

1A Bipolar Linear Regulator

General Description

The ETC1117 is the low dropout three-terminal regulators with fixed output 1.2V, 1.8V, 2.5V, 2.85V, 3.3V, 5V and an adjustable version, which can provide an output voltage from 1.25 to 12V with only two external resistors.

The ETC1117 features dropout of 1.1V at 1A load current and very low standby current 2mA. ETC1117 offers thermal shut down function to assure the stability of chip and power system.

The ETC1117 is available in the SOT-223, SOT89-3 and TO-252 package.

Features

- Maximum Output Current is 1.2A (TYP)
- Range of Operation Input Voltage up to 15V (MAX)
- Line Regulation is 0.03%/V (TYP)
- Standby Current is 2mA (TYP)
- Low Dropout Voltage is 1.1V (TYP)@0.8A

Applications

- Power Management for Computer Mother Board, Graphic Card
- LCD Monitor and LCD TV
- ADSL Modem
- Post Regulators for Switching Supplies

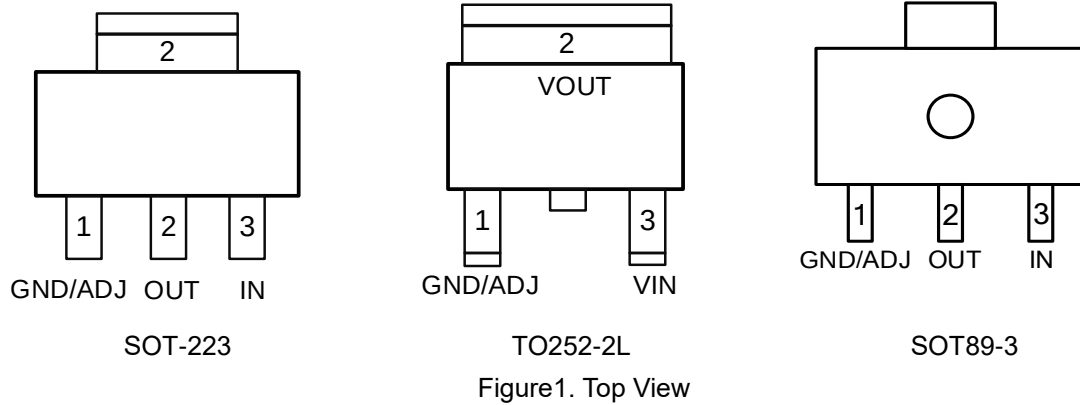
Device Information

ETC1117 XXX X

<u>XXX</u> Output Voltage		<u>X</u> Package		MSL
XXX	Output X.X-V For Example, V33 is 3.3V Output; Default is Adjustable Version	/	SOT-223	3
		B1	SOT89-3	3
		O	TO252	3

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Pin Configuration



Pin Function

Pin	Name	Description
1	GND / ADJ	Ground Pin (Fixed Type) / ADJ Pin (ADJ Type)
2	OUT	Output Pin
3	IN	Input Pin

