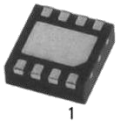
Description

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 0.2Ω. A third pin enables adjusting the reference voltage and the temperature coefficient.

SOP-8

TO-92



DFN-8 3*3

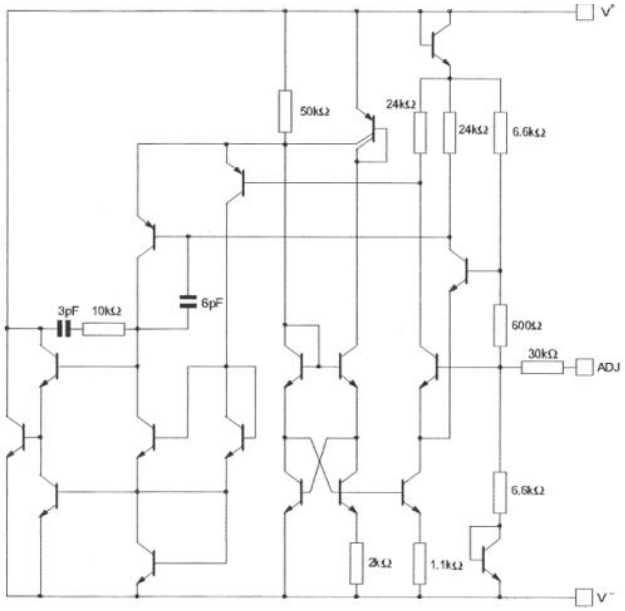
Features

- Low temperature coefficient
- Wide operating current of 400μA to 10 mA
- 0.2Ω dynamic impedance
- ± 1% initial tolerance available
- Guaranteed temperature stability
- Fast turn-on

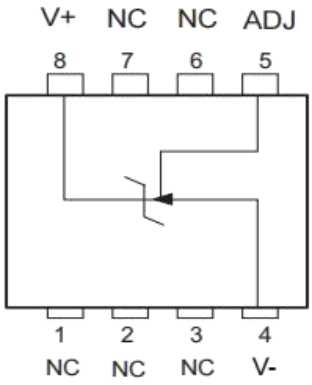
Ordering Information

DEVICE	Package Type	MARKING	Packing	Packing Qty
LM236D-2.5RG	SOP-8	236-2.5	Reel	2500pcs/reel
LM236D-2.5RG4	SOP-8	236-2.5	Reel	4000pcs/reel
LM336D-2.5RG	SOP-8	336-2.5	Reel	2500pcs/reel
LM336D-2.5RG4	SOP-8	336-2.5	Reel	4000pcs/reel
LM236LP-2.5G	TO-92	LM236-2.5	Bag	1000pcs/box
LM336LP-2.5G	TO-92	LM336-2.5	Bag	1000pcs/box
LM236DQ-2.5RG	DFN-8 3*3	236-2.5	Reel	2500pcs/reel
LM336DQ-2.5RG	DFN-8 3*3	336-2.5	Reel	2500pcs/reel

Schematic Diagram



Pin Connections



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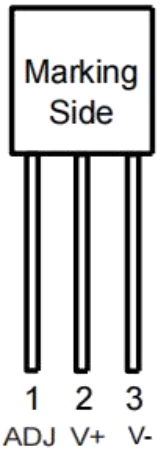

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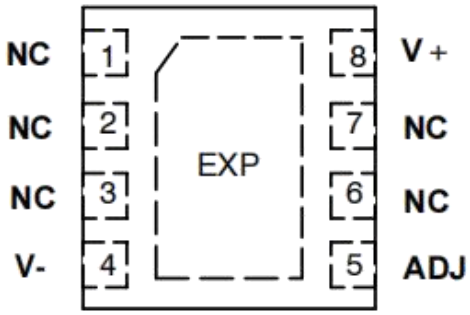


DFN-8 3*3

Absolute Maximum Ratings

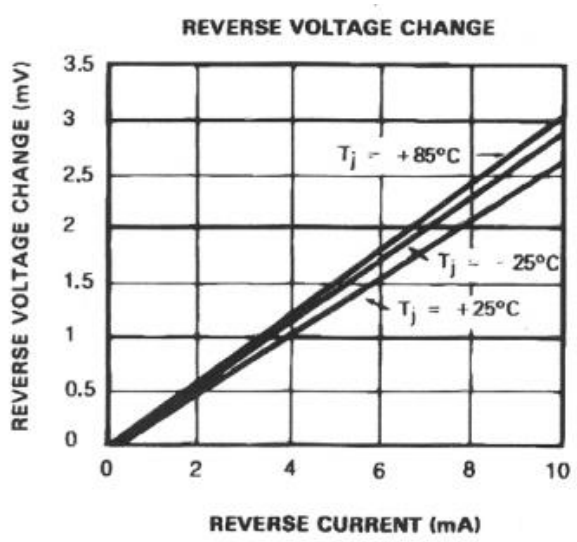
Symbol	Parameter	LM336	Unit
I_R I_F	Current Reverse Forward	 15 10	mA
Toper	Operating Free-air Temperature Range	LM336-2.5: 0 to +70	°C
		LM236-2.5: -40 to +85	°C
T_{Stg}	Storage Temperature Range	-65 to +150	°C
T_L	Lead Temperature (Soldering, 10 seconds)	245	°C

