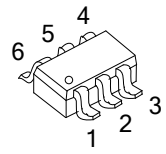
UM610/A

LINEAR INTEGRATED CIRCUIT

CONSTANT VOLTAGE AND CONSTANT CURRENT CONTROLLER



SOT-26

■ DESCRIPTION

The UTC **UM610/A** is a monolithic IC that includes one 2.5V voltage reference and two operational amplifiers.

This device is offering space and cost saving in many applications like power supply management or switching battery chargers.

■ FEATURES

* Constant voltage and constant current control
* Low supply current: 190uA
* Operating power supply range: 3.5V~36V
* Precision internal voltage reference 2.5V
* Low current sense threshold: UM610:48mV, UM610A:30mV
* Easy compensation
* Low external component count

■ ORDERING INFORMATION

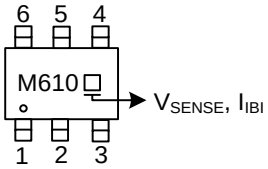
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UM610L-AG6-R	UM610G-AG6-R	SOT-26	Tape Reel
UM610AL-AG6-R	UM610AG-AG6-R	SOT-26	Tape Reel

UM610AG-AG6-R

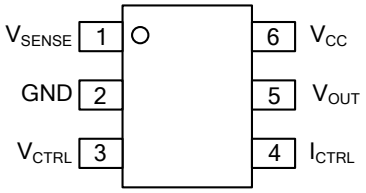
(1)Packing Type
(2)Package Type
(3)Green Package
(4)V_{SENSE}, I_{IBI}

(1) R: Tape Reel
(2) AG6: SOT-26
(3) G: Halogen Free and Lead Free, L: Lead Free
(4) refer to ELECTRICAL CHARACTERISTICS

■ MARKING



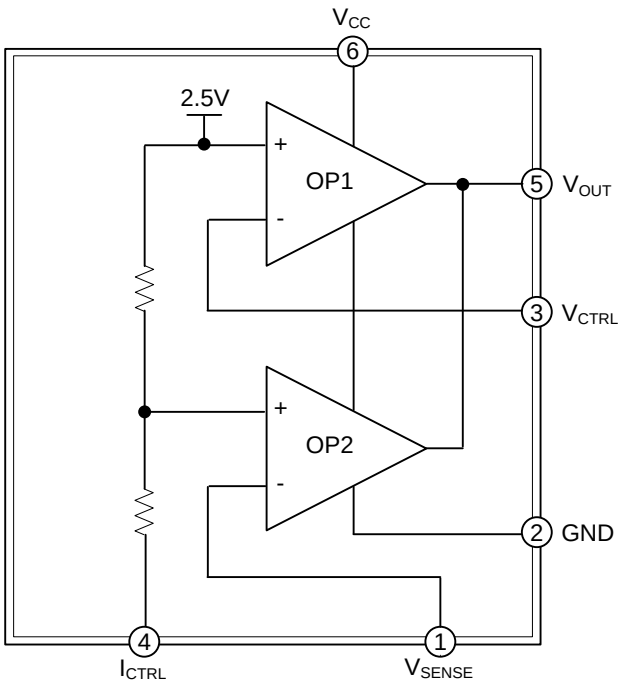
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V_{SENSE}	Input pin of the current control loop
2	GND	Ground
3	V_{CTRL}	Input pin of the voltage control loop
4	I_{CTRL}	Input pin of the current control loop
5	V_{OUT}	Output pin. Sinking current only
6	V_{CC}	Power Supply

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Power Supply Voltage	V_{CC}	-0.3 ~ 38	V
Input Voltage (V_{OUT} Pin)	V_{OUT}	-0.3 ~ V_{CC}	V
Input Voltage (I_{CTRL} Pin)	V_{ICTRL}	-0.3 ~ 18	V
Input Voltage (V_{SENSE} Pin)	V_{SENSE}	-0.3 ~ 18	V
Input Voltage (V_{CTRL} Pin)	V_{VCTRL}	-0.3 ~ 18	V
Junction Temperature	T_J	+150	°C
Storage Temperature	T_{STG}	-55 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	250	°C/W

