

1A LDO VOLTAGE REGULATOR

DESCRIPTION

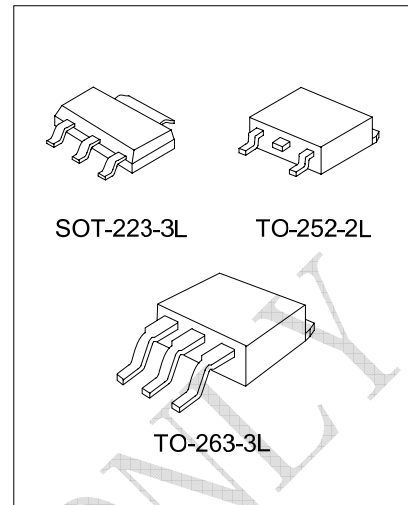
The SA1117B is a positive low voltage dropout regulator, voltage dropout is only 1.3V at 1A.

SA1117B provides two versions: fixed and adjustable versions. V_{OUT} has a tolerance of less than 1.5% for fixed versions 1.5V, 1.8V, 2.5V, 3.3V, 5.0V and adjustable version or 2% output accuracy for fixed version 1.2V.

The SA1117B offers some key features include thermal shutdown and current limiting. It is suitable for all electronic products.

FEATURES

- * 1.5% output accuracy for fixed versions 1.5V, 1.8V, 2.5V, 3.3V, 5.0V and adjustable version
- * 2% output accuracy for fixed version 1.2V
- * Low Dropout Voltage: 1.3V at 1A output current
- * Current Limiting
- * Thermal Shutdown
- * Temperature Range: -40°C to 125°C



APPLICATIONS

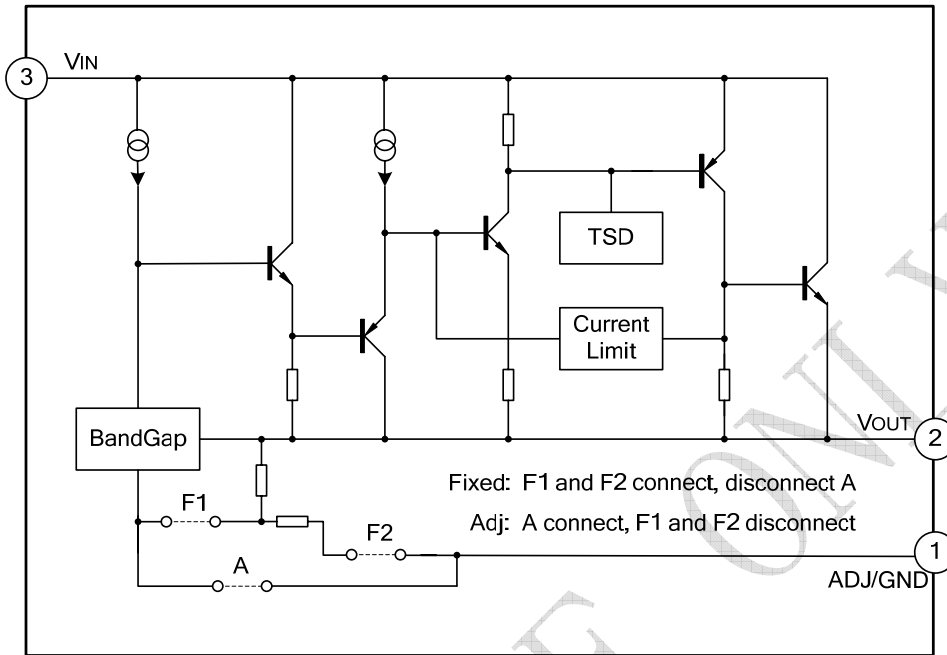
- * Laptop, Palmtop, and Notebook Computers
- * Battery Charger
- * SCSI-II Active Terminator
- * Cellular Phone
- * Cordless Telephones
- * Battery Powered Systems
- * Portable Instrumentation
- * SMPS Post-Regulator

ORDERING INFORMATION (Temperature range: -40°C ~125°C)



