
1A Low Dropout Linear Regulator**■ FEATURES**

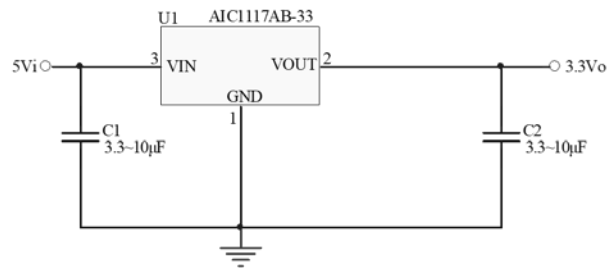
- 1.5V maximum dropout at full load current
- Fast transient response
- Output current limiting
- Built-in thermal shutdown
- Good noise rejection
- Low-ESR Ceramic Capacitor (MLCC) Required for Stability
- 3-Terminal Adjustable or Fixed 1.5V, 1.8V, 2.5V, 3.3V, 5.0V
- Packages: SOT223-3, TO252-3

■ DESCRIPTION

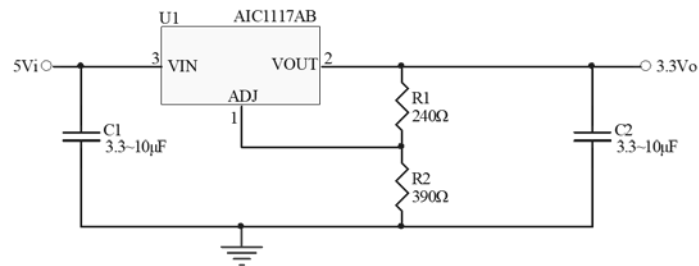
AIC1117AB is a low dropout positive adjustable or fixed-mode regulator with minimum of 1A output current capability. The product is specifically designed to provide well-regulated supply for low voltage IC applications such as high-speed bus termination and low current 3.3V logic supply. AIC1117AB is also well suited for other applications such as VGA cards. AIC1117AB is guaranteed to have lower than 1.4V dropout at full load current making it ideal to provide well-regulated outputs of 1.25 to 5.0 with 6.4V to 12V input supply.

■ APPLICATIONS

- Active SCSI Terminators
- Post Regulators for Switching Supplies
- Battery Chargers
- PC Add-On Card

■ TYPICAL APPLICATION CIRCUIT


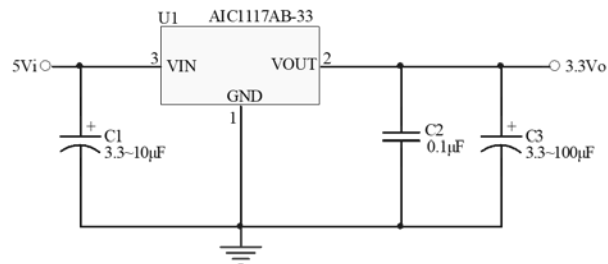
(a) Fixed Voltage Regulator



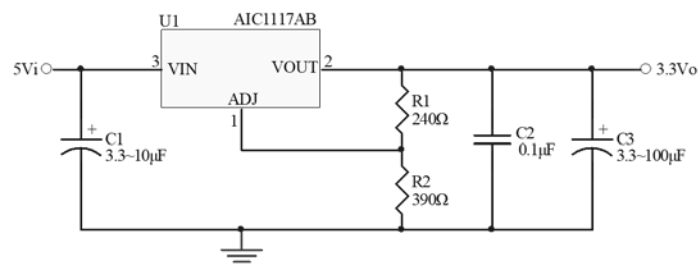
$$V_{OUT} = V_{REF} \times (1 + R_2/R_1); V_{REF} = 1.250V$$

(b) Adjustable Voltage Regulator

Fig. 1 AIC1117AB Typical Application Circuit (Using Multilayer Ceramic Capacitor (MLCC))



(a) Fixed Voltage Regulator



$$V_{OUT} = V_{REF} \times (1 + R_2/R_1); V_{REF} = 1.250V$$

(b) Adjustable Voltage Regulator

Fig. 2 AIC1117AB Typical Application Circuit (Using Aluminum Electrolytic Capacitor (AL))

