1. DESCRIPTION

The XL236-2.5 and XL/XT336-2.5 integrated circuits are precision 2.5V shunt regulator diodes. These monolithic IC voltage references operate as a low-temperature-coefficient 2.5V zener with 0.2Ω dynamic impedance.

2. FEATURES

- Low Temperature Coefficient
- Wide Operating Current of 400 μA to 10 mA
- 0.2Ω Dynamic Impedance
- ±1% Initial Tolerance Available
- Specified Temperature Stability
- Easily Trimmed for Minimum Temperature Drift
- Fast Turn-On

3. CONNECTION DIAGRAM

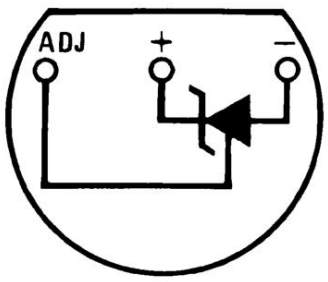


Figure 1.TO-92 Plastic Package

(Bottom View)

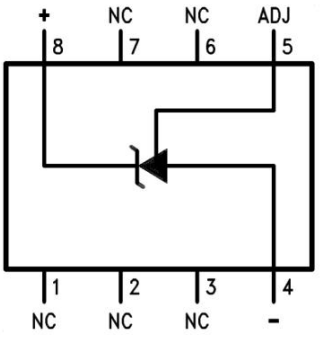
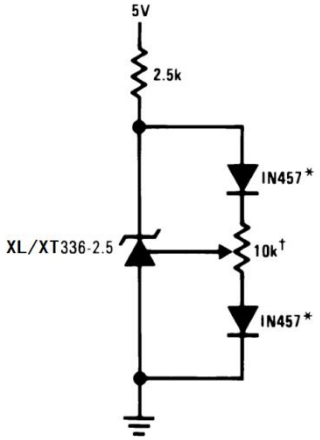


Figure 2. SOP 8 Package

4. TYPICAL APPLICATIONS



†Adjust to 2.490V
*Any silicon signal diode

Figure 3. 2.5V Reference with Minimum Temperature Coefficient

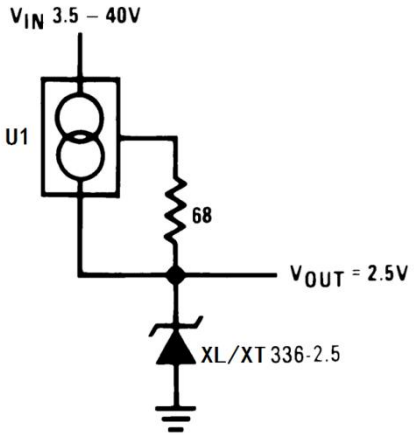


Figure 4. Wide Input Range Reference

Note 1: U1 uses a constant current source IC, such as an LM334 or equivalent.

5. ABSOLUTE MAXIMUM RATINGS(1)(2)

Reverse Current			15 mA
Forward Current			10 mA
Storage Temperature			−60°C to +150°C
Operating Temperature Range		XL236	−40°C to +85°C
		XL/XT336	−40°C to +85°C
Soldering Information	TO-92 Package (10 sec.)		260°C
	SOP Package	Vapor Phase (60 sec.)	215°C
		Infrared (15 sec.)	220°C

(1) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Electrical specifications do not apply when operating the device beyond its specified operating conditions.

6. THERMAL CHARACTERISTICS

Thermal Resistance	TO-92	SOP
θ_{ja} (Junction to Ambient)	180°C/W (0.4" leads)	165°C/W
	170°C/W (0.125" lead)	
θ_{ja} (Junction to Case)	n/a	n/a

