3.3V 600mA Low-Dropout Regulator

DESCRIPTION

The EUP7910A positive 3.3V voltage regulator features the ability to source 600mA of output current with a dropout voltage of 0.3V. A low quiescent current is provided. The typical quiescent current is 170µA.

Other features include ultra low dropout, high output accuracy, high PSRR, thermal shutdown and over current protection.

FEATURES

- Dropout voltage 0.3V @ Io=600mA
- Output Current in Excess of 600mA
- Output Voltage Accuracy ± 2%
- Quiescent Current, Typically 170µA
- Stable with Ceramic Capacitor
- Short Circuit Current Limit
- Over Temperature Protection
- Available in SOT-89 Packages
- RoHS Compliant and 100% Lead (Pb)-Free

APPLICATIONS

- LDO Linear Regulator for Low-Voltage Digital IC
- PC Add-In Cards
- High Efficiency Linear Power Supplies
- Post Regulator

Typical Application Circuit

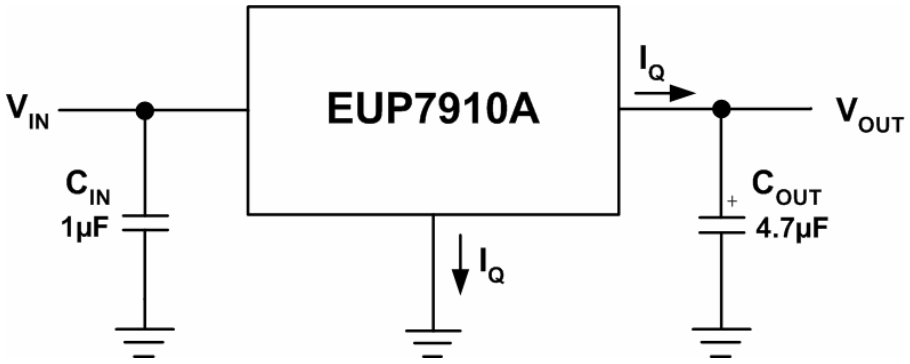
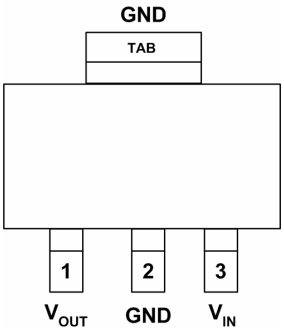


Figure 1.

Pin Configurations

Package Type	Pin Configurations
SOT-89	

Pin Description

PIN	SOT-89	DESCRIPTION
V_{OUT}	1	Output voltage of the LDO
GND	2	Ground: TAB is connected to ground
V_{IN}	3	Input Voltage of the LDO

Ordering Information

Order Number	Package Type	Marking	Operating Temperature Range
EUP7910A-33CIR1	SOT-89	xxxxx 7910A1H	-40 °C to 85°C

EUP7910A-□□ □ □ □ □

Lead Free Code
1: Lead Free 0: Lead

Packing
R: Tape & Reel

Operating temperature range
I: Industry Standard

Package Type:
C: SOT89

Output Voltage

Absolute Maximum Ratings

- Supply Voltage V_{IN} ---------- 6.5V
- Package Thermal Resistance
  SOT-89, θ_{JA} ----------175°C /W
- Power Dissipation, PD@TA=25°C
  SOT-89 ---------- 0.55W
- Junction Temperature ---------- 150°C
- Storage Temperature ---------- -65°C to +150°C
- Reflow Temperature (soldering, 10sec) ---------- 260°C
- ESD Rating
  Human Body Model ---------- 2kV

Operating Ratings

- Supply Voltage V_{IN} ---------- 3.6 to 6V
- Junction Temperature ---------- -40°C to +85°C

Electrical Characteristics

Conditions: V_{IN} =5V, C_{IN} = C_{OUT}= 4.7uF (Ceramic),T_A=25℃,Unless otherwise specified. I_L=10mA, C_{OUT}= 4.7µF.