ORDERING INFORMATION

AIC1117AB-XXXXXXXX

PACKING TYPE
TR: TAPE & REEL
TB: TUBE

PACKAGING TYPE
E3: TO252-3
Y3: SOT223-3

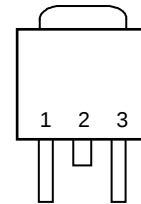
G: Green Package

OUTPUT VOLTAGE
DEFAULT: ADJUSTABLE
15: 1.5V
18: 1.8V
25: 2.5V
33: 3.3V
50: 5.0V

PIN CONFIGURATION

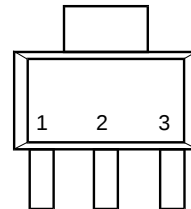
TO252-3
TOP VIEW

1: ADJ (GND)
2: VOUT (TAB)
3: VIN



SOT223-3
TOP VIEW

1: ADJ (GND)
2: VOUT (TAB)
3: VIN



Example: AIC1117AB-25GE3TR

→ 2.5V version in TO252-3 Green
Package & Taping & Reel
Packing Type

AIC1117AB-25GY3TR

→ 2.5V version in SOT223-3 Green
Package & Taping & Reel
Packing Type

ABSOLUTE MAXIMUM RATINGS

VIN Pin to GND	-0.3V to 15V
Maximum Junction Temperature	150°C
Storage Temperature Range	-65°C~150°C
Lead Temperature (Soldering, 10 sec)	260°C
Operating Temperature Range	-40°C~85°C
Thermal Resistance Junction to Ambient, θ_{JA}	
SOT223-3	155°C/W
TO252-3	100°C/W
Thermal Resistance Junction to Case, θ_{JC}	
SOT223-3	15°C/W
TO252-3	12.5°C/W

(Assume no ambient airflow, no heatsink)

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

■ ELECTRICAL CHARACTERISTICS

(T_A=25°C, unless otherwise specified) (Note 1)

PARAMETER	TEST CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operation Input Voltage		V _{IN}	2.75		12	V
Reference Voltage	AIC1117AB, T _J =25°C, (V _{IN} -V _{OUT})=1.5V, I _{OUT} =10mA	V _{REF}	1.225	1.250	1.275	
Output Voltage	AIC1117AB-15, I _{OUT} =10mA, T _J =25°C, 3V ≤ V _{IN} ≤ 12V	V _{OUT}	1.470	1.500	1.530	V
	AIC1117AB-18, I _{OUT} =10mA, T _J =25°C, 3.3V ≤ V _{IN} ≤ 12V		1.764	1.800	1.836	
	AIC1117AB-25, I _{OUT} =10mA, T _J =25°C, 4V ≤ V _{IN} ≤ 12V		2.450	2.500	2.550	
	AIC1117AB-33, I _{OUT} =10mA, T _J =25°C, 4.8V ≤ V _{IN} ≤ 12V		3.235	3.300	3.365	
	AIC1117AB-50, I _{OUT} =10mA, T _J =25°C, 6.5V ≤ V _{IN} ≤ 12V		4.900	5.000	5.100	
Line Regulation	AIC1117AB-XX, I _{OUT} =10mA, (V _{OUT} +1.5V)<V _{IN} <12V, T _J =25°C (Note 2, 3)	V _{LNR}		0.2	0.5	%
Load Regulation	AIC1117AB, V _{IN} =3.3V 10mA<I _{OUT} <1A, T _J =25°C (Note 2, 3)	V _{LDR}		0.4	1	%
	AIC1117AB-15, V _{IN} =3V 10mA<I _{OUT} <1A, T _J =25°C (Note 2, 3)			12	15	mV
	AIC1117AB-18, V _{IN} =3.3V 10mA<I _{OUT} <1A, T _J =25°C (Note 2, 3)			15	18	mV
	AIC1117AB-25, V _{IN} =4V 10mA<I _{OUT} <1A, T _J =25°C (Note 2, 3)			20	25	mV
	AIC1117AB-33, V _{IN} =5V 10mA<I _{OUT} <1A, T _J =25°C (Note 2, 3)			26	33	mV
	AIC1117AB-50, V _{IN} =6.5V 10mA<I _{OUT} <1A, T _J =25°C (Note 2, 3)			40	50	mV
Dropout Voltage(V _{IN} -V _{OUT})	AIC1117AB/AIC1117AB-XX, I _{OUT} =1A, ΔV _{OUT} = 1%V _{OUT}	V _{DROP}		1.3	1.5	V
Current Limit	AIC1117AB/AIC1117AB-XX, (V _{IN} -V _{OUT})=3V	I _{LIM}	1.1			A
Minimum Load Current	AIC1117AB-XX, 0°C ≤ T _J ≤ 125°C			5	7	mA
Ripple Rejection	AIC1117AB-XX, f=120Hz, V _{IN} =V _{OUT} +3V, C _{OUT} =10μF, 4.7μF, 3.3μF	PSRR	50	60	70	dB
Temperature Stability	I _{OUT} =10mA			0.5		%

