

MB3306

Constant Voltage and Constant Current Controller



CBC Microelectronics
<http://www.cbcev.net>

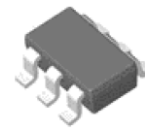
General Description

The MB3306 is a highly integrated solution for a constant voltage/constant current mode SMPS application.

The MB3306 contains one 1.21V voltage reference with $\pm 0.5\%$ accuracy, one current sensing circuit and two operational amplifiers. Combining the voltage reference with one operational amplifier makes MB3306 an ideal voltage controller for use in adapters and battery chargers. The other low voltage reference combined with the other operational amplifier makes it an ideal current limiter for output low side current sensing.

The MB3306 is available in SOT-23-6 package.

Pin Configuration



SOT-23-6

Features

- Constant Voltage and Constant Current Control.
- Precision Internal Voltage Reference.
- Few External Components.
- Easy Compensation.
- Low Supply Current: 0.5mA.
- Operating Temperature Range: -40°C to 105°C

Applications

- Adapters.
- Battery Chargers

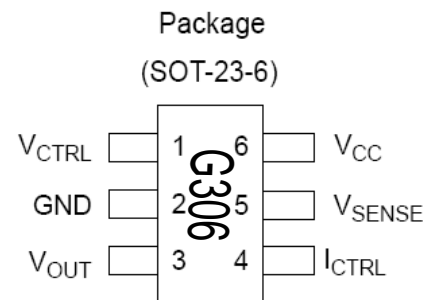


Figure1: Pin Configuration of MB3306
(Top View)

MB3306

Ordering Information

MB3306G □ □

Circuit Type **G: Halogen Free**

Package **N: SOT-23-6** TR: Tape and Reel
Blank: Tube

| Package | Temperature Range | Part Number | Marking ID | Packing Type |
|----------|-------------------|-------------|------------|--------------|
| SOT-23-6 | -40 to 105°C | MB3306GNTR | G306 | Tape & Reel |

