



**THE DATASHEET OF  
LT1034CS8-1.2#PBF**



## FEATURES

- **Guaranteed 20 ppm/°C Drift**
- **Guaranteed 40 ppm/°C Drift (SO-8 Package)**
- **20 $\mu$ A to 20mA Operation (1.2V)**
- Dynamic Impedance: 1 $\Omega$
- 7V, 100 $\mu$ A Reference


## APPLICATIONS

- Portable Meters
- Precision Regulators
- Calibrators

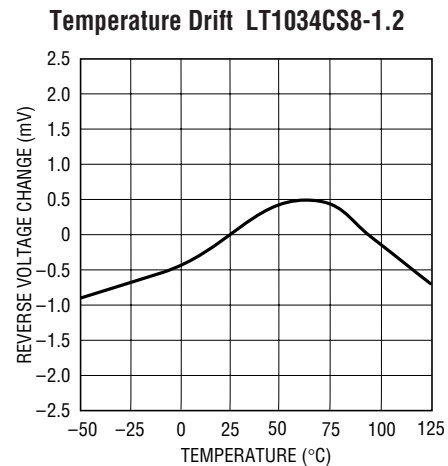
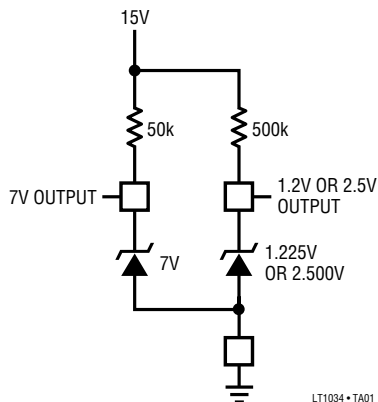
## DESCRIPTION

The LT<sup>®</sup>1034 is a micropower, precision 1.2V/2.5V reference combined with a 7V auxiliary reference. The 1.2V/2.5V reference is a trimmed, thin-film, band-gap, voltage reference with 1% initial tolerance and guaranteed 20ppm/°C temperature drift. Operating on only 20 $\mu$ A, the LT1034 offers guaranteed drift, low temperature cycling hysteresis and good long-term stability. The low dynamic impedance makes the LT1034 easy to use from unregulated supplies. The 7V reference is a subsurface zener device for less demanding applications.

The LT1034 reference can be used as a high performance upgrade of the LM385 or LT1004, where guaranteed temperature drift is desired.

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## TYPICAL APPLICATION



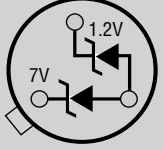
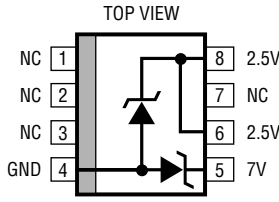
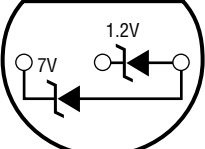
# LT1034-1.2/LT1034-2.5

## ABSOLUTE MAXIMUM RATINGS (Note 1)

Operating Current ..... 20mA  
 Forward Current (Note 2) ..... 20mA  
 Storage Temperature Range ..... -65°C to 150°C  
 Lead Temperature (Soldering, 10 sec)..... 300°C

Operating Temperature  
 Commercial ..... 0° to 70°C  
 Industrial ..... -40°C to 85°C  
 Military (**OBsolete**) ..... -55°C to 125°C

