Micropower Precision Shunt Voltage Reference

FEATURES

- **Initial Voltage Accuracy: 0.05%**
- **Low Operating Current: 10μA**
- **Low Drift: 25ppm/°C Max**
- Less Than 1Ω Dynamic Impedance
- Available in MSOP, SO-8 and TO-92 Packages
- Available in Commercial and Industrial Grades

APPLICATIONS

- Portable Meters
- Precision Regulators
- A/D and D/A Converters
- Calibrators

DESCRIPTION

The LT®1634 is a micropower, precision, shunt voltage reference. The bandgap reference uses trimmed precision thin film resistors to achieve 0.05% initial voltage accuracy. Improved curvature correction technique guarantees 25ppm/°C maximum temperature drift. Advances in design, processing and packaging techniques guarantee 10μA operation and low temperature cycling hysteresis. The LT1634 does not require an output compensation capacitor, but is stable with capacitive loads. Low dynamic impedance makes the LT1634 reference easy to use from unregulated supplies.

The LT1634 reference can be used as a high performance upgrade to the LM185/LM385, LT1004 and LT1034 where lower power and guaranteed temperature drift is required. 2.5V, 4.096V and 5V versions are also available.

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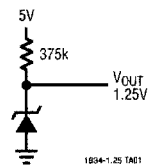
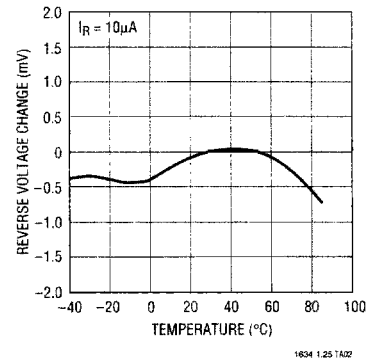
TYPICAL APPLICATION



Temperature Drift

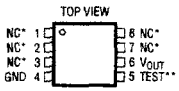


ABSOLUTE MAXIMUM RATINGS

Operating Current 100mA
Forward Current 20mA
Storage Temperature Range ..... −65°C to 150°C
Lead Temperature (Soldering, 10 sec) ..... 300°C

Operating Temperature Range
Commercial ..... 0°C to 70°C
Industrial ..... −40°C to 85°C

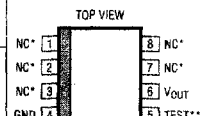
PACKAGE/ORDER INFORMATION



MS8 PACKAGE
8-LEAD PLASTIC MSOP
T_{JMAX} = 125°C,
θ_{JA} = 250°C/W

ORDER PART NUMBER
LT1634BCMS8-1.25

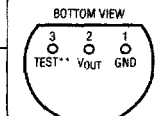
MS8 PART MARKING
LTCV



S8 PACKAGE
8-LEAD PLASTIC SO
T_{JMAX} = 125°C,
θ_{JA} = 190°C/W

ORDER PART NUMBER
LT1634BCS8-1.25
LT1634BIS8-1.25

S8 PART MARKING
634B1
634BI1



Z PACKAGE
3-LEAD PLASTIC TO-92
T_{JMAX} = 125°C,
θ_{JA} = 190°C/W

ORDER PART NUMBER
LT1634CCZ-1.25

*Connected internally. Do not connect external circuitry to these pins. **Connect to ground in user application. Consult factory for Military grade parts.

AVAILABLE OPTIONS

TEMPERATURE	ACCURACY (%)	TEMPERATURE COEFFICIENT (ppm/°C)	PACKAGE TYPE		
			MS8	S8	Z
0°C to 70°C	0.05	25	LT1634BCMS8-1.25	LT1634BCS8-1.25	
−40°C to 85°C	0.05	25		LT1634BIS8-1.25	
0°C to 70°C	0.20	25			LT1634CCZ-1.25

ELECTRICAL CHARACTERISTICS (Note 1)

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
Reverse Breakdown Voltage	LT1634BCS8/LT1634BIS8/LT1634BCMS8 (I_R = 10μA)		1.24937 −0.05	1.250	1.25062 0.05	V %
	LT1634CCZ (I_R = 10μA)		1.24750 −0.20	1.250	1.25250 0.20	V %
	LT1634BCS8/LT1634BCMS8 (I_R = 10μA)	●	1.24718 −0.225	1.250	1.25281 0.225	V %
	LT1634BIS8 (I_R = 10μA)	●	1.24547 −0.362	1.250	1.25453 0.362	V %
	LT1634CCZ (I_R = 10μA)	●	1.24531 −0.375	1.250	1.25469 0.375	V %
Reverse Breakdown Change with Current (Note 2)	10μA ≤ I_R ≤ 2mA	 ●		0.25 0.30	1 2	mV mV
	2mA ≤ I_R ≤ 20mA	 ●		2 2	8 10	mV mV
Minimum Operating Current		●		3	7	μA
Temperature Coefficient	I_R = 10μA	●		10	25	ppm/°C
Reverse Dynamic Impedance (Note 3)	10μA ≤ I_R ≤ 2mA	 ●		0.125 0.150	0.5 1.0	Ω Ω
Low Frequency Noise (Note 4)	I_R = 10μA, 0.1Hz ≤ f ≤ 10Hz	●		10		μV_{P-P}

The ● denotes specifications which apply over the full operating temperature range.

