LM385 / 385B

1.2 & 2.5V MICROPOWER VOLTAGE REFERENCE

PRODUCTION DATA SHEET

THE INFINITE POWER OF INNOVATION

DESCRIPTION

The LM385/385B Micropower Voltage References are two terminal bandgap reference diodes designed and optimized for accurate low power operation in portable and other power sensitive systems. Operating currents are guaranteed from as low as 15µA up to 20mA for the LX385/385B-1.2, and 20µA up to 20mA for the LM385/385B-2.5, giving designers a great deal of flexibility in optimizing power consumption, noise and ultimate application performance. As an added feature, the references output impedance is extraordinarily low over the entire operating range of quiescent current. This enables an extremely wide dynamic load range with little effect on the overall reference accuracy.

The LM385 family is available in fixed 1.2V and 2.5V reference values. Process and circuit design optimization provides for high accuracy with initial tolerance values of 1% for the LM385B-1.2, 2% for the LM385-1.2, 1.5% for the LM385B-2.5, and 3% for the LM385-2.5. Complementing their initial accuracy, the bandgap reference is temperature compensated to deliver 20ppm performance over the 0° to 70°C operating temperature range.

The LM385 family from Linfinity is a pin-to-pin replacement for the LM385/385B family of voltage references.

IMPORTANT: For the most current data, consult *MICROSEMI*'s website: **http://www.microsemi.com**

KEY FEATURES

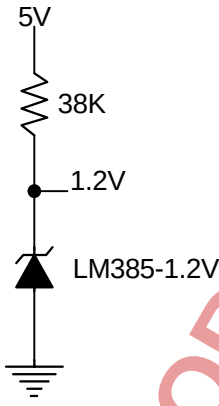
- Guaranteed 1% Initial Accuracy (LM385B-1.2)
- Guaranteed 2.5% Initial Accuracy (LM385-1.2)
- Guaranteed 1.5% Initial Accuracy (LM385B-2.5)
- Guaranteed 3.0% Initial Accuracy (LM385-2.5)
- Guaranteed 20µA Operating Current
- Low Temperature coefficient
- Operating Current of 20µA to 20mA
- Very Low Dynamic Impedance: 10Ω

APPLICATIONS

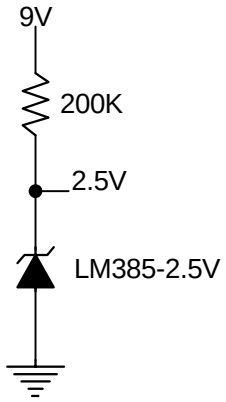
- Portable Meter References
- Portable Test Instruments
- Battery Operated Systems
- Current Loop Instrumentation

PRODUCT HIGHLIGHT

1.2V REFERENCE



MICROPOWER REFERENCED FROM 9V BATTERY



PACKAGE ORDER INFO

T_A (°C)	Reference Voltage	Initial Tolerance	DM Plastic SOIC 8-Pin RoHS Compliant / Pb-free Transition DC: 0440	LP Plastic TO-92 3-Pin RoHS Compliant / Pb-free Transition DC: 0509
0 to 70	1.2V	±30mV	**LM385DM-1.2**	**LM385LP-1.2**
		±12mV	**LM385BDM-1.2**	**LM385BLP-1.2**
	2.5V	±75mV	**LM385DM-2.5**	**LM385LP-2.5**
		±38mV	**LM385BDM-2.5**	**LM385BLP-2.5**

Note: Available in Tape & Reel. Append the letters "TR" to the part number. (i.e. LX385BDM-TR)

Rev. 1.2a,2005-03-08

LINFINITY MICROELECTRONICS INC.
11861 WESTERN AVENUE, GARDEN GROVE, CA. 92841, 714-898-8121, FAX: 714-893-2570

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PRODUCTION DATA SHEET

ABSOLUTE MAXIMUM RATINGS (Note 1)

Reverse Breakdown Current 30mA
Forward Current 10mA
Operating Temperature Range
LM385 ..... 0°C to 70°C
Storage Temperature Range ..... -65°C to 150°C
Lead Temperature (soldering, 10 seconds) ..... 300°C
Pb-free / RoHS Peak Package Solder Reflow Temp (40second max. exposure) ..... 260°C (+0, -5)

