Fanless Passive Cooling Design Noise - Official Technical Overview & Hardware Datasheet

FANLESS PASSIVE COOLING DESIGN NOISE: PRODUCT OVERVIEW AND DATASHEET

EXECUTIVE SUMMARY

The enterprise networking landscape increasingly demands silent, dust-immune, and highly reliable switching and routing platforms for noise-sensitive environments such as open offices, medical imaging suites, recording studios, residential gateways, and light-industrial control rooms. Traditional forced-air cooling introduces acoustic pollution, mechanical wear, and particulate ingress, directly reducing mean time between failures (MTBF). The fanless passive cooling architecture described in this document eliminates all moving parts, achieving zero-decibel acoustic emission while maintaining full line-rate forwarding. This datasheet provides hardware engineers, procurement specialists, and systems integrators with complete mechanical, thermal, and forwarding specifications for deploying passive-cooled Ethernet infrastructure.



HARDWARE ARCHITECTURE & SILICON

The passive cooling design leverages a vertically oriented extruded aluminum heatsink array bonded directly to the packet forwarding engine and PHY devices via high-thermal-conductivity interface material. The chassis functions as a primary heat radiator, with convective airflow channels oriented to maximize natural chimney effect when mounted in standard 19-inch rack or desktop orientation. No fans, blowers, or rotating media are present. The silicon architecture implements a store-and-forward non-blocking switching fabric with integrated traffic manager, eliminating the need for active cooling on memory subsystems.

KEY FEATURES & ROUTING LOGIC

- Absolute Zero Noise: Acoustic emission measured at 0 dBA in any ambient temperature from 0°C to 40°C under full PoE+ load.

- Dust & Particulate Immunity: IP3X ingress protection rating for contaminant-free operation in industrial or warehouse edge deployments.

- Predictive Thermal Modelling: Integrated temperature sensors with software-adjustable warning thresholds; no fan failure states possible.

- MTBF Enhancement: Elimination of bearings and spinning media achieves calculated >500,000 hours MTBF at 40°C ambient.

- Forwarding Logic: Full Layer 2 switching with 802.1Q VLAN, Spanning Tree (RSTP/MSTP), and Layer 3 static routing / RIPng / OSPFv2.

- Power over Ethernet (Optional): 802.3at PoE+ support on designated ports, drawing energy from external power supply; passive thermal design validated for 30W per port simultaneously.

COMPLIANCE & STANDARDS

- Acoustic: ISO 7779 / ECMA-74 (declared noise emission, A-weighted) — reported as 0.0 dB(A) at operator position.

- Safety: UL 62368-1, CSA C22.2, IEC 60950-1 (transitioned to 62368-1).

- EMC: FCC Part 15 Class B, EN 55032 Class B, EN 55024, CISPR 32.

- Environmental: RoHS3, REACH, WEEE, Energy Star 3.0 (Network Equipment), ErP Lot 9.

- Thermal: GR-63-CORE NEBS Level 3 (thermal requirements for passive convection, office environment).

TECHNICAL SPECIFICATIONS

Forwarding Capacity: 56 Gbps non-blocking switching fabric

Throughput (64-byte): 41.66 Mpps

MAC Table: 16K entries

Routing Table (IPv4): 512 static / 256 dynamic (OSPF)

Jumbo Frame: 9216 bytes

Port Configuration: 8x 10/100/1000BASE-T RJ45 + 2x 1G SFP combo (or variant per SKU)

Power Supply: External 54V DC adapter (for PoE) or internal AC input 100-240V ~ 50/60Hz

Max Power Consumption (non-PoE): 18W (full line rate)

Max Power Consumption (PoE+): 160W (including device budget)

Operating Temperature: 0°C to 45°C (convection only, no derating)

Storage Temperature: -20°C to 85°C

Operating Humidity: 10% to 90% non-condensing

Chassis Dimensions: 330mm (W) x 44mm (H) x 205mm (D) — 1RU half-width or full 19-inch tray

Weight: 1.9 kg (4.2 lbs)

Mounting: Desktop rubber feet or 19-inch rack ear kit (included)

Parameter	Specification
Form Factor	1RU Rack-mountable or Desktop (19-inch tray compatible)
Switching Capacity	56 Gbps non-blocking
Power Supply	External 54V DC adapter (PoE models) or dual internal AC 100-240V (non-PoE enterprise models)
Acoustic Noise	0 dBA (fanless passive cooling, ISO 7779)
Operating Temperature Range	0°C to 45°C (100% line rate, no forced air)
MTBF (40°C ambient)	500,000 hours (Telcordia SR-332)

ORDERING SKU INFORMATION

SKU-FL-08GT: 8-port Gigabit Ethernet fanless switch, no PoE, external AC adapter.

SKU-FL-08GTP: 8-port Gigabit Ethernet fanless switch, 4x PoE+ ports (802.3at), 160W total power budget.

SKU-FL-16GT: 16-port Gigabit Ethernet fanless switch, rack-mountable, dual internal AC PSU (redundant).

SKU-FL-SFP4: 4x 1G SFP fanless aggregation switch with Layer 3 static routing.

Accessory: FL-RMK-1U (universal rack mount tray for half-width models).

