LDO_514

IP Library: High PSRR, Very Low power, 200mA Low Dropout Voltage Regulator

PRODUCT PREVIEW

- RF REGULATOR
- VERY LOW DROPOUT VOLTAGE : 50mV
- VERY LOW CONSUMPTION : 320µA FULL LOAD
- VERY GOOD TRANSIENT BEHAVIOUR : 1mV
- OUTPUT CURRENT : 200mA
- 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} = 1µF) with an equivalent serial resistance (ESR) in the range 0.02 to 0.6Ω is used for regulator stability.

Figure 1 : Block Diagram

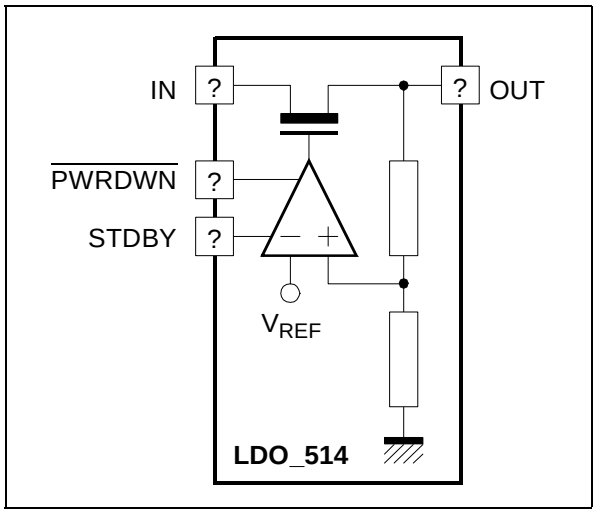
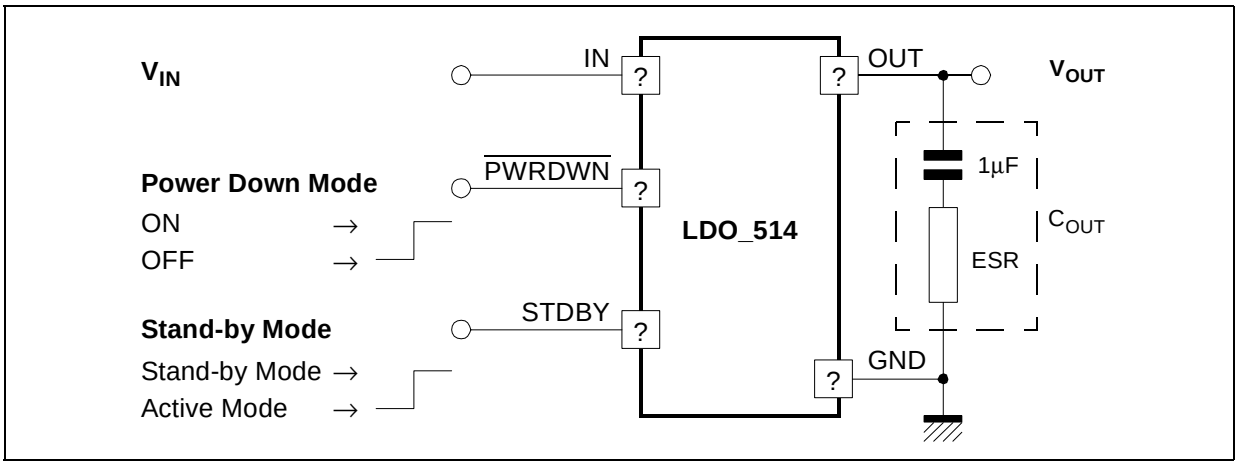


Figure 2 : Typical Application Circuit



ELECTRICAL CHARACTERISTICS

$3V < V_{IN} < 5.5V$, $-55°C < T_A < +125°C$, $C_{OUT} = 1\mu F \pm 20\%$, $20m\Omega < ESR < 0.6\Omega$, $I_{LOAD} = 200mA$.

