

TL432

Programmable Precision Reference

Description

The TL432 is a Three-terminal adjustable shunt regulator highly accurate 1.24V 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 TL432 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.

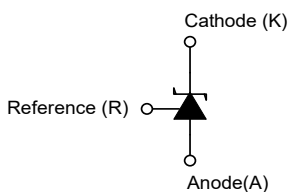
Feature

- Wide programmable output voltage from 1.24V to 18V
- Sink current capability from 55μA to 100mA.
- Low output noise
- Wide Operating Range of -40 to 125°C

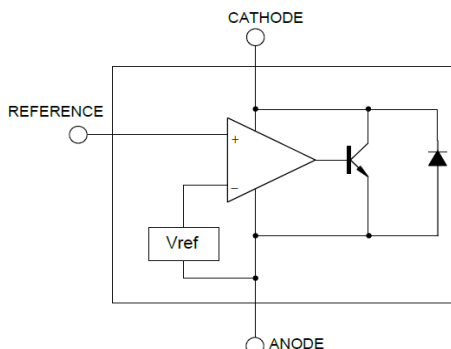
Application

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

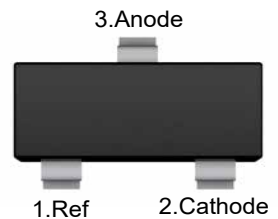
Schematic diagram



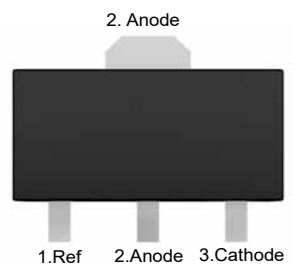
Functional block diagram



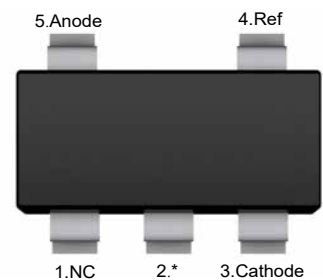
SOT-23



SOT-89



SOT-23-5



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

Ordering Information

TL432-□ □

└ Package Type

□□(Blank): SOT-23

SQ: SOT-89

SE: SOT-23-5

└ V_{REF} tolerance

□(Blank): 1%

C: 0.5%

Orderable Device	Voltage Tolerance	Package	Reel (inch)	Package Qty (PCS)	Marking Code
TL432	1%	SOT-23	7	3000	432
TL432C	0.5%	SOT-23	7	3000	432C
TL432SQ	1%	SOT-89	7 / 13	1000 / 3000	TL432
TL432CSQ	0.5%	SOT-89	7 / 13	1000 / 3000	TL432C
TL432SE	1%	SOT-23-5	7	3000	432E
TL432CSE	0.5%	SOT-23-5	7	3000	432CE

Absolute Maximum Ratings (Ta=25°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	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°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	°C

Thermal Information

Parameter	Symbol	Value		Units
Junction-to-Ambient thermal resistance	$R_{\theta JA}$	SOT-23	416	°C/W
		SOT-23-5	416	°C/W
		SOT-89	156	°C/W

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

Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Reference Input Voltage ^{Fig1}	V _{REF}	V _{KA} =V _{REF} , I _{KA} =10mA	TL432(1%)	1.228	1.24	1.252	V
			TL432C(0.5%)	1.234	1.24	1.246	V
Deviation of Reference Input Voltage Over Temperature ^{Fig1}	ΔV _{REF}	V _{KA} =V _{REF} , I _{KA} =10mA	0°C ≤T _A ≤70°C	--	2	10	mV
			-20°C ≤T _A ≤125°C	--	3	15	mV
			-40°C ≤T _A ≤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 _{KA} =10mA, ΔV _{KA} =V _{REF} ~16V		--	-0.5	-1.5	mV/V
Reference Input Current ^{Fig2}	I _{REF}	I _{KA} =10mA, R1=10KΩ, R2=∞		--	0.15	0.4	μA
Deviation of Reference Input Current Over Full Temperature Range ^{Fig2}	ΔI _{REF}	I _{KA} =10mA, R1=10KΩ, R2=∞, -20°C ≤T _A ≤+85°C		--	--	0.4	μA
Minimum Cathode Current for Regulation ^{Fig1}	I _{KA(MIN)}	V _{KA} =V _{REF}		--	--	80	μA
Off-State Cathode Current ^{Fig3}	I _{KA(OFF)}	V _{KA} =18V, V _{REF} =0		--	0.04	0.5	μA
Dynamic Impedance	Z _{KA}	V _{KA} =V _{REF} , I _{KA} =1~ 100mA, f≤1.0KHz		--	0.05	0.15	Ω

