# H134

## General Description

6-Lead Plastic **SOT-23-6L（TSOP-6）**
Package Code: N

The H134 is a highly integrated solution for a constant voltage/constant current mode SMPS application.

The H134 contains one 1.21V voltage reference with ± 0.5% accuracy, one current sensing circuit and two operational amplifiers. Combining the voltage reference with one operational amplifier makes H134 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 H134 is available in SOT-23-6L( TSOP-6 ) package.

## Features

· Constant Voltage and Constant Current Control

· Precision Internal Voltage Reference

· Few External Components

· Easy Compensation

· Low Supply Current

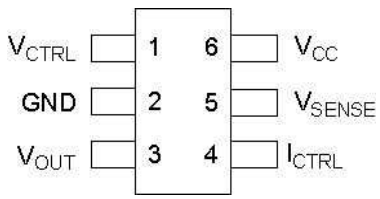
· Operating Temperature Range: -40 to 105℃

## Applications

· Adapters

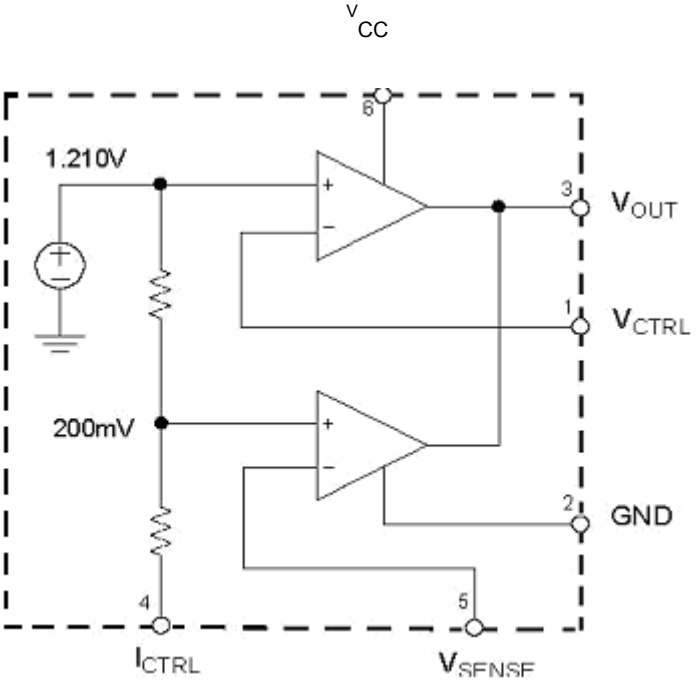
· Battery Chargers

## Pin Configuration




| Pin Number | Pin Name | Function |
|---|---|---|
| 1 | VCTRL | Input pin of the voltage control loop |
| 2 | GND | Ground |
| 3 | VOUT | Output pin. Sinking current only |
| 4 | ICTRL | Input pin of the current control loop |
| 5 | VSENSE | Input pin of the current control loop |
| 6 | VCC | Power supply |

## Functional Block Diagram




## Absolute Maximum Ratings (Note 1)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Power Supply Voltage | $V_{CC}$ | 20 | V |
| Input Voltage | $V_{IN}$ | -0.3 to $V_{CC}$ | V |
| Junction Temperature | $T_J$ | 150 | ℃ |
| Storage Temperature | $T_{STG}$ | -65 to 150 | ℃ |
| Package Thermal Resistance (Junction to Case) | $R_{\theta JC}$ | 92 | ℃/W |

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" 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.