Typical Application

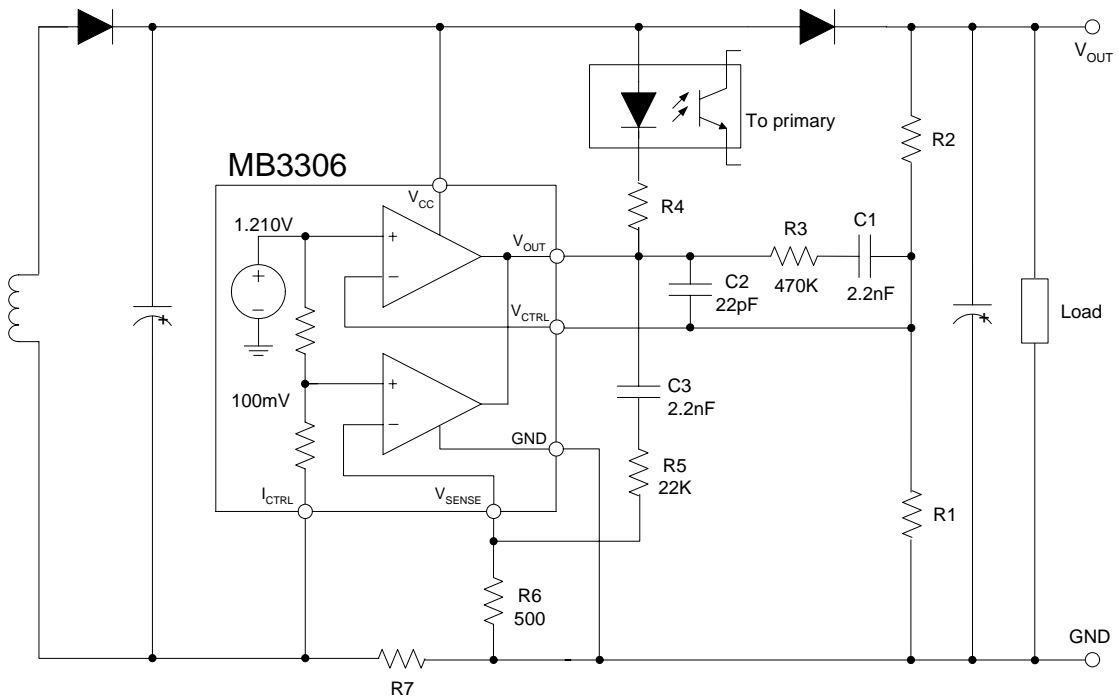


Figure 2: Typical Application of MB3306

MB3306

Block Diagram

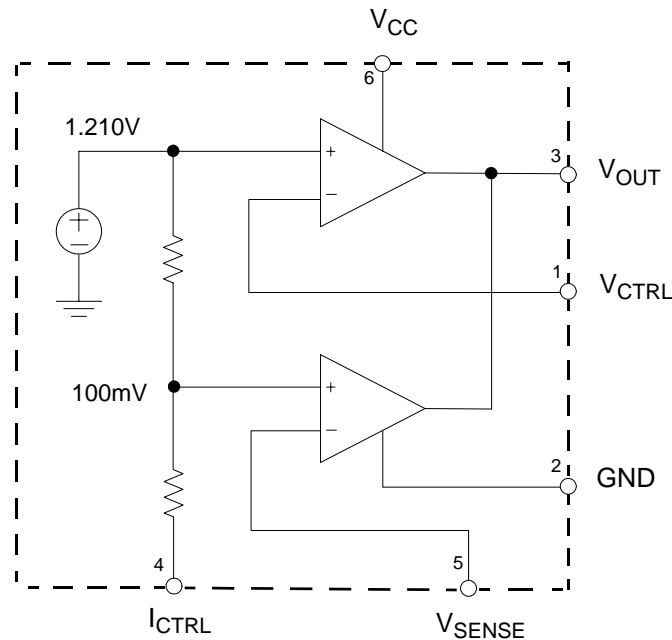


Figure 3: Functional diagram of MB3306

Absolute Maximum Ratings (Note 1)

| Symbol | Parameter | Rating | Units |
|---------------|---|----------|-------|
| V_{CC} | Power Supply Voltage | 20 | V |
| V_{IN} | Input Voltage | -0.3~VCC | V |
| T_J | Junction Temperature | 150 | °C |
| TSTG | Storage Temperature Range | -65~150 | °C |
| TLEAD | Lead Temperature (Soldering, 5sec) | 260 | °C |
| R θ JC | Package Thermal Resistance (Junction to Case) | 92 | °C/W |

Note 1: Stresses greater than those listed under: “Absolute Maximum Rating” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

MB3306

Recommended Operating Conditions

| Parameter | Symbol | Min | Max | Unit |
|-----------------------------|----------|-----|-----|--------------------|
| Power Supply Voltage | V_{CC} | 2.5 | 18 | V |
| Operating Temperature Range | T_A | -40 | 105 | $^{\circ}\text{C}$ |

Electrical Characteristics

($V_{CC} = 5\text{V}$, $T_A = 25^{\circ}\text{C}$ unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min | TYP | Max | Unit |
|----------------------------------|--|---|-------|------|-------|---------------|
| TOTAL CURRENT CONSUMPTION | | | | | | |
| I_{CC} | Total Supply Current Not Including the Output Sinking Current | $T_A = 25^{\circ}\text{C}$ | | 0.5 | 1 | mA |
| | | $-40^{\circ}\text{C} < T_A < 105^{\circ}\text{C}$ | | 0.6 | | |
| VOLTAGE CONTROL LOOP | | | | | | |
| G_{mv} | Transconduction Gain (V_{CTRL}). Sink Current Only | $T_A = 25^{\circ}\text{C}$ | 1 | 3.5 | | mA/mV |
| | | $-40^{\circ}\text{C} < T_A < 105^{\circ}\text{C}$ | | 2.5 | | |
| V_{REF} | Voltage Control Loop Reference | $T_A = 25^{\circ}\text{C}$ | 1.204 | 1.21 | 1.216 | V |
| | | $-40^{\circ}\text{C} < T_A < 105^{\circ}\text{C}$ | 1.198 | | 1.222 | |
| I_{IBV} | Input Bias Current (V_{CTRL}) | $T_A = 25^{\circ}\text{C}$ | | 50 | | nA |
| | | $-40^{\circ}\text{C} < T_A < 105^{\circ}\text{C}$ | | 100 | | |
| CURRENT CONTROL LOOP | | | | | | |
| G_{mi} | Transconduction Gain (I_{CTRL}). Sink Current Only | $T_A = 25^{\circ}\text{C}$ | 1.5 | 7 | | mA/mV |
| V_{SENSE} | Current Control Loop Reference | $I_{OUT} = 2.5\text{mA}$, $T_A = 25^{\circ}\text{C}$ | 98 | 100 | 102 | mV |
| | | $I_{OUT} = 2.5\text{mA}$, $-40^{\circ}\text{C} < T_A < 105^{\circ}\text{C}$ | 94 | | 106 | |
| I_{IBI} | Current Out of Pin I_{CTRL} at 200mV | $T_A = 25^{\circ}\text{C}$ | | 25 | | μA |
| | | $-40^{\circ}\text{C} < T_A < 105^{\circ}\text{C}$ | | 50 | | |
| OUTPUT STAGE | | | | | | |
| V_{OL} | Low Output Voltage at 10mA Sinking Current | $T_A = 25^{\circ}\text{C}$ | | 200 | | mV |
| I_{OS} | Output Short Circuit Current. Output to V_{CC} , Sink Current Only | $T_A = 25^{\circ}\text{C}$ | | 27 | 50 | mA |
| | | $-40^{\circ}\text{C} < T_A < 105^{\circ}\text{C}$ | | 35 | | |