Part No.	Package	Marking	Material	Packing Type	
SA1117BH-ADJTR	SOT-223-3L	SA1117BH-ADJ	Pb free	Tape & Reel	
SA1117BH-1.2TR		SA1117BH-1.2	Pb free	Tape & Reel	
SA1117BH-1.5TR		SA1117BH-1.5	Pb free	Tape & Reel	
SA1117BH-1.8TR		SA1117BH-1.8	Pb free	Tape & Reel	
SA1117BH-2.5TR		SA1117BH-2.5	Pb free	Tape & Reel	
SA1117BH-3.3TR		SA1117BH-3.3	Pb free	Tape & Reel	
SA1117BH-5.0TR		SA1117BH-5.0	Pb free	Tape & Reel	
SA1117BD-ADJ	TO-252-2L	SA1117BD-ADJ	Pb free	Tube	
SA1117BD-ADJTR		SA1117BD-ADJ	Pb free	Tape & Reel	
SA1117BD-1.2		SA1117BD-1.2	Pb free	Tube	
SA1117BD-1.2 TR		SA1117BD-1.2	Pb free	Tape & Reel	
SA1117BD-1.5		SA1117BD-1.5	Pb free	Tube	
SA1117BD-1.5TR		SA1117BD-1.5	Pb free	Tape & Reel	
SA1117BD-1.8		SA1117BD-1.8	Pb free	Tube	
SA1117BD-1.8TR		SA1117BD-1.8	Pb free	Tape & Reel	
SA1117BD-2.5		SA1117BD-2.5	Pb free	Tube	
SA1117BD-2.5TR		SA1117BD-2.5	Pb free	Tape & Reel	
SA1117BD-3.3		SA1117BD-3.3	Pb free	Tube	
SA1117BD-3.3TR		SA1117BD-3.3	Pb free	Tape & Reel	
SA1117BD-5.0		SA1117BD-5.0	Pb free	Tube	
SA1117BD-5.0TR		SA1117BD-5.0	Pb free	Tape & Reel	
SA1117BS-ADJ		TO-263-3L	SA1117BS-ADJ	Pb free	Tube
SA1117BS-ADJTR			SA1117BS-ADJ	Pb free	Tape & Reel
SA1117BS-1.2	SA1117BS-1.2		Pb free	Tube	
SA1117BS-1.2TR	SA1117BS-1.2		Pb free	Tape & Reel	
SA1117BS-1.5	SA1117BS-1.5		Pb free	Tube	
SA1117BS-1.5TR	SA1117BS-1.5		Pb free	Tape & Reel	
SA1117BS-1.8	SA1117BS-1.8		Pb free	Tube	
SA1117BS-1.8TR	SA1117BS-1.8		Pb free	Tape & Reel	
SA1117BS-2.5	SA1117BS-2.5		Pb free	Tube	
SA1117BS-2.5TR	SA1117BS-2.5		Pb free	Tape & Reel	
SA1117BS-3.3	SA1117BS-3.3		Pb free	Tube	
SA1117BS-3.3TR	SA1117BS-3.3		Pb free	Tape & Reel	
SA1117BS-5.0	SA1117BS-5.0		Pb free	Tube	
SA1117BS-5.0TR	SA1117BS-5.0		Pb free	Tape & Reel	

BLOCK DIAGRAM



ABOSOLUTE MAXIMUM RATINGS

Characteristics	Symbol	Ratings	Unit
Input Supply Voltage	V _{IN}	20	V
Lead Temperature (Soldering, 5 seconds)	T _{Lead}	260	°C
Operating Junction Temperature Range	T _J	150	°C
Storage Temperature Range	T _{stg}	-65 ~ +150	V
Power Dissipation	P _D	Internally Limited (Note1)	mW
ESD Tolerance (Minimum)	ESD	2000	V

Note1: The maximum allowable power dissipation is a function of maximum operating junction temperature, T_J (max), the junction to ambient thermal resistance, θ_{JA}, and the ambient temperature T_{amb}. The maximum allowable power dissipation at any ambient temperature is given: P_D (max) = (T_J (max) - T_{amb})/θ_{JA}, exceeding the maximum allowable power limit will result in excessive die temperature; thus, the regulator will go into thermal shutdown. The junction to ambient thermal resistance, θ_{JA} of some packages may be different, The value of θ_{JA} depends on mounting technique.

