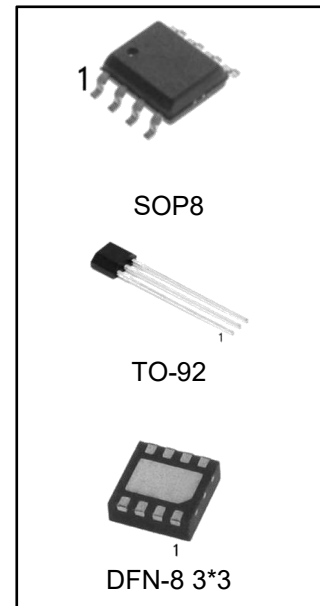


## Description

The LM236 and LM336 are precision 2.5V regulator diodes. These voltage reference monolithic ICs operate like 2.5V zener diodes with a low temperature coefficient and a dynamic impedance of  $0.2\Omega$ . A third pin enables adjusting the reference voltage and the temperature coefficient.

## Features

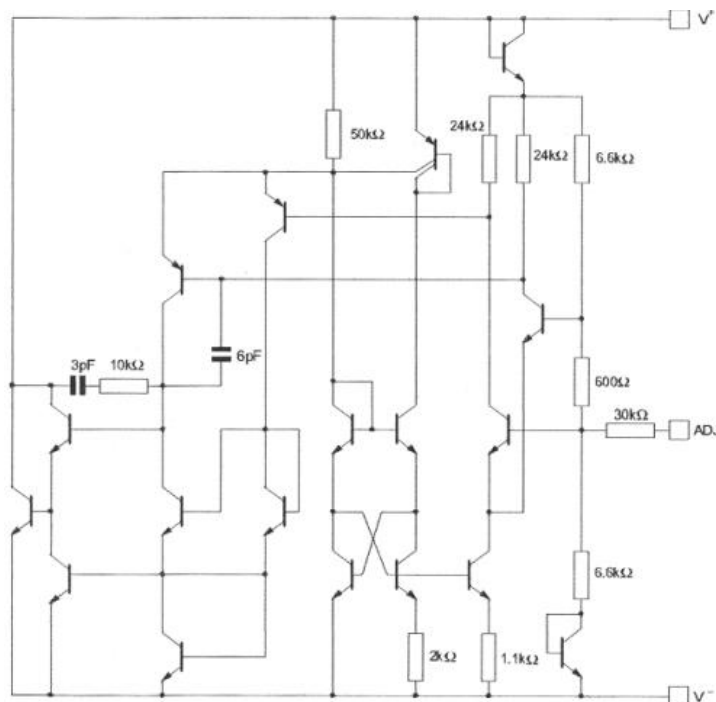
- Low temperature coefficient
- Wide operating current of  $400\mu\text{A}$  to  $10\text{ mA}$
- $0.2\Omega$  dynamic impedance
- $\pm 1\%$  initial tolerance available
- Guaranteed temperature stability
- Fast turn-on



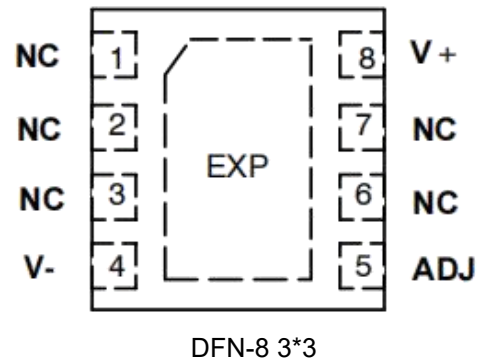
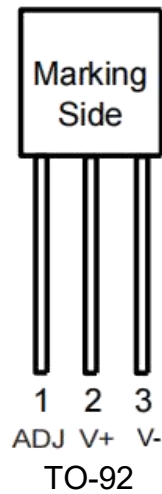
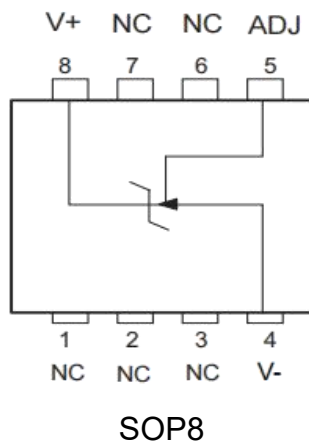
## Ordering Information

DEVICE	Package Type	MARKING	Packing	Packing Qty
LM236M-2.5/TR	SOP8	236-2.5	Reel	2500pcs/reel
LM336M-2.5/TR	SOP8	336-2.5	Reel	2500pcs/reel
LM236Z-2.5	TO-92	LM236-2.5	Tape	1000pcs/box
LM336Z-2.5	TO-92	LM336-2.5	Tape	1000pcs/box
LM236DQ-2.5/TR	DFN-8 3*3	236-2.5	Reel	2500pcs/reel
LM336DQ-2.5/TR	DFN-8 3*3	336-2.5	Reel	2500pcs/reel

