300mA Low Dropout Linear Regulator

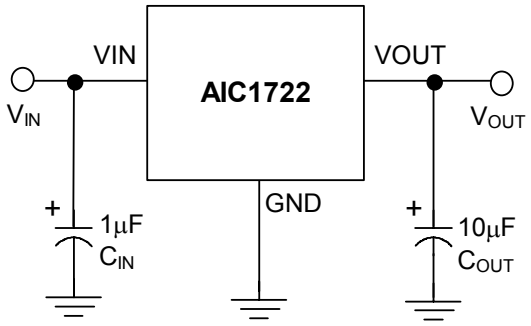
FEATURES

- Low Dropout Voltage of 130mV at 100mA Output Current (5.2V Output Version).
- Low Ground Current at 55μA.
- Input Voltage Range up to 12V.
- Internal 1.3Ω P-MOSFET Draws no Base Current.
- Guaranteed 300mA Output Current.
- 2% Accuracy Output Voltage of 3.3V/ 3.5V/ 3.7V/ 3.8V/ 5.0V/ 5.2V.
- Current Limiting and Thermal Protection

APPLICATIONS

- CD-ROM Drivers.
- LAN Cards.
- Microprocessor.
- Wireless Communication Systems.
- Battery Powered Systems.

TYPICAL APPLICATION CIRCUIT



Low Dropout Linear Regulator

DESCRIPTION

The AIC1722 is a 3-pin low dropout linear regulator. The superior characteristics of the AIC1722 include zero base current loss, very low dropout voltage, and 2% accuracy output voltage. Typical ground current remains approximately 55μA, for loading ranging from zero to maximum. When output current is 100mA, dropout voltage of AIC1722 is substantially low (130mV for the AIC1722-50/ 52, and 180mV for the AIC1722-33/35/37/38). Built-in output current limiting and thermal limiting provide maximal protection to the AIC1739 against fault conditions.

The AIC1722 is available in popular 3-pin SOT-89 and TO-92 packages.

■ ORDERING INFORMATION

AIC1722-XXXXXX

- PACKING TYPE
  - TR: TAPE & REEL
  - BG: BAG
- PACKAGING TYPE
  - X: SOT-89
  - ZT: TO-92
  - ZL: TO-92
- C: Commercial
- OUTPUT VOLTAGE
  - 33: 3.3V
  - 35: 3.5V
  - 37: 3.7V
  - 38: 3.8V
  - 50: 5.0V
  - 52: 5.2V

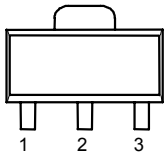
Example: AIC1722-33CXTR

→ 3.3V version in SOT-89 Package & Taping & Reel Packing Type

PIN CONFIGURATION

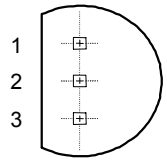
SOT-89
FRONT VIEW

1: VOUT
2: GND
3: VIN



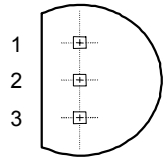
TO-92
TOP VIEW

1: GND
2: VIN
3: VOUT



TO-92
TOP VIEW

1: VIN
2: GND
3: VOUT



- **SOT-89 Marking**

Part No.	CX
AIC1722-33	AH33
AIC1722-35	AH35
AIC1722-37	AH37
AIC1722-38	AH38
AIC1722-50	AH50
AIC1722-52	AH52

ABSOLUTE MAXIMUM RATINGS

Input Supply Voltage ..... -0.3~12V
Operating Temperature Range ..... -40°C~ 85°C
Storage Temperature Range ..... -65°C~150°C
Maximum Junction Temperature ..... 125°C
Lead Temperature (Soldering) 10 sec. ..... 235°C
Power Dissipation SOT-89 Package 0.5W
TO-92 Package 0.5W

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

TEST CIRCUIT

Refer to the TYPICAL APPLICATION CIRCUIT

ELECTRICAL CHARACTERISTICS (Ta=25°C, C_{IN}=1μF, C_{OUT}=10μF, unless otherwise specified.)

