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 ±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.

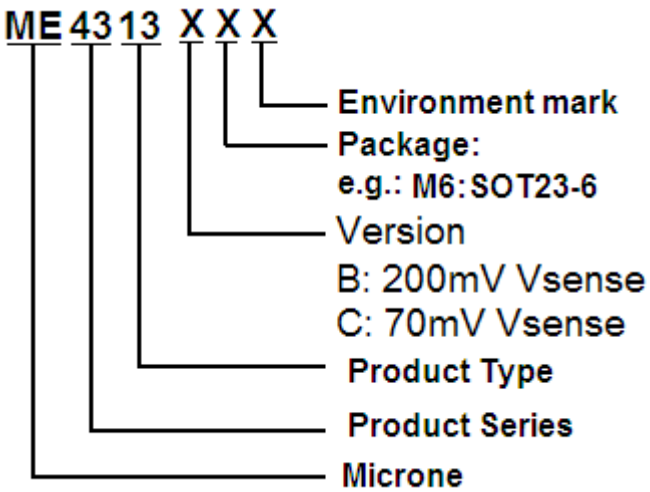
Features

- ●Constant Voltage and Constant Current Control
- ●Precision Internal Voltage Reference
- ●Few External Components
- ●Easy Compensation
- ●Low supply current: 0.5mA
- ●Current Control Loop Reference

  B Version : 200mV

  C Version : 70mV
- ●Operating temperature range:-40 to 125℃
- ●Operating Supply Voltage:2.5V to 18V
- ● Available in SOT23-6 package

Selection Guide

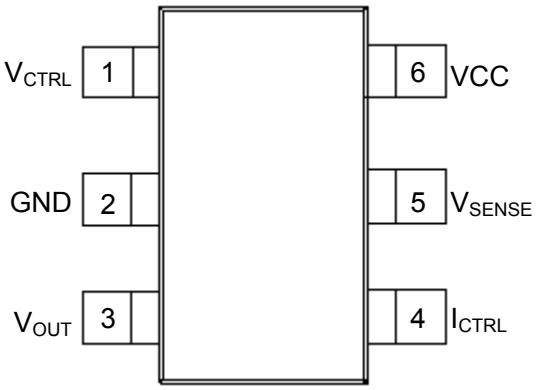


Typical Application

- Adapters
- Battery Chargers

Pin Configuration

The ME4313 is offered in SOT23-6 packages shown as below.



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

Absolute Maximum Ratings

Parameter	Range	Unit
Power Supply Voltage VCC	20	V
Input Voltage V_{IN}	-0.3 to V_{CC}	V
Junction Temperature T_J	150	°C
Storage Temperature T_{STG}	-65 to 150	°C
Lead Temperature (Soldering, 5sec) T_{LEAD}	260	°C
Package Thermal Resistance (Junction to Case) θ_{JC}	92	°C/W

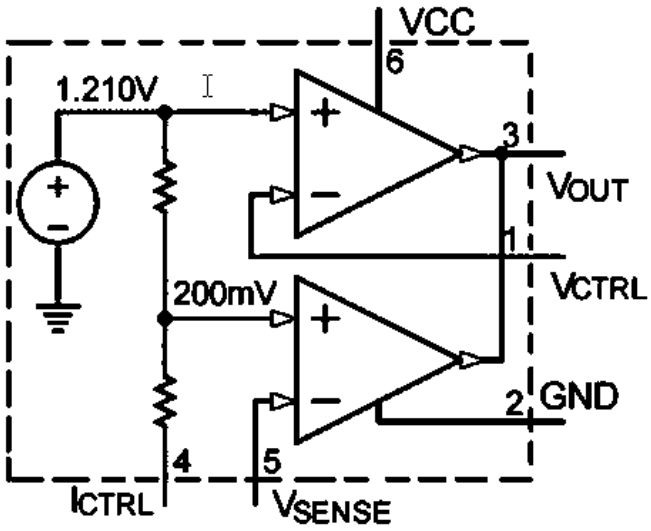
Caution: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage.

These values must therefore not be exceeded under any conditions.

