

### Description

The TL432A is a Three-terminal adjustable shunt regulator highly accurate 1.25V bandgap reference.

The device offers thermal stability, wide operating current and an extended temperature range of 0 to 105 °C for operation in power supply applications.

The TL432A offers a wide operating voltage range of up to 18V and is an excellent choice for voltage reference requirements in an isolated feedback circuit for 3.0V to 3.3V switching mode power supplies.

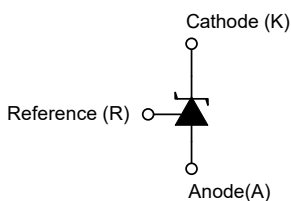
### Feature

- Wide programmable output voltage from 1.25V to 18V
- Sink current capability from 55µA to 100mA.
- Low output noise
- Wide Operating Range of -40 to 125°C

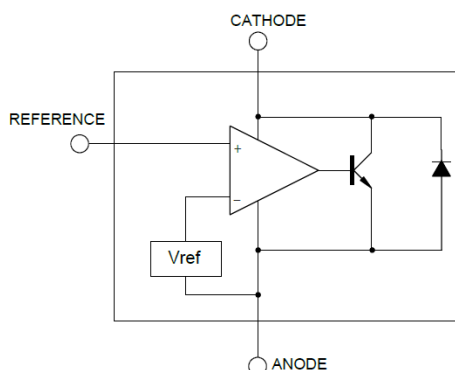
### Application

- Adjustable voltage and current references
- Voltage monitoring
- Replacement of zener diode
- Comparator with integrated reference

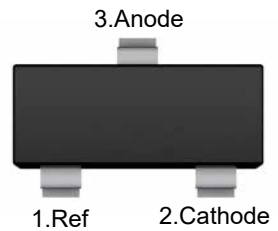
### Schematic diagram



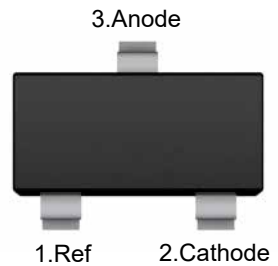
### Functional block diagram



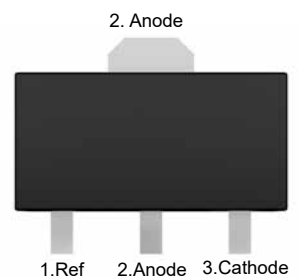
#### SOT-23



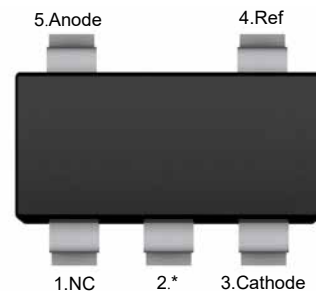
#### SOT-23-3



#### SOT-89

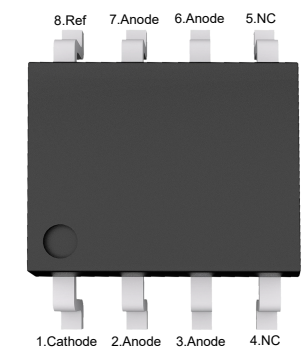


#### SOT-23-5



NC: No internal connection  
\*: Attached to substrate and must be connected to Anode or left open