## Recommended Operating Conditions

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

## Electrical Characteristics

($V_{CC}$=5V, $T_A$=25℃, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|---|
| **TOTAL CURRENT CONSUMPTION** | | | | | | | |
| Total Supply Current Not Including the Output Sinking Current | ICC | TA=25℃ | | | 0.9 | 1.3 | mA |
| | | -40℃<TA<105℃ | | | 1.0 | | |
| **VOLTAGE CONTROL LOOP** | | | | | | | |
| Transconduction Gain (VCTRL). Sink Current Only | Gmv | TA=25℃ | | 1 | 3.5 | | mA/mV |
| | | -40℃<TA< 105℃ | | | 2.5 | | |
| Voltage Control Loop Reference | VREF | TA=25℃ | B Rank | 1.200 | | 1.204 | V |
| | | | A Rank | 1.205 | 1.21 | 1.215 | |
| | | | C Rank | 1.216 | | 1.220 | |
| | | -40℃<TA< 105℃ | | 1.186 | | 1.234 | |
| Input Bias Current (VCTRL) | IIBV | TA=25℃ | | | 50 | | nA |
| | | -40℃<TA< 105℃ | | | 100 | | |
| **CURRENT CONTROL LOOP** | | | | | | | |
| Transconduction Gain (ICTRL). Sink Current Only | Gmi | TA=25℃ | | 1.5 | 7 | | mA/mV |
| Current Control Loop Reference | VSENSE | IOUT=2.5mA, TA=25℃ | | 194 | 198 | 203 | mV |
| | | IOUT=2.5mA, -40℃<TA< 105℃ | | 192 | | 208 | |
| Current Out of Pin ICTRL at 200mV | IIBI | TA=25℃ | | | 25 | | μA |
| | | -40℃<TA< 105℃ | | | 50 | | |
| **OUTPUT STAGE** | | | | | | | |
| Low Output Voltage at 10mA Sinking Current | VOL | TA=25℃ | | | 200 | | mV |
| Output Short Circuit Current. Output to VCC, Sink Current Only | IOS | TA=25℃ | | | 27 | 50 | mA |
| | | -40℃<TA< 105℃ | | | 35 | | |