PARAMETER	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Output Voltage	No Load					
	AIC1722-52	V_{IN}=5.5~12V	5.100	5.2	5.300	V
	AIC1722-50	V_{IN}=5.5~12V	4.900	5.0	5.100	
	AIC1722-38	V_{IN}=4.1~12V	3.725	3.8	3.875	
	AIC1722-37	V_{IN}=4.0~12V	3.625	3.7	3.775	
	AIC1722-35	V_{IN}=4.0~12V	3.430	3.5	3.570	
	AIC1722-33	V_{IN}=3.6~12V	3.235	3.3	3.365	
Output Voltage Temperature Coefficiency	(Note 1)			50	150	PPM/°C
Line Regulation	I_L=1mA					
	AIC1722-52	V_{IN}=5.5~12V		3	10	mV
	AIC1722-50	V_{IN}=5.5~12V		3	10	
	AIC1722-38	V_{IN}=4.1~12V		3	10	
	AIC1722-37	V_{IN}=4.0~12V		3	10	
	AIC1722-35	V_{IN}=4.0~12V		3	10	
	AIC1722-33	V_{IN}=3.6~12V		3	10	
Load Regulation (Note 2)	AIC1722-52	V_{IN}=7V, I_L=0.1~300mA		7	25	mV
	AIC1722-50	V_{IN}=7V, I_L=0.1~300 mA		7	25	
	AIC1722-38	V_{IN}=5V, I_L=0.1~300mA		7	25	
	AIC1722-37	V_{IN}=5V, I_L=0.1~300mA		7	25	
	AIC1722-35	V_{IN}=5V, I_L=0.1~300mA		7	25	
	AIC1722-33	V_{IN}=5V, I_L=0.1~300mA		7	25	

ELECTRICAL CHARACTERISTICS (Continued)

PARAMETER	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Current Limit	AIC1722-52	V_{IN}=7V, V_{OUT}=0V	320	440		mA
(Note 3)	AIC1722-50	V_{IN}=7V, V_{OUT}=0V	320	440		
	AIC1722-38	V_{IN}=7V, V_{OUT}=0V	320	440		
	AIC1722-37	V_{IN}=5V, V_{OUT}=0V	320	440		
	AIC1722-35	V_{IN}=5V, V_{OUT}=0V	320	440		
	AIC1722-33	V_{IN}=5V, V_{OUT}=0V	320	440		
Dropout Voltage	AIC1722s	I_L=0.1mA		0.2	10	mV
(Note 4)	AIC1722-52	I_L=300mA		400	500	
	AIC1722-50	I_L=300mA		400	500	
	AIC1722-38	I_L=300mA		540	640	
	AIC1722-37	I_L=300mA		540	640	
	AIC1722-35	I_L=300mA		540	640	
	AIC1722-33	I_L=300mA		540	640	
Ground Current	I_O=0.1mA~I_{MAX}					
	AIC1722-52	V_{IN}=5.5~12V		55	80	μA
	AIC1722-50	V_{IN}=5.5~12V		55	80	
	AIC1722-38	V_{IN}=4~12V		55	80	
	AIC1722-37	V_{IN}=4~12V		55	80	
	AIC1722-35	V_{IN}=4~12V		55	80	
	AIC1722-33	V_{IN}=4~12V		55	80	

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.
Note5: Specifications over -40°C to 85°C operating temperature range are guaranteed by design with Statistical Quality Controls (SQC), not production test.

