

1. DESCRIPTION

The XL4310 is a monolithic IC specifically designed to regulate the output current and voltage levels of switching battery chargers and power supplies.

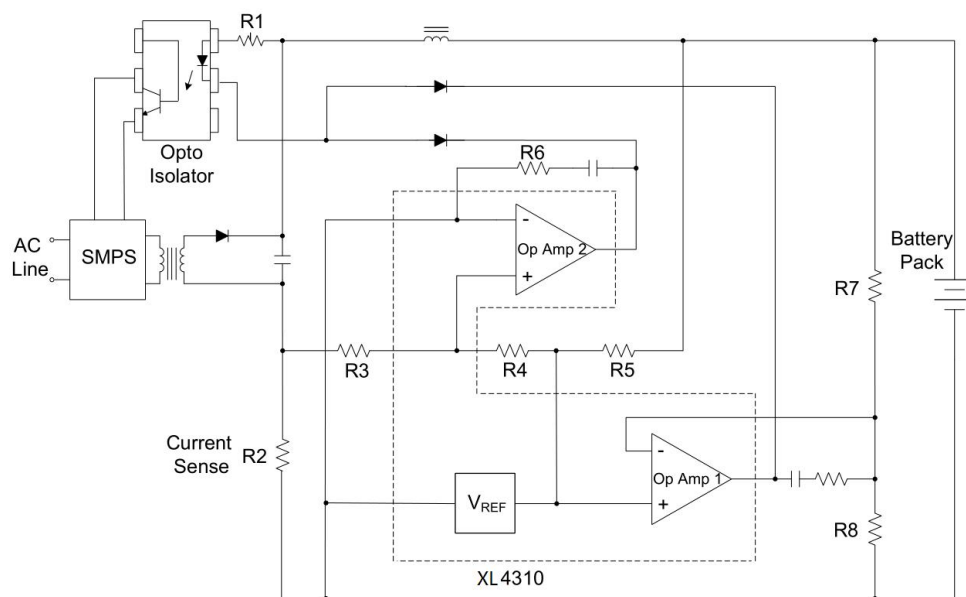
The device contains two Op Amps and a 2.5V precision shunt voltage reference. Op Amp 1 is designed for voltage control with its non-inverting input internally connected to the output of the shunt regulator. Op Amp 2 is for current control with both inputs uncommitted. The IC offers the power converter designer a control solution that features increased precision with a corresponding reduction in system complexity and cost.

2. FEATURES

- Input Offset Voltage: 0.5mV
- Supply Current: 75 μ A per OP Amp at 5.0V Supply Voltage
- Unity Gain Bandwidth:1MHz
- Output Voltage Swing: 0 to V_{CC} -1.5V
- Power Supply Range: 3 to 36V

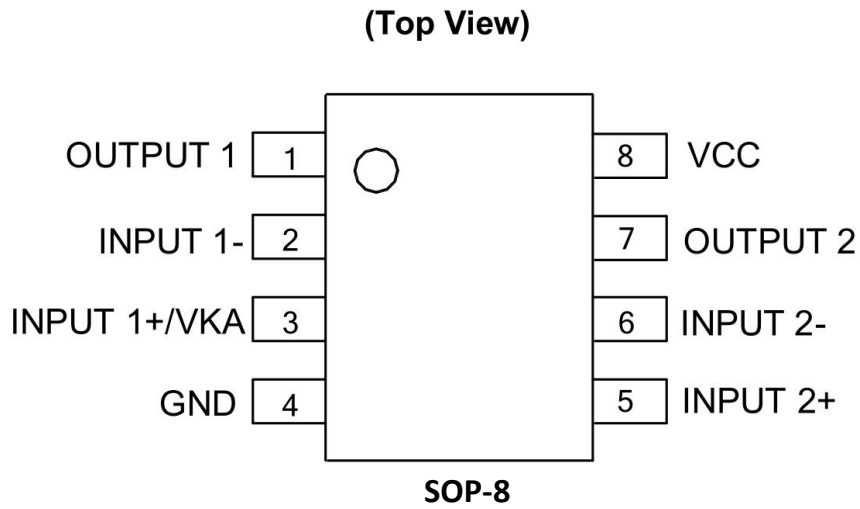
3. TYPICAL APPLICATION AND TYPICAL APPLICATIONS CIRCUIT