Recommended Operating Condition

Parameter	Range	Unit
Power Supply Voltage VCC	2.5 to 18	V
Operating Temperature Range T_A	-40 to 125	°C

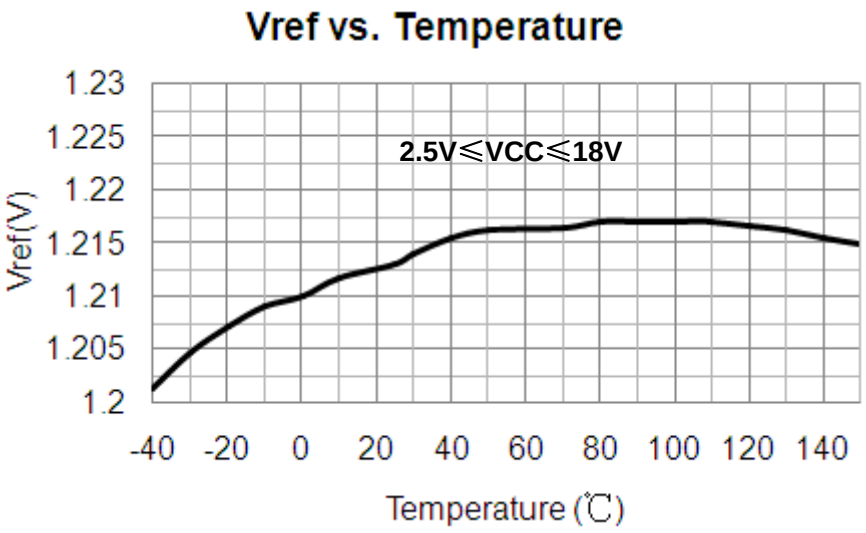
Block Diagram

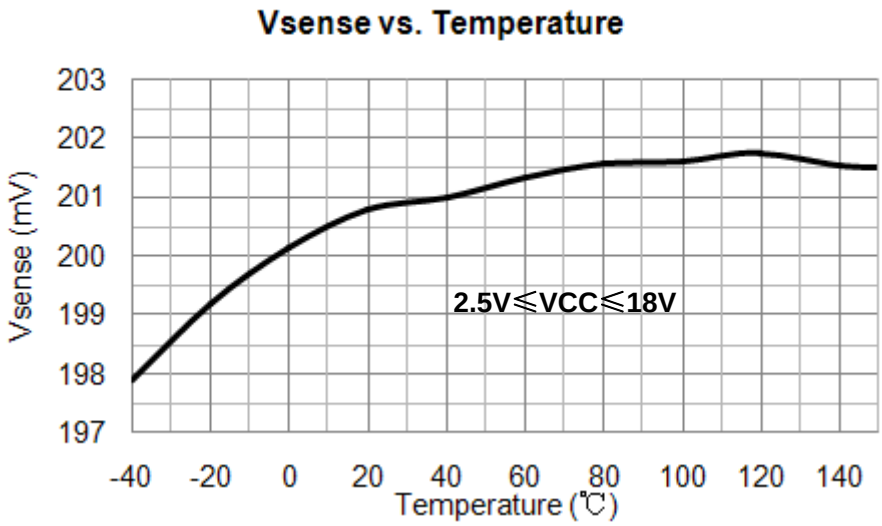


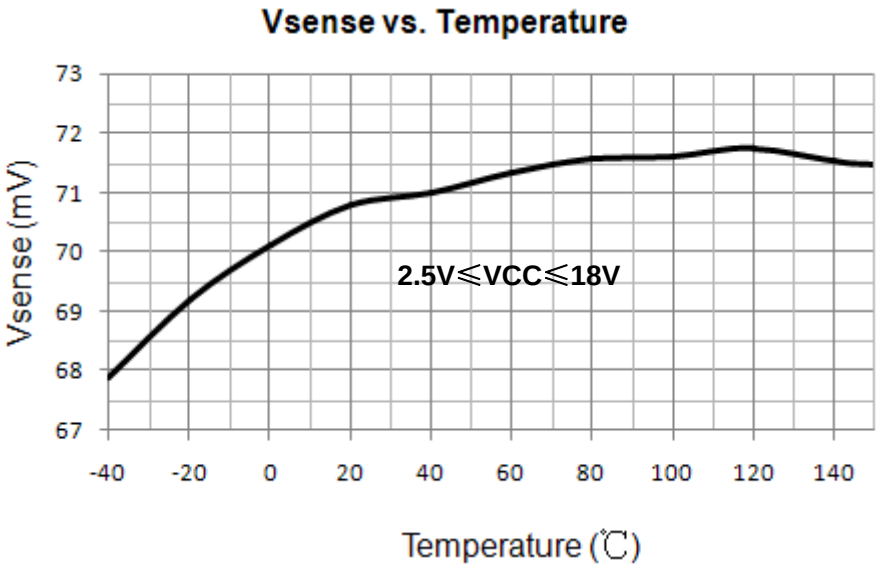
Electrical Characteristics(T_A = 25°C,VCC=5V, if not otherwise noted)

