

**MNLM113-X REV 1A0**

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## REFERENCE DIODE

### General Description

The LM113 is a temperature compensated, low voltage reference diode. It features extremely-tight regulation over a wide range of operating currents in addition to an unusually-low breakdown voltage and good temperature stability.

The diode is synthesized using transistors and resistors in a monolithic integrated circuit. As such, it has the same low noise and long term stability as modern IC op amps. Further, output voltage of the reference depends only on highly-predictable properties of components in the IC; so they can be manufactured and supplied to tight tolerances.

The characteristics of this reference recommend it for use in bias-regulation circuitry, in low-voltage power supplies or in battery powered equipment. The fact that the breakdown voltage is equal to a physical property of silicon-the energy-band gap voltage-makes it useful for many temperature-compensation and temperature-measurement functions.

### Industry Part Number

LM113

### NS Part Numbers

LM113H-QMLV \*\*

LM113H-SMD \*

LM113H/883

### Prime Die

LM113

### Controlling Document

See Features Page

### 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**

- SMD : 5962-8671101XA\*, 5962-9684301VXA\*\*

**(Absolute Maximum Ratings)**

(Note 1)

|                                             |                 |
|---------------------------------------------|-----------------|
| Power Dissipation                           | 100 mW          |
| Reverse Current                             | 50 mA           |
| Forward Current                             | 50 mA           |
| Storage Temperature Range                   | -65 C to +150 C |
| Lead Temperature<br>(Soldering, 10 seconds) | 300 C           |
| Operating Temperature Range                 | -55 C to + 125C |

Note 1: For operating at elevated temperatures, the device must be derated based on a 150 C maximum junction and a thermal resistance of 80C/W junction to case or 440 C/W junction to ambient.

## Electrical Characteristics

### DC PARAMETERS

| SYMBOL                | PARAMETER                 | CONDITIONS                    | NOTES | PIN-NAME | MIN   | MAX   | UNIT | SUB-GROUPS |
|-----------------------|---------------------------|-------------------------------|-------|----------|-------|-------|------|------------|
| V <sub>zr</sub>       | Zener Voltage             | I <sub>r</sub> = 1 mA         |       |          | 1.16  | 1.28  | V    | 1          |
|                       |                           |                               |       |          | 1.157 | 1.283 | V    | 2, 3       |
| Delta V <sub>zr</sub> | Delta Zener Voltage       | 0.5mA ≤ I <sub>r</sub> ≤ 20mA |       |          |       | 15    | mV   | 1          |
|                       |                           | 0.5mA ≤ I <sub>r</sub> ≤ 10mA |       |          |       | 15    | mV   | 2, 3       |
| V <sub>f</sub>        | Forward Voltage Drop      | I <sub>f</sub> = 1mA          |       |          |       | 1     | V    | 1, 2, 3    |
| R <sub>r</sub>        | Reverse Dynamic Impedance | I <sub>r</sub> = 1mA          | 1     |          |       | 1     | Ohm  | 4          |
|                       |                           | I <sub>r</sub> = 10mA         | 1     |          |       | 0.8   | Ohm  | 4          |

### DC PARAMETERS: DRIFT VALUES

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

DC: Delta calculations performed on JAN S and QMLV devices at Group B, Subgroup 5 "ONLY".

|                 |               |                      |  |  |       |      |   |   |
|-----------------|---------------|----------------------|--|--|-------|------|---|---|
| V <sub>zr</sub> | Zener Voltage | I <sub>r</sub> = 1mA |  |  | -0.02 | 0.02 | V | 1 |
|-----------------|---------------|----------------------|--|--|-------|------|---|---|

Note 1: Guaranteed parameter not tested.

## Graphics and Diagrams

| GRAPHICS#  | DESCRIPTION |
|------------|-------------|
| 09385HR    | (blank)     |
| MKT-H02ARC | (blank)     |

See attached graphics following this page.