TYPICAL PERFORMANCE CHARACTERISTICS

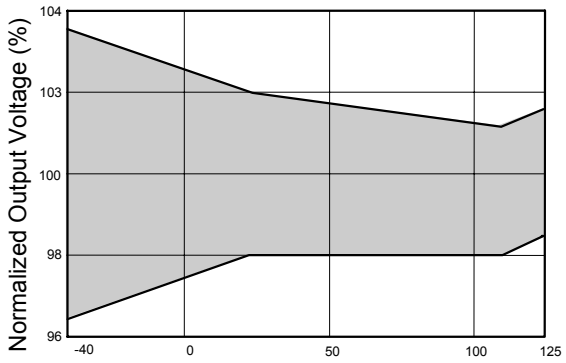


Fig. 1 Output Voltage vs. Temperature

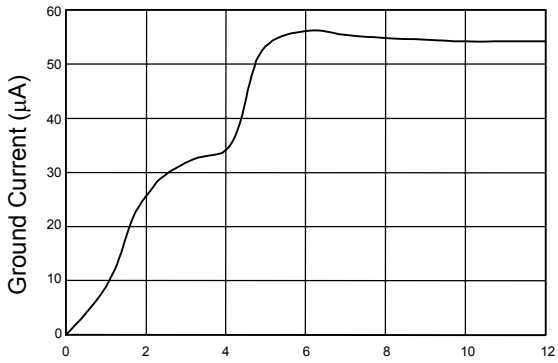


Fig. 2 Ground Current vs. Input Voltage

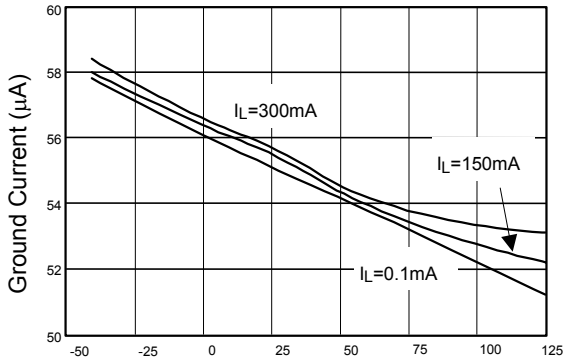


Fig. 3 Ground Current vs. Temperature

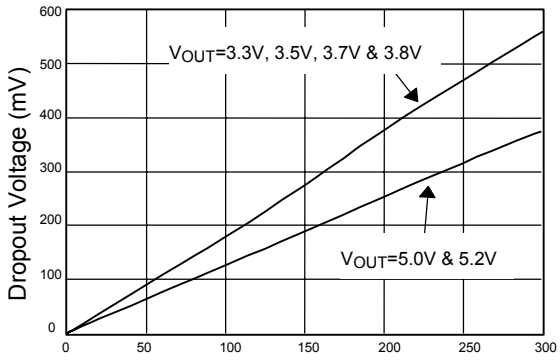


Fig. 4 Dropout Voltage vs. Load Current

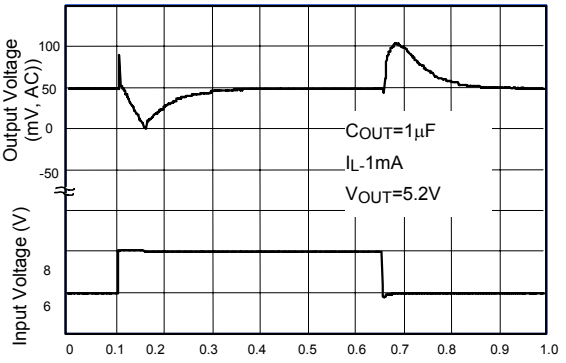


Fig. 5 Line Transient Response

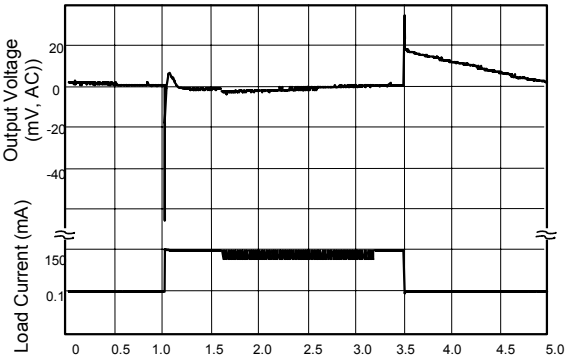


Fig. 6 Load Transient Response

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

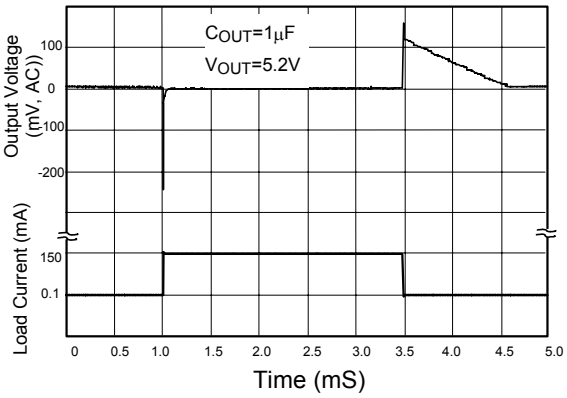


Fig. 7 Load Transient Response

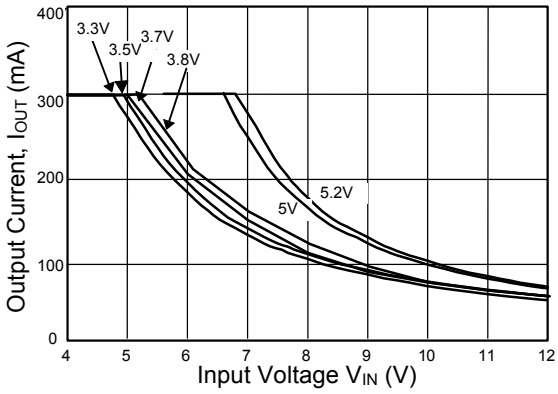
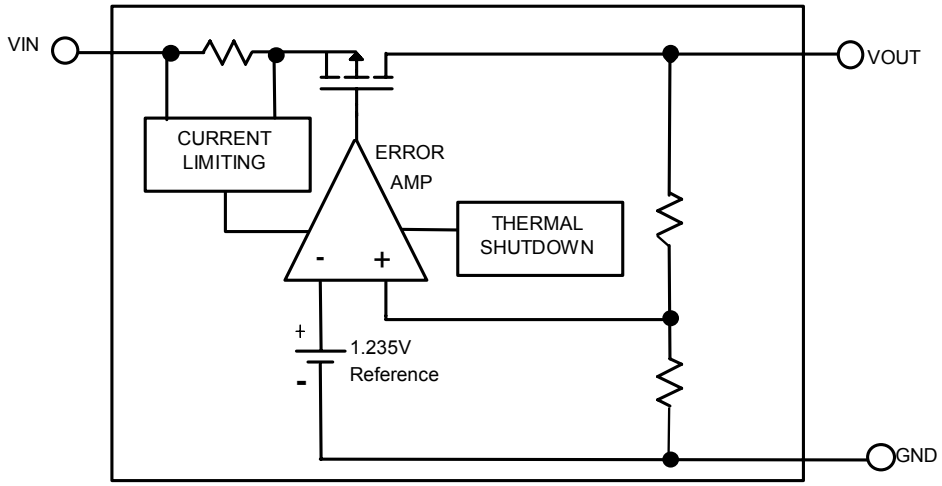


Fig. 8 Recommended Max. Output Current vs. Input Voltage

BLOCK DIAGRAM