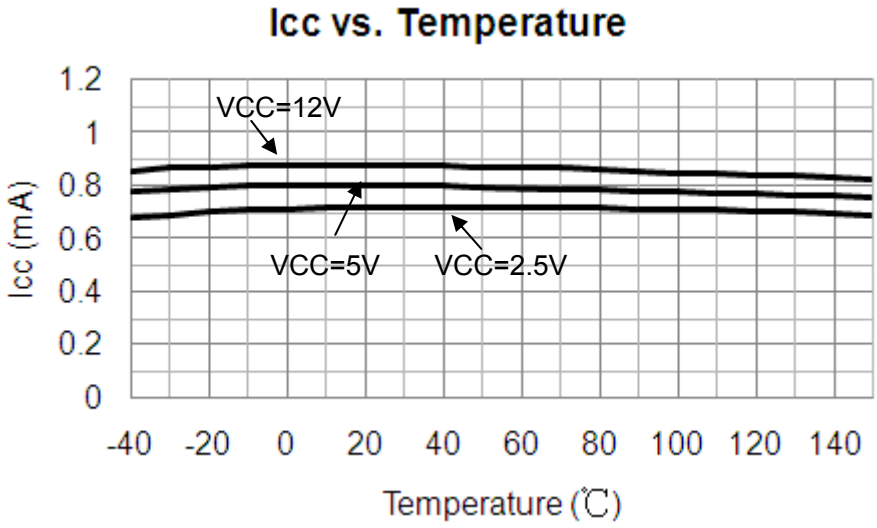
Symbol	Parameter	Test Conditions		Min	Typ.	Max	Unit
Total Current Consumption							
I_{CC}	Total Supply Current Not Including the Output Sinking Current			-	0.6	1.2	mA
Voltage Control Loop							
Gmv	Transconduction Gain (V_{CTRL}). Sink Current Only			1	3.5	-	mA/mV
V_{REF}	Voltage Control Loop Reference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