7. ELECTRICAL CHARACTERISTICS(1)

Parameter	Conditions		XL236-2.5			XL/XT336-2.5			Units
			Min	Typ	Max	Min	Typ	Max	
Reverse Breakdown Voltage	T_A=25°C, I_R=1 mA	XL236,XL/XT336	2.440	2.490	2.540	2.390	2.490	2.590	V
Reverse Breakdown Change With Current	T_A=25°C, 400 μA≤I_R≤10 mA			2.6	6		2.6	10	mV
Reverse Dynamic Impedance	T_A=25°C, I_R=1 mA, f = 100 Hz			0.2	0.6		0.2	1	Ω
Temperature Stability(2)	V_R Adjusted to 2.490V I_R=1 mA	0°C≤T_A≤70°C (XL/XT336)					1.8	6	mV
		−25°C ≤ T_A ≤ +85°C (XL236)		7.5	18				mV
Reverse Breakdown Change With Current	400 μA≤I_R≤10 mA			3	10		3	12	mV
Reverse Dynamic Impedance	I_R=1 mA			0.4	1		0.4	1.4	Ω
Long Term Stability	T_A=25°C ±0.1°C, I_R=1 mA, t = 1000 hrs			20			20		ppm

(1) Unless otherwise specified, the XL/XT336-2.5-N from −40°C ≤ T_A ≤ +85°C.
(2) Temperature stability for the XL/XT336 family is specified by design. Design limits are ensured (but not 100% production tested) over the indicated temperature and supply voltage ranges. These limits are not used to calculate outgoing quality levels. Stability is defined as the maximum change in V_{ref} from 25°C to T_A (min) or T_A (max).

8. TYPICAL PERFORMANCE CHARACTERISTICS

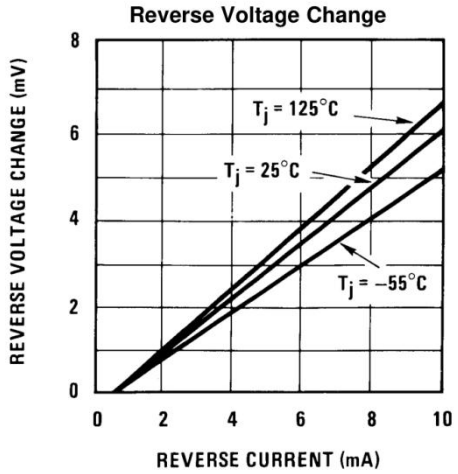


Figure 5.

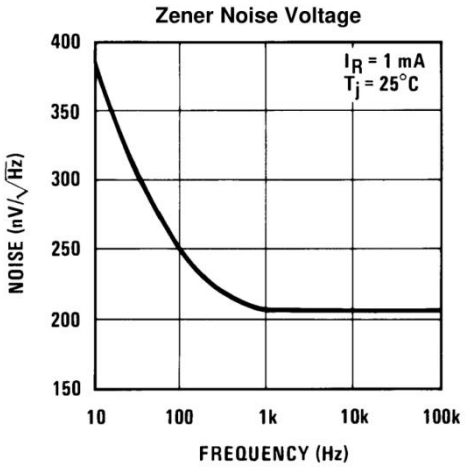


Figure 6.

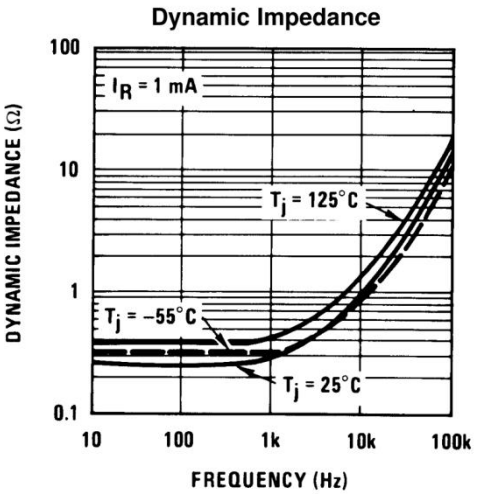


Figure 7.

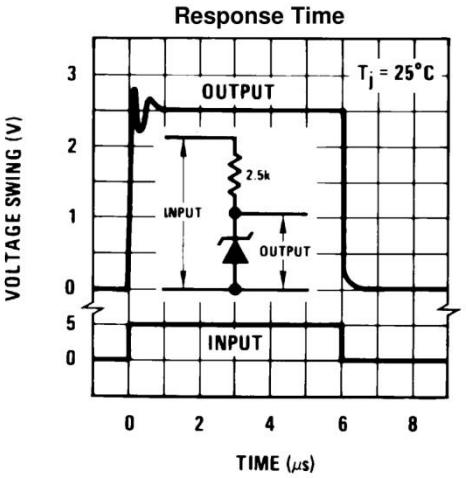


Figure 8.