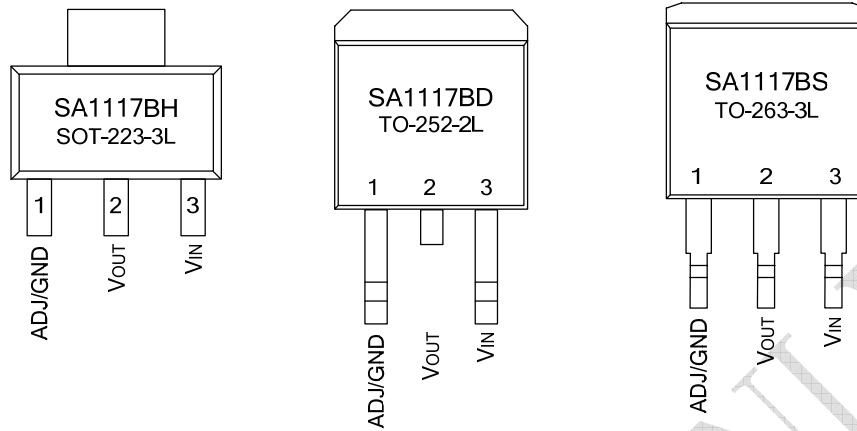
RECOMMENDED OPERATING CONDITIONS

Characteristics	Symbol	Ratings	Unit
Input voltage	V _{IN}	15	V
Operating Junction Temperature Range	T _J	-40 ~ +125	°C

ELECTRICAL CHARACTERISTICS($T_{amb}=25^{\circ}\text{C}$, unless otherwise specified. Limits appearing in Boldface type apply over the entire junction temperature range for operation, -40°C to 125°C .)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Reference Voltage	VREF	SA1117B-ADJ, $I_{OUT}=10\text{mA}$, $V_{IN}-V_{OUT}=2\text{V}$, $T_J=25^{\circ}\text{C}$ $10\text{mA}\leq I_{OUT}\leq 1\text{A}$, $1.4\text{V}\leq V_{IN}-V_{OUT}\leq 10\text{V}$	1.231 1.225	1.250 1.250	1.268 1.275	V
Output Voltage	VOUT	SA1117B-1.2, $I_{OUT}=10\text{mA}$, $V_{IN}=3.2\text{V}$, $T_J=25^{\circ}\text{C}$ $10\text{mA}\leq I_{OUT}\leq 1\text{A}$, $3.0\text{V}\leq V_{IN}\leq 10\text{V}$	1.176 1.152	1.2 1.2	1.224 1.248	V
		SA1117B-1.5, $I_{OUT}=10\text{mA}$, $V_{IN}=3.5\text{V}$, $T_J=25^{\circ}\text{C}$ $10\text{mA}\leq I_{OUT}\leq 1\text{A}$, $3.0\text{V}\leq V_{IN}\leq 10\text{V}$	1.477 1.470	1.500 1.500	1.522 1.530	V
		SA1117B-1.8, $I_{OUT}=10\text{mA}$, $V_{IN}=3.8\text{V}$, $T_J=25^{\circ}\text{C}$, $0\leq I_{OUT}\leq 1\text{A}$, $3.2\text{V}\leq V_{IN}\leq 10\text{V}$	1.773 1.746	1.800 1.800	1.827 1.854	V
		SA1117B -2.5, $I_{OUT}=10\text{mA}$, $V_{IN}=4.5\text{V}$, $T_J=25^{\circ}\text{C}$, $0\leq I_{OUT}\leq 1\text{A}$, $3.9\text{V}\leq V_{IN}\leq 10\text{V}$	2.462 2.450	2.500 2.500	2.538 2.550	V
		SA1117B-3.3, $I_{OUT}=10\text{mA}$, $V_{IN}=5\text{V}$, $T_J=25^{\circ}\text{C}$, $0\leq I_{OUT}\leq 1\text{A}$, $4.75\text{V}\leq V_{IN}\leq 10\text{V}$	3.250 3.235	3.300 3.300	3.349 3.365	V
		SA1117B-5.0, $I_{OUT}=10\text{mA}$, $V_{IN}=7\text{V}$, $T_J=25^{\circ}\text{C}$, $0\leq I_{OUT}\leq 1\text{A}$, $6.5\text{V}\leq V_{IN}\leq 12\text{V}$	4.925 4.900	5.000 5.000	5.075 5.10	V
		Line Regulation	Rline	$V_{INMIN}\leq V_{IN}\leq 12\text{V}$, $V_{OUT}=\text{Fixed/Adj}$, $I_{OUT}=10\text{mA}$	—	3
Load Regulation	Rload	$10\text{mA}\leq I_{OUT}\leq 1\text{A}$, $V_{OUT}=\text{Fixed/Adj}$	—	6	20	mV
Dropout Voltage	Vdrop	$I_{OUT}=100\text{mA}$	—	1.00	1.20	V
		$I_{OUT}=500\text{mA}$	—	1.05	1.25	
		$I_{OUT}=1\text{A}$	—	1.30	1.45	
Quiescent Current	Iq	$4.25\text{V}\leq V_{IN}\leq 6.5\text{V}$	—	5	10	mA
Ripple Rejection	PSRR	fRIPPLE=120Hz, $(V_{IN}-V_{OUT})=3\text{V}$, VRIPPLE=1VPP	60	75	—	dB
Adjust pin Current	Iadj		—	60	120	μA
Adjust pin Current Change		$0\leq I_{OUT}\leq 1\text{A}$, $1.4\text{V}\leq V_{IN}-V_{OUT}\leq 10\text{V}$	—	0.2	5	μA
Temperature Stability			—	0.5	—	%
Long Term Stability		$T_{AMB}=125^{\circ}\text{C}$, 1000Hrs	—	0.3	—	%
RMS Output Noise		% of VOUT, $10\text{Hz}\leq f\leq 10\text{kHz}$	—	0.003	—	%

