LDO_57

IP Library: High Output Current, Low power, 400mA Low Dropout Voltage Regulator

PRODUCT PREVIEW

- DIGITAL BASEBAND REGULATOR
- VERY LOW DROPOUT VOLTAGE : 50mV
- HIGH OUTPUT CURRENT : 400mA
- LOW QUIESCENT CURRENT : 100µA
- HIGH PSRR : 60dB
- LOW OUTPUT VOLTAGE NOISE
- 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 Digital Baseband devices for cellular phone.

APPLICATION NOTE

An external capacitor (C_{OUT} = 4.7µF) with an equivalent serial resistance (ESR) in the range 0.02 to 0.6Ω is used for regulator stability.

Figure 1 : Block Diagram

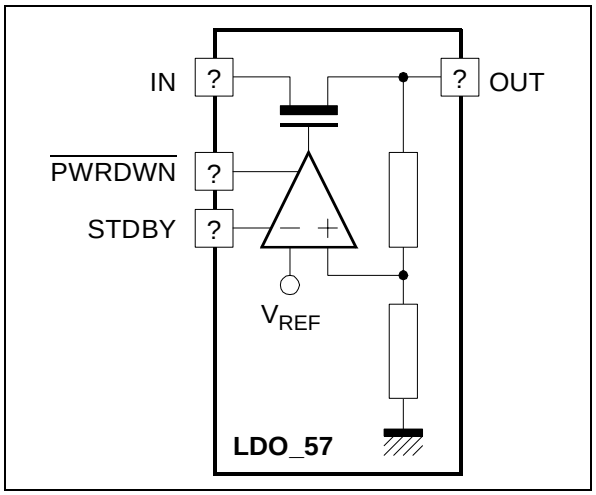
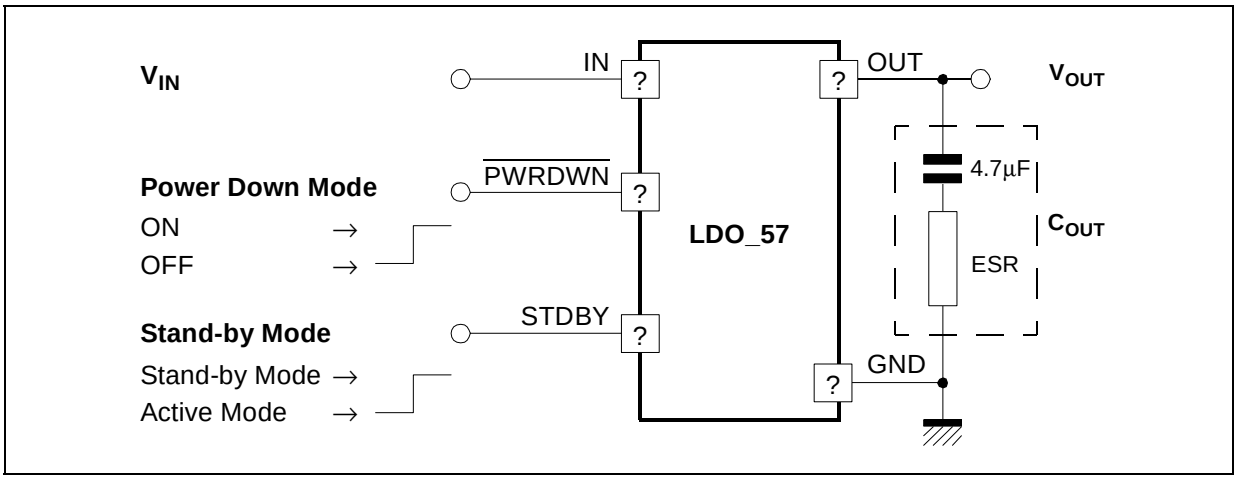


Figure 2 : Typical Application Circuit



ELECTRICAL CHARACTERISTICS

$3V < V_{IN} < 5.5V$, $-30°C < T_A < +85°C$, $V_{REF} = 2.8V$, $C_{OUT} = 4.7\mu F \pm 20\%$, $20m\Omega < ESR < 0.6\Omega$, $I_{LOAD} = 400mA$.

Typical case : $V_{IN} = 4V$, $T = 25°C$, $C_{OUT} = 4.7\mu F$, $I_{LOAD} = 400mA$.

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Input Voltage Range (Note 1)	V_{IN}		2,9		5,5	V
Output Voltage	V_{OUT}		1,8		4,9	V
Output Voltage Accuracy				3		%
Output current	I_{OUT}				400	mA
Dropout Voltage	ΔV_{DO}	$\Delta V_{OUT} = 50mV$, $I_{LOAD} = 400mA$,			50	mV
		(Note 2)	170			mV
Quiescent current	I_Q	$I_{LOAD} = 100\mu A$		100	150	µA
		$I_{LOAD} = 40mA$		150	230	
		$I_{LOAD} = 400mA$		350	450	
Power down mode quiescent current	I_{QPDM}	Power down active		100		nA
Power Supply Rejection Ratio	PSRR	DC	40	60		dB
		f = 10KHz	40	55		
Line Regulation	Lir	$I_{LOAD} = 400mA$, $V_{IN} = 2.9V$ to $5.5V$			4	mV
Load Regulation	Ldr	$I_{LOAD} = 100\mu A$ - 400mA		50	55	mV
Line Transient	Lirt	$\Delta V_{IN} = 300mV$ $t_{RISE} = t_{FALL} = 10\mu s$		2,5	5	mV
Load Transient	Ldtr	$I_{LOAD} = 100\mu A$ - 400mA in 10µs		3	5	mV
Output Noise Voltage	en	100Hz			1,2	$\frac{\mu V}{\sqrt{Hz}}$
		1KHz			400	$\frac{nV}{\sqrt{Hz}}$
		10KHz			140	
	en_{RMS}	BW : 100Hz to 100KHz			35	μV_{RMS}
Output decoupling Capacitor	C_{OUT}			4,7		µF
Settling time		From power down to active mode			50	µs
Short Circuit Current Limit	I_{SHORT}				2	A

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 performances of the regulator are guarenteed for a voltage drop of 170mV minimum.

ELECTRICAL CHARACTERISTICS : (Stand-by mode)

3V < V_{IN} < 5.5V, -30°C < T_A < +85°C, V_{REF} = 2.8V, C_{OUT} = 4.7µF ±20%, 20mΩ < ESR < 0.6Ω, I_{LOAD} = 500µA.

Typical case : V_{IN} = 4V, Ambient temperature, I_{LOAD} = 500µA.

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Output current in stand-by mode	$I_{OUTSTDBY}$				500	µA
Quiescent Current in stand-by mode	I_{STDBY}	I_{LOAD} = 500µA		20	30	
Power Supply Rejection Ratio in stand-by mode	$PSRR_{STY}$	f = 10KHz	35	45		dB
Line Regulation in stand-by mode	Lir_{STDBY}	I_{LOAD} = 500µA, V_{IN} = 2.9V to 5.5V		2	6	mV
Load Regulation	Ldr_{STDBY}	I_{LOAD} = 100µA - 500µA		50	55	mV

TYPCIAL CHARACTERISTICS

Figure 7 : PSRR vs Frequency for Various Voltage Drop