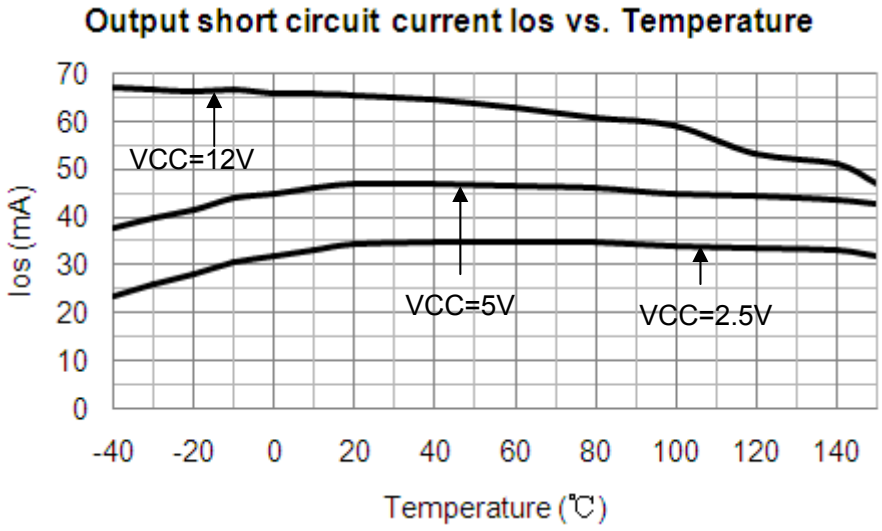
Type Characteristics



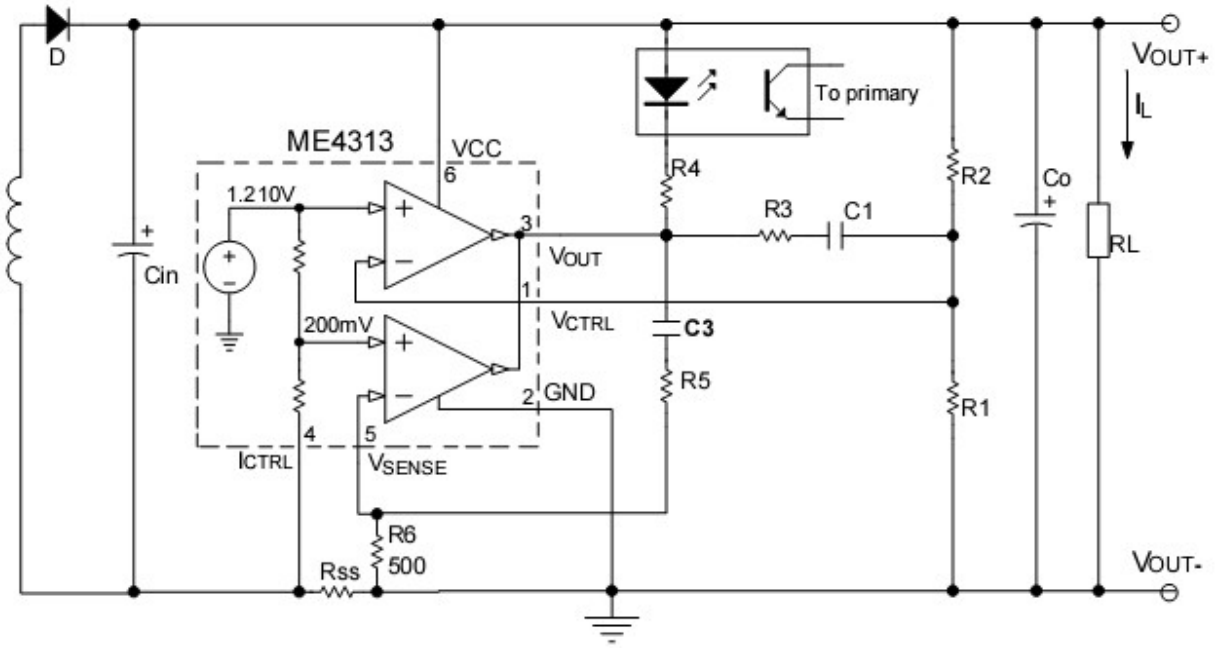





Icc vs. Temperature
1.2
1
0.8
0.6
0.4
0.2
0
Icc (mA)
VCC=12V
VCC=5V
VCC=2.5V
-40 -20 0 20 40 60 80 100 120 140
Temperature (℃)