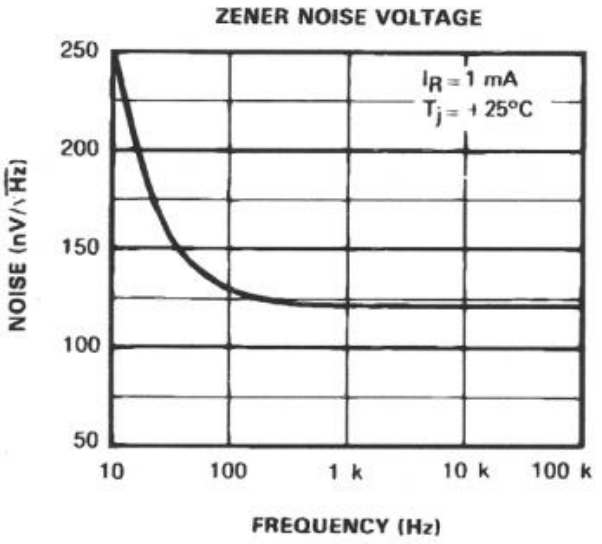
Note:Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but specific performance is not ensured.

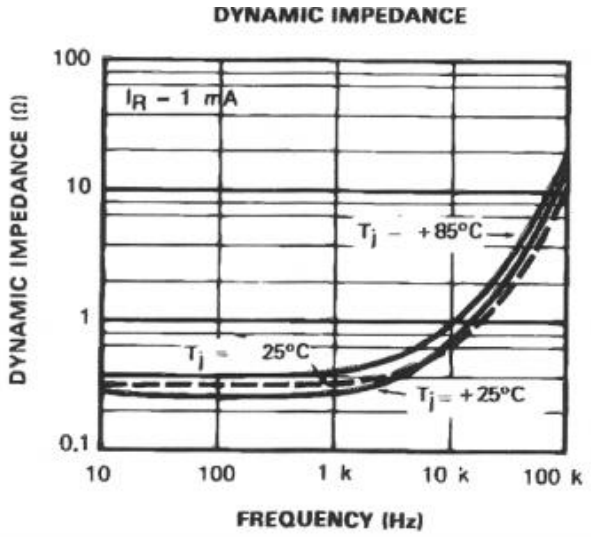
Electrical Characteristics

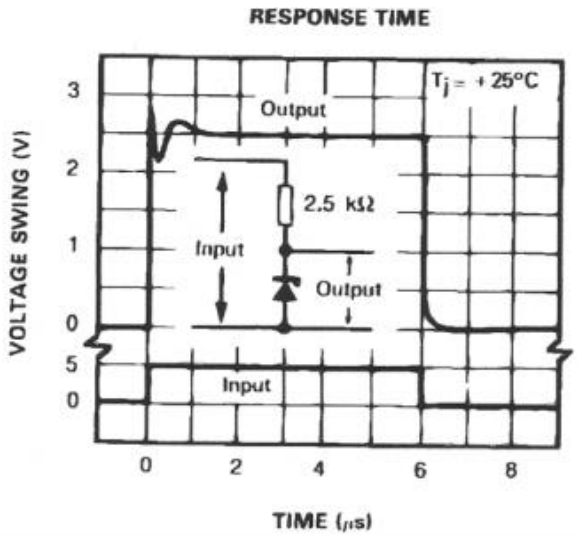
Symbol	Parameter	LM236/LM336			Unit
		Min.	Typ.	Max.	
V_R	Reference Breakdown Voltage T_{amb} = +25°C, I_R = 1mA LM336	2.44	2.49	2.54	V
ΔV_R	Reverse Breakdown Voltage Change with Current 400μA ≤ I_R ≤ 10mA T_{amb} = +25°C $T_{min.} \le T_{amb} \le T_{max.}$	-	 2.6 3	 10 12	mV
Z_D	Reverse Dynamic Impedance (I_R = 1mA) T_{amb} = +25°C $T_{min.} \le T_{amb} \le T_{max.}$	-	 0.2 0.4	 1 1.4	Ω
K_{VT}	Temperature Stability (V_R = 2.49V, I_R = 1mA)	-	1.8	6	mV
K_{VH}	Long Term Stability (T_{amb} = +25°C ±0.1°C, I_R= 1mA)	-	20	-	ppm