## Schematic Diagram



## Pin Connections



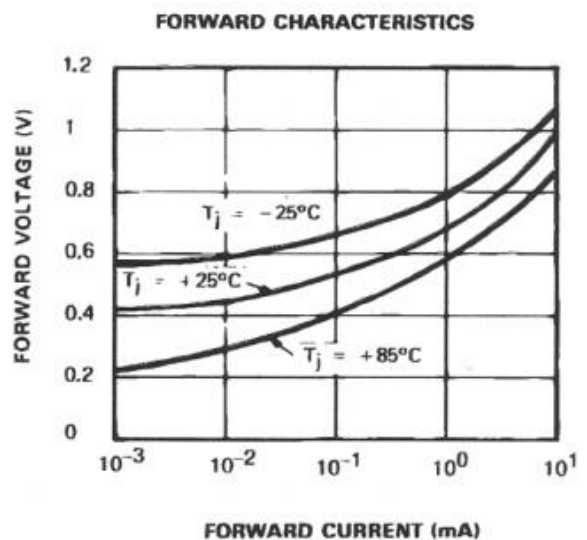
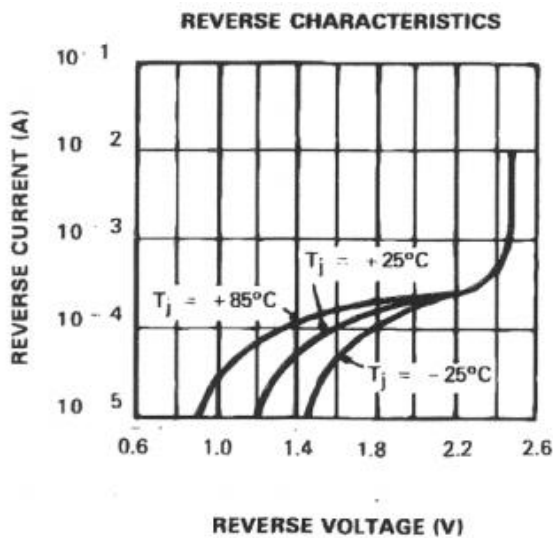
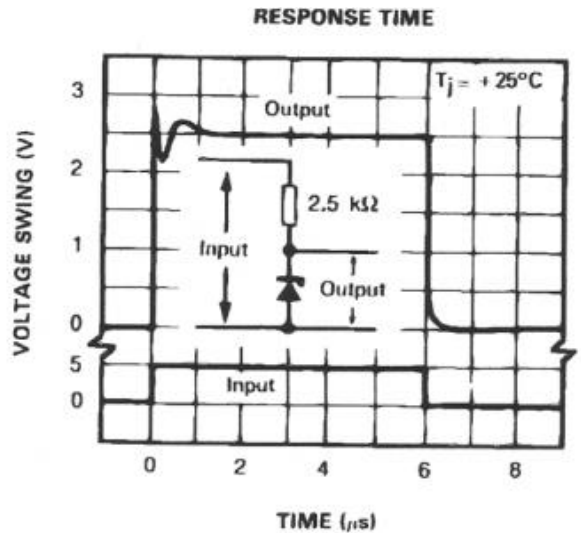
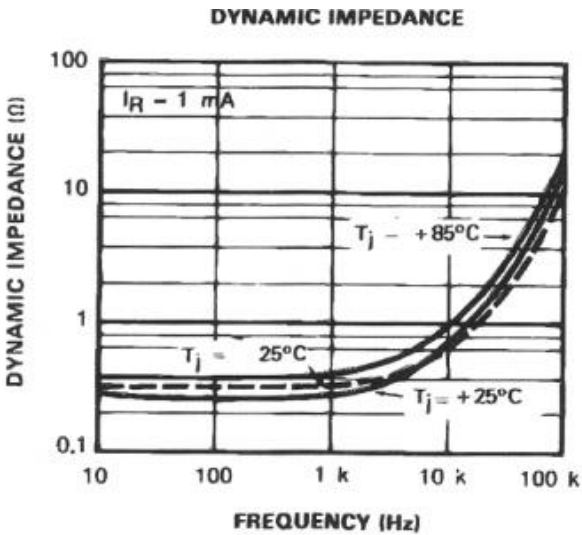
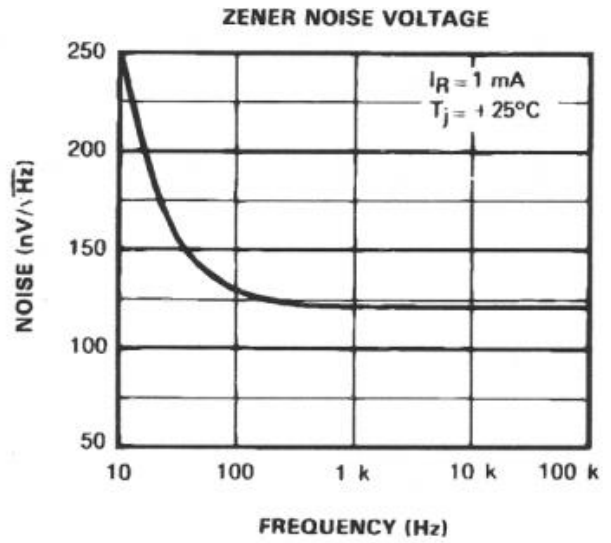
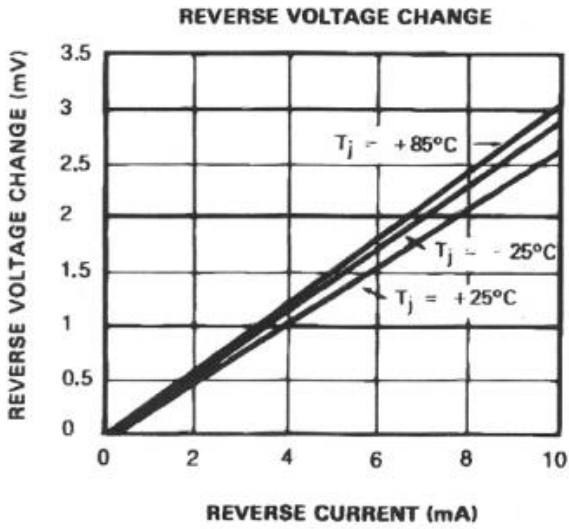
## Absolute Maximum Ratings

