

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 μ 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 Ω is used for regulator stability.

Figure 1 : Block Diagram

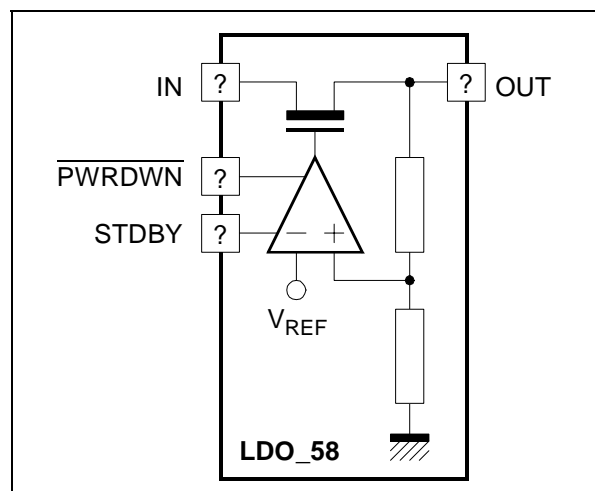
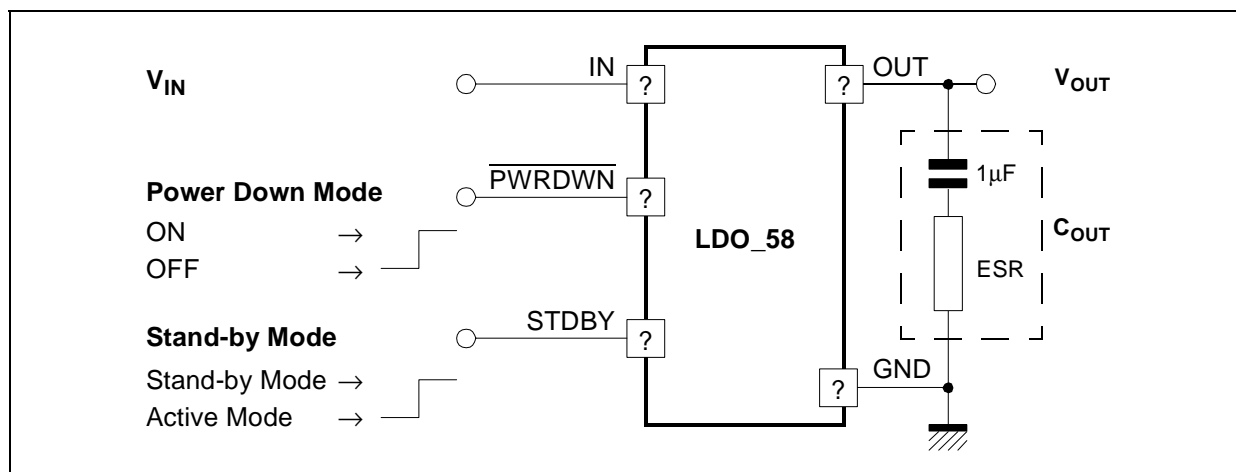


Figure 2 : Typical Application Circuit



ELECTRICAL CHARACTERISTICS

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

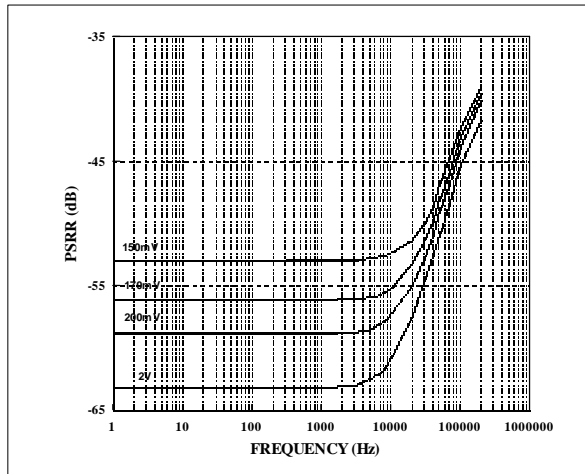
Typical case : $V_{IN} = 4V$, $T = 25^{\circ}C$, $C_{OUT} = 1\mu F$.

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	ΔV_{DO}	$\Delta V_{OUT} = 50mV$, $I_{LOAD} = 100mA$			50	mV
		(Note 2)	170			
Quiescent current	I_Q	$I_{LOAD} = 100\mu A$		50	70	μA
		$I_{LOAD} = 100mA$		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	$I_{LOAD} = 100mA$, $V_{IN} = 3V \text{ to } 5.5V$		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	μV_{RMS}
Output decoupling Capacitor	C_{OUT}			1		μF
Settling time		From power down to active mode		20	50	μs
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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