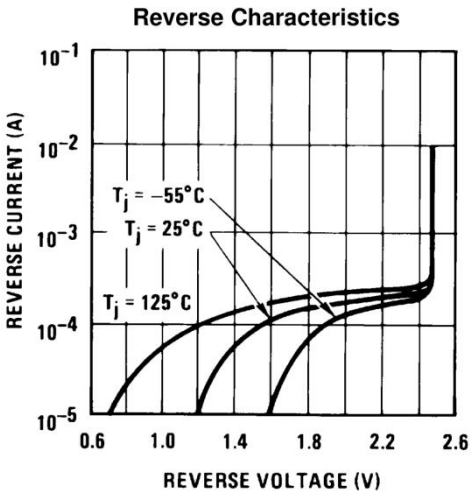


Figure 9.

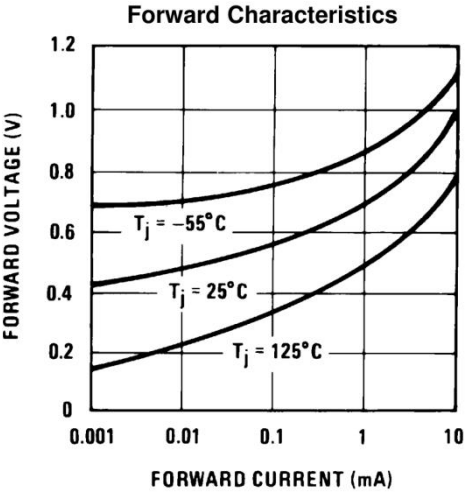


Figure 10.

TYPICAL PERFORMANCE CHARACTERISTICS(continued)

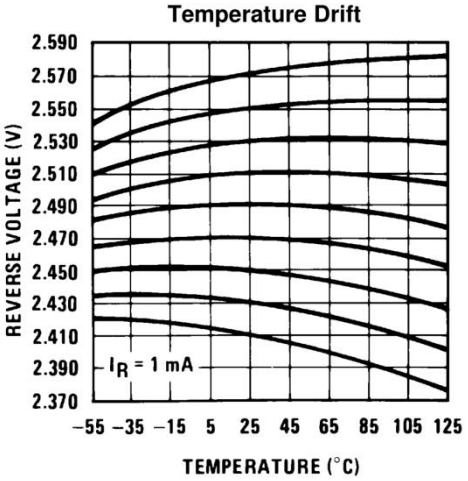


Figure 11.

