



## Constant Voltage and Constant Current controller ME4313

### General Description

ME4313 is a highly integrated solution for a constant voltage/constant current mode SMPS application.

The ME4313 contains one 1.21V voltage reference with  $\pm 1\%$  accuracy, one current sensing circuit and two operational amplifiers. Combining the voltage reference with one operational amplifier makes ME4313 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.

### Typical Application

- Adapters
- Battery Chargers

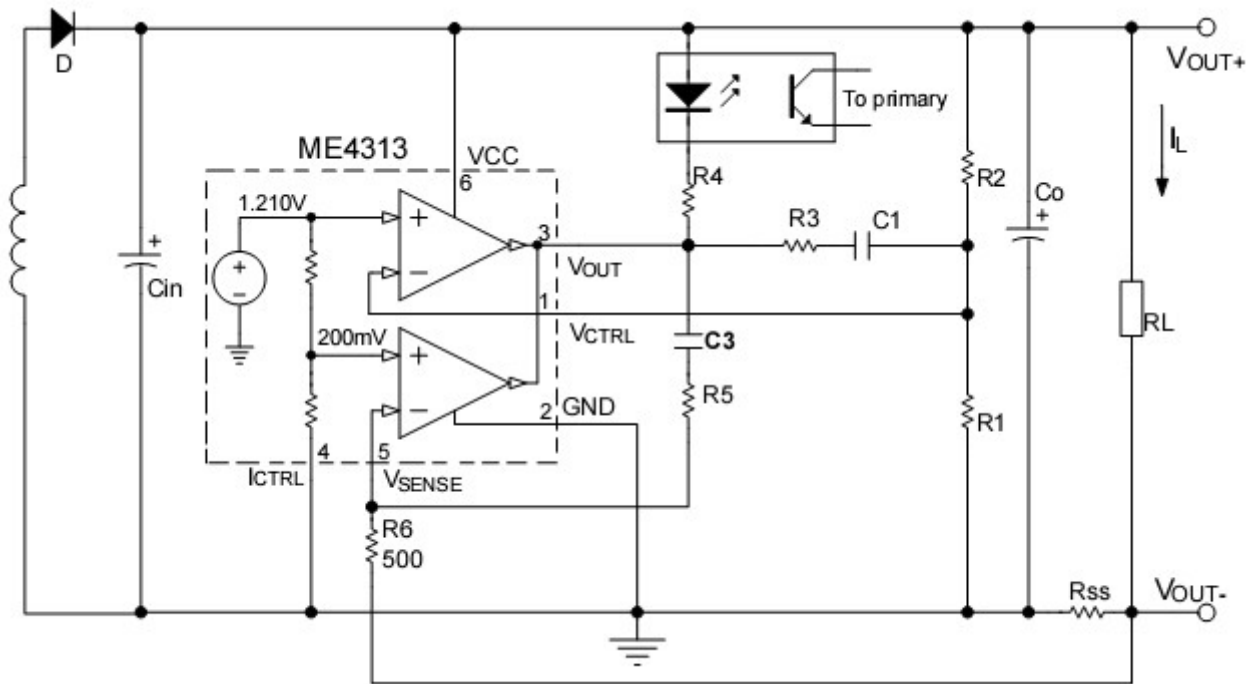
### Features

- Constant Voltage and Constant Current Control
- Precision Internal Voltage Reference
- Few External Components
- Easy Compensation
- Low supply current: 0.5mA
- Current Control Loop Reference
  - ME4313B: 200mV
  - ME4313C : 70mV
- Operating temperature range:-40 ~ 85°C
- Operating Supply Voltage:2.5V ~ 18V