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

- Note 2.** See thermal regulation specifications for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead = 1/18" from the package.
- Note 3.** Line and load regulation are guaranteed up to the maximum power dissipation of 15W. Power dissipation is determined by the difference between input and output differential and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range.
- Note 4.** Quiescent current is defined as the minimum output current required in maintaining regulation. At 12V input/output differential the device is guaranteed to regulate if the output current is greater than 10mA.
- Note 5.** To prevent oscillation, a 4.7 μ F minimum Y5V or a 1 μ F minimum X7R or X5R dielectric is strongly recommended if ceramics are used as input/output capacitors.

TYPICAL PERFORMANCE CHARACTERISTICS

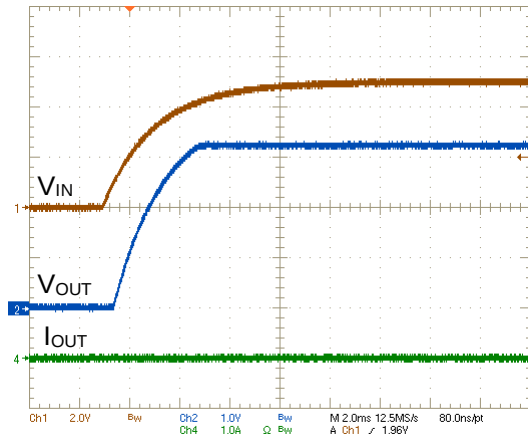


Fig. 3 Power On ($V_{IN}=5V$, $V_{OUT}=3.3V$, $I_{OUT}=0A$)

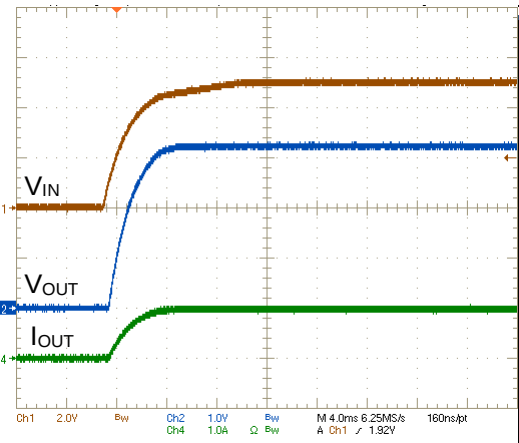


Fig. 4 Power On ($V_{IN}=5V$, $V_{OUT}=3.3V$, $I_{OUT}=1A$)

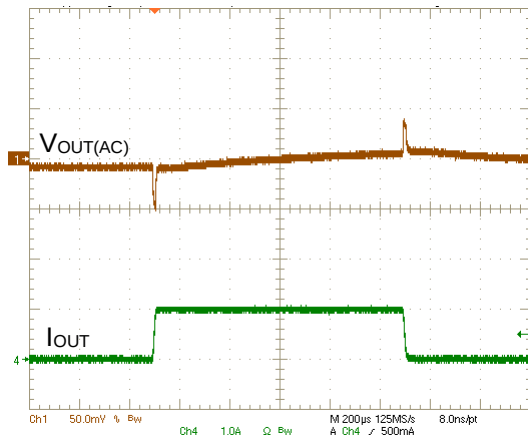


Fig. 5 Load Transient ($V_{IN}=5V$, $V_{OUT}=1.5V$, $I_{OUT}=0.01A\sim1A$)