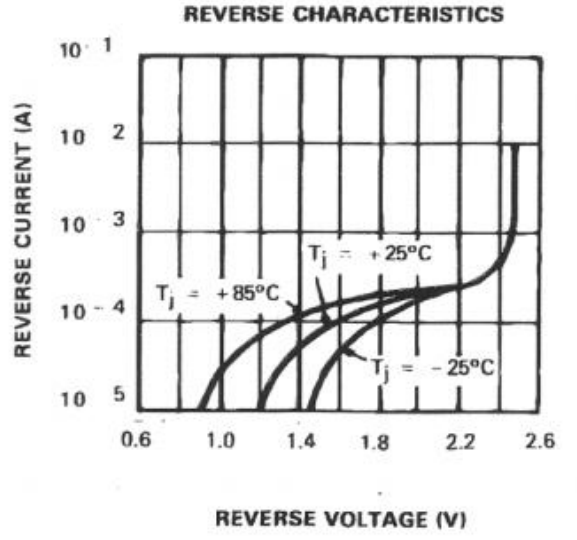
Typical Performance Characteristics

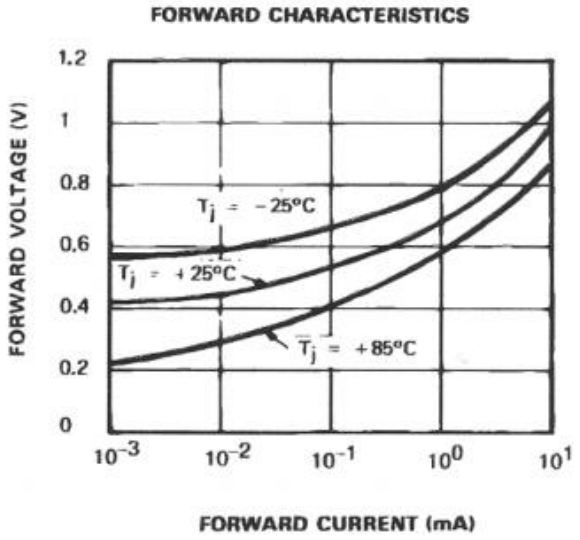




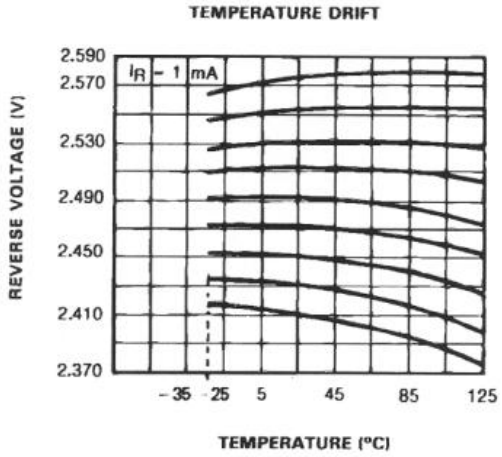








Typical Performance Characteristics (Continued)



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).