## PACKAGE/ORDER INFORMATION

|  |  |   |  |
|--|--|---|--|
| <p>BOTTOM VIEW</p>  <p>H PACKAGE<br/>3-LEAD TO-46 METAL CAN<br/><math>T_{JMAX} = 150^{\circ}\text{C}</math>, <math>\theta_{JA} = 440^{\circ}\text{C/W}</math>,<br/><math>\theta_{JC} = 80^{\circ}\text{C/W}</math></p> <p><b>OBsolete PACKAGE</b><br/>Consider the Z Package for Alternate Source</p> | <p>ORDER PART NUMBER</p> <p>LT1034BCH-1.2<br/>                 LT1034BCH-2.5<br/>                 LT1034BMH-1.2<br/>                 LT1034BMH-2.5<br/>                 LT1034CH-1.2<br/>                 LT1034CH-2.5<br/>                 LT1034MH-1.2<br/>                 LT1034MH-2.5</p> | <p>TOP VIEW</p>  <p>S8 PACKAGE<br/>8-LEAD PLASTIC SO</p> <p><math>T_{JMAX} = 175^{\circ}\text{C}</math>, <math>\theta_{JA} = 150^{\circ}\text{C/W}</math></p> | <p>ORDER PART NUMBER</p> <p>LT1034CS8-1.2<br/>                 LT1034CS8-2.5<br/>                 LT1034IS8-1.2<br/>                 LT1034IS8-2.5</p> |
| <p>BOTTOM VIEW</p>  <p>Z PACKAGE<br/>3-LEAD TO-92 PLASTIC<br/><math>T_{JMAX} = 100^{\circ}\text{C}</math>, <math>\theta_{JA} = 160^{\circ}\text{C/W}</math></p>   | <p>ORDER PART NUMBER</p> <p>LT1034BCZ-1.2<br/>                 LT1034BCZ-2.5<br/>                 LT1034BIZ-1.2<br/>                 LT1034BIZ-2.5<br/>                 LT1034CZ-1.2<br/>                 LT1034CZ-2.5<br/>                 LT1034IZ-1.2<br/>                 LT1034IZ-2.5</p> |   | <p>PART MARKING</p> <p>3401<br/>                 3402<br/>                 1034I12<br/>                 34I02</p>                                      |

Consult LTC Marketing for parts specified with wider operating temperature ranges.

**ELECTRICAL CHARACTERISTICS** The ● denotes the specifications which apply over the full operating temperature range, otherwise specifications are at  $T_A = 25^\circ\text{C}$ .

| PARAMETER                             | CONDITIONS  |   | LT1034-1.2 |       |       | LT1034-2.5 |      |                            | UNITS                 |
|---------------------------------------|---|---|------------|-------|-------|------------|------|----------------------------|-----------------------|
|                                       |   |   | MIN        | TYP   | MAX   | MIN        | TYP  | MAX                        |                       |
| Reverse Breakdown Voltage             | $I_R = 100\mu\text{A}$  | ● | 1.210      | 1.225 | 1.240 | 2.46       | 2.5  | 2.54                       | V                     |
|                                       |   |   | 1.205      | 1.225 | 1.245 | 2.43       | 2.5  | 2.57                       | V                     |
| Reverse Breakdown Change with Current | (Note 4)<br>$2\text{mA} \leq I_R \leq 20\text{mA}$              | ● |            | 0.5   | 2.0   |            | 1.0  | 3.0                        | mV                    |
|                                       |   |   |            | 1.0   | 4.0   |            | 1.5  | 6.0                        | mV                    |
|                                       |   |   |            | 4.0   | 8.0   |            | 6.0  | 16.0                       | mV                    |
|                                       |   |   |            | 6.0   | 15.0  |            | 10.0 | 20.0                       | mV                    |
| Minimum Operating Current             |   | ● | 10         | 20    |       | 15         | 30   | $\mu\text{A}$              |                       |
| Temperature Coefficient               | $I_R = 100\mu\text{A}$ LT1034B<br>LT1034                        | ● |            | 10    | 20    |            | 10   | 20                         | ppm/ $^\circ\text{C}$ |
|                                       |   |   |            | 20    | 40    |            | 20   | 40                         | ppm/ $^\circ\text{C}$ |
| Reverse Dynamic Impedance (Note 3)    | $I_R = 100\mu\text{A}$  | ● |            | 0.25  | 1.0   |            | 0.5  | 1.5                        | $\Omega$              |
|                                       |   |   |            | 0.50  | 2.0   |            | 1.0  | 2.5                        | $\Omega$              |
| Low Frequency Noise                   | $I_R = 100\mu\text{A}$ , $0.1\text{Hz} \leq F \leq 10\text{Hz}$ | ● |            | 4     |       |            | 6    | $\mu\text{V}_{\text{P-P}}$ |                       |
| Long-Term Stability                   | $I_R = 100\mu\text{A}$  |   |            | 20    |       |            | 20   | ppm/ $\sqrt{\text{kh}}$    |                       |