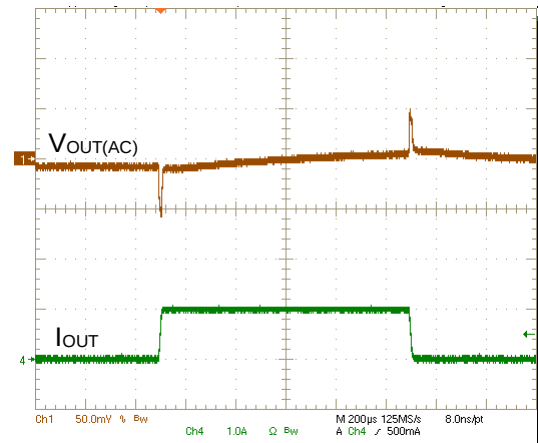


Fig. 6 Load Transient ($V_{IN}=5V$, $V_{OUT}=1.8V$, $I_{OUT}=0.01A\sim1A$)

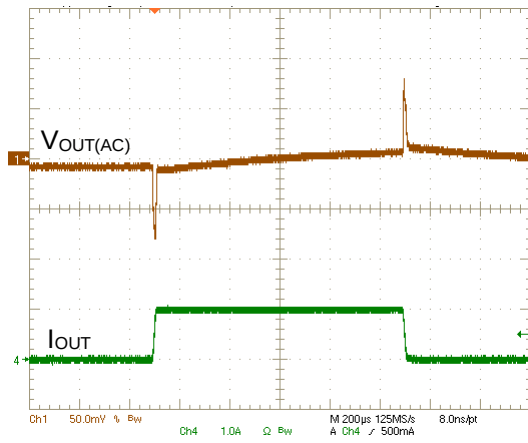


Fig. 7 Load Transient ($V_{IN}=5V$, $V_{OUT}=2.5V$, $I_{OUT}=0.01A\sim1A$)

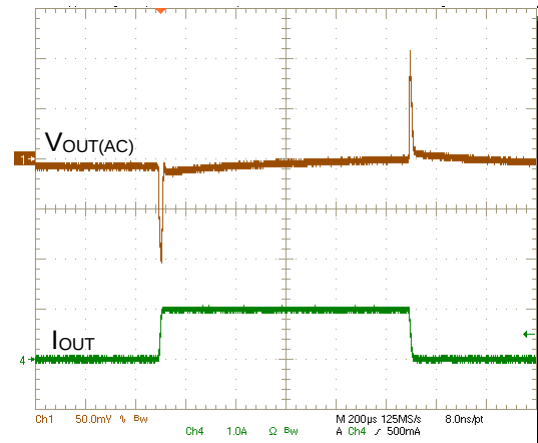


Fig. 8 Load Transient ($V_{IN}=5V$, $V_{OUT}=3.3V$, $I_{OUT}=0.01A\sim1A$)

■ TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

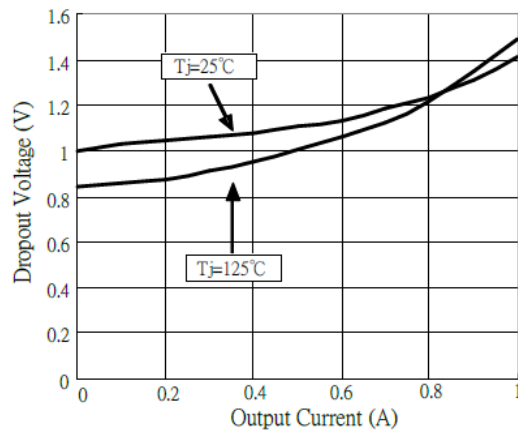


Fig. 9 Dropout Voltage vs. Output Current

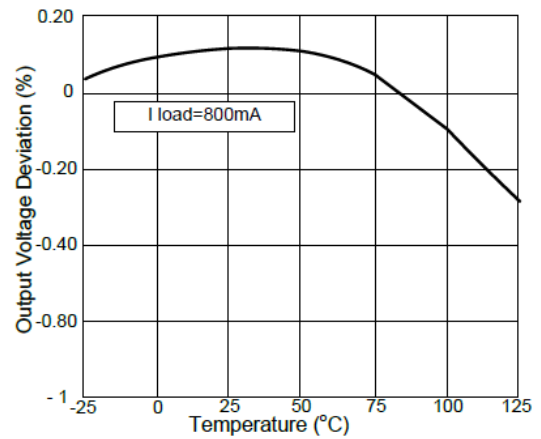


Fig. 10 Load Regulation vs. Temperature

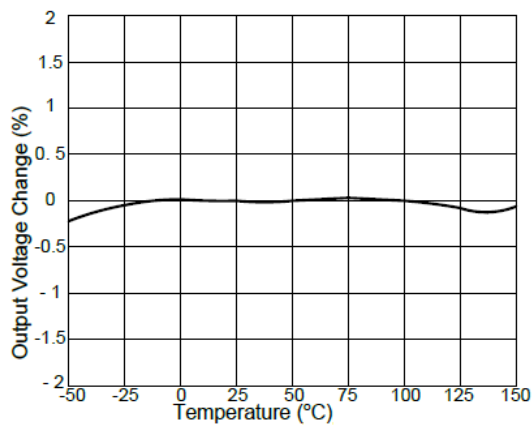
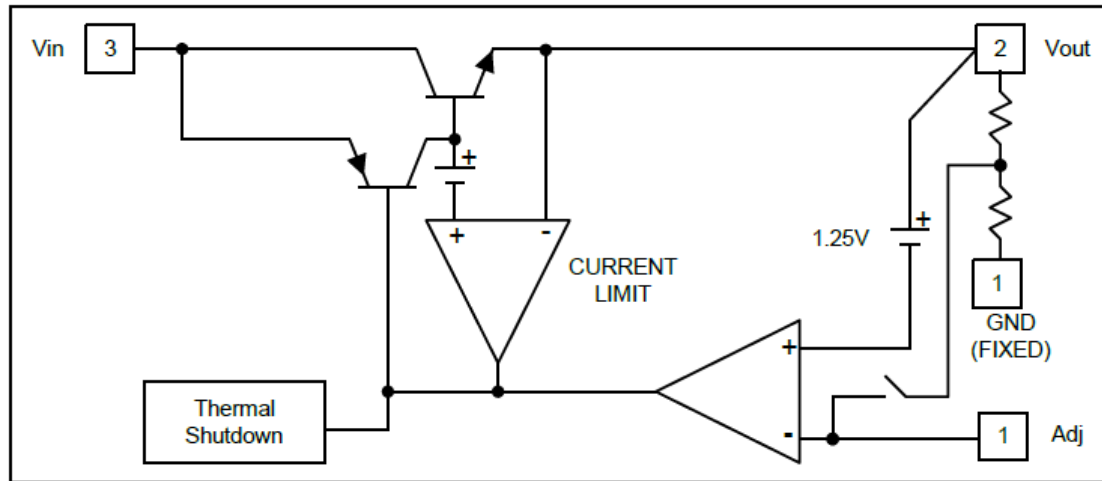


Fig. 11 Percent Change in Output Voltage vs. Temperature

■ BLOCK DIAGRAM



Functional Block Diagram of AIC1117AB

■ PIN DESCRIPTION

- ADJ(GND) Pin - A resistor divider from this pin to the VOUT pin and ground sets the output voltage. (Ground only for Fixed-Mode)
- VOUT Pin - The output of the regulator. A minimum of 3.3 μ F EL capacitor ($10m\Omega \leq ESR \leq 1\Omega$) must be connected from this pin to ground to insure stability. (Note 5)
- VIN Pin - The input pin of regulator. Typically a large storage capacitor is connected from this pin to ground to insure that the input voltage does not sag below the minimum dropout voltage during the load transient response. This pin must always be 1.5V higher than VOUT in order for the device to regulate properly. (Note 5)

■ APPLICATION INFORMATION

LAYOUT GUIDE

Best performance is achieved by placing C1 and C2 on the same side of the PCB as the AIC1117AB, and as close as is practical to the package. The ground connections for C1 and C2 should be back to the AIC1117AB ground plane using as wide, and

as short, of a copper trace as is practical. To ensure the device does not overheat, connect the pad to VOUT plane with an appropriate amount of copper PCB area.

Figures 12 and 13 show the layout diagrams of AIC1117AB.