■ RECOMMENDED OPERATING CONDITIONS

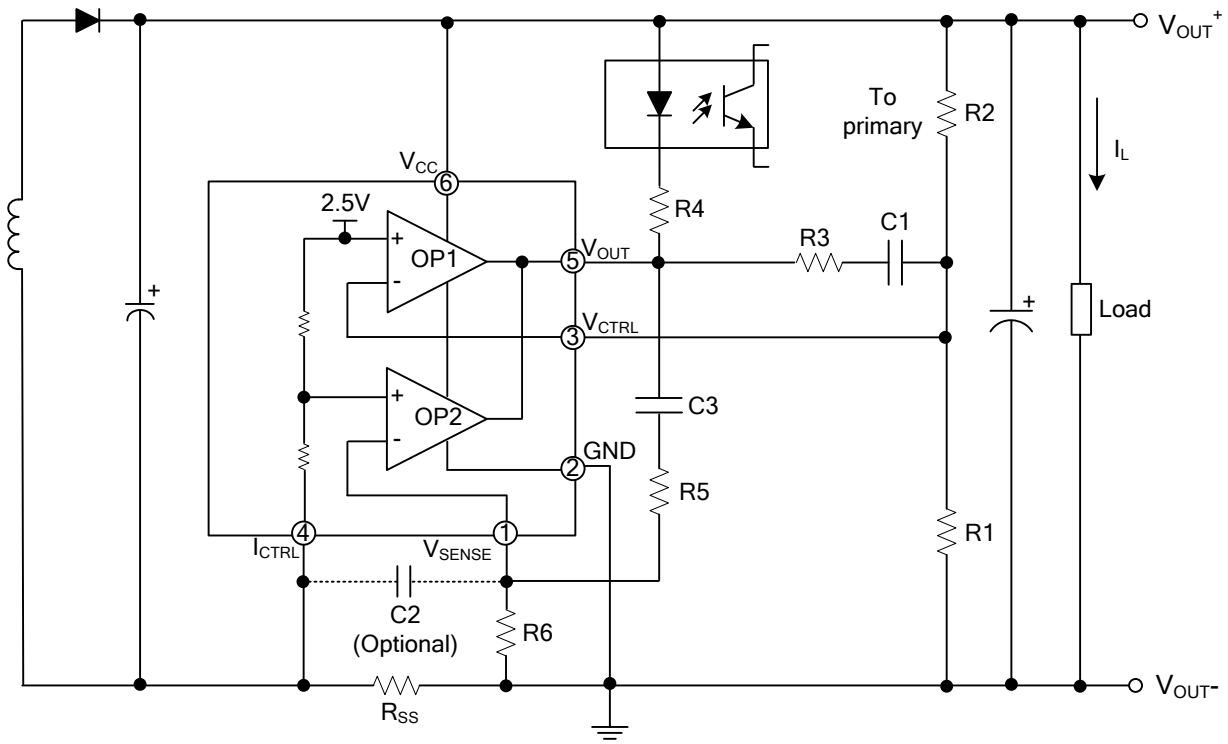
PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Power Supply Voltage	V_{CC}	3.5		36	V

■ ELECTRICAL CHARACTERISTICS

(Operating Conditions: V_{CC}=20V, T_A=25°C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Total Current Consumption						
Total Supply Current Not Including the Output Sinking Current	I_{CC}	V_{ICTRL}=V_{SENSE}=0V, V_{OUT}=Open		190		μA
Voltage Control Loop						
Transconduction Gain (V_{CTRL}). Sink Current Only	Gmv		1.0	3.5		mA/mV
Voltage Control Loop Reference	V_{REF}	T_A=25°C	2.488	2.50	2.512	V
		T_A=-25~+125°C	2.48		2.52	
Input Bias Current（V_{CTRL}）	I_{IBV}			25		nA
Current Control Loop						
Transconduction Gain (I_{CTRL}). Sink Current Only	Gmi		1.5	7		mA/mV
Current Control Loop Reference	V_{SENSE}	UM610A (T_A=25°C)	29	30	31	mV
		UM610A (T_A=-25~+125°C)	28	30	32	mV
		UM610 (T_A=25°C)	46.5	48	49.5	mV
		UM610 (T_A=-25~+125°C)	44	48	52	mV
Current Out of Pin I_{CTRL} at V_{SENSE}	I_{IBI}	UM610A, V_{ICTRL}=-30mV		16		μA
		UM610, V_{ICTRL}=-48mV		16		μA
Output Stage						
Low Output Voltage at 2mA Sinking Current	V_{OL}			30	100	mV
Output Short Circuit Current. Sink Current Only	I_{OS}	V_{OUT}=4V		30		mA