Symbol	Parameter	LM336	Unit
I <sub>RF</sub>	Current Reverse Forward	15	mA
		10	
T <sub>oper</sub>	Operating Free-air Temperature Range	LM336-2.5: 0 to +70	°C
		LM236-2.5: -40 to +85	°C
T <sub>Stg</sub>	Storage Temperature Range	-65 to +150	°C

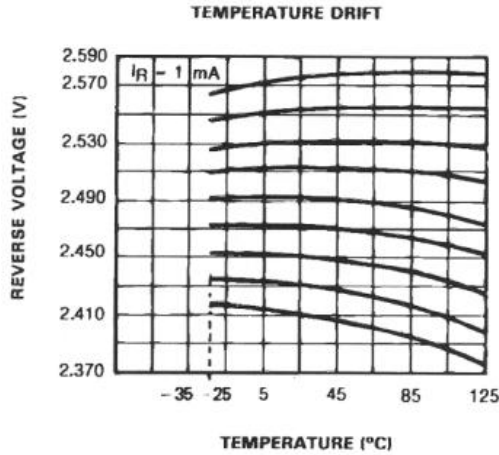
## Electrical Characteristics

Symbol	Parameter	LM236/LM336			Unit
		Min.	Typ.	Max.	
V <sub>R</sub>	Reference Breakdown Voltage T <sub>amb</sub> = +25°C, I <sub>R</sub> = 1mA LM336	2.44	2.49	2.54	V
ΔV <sub>R</sub>	Reverse Breakdown Voltage Change with Current 400μA ≤ I <sub>R</sub> ≤ 10mA T <sub>amb</sub> = +25°C T <sub>min.</sub> ≤ T <sub>amb</sub> ≤ T <sub>max.</sub>	-	2.6 3	10 12	mV
Z <sub>D</sub>	Reverse Dynamic Impedance (I <sub>R</sub> = 1mA) T <sub>amb</sub> = +25°C T <sub>min.</sub> ≤ T <sub>amb</sub> ≤ T <sub>max.</sub>	-	0.2 0.4	1 1.4	Ω
KVT	Temperature Stability (V <sub>R</sub> = 2.49V, I <sub>R</sub> = 1mA)	-	1.8	6	mV
KVH	Long Term Stability (T <sub>amb</sub> = +25°C ±0.1°C, I <sub>R</sub> = 1mA)	-	20	-	ppm

Typical Performance Characteristics



**Typical Performance Characteristics** (Continued)



**Application Hints**

The LM336 voltage references are easier to use than zener diodes. Their low impedance and wide current range facilitate biasing in any circuits. Besides, the breakdown voltage or the temperature coefficient can be adjusted so as to optimize the performance of the circuit.

Figure 1 represents a LM336 with a 10kΩ potentiometer to adjust the reverse breakdown voltage which can be adjusted without altering the temperature coefficient of the circuit. The adjustment range is generally sufficient to adjust the initial tolerance of the circuit and the inaccuracy of the amplifier circuit.

To obtain a lower temperature coefficient two diodes can be connected in series as indicated in Figure 2.

When the circuit is adjusted to 2.49V the temperature coefficient is minimized. For a correct temperature coefficient, the diodes should be at the same ambient temperature as the LM336. The value of R1 is not critical (2-20kΩ).

