LDO_52

IP Library: High PSRR, Low Power, 70mA Low Dropout Voltage Regulator

PRODUCT PREVIEW

- DIGITAL BASEBAND REGULATOR
- VERY LOW DROPOUT VOLTAGE : 50mV
- HIGH PSRR : 60dB
- LOW QUIESCENT CURRENT : 150µA
- 1µA STAND-BY MODE CURRENT
- NO CURRENT IN POWER DOWN MODE
- SHORT CIRCUIT PROTECTION
- SMALL DECOUPLING CERAMIC CAPACITOR

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 (Memory, DSP/Microcontroller) devices.

APPLICATION NOTE

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

Figure 1 : Block Diagram

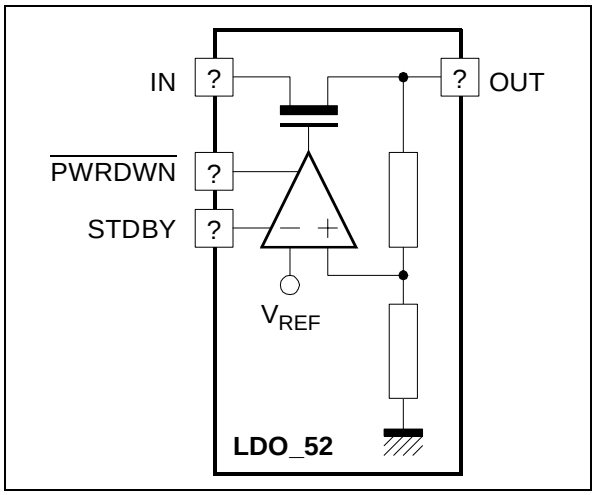
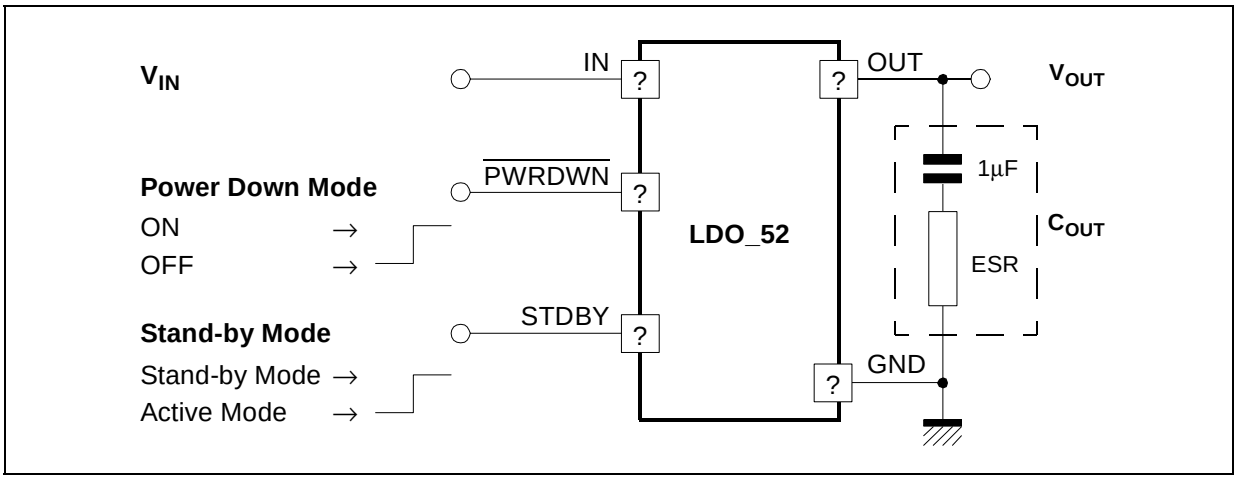


Figure 2 : Typical Application Circuit



ELECTRICAL CHARACTERISTICS

$3V < V_{IN} < 5.5V$, $-30°C < T < +125°C$, $V_{REF} = 2.8V$, $0.8\mu F < C_{OUT} < 1.2\mu F$, $20m\Omega < ESR < 0.6\Omega$. $100\mu A < I_{LOAD} < 70mA$.

Typical case : $V_{IN} = 4V$, $T = 25°C$, $I_{OUT} = 35mA$.

