



# H134

## General Description

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  $\pm 0.5\%$  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°C

## Applications

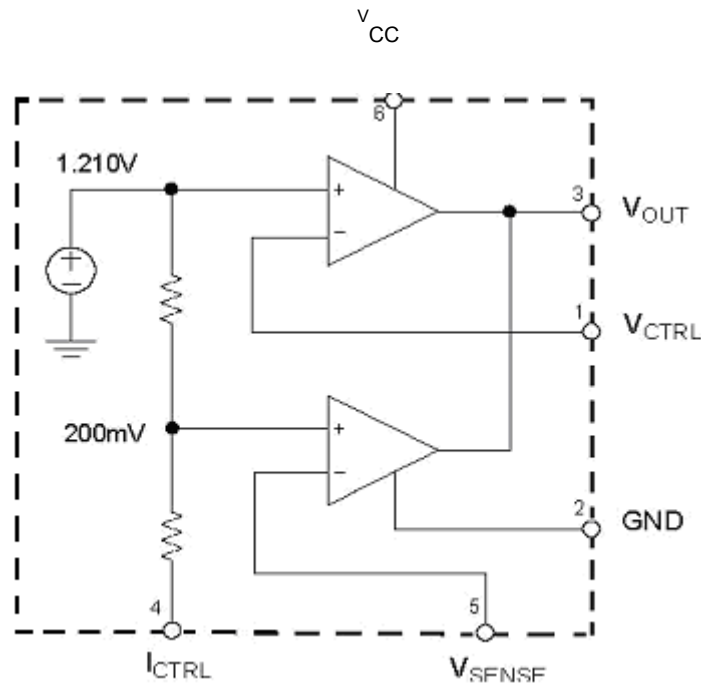
- Adapters
- Battery Chargers

## Pin Configuration

	Pin Number	Pin Name	Function
	1	V_CTRL	Input pin of the voltage control loop
	2	GND	Ground
	3	V_OUT	Output pin. Sinking current only
	4	I_CTRL	Input pin of the current control loop
	5	V_SENSE	Input pin of the current control loop
	6	V_CC	Power supply



### Functional Block Diagram



### Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Power Supply Voltage	V <sub>CC</sub>	20	V
Input Voltage	V <sub>IN</sub>	-0.3 to V <sub>CC</sub>	V
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-65 to 150	°C
Package Thermal Resistance (Junction to Case)	R <sub>θJC</sub>	92	°C/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 <sub>CC</sub>	2.5	18	V
Operating Temperature Range	T <sub>A</sub>	-40	105	°C



### Electrical Characteristics

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

Parameter	Symbol	Conditions	Min	Type	Max	Unit	
<b>TOTAL CURRENT CONSUMPTION</b>							
Total Supply Current Not Including the Output Sinking Current	I <sub>CC</sub>	TA=25°C		0.9	1.3	mA	
		-40°C < TA < 105°C		1.0			
<b>VOLTAGE CONTROL LOOP</b>							
Transconductance Gain (V <sub>CTRL</sub> ). Sink Current Only	G <sub>mv</sub>	TA=25°C	1	3.5		mA/mV	
		-40°C < TA < 105°C		2.5			
Voltage Control Loop Reference	V <sub>REF</sub>	TA=25°C	B Rank	1.200		1.204	V
			A Rank	1.205	1.21	1.215	
			C Rank	1.216		1.220	
		-40°C < TA < 105°C	1.186		1.234		
Input Bias Current (V <sub>CTRL</sub> )	I <sub>IBV</sub>	TA=25°C		50		nA	
		-40°C < TA < 105°C		100			
<b>CURRENT CONTROL LOOP</b>							
Transconductance Gain (I <sub>CTRL</sub> ). Sink Current Only	G <sub>mi</sub>	TA=25°C	1.5	7		mA/mV	
Current Control Loop Reference	V <sub>SENSE</sub>	I <sub>OUT</sub> =2.5mA, TA=25°C	194	198	203	mV	
		I <sub>OUT</sub> =2.5mA, -40°C < TA < 105°C	192		208		
Current Out of Pin I <sub>CTRL</sub> at 200mV	I <sub>BI</sub>	TA=25°C		25		μA	
		-40°C < TA < 105°C		50			
<b>OUTPUT STAGE</b>							
Low Output Voltage at 10mA Sinking Current	V <sub>OL</sub>	TA=25°C		200		mV	
Output Short Circuit Current. Output to V <sub>CC</sub> , Sink Current Only	I <sub>OS</sub>	TA=25°C		27	50	mA	
		-40°C < TA < 105°C		35			



