TN1117 Series

Low Dropout Regulators

Description

The TN1117 Series are low-dropout three-terminal Linear regulator circuit with positive voltage output. They are divided into two versions, fixed voltage output version and adjustable voltage output version： The fixed output voltage is 1.2V, 1.8V, 2.5V, 3.3V, 5V and the adjustable version can provide the output voltage from 1.25V to 12V with only 2 external resistors.

Features

- Quiescent Current: 2mA(Typ.)
- Maximum Output Current: 1.0A
- Range of Operation Input Voltage: Max.15V
- Current Limiting
- Thermal Shutdown
- Operation Ambient Temperature: -40~85°C
- Available Packages: SOT-89, SOT-223, TO-252

Applications

- LCD Monitor and LCD TV
- DVD Decode Board
- ADSL Modem

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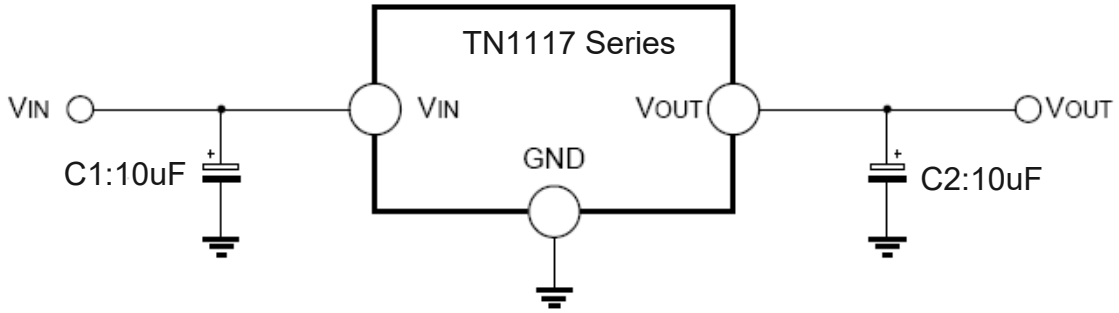
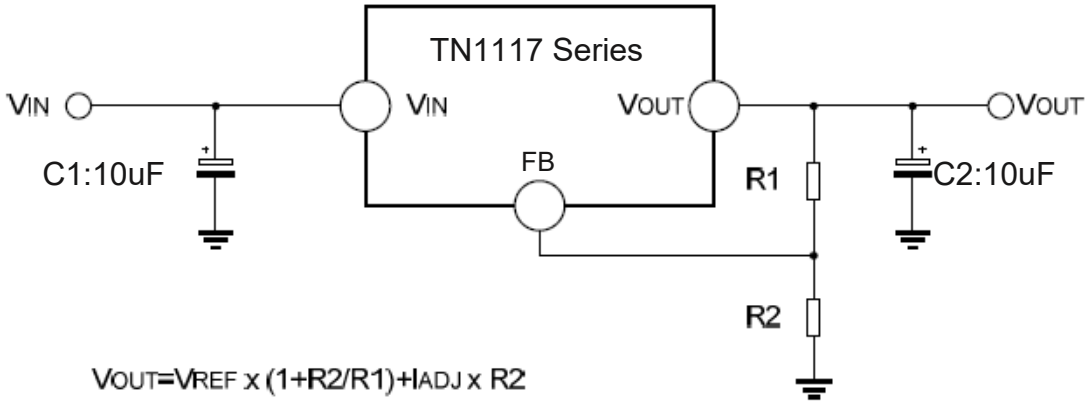
Typical Application Circuit

The TN1117 Series have adjustable version and six fixed versions (1.2V, 1.8V, 2.5V, 3.3V and 5V) **Fixed Voltage Output Version**



1. Recommend using 10uF tan capacitor as bypass capacitor (C1) for all application circuit.
2. Recommend using 10uF tan capacitor to assure circuit stability.

Adjustable Voltage Output Version



The output voltage of adjustable version follows the equation: $V_{OUT}=1.25\times(1+R2/R1)+I_{Adj}\times R2$. 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 125Ω or lower. As TN1117XX-ADJ can keep itself stable at load current about 2mA, R1 is not allowed to be higher than 625Ω.

(2). Using a bypass capacitor (C_{ADJ}) between the FB 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: $1/(2\pi\times fripple\times C_{ADJ})<R1$.