Figure 1. Test Circuit for $V_{KA} = V_{REF}$

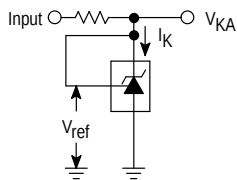


Figure 2. Test Circuit for $V_{KA} > V_{REF}$

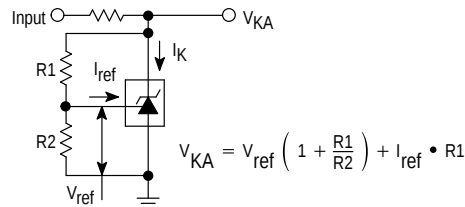
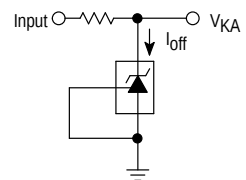
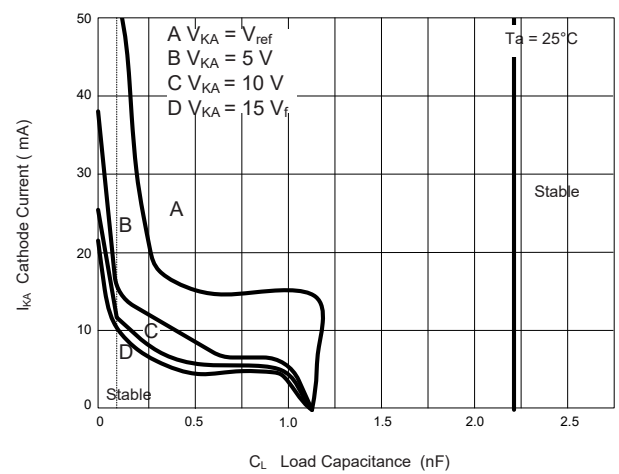
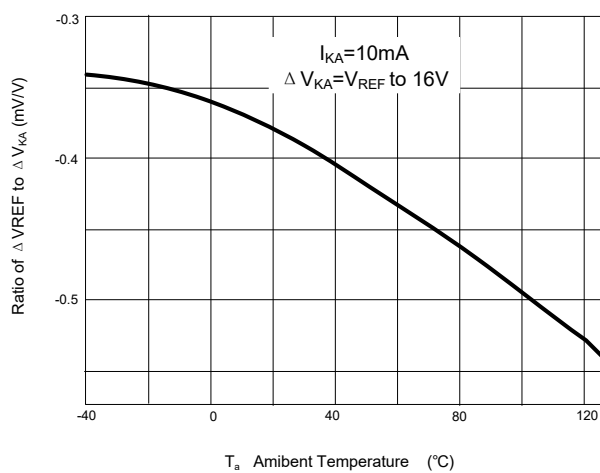
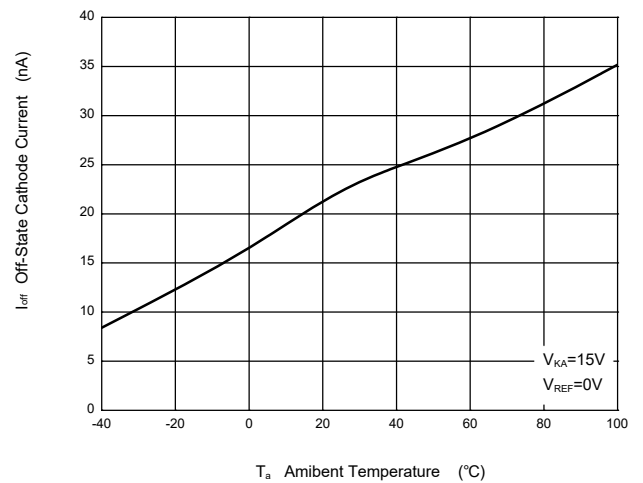
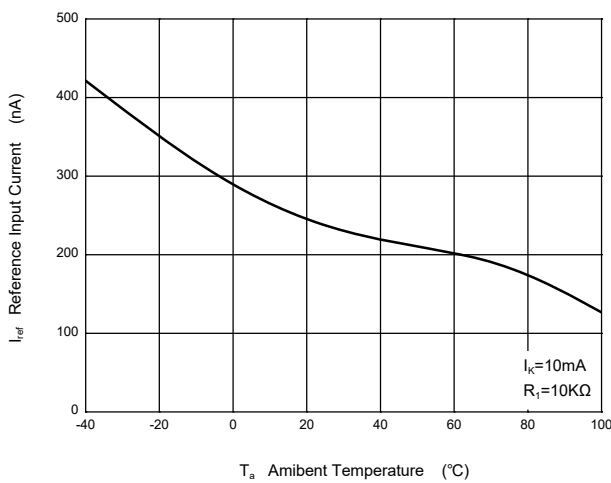
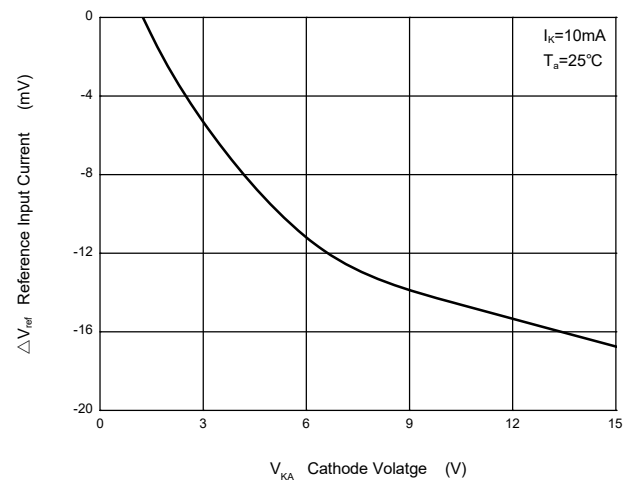
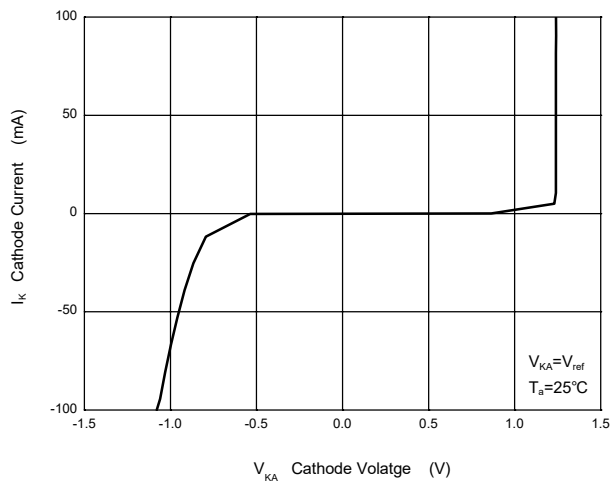