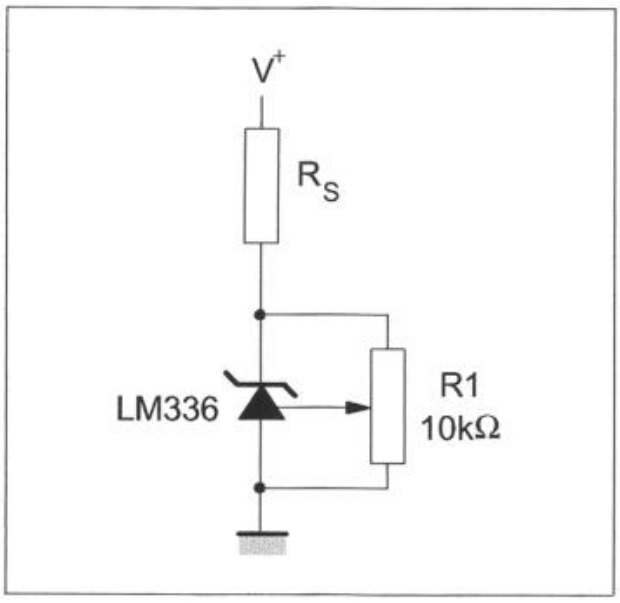


FIGURE1.LM336 with Pot for Adjustment of Breakdown Voltage

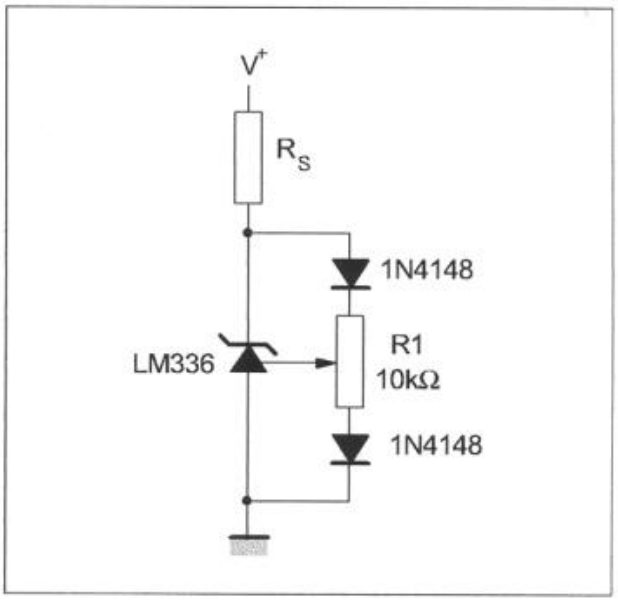


FIGURE 2. Temperature Coefficient Adjustment

Typical Applications