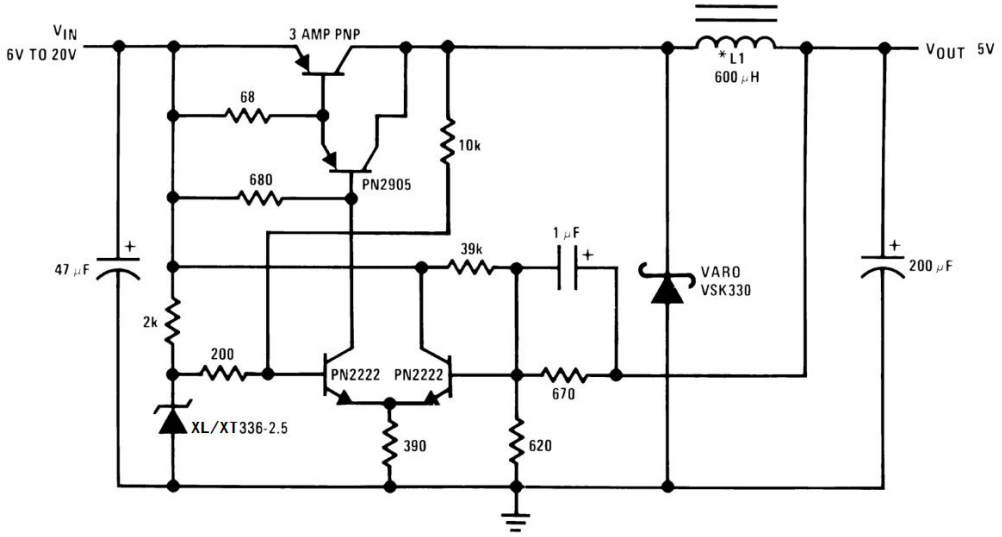


Figure 12. Low Cost 2 Amp Switching Regulator

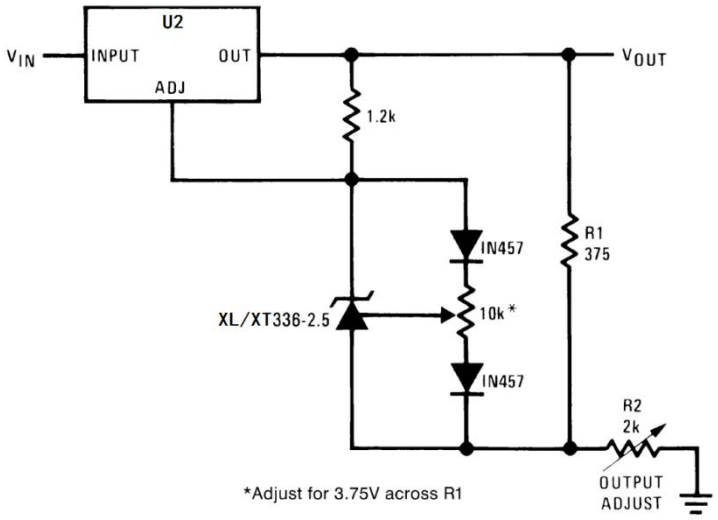


Figure 13. Precision Power Regulator with Low Temperature Coefficient

Note 2: U2 uses a constant current source IC, such as an X L 3 1 7 or equivalent.

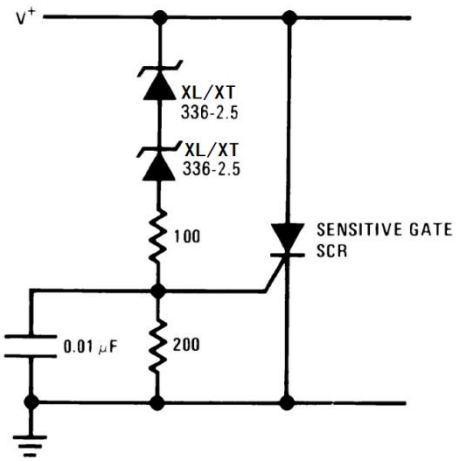
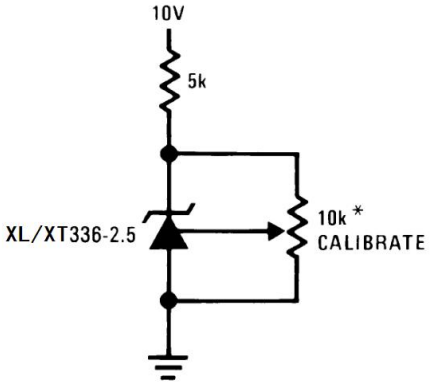


Figure 14.5V Crowbar



*Does not affect temperature coefficient

Figure 15.Trimmed 2.5V Reference with Temperature Coefficient Independent of Breakdown Voltage

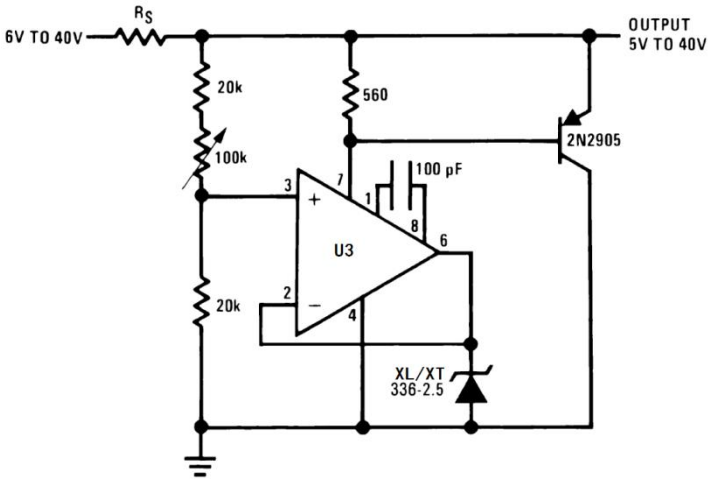


Figure 16.Adjustable Shunt Regulator

Note 3: U3 uses a constant current source IC, such as an LM308A or equivalent.

