1A Low Dropout Positive Adjustable Regulator

FEATURES

- Dropout Voltage 1.3V at 1A Output Current.
- Fast Transient Response.
- Line Regulation typically at 0.015%.
- Load Regulation typically at 0.1%.
- Internal Thermal and Current Limiting.
- Adjustable Output Voltage or Fixed 2.85V, 3.3V, 5V.
- Standard 3-Pin Power Packages.

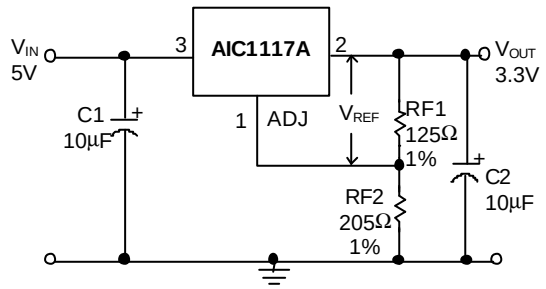
APPLICATIONS

- Post Regulator for Switching Supply.
- Active SCSI Termination.
- Battery Chargers.
- Constant-Current Regulators.
- Motherboard Clock Supplies.

DESCRIPTION

The AIC1117A is a low dropout three terminal regulator with 1A output current capability. The output voltage is adjustable with the use of a resistor divider or fixed 2.85V, 3.3V, 5V. Dropout is guaranteed at a maximum of 1.5V 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.

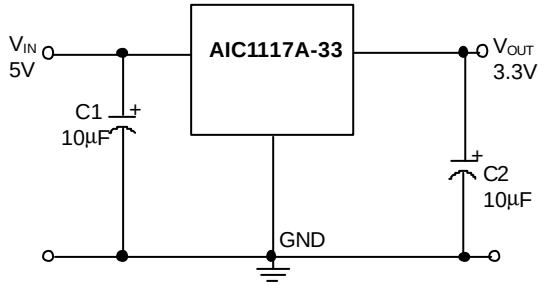
TYPICAL APPLICATION CIRCUIT



Adjustable Voltage Regulator

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

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



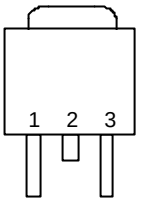
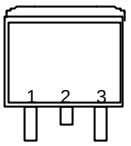
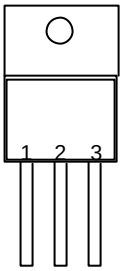
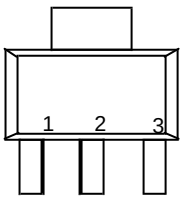
Fixed Voltage Regulator

■ ORDERING INFORMATION

AIC1117A-XXCX

PACKAGING TYPE
E: TO-252
M: TO-263
T: TO-220
Y: SOT-223

DEFAULT: ADJ.
28: 2.85V
33: 3.3V
50: 5.0V

ORDER NUMBER	PIN CONFIGURATION
AIC1117ACE (TO-252)	FRONT VIEW 1: ADJ 2: VOUT (TAB) 3: VIN 
AIC1117ACM (TO-263)	FRONT VIEW 1: ADJ 2: VOUT (TAB) 3: VIN 
AIC1117ACT (TO-220)	FRONT VIEW 1: ADJ 2: VOUT (TAB) 3: VIN 
AIC1117ACY (SOT-223)	FRONT VIEW 1: ADJ 2: VOUT (TAB) 3: VIN 

ABSOLUTE MAXIMUM RATINS

VIN pin to ADJ/GND pin 7V

Operating Junction Temperature Range ..... 0°C ~ 125°C

Power Dissipation .....Internally Limited

Thermal Resistance (Junction to Case) TO-220 ..... 3°C /W

TO-263 .....3°C /W

SOT-223 .....15°C /W

TO-252 .....12.5°C /W

Thermal Resistance (Junction to Ambient) TO-220 ..... 50°C/W

(Assume no ambient airflow, no heatsink) TO-263 .....60°C/W

SOT-223 .....155°C/W

TO-252 .....100°C/W

Storage Temperature Range ..... - 65°C ~ 150°C

Lead Temperature (Soldering) 10 sec. .....260°C

ELECTRICAL CHARACTERISTICS (V_{IN}=5V, T_J=25°C, I_O=10mA, Unless otherwise specified)

