



MAXIMIZE YOUR BATTERY LIFE WITH MICROPOWER SWITCH AND LATCH SENSORS

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INTRODUCTION: THE NEVER-ENDING QUEST FOR BATTERY LIFE

The pursuit of longer battery life is a constant challenge for engineers across diverse fields. Whether designing a wearable medical device, the next generation of consumer electronics, or an industrial application, minimizing power consumption is paramount. Allegro MicroSystems' APS11753 micropower switch and APS12753 micropower latch offer an efficient solution, combining ultra-low current consumption with robust performance and flexibility.

This whitepaper delves into the technical advantages of these devices, showcasing their value propositions and the system-level benefits they bring to power-sensitive applications.

Table 1: Key Characteristics

Characteristic	APS11753 (Typical)	APS12753 (Typical)
Supply Voltage (V)	1.7 to 5.5	1.7 to 5.5
Average Supply Current (μ A)	56 (1.5 ms sleep) / 4.4 (48 ms sleep)	56 (1.5 ms sleep) / 4.4 (48 ms sleep)
Supply Current, Sleep (μ A)	2.7	2.7
Operating Temperature ($^{\circ}$ C)	-40 to 150 / -40 to 125	-40 to 150 / -40 to 125
Switch/Latch point (Gauss)	15 / 30 / 400 (B_{OP})	10 / 20 / 400 (B_{OP})
Switch/Latch point Hysteresis (Gauss)	5 / 10 / 65 (B_{HYST})	20 / 40 / 70 (B_{HYST})

ALLEGRO'S MICROPOWER SWITCH AND LATCH SOLUTIONS: SMALL SIZE, BIG IMPACT

The APS11753 and APS12753 stand out for their innovative design and features tailored for battery-powered applications:

- **Ultra-Low Current Consumption:** These devices operate in the microampere (μ A) range, significantly reducing battery drain. This translates to extended operating times, smaller battery sizes, and reduced maintenance costs. The table below details the current consumption in different operating modes, highlighting the micropower capabilities.
- **Flexible Sleep Modes:** Programmable sleep times allow designers to fine-tune the balance between responsiveness and power consumption. In sleep mode, the current consumption drops drastically, further extending battery life.
- **Chopper Stabilization:** This advanced technique minimizes offset drift caused by temperature fluctuations and package

stress. This ensures reliable operation and accurate switching/latching points without frequent calibration, which can consume power. The Chopper Stabilization technique uses dynamic quadrature offset cancellation to eliminate these drift sources by modulating the magnetically induced signal and filtering out the DC offset.

- **Wide Operating Voltage Range:** This broad compatibility simplifies system design and eliminates the need for additional voltage regulators, which can introduce power losses.
- **Diverse Magnetic Sensitivity Options:** The APS11753 and APS12753 offer various magnetic sensitivity options, catering to different application requirements. This allows for optimized performance and precise actuation thresholds.
- **Push-Pull Output:** Simplifies integration with downstream circuitry.

APPLICATIONS

The APS11753 and APS12753 enable significant battery life improvements across a wide range of applications:

- **Medical Wearables:** Allegro's micropower switches and latches empower continuous monitoring in wearable applications like fitness trackers and medical patches. Their low current consumption drastically reduces the need for frequent battery replacements, enabling extended operation. These devices deliver the precise and reliable switching essential for accurate data capture in critical functions such as continuous glucose monitoring (CGM) and hearing aids.
- **Consumer Electronics:** Allegro's devices excel in consumer electronic applications by demanding robust performance and specialized features. Consider high-end gaming systems or peripherals, where precise position sensing enhances user experience. Smart home devices and consumer appliances prioritizing dependability also benefit from these sensors' reliable on/off functionality and precise position detection.
- **Industrial:** Allegro's micropower switches and latches deliver robust performance and specialized features essential for demanding industrial applications. In automated factories, our precise sensing optimizes robotic arm movements and conveyor belt control. Remote monitoring systems benefit from the low-power "change-of-state" reporting. For safety-critical functions, such as limit switches reliable on/off functionality and precise position detection are ensured.

CONCLUSION: ALLEGRO – YOUR PARTNER IN POWER-EFFICIENT DESIGN

In the quest for extended battery life, the APS11753 micropower switch and APS12753 micropower latch offer a compelling combination of ultra-low power consumption, robust performance, and design flexibility. These devices enable engineers to push the boundaries of what's possible in battery-powered applications, from wearable medical devices and remote industrial sensors to the next generation of consumer electronics and automotive systems. By leveraging these micropower solutions, designers can create innovative, energy-efficient products that meet the increasing demand for longer operating times and reduced maintenance costs.

Ready to explore the world of micropower possibilities? Visit the product page to learn more about our micropower switches and latches and start building smarter, more energy-efficient designs today!

Revision History

Number	Date	Description	Responsibility
-	November 6, 2024	Initial release	Neil Gokhale

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