

# High-Performance 10/40 GbE Top-of-Rack Switch

**High-density 48-port 10 GbE switch with four 40 GbE uplinks in just 1-RU**

**Ultra-low-latency, non-blocking, cut-through switch ensures line-rate L2 and L3 performance**

**Integrated network automation and virtualization tools via the Open Automation Framework**

**Reversible front-to-back / back-to-front airflow with redundant, hot-swappable power and fans**

**VirtualScale stacking technology\***

**Data Center Bridging support via software\***

## Ultra-Low-Latency, Data Center Optimized 10/40 GbE Switch

The Force10 S-Series S4810 is an ultra low-latency 10/40 GbE Top-of-Rack (ToR) switch purpose-built for applications in high-performance data center and computing environments. Leveraging a non-blocking, cut-through switching architecture, the S4810 delivers line-rate L2 and L3 forwarding capacity with latency as low as 650 nanoseconds to maximize network performance. The compact S4810 design provides industry-leading density of 48 dual-speed 1/10 GbE (SFP+) ports as well as four 40 GbE QSFP+ uplinks to conserve valuable rack space and simplify the migration to 40 Gbps in the data center core. Powerful QoS features, coupled with Data Center Bridging (DCB) support via a future software enhancement, make the S4810 ideally suited for iSCSI storage environments. In addition, the S4810 incorporates multiple architectural features that optimize data center network flexibility, efficiency, and availability, including Force10's VirtualScale stacking technology, reversible front-to-back or back-to-front airflow for hot/cold aisle environments, and redundant, hot-swappable power supplies and fans.

The S4810 also supports Force10's Open Automation Framework, which provides advanced network automation and virtualization capabilities for virtual data center environments. The Open Automation Framework is comprised of a suite of inter-related network management tools that can be used together or independently to provide a network that is more flexible, available and manageable while reducing operational expenses.

## Applications

- Ultra-low-latency 10 GbE switching in HPCC, high-speed trading, iSCSI storage or other business-sensitive deployments that require the highest bandwidth and lowest latency
- High-density 10 GbE ToR server aggregation in high-performance data center environments
- Coupled with the ExaScale core switch/router to create a flat, two-tier, non-blocking 1/10/40 GbE data center network design
- Coupled with the S-Series 1/10 GbE ToR switches for cost-effective aggregation of 10 GbE uplinks

## Key Features

- 1-RU high-density 10/40 GbE ToR switch with 48 dual-speed 1/10 GbE (SFP+) ports and four 40 GbE (QSFP+) uplinks
- 1.28 Tbps (full-duplex) non-blocking, cut-through switching fabric delivers line-rate performance under full load with latency as low as 650 nanoseconds
- Scalable L2 and L3 Ethernet switching with QoS and a full complement of standards-based IPv4 and IPv6 features for unicast and multicast applications
- Reversible front-to-back or back-to-front airflow
- Redundant, hot-swappable power supplies and fans
- VirtualScale stacking technology leveraging 10 GbE or 40 GbE ports\*
- Open Automation Framework adds VM-awareness as well as automated configuration and provisioning capabilities to simplify the management of virtual network environments
- Modular Force10 Operating System (FTOS) software delivers inherent stability as well as advanced monitoring and serviceability functions
- Data Center Bridging (DCB) support\* enables a lossless Ethernet fabric for iSCSI storage and NFS traffic
- Supports jumbo frames for high-end server connectivity
- 128 link aggregation groups with up to 8 members per group, using advanced hashing
- VirtualView real-time network and application traffic monitoring for virtualized data centers
- Low power consumption

\* Indicates a roadmap feature.



# Specifications: S4810 High-Performance 10/40 GbE Top-of-Rack Switch

## Ordering Information

ORDER NUMBER	DESCRIPTION
S4810P-AC	S4810 base unit* with 1 AC power supply and dual fans (front to rear airflow**)
S4810P-AC-R	S4810 base unit* with 1 AC power supply and dual fans (rear to front airflow**)
S4810P-PWR-AC	S4810 AC power supply module with integrated fan (front to rear airflow**)
S4810P-PWR-AC-R	S4810 AC power supply module with integrated fan (rear to front airflow**)
S4810P-FAN	S4810 fan module (front to rear airflow**)
S4810P-FAN-R	S4810 fan module (rear to front airflow**)

\* S4810 base unit provides 48 10 GbE SFP+ ports and four 40 GbE QSFP+ ports. SFP+ and QSFP+ ports are ordered separately.