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}	Active mode			70	mA
		Low power mode			500	µA
P_{MOS} Output Resistance	R_{ON}				0,2	Ω
Dropout Voltage	ΔV_{DO}	$\Delta V_{OUT} = 50mV$, $I_{LOAD} = 70mA$			60	mV
		(Note 2)	170			
Quiescent current	I_Q	$I_{LOAD} = 100\mu A$		20	30	µA
		$I_{LOAD} = 70mA$		150	170	
Stand-by current	I_{STDBY}	$I_{LOAD} = 500\mu A$		5	10	µA
Power down mode quiescent current	$I_{QPRWDWN}$	Power down active		100	1000	nA
Power Supply Rejection Ratio	PSRR	DC	50	60		dB
		f < 10KHz	40	45		
Load Regulation	Ldr	$V_{OUT} = 2.8V$		20	35	mV
Line Regulation	Lir	$I_{LOAD} = 70mA$, $V_{OUT} = 2.8V$		2	3	mV
		Std-by mode $I_{LOAD} = 500\mu A$			10	mV
Line Transient	Lirt	$V_{OUT} = 2.8V$ $I_{LOAD} = 70mA$, $\Delta V_{IN} = 300mV$, $t_{RISE} = t_{FALL} = 10\mu s$			3	mV
Load Transient	Ldtr	10% to 90% and 90% to 10% of 70mA in 10µs			5	mV
		Recovery time		5	6	µs
Output decoupling capacitor	C_{OUT}			1		µF
Settling time (from power down to active mode)		$V_{OUT} = 2.8V$, $C_{OUT} = 1\mu F$		20	50	µs
Short Circuit Current Limit	I_{SHORT}		300		800	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
(I_{LOAD} = 35mA ;
V_{BAT} = 4V + 300mV with 10µs)

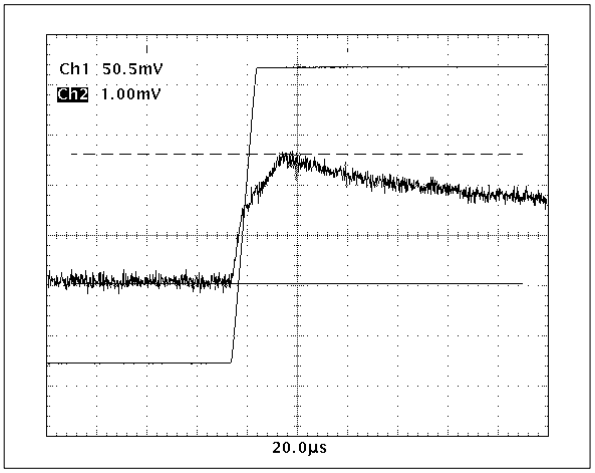


Figure 4 : Line transient
(I_{LOAD} = 35mA ;
V_{BAT} = 4V + 300mV with 10µs)

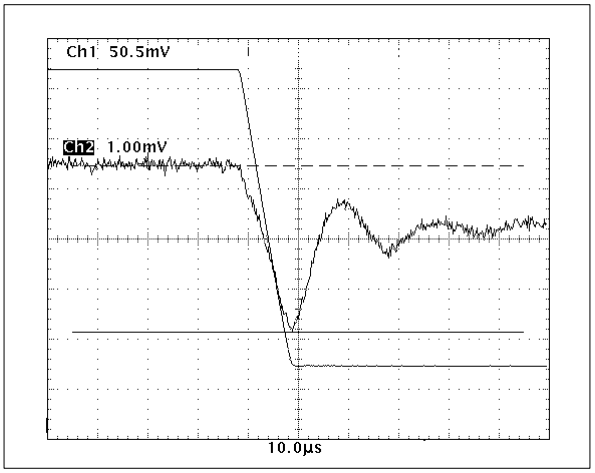


Figure 5 : Load transient
(I_{LOAD} = 0 to 70mA ; V_{BAT} = 4V)

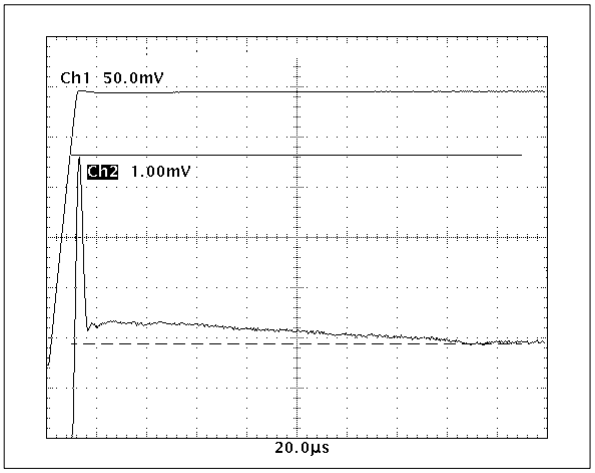


Figure 6 : Load transient
(I_{LOAD} = 0 to 70mA ; V_{BAT} = 4V)

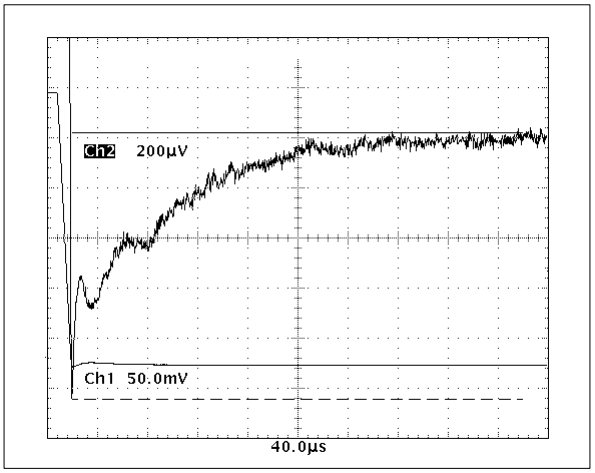


Figure 7 : Settling Time