MB3306

Typical Characteristics

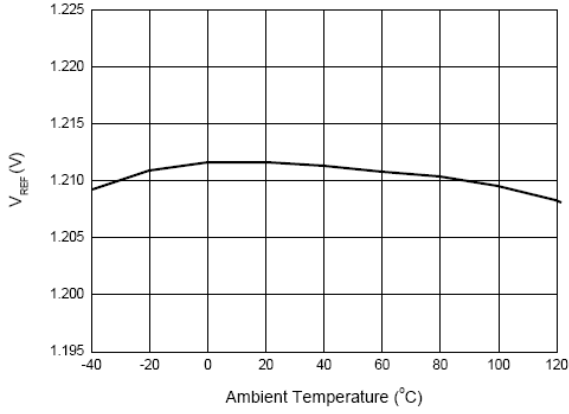


Figure 4. V_{REF} vs. Ambient Temperature

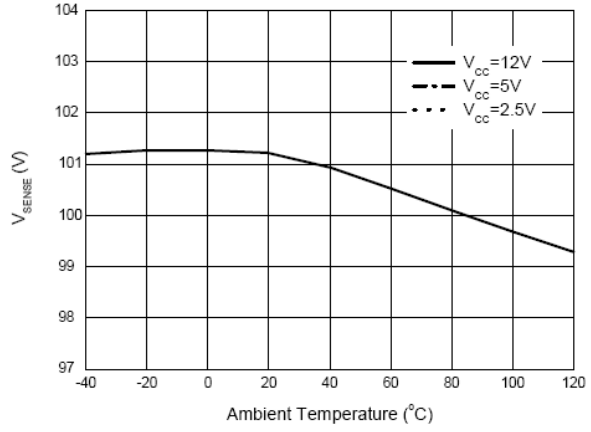


Figure 5. V_{SENSE} vs. Ambient Temperature

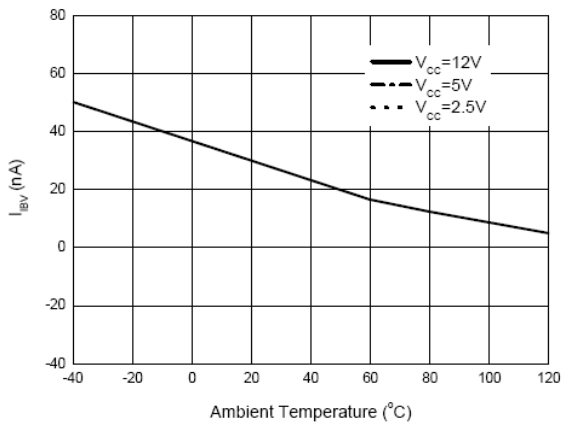


Figure 6. I_{BV} vs. Ambient Temperature

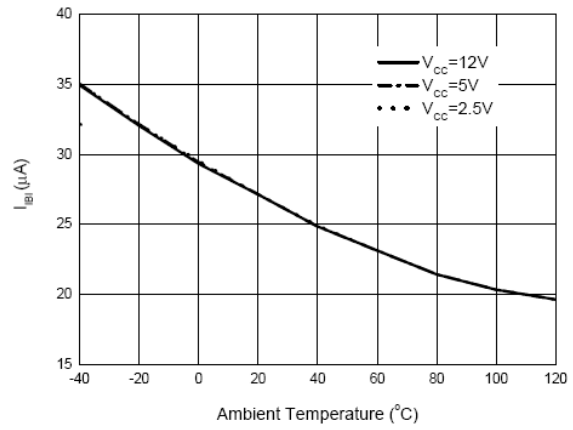


Figure 7. I_{BI} vs. Ambient Temperature

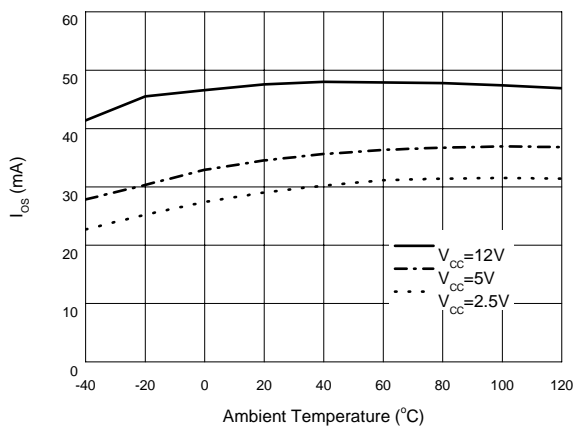


Figure 8. Output Short Circuit Current vs. Ambient Temperature

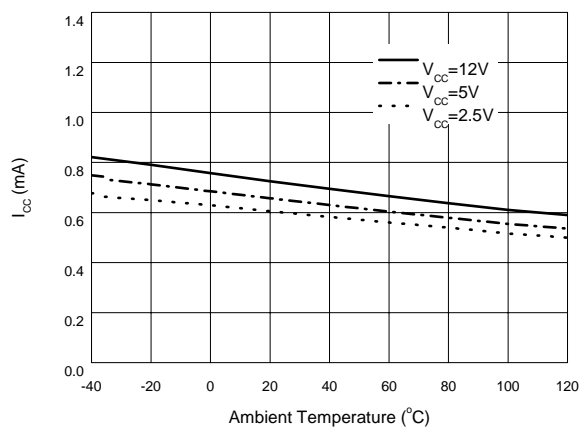
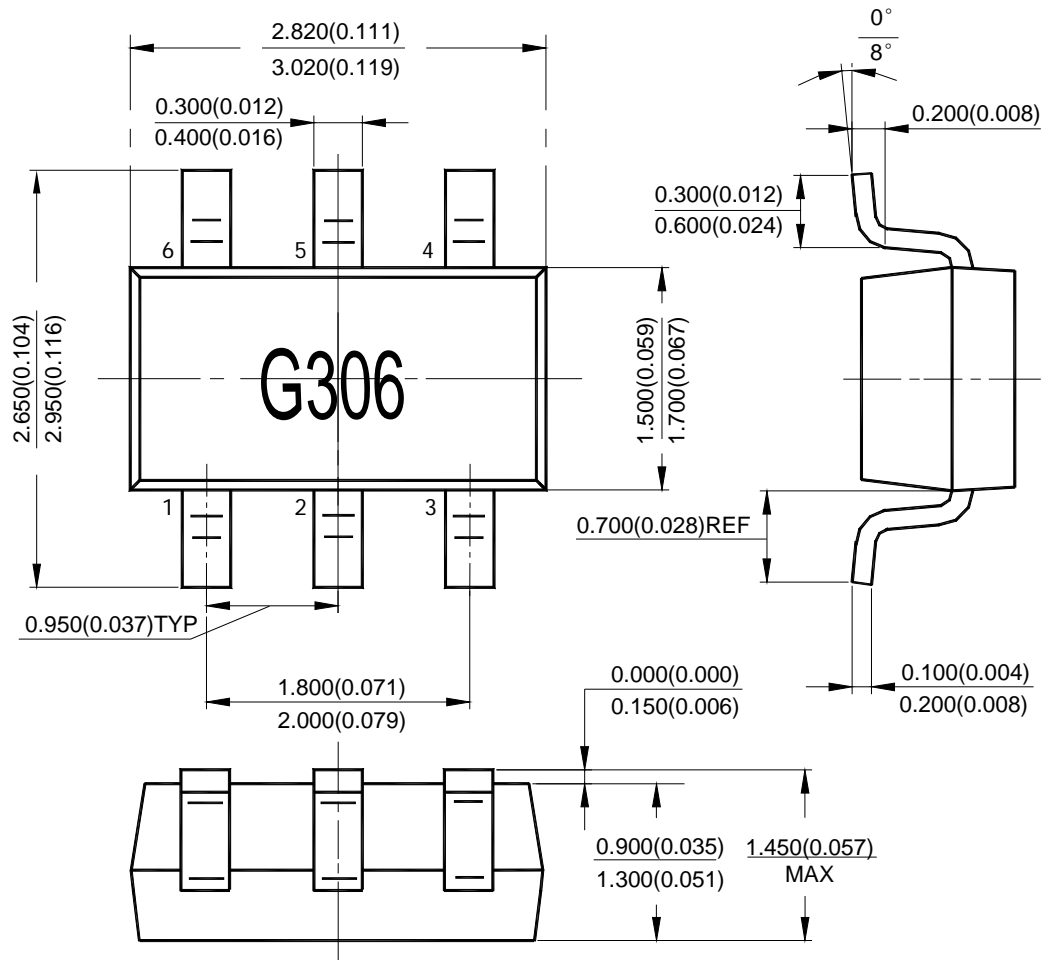


Figure 9. Supply Current vs. Ambient Temperature

MB3306

Mechanical Dimensions

SOT-23-6 Unit: mm (inch)



MB3306

IMPORTANT NOTICE

CBC Microelectronics Co., LTD reserves the right to make changes without further notice to any products or specifications herein. CBC Microelectronics Co., LTD does not assume any responsibility for use of any its products for any particular purpose, nor does CBC Microelectronics Co., LTD assume any liability arising out of the application or use of any its products or circuits. CBC Microelectronics Co., LTD does not convey any license under its patent rights or other rights nor the rights of others.