

**MNLM136A-5.0-X REV 0B0**

 Original Creation Date: 07/10/95  
 Last Update Date: 02/11/03  
 Last Major Revision Date: 03/02/00

**5 V REFERENCE DIODE**
**General Description**

The LM136A-5.0 integrated circuit is a precision 5.0V shunt regulator diode. This monolithic IC voltage reference operates as a low temperature coefficient 5.0V zener with 0.6 ohm dynamic impedance. A third terminal on the LM136A-5.0 allows the reference voltage and temperature coefficient to be trimmed easily.

The LM136A-5.0 is useful as a precision 5.0V low voltage reference for digital voltmeters, power supplies or op amp circuitry. The 5.0V makes it convenient to obtain a stable reference from low supplies. Further, since the LM136A-5.0 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-5.0-SMD  
 LM136AH-5.0/883

**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**

- Adjustable 4V to 6V
- Low temperature coefficient
- Wide operating current of 600uA to 10mA
- 0.6 Ohm dynamic impedance
- $\pm 1\%$  initial tolerance available
- Guaranteed temperature stability
- Easily trimmed for minimum temperature drift
- Fast turn-on
- Three lead transistor package

CONTROLLING DOCUMENT:

LM136AH-5.0-SMD      8418002XA

**(Absolute Maximum Ratings)**

(Note 1)

Reverse Current	15mA
Forward Current	15mA
Storage Temperature	-60 C ≤ Ta ≤ +150 C
Operating Temperature Range (Note 2)	-55 C to +150 C
Soldering Information Metal Can (10 Second)	300 C
Maximum Junction Temperature	+150 C
Thermal Resistance ThetaJA Metal Can (Still Air)	400 C/W
ThetaJC Metal Can	80 C/W
ESD Tolerance (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 Tjmax (maximum junction temperature), ThetaJA (package junction to ambient thermal resistance), and TA (ambient temperature). The maximum allowable power dissipation at any temperature is Pdmax = (Tjmax - TA)/ThetaJA or the number given in the Absolute Maximum Ratings, whichever is lower.

Note 3: Human body model, 100 pF discharged through 1.5k Ohms.

## Electrical Characteristics

### DC PARAMETERS

(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
Vr	Reverse Breakdown Voltage	Vadj = 2.5V			4.6	5.4	V	1
					4.8	5.6	V	2, 3
		Vadj = 1.5V			5.4	6.6	V	1
					5.6	6.8	V	2, 3
		Vadj = 3.5V			2.4	4.6	V	1
					2.8	4.8	V	2, 3
Vadj = Open			4.935	5.029	V	1		
			4.88	5.08	V	2, 3		
Iadj	Adjust Current	Vadj = 2.5V			-260	260	uA	1
		Vadj = 1.5V			-260	260	uA	1
		Vadj = 3.5V			-260	260	uA	1
Delta Vr	Reverse Breakdown Change with Current	$0.6 \text{ mA} \leq I_r \leq 15 \text{ mA}$			-12	12	mV	1
					-20	20	mV	2, 3
Vf	Forward Voltage	$I_r = -10\text{mA}$			-1.5	-0.49	V	1
Vstab	Temperature Stability	Vr = Adjusted to 5V				36	mV	2, 3
Zrd	Reverse Dynamic Impedance		1			1.6	Ohm	1, 2, 3

Note 1: Guaranteed, Not Tested.

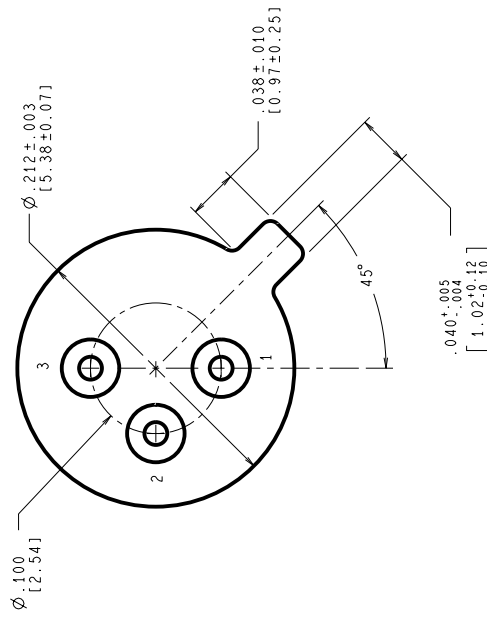
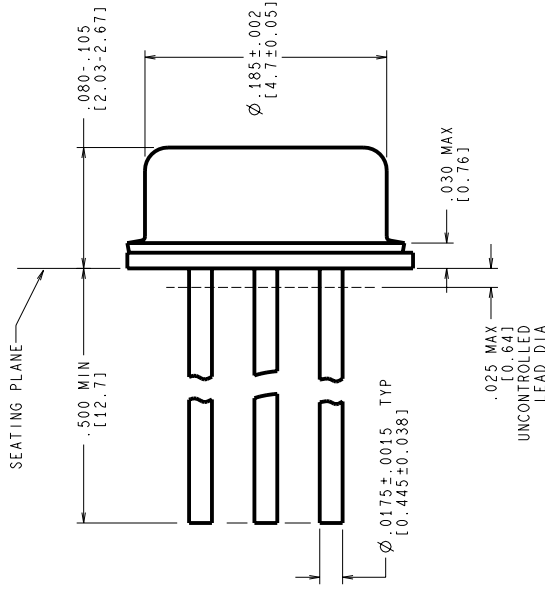
## Graphics and Diagrams