Note 1. Values beyond which damage may occur. All voltages are specified with respect to ground, and all currents are positive into the specified terminal

THERMAL DATA

DM PACKAGE:

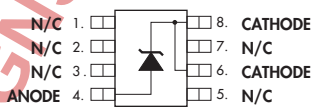
THERMAL RESISTANCE-JUNCTION TO AMBIENT, θ_{JA}	165°C/W

LP PACKAGE:

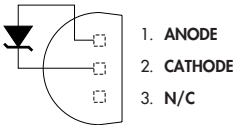
THERMAL RESISTANCE-JUNCTION TO AMBIENT, θ_{JA}	165°C/W

The θ_{JA} numbers are guidelines for the thermal performance of the device/pc-board system. All of the above assume no ambient airflow.

PACKAGE PIN OUTS



DM PACKAGE
(Top View)
100% Pb-free / RoHS Matte Tin Lead Finish



LP PACKAGE
(Top View)

LINFINITY MICROELECTRONICS

Rev. 1.2a 8/04

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, these specifications apply to T_A = 25°C. Typ number represents T_A = 25°C value.)

LM385/385B-1.2

Parameter		Symbol	Test Conditions	LM385/385B-1.2 Min.	LM385/385B-1.2 Typ.	LM385/385B-1.2 Max.	Units
Reverse Breakdown Voltage	LM385	V_Z	$I_{MIN} \le I_R \le I_{MAX}$	1.205	1.235	1.260	V
	LM385B		$I_{MIN} \le I_R \le I_{MAX}$	1.223	1.235	1.247	V
Average Temperature Coefficient		$\frac{\Delta V_Z}{\Delta Temp}$	I_R = 100µA		20		ppm/°C
Minimum Operating Current		I_{MIN}			8	15	µA
Reverse Breakdown Voltage Chang		e	ΔV_Z $I_{MIN} \le I_R \le$ 1mA			1.5	mV
with Current		ΔI_R	1mA ≤ I_R ≤ 20mA			20	mV
Reverse Dynamic Impedance		r_z	I_R = 100µA		1		Ω
Wide Band Noise (RMS)		e_n	I_R = 100µA, 10Hz ≤ f ≤ 10kHz		60		µV
Long Term Stability		$\frac{\Delta V_Z}{\Delta Time}$	I_R = 100µA, T_A = 25°C ± 0.1°C		20		ppm/kHr

LM385/385B-2.5

Parameter		Symbol	Test Conditions	LM385/385B-2.5 Min.	LM385/385B-2.5 Typ.	LM385/385B-2.5 Max.	Units
Reverse Breakdown Voltage	LM385	V_Z	$I_{MIN} \le I_R \le I_{MAX}$	2.425	2.500	2.575	V
	LM385B		$I_{MIN} \le I_R \le I_{MAX}$	2.462	2.500	2.538	V
Average Temperature Coefficient		$\frac{\Delta V_Z}{\Delta Temp}$	I_R = 100µA		20		ppm/°C
Minimum Operating Current		I_{MIN}			13	20	µA
Reverse Breakdown Voltage Chang		e	ΔV_Z $I_{MIN} \le I_R \le$ 1mA			2	mV
with Current		ΔI_R	1mA ≤ I_R ≤ 20mA			20	mV
Reverse Dynamic Impedance		r_z	I_R = 100µA, f = 20Hz		1		Ω
Wide Band Noise (RMS)		e_n	I_R = 100µA, 10Hz ≤ f ≤ 10kHz		120		µV
Long Term Stability		$\frac{\Delta V_Z}{\Delta Time}$	I_R = 100µA, T_A = 25°C ± 0.1°C		20		ppm/kHr