#### SOP-8



NC: No internal connection



### Ordering Information

TL432A-□□

└ Package Type

□□(Blank): SOT-23

SC: SOT-23-3

SQ: SOT-89

SE: SOT-23-5

PA: SOP-8

└ V<sub>REF</sub> tolerance

□(Blank): 1%

C: 0.5%

Orderable Device	Voltage Tolerance	Package	Reel (inch)	Package Qty (PCS)	Eco Plan <sup>Note</sup>	MSL Level	Marking Code
TL432A	1%	SOT-23	7	3000	RoHS & Green	MSL1	432A
TL432AC	0.5%	SOT-23	7	3000	RoHS & Green	MSL1	432AC
TL432ASC	1%	SOT-23-3	7	3000	RoHS & Green	MSL3	T432A
TL432ACSC	0.5%	SOT-23-3	7	3000	RoHS & Green	MSL3	T432AC
TL432ASQ	1%	SOT-89	7 / 13	1000 / 3000	RoHS & Green	MSL1	TL432A
TL432ACSQ	0.5%	SOT-89	7 / 13	1000 / 3000	RoHS & Green	MSL1	TL432AC
TL432ASE	1%	SOT-23-5	7	3000	RoHS & Green	MSL3	432AE
TL432ACSE	0.5%	SOT-23-5	7	3000	RoHS & Green	MSL3	432ACE
TL432APA	1%	SOP-8	13	4000	RoHS & Green	MSL3	432AP
TL432ACPA	0.5%	SOP-8	13	4000	RoHS & Green	MSL3	432ACP

#### Note:

RoHS: PJ 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: PJ defines "Green" to mean Halogen-Free and Antimony-Free.

**Absolute Maximum Ratings** ( $T_a=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Value	Units
Cathode Voltage	$V_{KA}$	20	V
Cathode Current Range(Continuous)	$I_{KA}$	-100 ~ +100	mA
Reference Input Current Range	$I_{REF}$	10	mA
Operating Junction Temperature	$T_J$	150	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-65 ~ +150	$^{\circ}\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.  
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

**Recommended Operating Conditions**

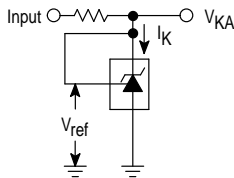
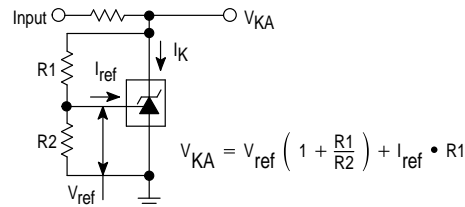
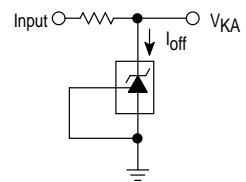
Parameter	Symbol	Min.	Max.	Units
Cathode Voltage	$V_{KA}$	$V_{REF}$	18	V
Cathode Current	$I_{KA}$	0.1	100	mA
Operating Ambient Temperature Range	$T_{OPR}$	-40	125	$^{\circ}\text{C}$