- Battery Charger
- Switching Power Supply

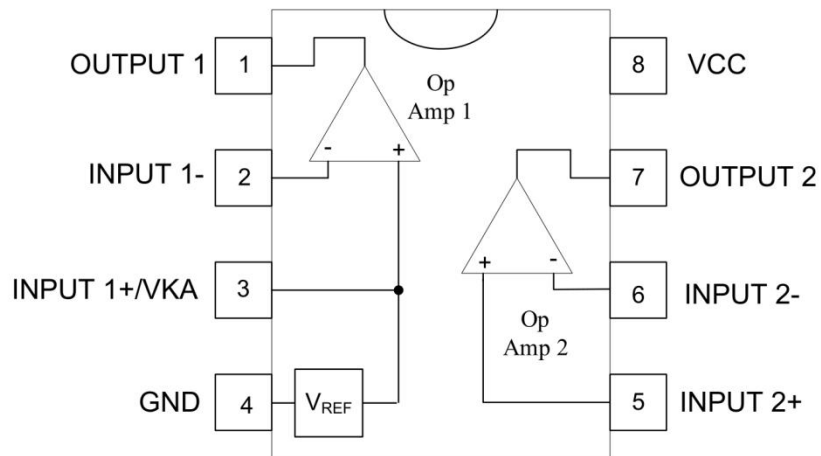


Application of XL4310 in a Constant Current and Constant Voltage Charger

4. PIN CONFIGURATIONS AND FUNCTIONS



5. BLOCK DIAGRAM



6. ABSOLUTE MAXIMUM RATINGS (Note 4)

Symbol	Parameter	Rating	Unit
V _{CC}	Power Supply Voltage (VCC to GND)	40	V
V _{IN}	Op Amp1 and 2 Input Voltage Range (Pins 2, 5, 6)	-0.3 to V _{CC} +0.3	V
V _{ID}	Op Amp 2 Input Differential Voltage (Pins 5, 6)	40	V
I _K	Voltage Reference Cathode Current (Pin 3)	100	mA
P _D	Power Dissipation (T _A = +25°C)	500	mW
T _J	Operating Junction Temperature	+150	°C
T _{STG}	Storage Temperature Range	-65 to +150	°C
T _{LEAD}	Lead Temperature (Soldering 10sec)	+260	°C
ESD	ESD (Human Body Model)	≥2000	V

Note 4: 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.

7. RECOMMENDED OPERATING CONDITIONS

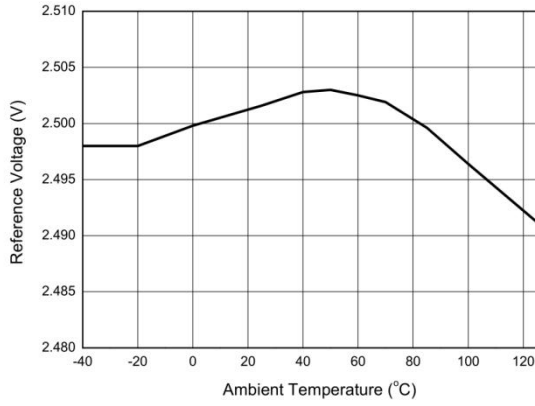
Parameter	Min	Max	Unit
Supply Voltage	3	36	V
Ambient Temperature	-40	+105	°C