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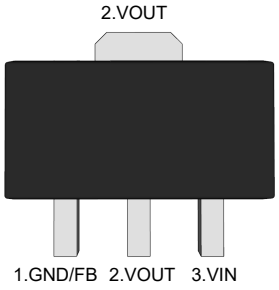
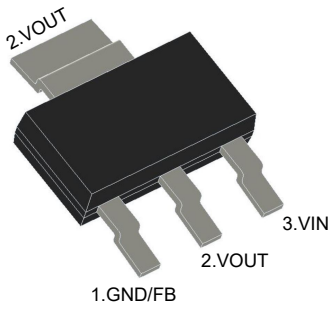
Pin Distribution

SOT-89



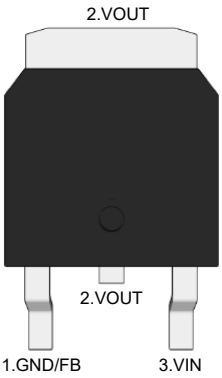
(Top View)

SOT-223



(Top View)

TO-252



(Top View)

Functional Pin Description

Pin Name	Pin Function
GND/ADJ	Ground/Adjustable Pin
VOUT	Output Voltage
VIN	Power Input Voltage

Ordering Information

TN1117□□ -□□

Fixed Voltage Output Version
1.2 : 1.2V 1.8 : 1.8V 2.5 : 2.5V 3.3 : 3.3V 5.0 : 5.0V
Adjustable Voltage Output Version
ADJ: V_{FB}=1.25

Package Type
SQ: SOT-89 ST: SOT-223 TE: TO-252

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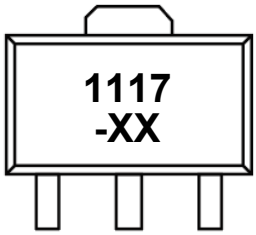
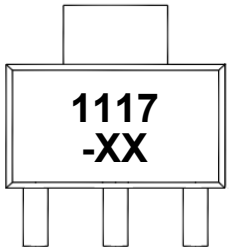
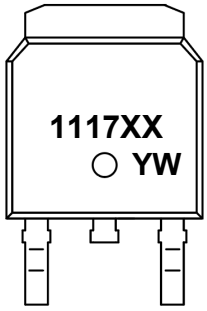
Ordering Information

Orderable Device	Package	Reel (inch)	Package Qty (PCS)	Eco Plan Note	MSL Level	Marking Code
TN1117SQ-1.2	SOT-89	7/13	1000/3000	RoHS & Green	MSL1	 The "XX" is variable TN1117SQ-1.2 = 1117 -1.2 TN1117SQ-1.8 = 1117 -1.8 TN1117SQ-2.5 = 1117 -2.5 TN1117SQ-3.3 = 1117 -3.3 TN1117SQ-5.0 = 1117 -5.0 TN1117SQ-ADJ = 1117 -AJ
TN1117SQ-1.8						
TN1117SQ-2.5						
TN1117SQ-3.3						
TN1117SQ-5.0						
TN1117SQ-ADJ						
TN1117ST-1.2	SOT-223	13	4000	RoHS & Green	MSL3	 The "XX" is variable TN1117ST-1.2 = 1117 -1.2 TN1117ST-1.8 = 1117 -1.8 TN1117ST-2.5 = 1117 -2.5 TN1117ST-3.3 = 1117 -3.3 TN1117ST-5.0 = 1117 -5.0 TN1117ST-ADJ = 1117 -AJ
TN1117ST-1.8						
TN1117ST-2.5						
TN1117ST-3.3						
TN1117ST-5.0						
TN1117ST-ADJ						
TN1117TE-1.2	TO-252	13	2500	RoHS & Green	MSL3	 "XX" and "YW" are variable TN1117TE-1.2 = 111712 YW TN1117TE-1.8 = 111718 YW TN1117TE-2.5 = 111725 YW TN1117TE-3.3 = 111733 YW TN1117TE-5.0 = 111750 YW TN1117TE-ADJ = 1117AJ YW
TN1117TE-1.8						
TN1117TE-2.5						
TN1117TE-3.3						
TN1117TE-5.0						
TN1117TE-ADJ						

Note:
RoHS: TN defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials.
Green: TN defines "Green" to mean Halogen-Free and Antimony-Free.