**Thermal Information**

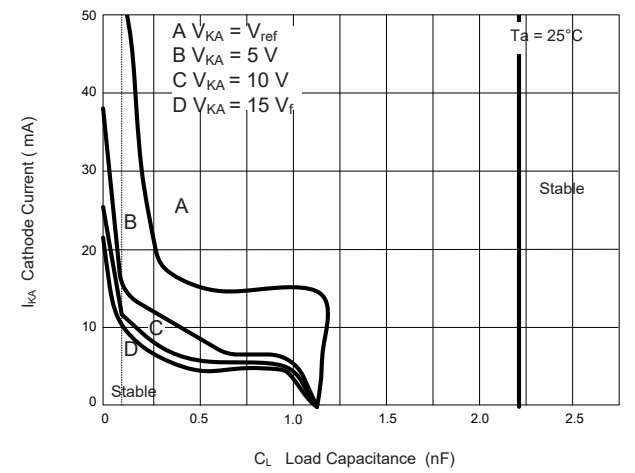
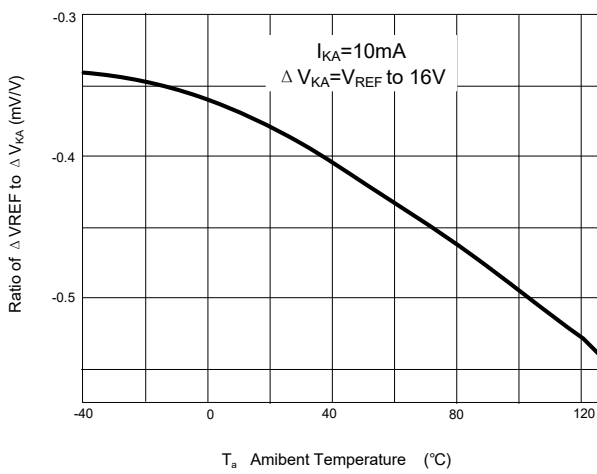
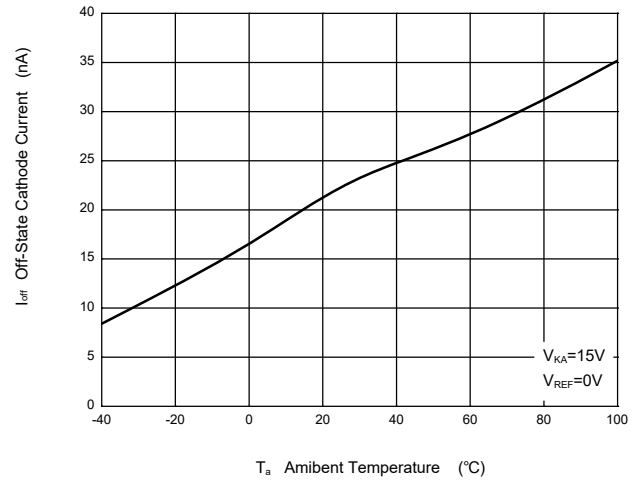
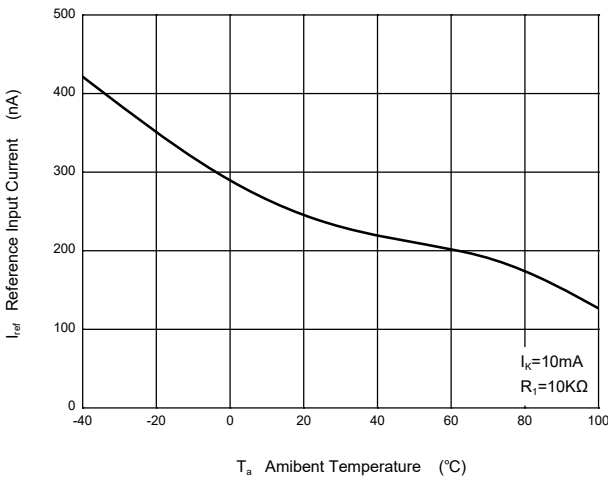
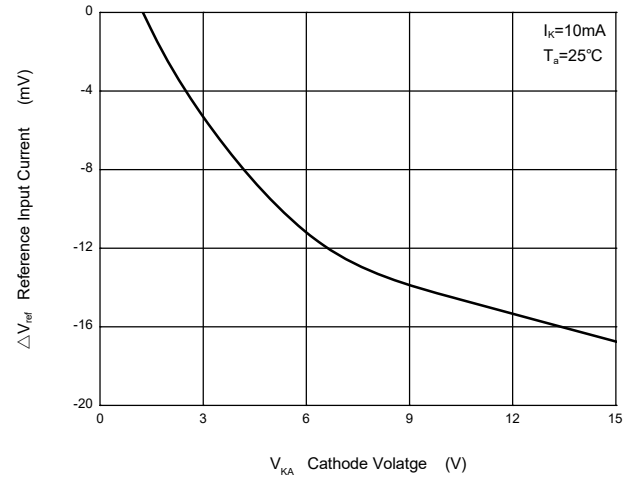
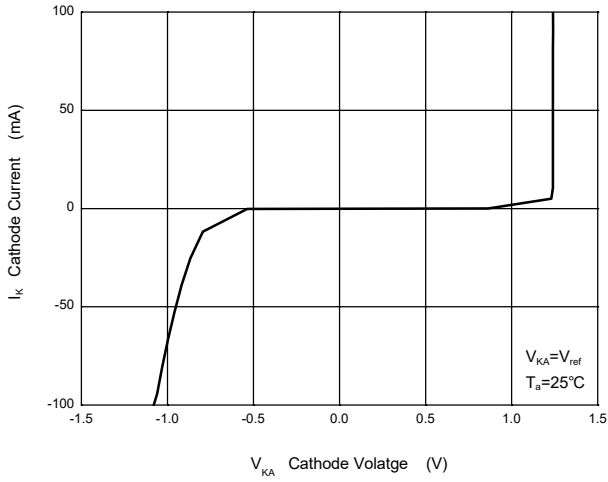
Parameter	Symbol	Value		Units
Junction-to-Ambient thermal resistance	$R_{\theta JA}$	SOT-23	416	$^{\circ}\text{C/W}$
		SOT-23-3	416	$^{\circ}\text{C/W}$
		SOT-23-5	416	$^{\circ}\text{C/W}$
		SOT-89	156	$^{\circ}\text{C/W}$
		SOP-8	208	$^{\circ}\text{C/W}$