GRAPH / CURVE INDEX

Characteristic Curves
LM385/385B-1.2

FIGURE #

Characteristic Curves
LM385/385B-2.5

FIGURE #

CHARACTERISTIC CURVES — LM385/385B-1.2V

FIGURE 1. — RESPONSE TIME

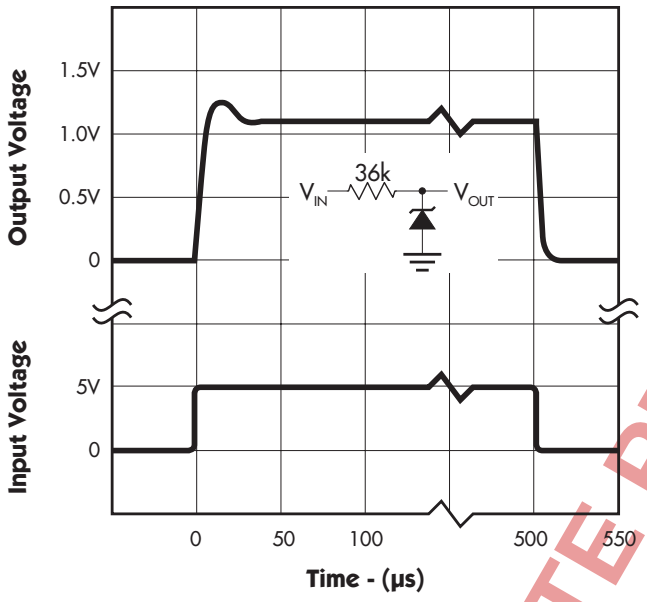


FIGURE 2. — REVERSE CHARACTERISTICS

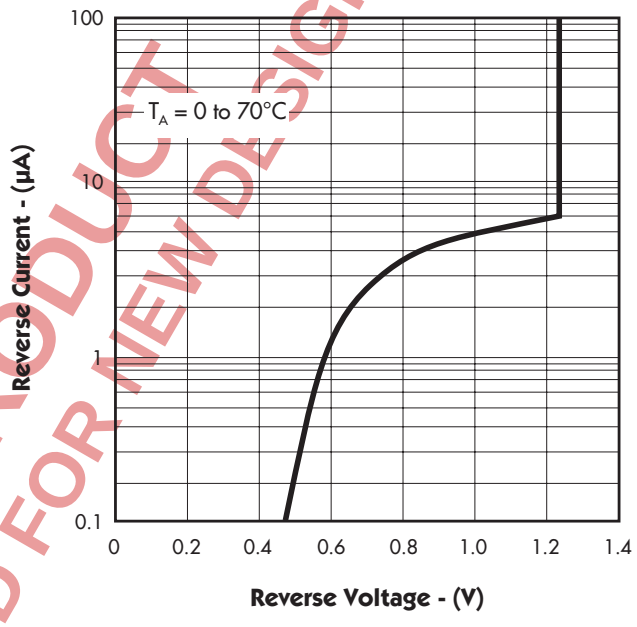


FIGURE 3. — FORWARD CHARACTERISTICS

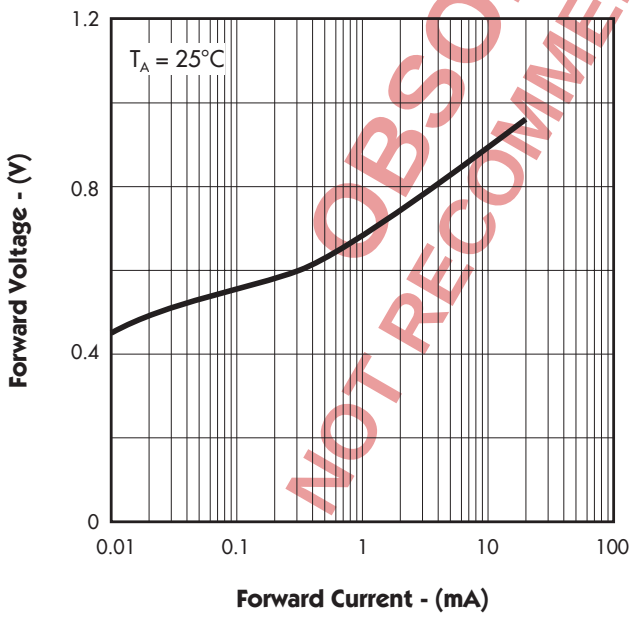
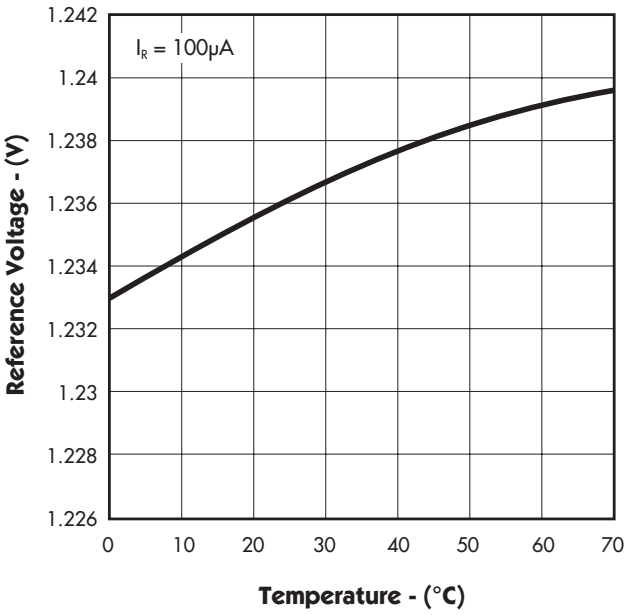