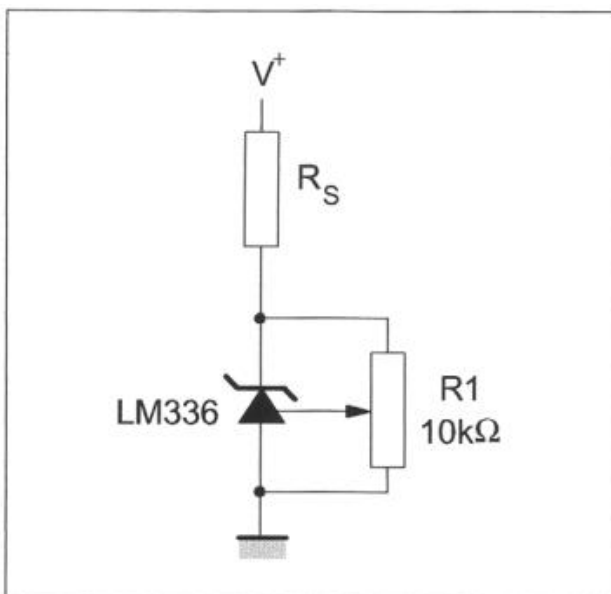


FIGURE1.LM336 with Pot for Adjustment of Breakdown Voltage

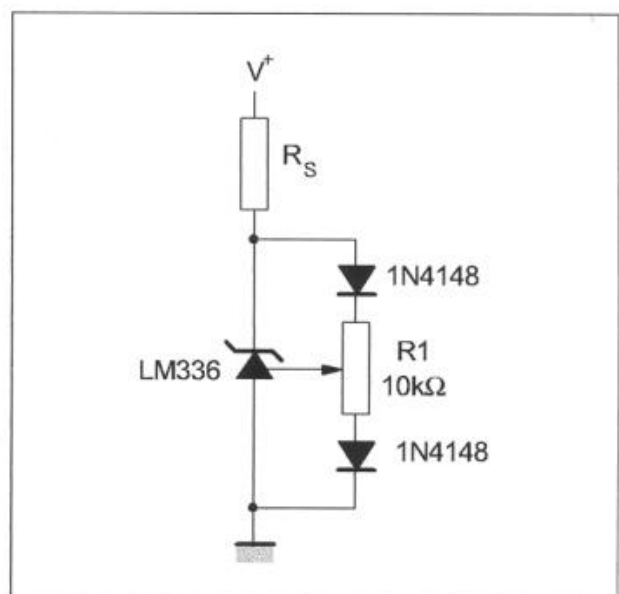


FIGURE 2. Temperature Coefficient Adjustment