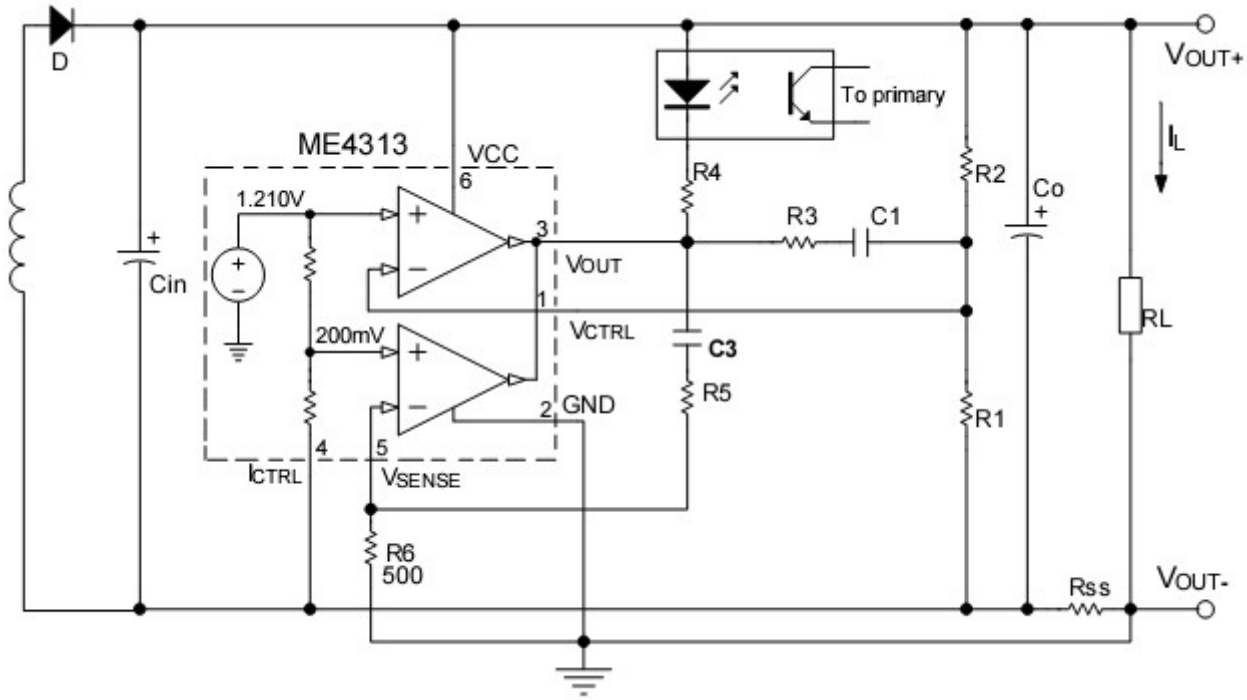

Output short circuit current Ios vs. Temperature
70
60
50
40
30
20
10
0
Ios (mA)
VCC=12V
VCC=5V
VCC=2.5V
-40 -20 0 20 40 60 80 100 120 140
Temperature (℃)

Typical Application Circuit



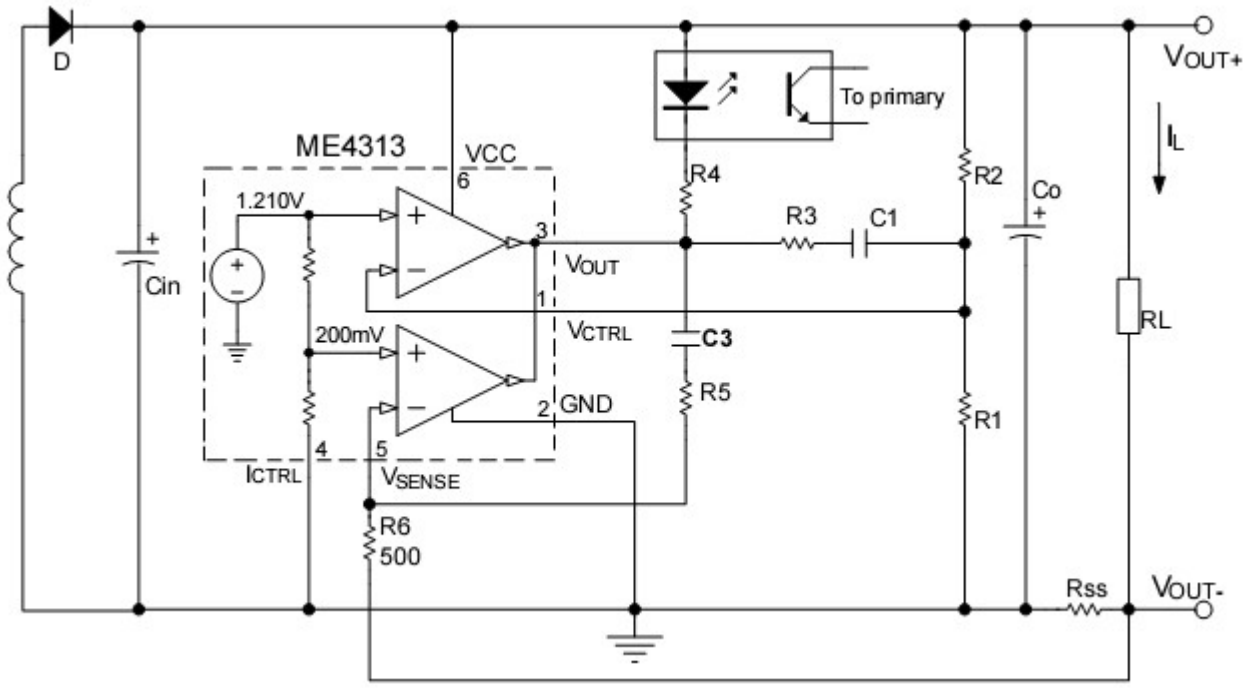
$$V_{OUT} = V_{REF} x \frac{R1+R2}{R1} \ (V) \qquad CurrentLimit = \frac{V_{SENSE}}{Rss} (A)$$