Note 1: ESD (Electrostatic Discharge) sensitive device. Use proper ESD handling precautions.

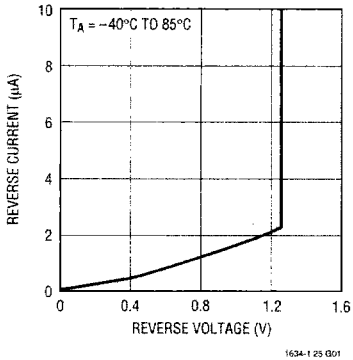
Note 2: Output requires 0.1μF for operating current greater than 1mA.

Note 3: This parameter is guaranteed by "reverse breakdown change with current" test.

Note 4: Peak-to-peak noise is measured with a single highpass filter at 0.1Hz and 2-pole lowpass filter at 10Hz.

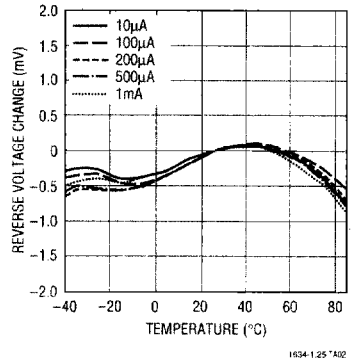
TYPICAL PERFORMANCE CHARACTERISTICS

Reverse Characteristics



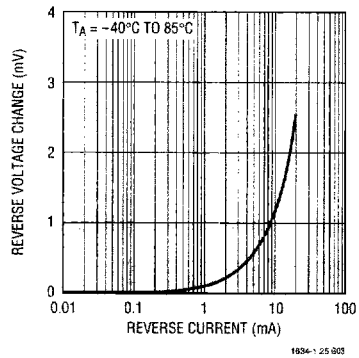
1634-1.25 G01

Temperature Drift



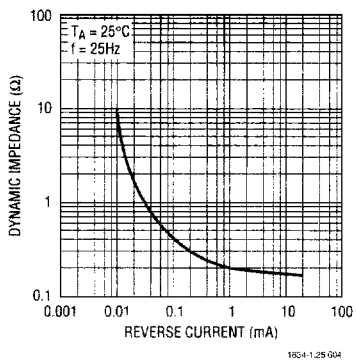
1634-1.25 G02

Reverse Voltage Change vs Current



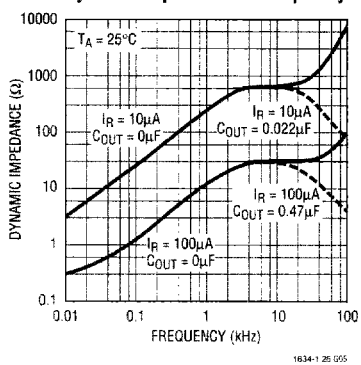
1634-1.25 G03

Reverse Dynamic Impedance



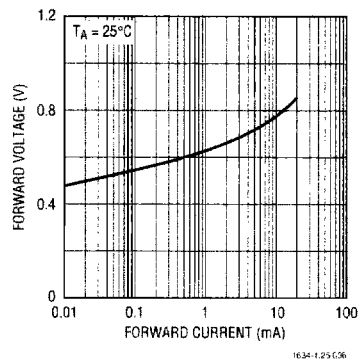
1634-1.25 G04

Dynamic Impedance vs Frequency



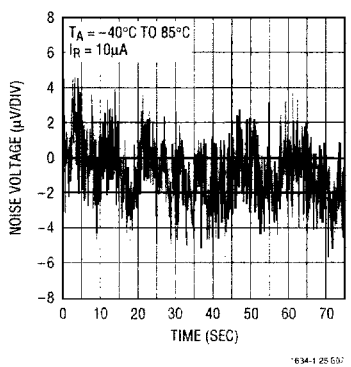
1634-1.25 G05

Forward Characteristics



1634-1.25 G06

0.1Hz to 10Hz Noise



1634-1.25 G07

Response Time

I_R = 10µA
C_{OUT} = 0
200µs/DIV

Response Time

I_R = 10µA
C_{OUT} = 0.1µF
50ms/DIV

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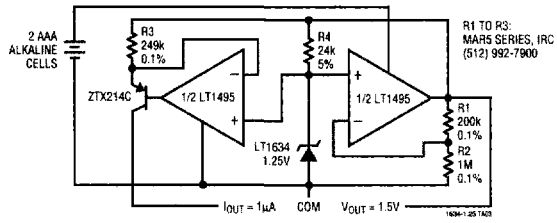
TYPICAL APPLICATION

Micropower Voltage and Current Reference



RELATED PARTS

PART NUMBER	DESCRIPTION	COMMENTS
LTC®1440	Micropower Comparator with Reference	3.7µA Max Supply Current, 1% 1.182V Reference
LT1460	Micropower Series Reference	0.075% Max, 10ppm/°C Max Drift, 2.5V, 5V and 10V Versions
LT1495	1.5µA Precision Rail-to-Rail Dual Op Amp	1.5µA Max Supply Current, 100pA Max I_{OS}
LTC1540	Nanopower Comparator with Reference	600nA Max Supply Current, 2% 1.182V Reference