FIGURE 4. — TEMPERATURE DRIFT



CHARACTERISTIC CURVES — LM385/385B-1.2V

FIGURE 5. — REVERSE VOLTAGE CHANGE

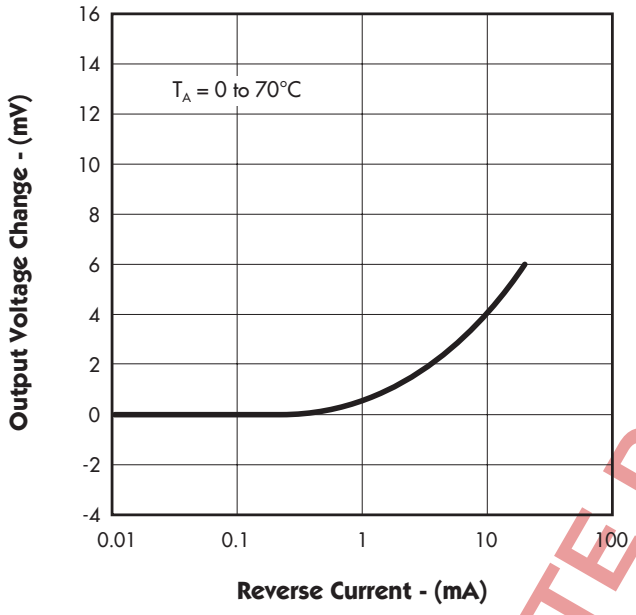


FIGURE 6. — REVERSE DYNAMIC IMPEDANCE

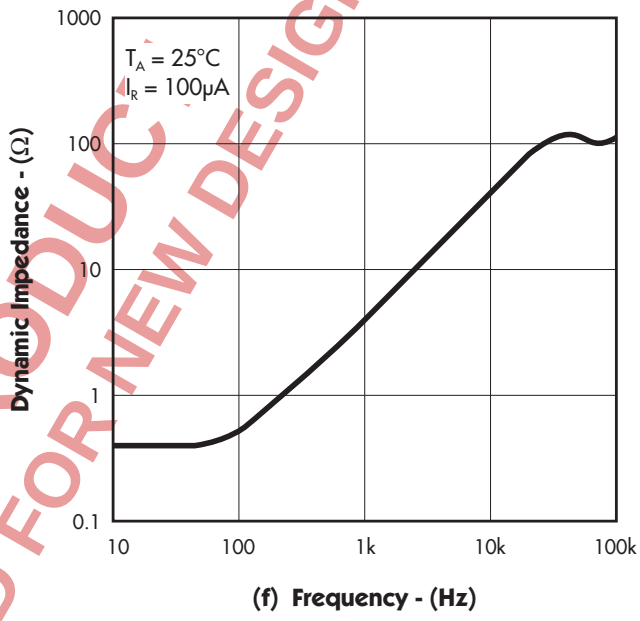
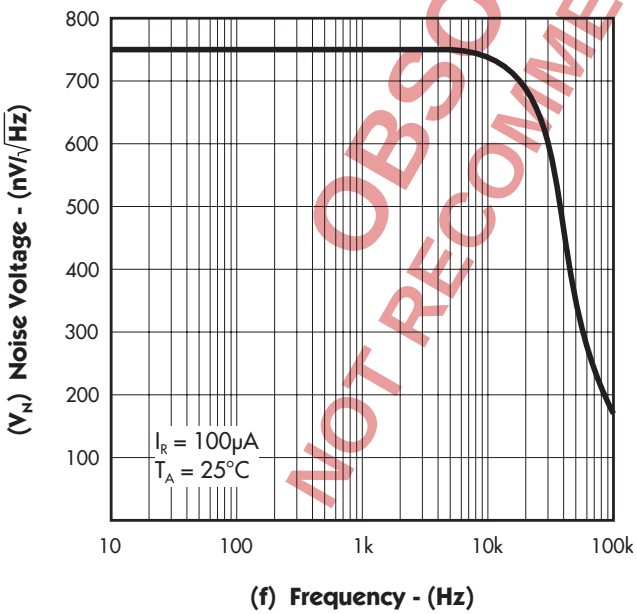