Block Diagram

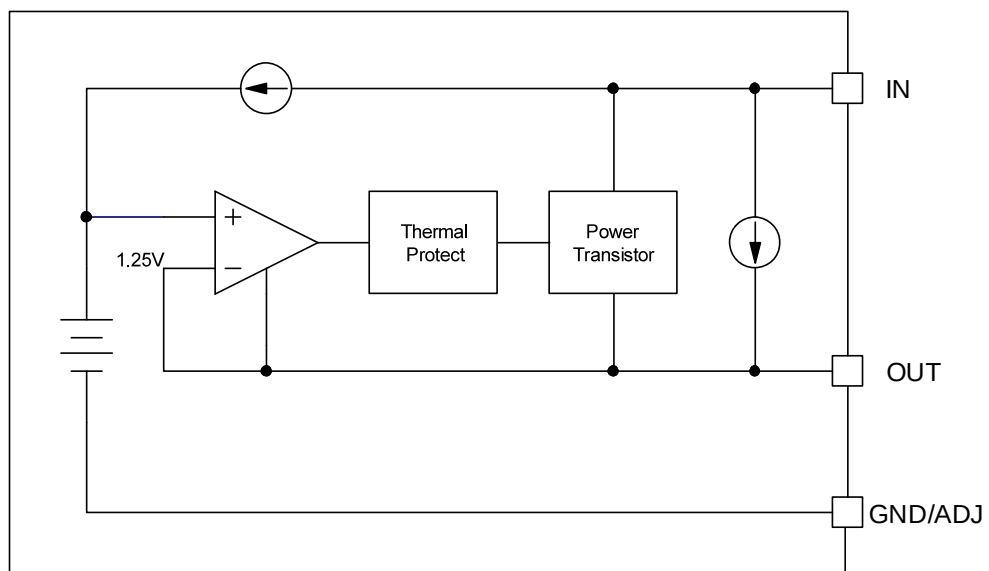


Figure2. Block Diagram

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Functional Description

ETC1117 is a low dropout voltage, three terminal regulators. Its application circuit is very simple: the fixed version only needs two capacitors and the adjustable version only needs two resistors and two capacitors to work. It is composed of some modules including start-up circuit, bias circuit, band gap, thermal shutdown, power transistors and its driver circuit and so on.

The thermal shutdown modules can assure chip and its application system working safety when the junction temperature is larger than 125°C.

Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted)

Symbol	Parameter		Rating	Unit
V _{IN}	Input Voltage		-0.3 ~ 18	V
I _{OUT_MAX}	Maximum Output Current		1.2	A
T _{JMAX}	Maximum Operating Junction Temperature		150	°C
T _{STG}	Storage Temperature		-40 ~ 150	°C
P _D	Power Dissipation	SOT-223	1.25	W
		TO252-2L	2.0	
		SOT89-3	0.92	
θ _{JC}	Thermal Resistance	SOT-223	20	°C/W
		TO252-2L	10	
		SOT89-3	14.7	

Recommended Operating Conditions

Symbol	Parameter	Rating	Unit
V _{IN} ⁽¹⁾	Input Voltage	-0.3 ~ 15	V
I _{OUT}	Maximum Output Current	1	A
T _J	Operating Junction Temperature	-40 ~ 125	°C

Notes1: The maximum input voltage should take into account the maximum power consumption (P_{D(MAX)}).

The calculation formula is as follows:

$$P_{D(MAX)} = (V_{IN(MAX)} - V_{OUT}) \times I_{OUT}$$

The maximum power consumption of the SOT-223 is 1250mW.

$$V_{IN(MAX)} = 1250mW / I_{OUT} + V_{OUT}$$

For example:

If V_{OUT} = 5.0V, I_{OUT} = 250mA, the maximum input voltage is V_{IN(MAX)} = 1250mW / 250mA + 5.0 = 10.0V

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Electrical Characteristics

$T_A = 25^\circ\text{C}$, unless otherwise noted.