The ● denotes the specifications which apply over the full operating temperature range, otherwise specifications are at  $T_A = 25^\circ\text{C}$ .  
**7V Reference.**

| PARAMETER                             | CONDITIONS                                |   | MIN  | TYP | MAX | UNITS                   |
|---------------------------------------|---|---|------|-----|-----|-------------------------|
| Reverse Breakdown Voltage             | $I_R = 100\mu\text{A}$                    | ● | 6.80 | 7.0 | 7.3 | V                       |
|                                       |   |   | 6.75 | 7.0 | 7.4 | V                       |
| Reverse Breakdown Change with Current | $100\mu\text{A} \leq I_R \leq 1\text{mA}$ | ● |      | 90  | 140 | mV                      |
|                                       | $100\mu\text{A} \leq I_R \leq 1\text{mA}$ |   |      | 100 | 190 | mV                      |
|                                       | $1\text{mA} \leq I_R \leq 20\text{mA}$    |   |      | 160 | 250 | mV                      |
|                                       | $1\text{mA} \leq I_R \leq 20\text{mA}$    |   |      | 200 | 350 | mV                      |
| Temperature Coefficient               | $I_R = 100\mu\text{A}$                    | ● |      | 40  |     | ppm/ $^\circ\text{C}$   |
| Long-Term Stability                   | $I_R = 100\mu\text{A}$                    |   |      | 20  |     | ppm/ $\sqrt{\text{kh}}$ |

**Note 1:** Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

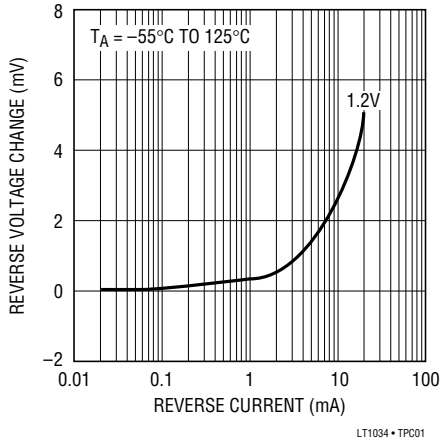
**Note 2:** Forward biasing either diode will affect the operation of the other diode.

**Note 3:** This parameter guaranteed by “reverse breakdown change with current” test.

**Note 4:** For the LT1034-1.2:  $20\mu\text{A} \leq I_R \leq 2\text{mA}$ . For the LT1034-2.5:  $30\mu\text{A} \leq I_R \leq 2\text{mA}$ .

