

## IP Library: Ultra Low Noise, Low power, 100mA Low Dropout Voltage Regulator

PRODUCT PREVIEW

- RF REGULATOR
- VERY LOW DROPOUT VOLTAGE : 50mV
- ULTRA LOW OUTPUT NOISE
- HIGH OUTPUT CURRENT : 100mA
- LOW QUIESCENT CURRENT : 110 $\mu$ A
- HIGH PSRR : 65dB
- NO CURRENT IN POWER DOWN MODE
- SHORT CIRCUIT PROTECTION

### TYPICAL APPLICATIONS

- Cellular and Cordless phones supplied by 1 cell Lithium-ion battery / 3 cells Ni-MH or Ni-Cd battery.
- PDA (Personal Digital Assistant), Smart phone.
- Portable equipment.
- Supply for RF devices for cellular phone.

### APPLICATION NOTE

An external capacitor ( $C_{OUT} = 1\mu\text{F}$ ) with an equivalent serial resistance (ESR) in the range 0.02 to 0.6 $\Omega$  is used for regulator stability.

Figure 1 : Block Diagram

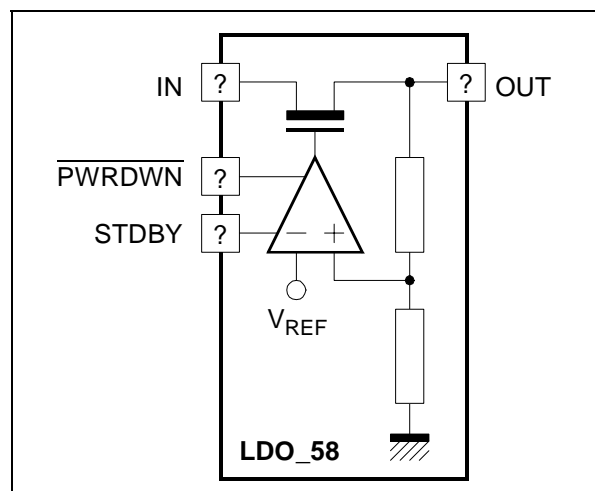
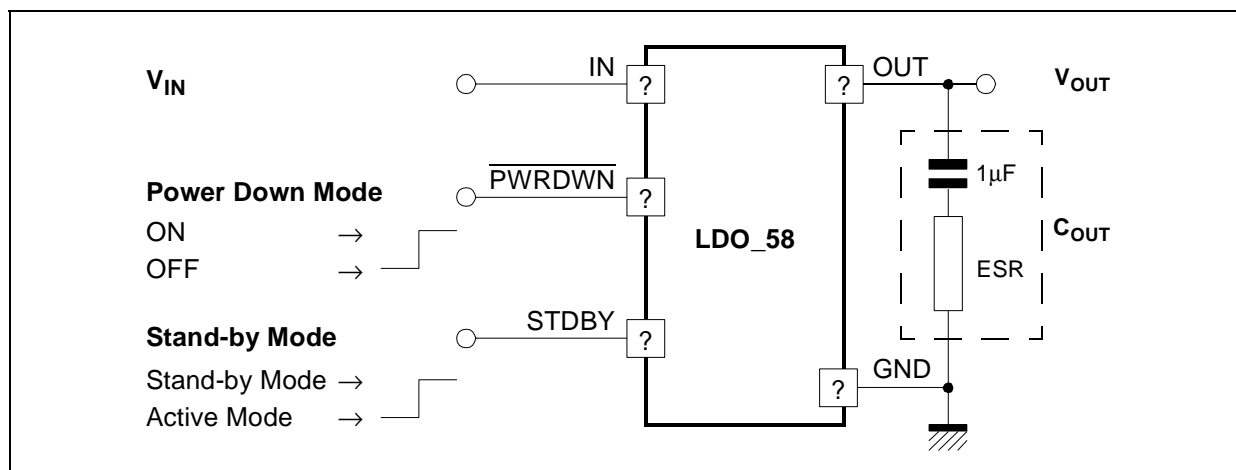


Figure 2 : Typical Application Circuit



**ELECTRICAL CHARACTERISTICS**

$3V < V_{IN} < 5.5V$ ,  $-30^{\circ}C < T_A < +85^{\circ}C$ ,  $V_{REF} = 2.8V$ ,  $C_{OUT} = 1\mu F \pm 20\%$ ,  $20m\Omega < ESR < 0.6\Omega$ ,  $I_{LOAD} = 100mA$ .