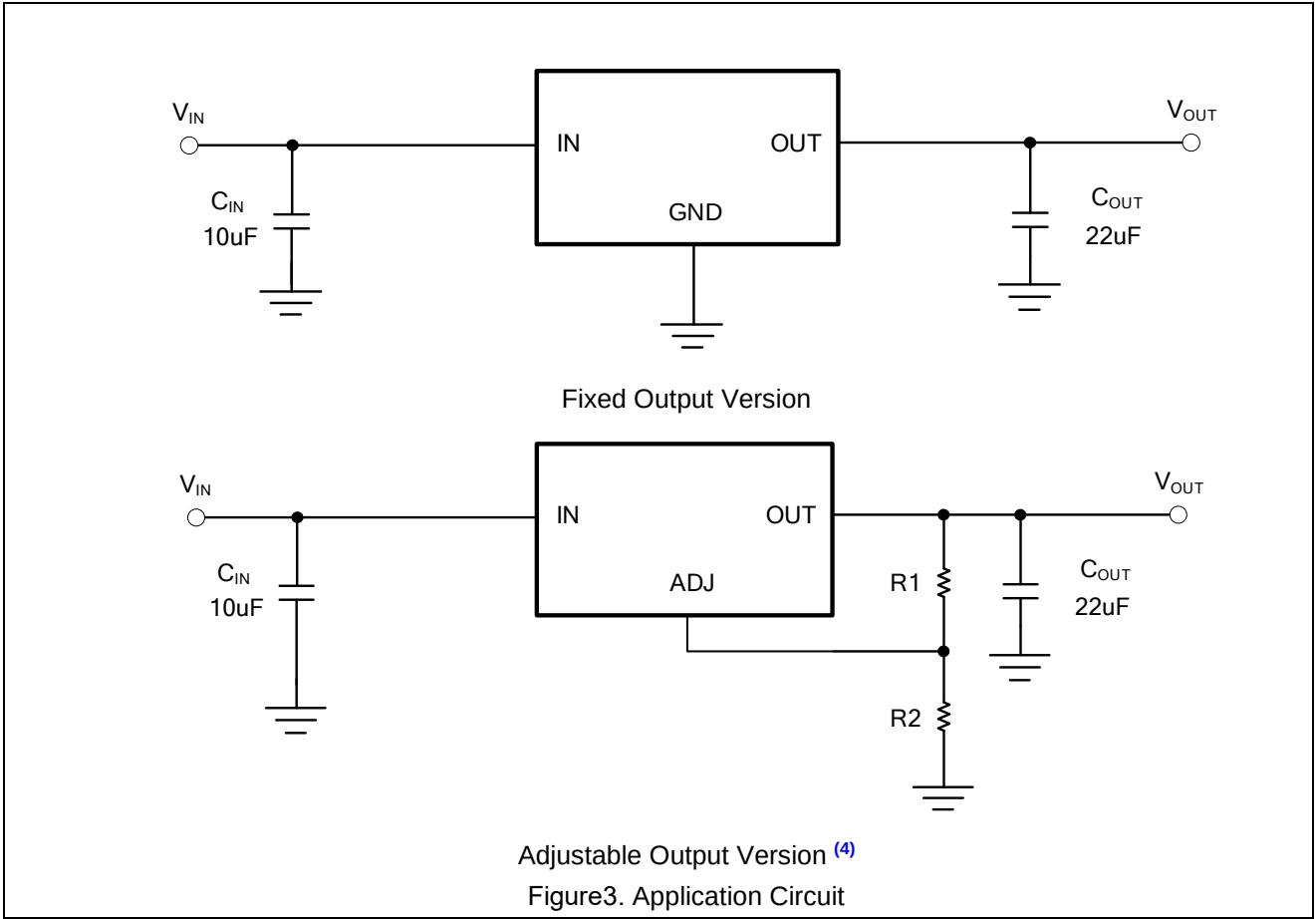
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{REF}	Reference Voltage	$0 \leq I_{OUT} \leq 0.8\text{A}$, $V_{IN} = 3.25\text{V}$, 25°C (Adjustable Version)	1.225	1.25	1.275	V
V_{OUT}	Output Voltage	$0 \leq I_{OUT} \leq 0.8\text{A}$, $V_{IN} = V_{OUT} + 2\text{V}$, 25°C $0\text{mA} \leq I_{OUT} \leq 800\text{mA}$ (Fixed Version)	-2		2	%
		$V_{OUT} + 2\text{V} \leq V_{IN} \leq 12\text{V}$, $I_{OUT} = 10\text{mA}$ $-40 \sim 125^\circ\text{C}$	-2		2	
$\Delta V_{OUT} / V_{IN}$	Line Regulation	$I_{OUT} = 10\text{mA}$, $7.0\text{V} \leq V_{IN} \leq 12\text{V}$		0.03	0.2	%/V
$\Delta V_{OUT} / I_{OUT}$	Load Regulation	$V_{IN} = V_{OUT} + 1.5\text{V}$, $V_{OUT} = 1.2\text{V}$ $10\text{mA} \leq I_{OUT} \leq 0.8\text{A}$		2	8	mV
		$V_{IN} = V_{OUT} + 1.5\text{V}$, Adj Version $10\text{mA} \leq I_{OUT} \leq 0.8\text{A}$		2	20	