**Typical Applications**

Figure 3 :2.5V Reference

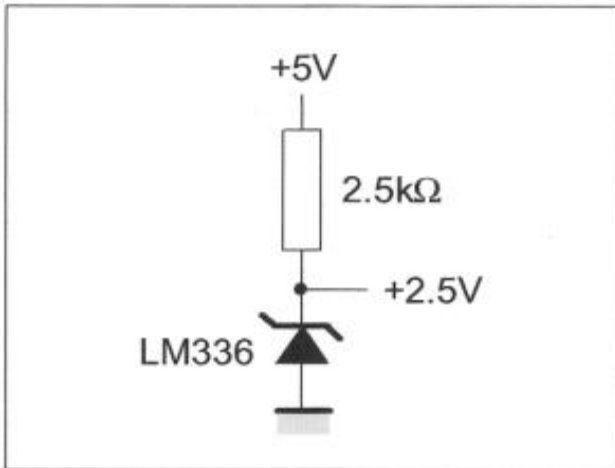


Figure 4 :Wide Input Range Reference

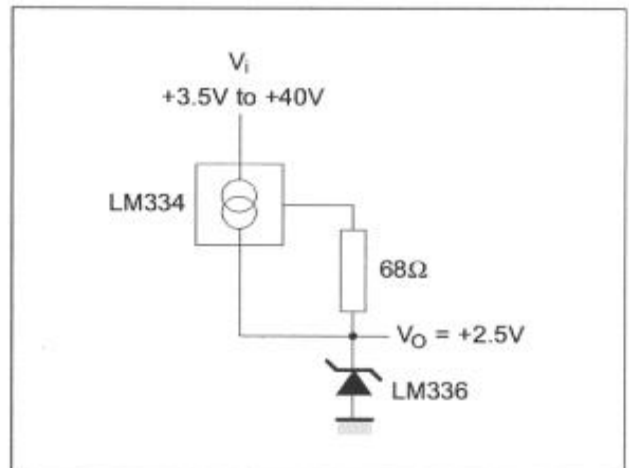


Figure 5 :Precision Power Regulator with Low Temperature Coefficient