Figure 3 :2.5V Reference

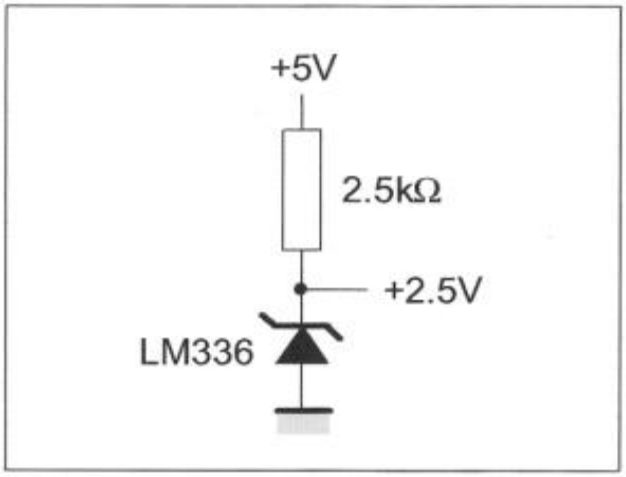


Figure 4 :Wide Input Range Reference

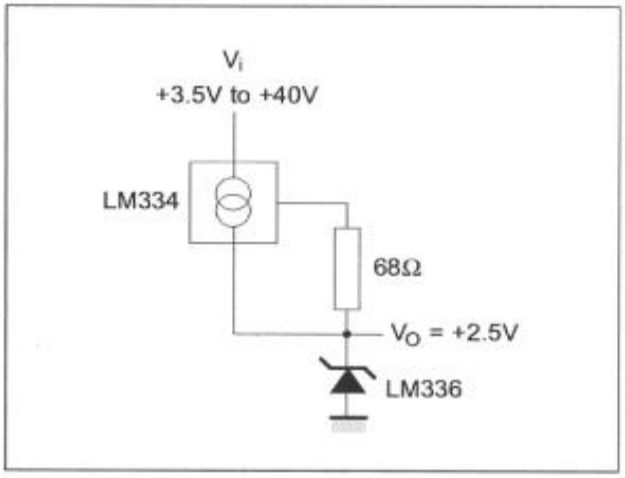


Figure 5 :Precision Power Regulator with Low Temperature Coefficient