FIGURE 7. — NOISE VOLTAGE



CHARACTERISTIC CURVES — LM385/385B-2.5V

FIGURE 8. — RESPONSE TIME

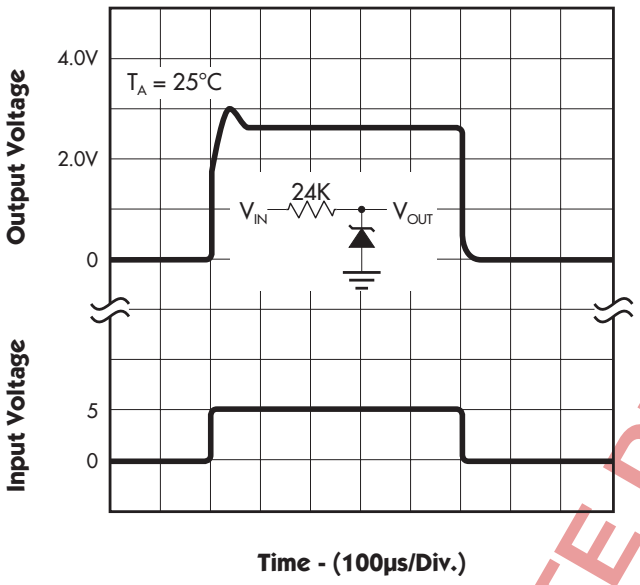


FIGURE 9. — REVERSE CHARACTERISTICS

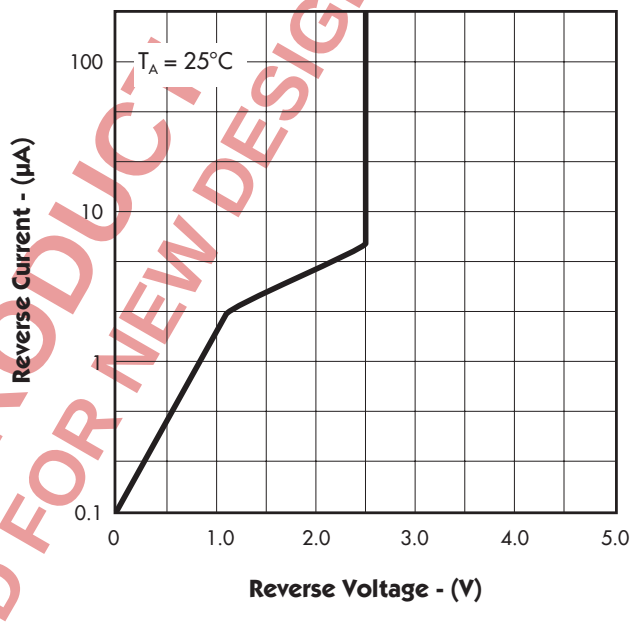


FIGURE 10. — FORWARD CHARACTERISTICS