**Electrical Characteristics (Ta=25°C unless otherwise specified)**

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Reference Input Voltage Fig1	V <sub>REF</sub>	V <sub>KA</sub> =V <sub>REF</sub> , I <sub>KA</sub> =10mA	TL432A(1%)	1.238	1.25	1.262	V
			TL432AC(0.5%)	1.244	1.25	1.256	V
Deviation of Reference Input Voltage Over Temperature Fig1	ΔV <sub>REF</sub>	V <sub>KA</sub> =V <sub>REF</sub> , I <sub>KA</sub> =10mA	0°C ≤ T <sub>A</sub> ≤ 70°C	--	2	10	mV
			-20°C ≤ T <sub>A</sub> ≤ 125°C	--	3	15	mV
			-40°C ≤ T <sub>A</sub> ≤ 125°C	--	8	25	mV
Ratio of Change in Reference Input Voltage to The Change in Cathode Voltage Fig2	$\frac{\Delta V_{REF}}{\Delta V_{KA}}$	I <sub>KA</sub> =10mA, V <sub>KA</sub> =V <sub>REF</sub> ~16V	--	-0.5	-1.5	mV/V	
Reference Input Current Fig2	I <sub>REF</sub>	I <sub>KA</sub> =10mA, R1=10KΩ, R2=∞	--	0.15	0.4	μA	
Deviation of Reference Input Current Over Full Temperature Range Fig2	ΔI <sub>REF</sub>	I <sub>KA</sub> =10mA, R1=10KΩ, R2=∞, -20°C ≤ T <sub>A</sub> ≤ +85°C	--		0.4	μA	
Minimum Cathode Current for Regulation Fig1	I <sub>KA(MIN)</sub>	V <sub>KA</sub> =V <sub>REF</sub>	--		80	μA	
Off-State Cathode Current Fig3	I <sub>KA(OFF)</sub>	V <sub>KA</sub> =18V, V <sub>REF</sub> =0	--	0.04	0.5	μA	
Dynamic Impedance	Z <sub>KA</sub>	V <sub>KA</sub> =V <sub>REF</sub> , I <sub>KA</sub> =1~100mA, f ≤ 1.0KHz	--	0.05	0.15	Ω	

