

LM336Z-2.5 Integrated Reference Circuits

1. General Description

1.1 Description

The LM336Z-2.5 integrated circuits are precision 2.5-V shunt regulator diodes. These reference circuits operate as low-temperature-coefficient 2.5-V Zener diodes. A third terminal provided on the circuit allows the reference voltage and temperature coefficient to be trimmed easily.

The series is useful as precision 2.5-V low-voltage references (V_Z) for digital voltmeters, power supplies, or operational-amplifier circuitry. The 2.5-V voltage reference makes it convenient to obtain a stable reference from 5-V logic supplies. Devices in this series operate as shunt regulators, and can be used as either positive or negative voltage references.

The LM336Z-2.5 is characterized for

operation from 0°C to 70°C.

1.2 Features

- Low Temperature Coefficient
- Wide Operating Current 400 μ A to 10 mA
- 0.27- Ω Dynamic Impedance
- $\pm 1\%$ Tolerance Available
- Specified Temperature Stability
- Easily Trimmed for Minimum Temperature Drift
- Fast Turn on

1.3 Device Information

PART NUMBER	PACKAGE
LM336Z-2.5	SOP
	TO92

2. Connection Diagrams and Pin Description

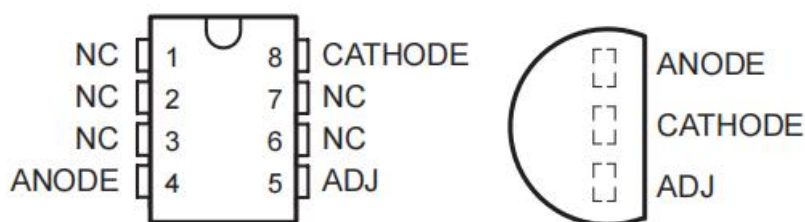


Figure 2.1: Top View

3. Schematic Diagram

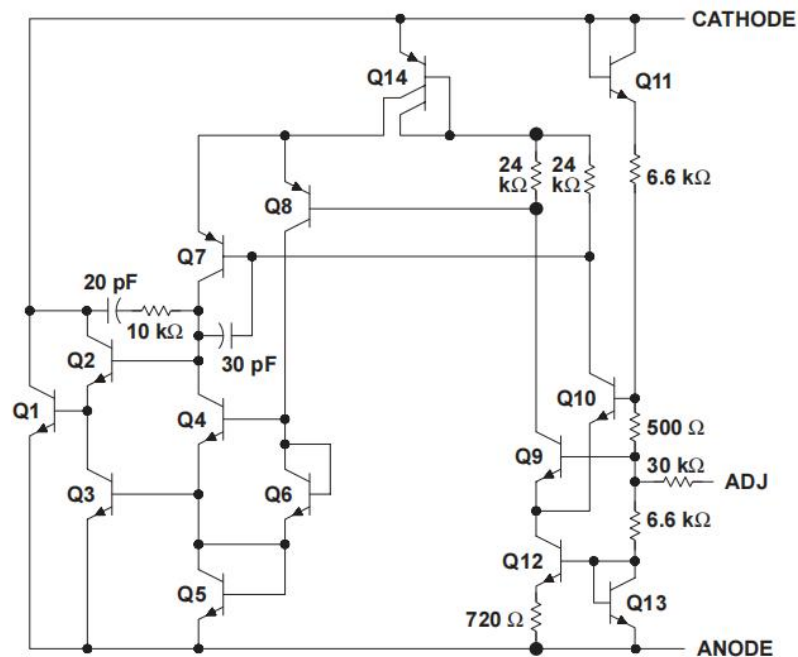


Figure 3.1: LM336Z-2.5 Functional Block Diagram

4. Specifications

4.1 Absolute Maximum Ratings

(Ta=25°C, unless otherwise specified)

Symbol	Parameter	MIN	MAX	Unit
IR	Reverse Current		20	mA
IF	Forward Current		10	mA
T _J	Junction Temperature		125	°C
T _{OP}	Operating Temperature	0	70	°C

Absolute maximum ratings are those values beyond which the device could be permanently damaged. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under normal operating conditions.

4.2 Electrical Characteristics

($T_a=25^{\circ}\text{C}$, unless otherwise specified)

Symbol	Parameter	Test Condition	MIN	TYP	MAX	Unit
V_z	Reference voltage	$I_z=1\text{mA}$	2.44	2.49	2.54	V
$\Delta V_z(\Delta T)$	Change in reference Temperature	V_z adjusted to 2.490 V. $I_z=1\text{mA}$	--	1.8	6	mV
$\Delta V_z(\Delta I)$	voltage with current Change in reference	$I_z=400\mu\text{A}$ to 10mA	--	4	--	mV
$\Delta V_z(\Delta t)$	Long-term change in reference voltage	$I_z=1\text{mA}$	--	20	--	ppm/khr
Z_z	Impedance Reference	$I_z=1\text{mA}$ $f=1\text{kHz}$	--	0.8	--	W

(1) All characteristics are measured under open-loop conditions, with zero common-mode input voltage, unless otherwise specified. MAX V_{CC} for testing purposes is 30 V for the others.