### Typical Performance Characteristics

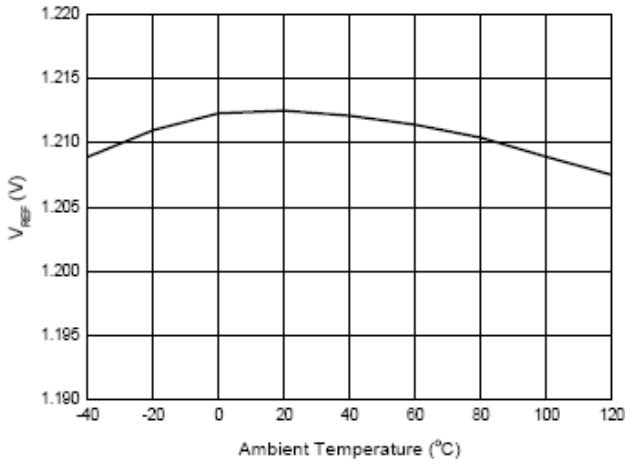


Figure 1. Vref VS. Ambient Temperature

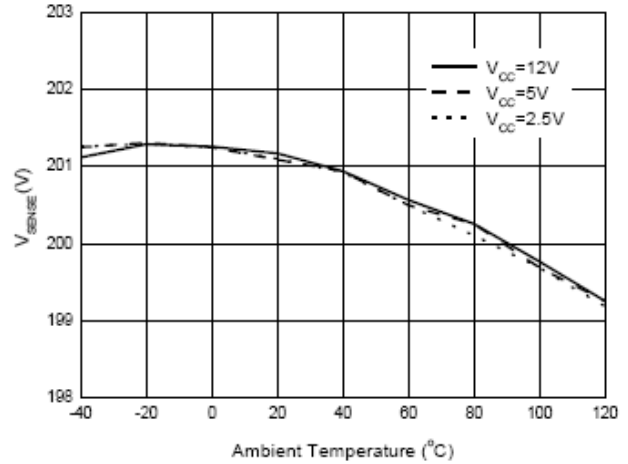


Figure 2. VSENSE VS. Ambient Temperature

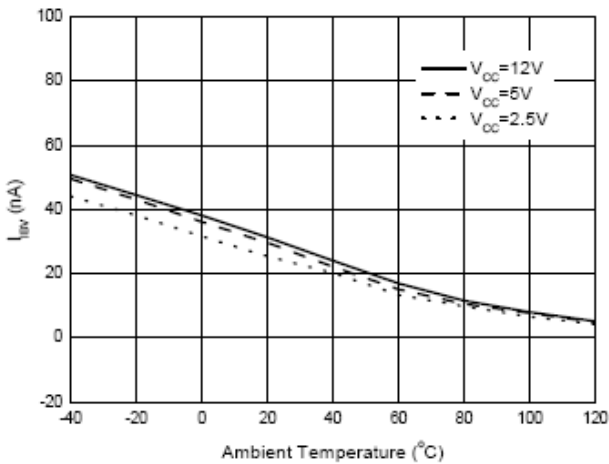


Figure 3. VCTRL Pin Input Bias Current VS. Ambient Temperature