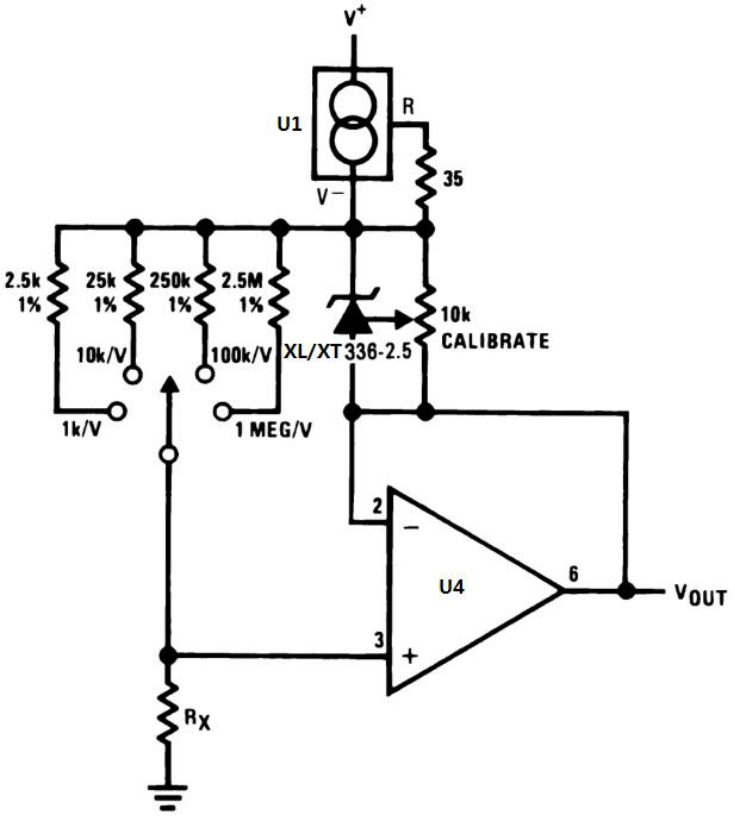


Figure 17.Linear Ohmmeter

Note 4: U4 uses a constant current source IC, such as an LM312 or equivalent.

