LDO_51

IP Library: High PSRR, Low power, 80mA Low Dropout Voltage Regulator

PRODUCT PREVIEW

- ANALOG BASEBAND REGULATOR
- VERY LOW DROPOUT VOLTAGE : 50mV
- HIGH PSRR : 60dB
- LOW QUIESCENT CURRENT : 130µA
- LOW OUTPUT VOLTAGE NOISE
- NO CURRENT IN POWER DOWN MODE
- SHORT CIRCUIT PROTECTION
- SMALL DECOUPLING CERAMIC CAPACITOR

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 Analog and Mixed-signal devices for cellular phone.

APPLICATION NOTE

An external capacitor (C_{OUT} = 1µF) with an equivalent serial resistance (ESR) in the range 0.02 to 0.6Ω is used for regulator stability.

Figure 1 : Block Diagram

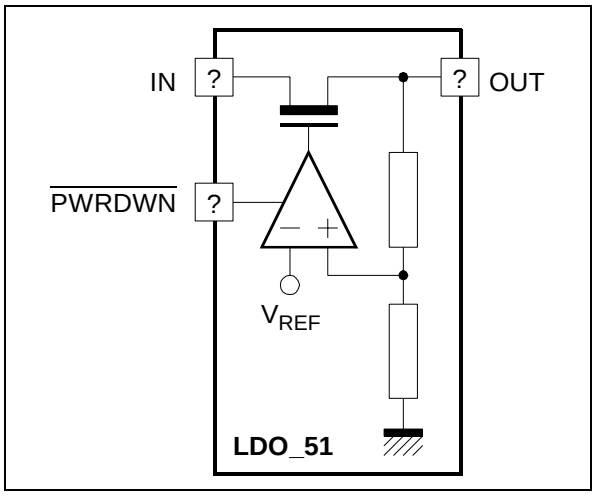
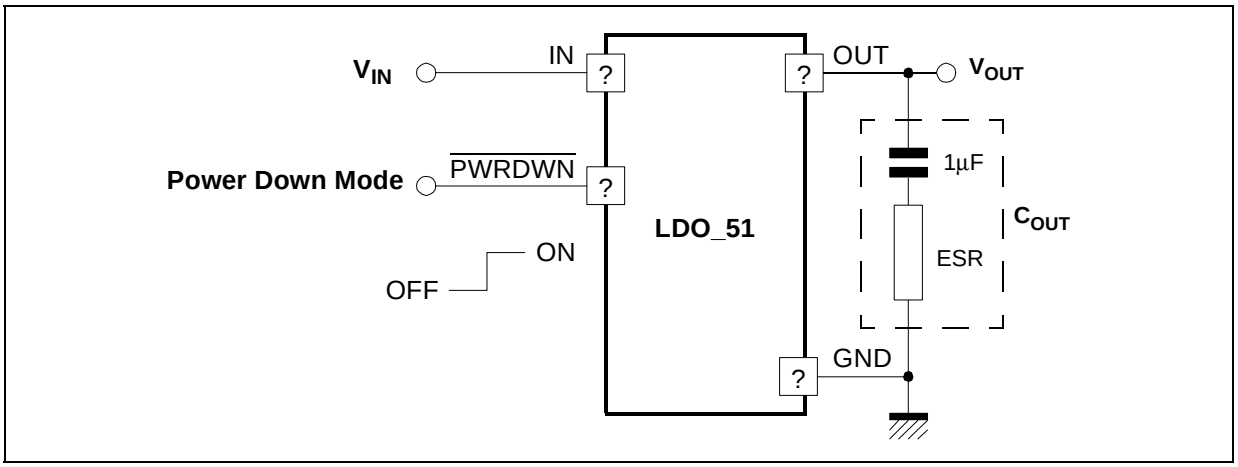


Figure 2 : Typical Application Circuit



ELECTRICAL CHARACTERISTICS

$3V < V_{IN} < 5.5V$, $-55°C < T_A < +125°C$, $V_{REF} = 2.8V$, $0.8\mu F < C_{OUT} < 1.2\mu F$, $20m\Omega < ESR < 0.6\Omega$. $100\mu A < I_{LOAD} < 80mA$.