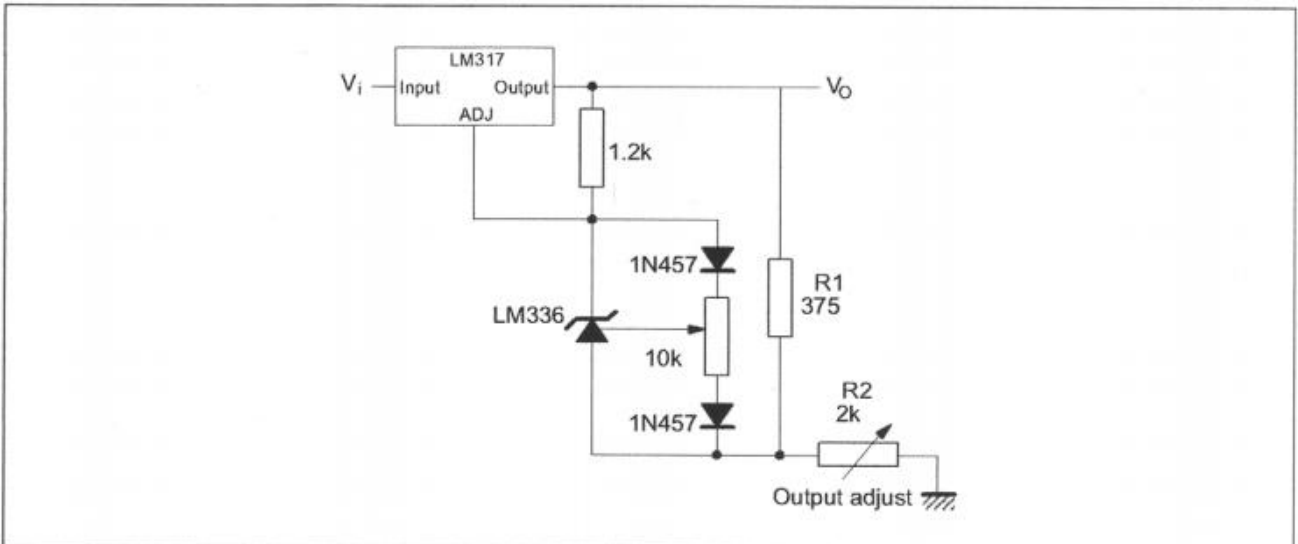


Figure 5 :Adjustable Shunt Regulator

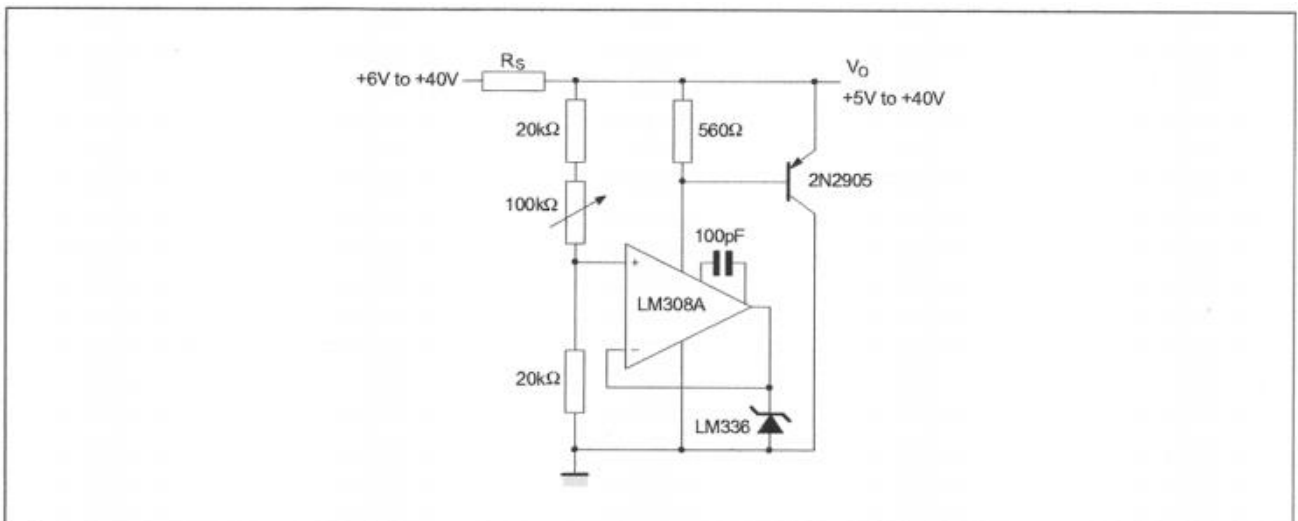


Figure 7 :Linear Ohmmeter

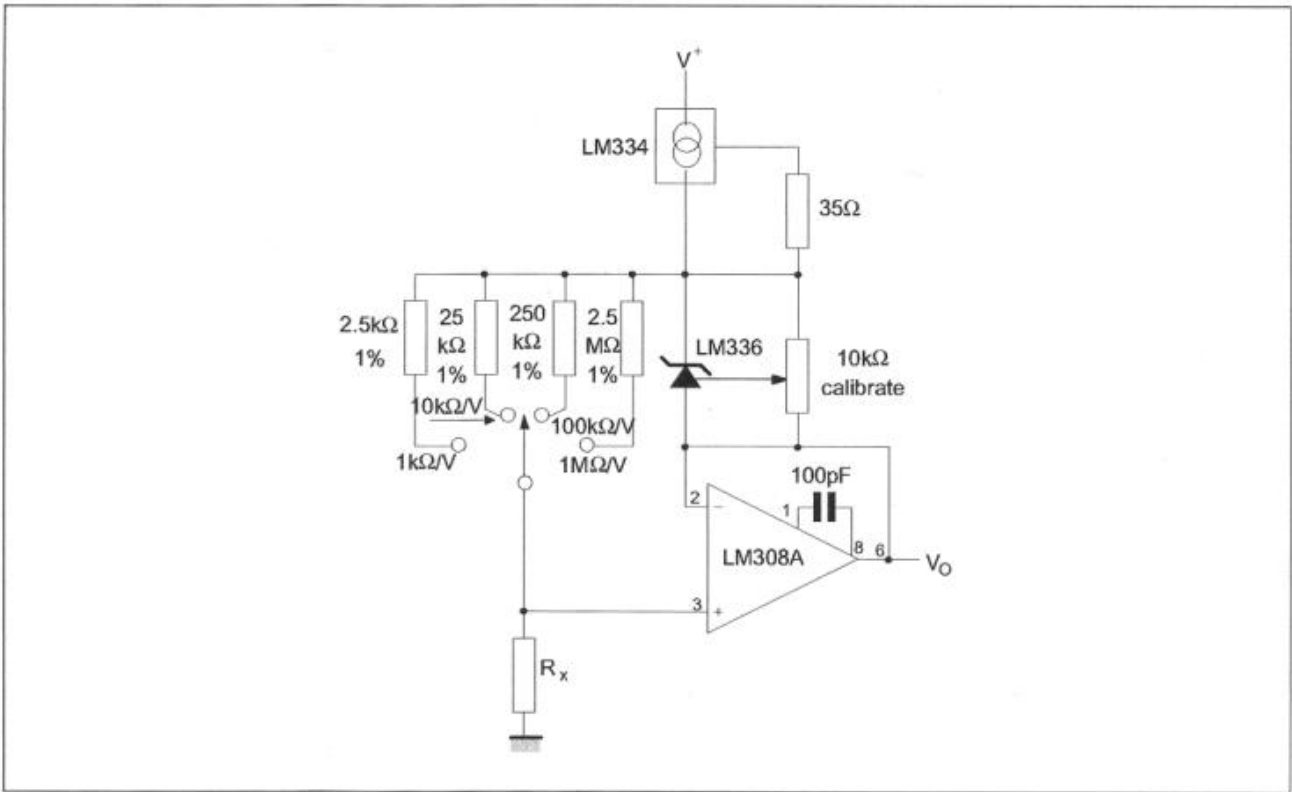


Figure 8 :Bipolar Output Reference