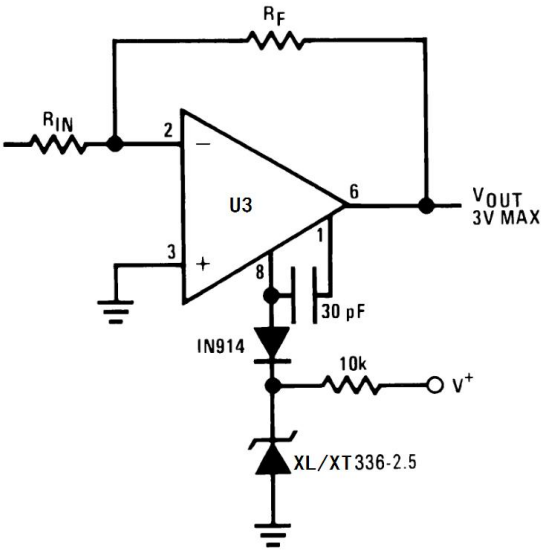


Figure 18. Op Amp with Output Clamped

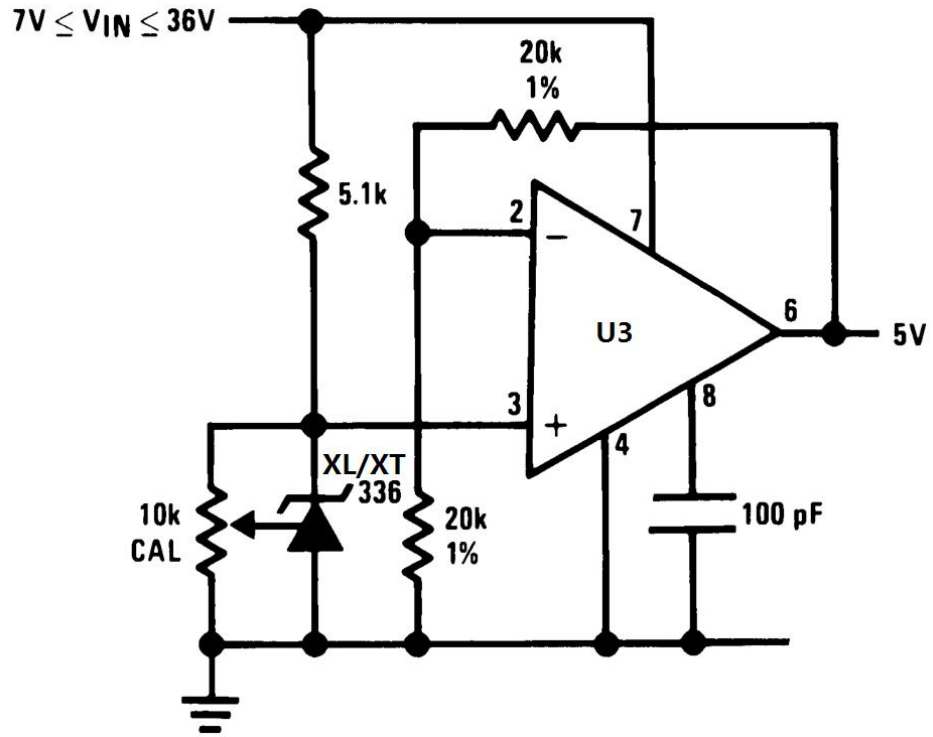