\*\* The S4810 I/O panel is considered the front, the power supply panel is considered the rear.

## Physical

48 line-rate 10 Gigabit Ethernet SFP+ ports  
4 line-rate 40 Gigabit Ethernet QSFP+ ports  
1 RJ45 console/management port with RS232 signaling

Size: 1 RU, 1.73 h x 17.32 w x 18.11" d (4.4 h x 44 w x 46 cm d)  
Weight: 14.39 lbs (6.54 kg)  
ISO 7779 A-weighted sound pressure level: 59.6 dBA at 73.4°F (23°C)  
Power supply: 100-240 VAC 50/60 Hz  
Max. thermal output: 1,023.6 BTU/h  
Max. current draw per system:  
2 A at 100/120 VAC, 1 A at 200/240 VAC  
Max. power consumption: Under 300W  
Max. operating specifications:  
Operating temperature: 32° to 104°F (0° to 40°C)  
Operating humidity: 10 to 85% (RH), non-condensing  
Max. non-operating specifications:  
Storage temperature: -40° to 158°F (-40° to 70°C)  
Storage humidity: 5 to 95% (RH), non-condensing  
Reliability: MTBF 169,315 hours

## Redundancy

Ring stacking topology with dynamic master election  
Hot swappable redundant power  
Hot swappable redundant fans

## Performance

MAC addresses: 128K  
IPv4 routes: 16K  
Switch fabric capacity: 1.28 Tbps (full-duplex)  
640 Gbps (half-duplex)  
Link aggregation: 8 links per group, 128 groups per stack  
Queues per port: 4 queues  
VLANs: 4096  
Line-rate Layer 2 switching: all protocols, including IPv4 and IPv6  
Line-rate Layer 3 routing: IPv4 and IPv6  
ACLs: 2K ingress, 1k egress  
LAGs: 128 with up to 8  
LAG load balancing: based on Layer 2, IPv4 or IPv6 headers  
Switching latency: 650 to 770 nanoseconds  
Packet buffer memory: 9MB  
CPU memory: 2GB

## IEEE Compliance

802.1AB LLD  
802.1ag Connectivity fault Management  
802.1D Bridging, STP  
802.1p L2 Prioritization  
802.1Q VLAN Tagging, Double VLAN Tagging, GVRP  
802.1s MSTP  
802.1w RSTP  
802.1X Network Access Control  
802.3ab Gigabit Ethernet (1000BASE-T)  
802.3ac Frame Extensions for VLAN Tagging  
802.3ad Link Aggregation with LACP  
802.3ae 10 Gigabit Ethernet (10GBASE-X)  
802.3ak 10 Gigabit Ethernet (10GBASE-CX4)  
802.3i Ethernet (10BASE-T)  
802.3u Fast Ethernet (100BASE-TX)

802.3x Flow Control  
802.3z Gigabit Ethernet (1000BASE-X)  
ANSI/TIA-1057 LLDP-MED  
Force10 PVST+  
MTU 9,252 bytes

## RFC and I-D Compliance

### General Internet Protocols

768 UDP 1321 MD5  
793 TCP 1350 TFTP  
854 Telnet 2474 Differentiated Services  
959 FTP 3164 Syslog

### General IPv4 Protocols

791 IPv4 1812 Routers  
792 ICMP 1858 IP Fragment Filtering  
826 ARP 2131 DHCP (relay)  
1027 Proxy ARP 2338 VRRP  
1035 DNS (client) 3021 31-bit Prefixes  
1042 Ethernet Transmission 3046 DHCP Option 82  
1191 Path MTU Discovery 3069 Private VLAN  
1305 NTPv3 3128 Tiny Fragment Attack Protection  
1519 CIDR  
1542 BOOTP (relay)

### General IPv6 Protocols

1981 Path MTU Discovery 2463 ICMPv6 (partial) 2464 Ethernet Transmission  
2460 IPv6 2675 Jumbograms  
2461 Neighbor Discovery 3587 Global Unicast (partial) Address Format  
2462 Stateless Address 4291 Addressing