		$V_{IN} = V_{OUT} + 1.5\text{V}$, $V_{OUT} = 5.0\text{V}$ $10\text{mA} \leq I_{OUT} \leq 0.8\text{A}$		5	20	
$V_{Drop}^{(2)}$	Dropout Voltage	$I_{OUT} = 100\text{mA}$		1.0	1.2	V
		$I_{OUT} = 500\text{mA}$		1.05	1.25	V
		$I_{OUT} = 800\text{mA}$		1.1	1.3	V
I_Q	Quiescent Current	$V_{IN} = 12\text{V}$		2	5	mA
I_{LIMIT}	Max Limit Current	$V_{IN} - V_{OUT} = 5\text{V}$	1.2	1.4		A
$PSRR^{(3)}$	Ripple Rejection	$V_{IN} - V_{OUT} = 3\text{V}$, $V_{RIPPLE} = 1\text{V}_{PP}$, $f = 120\text{Hz}$		65		dB
I_{ADJ}	Adjust Pin Current	$V_{IN} = 5\text{V}$, Adj Version, $10\text{mA} \leq I_{OUT} \leq 0.8\text{A}$		55	120	μA
I_{Change}	I_{ADJ} Change	$V_{IN} = 5\text{V}$, Adj Version, $10\text{mA} \leq I_{OUT} \leq 0.8\text{A}$		0.2	10	μA
$\Delta V/\Delta T$	Temperature Coefficient	$-40^\circ\text{C} \sim 125^\circ\text{C}$		± 100		ppm