### Package

- 6-pin SOT23-6

Typical Application Circuit

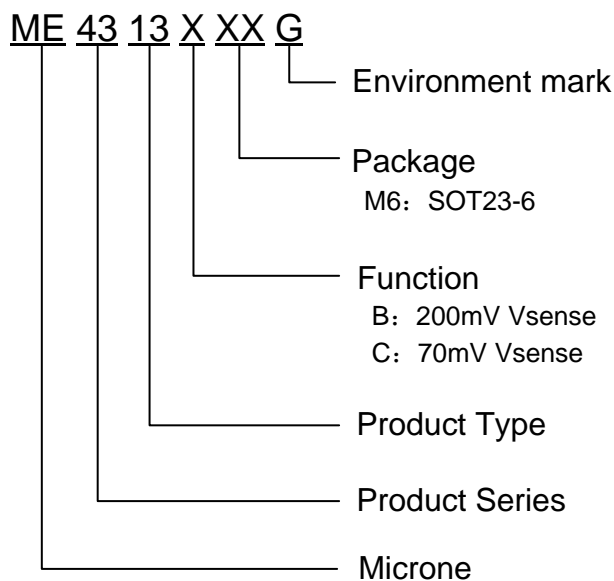


$$V_{OUT} = V_{REF} \times \frac{R1+R2}{R1} - (I_L \times R_{ss}) \text{ (V)}$$

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

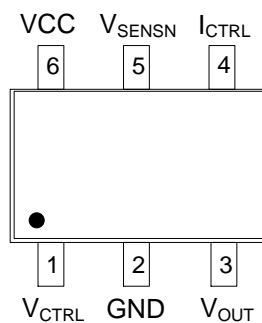
Fig.1

## Selection Guide



product series	product description
ME4313BM6G	$V_{SENSE} = 200\text{mV}$ ; $1.198 \leq V_{REF} \leq 1.222\text{V}$ ; Package: SOT23-6
ME4313CM6G-1	$V_{SENSE} = 70\text{mV}$ ; $1.198 \leq V_{REF} \leq 1.21\text{V}$ ; Package: SOT23-6
ME4313CM6G-2	$V_{SENSE} = 70\text{mV}$ ; $1.21 \leq V_{REF} \leq 1.222\text{V}$ ; Package: SOT23-6

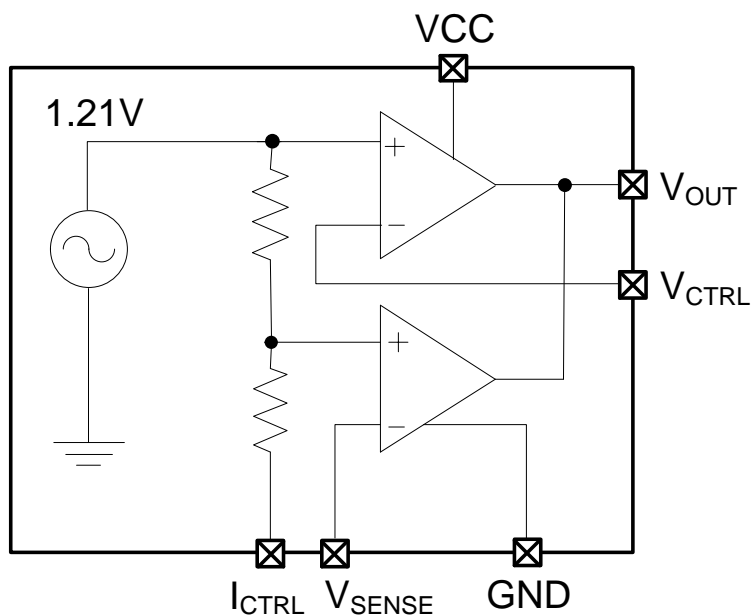
## Pin Configuration



## Pin Assignments

Pin Num.	Symbol	Description
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	VCC	Power supply

## Block Diagram



## Absolute Maximum Ratings

Parameter	Range	Unit
Power Supply Voltage VCC	20	V
Input Voltage V <sub>IN</sub>	-0.3 ~ V <sub>CC</sub>	V
Operating Ambient Temperature Range T <sub>A</sub>	-40 ~ +85	°C
Junction Temperature T <sub>J</sub>	-40 ~ +150	°C
Storage Temperature T <sub>STG</sub>	-55 ~ +150	°C
Lead Temperature (Soldering, 5sec) T <sub>LEAD</sub>	260	°C
Thermal resistance (Junction to air) θ <sub>JA</sub>	200	°C/W
Internal Power Dissipation Pd	0.63	W

Caution: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage.

These values must therefore not be exceeded under any conditions.