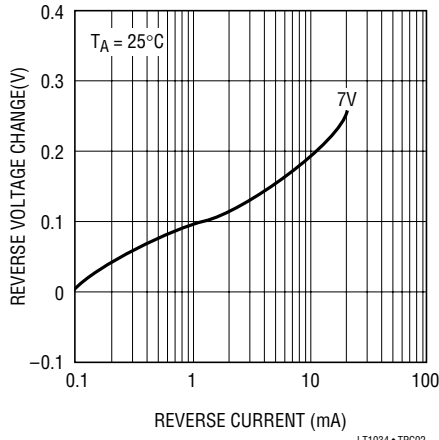
# TYPICAL PERFORMANCE CHARACTERISTICS

**Reverse Voltage Change 1.2V**



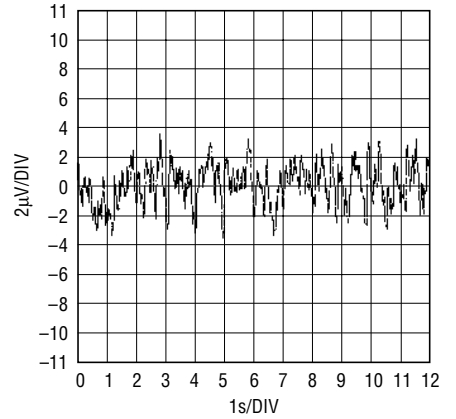
LT1034 • TPC01

**Reverse Voltage Change 7V**



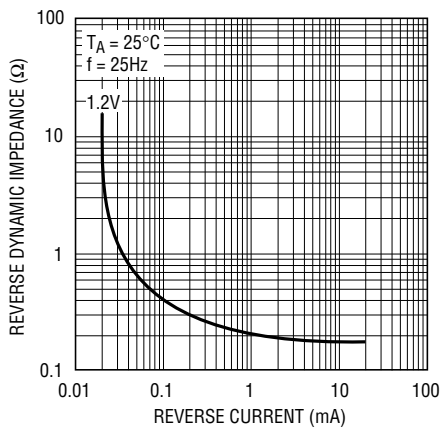
LT1034 • TPC02

**0.1Hz to 10Hz Noise 1.2V**



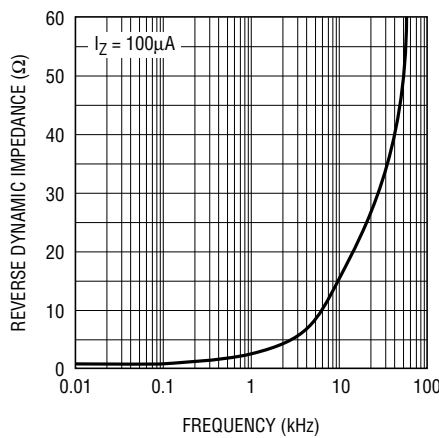
LT1034 • TPC03

**Reverse Dynamic Impedance 1.2V**



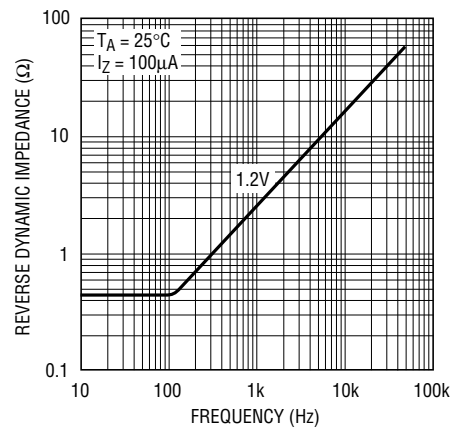
LT1034 • TPC04

**Reverse Dynamic Impedance 2.5V**



LT1034 • TPC05

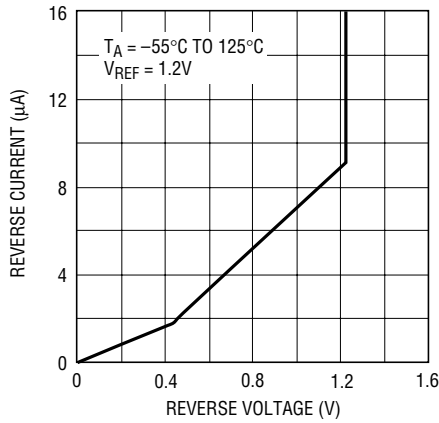
**Reverse Dynamic Impedance 7V**



LT1034 • TPC06

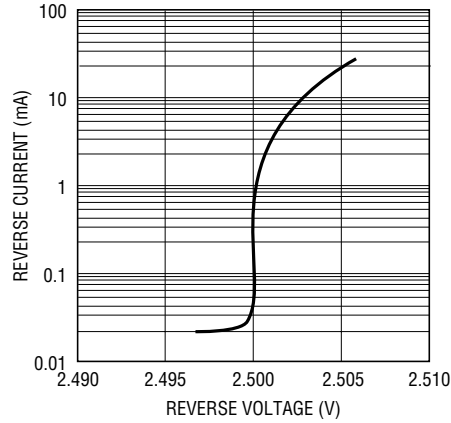
# TYPICAL PERFORMANCE CHARACTERISTICS

Reverse Characteristics 1.2V