Symbol	Parameter	Conditions	EUP7910A			Unit
			Min	Typ	Max.	
ΔV_{OUT}	Output Voltage Accuracy	10mA ≤ I_{OUT} ≤ 300mA	3.234	3.3	3.366	V
		I_{OUT}=10mA, T_A=-40°C to 85°C	3.201		3.399	V
ΔV_{LINE}	Line Regulation	V_{IN}=4V to 6V, I_{OUT}=10mA		4	10	mV
ΔV_{LOAD}	Load Regulation	10mA ≤ I_{OUT} ≤ 600mA		4	15	mV
I_Q	Quiescent Current	I_{OUT}= 10mA		170	250	uA
		I_{OUT}= 600mA		420	550	uA
PSRR	Power Supply Ripple Rejection	f=120Hz, I_{OUT}=10mA		60		dB
V_{DROP}	Dropout Voltage	I_{OUT}=600mA		300	450	mV
I_{LIMIT}	Current Limit			1		A
I_{SC}	Short Circuit Current			1.2		A
T_{SD}	Thermal Shutdown Temperature			160		°C
ΔT_{SD}	Thermal Shutdown Hysteresis			20		°C

Typical Operating Characteristics

Line Transient Response

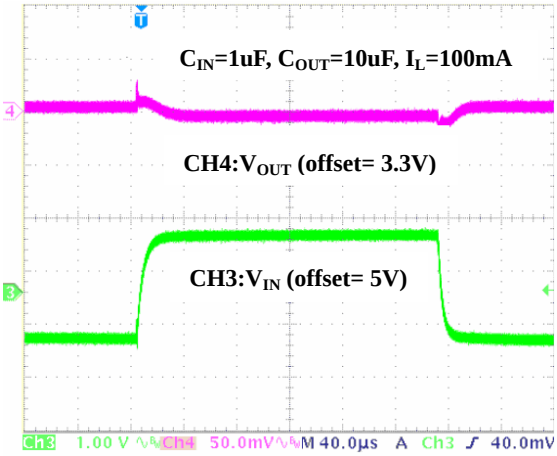


Figure 2.

Load Transient Response

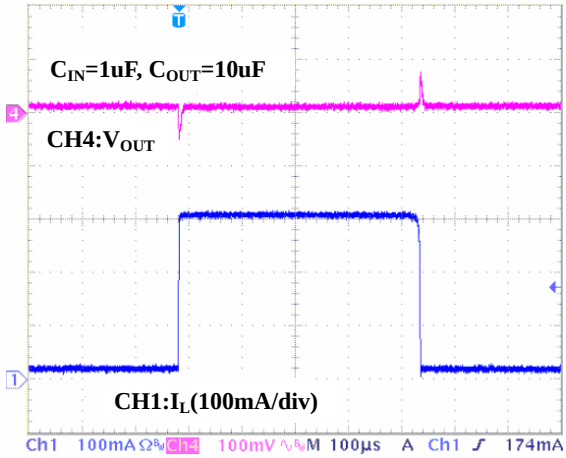


Figure 3.

Short Circuit Current

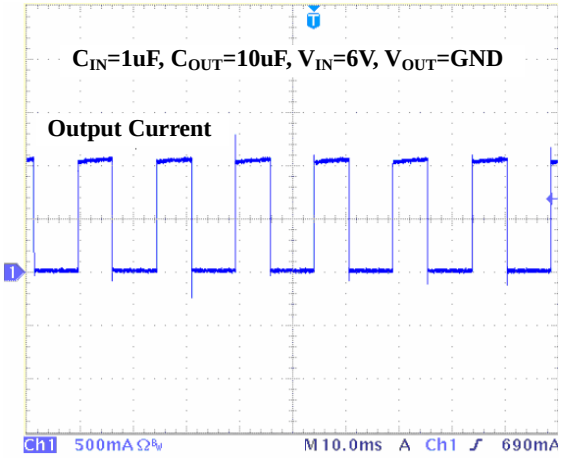


Figure 4.