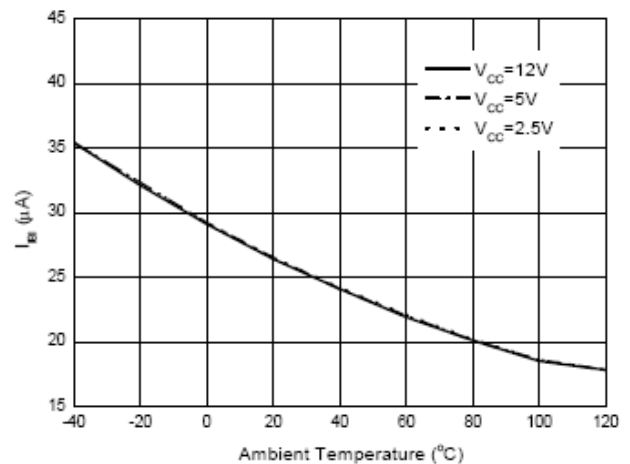


Figure 4. ICTRL Pin Input Bias Current VS. Ambient Temperature

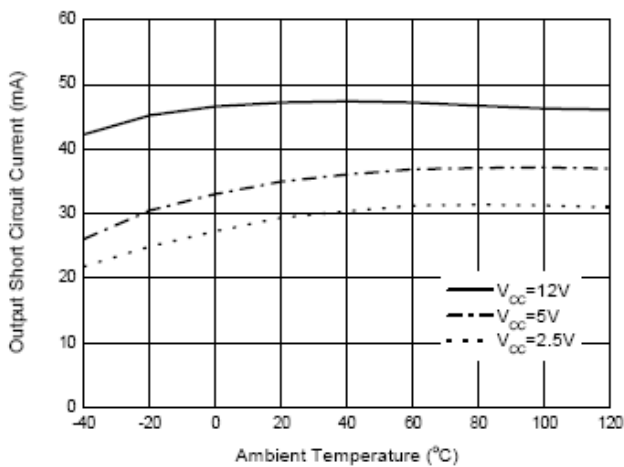


Figure 5. Output Short Circuit Current VS. Ambient Temperature

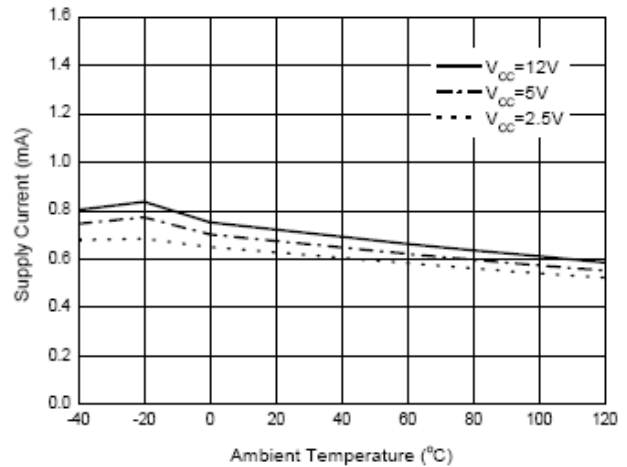
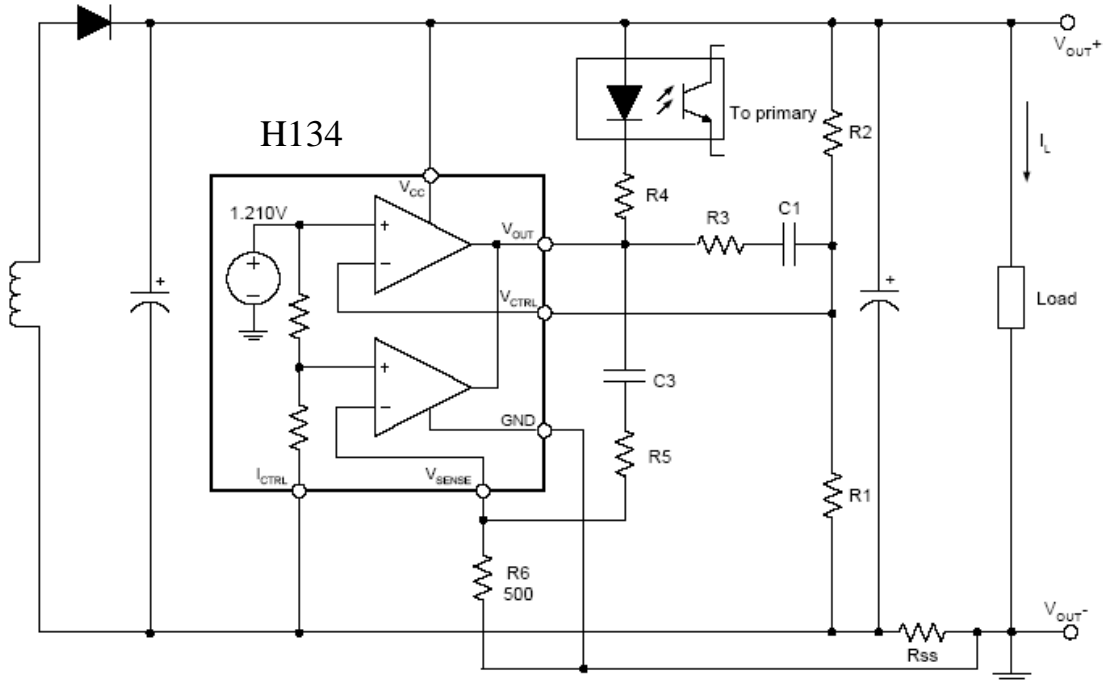