PIN CONFIGURATION



PIN DESCRIPTION

Pin No.	Pin name	I/O	Functions
1	GND/ADJ	--/O	Ground/ADJ
2	V _{OUT}	O	Output voltage
3	V _{IN}	I	Input supply voltage

FUNCTION DESCRIPTION

The SA1117B is a LDO regulator, its pass transistor is made up of a single NPN transistor being driven by a PNP. The dropout voltage is defined as: $V_{DROP} = V_{BE} + V_{SAT}$.

The SA1117B series of fixed and adjustable regulators are easy to use. Output voltages are 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, and 5.0V. On-chip thermal shut down provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The SA1117B requires an output capacitor for device stability. Its value of 22μF tantalum covers all cases of bypassing the adjustment terminal. Without bypassing the adjustment terminal smaller capacitors can be used with equally good results which depend upon the application circuit. In general, linear regulator stability decreases with higher output currents.

TYPICAL APPLICATION CIRCUIT

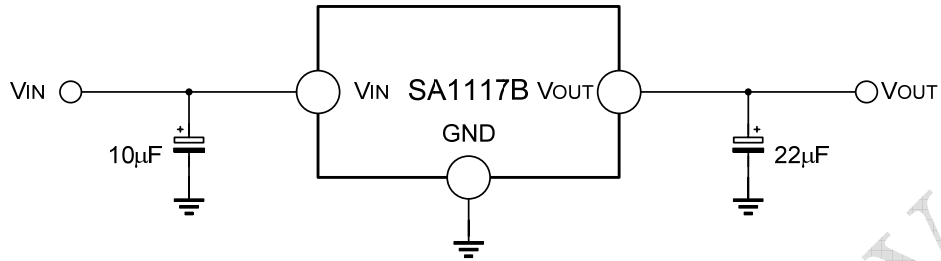


Figure 1. Typical Fixed Output Voltage

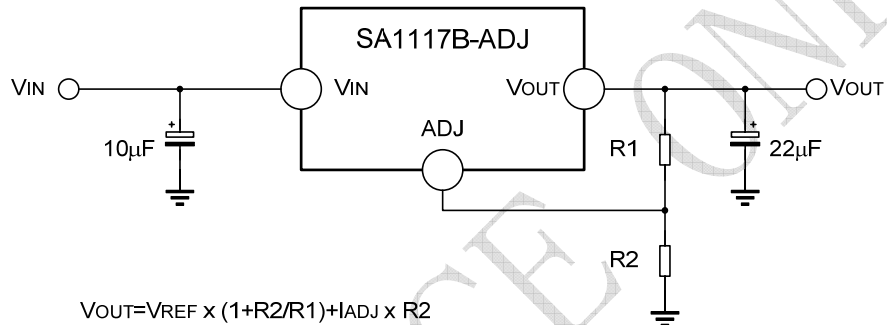
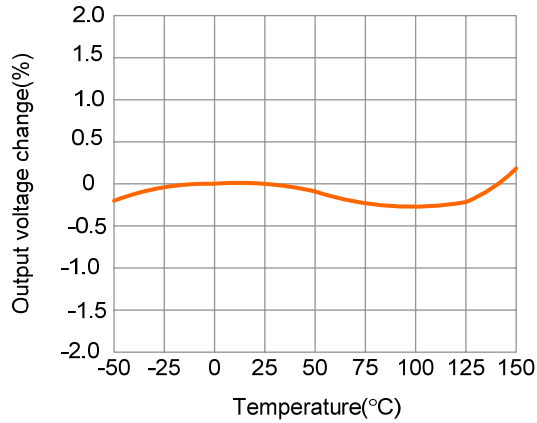