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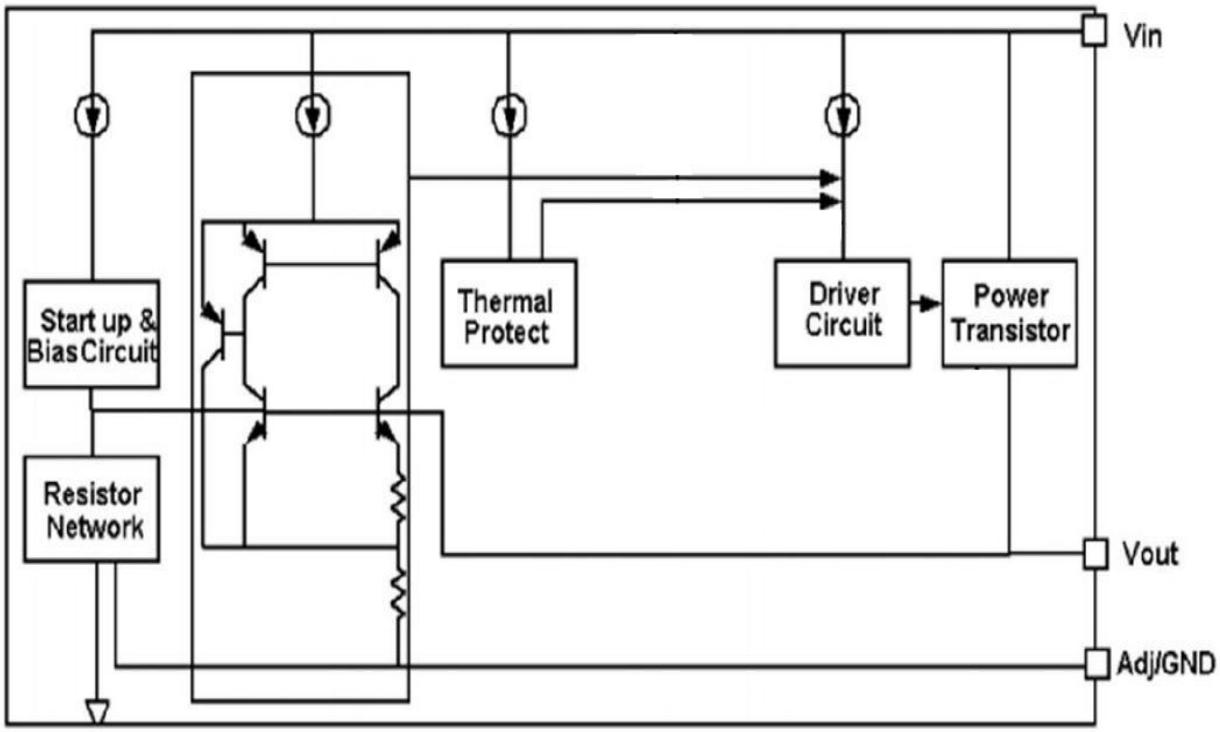
Function Block Diagram



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Absolute Maximum Ratings Note1

Ratings at 25℃ ambient temperature unless otherwise specified.

Parameter		Symbol	Rating	Unit
Supply Voltage		V_{IN}	18	V
Maximum Output Current		I_{OUT}	1	A
Power Dissipation Note2		P_D	Internally Limited	--
Thermal Resistance Junction-to-Case	SOT-89	$R_{\theta JC}$	45	°C/W
	SOT-223		20	°C/W
	TO-252		12.5	°C/W
Junction Temperature		T_J	150	°C
Storage Temperature		T_{STG}	-40 to +150	°C
Lead Temperature & Time		T_L	260°C, 10S	--

Note:

1. These are stress ratings only. Stresses exceeding the range specified under Absolute Maximum Ratings may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.
2. The Power Dissipation is : $P_D=(T_{J(MAX)}-T_C)/R_{\theta JC}$

Recommended Operating Conditions

Parameter	Symbol	Rating	Unit
Recommended Maximum Input Voltage	V_{IN}	15	V
Recommended Operating Junction Temperature	T_{opr}	-40 to +85	°C

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Fixed Voltage Output Version