## Recommended Operating Condition

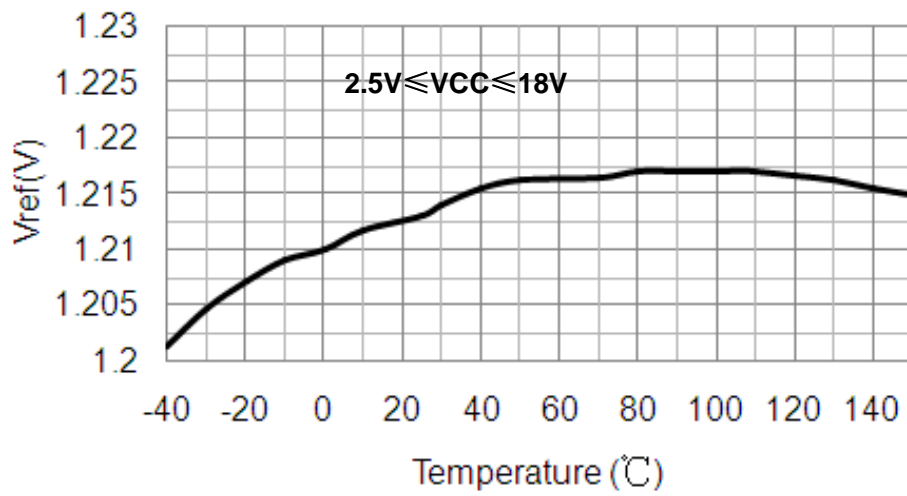
Parameter	Range	Unit
Power Supply Voltage VCC	2.5 ~ 18	V
Operating Ambient Temperature Range T <sub>A</sub>	-40 ~ 85	°C

## Electrical Characteristics (T<sub>A</sub> = 25°C, VCC=5V, if not otherwise noted)

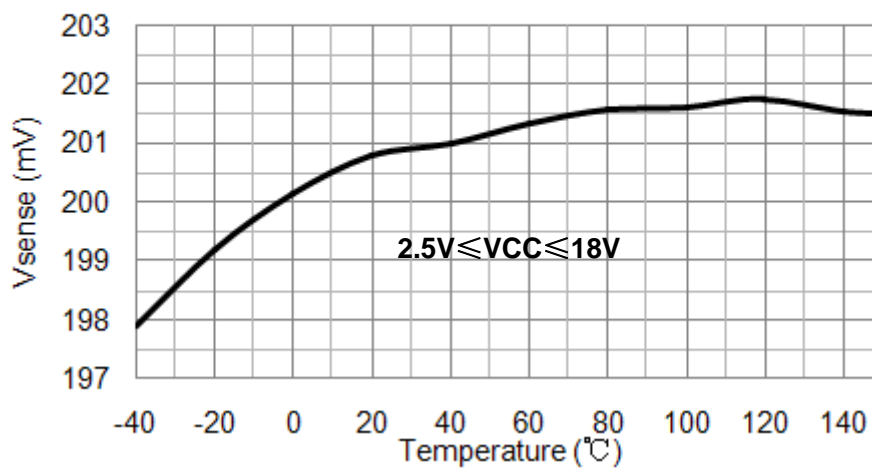
Symbol	Parameter	Test Conditions	Min	Typ.	Max	Unit	
<b>Total Current Consumption</b>							
I <sub>CC</sub>	Total Supply Current Not Including the Output Sinking Current		-	0.6	1.2	mA	
<b>Voltage Control Loop</b>							
G <sub>mv</sub>	Transconduction Gain (V <sub>CTRL</sub> ). Sink Current Only		1	3.5	-	mA/mV	
V <sub>REF</sub>	Voltage Control Loop Reference	ME4313BM6G	1.198	1.21	1.222	V	
		ME4313CM6G-1	1.198	-	1.21	V	
		ME4313CM6G-2	1.21	-	1.222	V	
I <sub>IBV</sub>	Input Bias Current (V <sub>CTRL</sub> )		-	50	-	nA	
<b>Current Control Loop</b>							
G <sub>mi</sub>	Transconduction Gain (I <sub>CTRL</sub> )		1.5	7	-	mA/mV	
V <sub>SENSE</sub>	Current Control Loop Reference	I <sub>OUT</sub> =2.5mA	B Version	196	200	204	mV
			C Version	66.5	70	73.5	mV
I <sub>IBI</sub>	Current Out of Pin ICTRL at Vsense	B Version		-	25	-	μA
		C Version			18		μA
<b>Output Stage</b>							
V <sub>OL</sub>	Low Output Voltage at 10Ma Sinking Current		-	200	-	mV	
I <sub>OS</sub>	Output Short Circuit Current. Output to VCC.Sink Current Only		-	27	60	mA	