**Figure 1. Test Circuit for V<sub>KA</sub> = V<sub>REF</sub>**

**Figure 2. Test Circuit for V<sub>KA</sub> > V<sub>REF</sub>**

**Figure 3. Test Circuit for I<sub>OFF</sub>**


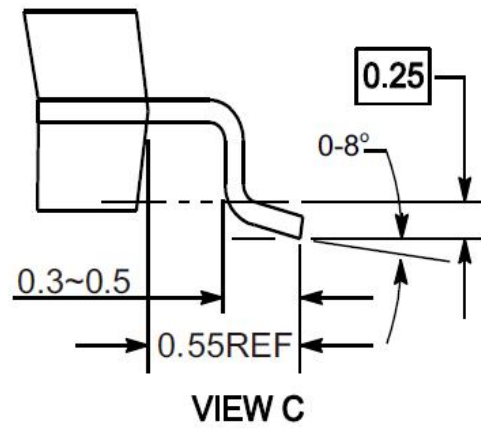
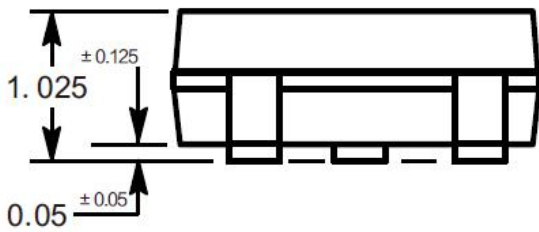
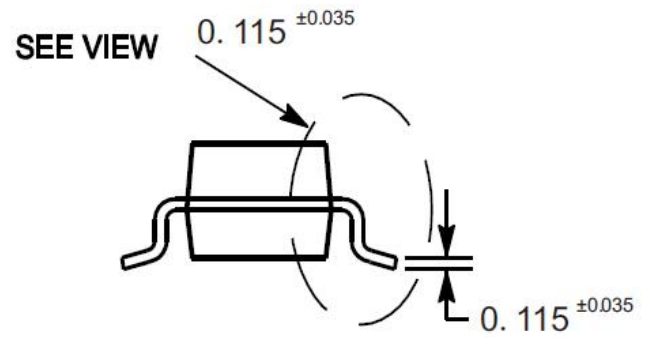
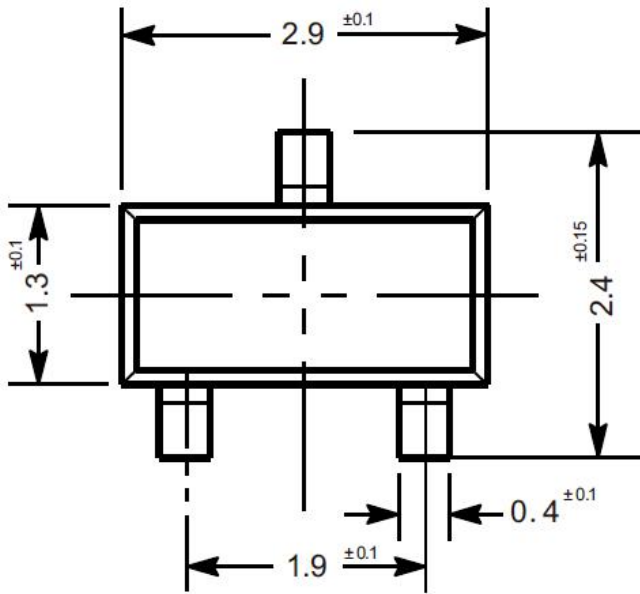
### Typical Characteristic Curves



**Package Outline**

SOT-23

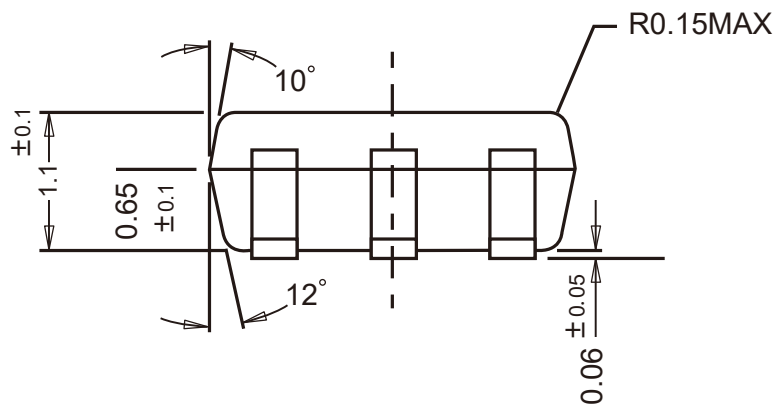
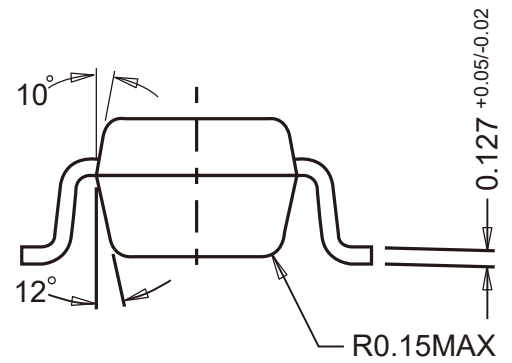
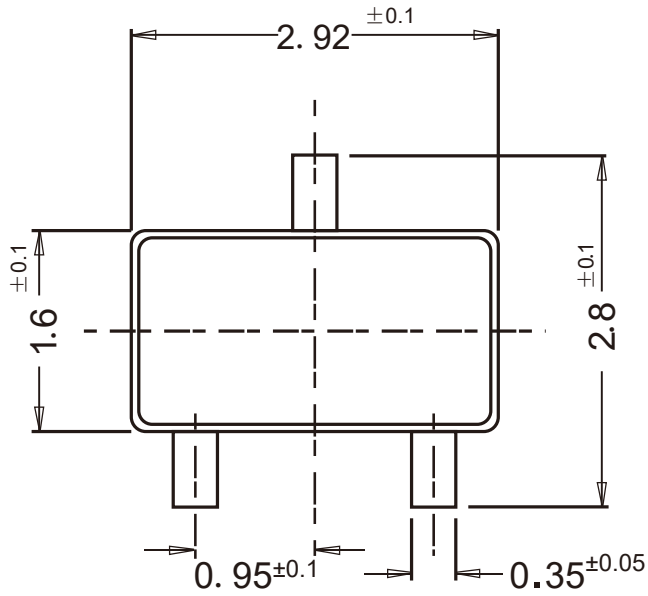
Dimensions in mm