■ TYPICAL APPLICATION CIRCUIT

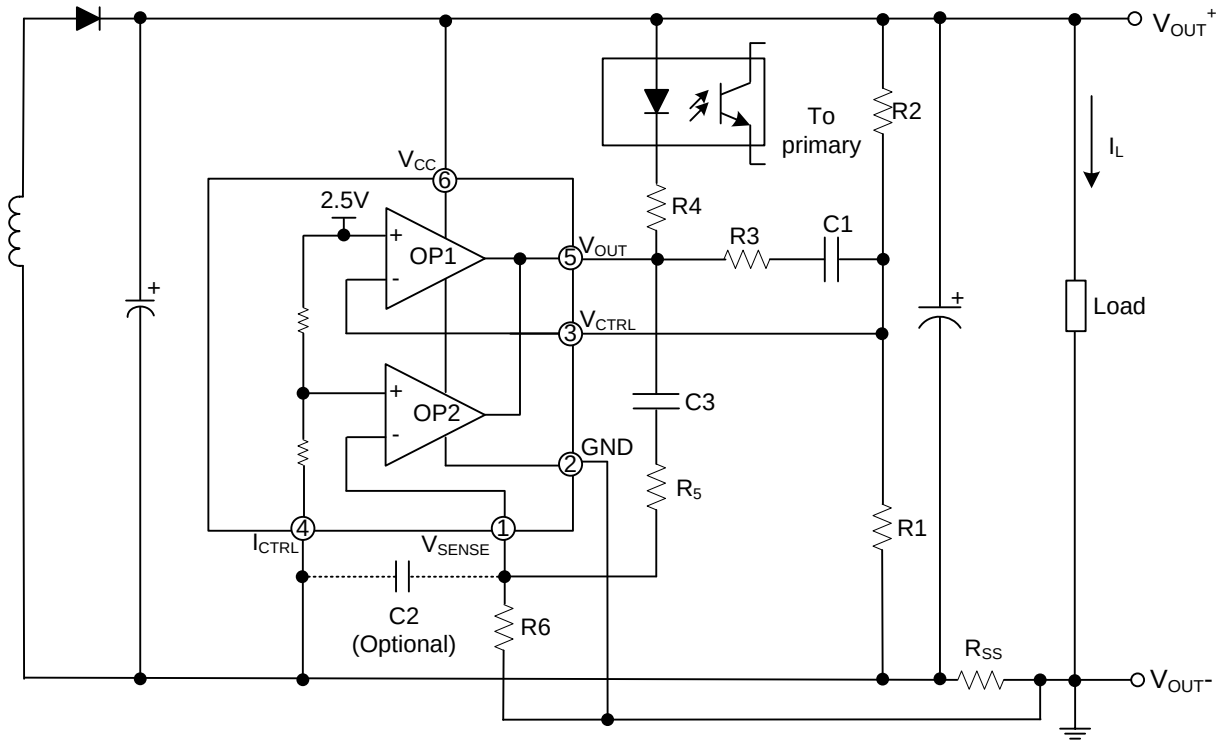


$$V_{OUT} = V_{REF} \times \frac{R1+R2}{R1}$$

$$\text{Current Limit} = \frac{V_{SENSE}}{R_{SS}}$$

Typical Application 1

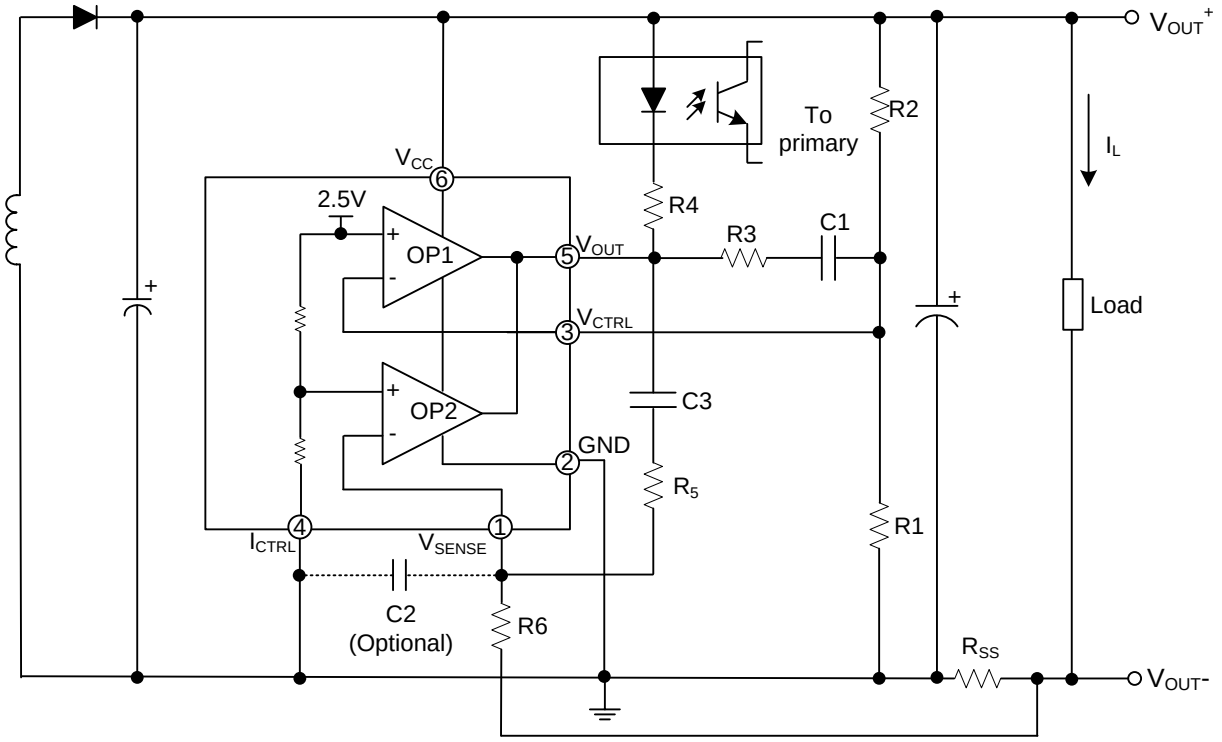
■ TYPICAL APPLICATION CIRCUIT (Cont.)



$$V_{OUT} = [V_{REF} + (I_L \times R_{SS})] \times \frac{R1 + R2}{R1} - (I_L \times R_{SS}) \qquad \text{Current Limit} = \frac{V_{SENSE}}{R_{SS}}$$

Typical Application 2

■ TYPICAL APPLICATION CIRCUIT (Cont.)



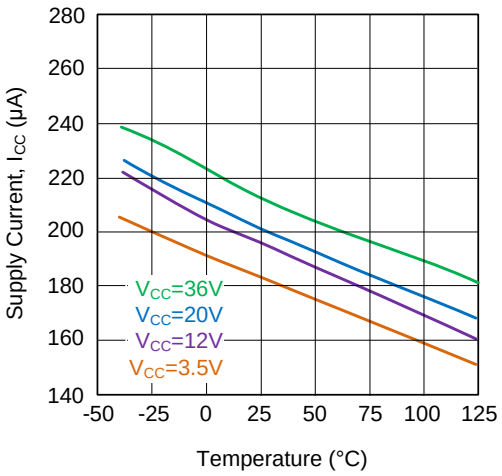
$$V_{OUT} = V_{REF} \times \frac{R1+R2}{R1} - (I_L \times R_{SS})$$

$$\text{Current Limit} = \frac{V_{SENSE} \times V_{REF}}{(V_{SENSE} + V_{REF}) \times R_{SS}}$$