8. ELECTRICAL CHARACTERISTICS (@V_{CC}=5V, T_A=+25 °C , unless otherwise specified.)

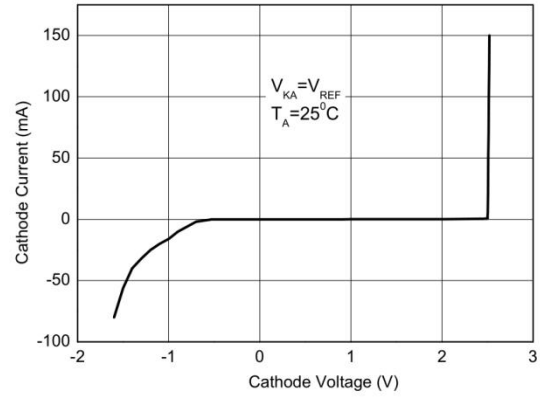
Parameters	Conditions	Min	Typ	Max	Unit	
Total Supply Current, excluding Current in Voltage Reference	V _{CC} =5V, no load, -40°C ≤ T _A ≤ +105°C	–	0.15	0.25	mA	
	V _{CC} =30V, no load, -40°C ≤ T _A ≤ +105°C	–	0.20	0.30		
Voltage Reference Section						
Reference Voltage	I _K =10mA	T _A = +25°C	2.49	2.50	2.51	V
		-40°C ≤ T _A ≤ +105°C	2.48	2.50	2.52	
Reference Voltage Deviation over Full Temperature Range	I _K =10mA, T _A = -40°C to +105°C	–	5	24	mV	
Minimum Cathode Current for Regulation	–	–	0.01	0.05	mA	
Dynamic Impedance	I _K =1mA to 80mA, f<1kHz	–	0.2	0.5	Ω	
Op Amp 1 Section (V_{CC} = 5V, V_O = 1.4V, T_A = +25°C, unless otherwise noted.)						
Input Offset Voltage		T _A = +25°C	–	0.5	3	mV
		T _A = -40°C to +105°C	–	–	5	
Input Offset Voltage Temperature Drift		T _A = -40°C to +105°C	–	7	–	μV/°C
Input Bias Current (Inverting Input Only)		T _A = +25°C	–	20	150	nA
Large Signal Voltage Gain		V _{CC} = 15V, R _L = 2kΩ, V _O = 1.4V to 11.4V	85	100	–	dB
Power Supply Rejection Ratio		V _{CC} = 5V to 30V	70	90	–	dB
Output Current	Source	V _{CC} = 15V, V _{ID} = 1V, V _O = 2V	20	40	–	mA
	Sink	V _{CC} = 15V, V _{ID} = -1V, V _O = 2V	5	20	–	
Output Voltage Swing (High)		V _{CC} = 30V, R _L = 10kΩ, V _{ID} = 1V	27	28	–	V
Output Voltage Swing (Low)		V _{CC} = 30V, R _L = 10kΩ, V _{ID} = -1V	–	17	100	mV
Slew Rate		V _{CC} = 18V, R _L = 2kΩ, A _V = 1, V _{IN} = 0.5V to 2V, C _L = 100pF	0.2	0.5	–	V/μs
Unity Gain Bandwidth		V _{CC} = 30V, R _L = 2kΩ, C _L = 100pF	0.7	1.0	–	MHz
Op Amp 2 Section (V_{CC} = 5V, V_O = 1.4V, T_A = +25°C, unless otherwise noted.)						
Input Offset Voltage		T _A = +25°C	–	0.5	3	mV
		T _A = -40°C to +105°C	–	–	5	
Input Offset Voltage Temperature Drift		T _A = -40°C to +105°C	–	7	–	μV/°C
Input Offset Current		T _A = +25°C	–	2	30	nA
Input Bias Current		T _A = +25°C	–	20	150	nA
Input Voltage Range		V _{CC} = 0 to 36V	0	–	V _{CC} -1.5	V
Common Mode Rejection Ratio		T _A = +25°C, V _{CM} = 0 to 3.5V	70	85	–	dB
Large Signal Voltage Gain		V _{CC} = 15V, R _L = 2kΩ, V _O = 1.4V to 11.4V	85	100	–	dB
Power Supply Rejection Ratio		V _{CC} = 5V to 30V	70	90	–	dB
Output Current	Source	V _{CC} = 15V, V _{ID} = 1V, V _O = 2V	20	40	–	mA
	Sink	V _{CC} = 15V, V _{ID} = -1V, V _O = 2V	5	20	–	
Output Voltage Swing (High)		V _{CC} = 30V, R _L = 10kΩ, V _{ID} = 1V	27	28	–	V
Output Voltage Swing (Low)		V _{CC} = 30V, R _L = 10kΩ, V _{ID} = -1V	–	17	100	mV
Slew Rate		V _{CC} = 18V, R _L = 2kΩ, A _V = 1, V _{IN} = 0.5V to 2V, C _L = 100pF	0.2	0.5	–	V/μs
Unity Gain Bandwidth		V _{CC} = 30V, R _L = 2kΩ, C _L = 100pF	0.7	1.0	–	MHz

9. PERFORMANCE CHARACTERISTICS

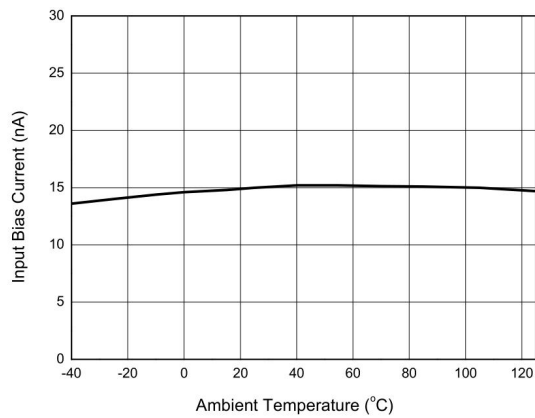
Reference Voltage vs. Ambient Temperature