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	MS/



CONTROLLING DIMENSION IS INCH  
VALUES IN [ ] ARE MILLIMETERS

MIL-I-38535  
CONFIGURATION CONTROL

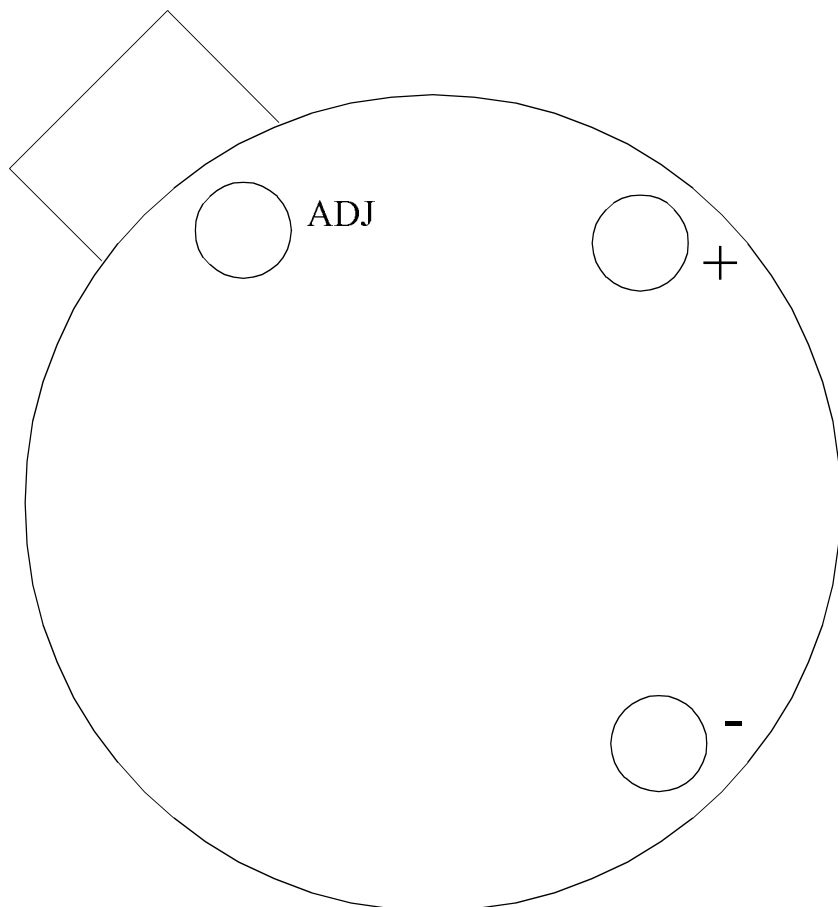
NOTES: UNLESS OTHERWISE SPECIFIED

- LEADS TO BE LOCATED WITHIN .007 IN/ .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
DRYAN T. LEONARD	05/19/94
DPTG. CHK.	
ENGR. CHK.	
PROJECTION	
SCALE	SIZE
N/A	C
DRAWING NUMBER	
MKT-H03H	
REV	
E	

**National Semiconductor**  
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METAL CAN,  
TO-46, 3 LEAD,  
.100 DIA P.C.



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



National Semiconductor™  
MIL/AEROSPACE OPERATIONS  
2900 SEMICONDUCTOR DRIVE  
SANTA CLARA, CA 95050

**Revision History**

Rev	ECN #	Rel Date	Originator	Changes
0A0	M0003634	02/11/03	Rose Malone	Update MNLM136A-5.0-X, Rev. 0BL to MNLM136A-5.0-X, Rev. 0A0 Fully Released. Archive Rev. 0BL.
0B0	M0004107	02/11/03	Rose Malone	Updated MDS: MNLM136A-5.0-X, Rev. 0A0 to MNLM136A-5.0-X, Rev. 0B0. Corrected typo in SMD Number from 8418002YA to 8418002XA in Features Section.