Typical case : $V_{IN} = 4V$, $T = 25°C$, $I_{OUT} = 40mA$.

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		3	%
Output current	I_{OUT}		0,1		80	mA
P_{MOS} Output Resistance	R_{ON}				0,5	Ω
Dropout Voltage	ΔV_{DO}	$\Delta V_{OUT} = 50mV$, $I_{LOAD} = 80mA$			50	mV
		(Note 2)	170			
Quiescent current	I_Q	$I_{LOAD} = 100\mu A$		30	50	µA
		$I_{LOAD} = 80mA$		130	170	
Power down mode quiescent current	I_{QPDM}	Power down active		100		nA
Power Supply Rejection Ratio	PSRR	f < 10KHz	50	60		dB
		f < 100KHz	40	50		
Line Regulation	Lir	$I_{LOAD} = 80mA$, $V_{IN} = 3V$ to $5.1V$		3	6	mV
Load Regulation	Ldr			30	45	mV
Line Transient	Lirt	$\Delta V_{IN} = 300mV$ $t_{RISE} = t_{FALL} = 10\mu s$			1	mV
Load Transient	Ldtr	10% to 90% and 90% to 10% of 80mA in 10µs			1	mV
Output Noise Voltage	en	100Hz			1,5	$\frac{\mu V}{\sqrt{Hz}}$
		1KHz			550	$\frac{nV}{\sqrt{Hz}}$
		100KHz			300	
Output decoupling Capacitor	C_{OUT}			1		µF
Settling time		From power down to active mode			25	µs
Short Circuit Current Limit	I_{SHORT}		180	230	300	mA

Notes: 1. Above characteristics are given for 3V minimum input operating range voltage, but regulator is operational with 2.7V minimum input voltage.

2. All parameters are guaranteed with 170mV Dropout voltage.

TYPICAL CHARACTERISTICS

Figure 3 : Line transient

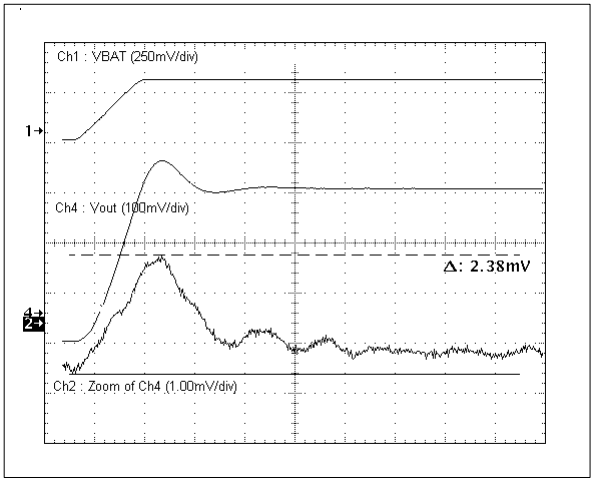


Figure 4 : Settling Time

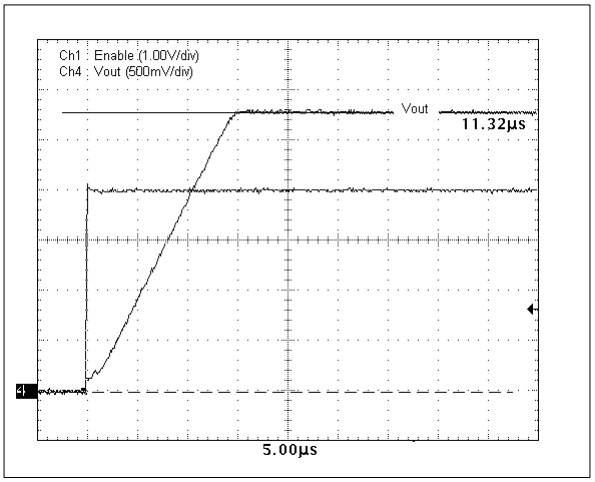


Figure 5 : Load Transient (rising edge)