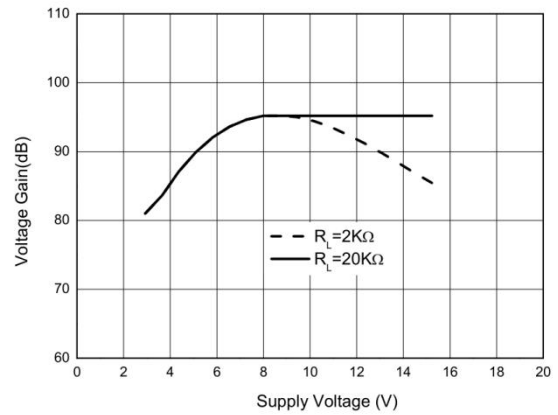
Cathode Current vs. Cathode Voltage



Input Bias Current vs. Ambient Temperature



Op Amp Voltage Gain

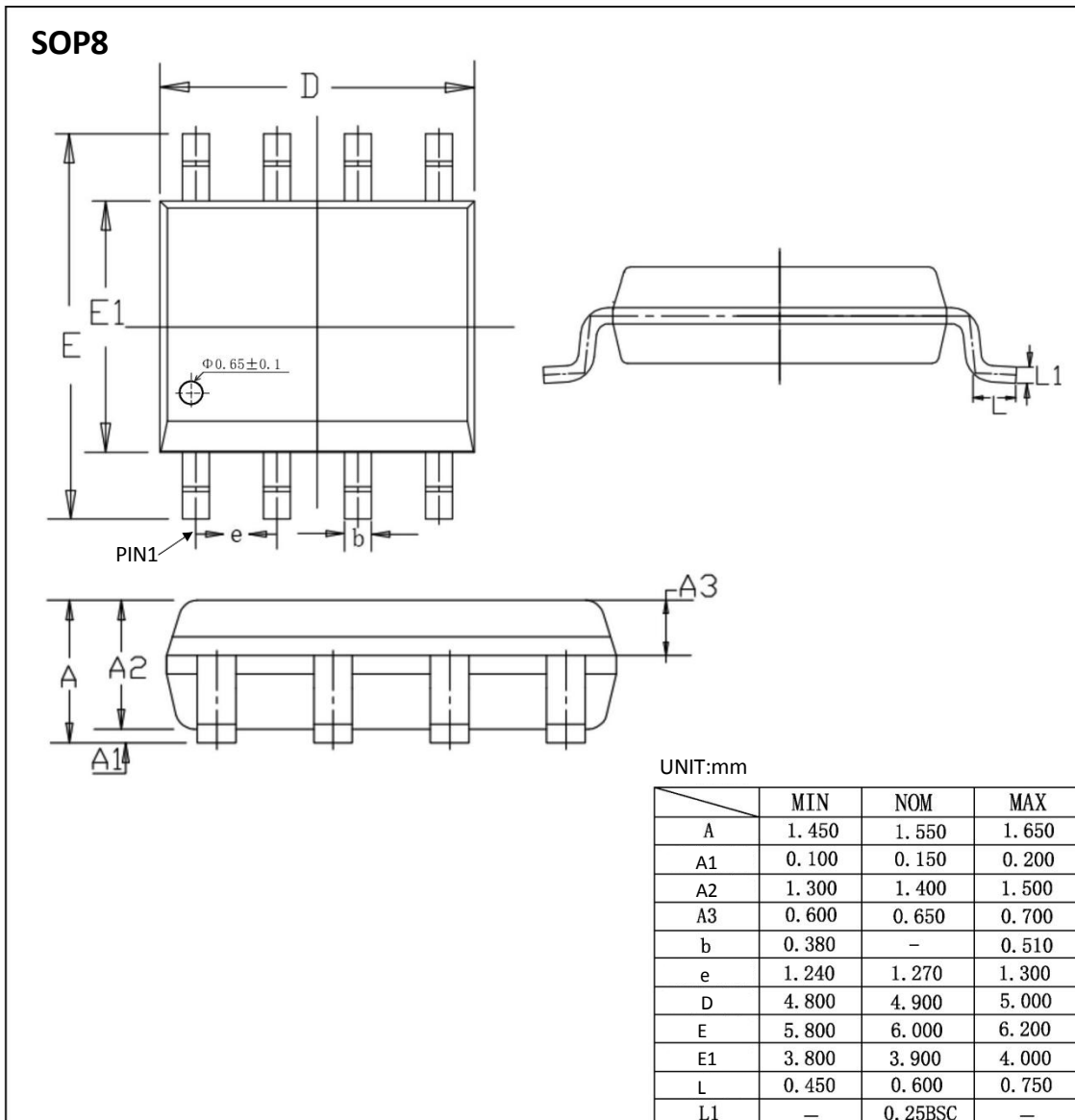


10. ORDERING INFORMATION

Ordering Information

Part Number	Device Marking	Package Type	Body size (mm)	Temperature (°C)	MSL	Transport Media	Package Quantity
XL4310	XL4310	SOP8	4.90 * 3.90	- 40 to 85	MSL3	T&R	2500

11. DIMENSIONAL DRAWINGS



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