



MICROCIRCUIT DATA SHEET

MNLM136A-2.5-X-RH REV 0E0

Original Creation Date: 12/03/99
 Last Update Date: 02/13/03
 Last Major Revision Date:

**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

NS Part Numbers

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

Prime Die

LM136

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)	354 C/W
(500LF/Min Air Flow)	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 uA \leq Z \leq 10mA	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
			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.

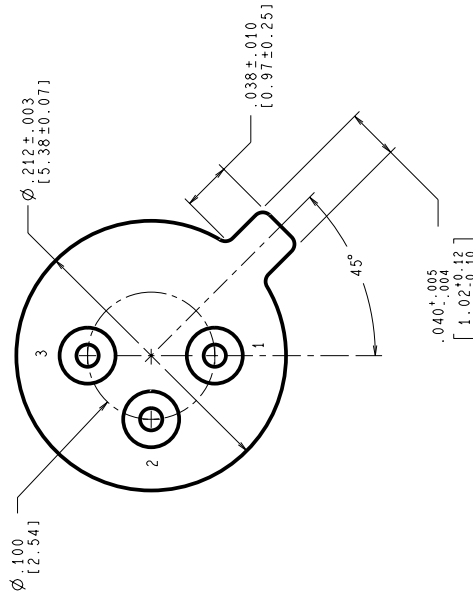
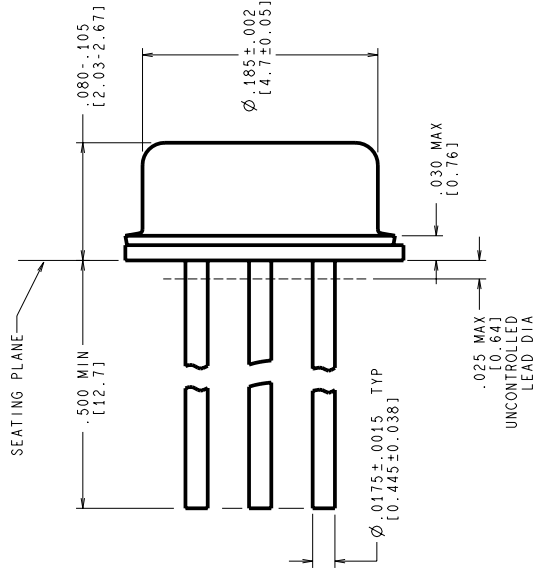
Graphics and Diagrams

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.

REVISIONS

LTR	DESCRIPTION	E.C.N.	DATE	BY/APP'D
D	REVISE & REDRAW PER NEW STANDARD	10404	05/19/94	TL/GY
E	UPDATE MIL/AERO STAMPS	11000	06/19/95	MS7



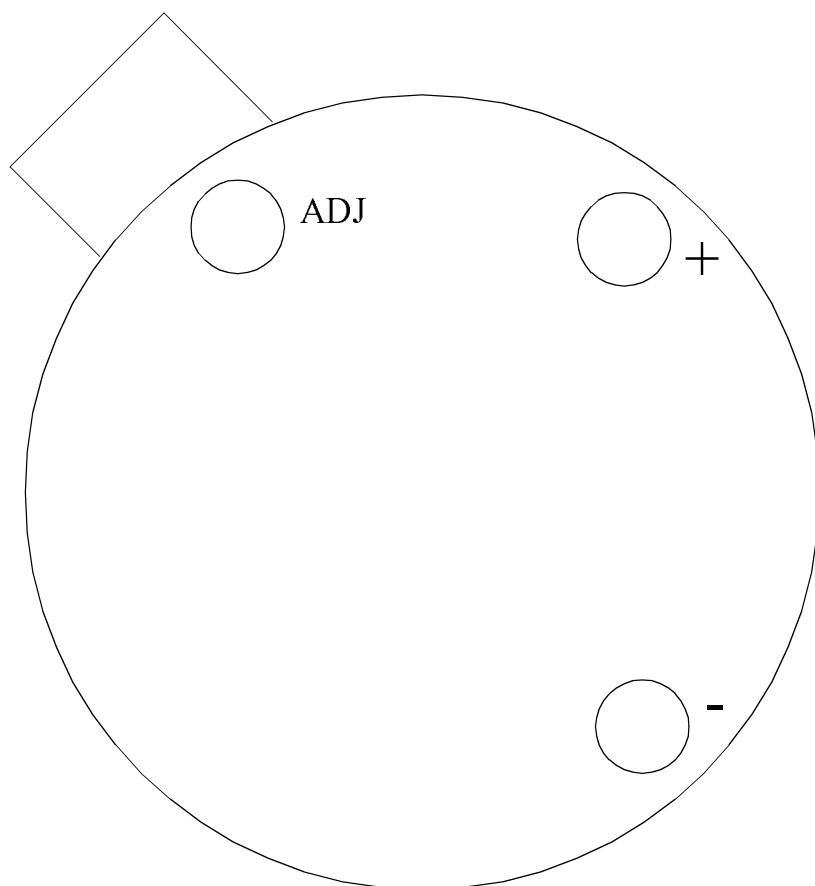
CONTROLLING DIMENSION IS INCH
VALUES IN [] ARE MILLIMETERS

MIL-I-38535
CONFIGURATION CONTROL

NOTES: UNLESS OTHERWISE SPECIFIED

- LEADS TO BE LOCATED WITHIN .007 IN / 0.18 mm OF THEIR TRUE POSITIONS RELATIVE TO A MAXIMUM WIDTH TAB.
- STANDARD METAL CAN TYPE: SOLID BASE.
- APPLIES TO MIL-AERO AND LINEAR PRODUCTS.
- REFERENCE JEDEC REGISTRATION TO-46, JEDEC PUBLICATION No. 95.

APPROVALS	DATE	National Semiconductor	
DRWN: T. LIZOWSKI	05/19/94	2900 Semiconductor dr., Santa Clara, CA 95052-8090	
DTG: CHK.		METAL CAN, TO-46, 3 LEAD, .100 DIA P.C.	
ENGR: CHK.		SCALE: N/A	SIZE: C
PROJ: [Symbol]		DRAWING NUMBER: MKT-H03H	REV: E
INCH (MM)		DO NOT SCALE DRAWING SHEET 1 of 1	



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

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.