



# LDOC\_516

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

PRODUCT PREVIEW

- CMOS REGULATOR
- VERY LOW DROPOUT VOLTAGE : 50mV
- LOW CONSUMPTION : 170µA FULL LOAD
- LOW NOISE : 200µV
- HIGH PSRR : 55dB
- OUTPUT CURRENT : 100mA
- SMALL OUTPUT DECOUPLING 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 ( $C_{OUT} = 1\mu\text{F}$ ) with an equivalent serial resistance (ESR) in the range 0.02 to 0.6Ω is used for regulator stability.

Figure 1 : Block Diagram

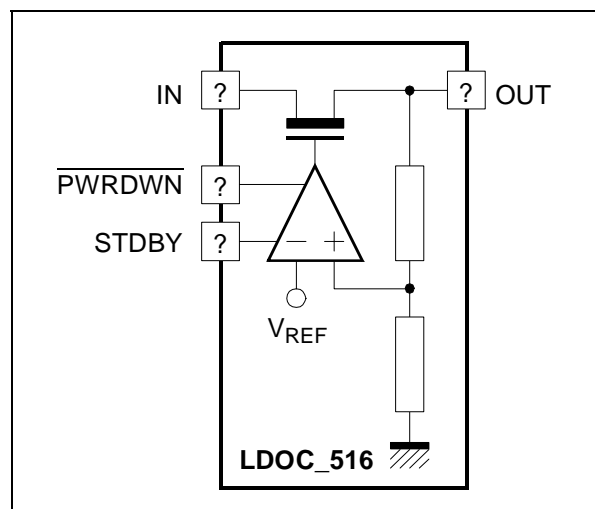
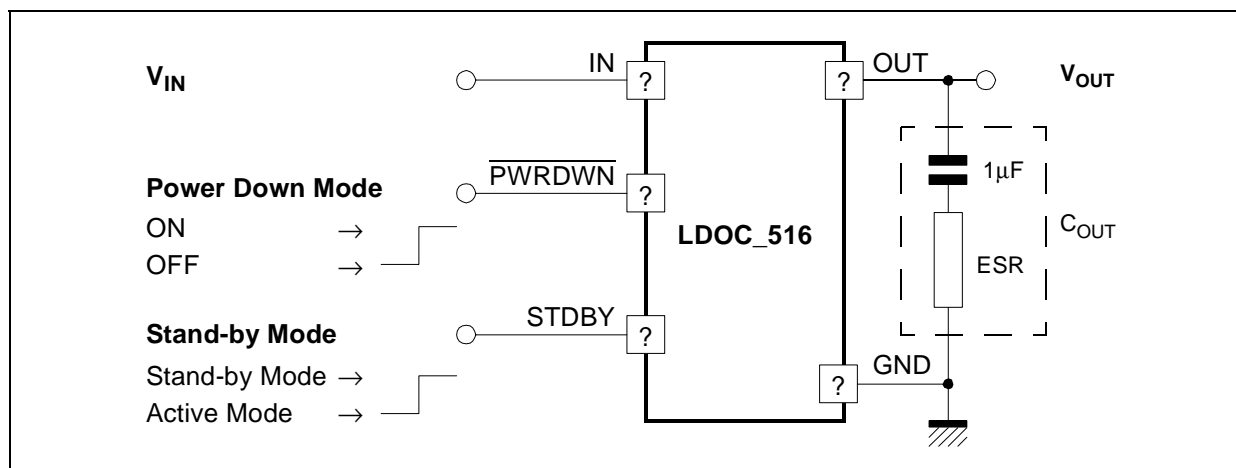


Figure 2 : Typical Application Circuit



**ELECTRICAL CHARACTERISTICS**

3V < V<sub>IN</sub> < 5.5V, -55°C < T<sub>A</sub> < +125°C, C<sub>OUT</sub> = 1µF ±20%, 20mΩ < ESR < 0.6Ω, I<sub>LOAD</sub> = 100mA.

Typical case : V<sub>IN</sub> = 4V, T = 25°C, C<sub>OUT</sub> = 1µF.

| Parameter                         | Symbol             | Test Condition  | Min. | Typ. | Max. | Unit                      |
|-----------------------------------|--------------------|---|------|------|------|---------------------------|
| Input Voltage Range (Note 1)      | V <sub>IN</sub>    |   | 3    |      | 5.5  | V                         |
| Output Voltage                    | V <sub>OUT</sub>   |   |      | 2.8  |      | V                         |
| Output Voltage Accuracy           |                    |   |      | 3    |      | %                         |
| Output current                    | I <sub>OUT</sub>   |   |      |      | 100  | mA                        |
| Dropout Voltage                   | ΔV <sub>DO</sub>   | ΔV <sub>OUT</sub> = 50mV,<br>I <sub>LOAD</sub> = 100mA                  |      |      | 50   | mV                        |
|                                   |                    | (Note 2)  | 200  |      |      |                           |
| Quiescent current                 | I <sub>Q</sub>     | I <sub>LOAD</sub> = 100µA   |      | 45   | 65   | µA                        |
|                                   |                    | I <sub>LOAD</sub> = 100mA   |      | 600  | 750  |                           |
| Power down mode quiescent current | I <sub>QPDM</sub>  | Power down active   |      | 100  |      | nA                        |
| Power Supply Rejection Ratio      | PSRR               | DC ; Dropout = 200mV  | 40   | 55   |      | dB                        |
|                                   |                    | f = 10KHz   | 40   | 55   |      |                           |
|                                   |                    | f = 100KHz  | 35   | 45   |      |                           |
| Line Regulation                   | L <sub>IR</sub>    | I <sub>LOAD</sub> = 100mA,<br>V <sub>IN</sub> = 3V to 5.5V              |      | 3.5  | 6.5  | mV                        |
| Load Regulation                   | L <sub>DR</sub>    | I <sub>LOAD</sub> = 100µA - 100mA                                       |      | 20   | 25   | mV                        |
| Line Transient                    | L <sub>IRT</sub>   | ΔV <sub>IN</sub> = 300mV<br>t <sub>RISE</sub> = t <sub>FALL</sub> = 5µs |      |      | 1    | mV                        |
| Load Transient                    | L <sub>DTR</sub>   | I <sub>LOAD</sub> = 100µA - 100mA<br>in 5µs                             |      | 2    |      | mV                        |
| Output Noise Voltage              | en                 | 100Hz   |      | 1.2  |      | $\frac{\mu V}{\sqrt{Hz}}$ |
|                                   |                    | 1KHz  |      | 400  |      | $\frac{nV}{\sqrt{Hz}}$    |
|                                   |                    | 10KHz   |      | 200  |      | $\frac{nV}{\sqrt{Hz}}$    |
|                                   | en <sub>RMS</sub>  | BW : 100Hz to 100KHz  |      | 60   |      | µV <sub>RMS</sub>         |
| Output decoupling Capacitor       | C <sub>OUT</sub>   |   |      | 1    |      | µF                        |
| Settling time                     |                    | I <sub>LOAD</sub> = 100mA   |      | 15   | 40   | µs                        |
| Short Circuit Current Limit       | I <sub>SHORT</sub> |   |      | 400  | 700  | 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 200mV min Dropout voltage.



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