Electrical Characteristics

(T_A=25℃ , unless otherwise noted.)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	ΔV_{OUT}	$0 \le I_{OUT} \le 1A, V_{IN}=V_{OUT}+2V$	-2	--	+2	%
Quiescent Current	I_Q	V_{OUT}=1.2V I_{OUT}=0mA, V_{IN}=10V	--	2	5	mA
		$1.8V \le V_{OUT} \le 5V$ I_{OUT}=0mA, V_{IN}=12V	--	2	5	mA
Dropout Voltage	V_{DROP}	I_{OUT}=100mA	--	1.15	1.3	V
		I_{OUT}=1A	--	1.3	1.5	V
Line Regulation	ΔV_{LINE}	V_{OUT}=1.2V I_{OUT}=10mA, $2.7V \le V_{IN} \le 10V$	--	0.03	0.2	%/V
		$1.8V \le V_{OUT} \le 5V$ I_{OUT}=10mA, $V_{OUT}+1.5V \le V_{IN} \le 12V$	--	0.03	0.2	
Load Regulation	ΔV_{LOAD}	$10mA \le I_{OUT} \le 1A$, $V_{IN}=V_{OUT}+1.5V$	--	--	36	mV
Temperature coefficient	$\Delta V/\Delta T$		--	+100	--	ppm

Adjustable Voltage Output Version

Electrical Characteristics

(T_A=25℃ , unless otherwise noted.)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Reference voltage	V_{ref}	$10mA \le I_{OUT} \le 1A$, V_{IN}=3.25V	1.225	1.25	1.275	V
Line Regulation	ΔV_{LINE}	I_{OUT}=10mA, $2.75V \le V_{IN} \le 12V$	--	0.03	0.2	%/V
Load Regulation	ΔV_{LOAD}	$10mA \le I_{OUT} \le 1A, V_{IN}$=2.75V	--	2	8	mV
Dropout Voltage	V_{DROP}	I_{OUT}=100mA	--	1.15	1.3	V
		I_{OUT}=1A	--	1.3	1.5	V
Temperature coefficient	$\Delta V/\Delta T$		--	+100	--	ppm
Minimum load current	I_{min}		--	2	10	mA
Adjust pin current	I_{adj}	$10mA \le I_{OUT} \le 1A$, V_{IN}=5V	--	55	120	μA
Iadj change	I_{change}	$10mA \le I_{OUT} \le 1A$, V_{IN}=5V	--	0.2	10	μA

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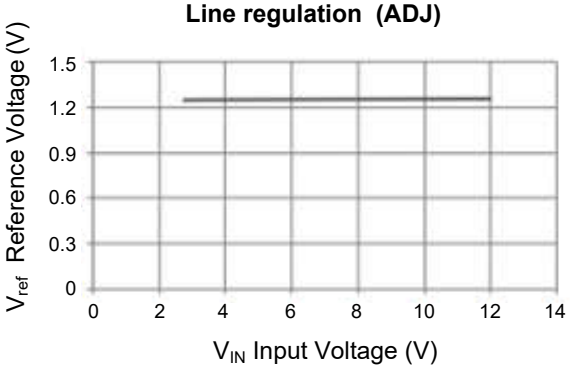
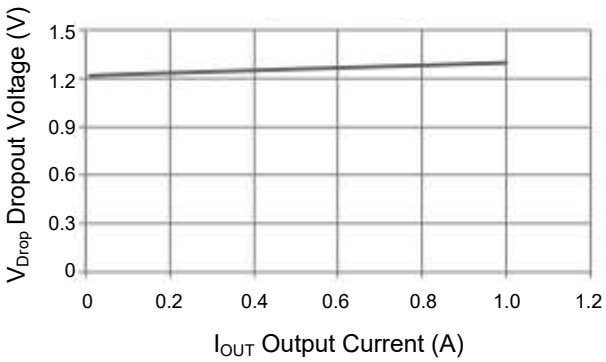
Typical Characteristics Curves

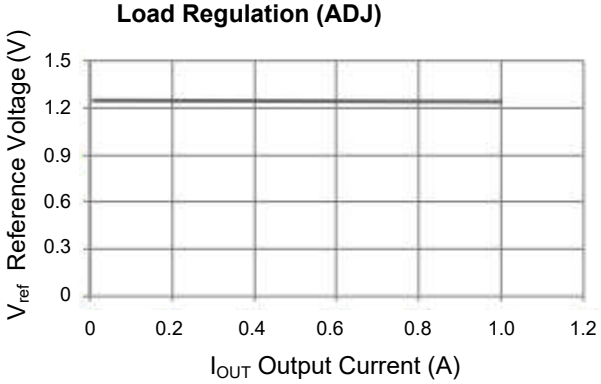
Line regulation (ADJ)