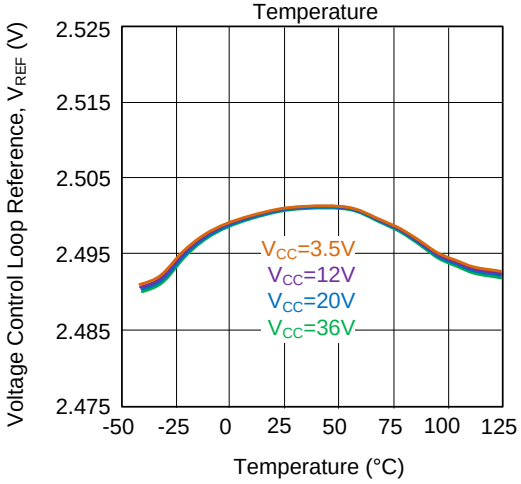
Typical Application 3

■ TYPICAL CHARACTERISTICS

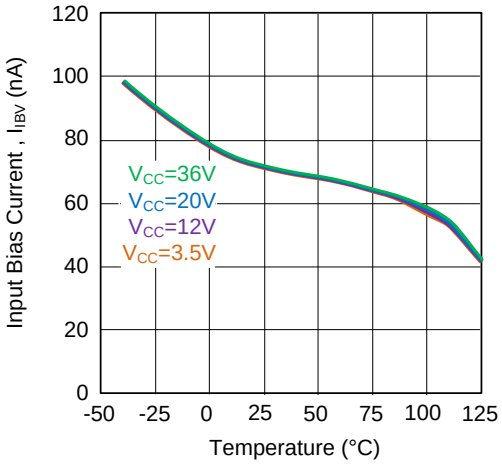
Supply Current vs. Temperature



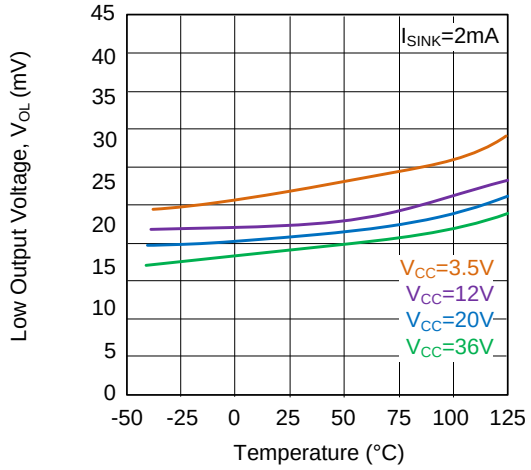
Voltage Control Loop Reference vs. Temperature



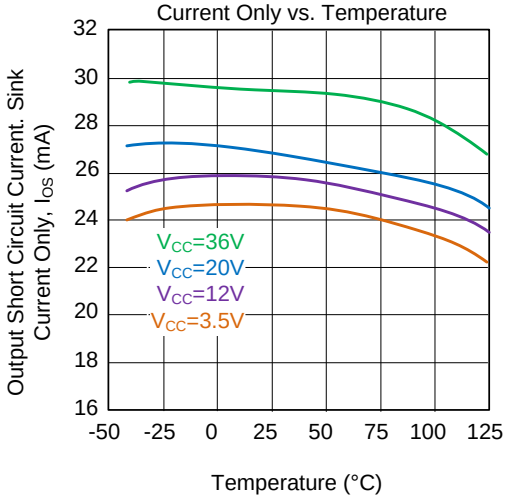
Input Bias Current vs. Temperature



Low Output Voltage vs. Temperature



Output Short Circuit Current. Sink Current Only vs. Temperature



Current Control Loop Reference vs. Temperature (UM610)