Figure 3. Test Circuit for I_{OFF}



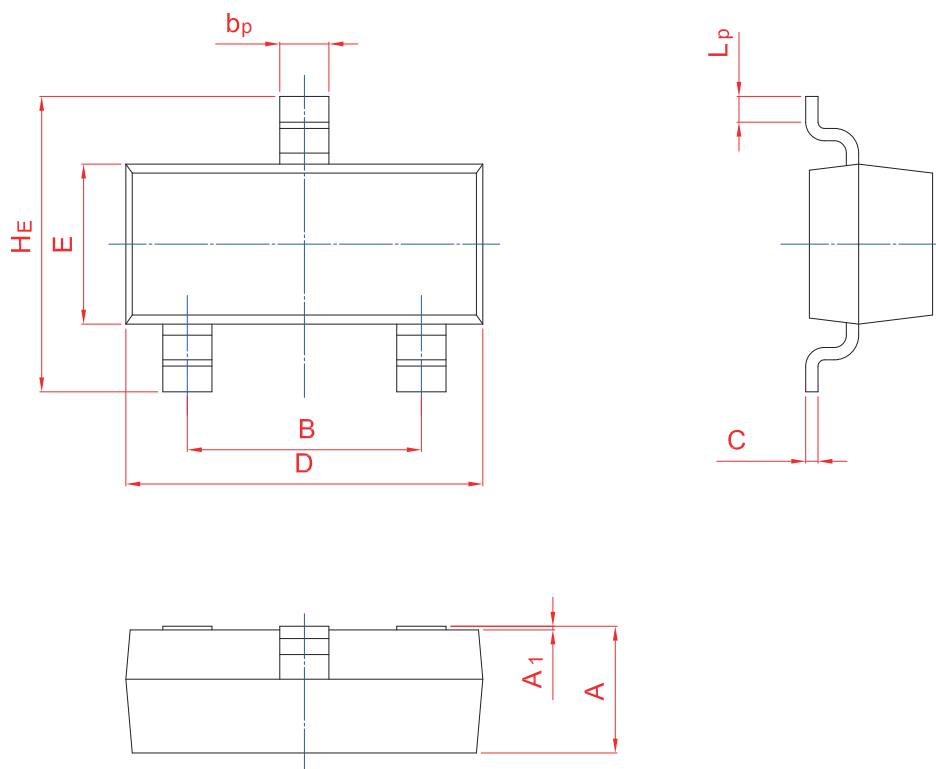
Typical Characteristic Curves



Package Outline

SOT-23

Dimensions in mm

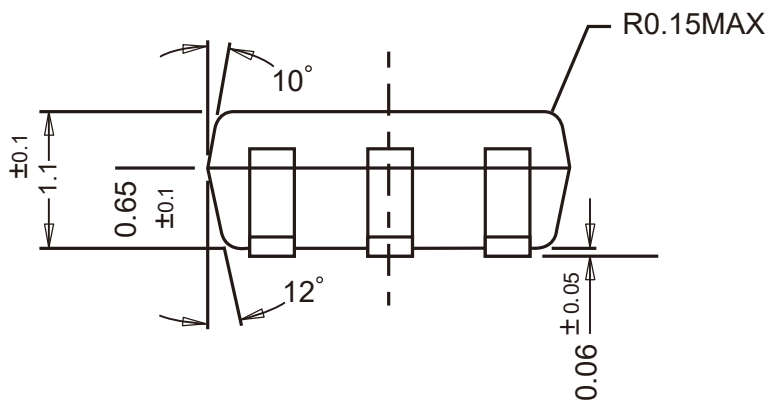
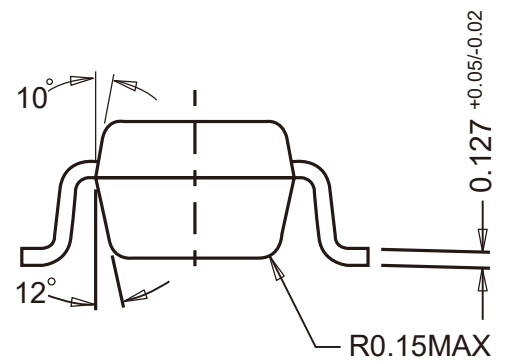
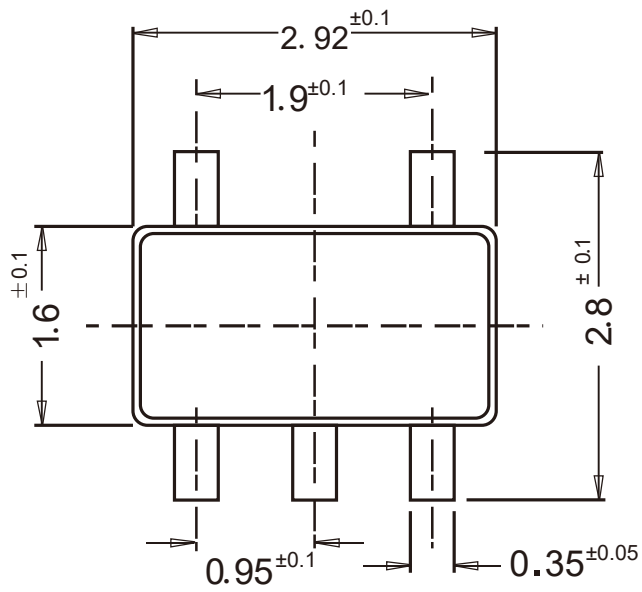


UNIT	A	B	b _p	C	D	E	HE	A ₁	L _p
mm	1.40 0.89	2.04 1.78	0.51 0.30	0.19 0.08	3.10 2.70	1.65 1.20	3.00 2.20	0.100 0.013	0.50 0.20

Package Outline

SOT-23-5

Dimensions in mm



Dimensions in mm