**Package Outline**

SOT-23-3

Dimensions in mm

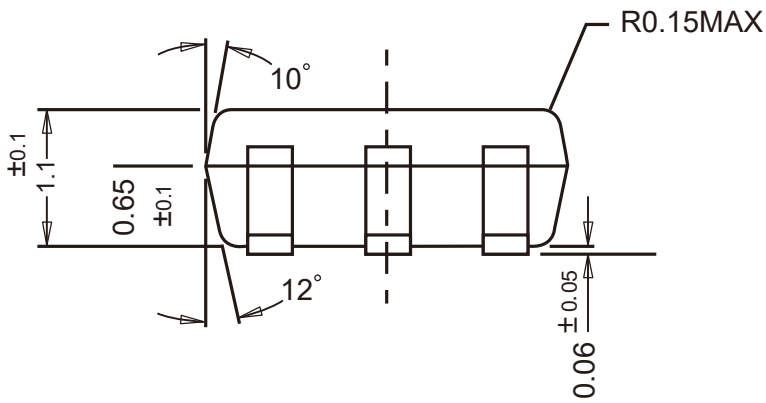
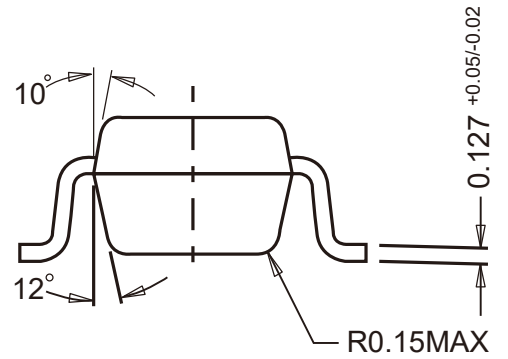
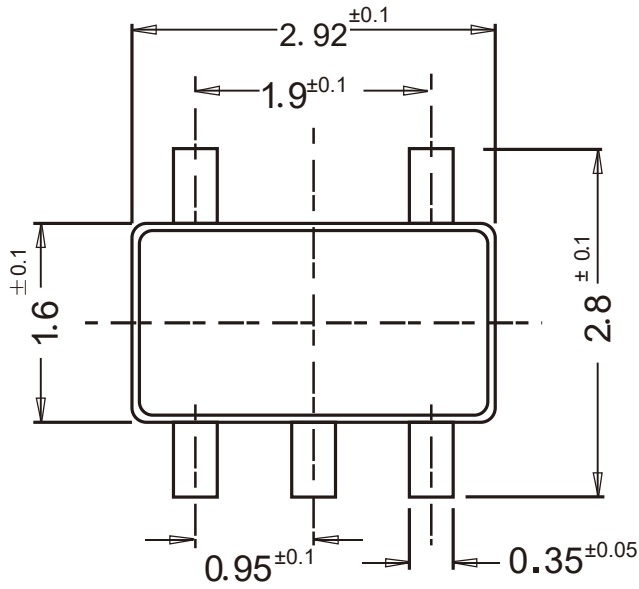