Figure 19.10V Buffered Reference

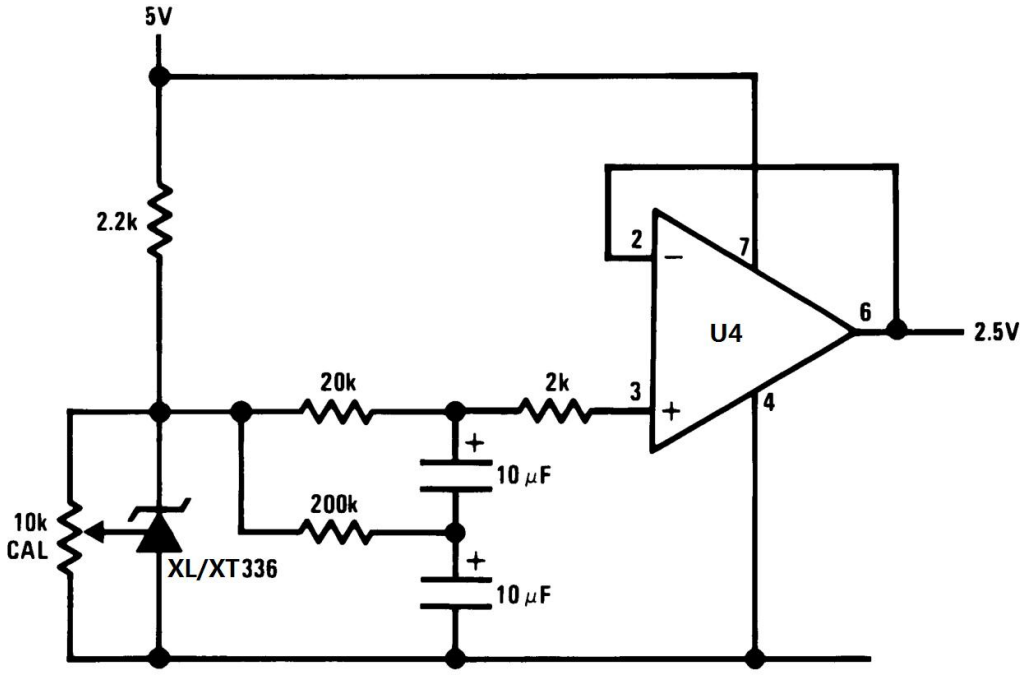
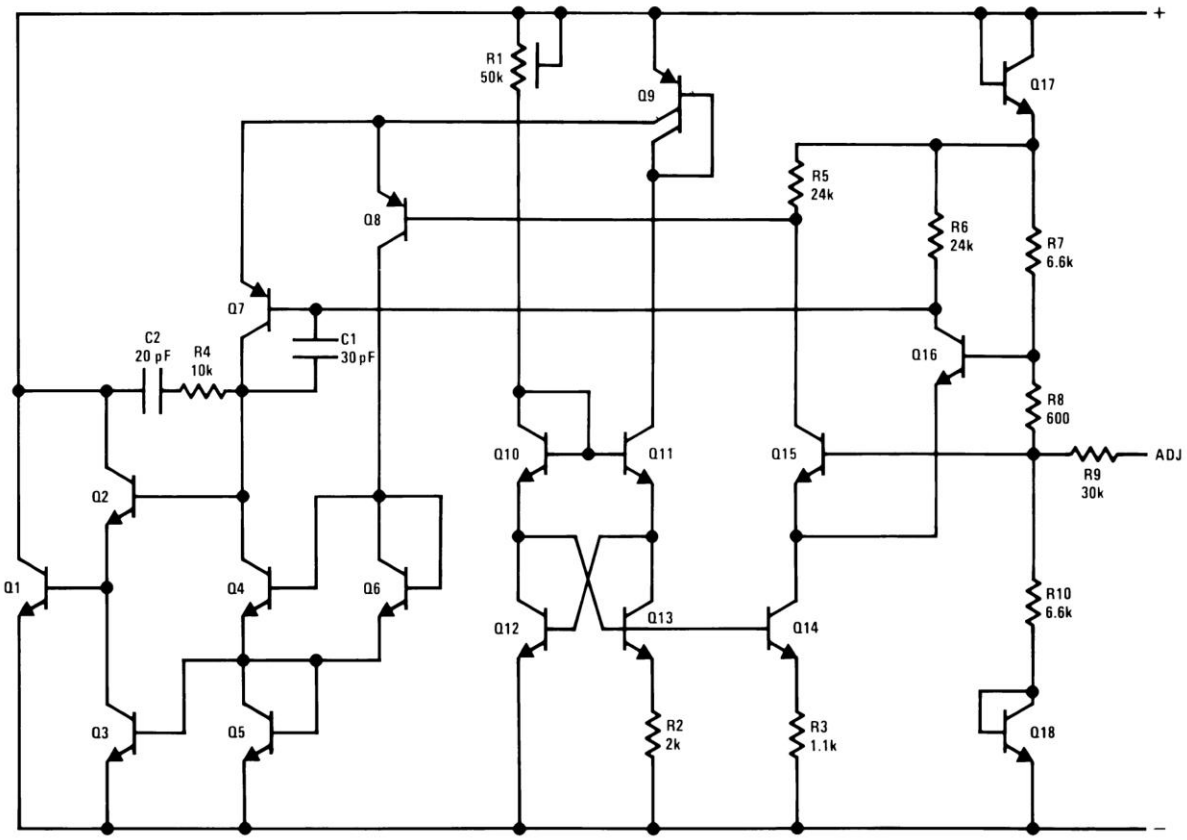