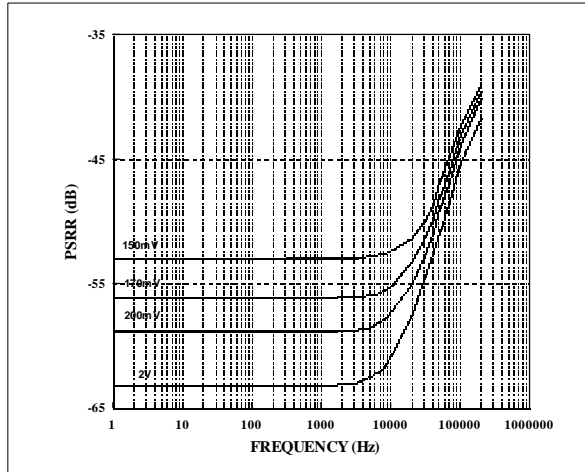
**Typical case** :  $V_{IN} = 4V$ ,  $T = 25^{\circ}C$ ,  $C_{OUT} = 1\mu F$ .

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Input Voltage Range (Note 1)	$V_{IN}$		3		5,5	V
Output Voltage	$V_{OUT}$			2,8		V
Output Voltage Accuracy				3		%
Output current	$I_{OUT}$				100	mA
Dropout Voltage	$\Delta V_{DO}$	$\Delta V_{OUT} = 50mV$ , $I_{LOAD} = 100mA$			50	mV
		(Note 2)	170			
Quiescent current	$I_Q$	$I_{LOAD} = 100\mu A$		50	70	$\mu A$
		$I_{LOAD} = 100mA$		110	250	
Quiescent Current in stand-by mode	$I_{STDBY}$	$I_{LOAD} = 100\mu A$		20	40	
Power down mode quiescent current	$I_{QPDM}$	Power down active		100		nA
Power Supply Rejection Ratio	PSRR	DC	45	65		dB
		$f = 10KHz$	45	60		
		$f = 100KHz$	35	45		
Line Regulation	Lir	$I_{LOAD} = 100mA$ , $V_{IN} = 3V$ to $5.5V$		0,5	1	mV
Load Regulation	Ldr	$I_{LOAD} = 100\mu A - 100mA$		25	40	mV
Line Transient	Lirt	$\Delta V_{IN} = 300mV$ $t_{RISE} = t_{FALL} = 10\mu s$		0,5	1,5	mV
Load Transient	Ldtr	$I_{LOAD} = 100\mu A - 100mA$ in $10\mu s$		3	10	mV
Output Noise Voltage	en	100Hz		40	65	$\frac{nV}{\sqrt{Hz}}$
		1KHz - 10KHz		30	40	
	en <sub>RMS</sub>	BW : 10Hz to 100KHz		25	30	$\mu V_{RMS}$
Output decoupling Capacitor	$C_{OUT}$			1		$\mu F$
Settling time		From power down to active mode		20	50	$\mu s$
Short Circuit Current Limit	$I_{SHORT}$				200	mA

Notes: 1. Above characteristics are given for 2.9V minimum input operating range voltage, but regulator is operational with 2.7V minimum input voltage.

2. All parameters are guaranteed with 170mV min dropout voltage.

## TYPICAL CHARACTERISTICS

**Figure 7 : PSRR vs Frequency for Various Voltage Drop ( $I_{LOAD} = 100mA$ )**

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 2002 STMicroelectronics - All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco  
Singapore - Spain - Sweden - Switzerland - United Kingdom - United States

<http://www.st.com>