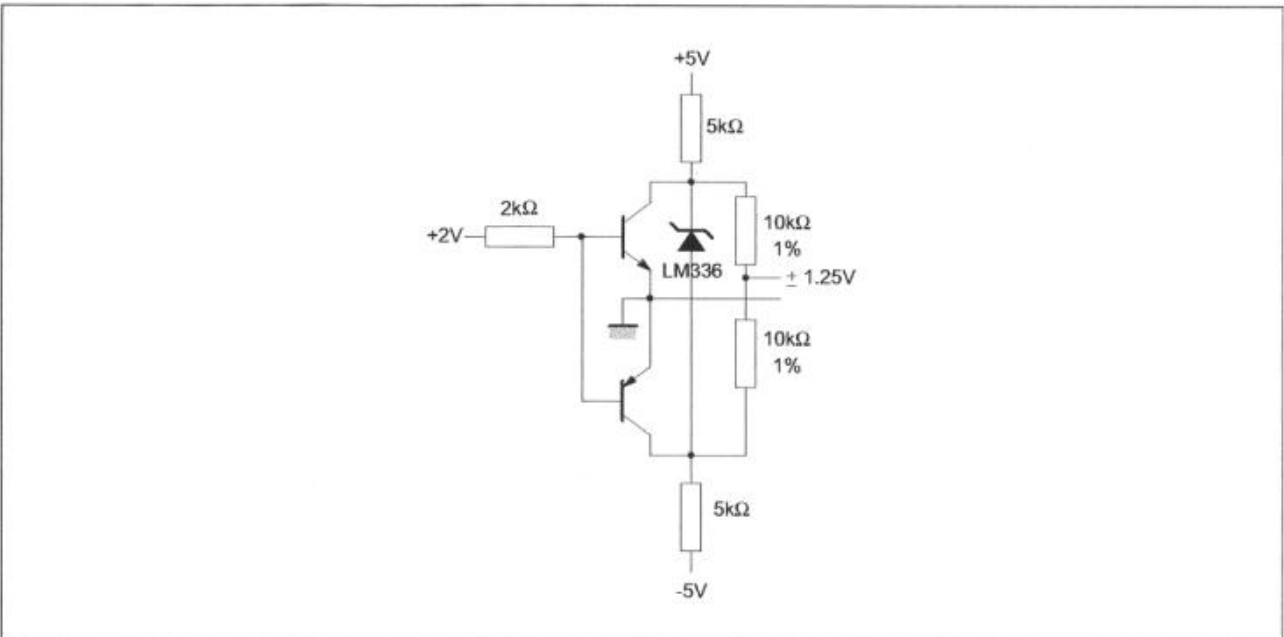


Figure 9 : 5V Buffered Reference

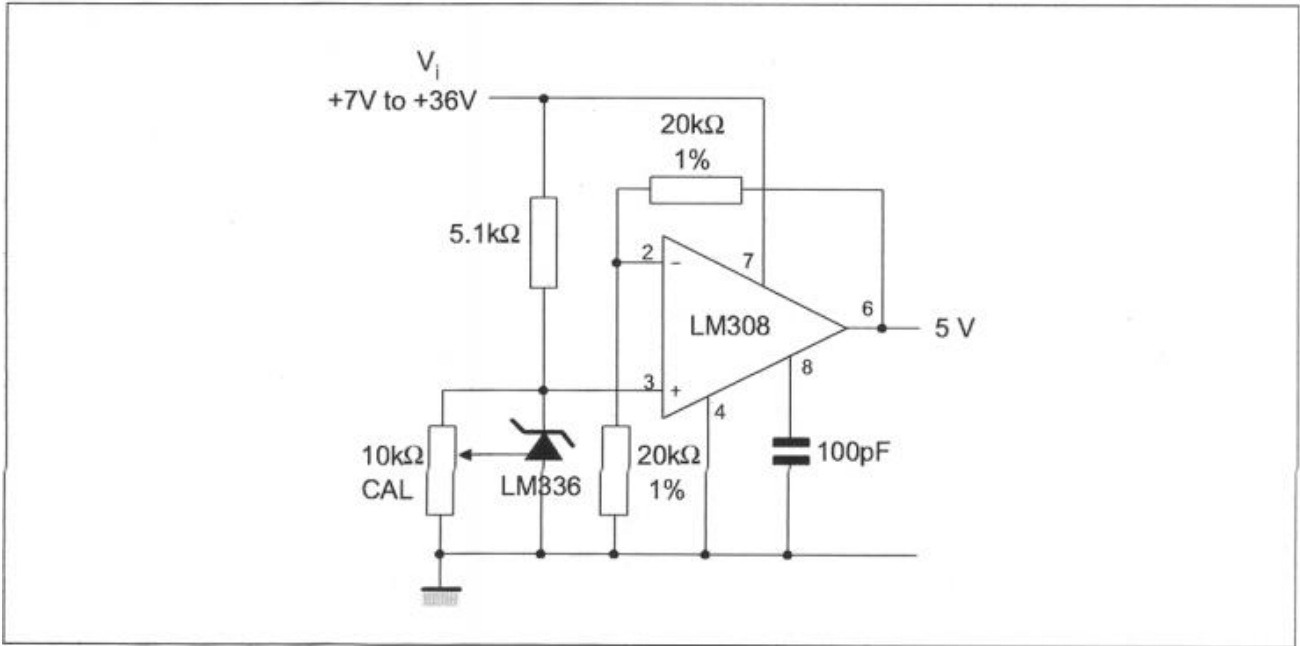
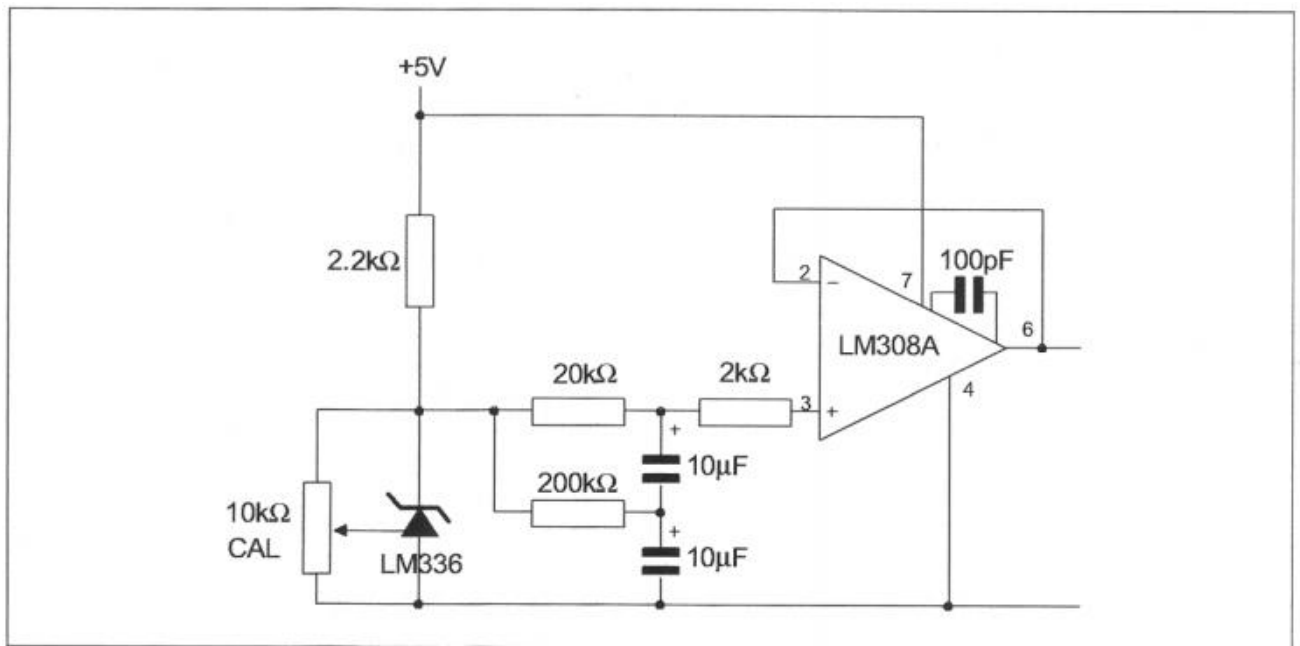
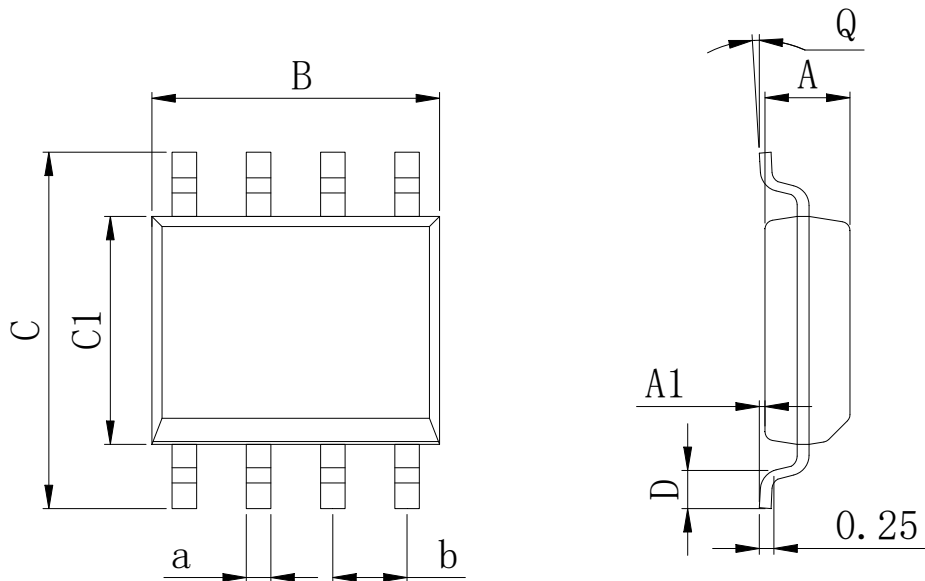


