

## 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 ( $C_{OUT} = 4.7\mu\text{F}$ ) with an equivalent serial resistance (ESR) in the range 0.02 to 0.6Ω is used for regulator stability.

Figure 1 : Block Diagram

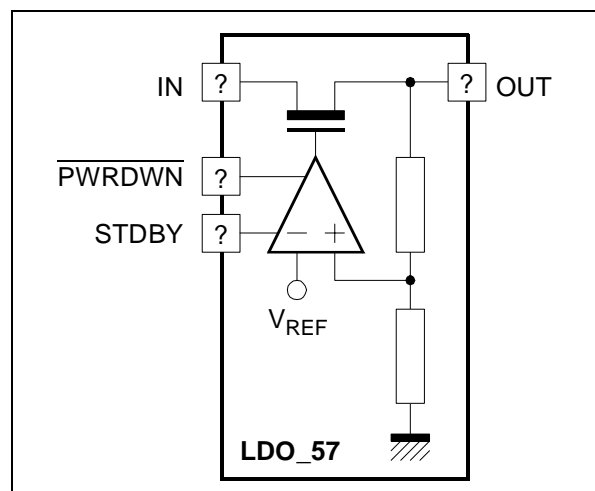
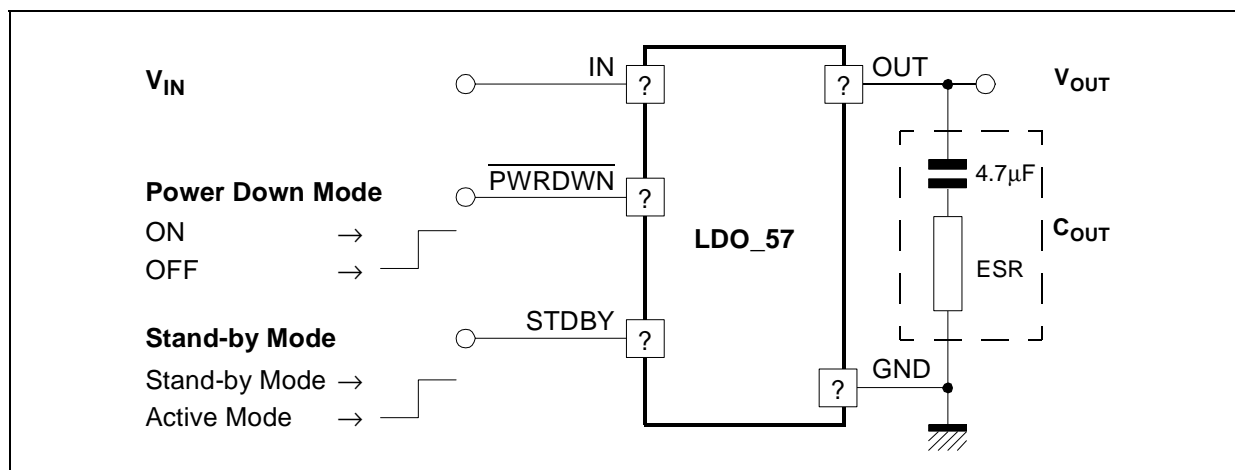


Figure 2 : Typical Application Circuit



## LDO\_57

### ELECTRICAL CHARACTERISTICS

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

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

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	$\Delta V_{DO}$	$\Delta V_{OUT} = 50mV$ , $I_{LOAD} = 400mA$ ,			50	mV
		(Note 2)	170			mV
Quiescent current	$I_Q$	$I_{LOAD} = 100\mu A$		100	150	$\mu A$
		$I_{LOAD} = 40mA$		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 $10\mu s$		3	5	mV
Output Noise Voltage	en	100Hz			1,2	$\frac{\mu V}{\sqrt{Hz}}$
		1KHz			400	$\frac{nV}{\sqrt{Hz}}$
		10KHz			140	$\frac{\mu V}{\sqrt{Hz}}$
	$en_{RMS}$	BW : 100Hz to 100KHz			35	$\mu V_{RMS}$
Output decoupling Capacitor	$C_{OUT}$			4,7		$\mu F$
Settling time		From power down to active mode			50	$\mu s$
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 guaranteed for a voltage drop of 170mV minimum.

**ELECTRICAL CHARACTERISTICS** : (Stand-by mode)

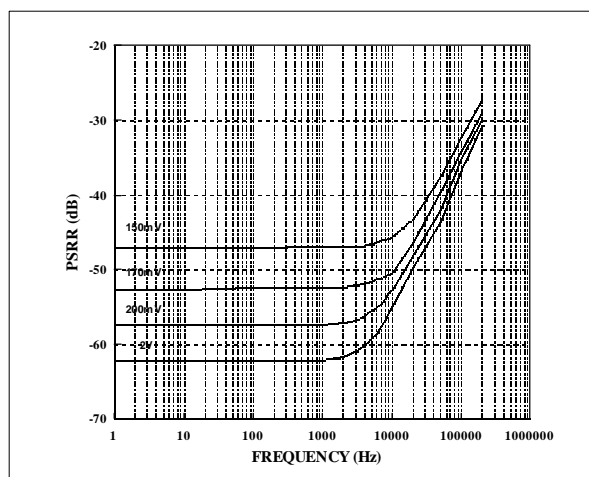
$3V < V_{IN} < 5.5V$ ,  $-30^{\circ}C < T_A < +85^{\circ}C$ ,  $V_{REF} = 2.8V$ ,  $C_{OUT} = 4.7\mu F \pm 20\%$ ,  $20m\Omega < ESR < 0.6\Omega$ ,  $I_{LOAD} = 500\mu A$ .

**Typical case** :  $V_{IN} = 4V$ , Ambient temperature,  $I_{LOAD} = 500\mu A$ .

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

**TYPICAL CHARACTERISTICS**

**Figure 7** : PSRR vs Frequency  
for Various Voltage Drop



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