## Typical Performance Characteristics

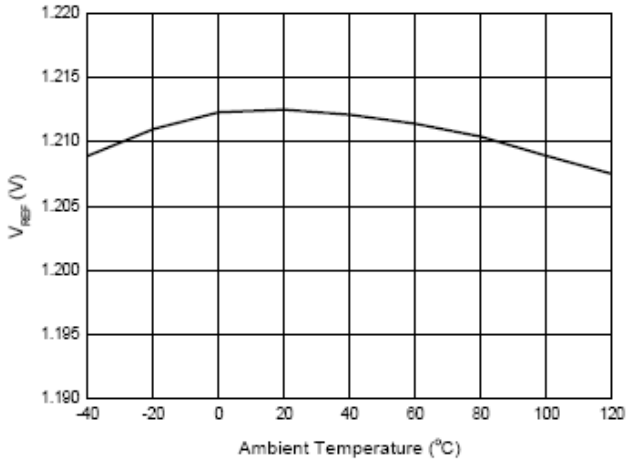



Figure 1.Vref VS. Ambient Temperature

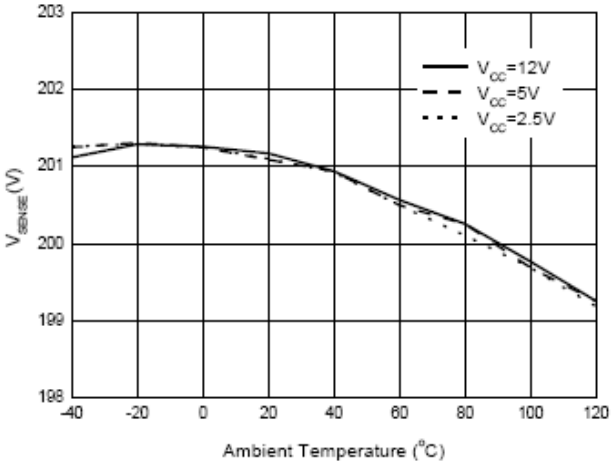



Figure 2.$V_{SENSE}$ VS. Ambient Temperature

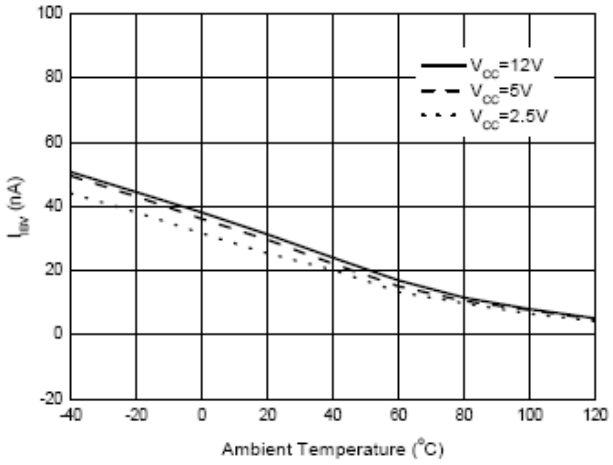



Figure 3.$V_{CTRL}$ Pin Input Bias Current VS. Ambient Temperature

