

MNLM185BY-1.2-X REV 0B0

 Original Creation Date: 08/15/95
 Last Update Date: 02/25/03
 Last Major Revision Date: 08/15/95

MICROPOWER VOLTAGE REFERENCE DIODE
General Description

The LM185BY-1.2 is a micropower 2-terminal band-gap voltage regulator diode. Operating over a 10 uA to 20 mA current range, it features exceptionally low dynamic impedance and good temperature stability. On-chip trimming is used to provide tight voltage tolerance. Since the LM185BY-1.2 band-gap reference uses only transistors and resistors, low noise and good long term stability result.

Careful design of the LM185BY-1.2 has made the device exceptionally tolerant of capacitive loading, making it easy to use in almost any reference application. The wide dynamic operating range allows its use with widely varying supplies with excellent regulation.

The extremely low power drain of the LM185BY-1.2 makes it useful for micropower circuitry. This voltage reference can be used to make portable meters, regulators or general purpose analog circuitry with battery life approaching shelf life. Further, the wide operating current allows it to replace older references with a tighter tolerance part.

Industry Part Number

LM185BY

NS Part Numbers

 LM185BYH1.2-SMD
 LM185BYH1.2/883

Prime Die

LM185

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

- Operating current of 10 uA to 20 mA.
- 1.0 Ohms max dynamic impedance (Typical).
- Low temperature coefficient.
- Low voltage reference-1.235V.
- CONTROLLING DOCUMENT:
LM185BYH1.2-SMD 5962-8759405XA

MICROCIRCUIT DATA SHEET

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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
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(Absolute Maximum Ratings)

(Note 1)

Reverse Current	30mA
Forward Current	10mA
Operating Temperature Range	-55 C to +125 C
Maximum Junction Temperature	150 C
Storage Temperature	-55 C to +150 C
Lead Temperature (Soldering, 10 seconds)	300 C
Thermal Resistance	
ThetaJA	
H-Pkg (Still Air)	300 C/W
H-Pkg (500LF/Min Air flow)	139 C/W
ThetaJC	
H-Pkg	57 C/W
Package Weight (Typical)	
H-Pkg	TBD
ESD Tolerance (Note 2)	4000V

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: Human body model, 1.5k Ohms in series with 100pF

Electrical Characteristics

DC PARAMETERS

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
V _{ref}	Reverse Breakdown Voltage	I _r = 10uA			1.223	1.247	V	1
		I _r = 20uA			1.205	1.26	V	2, 3
		I _r = 1mA			1.223	1.247	V	1
					1.205	1.26	V	2, 3
		I _r = 20mA			1.223	1.247	V	1
					1.205	1.26	V	2, 3
Delta V _{ref} /Delta I _r	Reverse Breakdown Voltage Change with Current	10uA ≤ I _r ≤ 1mA			-1.0	1.0	mV	1
		20uA ≤ I _r ≤ 1mA			-1.5	1.5	mV	2, 3
		1mA ≤ I _r ≤ 20mA			-10.0	10.0	mV	1
					-20.0	20.0	mV	2, 3
V _f	Forward Bias Voltage	I _f = 2mA			-1.0	-0.4	V	1
T _c	Temperature Coefficient		1			50	ppm/C	2, 3

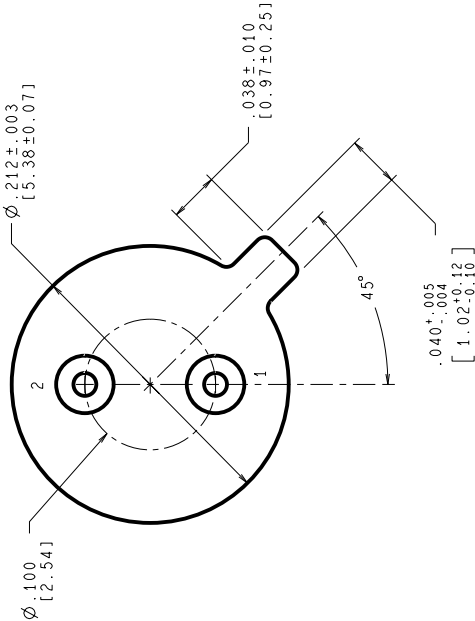
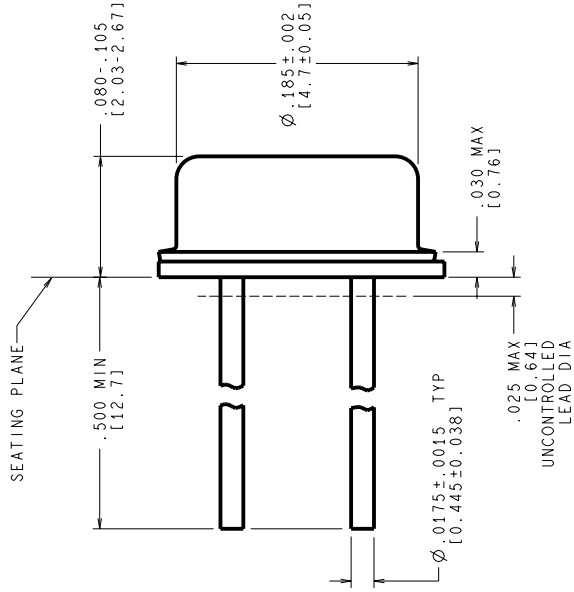
Note 1: The average temperature coefficient is defined as the maximum deviation of reference voltage at all measured temperatures between the operating T_{max} and T_{min}, divided by T_{max} - T_{min}. The measured temperatures are -55 C, -40 C, 0 C, 25 C, 70 C, 85 C and 125 C.