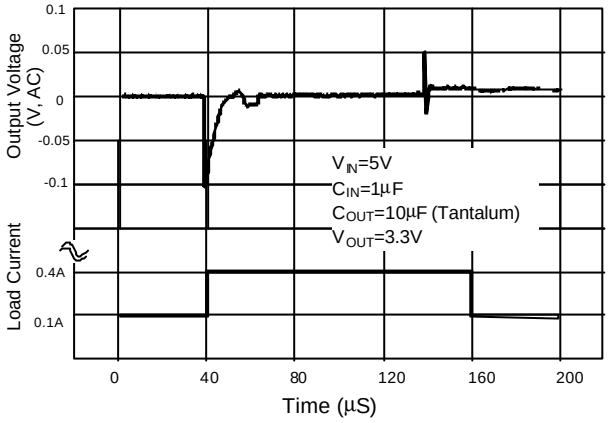
PARAMETER	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Reference Voltage	T_J=25°C	1.238	1.25	1.262	V
	0°C≤T_J≤125°C	1.225	1.25	1.275	
	2.65V≤V_{IN}≤7V				
	10mA≤I_O≤1A				
Output Voltage	AIC1117A-28, V_{IN}=5V	2.82	2.85	2.88	V
	AIC1117A-33, V_{IN}=5V	3.26	3.30	3.33	
	AIC1117A-50, V_{IN}=7V	4.95	5.00	5.05	
	AIC1117A				
	0°C≤T_J≤125°C				
	2.65V≤V_{IN}≤7V	0.98V_N	V_N	1.02V_N	
	10mA≤I_O≤1A				
Line Regulation	2.65≤V_{IN}≤7V				%V_{OUT}
	T_J=25°C		0.015	0.2	
	0°C≤T_J≤125°C		0.035	0.2	

■ ELECTRICAL CHARACTERISTICS (Continued)

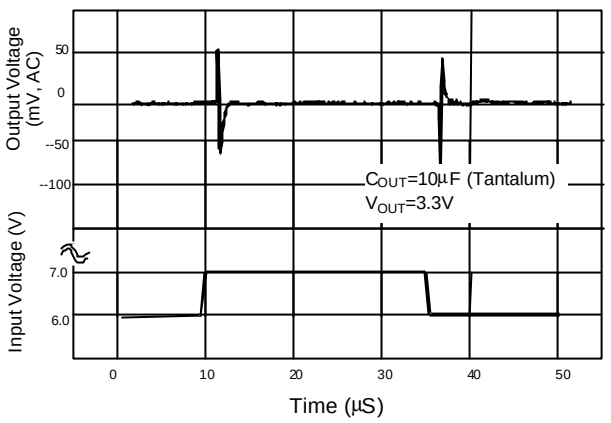
PARAMETER	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Load Regulation	T_J=25°C, I_O=10mA ~1A 0°C≤T_J≤125°C		0.1 0.2	0.3 0.4	%V_{OUT}
Dropout Voltage	ΔV_{OUT}, ΔV_{REF}=1% I_O=1A 0°C≤T_J≤125°C		1.3	1.5	V
Current Limit	0°C≤T_J≤125°C	1			A
Adjusted Pin Current (I_{ADJ})	2.65≤V_{IN}≤7V 10mA≤I_O≤1A 0°C≤T_J≤125°C		55	120	μA
Adjusted Pin Current Change (ΔI_{ADJ})	2.65≤V_{IN}≤7V 10mA≤I_O≤1A 0°C≤T_J≤125°C		0.2	5	μA
Temperature Stability	I_O=0.5A 0°C≤T_J≤125°C		0.5		% V_{OUT}
Minimum Load Current (Adj.)	0°C≤T_J≤125°C		5	10	mA
Quiescent Current (Fixed Version)	0°C≤T_J≤125°C		10	14	mA
RMS Output Noise (% of V_{OUT})	10Hz≤f≤10KHz		0.003		%V_{OUT}
Ripple Rejection Ratio	120Hz input ripple C_{OUT}=25μF	60	72		dB