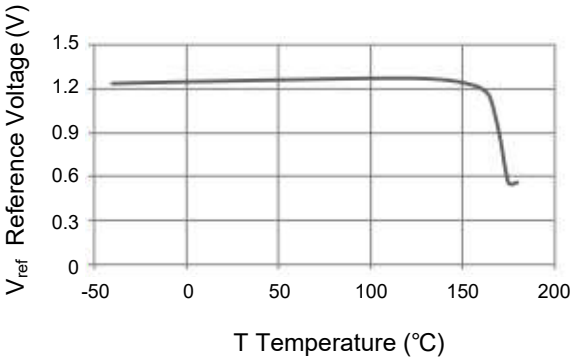
Dropout Voltage



Load Regulation (ADJ)



Thermal performance with OTP (ADJ)



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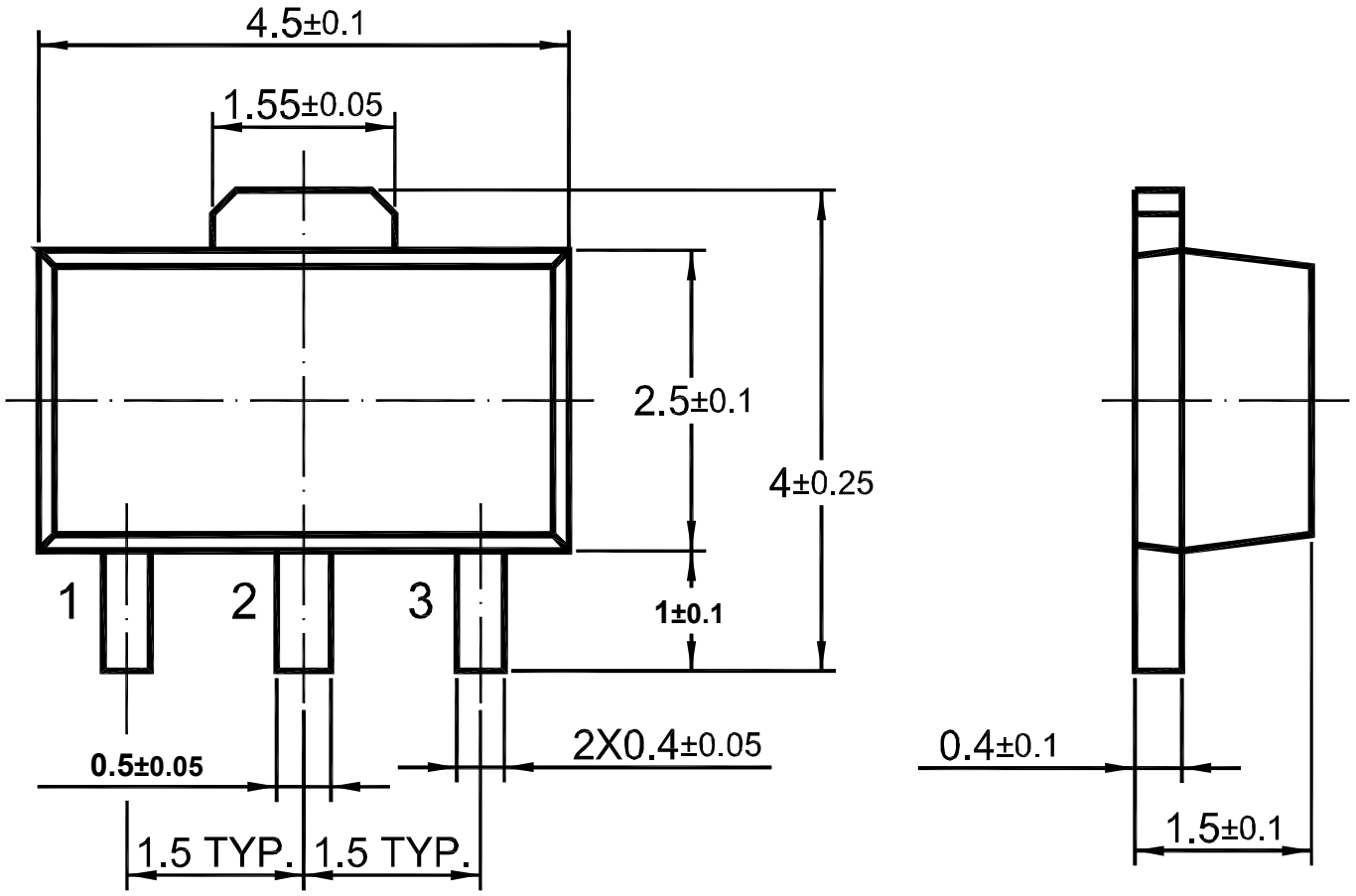
Package Outline

