

MNLM136A-2.5-X-RH REV 0E0

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**2.5V REFERENCE DIODE, GUARANTEED TO 100K RAD(Si)
 TESTED TO MIL-STD-883, METHOD 1019.5**
General Description

The LM136A-2.5 integrated circuit is a precision 2.5V shunt regulator diode. This monolithic IC voltage reference operates as a low-temperature-coefficient 2.5V zener with 0.2 Ohms dynamic impedance. A third terminal on the LM136A-2.5 allows the reference voltage and temperature coefficient to be trimmed easily.

The LM136A-2.5 is useful as a precision 2.5V low voltage reference for digital voltmeters, power supplies or op amp circuitry. The 2.5V makes it convenient to obtain a stable reference from 5V logic supplies. Further, since the LM136A-2.5 operates as a shunt regulator, it can be used as either a positive or negative voltage reference.

Industry Part Number

LM136A

Prime Die

LM136

NS Part Numbers

 LM136AH-2.5-SMD
 LM136AH-2.5/883
 LM136AH-2.5RQML
 LM136AH-2.5RQV

Controlling Document

SEE FEATURES SECTION

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

| Subgrp | Description | Temp (°C) |
|--------|---------------------|------------|
| 1 | Static tests at | +25 |
| 2 | Static tests at | +125 |
| 3 | Static tests at | -55 |
| 4 | Dynamic tests at | +25 |
| 5 | Dynamic tests at | +125 |
| 6 | Dynamic tests at | -55 |
| 7 | Functional tests at | +25 |
| 8A | Functional tests at | +125 |
| 8B | Functional tests at | -55 |
| 9 | Switching tests at | +25 |
| 10 | Switching tests at | +125 |
| 11 | Switching tests at | -55 |

Features

- Low temperature coefficient
- Wide operating current of 400uA to 10mA
- 0.2 Ohms dynamic impedance
- $\pm 1\%$ initial tolerance available
- Guaranteed temperature stability
- Easily trimmed for minimum temperature drift
- Fast turn-on
- Three lead transistor package

CONTROLLING DOCUMENTS:

| | |
|-----------------|-----------------|
| LM136AH-2.5-SMD | 5962-0050101QXA |
| LM136AH-2.5/883 | 8418003XA |
| LM136AH-2.5RQML | 5962R0050101QXA |
| LM136AH-2.5RQV | 5962R0050101VXA |

(Absolute Maximum Ratings)

(Note 1)

| | |
|---|-------------------|
| Reverse Current | 15mA |
| Forward Current | 10mA |
| Storage Temperature | -60 C to +150 C |
| Operating Ambient Temperature (Note 2) | -55 C to +125 C |
| Maximum Junction Temperature (Note 2) | 150 C |
| Lead Temperature (Soldering, 10 seconds) | 300 C |
| Thermal Resistance | |
| ThetaJA (Still Air Flow) (500LF/Min Air Flow) | 354 C/W 77 C/W |
| ThetaJC | 46 C/W |
| Package Weight (Typical) | TBD |
| ESD Rating (Note 3) | 1000V |

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics. The guaranteed specifications apply only for the test conditions listed. Some performance characteristics may degrade when the device is not operated under the listed test conditions.

Note 2: The maximum power dissipation must be derated at elevated temperatures and is dictated by T_{jmax} (maximum junction temperature), Θ_{JA} (package junction to ambient thermal resistance), and T_A (ambient temperature). The maximum allowable power dissipation at any temperature is $P_{dmax} = (T_{jmax} - T_A) / \Theta_{JA}$ or the number given in the Absolute Maximum Ratings, whichever is lower.

Note 3: Human body model, 1.5K Ohms in series with 100pF.

Electrical Characteristics

DC PARAMETERS: (SEE NOTE 3)

(The following conditions apply to all the following parameters, unless otherwise specified.)

DC: $I_z = 1\text{mA}$

| SYMBOL | PARAMETER | CONDITIONS | NOTES | PIN-NAME | MIN | MAX | UNIT | SUB-GROUPS |
|---------|---------------------------|---|-------|----------|-------|-------|------|------------|
| Iadj | Adjust Current | Vadj = 0.7V | 3 | | -125 | +125 | uA | 1, 2, 3 |
| Delta Z | Delta Zener Voltage | $400\text{ uA} \leq Z \leq 10\text{mA}$ | 3 | | | 6 | mV | 1 |
| | | | 3 | | | 10 | mV | 2, 3 |
| Vz | Zener Voltage | Vadj = Open | 3 | | 2.465 | 2.515 | V | 1 |
| | | | 3 | | 2.44 | 2.54 | V | 2, 3 |
| | | Vadj = 0.7V | 3 | | 2.39 | 2.49 | V | 1 |
| | | | 3 | | 2.29 | 2.49 | V | 2, 3 |
| | | Vadj = 1.9V | 3 | | 2.49 | 2.69 | V | 1, 2, 3 |
| Zrd | Reverse Dynamic Impedance | | 1, 3 | | | 0.6 | Ohm | 1 |
| | | | 1, 3 | | | 1 | Ohm | 2, 3 |
| Vstab | Temp Stability | Vz = Adjusted to 2.490V | 2, 3 | | | 18 | mV | 2, 3 |

DC PARAMETERS: DRIFT VALUES, (SEE NOTE 3)

(The following conditions apply to all the following parameters, unless otherwise specified.)