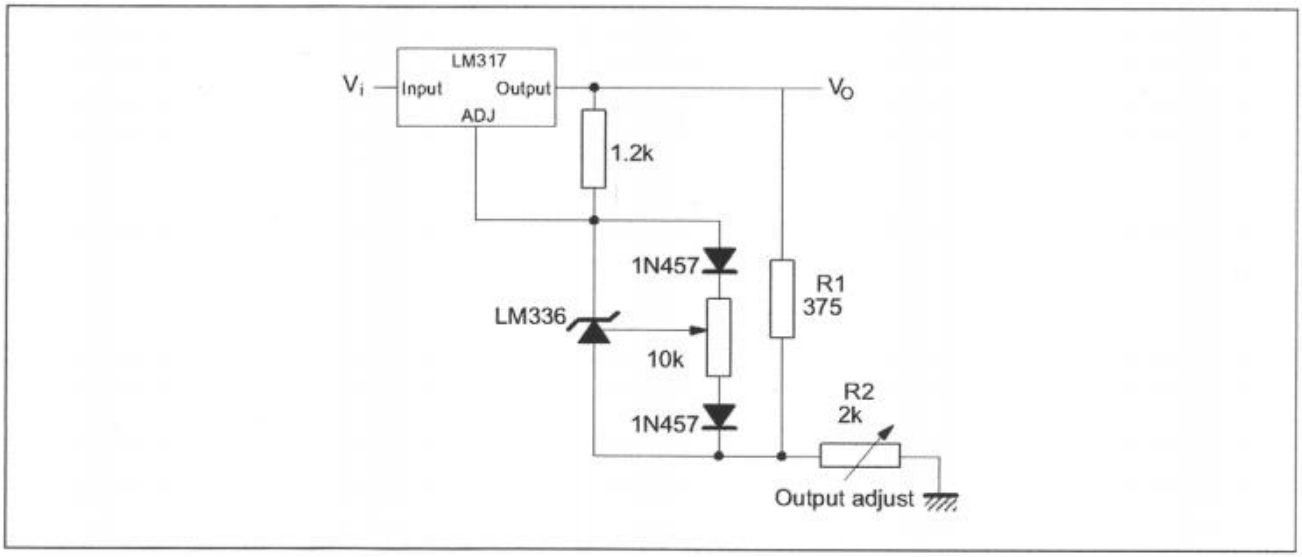


Figure 5 :Adjustable Shunt Regulator

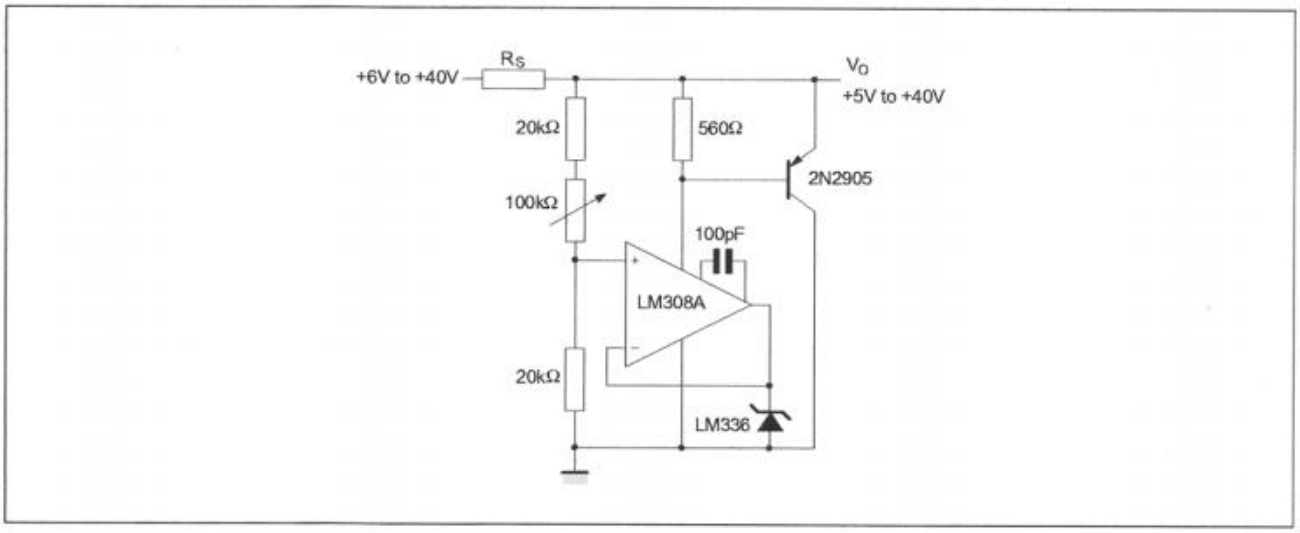


Figure 7 :Linear Ohmmeter

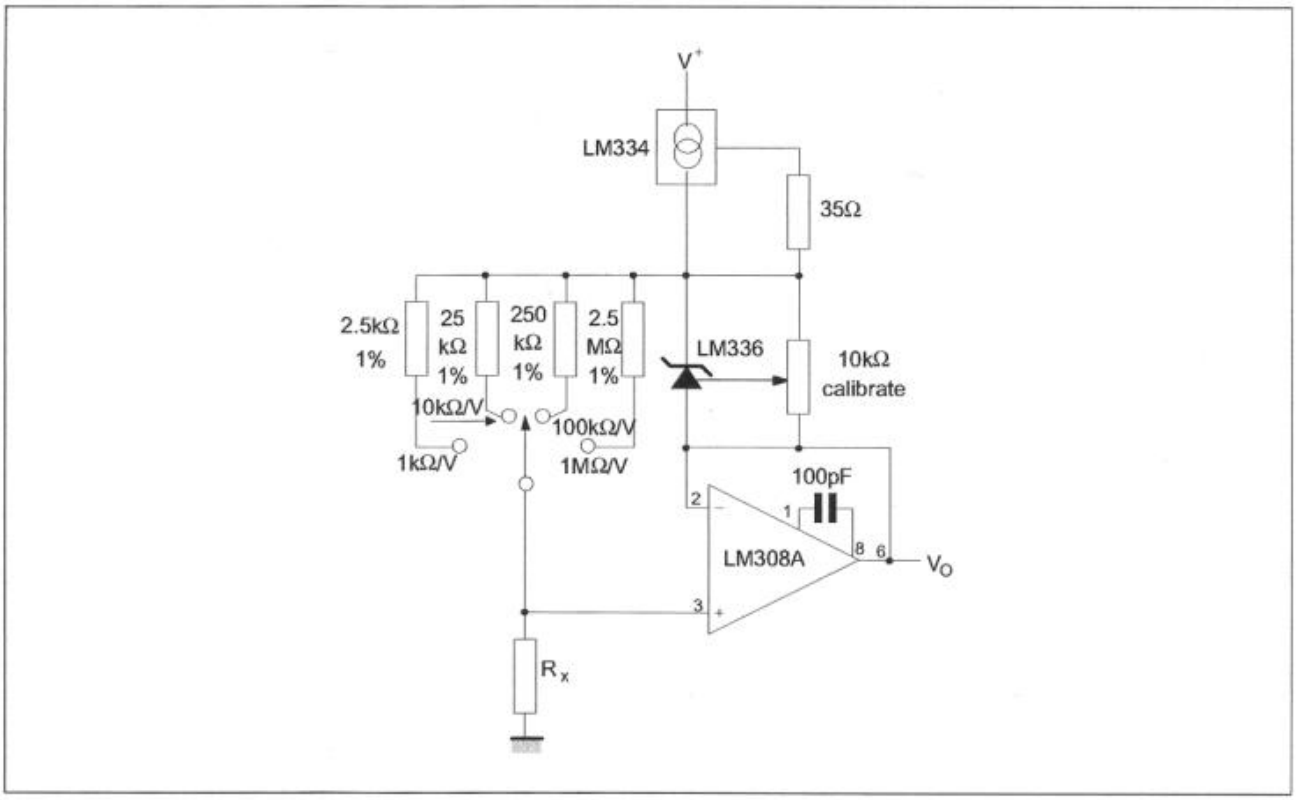


Figure 8 :Bipolar Output Reference