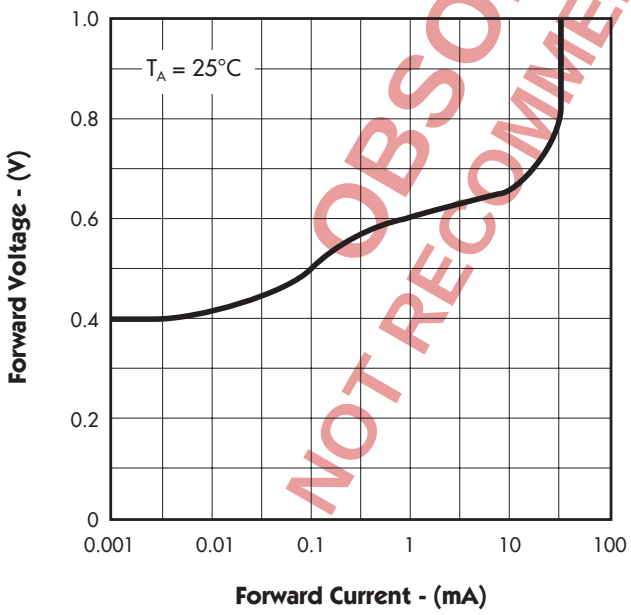
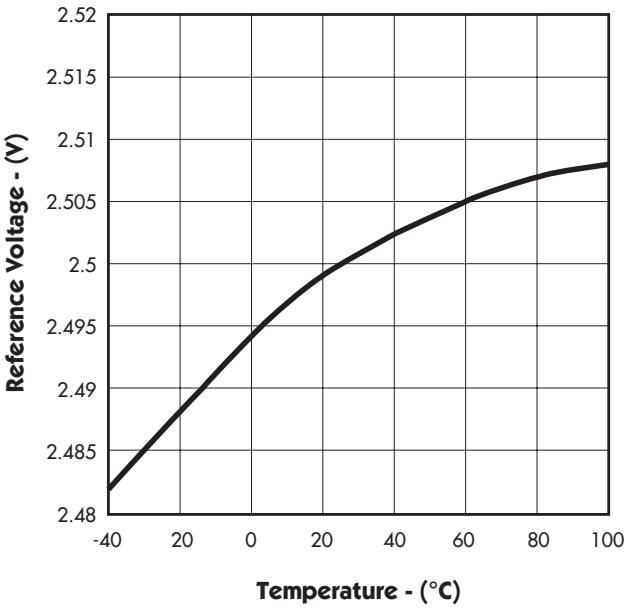


FIGURE 11. — TEMPERATURE DRIFT



CHARACTERISTIC CURVES — LM385/385B-2.5V

FIGURE 12. — REVERSE DYNAMIC IMPEDANCE

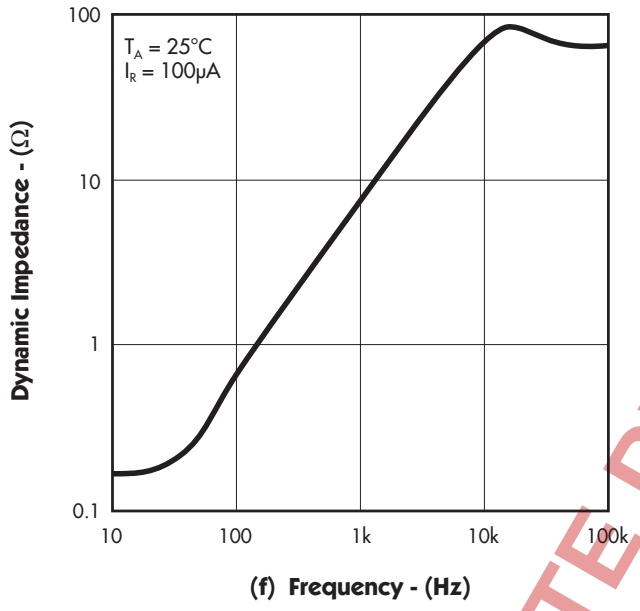


FIGURE 13. — NOISE VOLTAGE