Notes2: V_{DROP} FT test method: test the V_{OUT} voltage at $V_{SET} + V_{DROP_{MAX}}$ with output current.

Notes3: Guaranteed by design and characterization. Not a FT item.

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Application Circuit



Notes4: The output voltage of adjustable version follows the equation:

$$V_{OUT} = V_{REF} \times (1 + R2 / R1) + I_{ADJ} \times R2$$

We can ignore I_{ADJ} because I_{ADJ} (about 50uA) is much less than the current of $R1$ (about 2 ~ 10mA).

1) To meet the minimum load current (>10mA) requirement, $R1$ is recommended to be 125ohm or lower. As ETC1117(ADJ Version) can keep itself stable at load current about 2mA, $R1$ is not allowed to be higher than 625ohm.

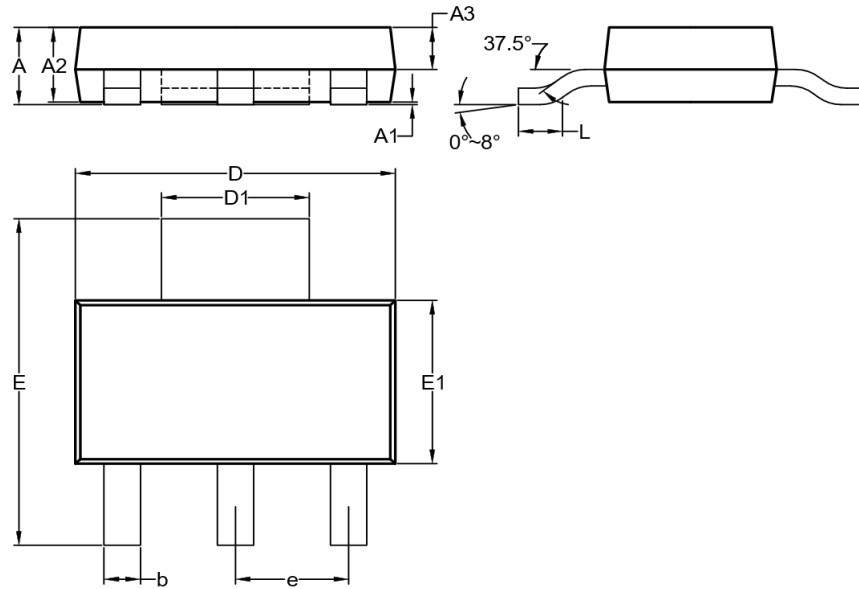
Using a bypass capacitor (C_{ADJ}) between the ADJ pin and ground can improve ripple rejection. This bypass capacitor prevents ripple from being amplified as the output voltage is increased. The impedance of C_{ADJ} should be less than $R1$ to prevent ripple from being amplified. As $R1$ is normally in the range of 100Ω~500Ω, the value of C_{ADJ} should satisfy this equation:

$$1 / (2\pi \times \text{fripple} \times C_{ADJ}) < R1$$

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Package Dimension

SOT-223

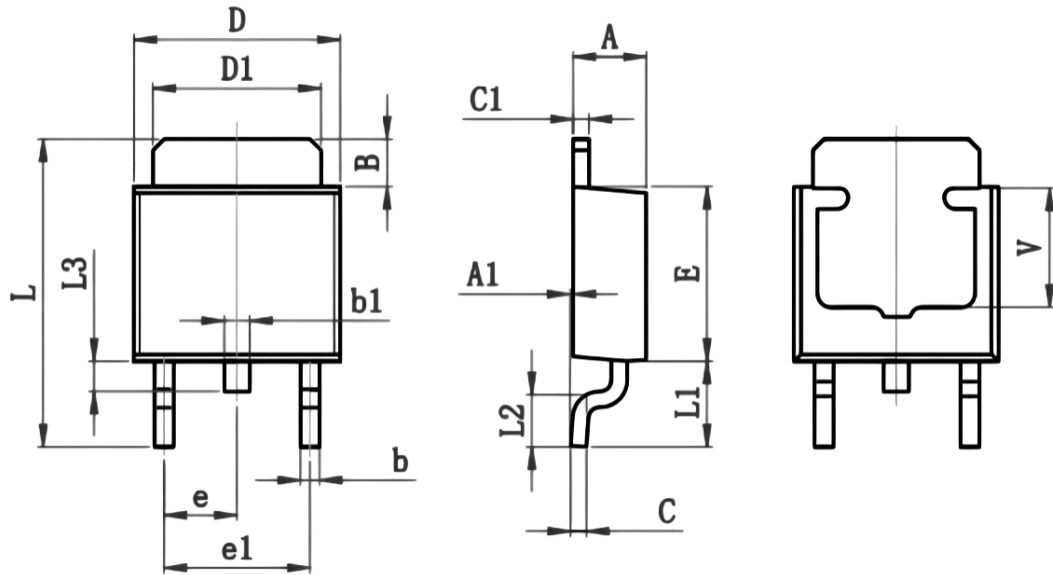


COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	1.5	1.65	1.8
A1	0.03	0.06	0.09
A2	1.45	1.60	1.75
A3	0.8	0.9	1
b	0.69	-	0.78
D	6.3	6.5	6.7
D1	3.00REF		
e	2.30BSC		
E	6.8	7	7.2
E1	3.4	3.5	3.6
L	0.9	-	-