Power Start-up

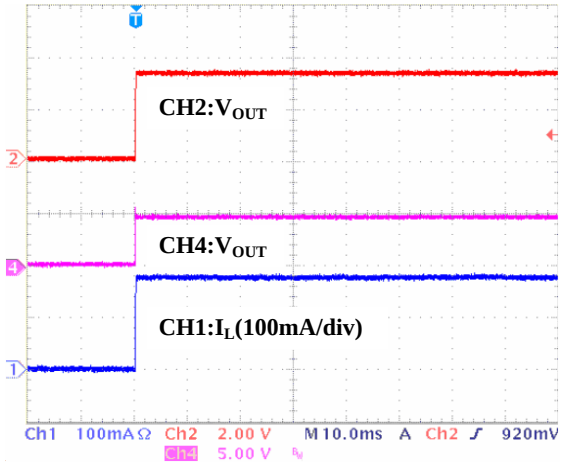


Figure 5.

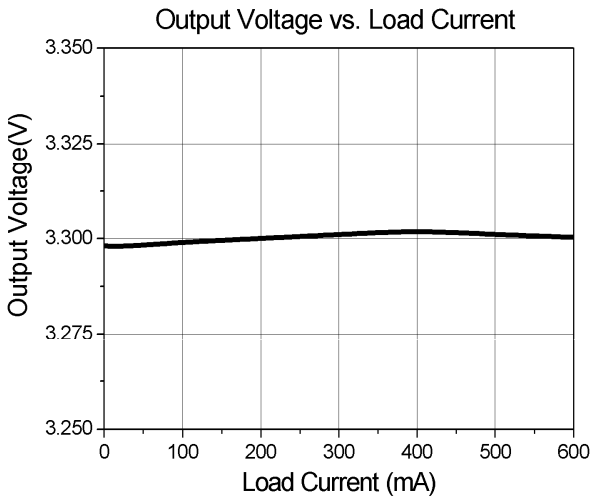


Figure 6.

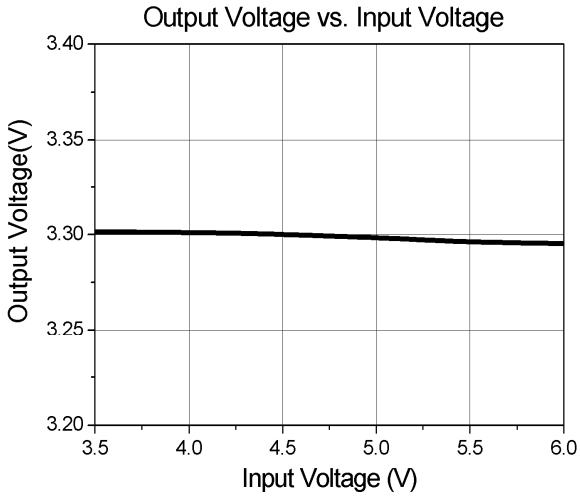


Figure 7.

Typical Operating Characteristics (continued)

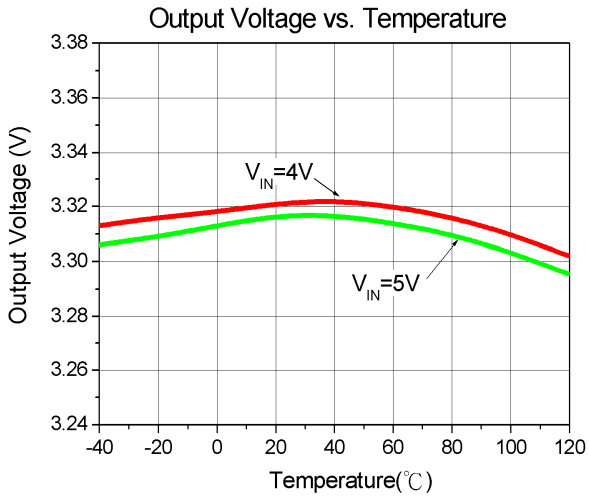


Figure 8.