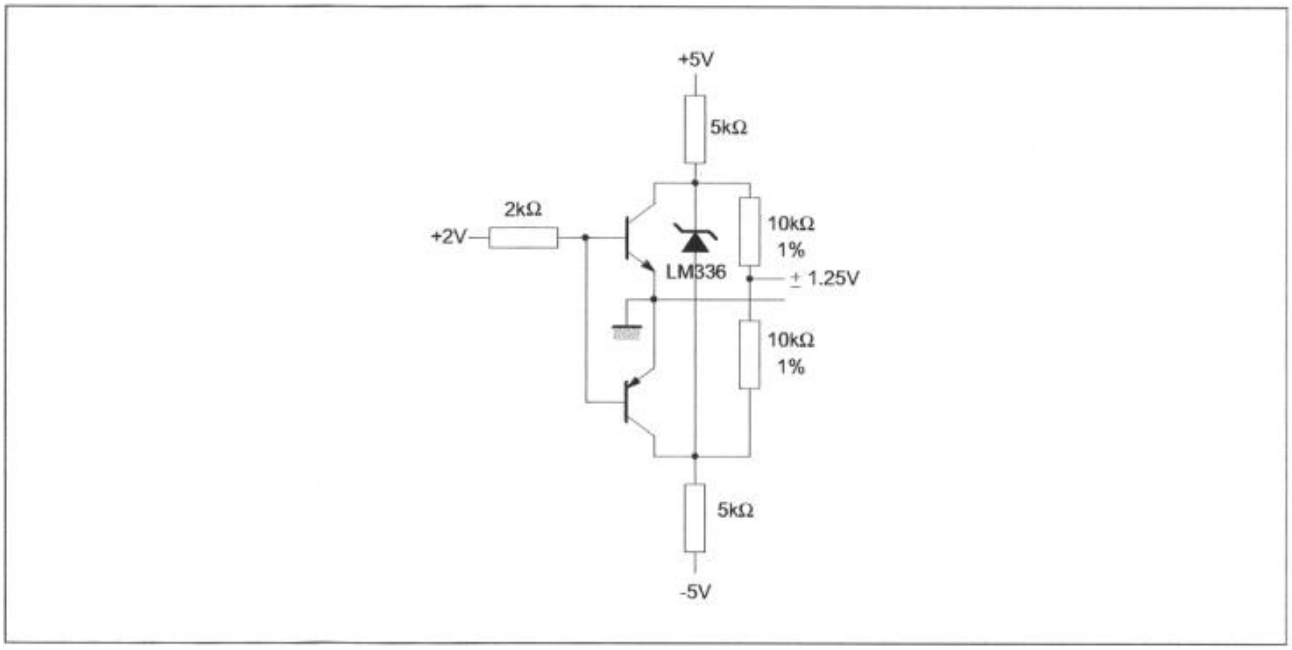


Figure 9 : 5V Buffered Reference

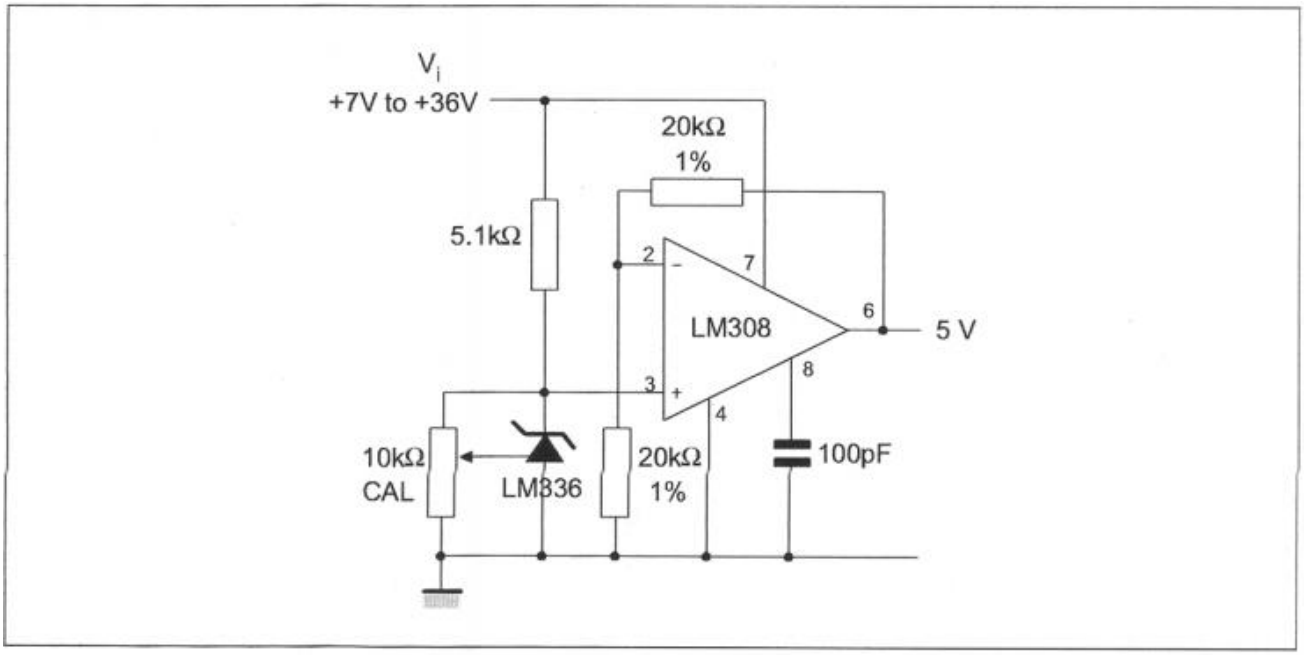
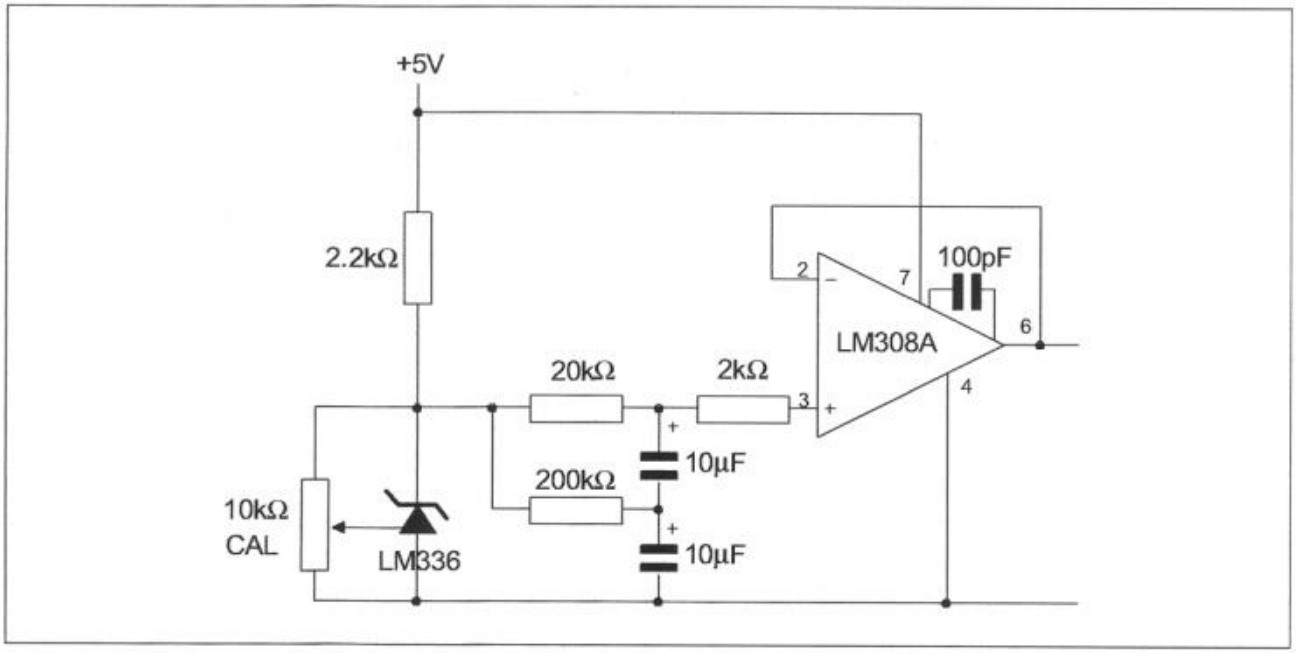
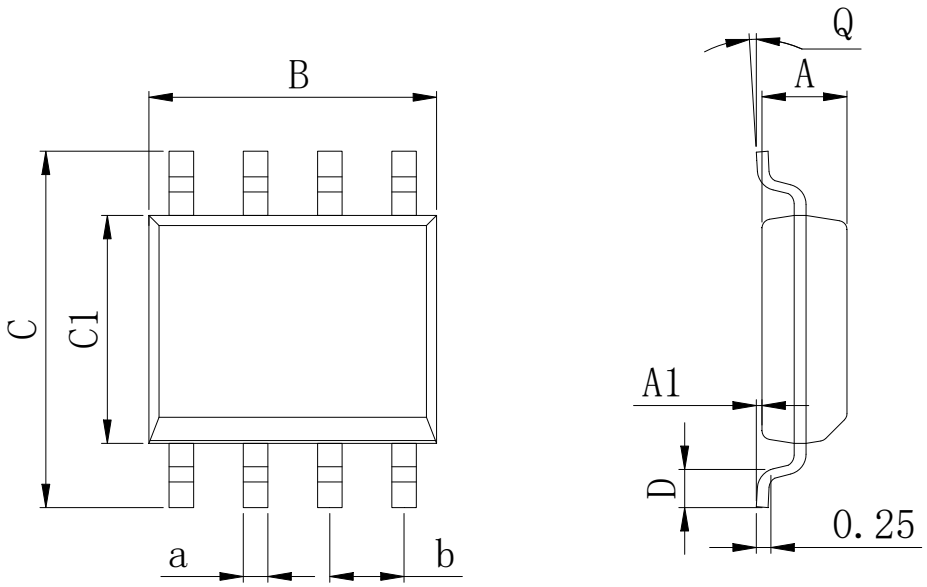