Figure 2. Typical Adjustable Output Voltage

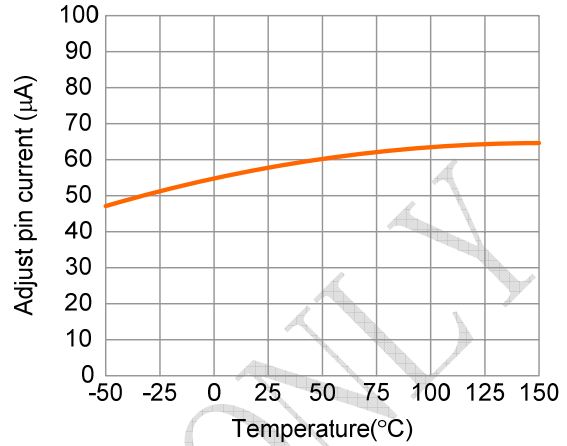
Note: The circuit and parameters are reference only, please set the parameters of the real application circuit based on the real test.

TYPICAL CHARACTERISTICS CURVES

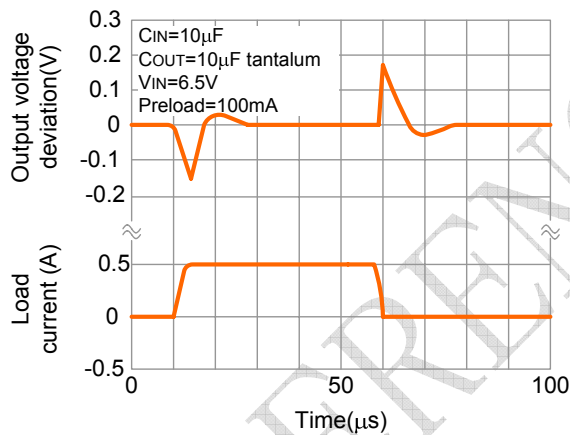
Temperature Stability



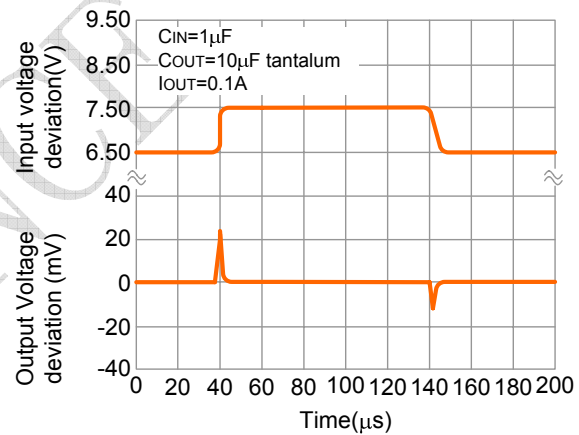
Adjust Pin Current



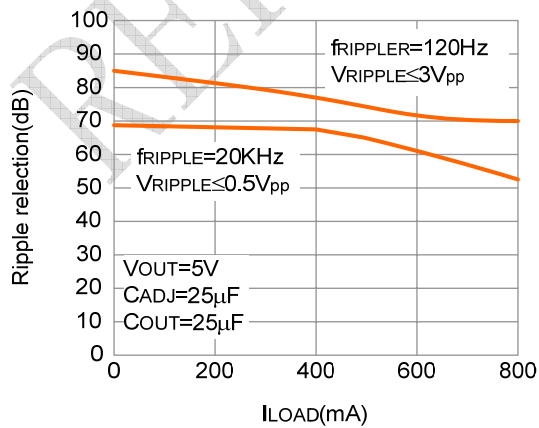
VOUT=5 V Load Transient Response



VOUT=5 V Line Transient Response