SOT-89

Dimensions in mm



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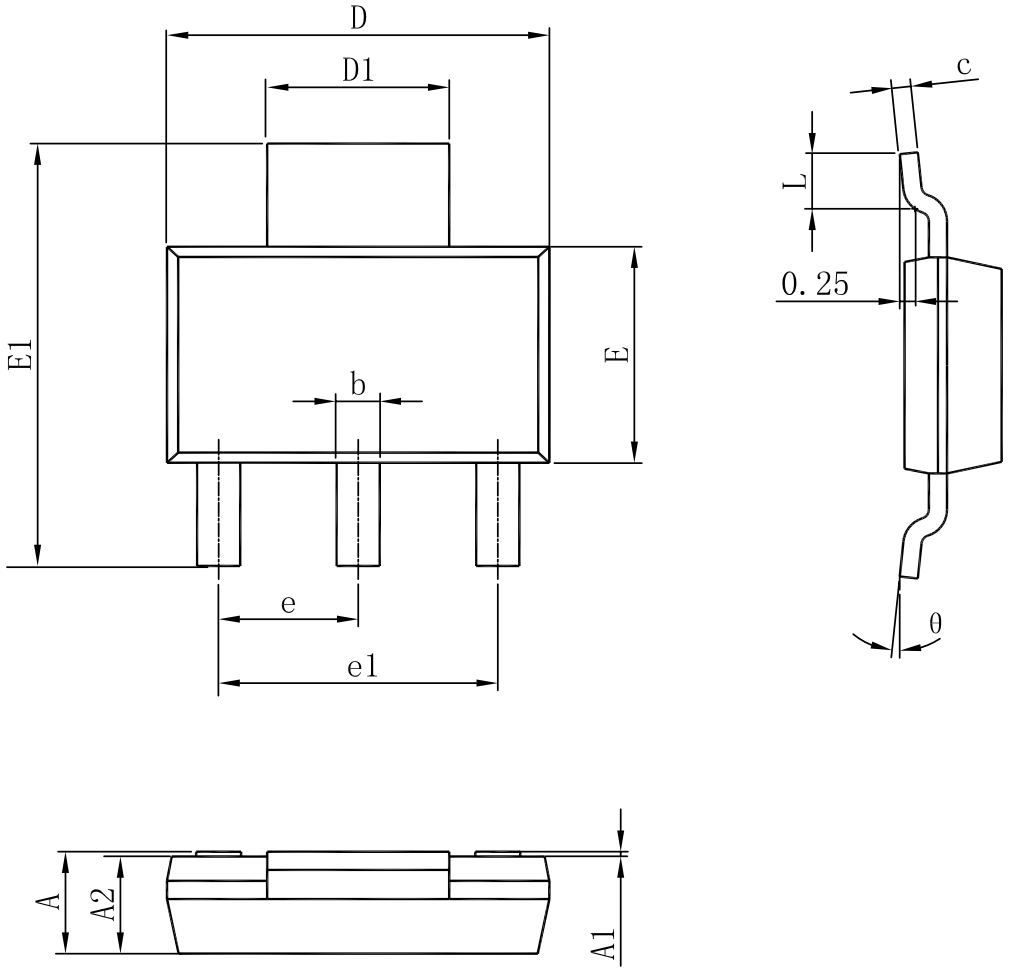
Package Outline

SOT-223

Dimensions in mm



1.塑脂体无缺损、缩孔、气泡、裂纹等缺陷；
2.树脂体上下部XY方向偏差、树脂体中心与引线框中心错位±0.035；
3.粗糙度Ra为0.4--0.6。

Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	/	/	1.80
A1	0.02	/	0.10
A2	1.50	1.60	1.70
b	0.66	0.71	0.84
c	0.23	0.30	0.35
D	6.30	6.50	6.70
D1	2.90	3.00	3.10
E	3.30	3.50	3.70
E1	6.70	7.00	7.30
e	2.30 BASIC		
e1	4.60 BASIC		
L	0.75	/	/
θ	0°	/	10°