Figure 10 : Low Noise Buffered Reference



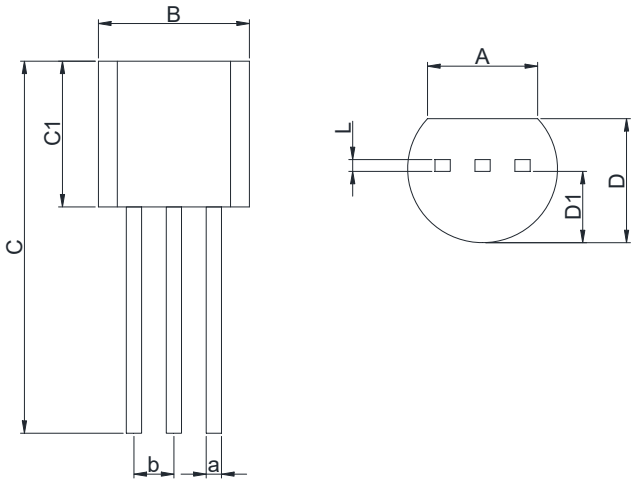
Physical Dimensions

SOP-8



Dimensions In Millimeters(SOP-8)									
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	

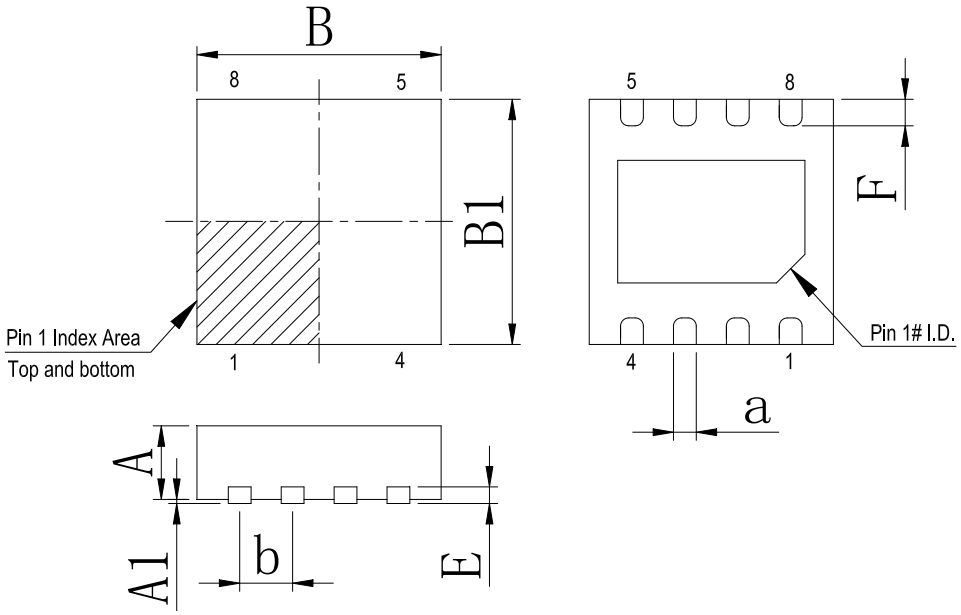
TO-92



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	

Revision History

REVISION NUMBER	DATE	REVISION	PAGE
V1.0	2018-9	New	1-11
V1.1	2023-9	Update Lead Temperature、Add annotation for Maximum Ratings.	2

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