Graphics and Diagrams

GRAPHICS#	DESCRIPTION
05886HRB2	METAL CAN (H), TO-39, 3LD, .200 DIA P.C. (B/I CKT)
H02ARE	METAL CAN, TO-46, 2LD, .100 DIA P.C. (P/P DWG)
P000363A	METAL CAN (H-1.2), TO-46, 2 LEAD (PINOUT)

See attached graphics following this page.

REVISIONS			
LTR	DESCRIPTION	E.C.N.	DATE
D	REVISE & REDRAW PER NEW STANDARD	10402	05/04/1994
E	UPDATE TITLE & MIL/AERO STAMP;		TL/GY
E	CHANGE DWG SIZE FORMAT FROM B TO C.	12131	11/17/1998
			MS/



CONTROLLING DIMENSION IS INCH
VALUES IN () ARE MILLIMETERS

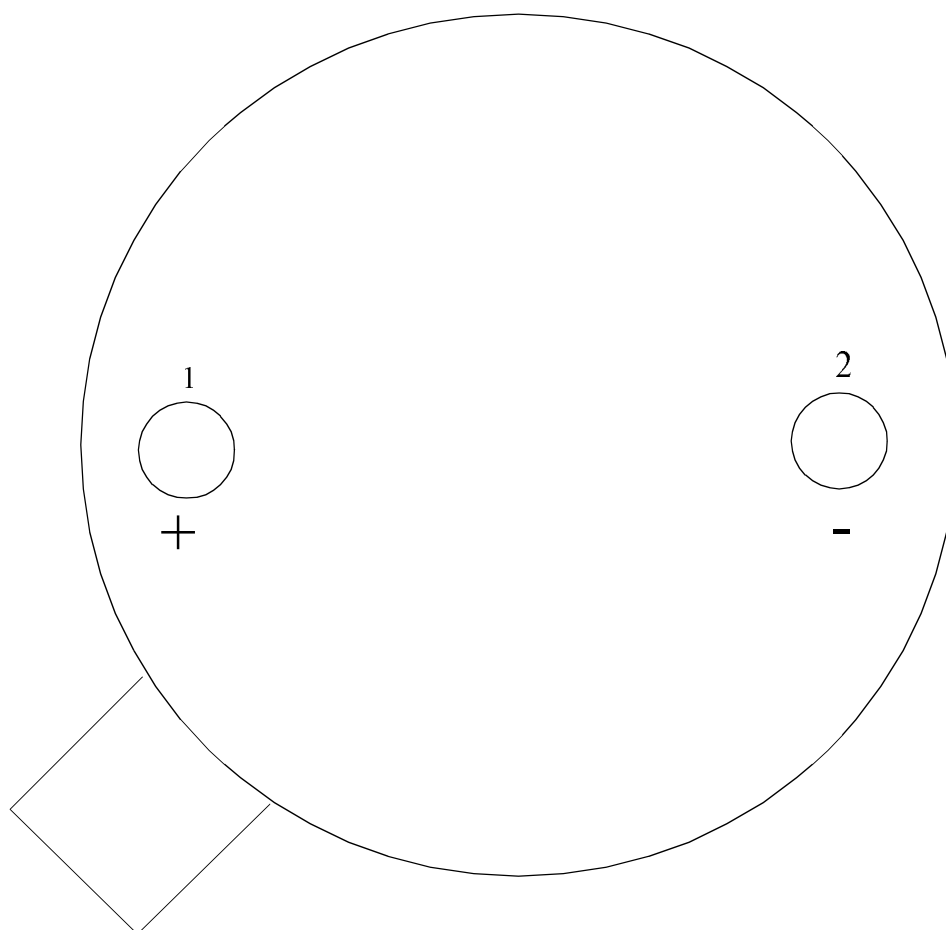
MIL-PRF-38535
CONFIGURATION CONTROL

- 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				
DESIGN	T. LEDWANG	05/04/1994			
ESTG. CHK.					
ENGR. CHK.					
PROJECTION					
SCALE	N/A	SIZE	C	DRAWING NUMBER	(SC)MKT-H02A
REV					E
DO NOT SCALE DRAWING SHEET 1 of 1					

National Semiconductor
2500 Semiconductor dr., Santa Clara, CA 95052-8000

METAL CAN,
TO-46, 2 LEAD,
.100 DIA P.C.



LM185H-1.2
2 - LEAD TO-46
CONNECTION DIAGRAM
BOTTOM VIEW
P000363A



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