PIN DESCRIPTIONS

VOUT PIN - Output pin.

GND PIN - Power GND.

VIN PIN - Power Supply Input.

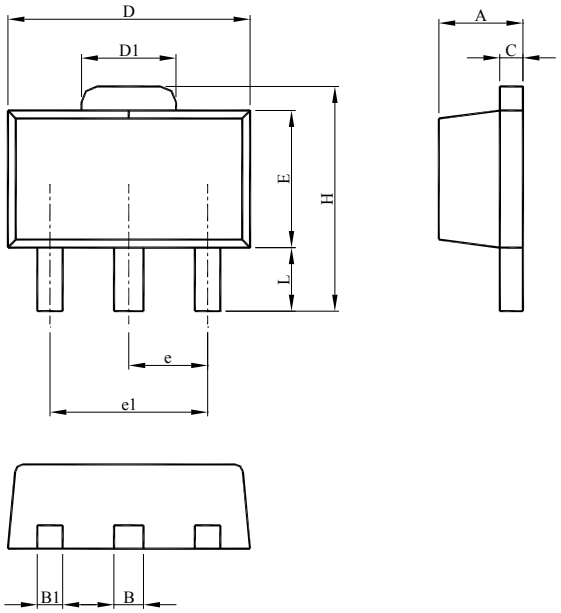
APPLICATION INFORMATION

A 10μF (or greater) capacitor is required between the AIC1722 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 5Ω 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.

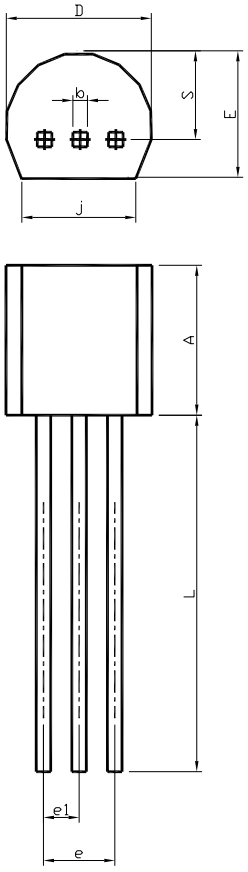
PHYSICAL DIMENSIONS (unit: mm)

- **SOT-89**



SYMBOL	SOT-89	
	MILLIMETERS	
	MIN.	MAX.
A	1.40	1.60
B	0.44	0.56
B1	0.36	0.48
C	0.35	0.44
D	4.40	4.60
D1	1.50	1.83
E	2.29	2.60
e	1.50 BSC	
e1	3.00 BSC	
H	3.94	4.25
L	0.89	1.20

- **TO-92**



SYMBOL	TO-92	
	MILLIMETERS	
	MIN.	MAX.
A	4.32	5.33
b	0.36	0.47
D	4.45	5.20
E	3.18	4.19
e	2.42	2.66
e1	1.15	1.39
j	3.43	
L	12.70	
S	2.03	2.66

Note:

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