Package Outline

SOT-23-5

Dimensions in mm

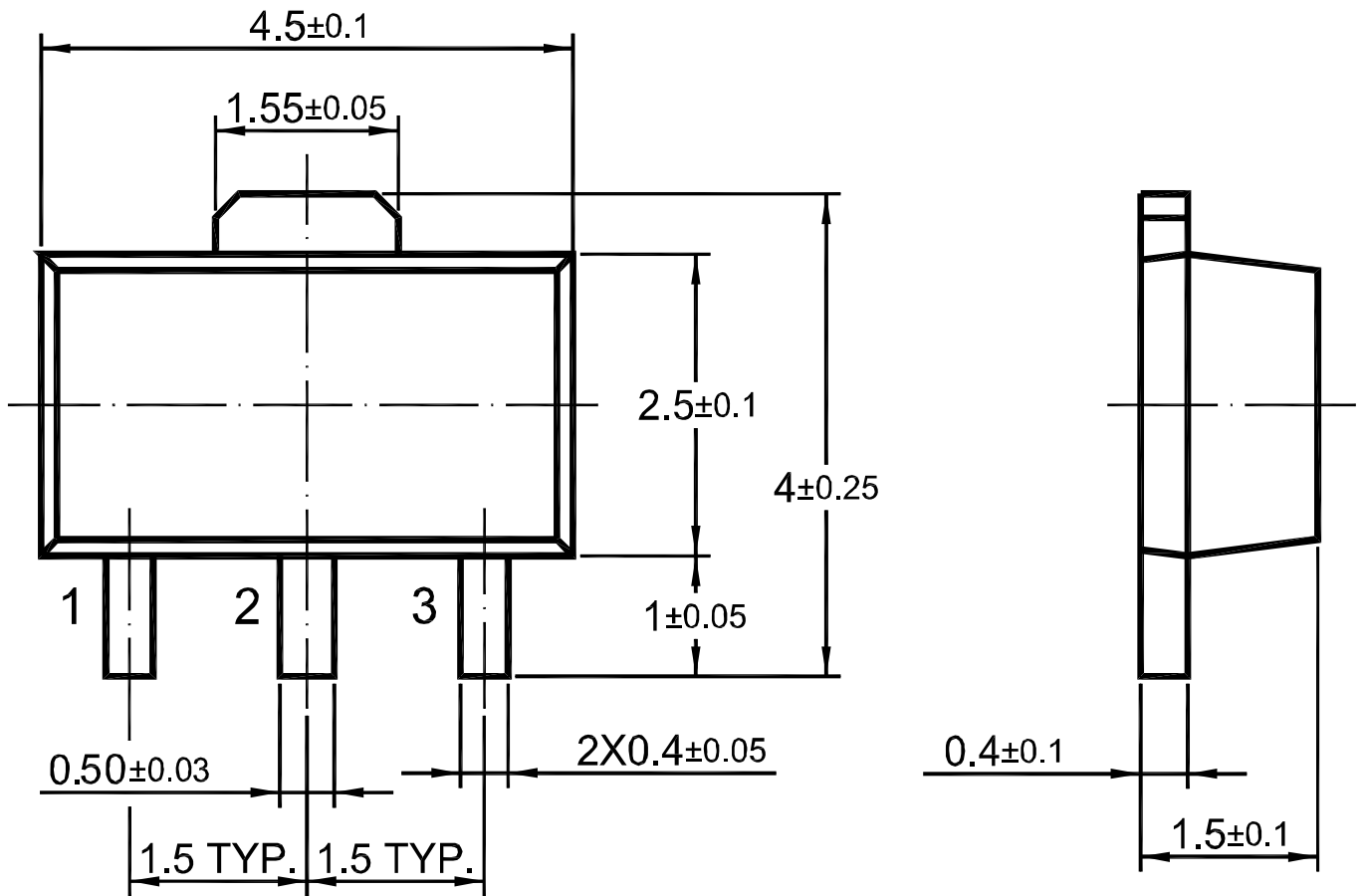




**Package Outline**

SOT-89

Dimensions in mm



**Package Outline**

SOP-8

Dimensions in mm