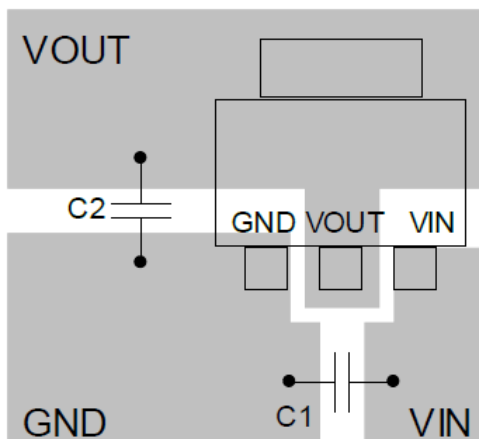


Fig. 12 Top Layer for Fixed Voltage Regulator

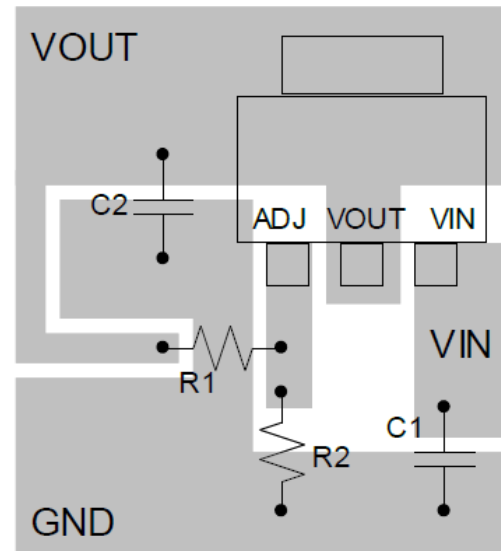
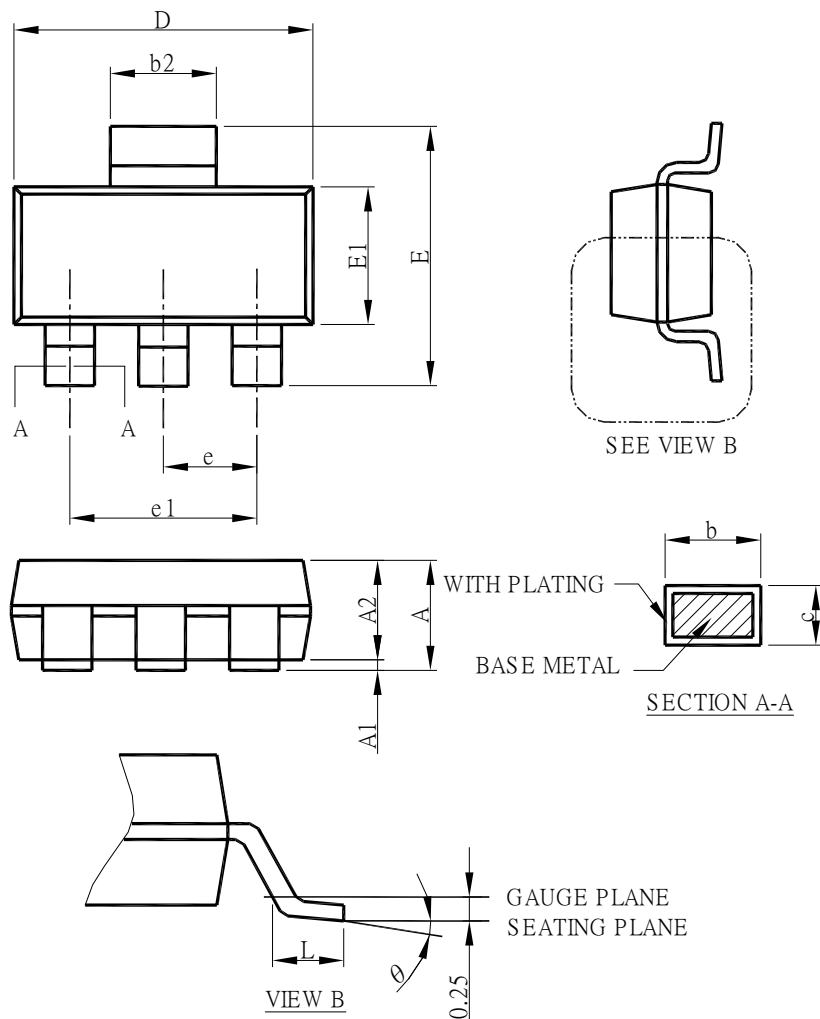