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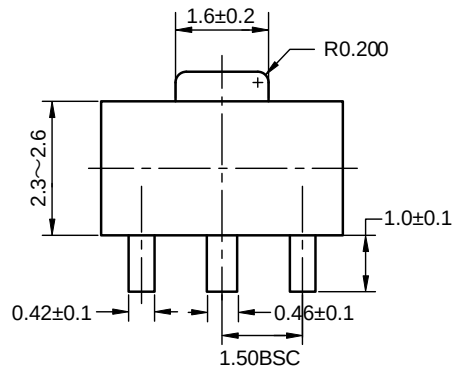
TO252



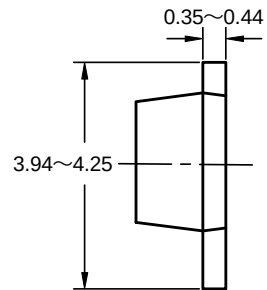
SYMBOL	MIN	MAX
A	2.200	2.400
A1	0.000	0.127
B	1.350	1.650
b	0.500	0.700
b1	0.700	0.900
C	0.430	0.580
c1	0.430	0.580
D	6.350	6.650
D1	5.200	5.400
E	5.400	5.700
e	2.300 TYP	
e1	4.500	4.700
L	9.500	9.900
L1	2.550	2.900
L2	1.400	1.780
L3	0.600	0.900
V	3.800 REF	

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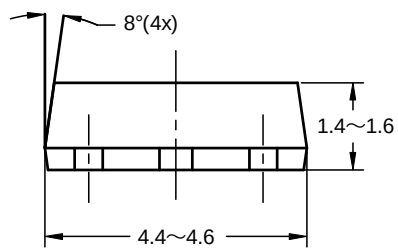
SOT89-3



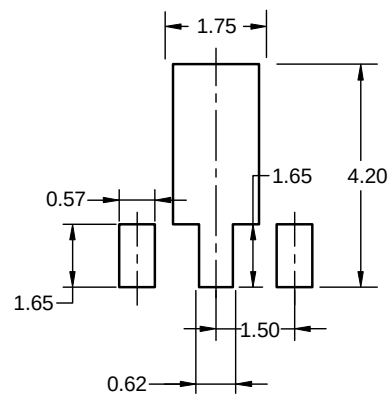
Top View



Side View



Side View

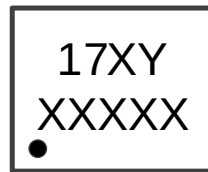


Recommended Land Pattern

Unit: mm

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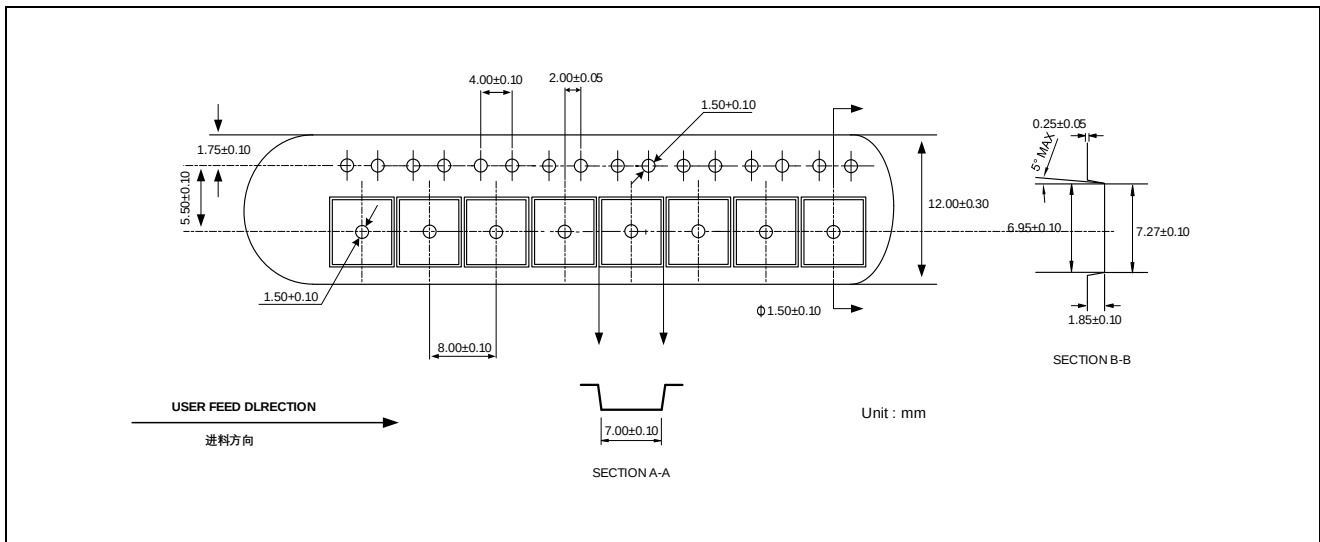
Marking