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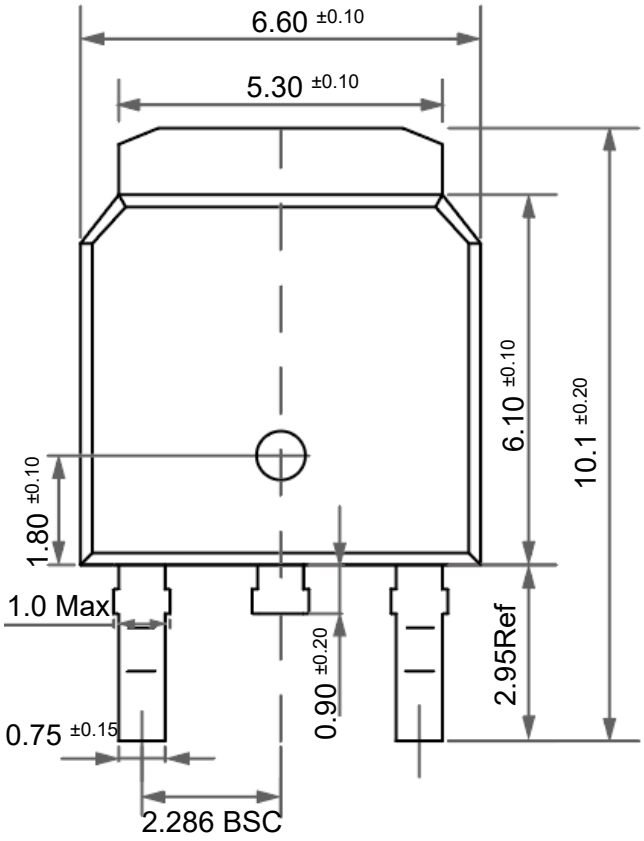
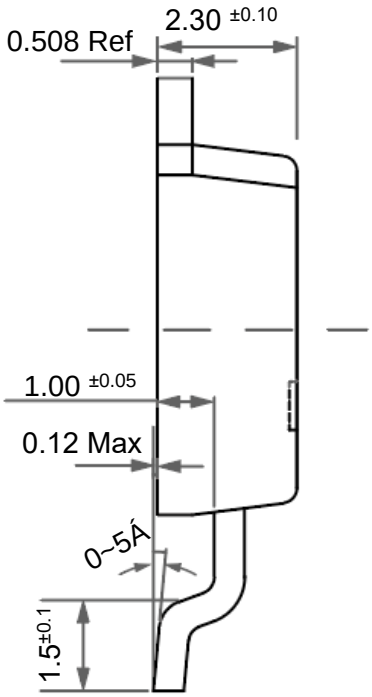
Package Outline

TO-252

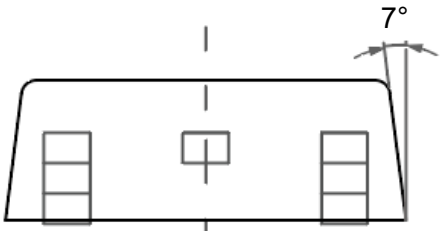
Dimensions in mm



Front View



Side View



Bottom View

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Revision history

Date	Revision	Changes
18-Nov-2019	A	First release
22-Nov-2024	B	Updated title, features and description on cover page. Document status promoted from preliminary to production data.
04-Jun-2025	C	Updated the naming model. Minor text changes.

Contact Information

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For additional information, please contact your local Sales Representative.

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The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee. The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. TANI shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and TANI assumes no responsibility for the application of the product. TANI strives to provide accurate and up -to- date information to the best of our ability. However, due to technical, human, or other reasons, TANI cannot guarantee that the information provided in the product specification is entirely accurate and error-free. TANI shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications. TANI reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with TANI to ensure that the prod uct specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult TANI in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement. Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment. The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. TANI shall assume no responsibility for any consequences resulting from such usage. Users should also comply with relevant laws, regulations, policies, and standards when using the product specification. Users are responsible for the risks and liabilities arising from the use of the product specification and must ensure that it is not used for illegal purposes. Additionally, users should respect the intellectual property rights related to the product specification and refrain from infringing upon any third- party legal rights. TANI shall assume no responsibility for any disputes or controv ersies arising from the above-mentioned issues in any form.

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