

## 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 : 110µA
- 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 0.6Ω is used for regulator stability.

Figure 1 : Block Diagram

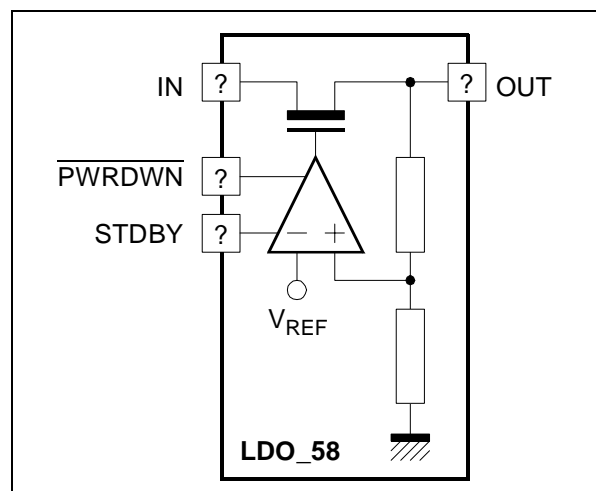
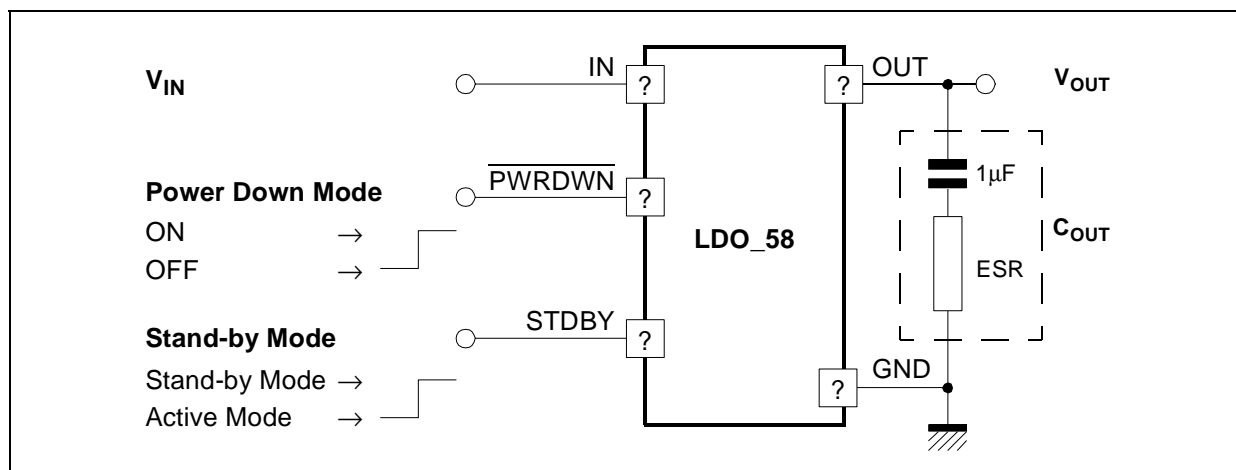


Figure 2 : Typical Application Circuit



**ELECTRICAL CHARACTERISTICS**

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

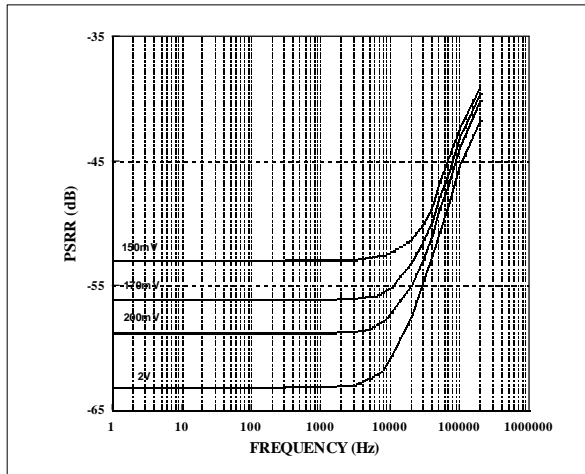
**Typical case** :  $V_{IN} = 4V$ ,  $T = 25^{\circ}C$ ,  $C_{OUT} = 1\mu F$ .

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	
	$en_{RMS}$	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 ( $I_{LOAD} = 100mA$ )**

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