Figure 10 : Low Noise Buffered Reference



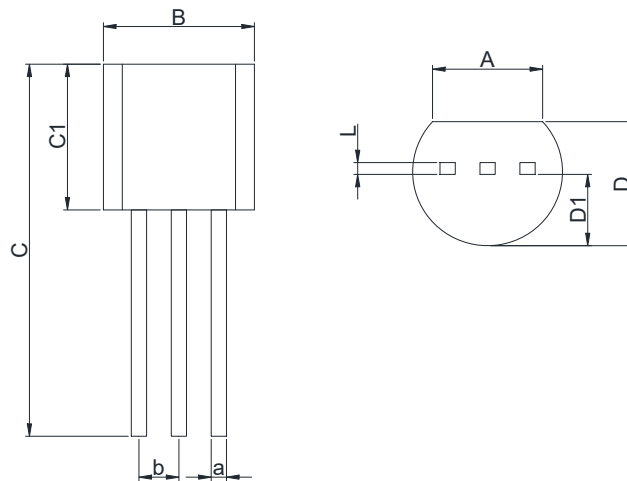
**Physical Dimensions**

SOP8


**Dimensions In Millimeters(SOP8)**

Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	4.90	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	5.10	6.20	4.00	0.80	8°	0.45	

TO-92

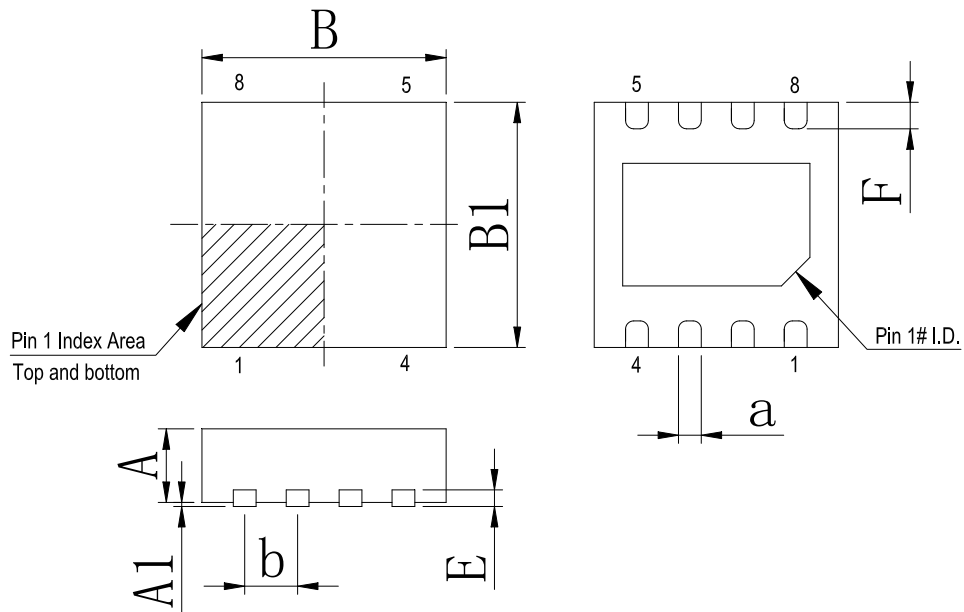

**Dimensions In Millimeters(TO-92)**

Symbol:	A	B	C	C1	D	D1	L	a	b
Min:	3.43	4.44	11.2	4.32	3.17	2.03	0.33	0.40	1.27BSC
Max:	3.83	5.21	12.7	5.34	4.19	2.67	0.42	0.52	



## Physical Dimensions

DFN-8 3\*3



Dimensions In Millimeters(DFN-8 3*3)								
Symbol:	A	A1	B	B1	E	F	a	b
Min:	0.85	0.00	2.90	2.90	0.20	0.30	0.20	0.65 BSC
Max:	0.95	0.05	3.10	3.10	0.25	0.50	0.34	

**IMPORTANT STATEMENT:**

Huaguan Semiconductor reserves the right to change its products and services without notice. Before ordering, the customer shall obtain the latest relevant information and verify whether the information is up to date and complete. Huaguan Semiconductor does not assume any responsibility or obligation for the altered documents.

Customers are responsible for complying with safety standards and taking safety measures when using Huaguan Semiconductor products for system design and machine manufacturing. You will bear all the following responsibilities: select the appropriate Huaguan Semiconductor products for your application; Design, validate and test your application; Ensure that your application meets the appropriate standards and any other safety, security or other requirements. To avoid the occurrence of potential risks that may lead to personal injury or property loss.

Huaguan Semiconductor products have not been approved for applications in life support, military, aerospace and other fields, and Huaguan Semiconductor will not bear the consequences caused by the application of products in these fields.

The technical and reliability data (including data sheets), design resources (including reference designs), application or other design suggestions, network tools, safety information and other resources provided for the performance of semiconductor products produced by Huaguan Semiconductor are not guaranteed to be free from defects and no warranty, express or implied, is made. The use of testing and other quality control technologies is limited to the quality assurance scope of Huaguan Semiconductor. Not all parameters of each device need to be tested.

The documentation of Huaguan Semiconductor authorizes you to use these resources only for developing the application of the product described in this document. You have no right to use any other Huaguan Semiconductor intellectual property rights or any third party intellectual property rights. It is strictly forbidden to make other copies or displays of these resources. You should fully compensate Huaguan Semiconductor and its agents for any claims, damages, costs, losses and debts caused by the use of these resources. Huaguan Semiconductor accepts no liability for any loss or damage caused by infringement.

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [Voltage References](#) category:*

*Click to view products by [HGSEMI](#) manufacturer:*

Other Similar products are found below :

[5962-8686103XC](#) [LT1460GIZ-5PBF](#) [LT1009IZPBF](#) [NCV431BVDMR2G](#) [REF01J/883](#) [SC431ILPRAG](#) [AP432AQG-7](#) [LM4040B25QFTA](#)  
[TL431BL3T](#) [TL431ACZ](#) [KA431SLMF2TF](#) [KA431SMF2TF](#) [KA431SMFTF](#) [LM4040QCEM3-3.0/NOPB](#) [LM4041C12ILPR](#)  
[LM4050AIM3X-5.0/NOPB](#) [LM4120AIM5-2.5/NOP](#) [LM431SCCMFX](#) [ZXRE250BSA-7](#) [ZXRE125DN8TA](#) [ZXRE250ASA-7](#)  
[ZTL431ASE5TA](#) [REF3012AIDBZR](#) [LM385BM-2.5/NOPB](#) [LM385D-2.5R2G](#) [LM4040AIM3-10.0](#) [LM4040BIM3-4.1](#) [LM4040CIM3-10.0](#)  
[LM4040CIM3X-2.0/NOPB](#) [LM4040CIX3-5.0+T](#) [LM4041DH5TA](#) [LM4041QDIM3-ADJ/NO](#) [LM4050QAEM3X4.1/NOPB](#) [LM4051BIM3-](#)  
[ADJ/NOPB](#) [LM4051CIM3X-1.2/NOPB](#) [LM4128CMF-1.8/NOPB](#) [LM4132DMF-1.8/NOPB](#) [LM4132EMF-1.8/NOPB](#) [LM4132EMF-](#)  
[2.0/NOPB](#) [LM431CIM](#) [LM385BD-2.5R2G](#) [LM385M-2.5/NOPB](#) [LM4030AMF-4.096/NOPB](#) [LM4040D30ILPR](#) [LM4051CIM3X-ADJ/NOPB](#)  
[LMV431ACM5X/NOPB](#) [AP432YG-13](#) [AP431IANTR-G1](#) [AP431AWG-7](#) [AS431ANTR-G1](#)