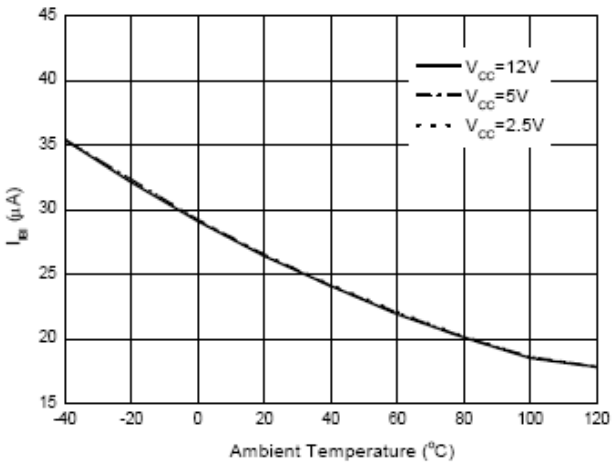



Figure 4.$I_{CTRL}$ Pin Input Bias Current VS. Ambient Temperature

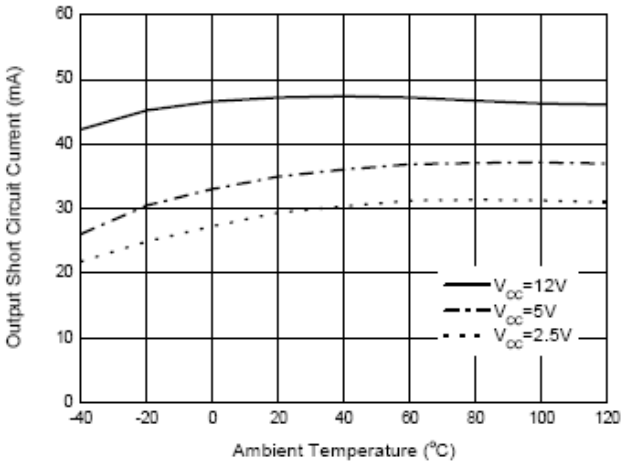



Figure 5.Output Short Circuit Current VS. Ambient Temperature

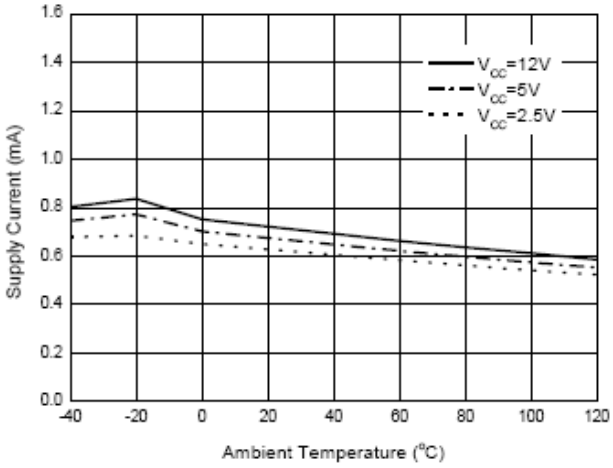
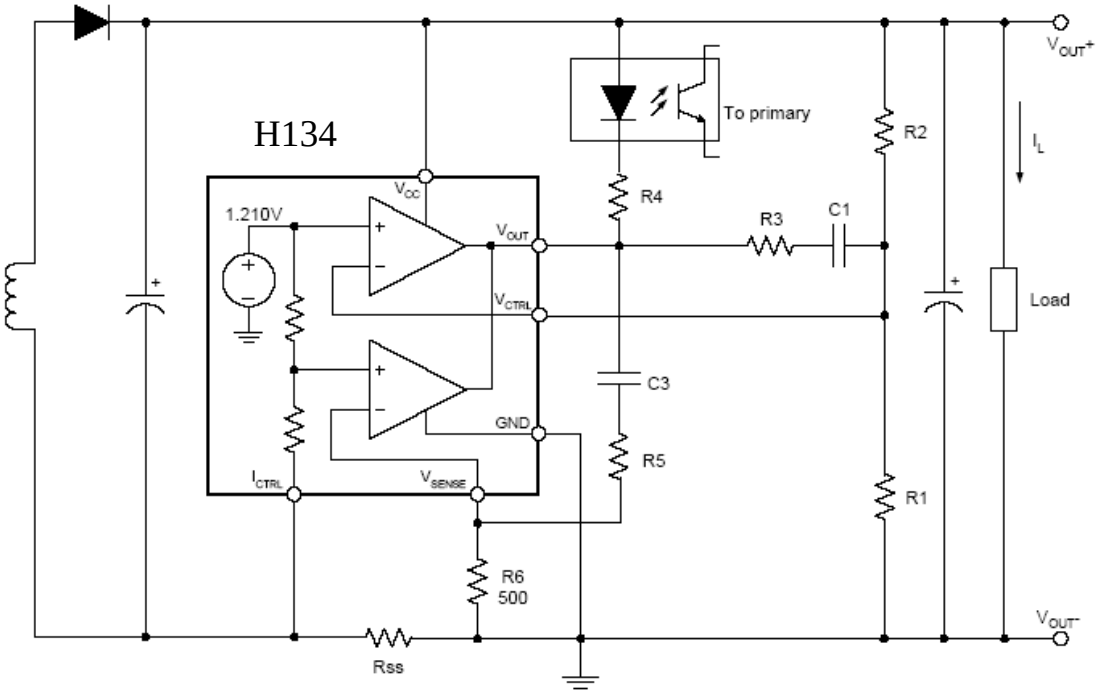