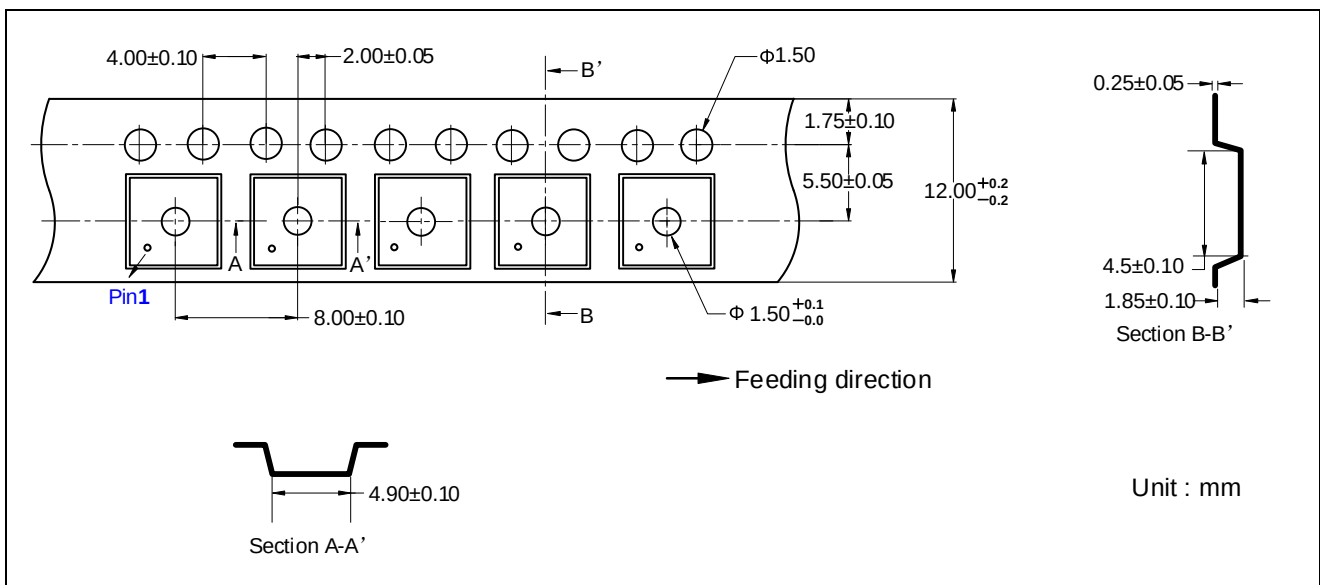
17 = Part Number,
X is V_{OUT} Version;
Y is Package Version
XXXXXX = Tracking Number

Tape Information

SOT-223



SOT89-3



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Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2024-12-07	Original Version	Peng junjie	Shi bo	Liu jiaying
1.0.a	2026-03-16	Update Format	Yu yifan	Yang xiaoxu	Liu jiaying
1.1	2026-08-05	Update Typeset	Zhang zixuan	Yang xiaoxu	Liu jiaying