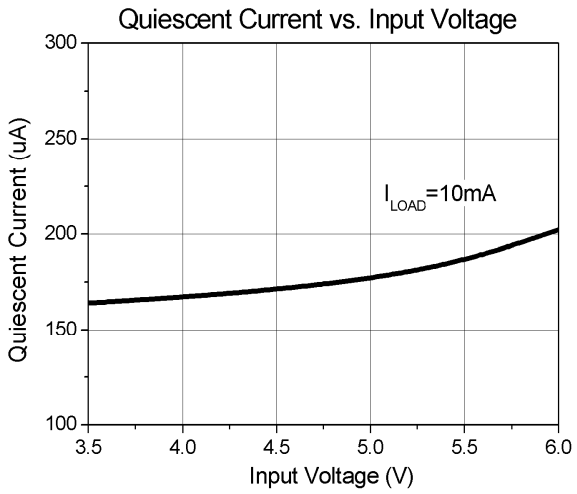


Figure 9.

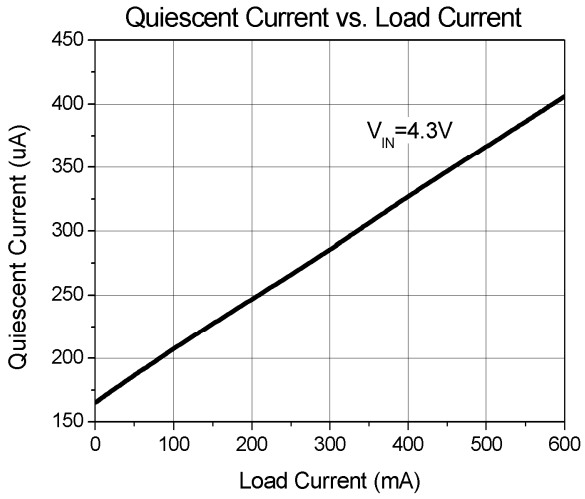


Figure 10.

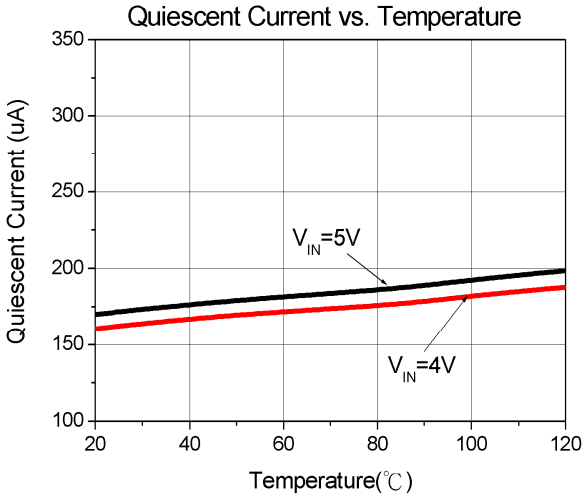


Figure 11.

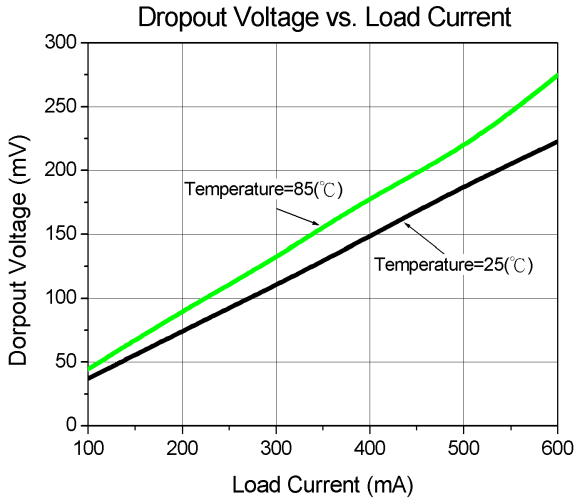


Figure 12.