Figure 6.Supply Current VS. Ambient Temperature

## Typical Application

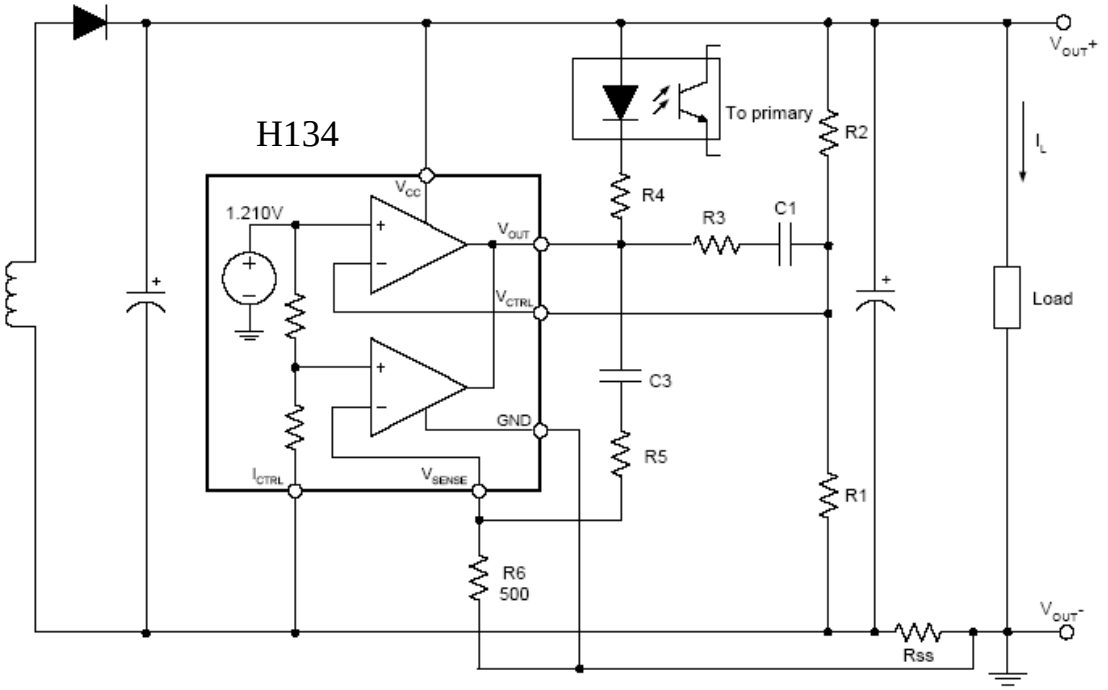



$$V_{OUT} = V_{REF} \times \frac{R1 + R2}{R1} \quad (V)$$

$$CurrentLimit = \frac{V_{SENSE}}{R_{SS}} \quad (A)$$

Figure 7. Typical Application 1 of H134

## Typical Application

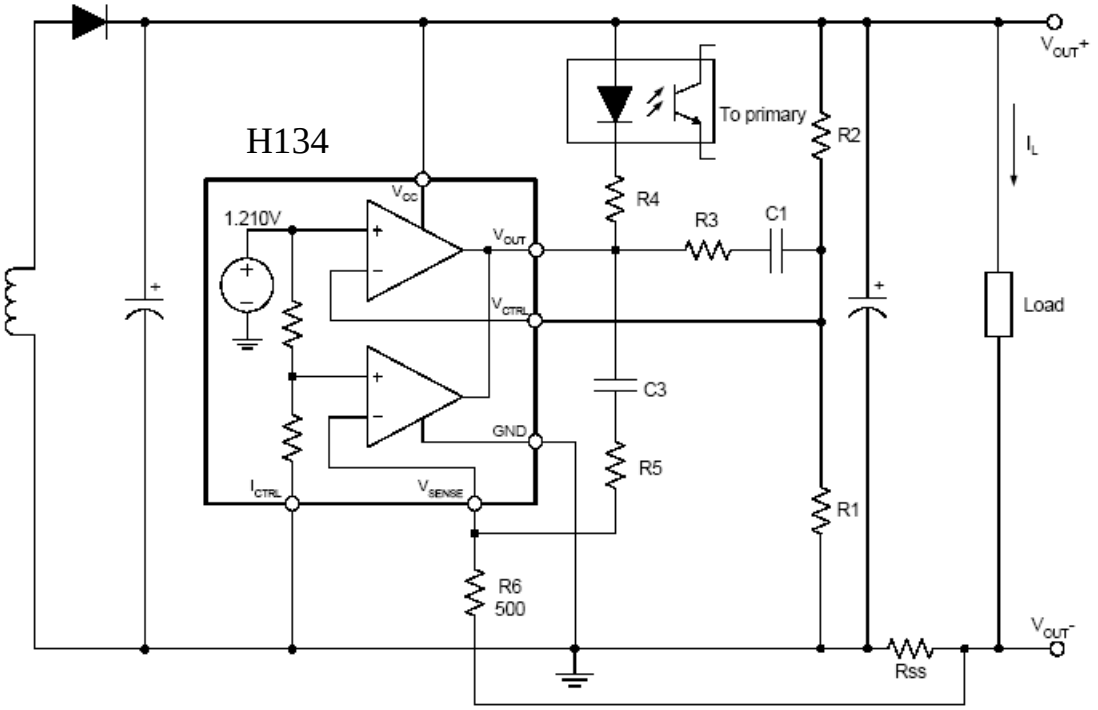



$$V_{OUT} = [V_{REF} + (I_L \times R_{SS})] \times \frac{R1 + R2}{R1} - (I_L \times R_{SS}) \quad (V)$$

$$CurrentLimit = \frac{V_{SENSE}}{R_{SS}} \quad (A)$$

Figure 8. Typical Application 2 of H134

## Typical Application

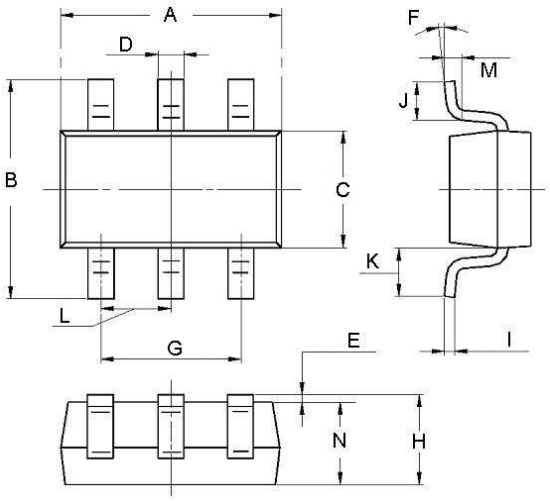



$$V_{OUT} = V_{REF} \times \frac{R1 + R2}{R1} - (I_L \times R_{SS}) \quad \text{(V)}$$

$$CurrentLimit = \frac{V_{SENSE} \times V_{REF}}{(V_{SENSE} + V_{REF}) \times R_{SS}} \quad \text{(A)}$$

Figure 9. Typical Application 3 of H134

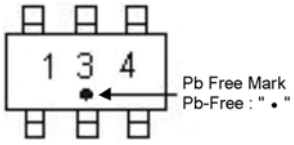
## SOT-23-6L (TSOP-6) package dimension




SOT-23-6L(TSOP-6) Surface Mounted Package

HSMC Package Code: N

Marking:




Pin Style: 1. Vctrl 2. GND 3. Vout
4.Ictrl 5. Vsense 6. Vcc

Material:
- Lead solder plating: Pure-Tin (Pb-free)
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

| DIM | Min. | Max. |
|---|---|---|
| A | 2.70 | 3.12 |
| B | 2.60 | 3.00 |
| C | 1.40 | 1.80 |
| D | 0.30 | 0.55 |
| E | 0.00 | 0.10 |
| F | 0° | 10° |
| G | 1.80 | 2.00 |
| H | - | 1.30 |
| I | 0.10 | 0.21 |
| J | 0.30 | 0.60 |
| K | 0.6* | |
| L | 0.95* | |
| M | 0.25* | |
| N | 1.00 | 1.20 |

*: Typical, Unit: mm



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