LDO_518

IP Library: Low Noise, High PSRR 100mA Low Dropout Voltage Regulator

PRODUCT PREVIEW

- ULTRA LOW POWER REGULATOR
- ULTRA LOW CONSUMPTION : 45µA FULL LOAD
- VERY LOW NOISE : 30µV
- VERY LOW DROPOUT VOLTAGE : 50mV
- HIGH PSRR : 60dB
- SMALL DECOUPLING CERAMIC CAPACITOR
- 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} = 2.2µF) with an equivalent serial resistance (ESR) in the range of 0.02 to 0.6Ω is used for regulator stability.

Figure 1 : Block Diagram

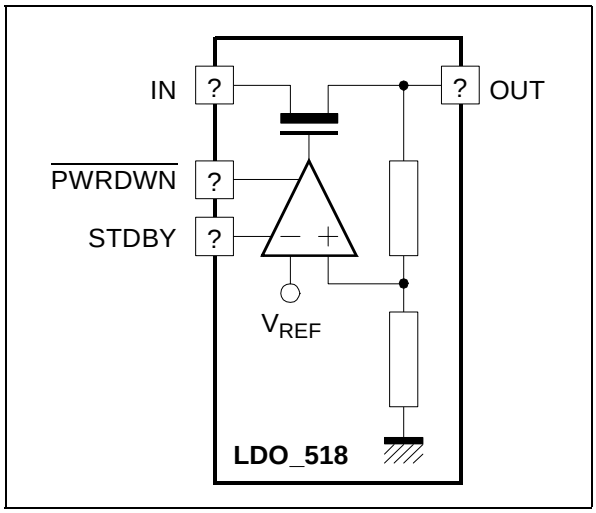
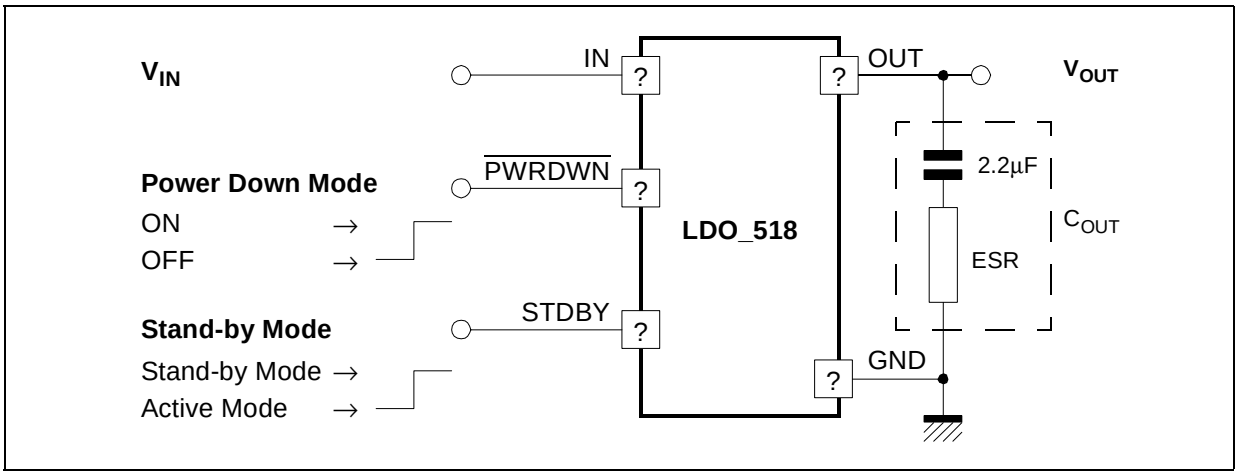


Figure 2 : Typical Application Circuit



ELECTRICAL CHARACTERISTICS

2V < V_{IN} < 5V, -55°C < T_A < +125°C, C_{OUT} = 2.2µF ±20%, 20 mΩ < ESR < 0.6Ω, I_{LOAD} = 100mA.
Typical case : V_{IN} = 4V, T = 25°C, C_{OUT} = 2.2µF.

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input Voltage Range (Note 1)	V_{IN}		2		5	V
Output Voltage	V_{OUT}			1.8		V
Output Voltage Accuracy				3		%
Output current	I_{OUT}				100	mA
Dropout Voltage	ΔV_{DO}	ΔV_{OUT} = 50mV, I_{LOAD} = 100mA			50	mV
		(Note 2)	170			
Quiescent current	I_Q	I_{LOAD} = 100µA		25		µA
		I_{LOAD} = 1mA		25		
		I_{LOAD} = 10mA		30		
		I_{LOAD} = 50mA		35		
		I_{LOAD}=100mA		45	50	
Power down mode quiescent current	I_{QPDM}	Power down active		100		nA
Power Supply Rejection Ratio	PSRR	ΔV_{DO} = 170mV ; f < 1KHz	45	50		dB
		f < 10KHz	35	40		
		ΔV_{DO} = 500mV; f < 100Hz	60	65		
		f < 1KHz	55	60		
		f < 10KHz	40	45		
Line Regulation	L_{IR}	I_{LOAD} = 100mA, V_{IN} = 2V to 5V		0.5	1	mV
Load Regulation	L_{DR}	I_{LOAD} = 100µA - 100mA		15	20	mV
Line Transient	L_{IRT}	ΔV_{IN} = 300mV t_{RISE} = t_{FALL} = 10µs		6	10	mV
Load Transient	L_{DTR}	I_{LOAD} = 100µA - 100mA in 10µs		7	50	mV
Output Noise Voltage	en	100Hz		140		$\frac{nV}{\sqrt{Hz}}$
		1KHz		75		
		10KHz		70		
	en_{RMS}	BW : 100Hz to 100KHz		40		μV_{RMS}
Settling time		I_{LOAD} = 100mA		35		µs

Notes: 1. Above characteristics are given for 3V minimum input operating range voltage, but regulator is operational with 2.5V minimum input voltage.

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

ELECTRICAL CHARACTERISTICS

$2V < V_{IN} < 5V$, $-55°C < T_A < +125°C$, $C_{OUT} = 2.2\mu F \pm 20\%$, $0.02\Omega < ESR < 0.6\Omega$, $I_{LOAD} = 100mA$.
Typical case : $V_{IN} = 4V$, Ambient temperature, $I_{LOAD} = 100mA$.

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output decoupling Capacitor	C_{OUT}			2.2		µF
Cout equivalent serial resistor	ESR		0.02		0.6	Ω
Short Circuit Current Limit	I_{SHORT}		200	400	800	mA
Settling Time	t_S			35	60	µs

TYPICAL CHARACTERISTICS

Figure 3 : PSRR vs Frequency for Various Dropout (V_{OUT} =1.8V, Full Load)