

# 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  $170\mu A$ .

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**

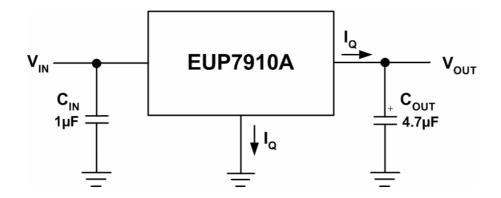
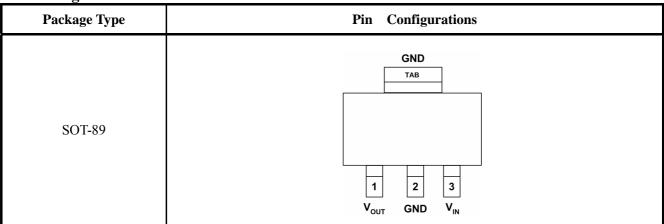


Figure 1.



**Pin Configurations** 



**Pin Description** 

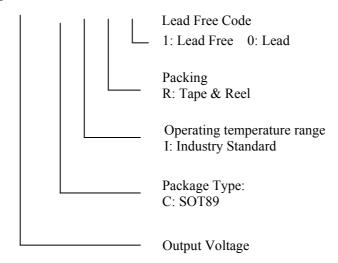
PIN	SOT-89	DESCRIPTION
$V_{OUT}$	1	Output voltage of the LDO
GND	2	Ground: TAB is connected to ground
$V_{\mathrm{IN}}$	3	Input Voltage of the LDO



# **Ordering Information**

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

### EUP7910A-





## **Absolute Maximum Ratings**

■ Supply Voltage V <sub>IN</sub>	6.5V
<ul> <li>Package Thermal Resistance</li> </ul>	
SOT-89, $\theta_{JA}$	175°C /W
Power Dissipation, PD@TA=25°C	
SOT-89	0.55W
Junction Temperature	150°C
Storage Temperature	
Reflow Temperature (soldering, 10s	ec) 260°C
ESD Rating	
Human Body Model	2kV

## **Operating Ratings**

 $\blacksquare \qquad \text{Supply Voltage $V_{\rm IN}$} \quad ------ \quad 3.6 \text{ to } 6V$ 

### **Electrical Characteristics**

 $Conditions: V_{IN} = 5V, C_{IN} = C_{OUT} = 4.7 uF \ (Ceramic), T_A = 25 \quad , Unless \ otherwise \ specified. \ I_L = 10 mA, C_{OUT} = 4.7 \mu F.$ 

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



## **Typical Operating Characteristics**

## **Line Transient Response**

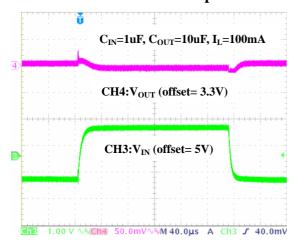


Figure 2.

## **Short Circuit Current**

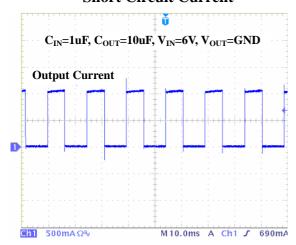


Figure 4.

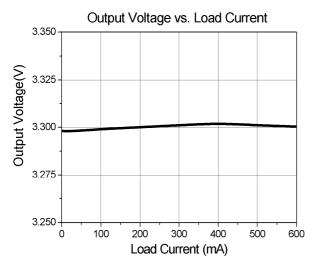


Figure 6.

#### **Load Transient Response**

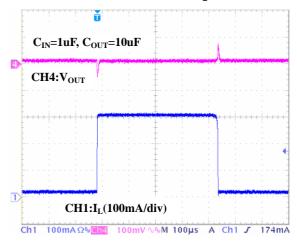


Figure 3.

### **Power Start-up**

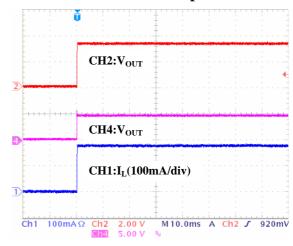


Figure 5.

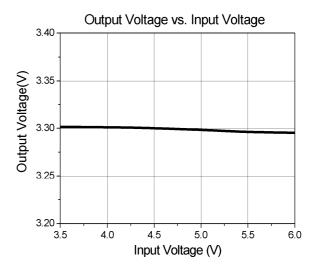
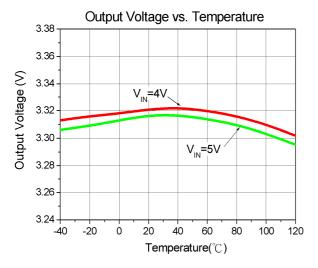


Figure 7.



## **Typical Operating Characteristics (continued)**





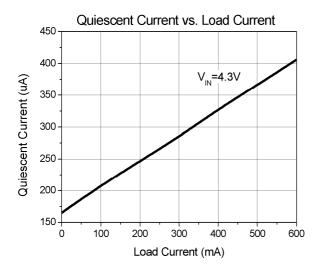


Figure 10.

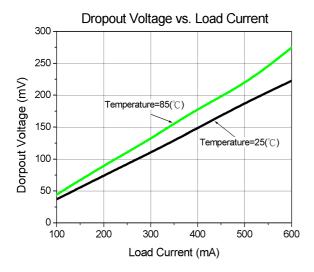


Figure 12.

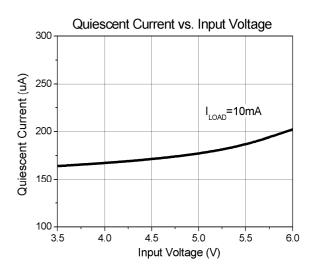


Figure 9.

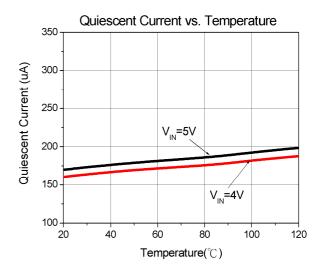


Figure 11.

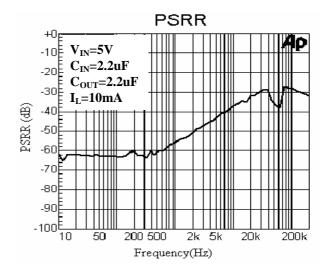


Figure 13.



## **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  $1\mu F$  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  $1\mu F$  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  $10\mu F$  range with  $5m\Omega$  to  $200m\Omega$  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  $(5m\Omega \text{ to } 200m\Omega)$ 

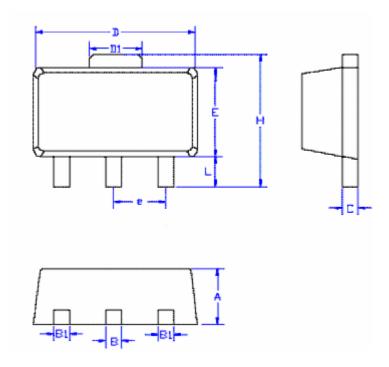
#### **No-Load Stability**

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	
В	0.44	0.56	0.017	0.022	
С	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	
Н	3.94	4.25	0.155	0.167	
Е	2.29	2.60	0.090	0.102	
e	1.50		0.059		