TYPICAL PERFORMANCE CHARACTERISTICS

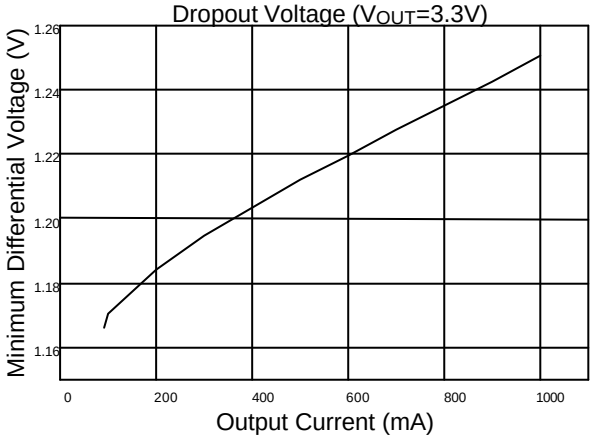
Load Transient Response



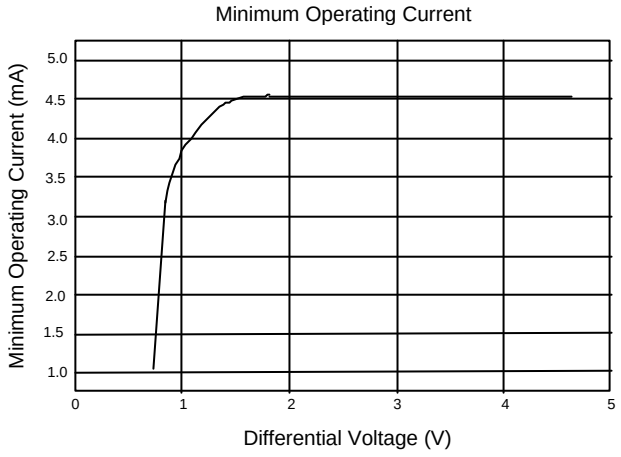
Line Transient Response



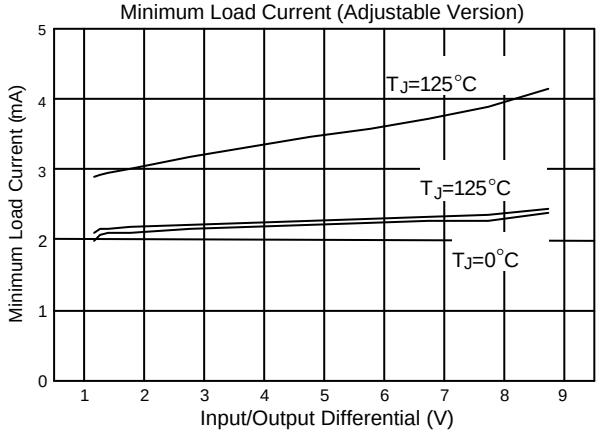
Dropout Voltage (V_{OUT}=3.3V)



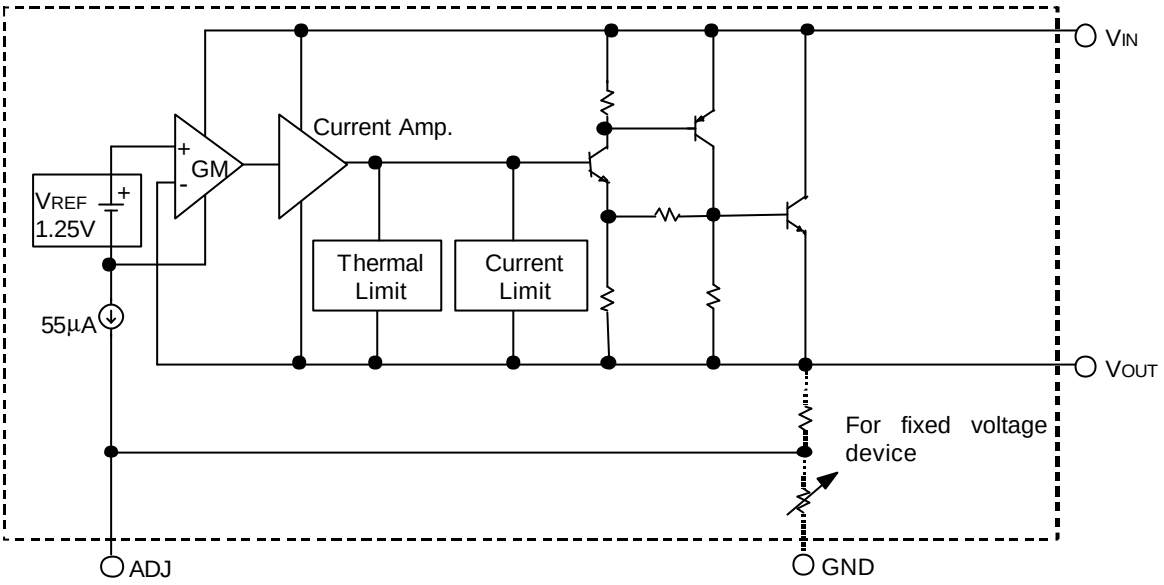
Minimum Operating Current



Minimum Load Current (Adjustable Version)