Type Characteristics

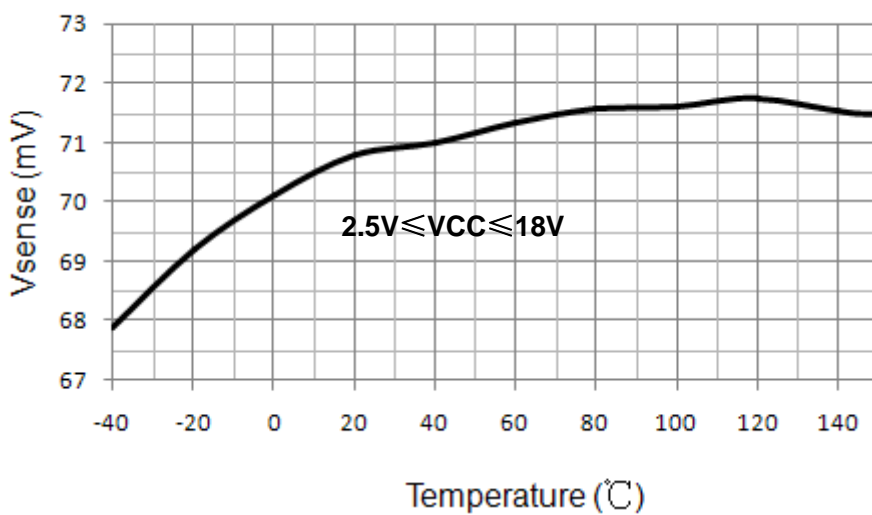
Vref vs. Temperature



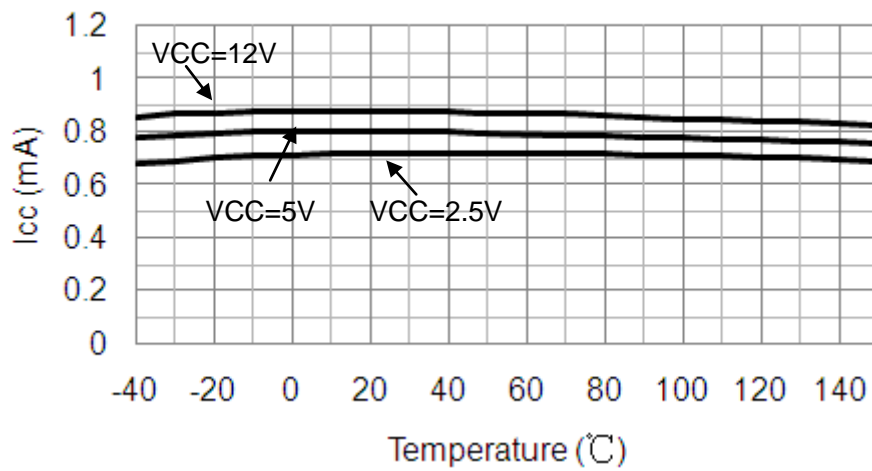
Vsense vs. Temperature



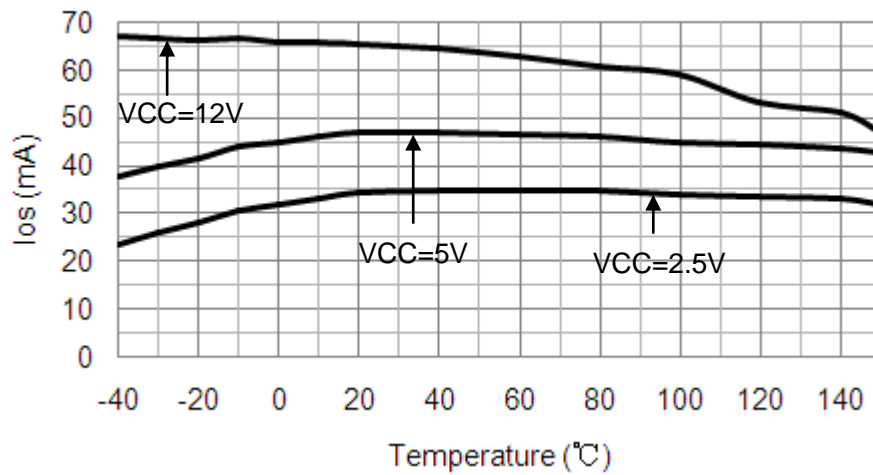
Vsense vs. Temperature



### I<sub>cc</sub> vs. Temperature

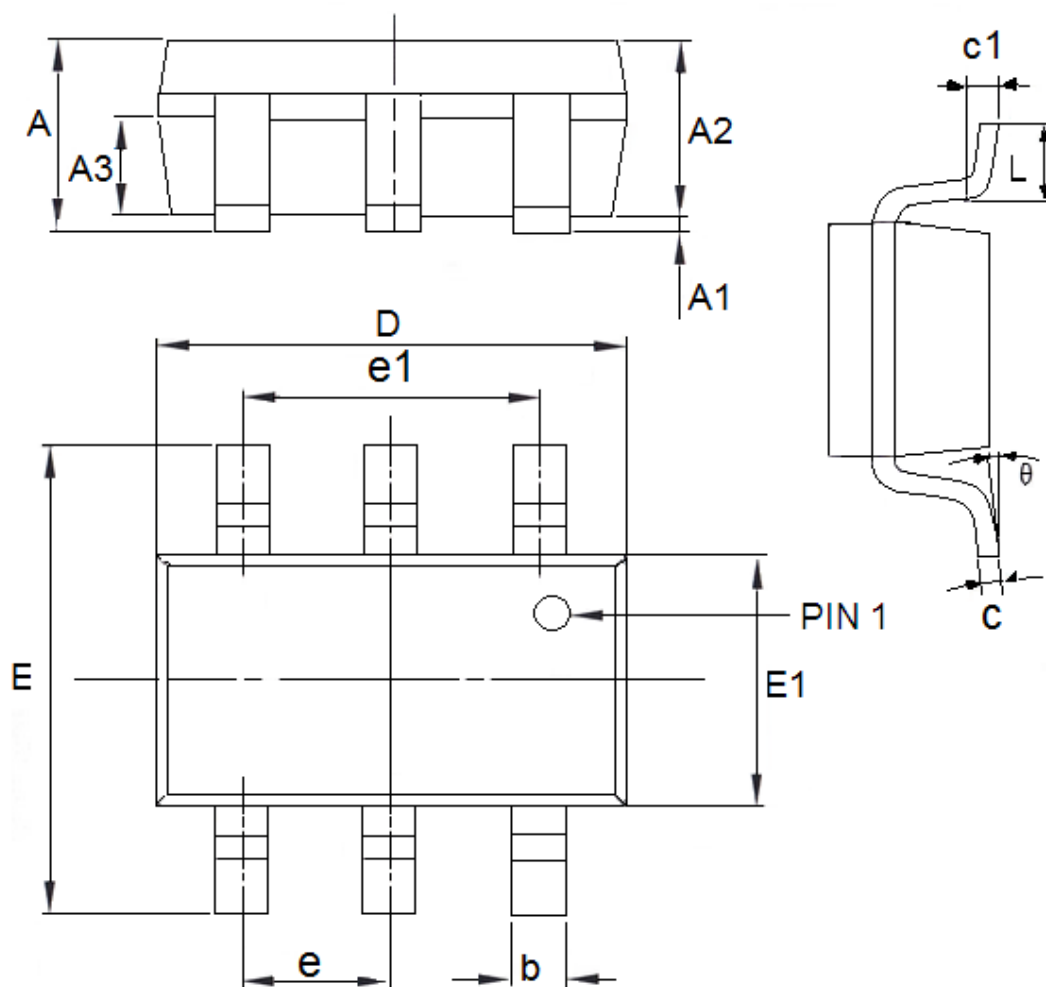


### Output short circuit current $I_{os}$ vs. Temperature



## Packaging Information

- Package Type:SOT23-6



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.05	1.45	0.0413	0.0571
A1	0	0.15	0.0000	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.55	0.75	0.0217	0.0295
b	0.25	0.5	0.0098	0.0197
c	0.1	0.25	0.0039	0.0098
D	2.7	3.12	0.1063	0.1228
e1	1.9(TYP)		0.0748(TYP)	
E	2.6	3.1	0.1024	0.1220
E1	1.4	1.8	0.0551	0.0709
e	0.95(TYP)		0.0374(TYP)	
L	0.25	0.6	0.0098	0.0236
theta	0	8°	0.0000	8°
c1	0.2(TYP)		0.0079(TYP)	



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