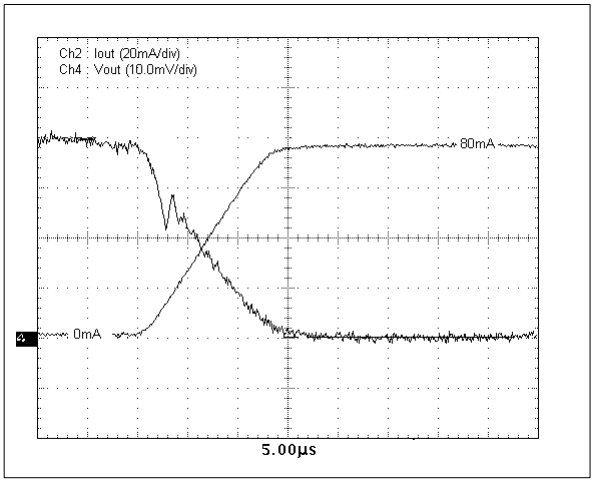


Figure 6 : Load Transient (falling edge)

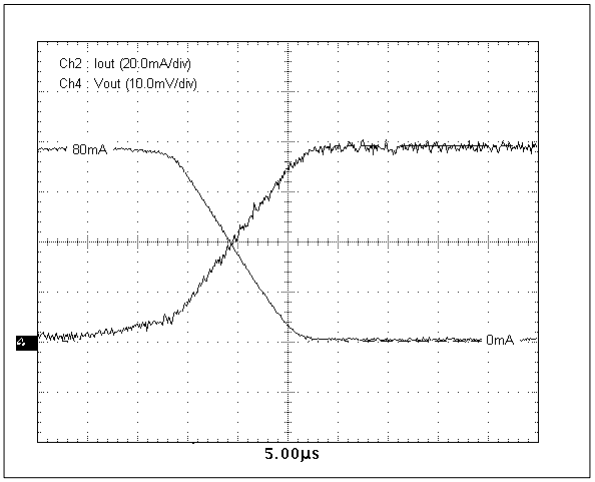


Figure 7 : PSRR vs Frequency (I_{LOAD} max - V_{IN} min)

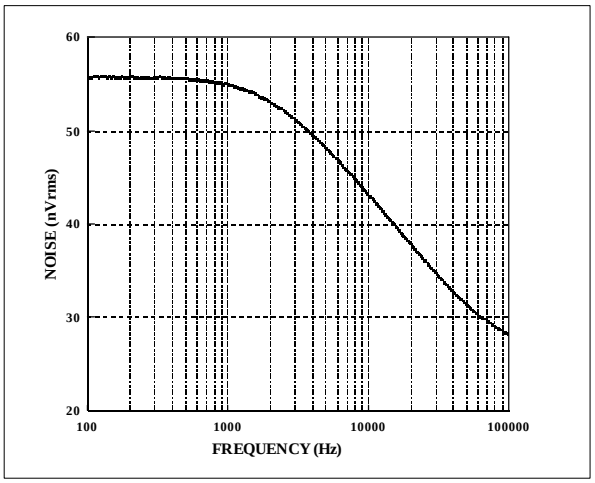


Figure 8 : Noise vs Frequency (I_{LOAD} max - V_{IN} min)

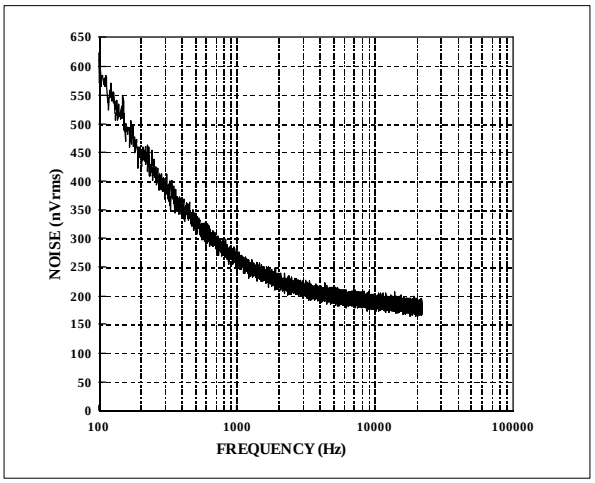


Figure 9 : Current Consumption vs Output Current (V_{IN} = 4V)