Figure 20.Low Noise Buffered Reference

9. SCHEMATIC DIAGRAM



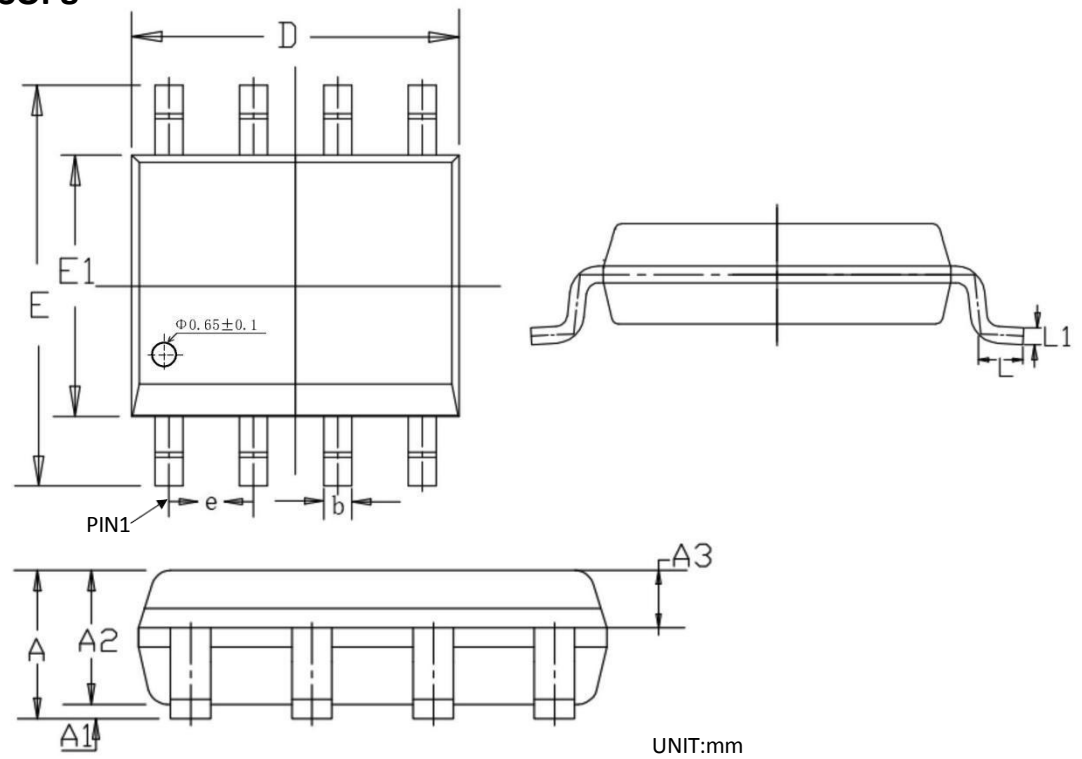
10. ORDERING INFORMATION

Ordering Information

Part Number	Device Marking	Package Type	Body size (mm)	Temperature (°C)	MSL	Transport Media	Package Quantity
XL336-2.5	XL336-2.5	SOP8	4.90 * 3.90	- 40 to 85	MSL3	T&R	2500
XT336-2.5	XT336-2.5	TO-92	4.58 * 4.58	- 40 to 85	MSL3	T&R	1000
XL236-2.5	XL236-2.5	SOP8	4.90 * 3.90	- 40 to 85	MSL3	T&R	2500

11. DIMENSIONAL DRAWINGS

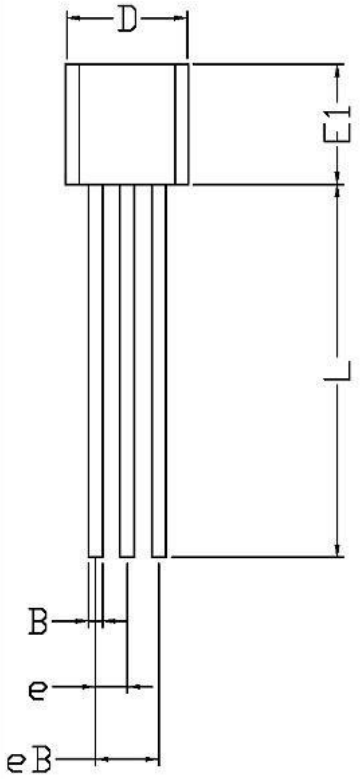
SOP8



UNIT:mm

	MIN	NOM	MAX
A	1.450	1.550	1.650
A1	0.100	0.150	0.200
A2	1.300	1.400	1.500
A3	0.600	0.650	0.700
b	0.380	–	0.510
e	1.240	1.270	1.300
D	4.800	4.900	5.000
E	5.800	6.000	6.200
E1	3.800	3.900	4.000
L	0.450	0.600	0.750
L1	—	0.25BSC	—

TO-92



SYMBOL	MIN	MAX
A	3.46	3.96
A1	1.02 TYP	
B	0.36	0.56
C	1.80 TYP	
D	4.33	4.83
E1	4.33	4.83
E	3.35	3.85
eB	2.54 TYP	
e	1.27 TYP	
L	13.97	14.97

UNIT : mm