## RIP

1058 RIPv1 2453 RIPv2

## OSPF

2154 MD5 3623 Graceful Restart  
1587 NSSA 4222 Prioritization and Congestion Avoidance  
2328 OSPFv2  
2370 Opaque LSA

## BGP

1997 Communities  
2385 MD5  
2439 Route Flap Damping  
2796 Route Reflection  
2842 Capabilities  
2858 Multiprotocol Extensions  
2918 Route Refresh  
3065 Confederations  
4360 Extended Communities  
4893 4-byte ASN  
5396 4-byte ASN representations  
draft-ietf-idr-bgp4-20 BGPv4  
draft-ietf-idr-restart-06 Graceful Restart  
draft-michaelson-4byte-as-representation-05 4-byte ASN Representation (partial)

## Multicast

1112 IGMPv1 3569 SSM for IPv4  
2236 IGMPv2 4541 IGMPv1/v2 Snooping  
3376 IGMPv3  
draft-ietf-pim-sm-v2-new-05 PIM-SM

## Network Management

1155 SMIv1  
1156 Internet MIB  
1157 SNMPv1  
1212 Concise MIB Definitions  
1215 SNMP Traps  
1493 Bridges MIB  
1850 OSPFv2 MIB  
1901 Community-based SNMPv2  
2011 IP MIB  
2012 TCP MIB  
2013 UDP MIB  
2024 DLSw MIB  
2096 IP Forwarding Table MIB  
2570 SNMPv3  
2571 Management Frameworks  
2572 Message Processing and Dispatching

2574 SNMPv3 USM  
2575 SNMPv3 VACM  
2576 Coexistence Between SNMPv1/v2/v3  
2578 SMIv2  
2579 Textual Conventions for SMIv2  
2580 Conformance Statements for SMIv2  
2618 RADIUS Authentication MIB  
2665 Ethernet-like Interfaces MIB  
2674 Extended Bridge MIB  
2787 VRRP MIB  
2819 RMON MIB (groups 1, 2, 3, 9)  
2863 Interfaces MIB  
2865 RADIUS  
3273 RMON High Capacity MIB  
3416 SNMPv2  
3418 SNMP MIB  
3434 RMON High Capacity Alarm MIB  
3580 802.1X with RADIUS  
5060 PIM MIB  
ANSI/TIA-1057 LLDP-MED MIB  
draft-grant-tacacs-02 TACACS+  
draft-ietf-idr-bgp4-mib-06 BGP MIBv1  
IEEE 802.1AB LLDP MIB  
IEEE 802.1AB LLDP DOT1 MIB  
IEEE 802.1AB LLDP DOT3 MIB  
rugin-mstp-mib-02 MSTP MIB (traps)  
sFlow.org sFlowv5  
sFlow.org sFlowv5 MIB (version 1.3)  
FORCE10-BGP4-V2-MIB Force10 BGP MIB (draft-ietf-idr-bgp4-mibv2-05)

FORCE10-IF-EXTENSION-MIB  
FORCE10-LINKAGG-MIB  
FORCE10-COPY-CONFIG-MIB  
FORCE10-MON-MIB  
FORCE10-PRODUCTS-MIB  
FORCE10-SS-CHASSIS-MIB  
FORCE10-SMI  
FORCE10-SYSTEM-COMPONENT-MIB  
FORCE10-TC-MIB  
FORCE10-TRAP-ALARM-MIB

## Regulatory Compliance

### Safety

UL/CSA 60950-1, Second Edition  
EN 60950-1, Second Edition  
IEC 60950-1, Second Edition Including all National Deviations and Group Differences  
EN 60825-1 Safety of Laser Products Part 1: Equipment Classification Requirements and User's Guide  
EN 60825-2 Safety of Laser Products Part 2: Safety of Optical Fibre Communication Systems  
FDA Regulation 21 CFR 1040.10 and 1040.11

### Emissions

Australia/New Zealand: AS/NZS CISPR 22: 2006, Class A  
Canada: ICES-003, Issue-4, Class A  
Europe: EN 55022: 2006+A1:2007 (CISPR 22: 2006), Class A  
Japan: VCCI V3/2009 Class A  
USA: FCC CFR 47 Part 15, Subpart B:2009, Class A

### Immunity

EN 300 386 V1.4.1:2008 EMC for Network Equipment  
EN 55024: 1998 + A1: 2001 + A2: 2003  
EN 61000-3-2: Harmonic Current Emissions  
EN 61000-3-3: Voltage Fluctuations and Flicker  
EN 61000-4-2: ESD  
EN 61000-4-3: Radiated Immunity  
EN 61000-4-4: EFT  
EN 61000-4-5: Surge  
EN 61000-4-6: Low Frequency Conducted Immunity

### RoHS

All S-Series components are EU RoHS compliant.



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