Figure 6. Supply Current VS. Ambient Temperature





**Typical Application**



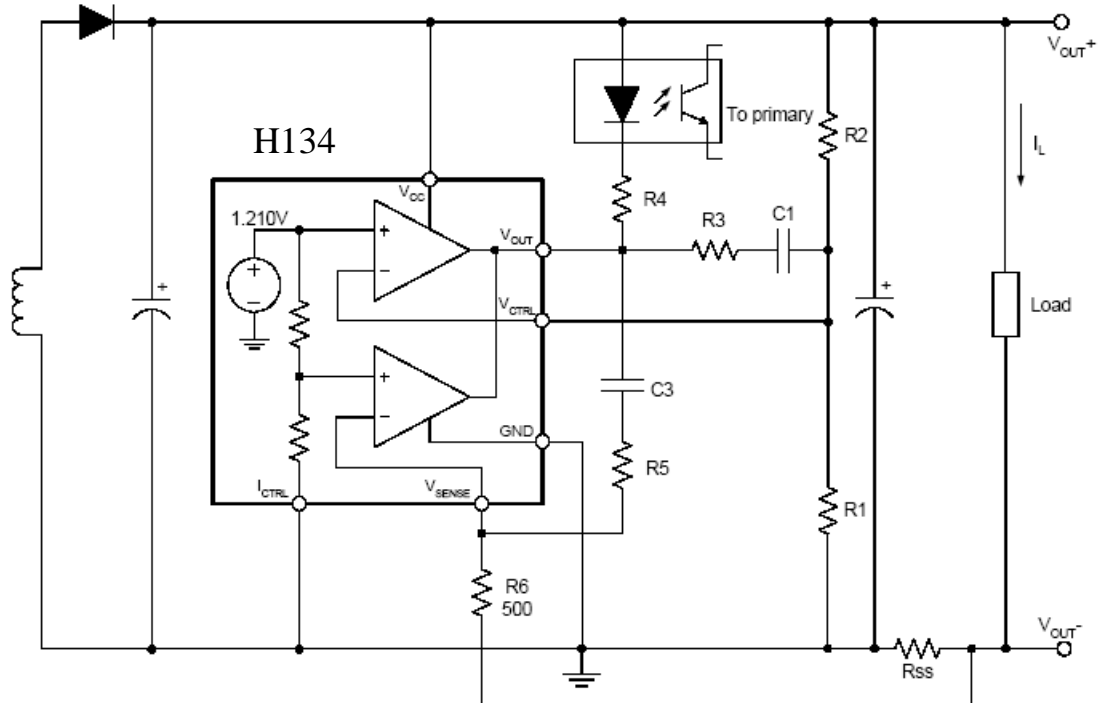
$$V_{OUT} = [V_{REF} + (I_L \times R_{SS})] \times \frac{R1 + R2}{R1} - (I_L \times R_{SS}) \quad (V)$$

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

Figure 8. Typical Application 2 of H134



**Typical Application**



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

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

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:

Pb Free Mark  
Pb-Free : "•"

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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