



LDO BASICS

Quiescent Current 101



Quiescent Current Defined

- Quiescent is defined as “a state or period of inactivity or dormancy”
- Quiescent current (I_Q) is the current drawn by a system in standby mode with light or no load.

Quiescent Current \neq Shutdown Current

- Shutdown current is the current drawn when a device is turned off but the battery is still connected to the system.

$$P_D = (V_{IN} - V_{OUT}) * I_{OUT} + (V_{IN} * I_Q)$$

Example



$$V_{IN} = 4.2V \mid V_{OUT} = 1.8V \mid I_{OUT} = 200mA \mid I_Q = 50\mu A$$

$$P_D = (V_{IN} - V_{OUT}) * I_{OUT} + (V_{IN} * I_Q)$$

Active Mode

Standby Mode

$$P_D = (4.2 - 1.8) * 0.2 + (4.2 * 0.00005)$$

$$P_D = 480.21 \text{ mW}$$

$$P_D = (4.2 - 1.8) * 0.0001 + (4.2 * 0.00005)$$

$$P_D = 0.45 \text{ mW}$$

Space Constraints + Battery Life



Huge



~10mm x 23mm



1mm x 1mm

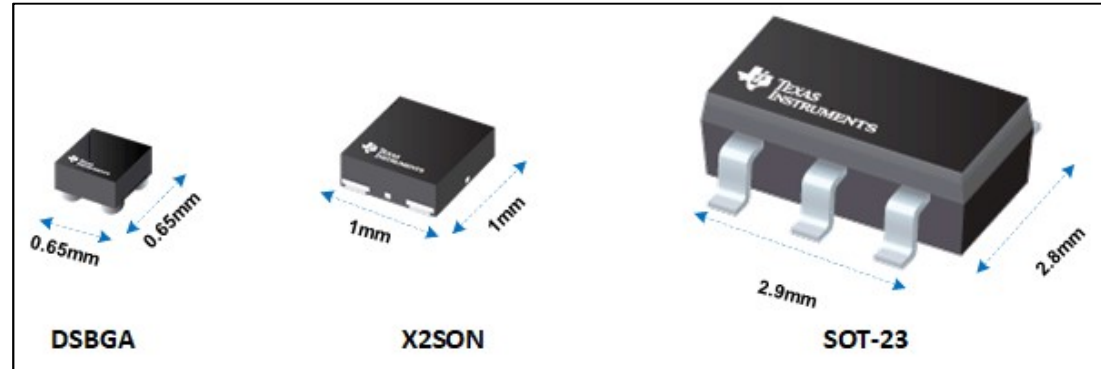


0.65mm x 0.65mm

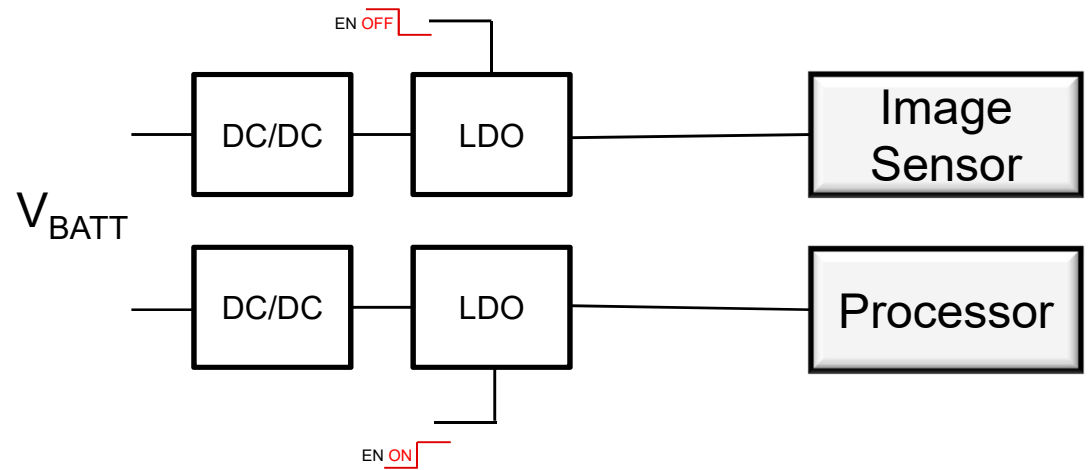
Space Constraints + Battery Life



Device	I_q
TPS7A05	1 μ A
TPS7A03	200nA
TPS7A02	25nA



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