Fig. 13 Top Layer for Adjustable Voltage Regulator

■ PHYSICAL DIMENSIONS

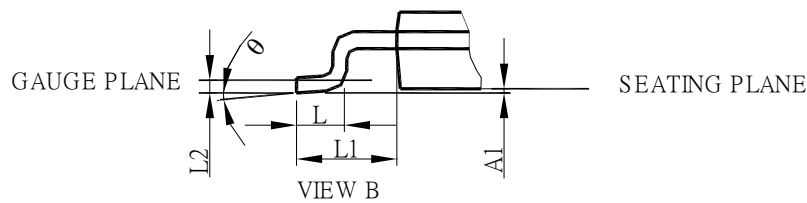
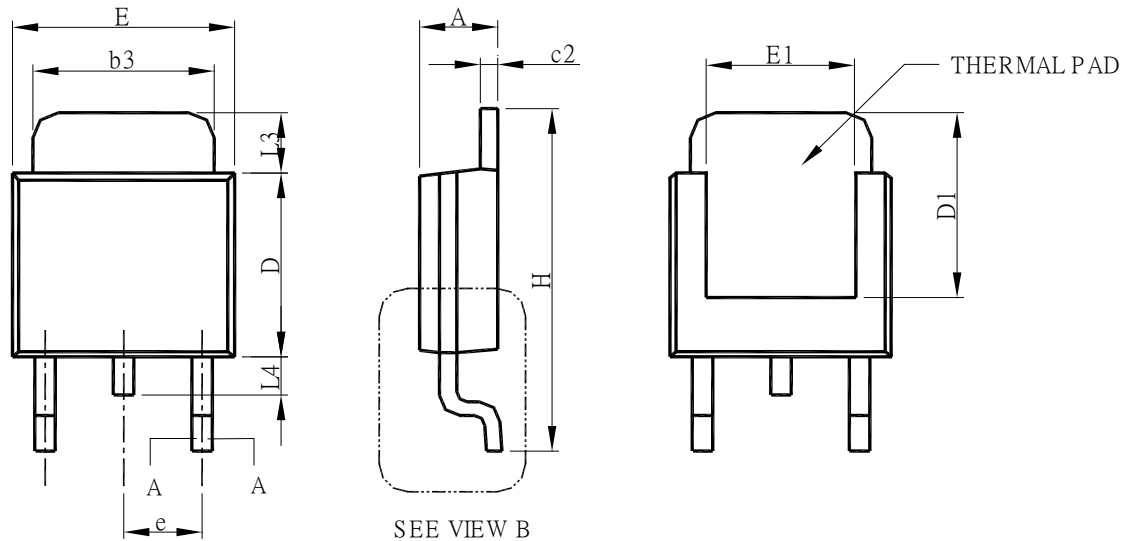
● SOT223-3



Note: 1. Refer to JEDEC TO-261AA.

2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.
3. Dimension "E1" does not include inter-lead flash or protrusions.
4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

SYMBOL	SOT223-3	
	MILLIMETERS	
	MIN.	MAX.
A		1.80
A1	0.02	0.10
A2	1.55	1.65
b	0.66	0.84
b2	2.90	3.10
c	0.23	0.33
D	6.30	6.70
E	6.70	7.30
E1	3.30	3.70
e	2.30 BSC	
e1	4.60 BSC	
L	0.90	
θ	0°	8°



- Note: 1. Refer to JEDEC TO-252AA and AB.
 2. Dimension "E" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side .
 3. Dimension "D" does not include inter-lead flash or protrusions.
 4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

S Y M B O L	TO252-3	
	MILLIMETERS	
	MIN.	MAX.
A	2.19	2.38
A1	0.00	0.13
b	0.64	0.89
b3	4.95	5.46
c	0.46	0.61
c2	0.46	0.89
D	5.33	6.22
D1	4.60	6.00
E	6.35	6.73
E1	3.90	5.46
e	2.28 BSC	
H	9.40	10.41
L	1.40	1.78
L1	2.67 REF	
L2	0.51 BSC	
L3	0.89	2.03
L4	--	1.02
θ	0°	8°

Note:

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