5. Applications information

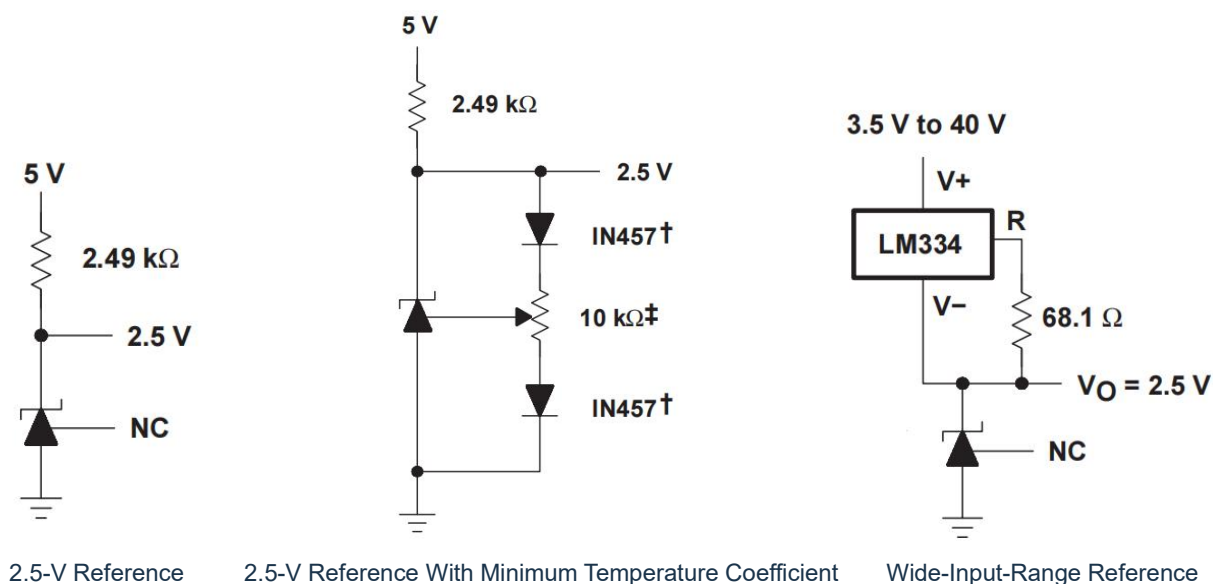


Figure 5.1 Application Schematic

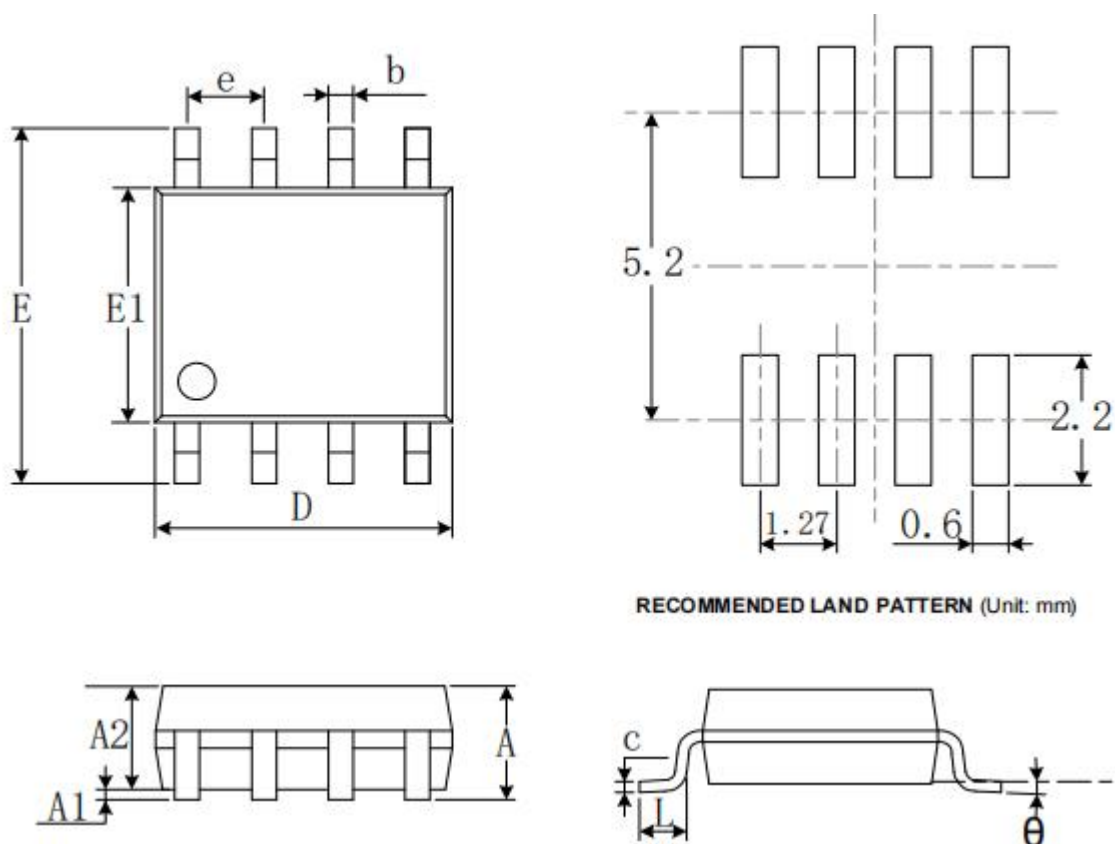


6. Ordering Information

Orderable Device	Package Type	Pins	Packing	Package Qty
LM336Z-2.5NS08ARDQ	SOP	8	Tape & Reel	4000
LM336Z-2.5KW03ABABQ	TO92	3	Bag	1000

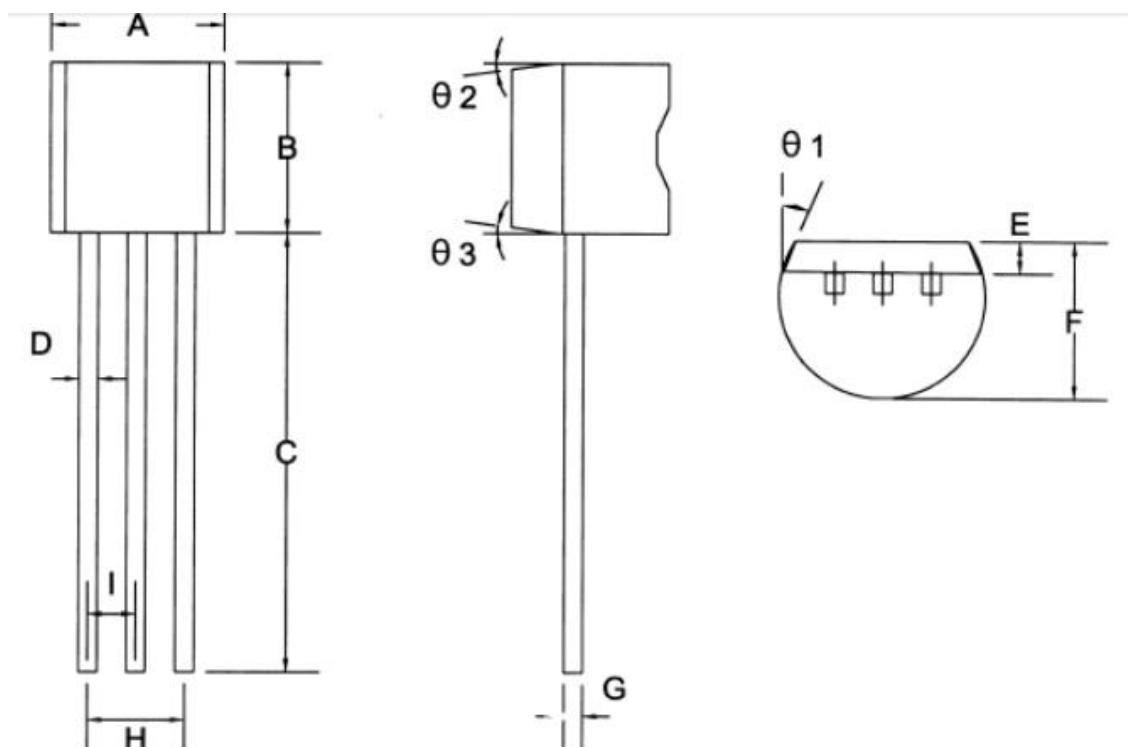
7. Package Information

7.1 SOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270(BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

7.2 TO-92



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min	Nom	Max	Min	Nom	Max
A	4.33	4.58	4.83	0.170	0.180	0.190
B	4.33	4.58	4.83	0.170	0.180	0.190
C	14.07	14.47	14.87	0.554	0.570	0.585
D	0.34	0.44	0.54	0.013	0.017	0.021
E	0.92	1.02	1.12	0.036	0.040	0.044
F	3.36	3.56	3.76	0.132	0.140	0.148
G	0.34	0.44	0.54	0.013	0.017	0.021
H	2.42	2.54	2.66	0.095	0.100	0.105
I	1.15	1.27	1.39	0.045	0.050	0.055
θ1	—	5°	—	—	5°	—
θ2	—	2°	—	—	2°	—
θ3	—	2°	—	—	2°	—