

Micropower Voltage Reference Diode



CLM285-1.2 / CLM385-1.2

FEATURES

- Tight Tolerance 1% - 2%
- Operating Current 10 μ A - 20mA
- Dynamic Impedance 1 Ω
- Low Temperature Coefficient

PRODUCT DESCRIPTION

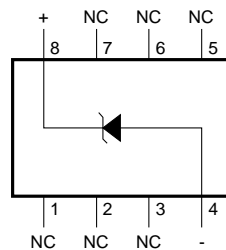
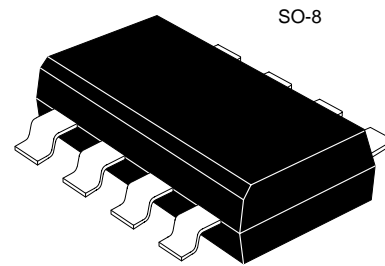
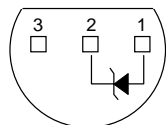
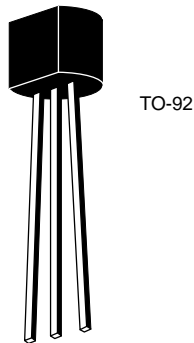
The CLM285 / 385 - 1.2 are micropower 2 terminal band-gap voltage regulator diodes. Operating over a wide current range of 10 μ A to 20mA with low dynamic impedance and stable temperature characteristics. Calogic utilizes on-chip trimming to provide tight voltage tolerances.

The devices are excellent in portable meters, regulators or general purpose analog circuitry with battery life approaching shelf life.

ORDERING INFORMATION

| Part | Package | Max Tempco (ppm) | Temp Range |
|----------|---------|------------------|--------------------------------------|
| CLM285Y1 | SOIC | 100 | -40 $^{\circ}$ C to +85 $^{\circ}$ C |
| CLM385T1 | TO-46 | 100 | 0 $^{\circ}$ C to +70 $^{\circ}$ C |
| CLM385N1 | TO-92 | 100 | 0 $^{\circ}$ C to +70 $^{\circ}$ C |
| CLM385Y1 | SOIC | 100 | 0 $^{\circ}$ C to +70 $^{\circ}$ C |

PIN CONFIGURATIONS





ABSOLUTE MAXIMUM RATINGS

| | | | |
|-----------------------------|----------------|---|-----------------|
| Reverse Current | 30mA | Storage Temperature | -55°C to +150°C |
| Forward Current | 10mA | Soldering Information | |
| Operating Temperature Range | | TO-92 Package (10 sec.) | 260°C |
| CLM285-1.2 | -40°C to +85°C | SO Package: Vapor Phase (60 sec.) | 215°C |
| CLM385-1.2 | 0°C to +70°C | Infrared (15 sec.) | 220°C |

ELECTRICAL CHARACTERISTICS (Note 1)

| PARAMETER | CLM285-1.2 | | | CLM385-1.2 | | | UNITS (LIMITS) | CONDITIONS |
|--|------------|-----------------------|-----------------------|----------------|----------------------------------|-----------------------|--|---|
| | TYP | TESTED LIMIT (NOTE 2) | DESIGN LIMIT (NOTE 3) | TYP | TESTED LIMIT (NOTE 2) | DESIGN LIMIT (NOTE 3) | | |
| Reverse Breakdown Voltage | 1.235 | 1.220 1.245 | | 1.235 1.235 | 1.223 1.247 1.225 1.245 | | V _{MIN} V _{MAX} V _{MIN} V _{MAX} | T _A = 25°C, 1 _{MIN} ≤ I _R ≤ 1 _{MAX} CLM285-1.2/CLM385B-1.2 CLM385-1.2 |
| Minimum Operating Current | 8 | 8 | 10 | 8 | 15 | 10 | μA | |
| Reverse Breakdown | | 1 | 1.5 | | 1 | 1.5 | mV | I _{MIN} ≤ I _R ≤ 1mA |
| Voltage Change with Current | | 10 | 20 | | 10 | 20 | mV | 1mA ≤ I _R ≤ 20mA |
| Reverse Dynamic Impedance | 1 | | 1.5 | 1 | | 1.5 | Ω | I _R = 100μA, f = 20Hz |
| Wideband Noise (rms) | 60 | | | 60 | | | μV | I _R = 100μA 10Hz ≤ f ≤ 10kHz |
| Long Term Stability | 20 | | | 20 | | | ppm | I _R = 100μA, T = 1000Hr T _A = 25°C ± 0.1°C |
| Average Temperature Coefficient (Note 4) | | 50 | 100 | | 50 | 100 | ppm/°C | I _R = 100μA |

Note 1: Parameters identified with **boldface type** apply at temperature extremes and for I_{MIN} < I_R < 20mA, unless otherwise specified. All other numbers apply at T_A = T_J = 25°C.

Note 2: Guaranteed and 100% production tested.

Note 3: Guaranteed (but not 100% production tested) over the operating temperature and input current ranges. These limits are not to be used to calculate outgoing quality levels.

Note 4: 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, 125°C.

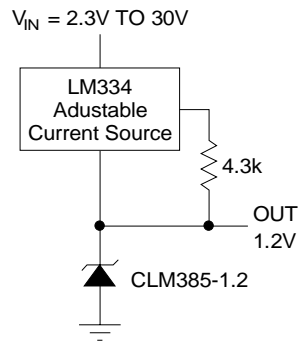
Note 5: For elevated temperature operation, T_j max is:

| | |
|--------|-------|
| CLM285 | 125°C |
| CLM385 | 100°C |

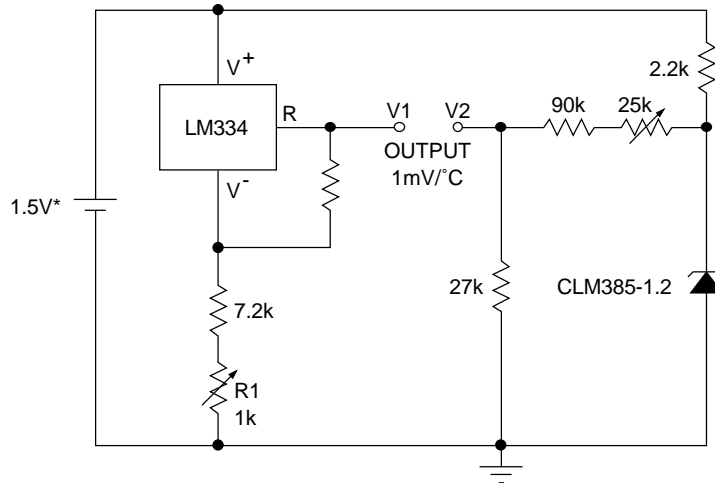
| Thermal Resistance | TO-92 | SO-8 |
|---------------------------------------|--|---------|
| θ _{ja} (Junction to Ambient) | 180°C/W (0.4" leads) 170°C/W (0.125" leads) | 165°C/W |
| θ _{jc} (Junction to Case) | N/A | N/A |

APPLICATIONS

WIDE INPUT RANGE REFERENCE



CENTIGRADE THERMOMETER



CALIBRATION

1. ADJUST R1 SO THAT V1 = TEMP AT 1mV/°K
2. ADJUST V2 TO 273.2mV

* I_Q FOR 1.3V TO 1.6V BATTERY VOLTAGE = 50 μ A TO 150 μ A