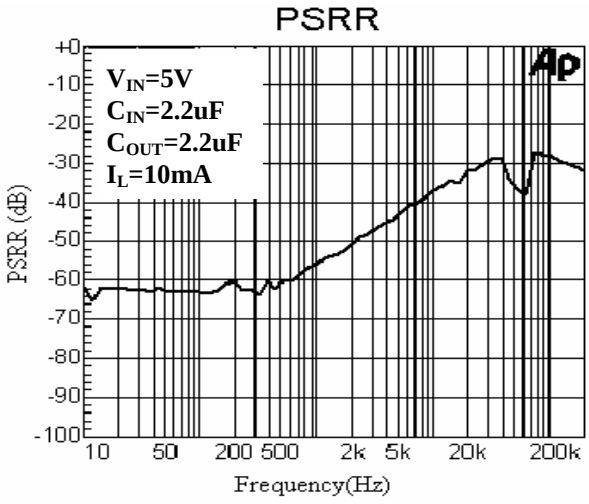


Figure 13.

Application Note

External Capacitors

Like any low-dropout regulator, the EUP7910A requires external capacitors for regulator stability. These capacitors must be correctly selected for good performance.

Input Capacitor

An input capacitance of 1µF is required between the EUP7910A input pin and ground (the amount of the capacitance may be increased without limit).

This capacitor must be located a distance of not more than 1cm from the input pin and returned to a clean analog ground. Any good quality ceramic, tantalum, or film capacitor may be used at the input.

If a tantalum capacitor is used at the input, it must be guaranteed by the manufacturer to have a surge current rating sufficient for the application.

There are no requirements for the ESR on the input capacitor, but tolerance and temperature coefficient must be considered when selecting the capacitor to ensure the capacitance will be 1µF over the entire operating temperature range.

Output Capacitor

The EUP7910A is designed specifically to work with very small ceramic output capacitors. A ceramic capacitor (temperature characteristics X7R, X5R, Z5U, or Y5V) in 2.2 to 10µF range with 5mΩ to 200mΩ ESR range is suitable in the EUP7910A application circuit.

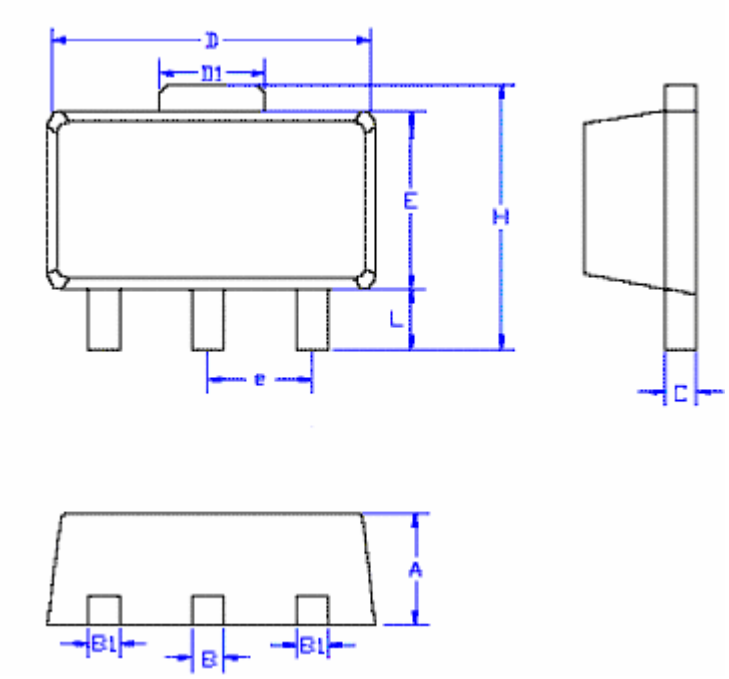
The output capacitor must meet the requirement for minimum amount of capacitance and also have an ESR (Equivalent Series Resistance) value which is within a stable range (5mΩ to 200mΩ)

No-Load Stability

The EUP7910A will remain stable and in regulation with no external load. This is specially important in CMOS RAM keep-alive applications.

Packaging Information

SOT-89



SYMBOLS	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	1.40	1.60	0.055	0.063
L	0.89	1.20	0.035	0.047
B1	0.36	0.48	0.014	0.019
B	0.44	0.56	0.017	0.022
C	0.35	0.44	0.014	0.017
D	4.40	4.60	0.173	0.181
D1	1.35	1.83	0.053	0.072
H	3.94	4.25	0.155	0.167
E	2.29	2.60	0.090	0.102
e	1.50		0.059	