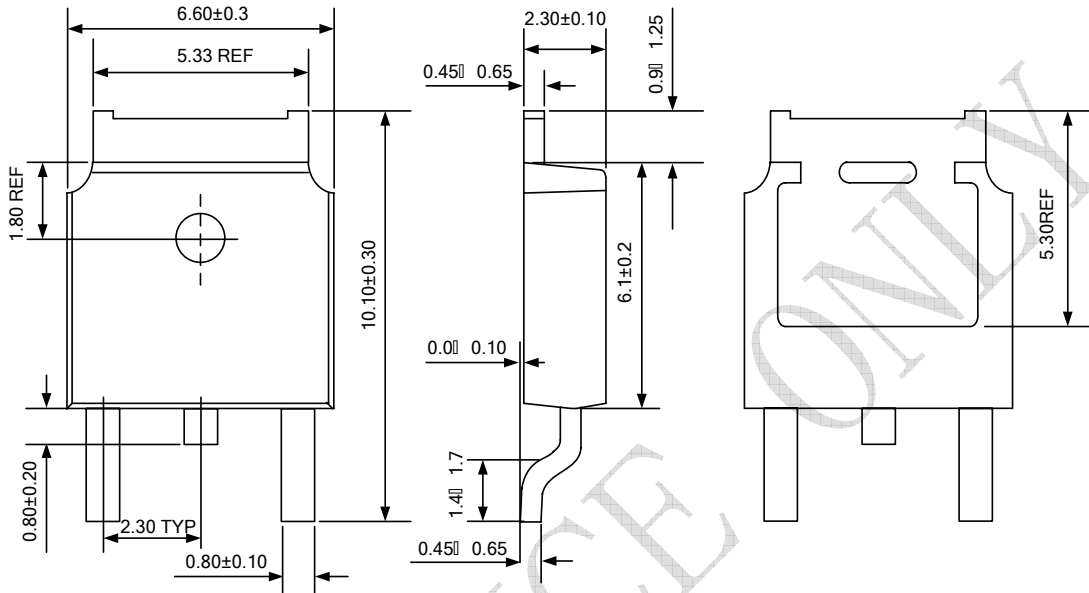
Ripple Rejection VS Current



PACKAGE OUTLINE

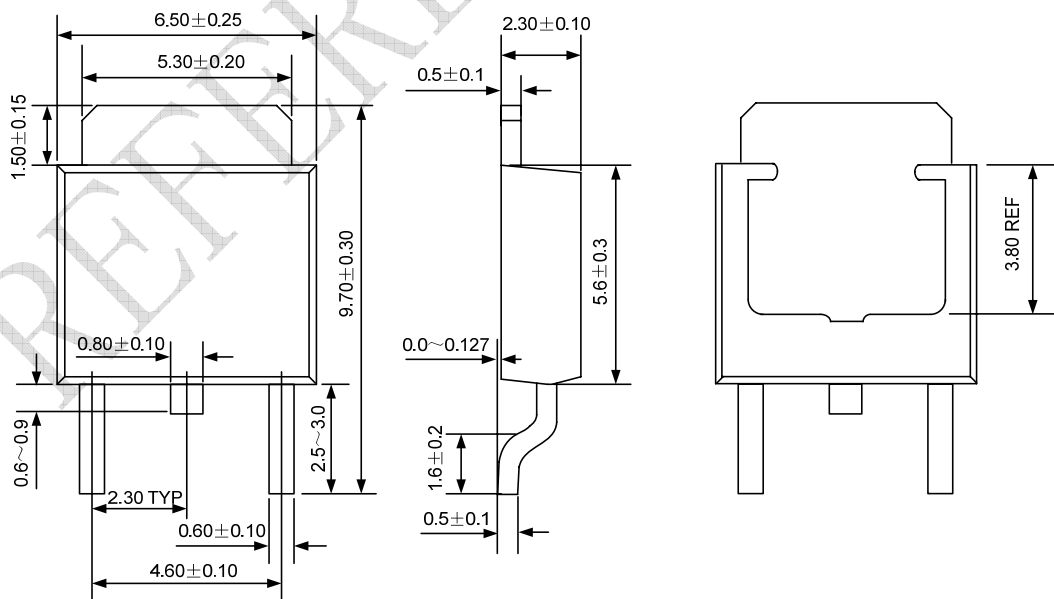
TO-252-2L

Unit: mm



TO-252-2L

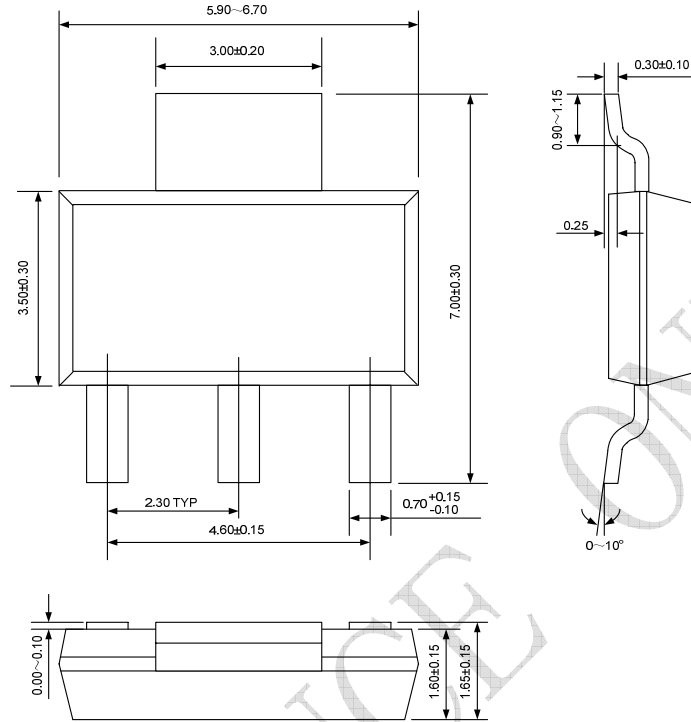
Unit: mm



PACKAGE OUTLINE

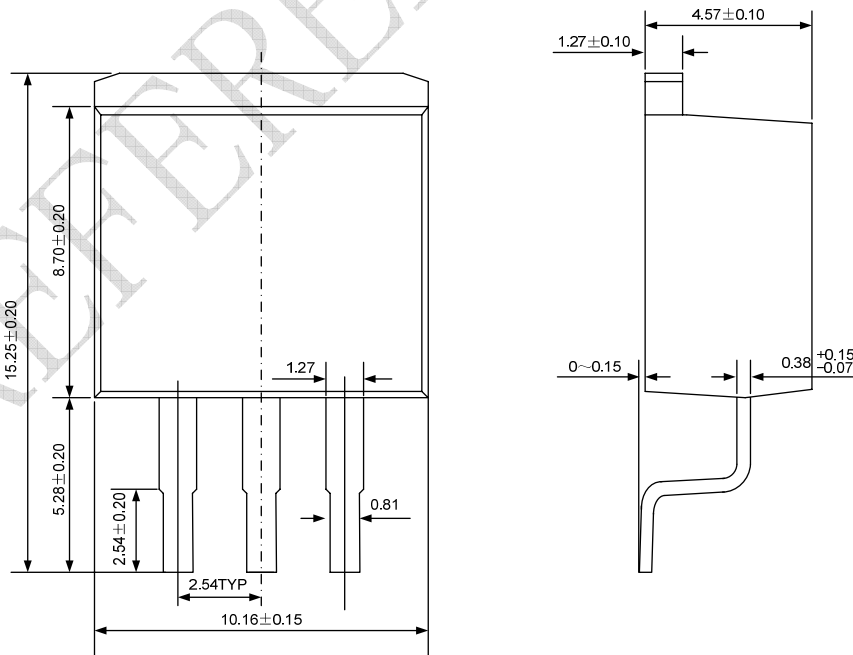
SOT-223-3L

Unit: mm



TO-263-3L

Unit: mm





REFERENCE ONLY

Disclaimer:

- Silan reserves the right to make changes to the information herein for the improvement of the design and performance without further notice!
- All semiconductor products malfunction or fail with some probability under special conditions. When using Silan products in system design or complete machine manufacturing, it is the responsibility of the buyer to comply with the safety standards strictly and take essential measures to avoid situations in which a malfunction or failure of such Silan products could cause loss of body injury or damage to property.
- Silan will supply the best possible product for customers!