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

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}				200	mA
Dropout Voltage	ΔV_{DO}	$\Delta V_{OUT} = 50mV$, $I_{LOAD} = 200mA$			50	mV
		(Note 2)	170			
Quiescent current	I_Q	$I_{LOAD} = 100\mu A$		70	110	µA
		$I_{LOAD} = 20mA$		90	130	
		$I_{LOAD} = 200mA$		320	440	
Power down mode quiescent current	I_{QPDM}	Power down active		100		nA
Power Supply Rejection Ratio	PSRR	DC		65		dB
		f = 10KHz		60		
		f = 100KHz		50		
Line Regulation	L_{IR}	$I_{LOAD} = 200mA$, $V_{IN} = 3V$ to $5.5V$		1.5	2.5	mV
Load Regulation	L_{DR}	$I_{LOAD} = 100\mu A$ - $200mA$		35	40	mV
Line Transient	L_{IRT}	$\Delta V_{IN} = 300mV$ $t_{RISE} = t_{FALL} = 10\mu s$		<1		mV
Load Transient	L_{DTR}	$I_{LOAD} = 100\mu A$ - $200mA$ in 10µs		0.5	1	mV
Output Noise Voltage	en	100Hz		1400		$\frac{nV}{\sqrt{Hz}}$
		1KHz		450		
		10KHz		150		
	en_{RMS}	BW : 100Hz to 100KHz		45		μV_{RMS}
Output decoupling Capacitor	C_{OUT}			1		µF
Settling time		$I_{LOAD} = 200mA$		15	30	µs
Short Circuit Current Limit	I_{SHORT}			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 min Dropout voltage.

ELECTRICAL CHARACTERISTICS : STAND-BY MODE

$3V < V_{IN} < 5.5V$, $-30°C < T_A < +85°C$, $V_{REF} = 2.8V$, $C_{OUT} = 4.7\mu F \pm 20\%$, $20m\Omega < ESR < 0.6\Omega$.
$I_{LOAD} = 500\mu A$.
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	$I_{OUTSTDBY}$				200	µA
Quiescent Current in stand-by mode	I_{STDBY}	I_{LOAD} = 500µA		15	20	
Power Supply Rejection Ratio in stand-by mode	$PSRR_{STY}$	f = 10KHz		55		dB
Line Regulation in stand-by mode	Lir_{STBY}	V_{IN} = 3V to 5.5V		2		mV
Load Regulation in stand-by mode	Ldr_{STBY}	I_{LOAD} = 100µA - 500µA		1		mV

TYPICAL CHARACTERISTICS

Figure 3 : PSRR vs Freq for Various Voltage Drop (V_{OUT} = 2.8V, Full Load)

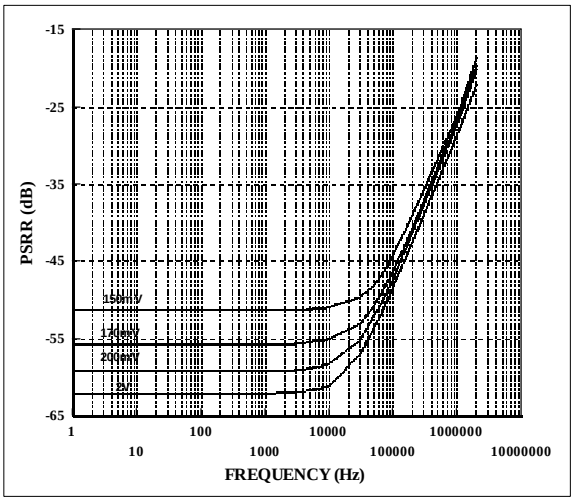


Figure 4 : Output Voltage vs. Input Voltage (V_{OUT} = 2.8V, Full Load)

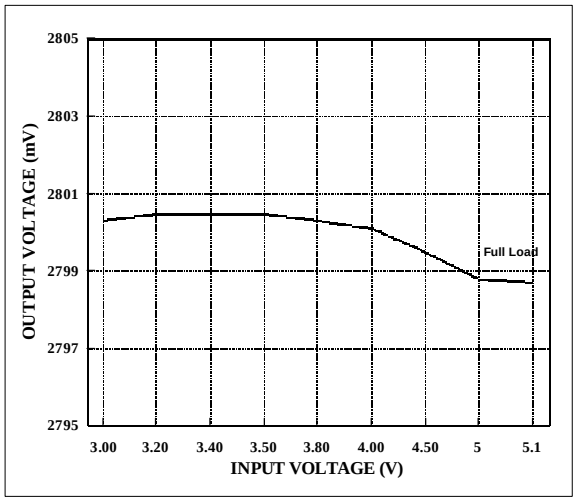


Figure 5 : Output Voltage vs Output Current (Load Regulation)