BLOCK DIAGRAM



PIN DESCRIPTIONS

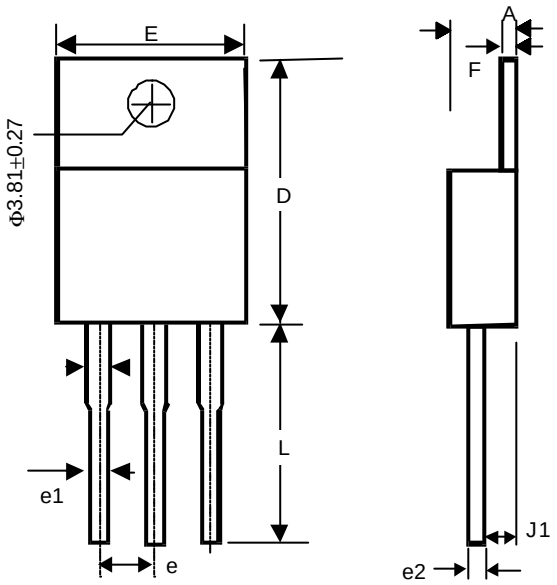
ADJ PIN - Providing V_{REF}=1.25V (typ.) for adjustable V_{OUT}. $V_{REF}=V_{OUT}-V_{ADJ}$ and I_{ADJ}=55µA (typ.)
(GND PIN - Power ground.)

VOUT PIN - Adjustable output voltage.

VIN PIN - Power Input.

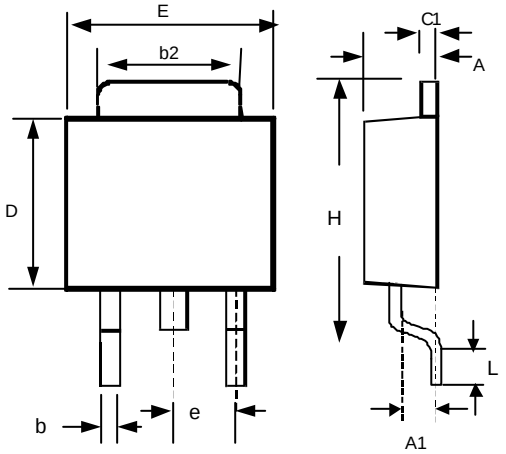
PHYSICAL DIMENSIONS

- **TO-220 (unit: mm)**



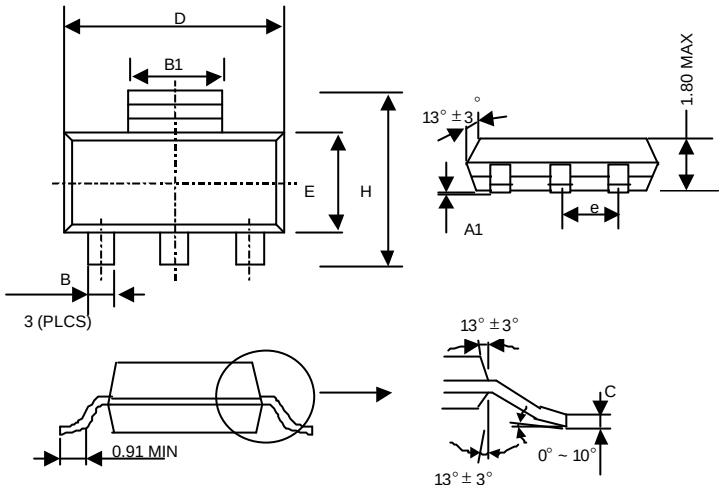
SYMBOL	MIN	MAX
A	3.56	4.82
D	14.23	16.51
E	9.66	10.66
e	2.29	2.79
e1	0.50	1.15
e2	-	1.10
F	0.51	1.39
J1	2.04	2.92
L	12.70	14.73

- **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	-

- **SOT-223**

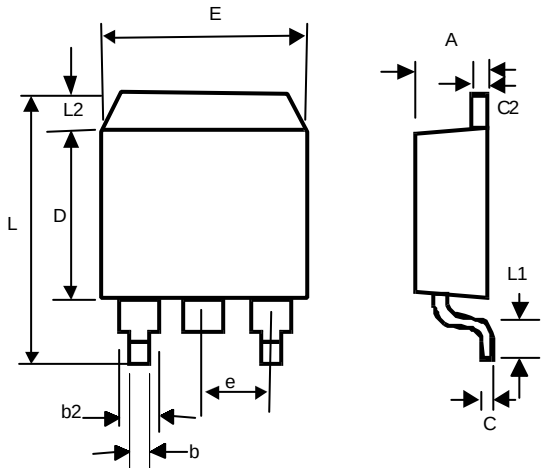


SYMBOL	MIN	MAX
A1	0.02	0.12
B	0.60	0.80
B1	2.90	3.15
C	0.24	0.35
D	6.30	6.80
E	3.30	3.70
e	2.30 (TYP.)	
H	6.70	7.30

- **SOT-223 Marking**

Part No.	**Marking**
AIC1117ACY	BS17
AIC1117A-28CY	BS28
AIC1117A-33CY	BS33
AIC1117A-50CY	BS50

- **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