DC: "Delta Calculation Performed on QMLV devices at Group B, Subgroup 5 ONLY"

| | | | | | | | | |
|----|---------------|-------------|---|--|-----|----|----|---|
| Vz | Zener Voltage | Vadj = Open | 3 | | -10 | 10 | mV | 1 |
| | | Vadj = 0.7V | 3 | | -10 | 10 | mV | 1 |
| | | Vadj = 1.9V | 3 | | -10 | 10 | mV | 1 |

Note 1: Parameter tested go-no-go only.

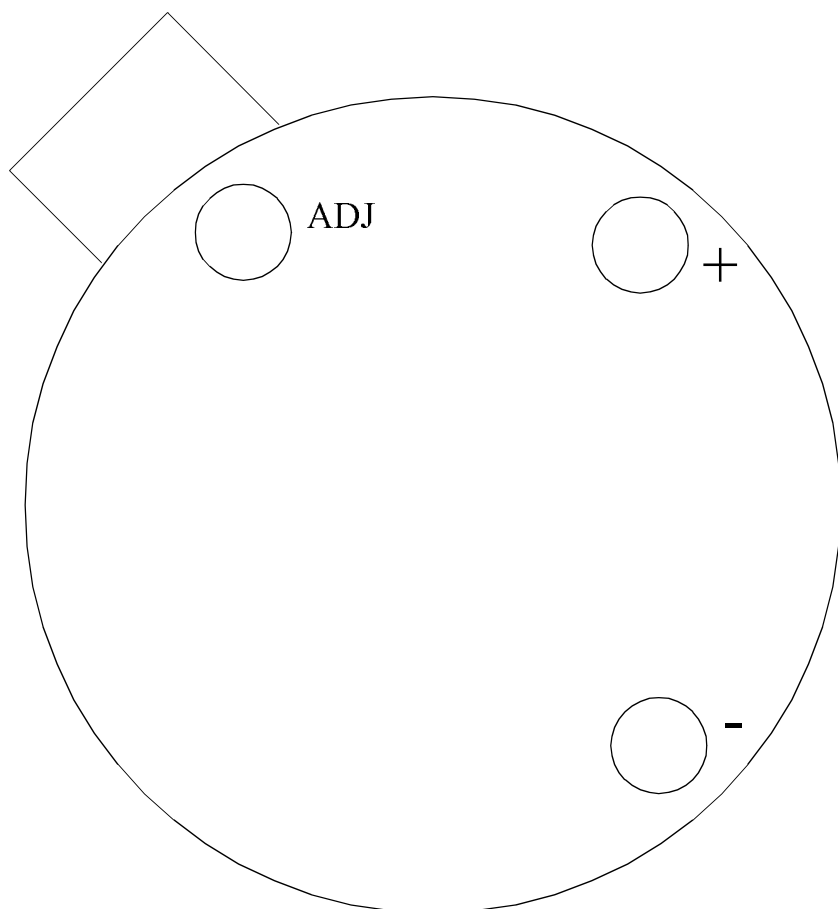
Note 2: Tested on Auto Drift Oven.

Note 3: Pre and post irradiation limits are identical to those listed under AC and DC electrical characteristics. These parts may be dose rate sensitive in a space environment and may demonstrate enhanced low dose rate effect. Radiation end point limits for the noted parameters are guaranteed only for the conditions as specified in MIL-STD-883, Method 1019.5.

Graphics and Diagrams

| GRAPHICS# | DESCRIPTION |
|-----------|--|
| 09988HRB4 | METAL CAN, TO-46, 3LD, .100 DIA P.C. (B/I CKT) |
| H03HRE | METAL CAN, TO-46, 3LD, .100 DIA P.C. (P/P DWG) |
| P000372A | METAL CAN, TO-46, 3LD, .100 DIA P.C. (PINOUT) |

See attached graphics following this page.



LM136AH, LM136H
3 - LEAD TO-46
CONNECTION DIAGRAM
BOTTOM VIEW
P000372A



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Revision History

| Rev | ECN # | Rel Date | Originator | Changes |
|-----|----------|----------|-------------|---|
| 0A0 | M0003447 | 03/14/01 | Rose Malone | Initial MDS Release: MNL136A-2.5-X-RH, Rev. 0A0. Replaces MNL136A-2.5-X, Rev. 0BL. |
| 0B0 | M0003791 | 01/03/02 | Rose Malone | Update MDS: MNL136A-2.5-X-RH, Rev. 0A0 to MNL136A-2.5-X-RH, Rev. 0B0. Added SMD reference to Features Section for LM136A-2.5/883. |
| 0C0 | M0003955 | 02/14/02 | Rose Malone | Update MDS: MNL136A-2.5-X-RH, Rev. 0B0 to MNL136A-2.5-X-RH, Rev. 0C0. Changed Main Table and Features Section NSID from LM136AH-2.5/883 to LM136AH-2.5-SMD to match PDS system. |
| 0D0 | M0003959 | 02/13/03 | Rose Malone | Update MDS: MNL136A-2.5-X-RH, Rev. 0C0 to MNL136A-2.5-X-RH, Rev. 0D0. Added to Main Table and Features Section LM136AH-2.5/883 reference. |
| 0E0 | M0004125 | 02/13/03 | Rose Malone | Update MDS: MNL136A-2.5-X-RH, Rev. 0D0 to MNL136A-2.5-RH, Rev. 0E0. Added SMD Number 8418003XA for LM136AH-2.5/883 to Features Section. |