

Rad-Hard Power Switches Enable Fault Management For Spacecraft Power Rails

[Apogee Semiconductor's](#) ARPS1020A5 and ARPS1050A5 represent a radiation-hardened power switch family engineered to bring deterministic protection, fault containment, and continuous health telemetry to spacecraft and other mission-critical power architectures. With two optimized variants, the ARPS power switch family cleanly spans key spacecraft rails (see the figure).

The ARPS1020A5 supports standard 3.3-V, 5-V, and 12-V power rails, while the ARPS1050A5 supports 28-V spacecraft buses, giving architects a consistent protection and telemetry strategy from regulated point-of-load domains through primary distribution. Designed as compact, high-side protected switches, these devices combine programmable overcurrent protection, short-circuit protection, overtemperature protection, adjustable soft-start, state-of-switch reporting, and current telemetry to enable system-level fault management without compromising SWaP-C.

"With the release of ARPS1020A5 and ARPS1050A5, we're continuing to expand the foundation established by our AxIO16 product releases," said Mark Hamlyn, general manager, Apogee Semiconductor. "The ARPS1020/ARPS1050 is the next step in executing our strategic roadmap and extending system-level fault management into power distribution."

The ARPS family represents the next milestone in Apogee's strategic roadmap to deliver modular, fault-managed building blocks that enable COTS-based spacecraft architecture. When paired with Apogee's recently released AxIO16 family of radiation-hardened I/O expanders, ARPS devices form a cohesive system-level solution for modern space systems.

Key features include:

- ARPS1020A5: 20 V at 8 A (23-m Ω R_{DS(ON)})
- ARPS1050A5: 50 V at 4 A (57-m Ω R_{DS(ON)})
- Industry's smallest eFuse, according to the vendor: 3-mm x 5-mm, 24-pin QFN
- Guaranteed break-before-make operation
- Overcurrent, short-circuit, and thermal protection
- Current-sense output for external telemetry
- Fault output and state-of-switch output pins for system health monitoring
- True current sharing in paralleled implementations
- Radiation tolerance for LEO and GEO missions

The ARPS1020 and ARPS1050 are available for ordering [online](#).



Figure. The ARPS1020A5 and ARPS1050A5 are radiation-hardened-by-design power switches with integrated FET. The 50-V variant supports the 28-V nominal bus voltage typically found in power distribution systems of a spacecraft, while the 20-V variant is well suited for a 12-V bus or at lower voltage loads such as 5 V and 3 V.