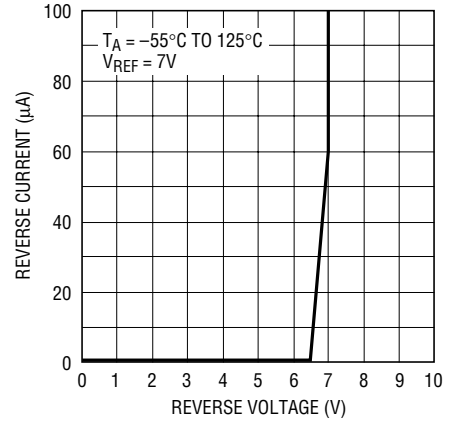
LT1034 • TPC07

Reverse Characteristics 2.5V



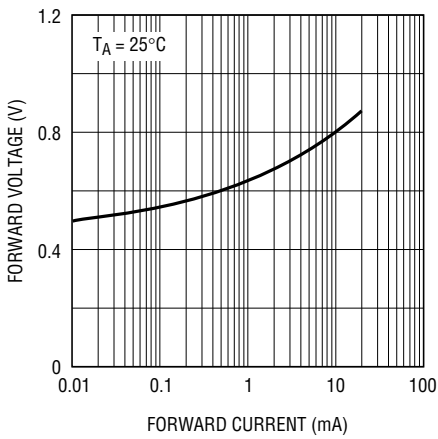
LT1034 • TPC02

Reverse Characteristics 7V



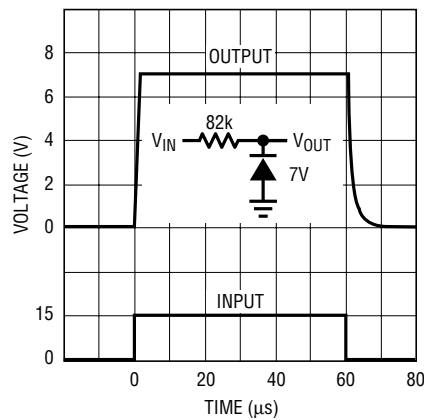
LT1034 • TPC09

Forward Characteristics



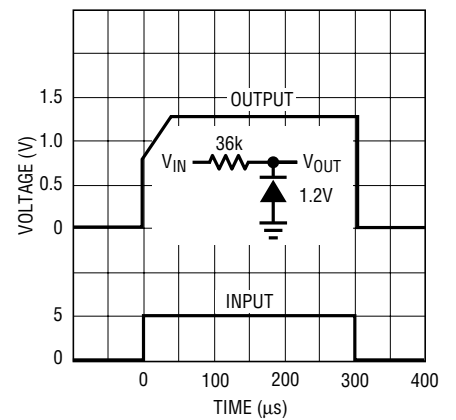
LT1034 • TPC10

Response Time



LT1180A • TPC11

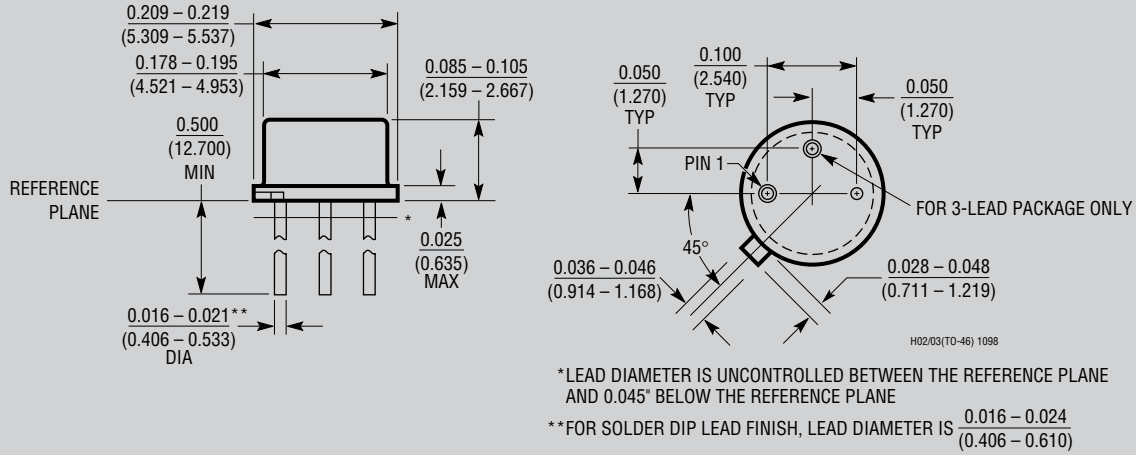
Response Time



LT1180A • TPC12

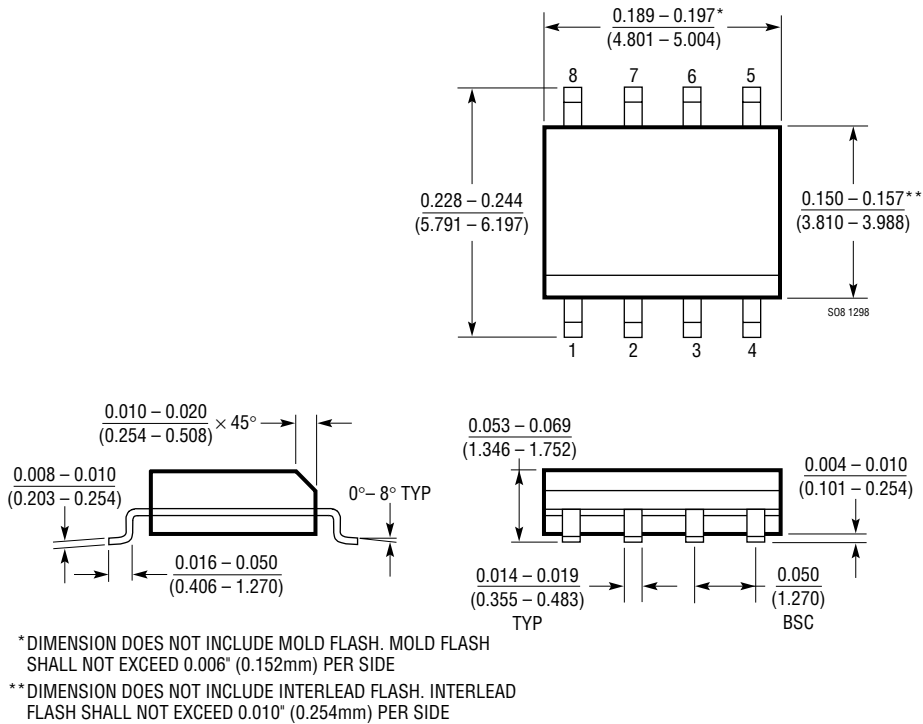
**PACKAGE DESCRIPTION**

**H Package**  
**8-Lead TO-5 Metal Can (.200 Inch PCD)**  
 (Reference LTC DWG # 05-08-1320)



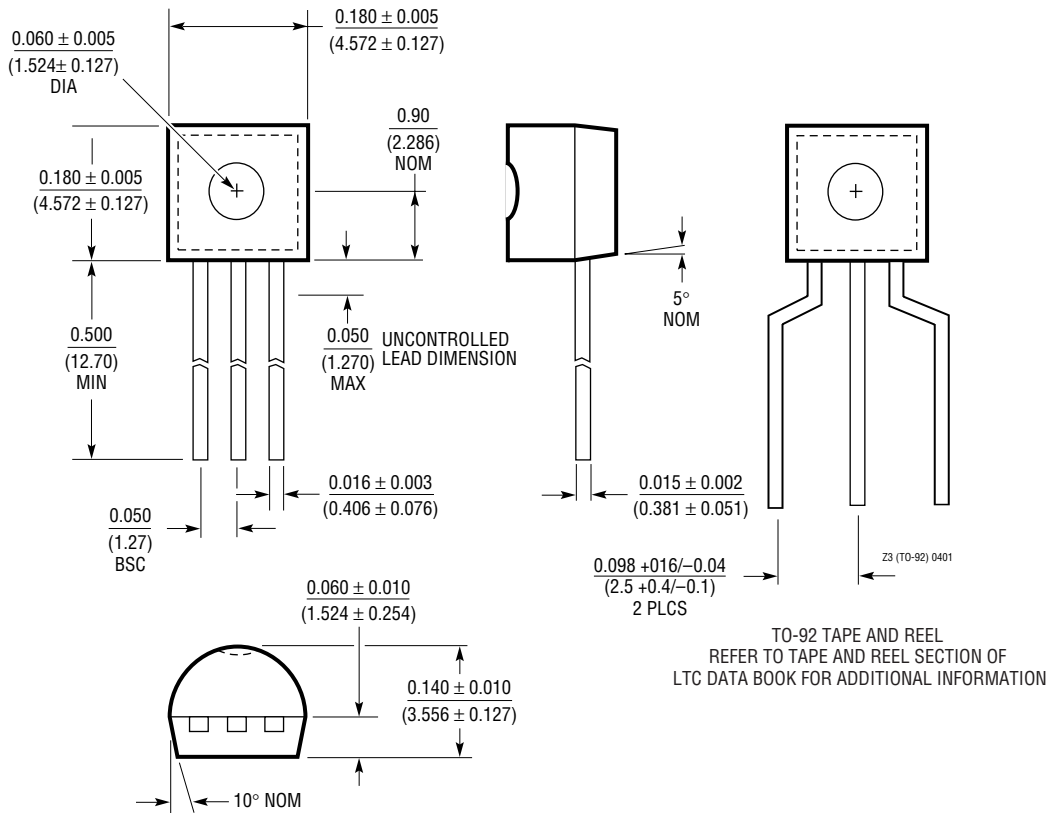
**OBsolete PACKAGE**

**S8 Package**  
**8-Lead Plastic Small Outline (Narrow .150 Inch)**  
 (Reference LTC DWG # 05-08-1610)



**PACKAGE DESCRIPTION**

**Z Package**  
**3-Lead Plastic TO-92 (Similar to TO-226)**  
 (Reference LTC DWG # 05-08-1410)



# LT1034-1.2/LT1034-2.5

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## RELATED PARTS

| PART NUMBER | DESCRIPTION                            | COMMENTS   |
|-------------|--|--|
| LT1004      | Low Cost Precision Band-Gap            | Micropower, SO-8, Industrial Temperature Options |
| LT1019      | Precision Series or Shunt Band-Gap     | Low Dropout, Multiple Output Options             |
| LT1236      | Precision Series or Shunt Buried Zener | Low Noise, Low Power, Multiple Output Options    |

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