Many Aluminum electrolytics have electrolytes that freeze at about -30°C, so solid tantalums are

recommended for operation below -25°C. The value of this capacitor may be increased without limit.

A 0.1 μ F capacitor (or greater) should be placed from the AIC1740 input to ground if the lead inductance between the input and power source exceeds 500nH (approximately 10 inches of trace).

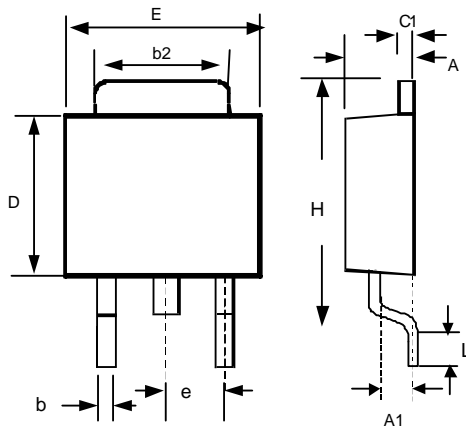
PHYSICAL DIMENSIONS

● TO-251 (unit: mm)



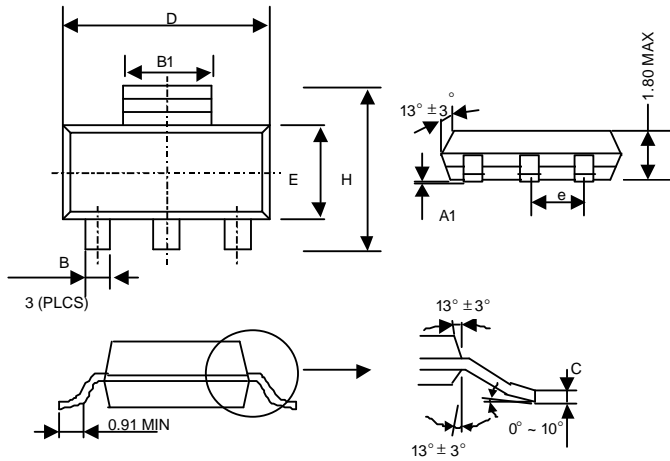
| SYMBOL | MIN | MAX |
|--------|-------------|------|
| A | 2.19 | 2.38 |
| A1 | 1.02 | 1.27 |
| b | 0.55 | 0.89 |
| b2 | 5.21 | 5.46 |
| C | 0.46 | 0.58 |
| C1 | 0.46 | 0.58 |
| D | 5.33 | 5.59 |
| E | 6.35 | 6.73 |
| e | 2.28 (TYP.) | |
| L | 7.62 (TYP.) | |

● 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 | - |

● SOT-223 (unit: mm)



| SYMBOL | MIN | MAX |
|--------|-------------|------|
| A1 | 0.02 | 0.12 |
| B | 0.60 | 0.80 |
| B1 | 2.90 | 3.15 |
| C | 0.24 | 0.35 |
| D | 6.30 | 6.80 |
| E | 3.30 | 3.70 |
| e | 2.30 (TYP.) | |
| H | 6.70 | 7.30 |

● SOT-223 MARKING

| Part No. | Marking |
|------------|---------|
| AIC1740-18 | AZ18 |
| AIC1740-20 | AZ20 |
| AIC1740-25 | AZ25 |
| AIC1740-27 | AZ27 |
| AIC1740-30 | AZ30 |