Fig.1 Typical Application 1 of ME4313



$$V_{OUT} = [V_{REF} + (I_L x Rss)] x \frac{R1+R2}{R1} - (I_L x Rss) (V) \qquad CurrentLimit = \frac{V_{SENSE}}{Rss} (A)$$

Fig.2 Typical Application 2 of ME4313

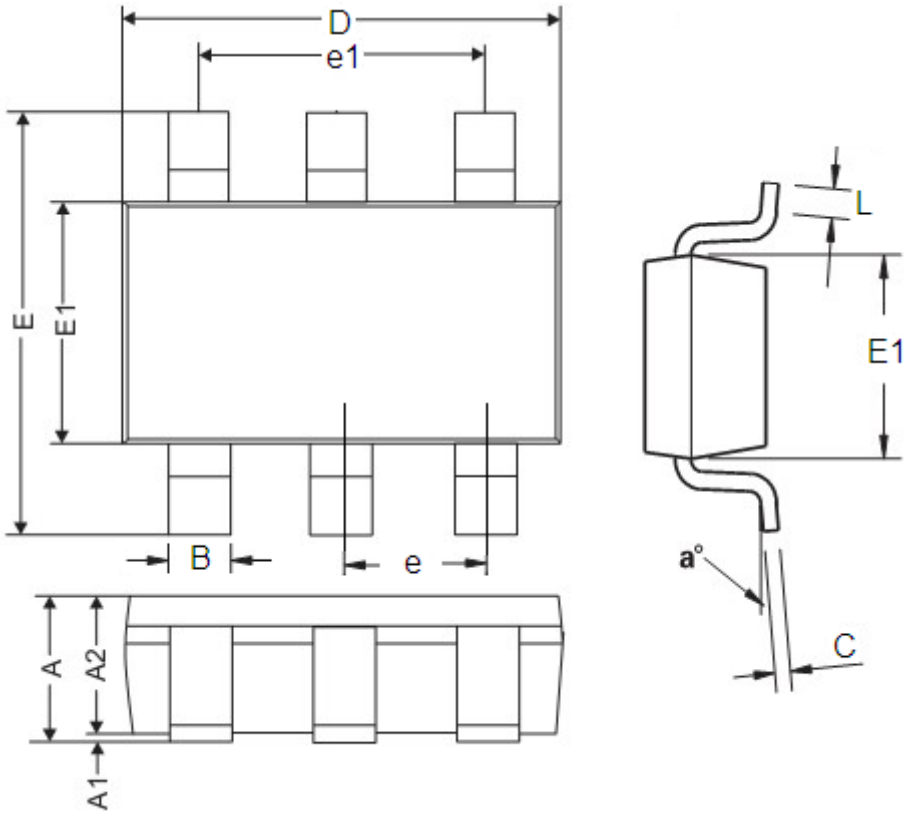


$$V_{OUT} = V_{REF} x \frac{R1+R2}{R1} - (I_L x Rss)\,(V) \qquad CurrentLimit = \frac{V_{SENSE} x V_{REF}}{(V_{SENSE} + V_{REF})Rss}\,(A)$$

Fig.3 Typical Application 3 of ME4313

Packaging Information

Package type:SOT23-6 Unit:mm(inch)



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	0.9	1.45	0.0354	0.0570
A1	0	0.15	0	0.0059
A2	0.9	1.3	0.0354	0.0511
B	0.2	0.5	0.0078	0.0196
C	0.09	0.26	0.0035	0.0102
D	2.7	3.10	0.1062	0.1220
E	2.2	3.2	0.0866	0.1181
E1	1.30	1.80	0.0511	0.0708
e	0.95REF		0.0374REF	
e1	1.90REF		0.0748REF	
L	0.10	0.60	0.0039	0.0236
a^0	0^0	30^0	0^0	30^0

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