

**48-port GbE fixed configuration 1-RU switch with up to four 10 GbE ports**

**Line-rate switching performance and ultra-deep packet buffering**

**VirtualScale™ technology supports 576 GbE ports by stacking up to twelve S60 units**

**Modular Force10 Operating System (FTOS) software delivers inherent stability**

**Optimized data center design with rear rack mounts and front-to-back airflow**

### S-Series S60 High Performance GbE/10 GbE Access Switch

The Force10 S60 brings core-like resiliency to the network edge. Designed and optimized for data center top of rack and edge switching applications, the high density S60 design delivers a mix of 48 copper (10/100/1000Base TX) and fiber (SFP) Gigabit Ethernet (GbE) ports with optional 10 GbE uplinks as well as VirtualScale stacking capabilities. The high performance and low latency S60 Gigabit Ethernet switch delivers the critical functionality demanded at the edge of advanced data center networks in a compact 1-RU form factor. In addition to offering an 136 Gbps switch fabric, ultra-deep packet buffering and in-service software upgrades, the S60 delivers advanced design features such as hot-swappable, redundant AC or DC power supplies, hot swappable redundant fans, rear rack mount, and front-to-back airflow optimized for hot/cold aisles.

### Key Applications

Coupled with the E-Series and C-Series, which deliver unmatched resiliency and scalability, the S60 enables IT managers to deploy a high-performance, standards-based GbE and 10 GbE solution that spans from core to network edge.

- Line-rate GbE and 10 GbE rack switches for the most demanding data center, storage or compute facility
- Cost effective distribution layer into a 10 GbE LAN core or distributed data center deployments

### Key Features

- The 1-RU S60 switch delivers 48 access ports:
  - 44 10/100/1000Base-T copper ports
  - 4 GbE SFP ports
- Plus, the S60 provides two optional high-speed slots that support any of the following uplink modules:
  - 2-port 10 GbE (LAN PHY, pluggable SFP+ modules)
  - 2-port 12 Gbps stacking module
  - 1-port 24 Gbps stacking module
- High-capacity 136 Gbps switch fabric delivers line-rate switching performance
- Ultra-deep packet buffering (1.25 GB) eliminates congestion associated with bursty data center and storage applications
- VirtualScale technology enables stacking of up to 12 S60 units to deliver a cost-effective and high capacity solution
- Modular FTOS with advanced monitoring and serviceability functions
- Modular hardware with hot swappable redundant AC or DC power and hot swappable redundant fans
- Data center optimized design supports front-to-back airflow for hot/cold aisles and rear rack mounts with ports on the back for easier cable management
- VirtualView real-time network and application traffic monitoring for virtualized data centers
- Advanced, bare-metal auto-configuration tool simplifies switch provisioning
- Supports 9,252 byte jumbo frames
- Designed for NEBS compliance
- Full complement of standards-based Layer 2, IPv4 and IPv6 features for unicast and multicast applications



# Specifications: S60 Data Center Switch

## Ordering Information

ORDER NUMBER	DESCRIPTION
S60-01-GE-48T	48-port 10/100/1000Base-T chassis with four SFP ports, two modular slots, one AC power supply, FTOS software
S60-01-10GE-2P	2-port 10 GbE SFP+ module
S60-01-12G-2S	2-port 12 Gbps stacking module
S60-01-24G-1S	1-port 24 Gbps stacking module
S60-01-SSC-12G	60 cm stacking cable for S60-01-12G-2S
S60-01-LSC-12G	4 m stacking cable for S60-01-12G-2S
S60-01-SSC-24G	60 cm stacking cable for S60-01-24G-1S
S60-01-LSC-24G	4 m stacking cable for S60-01-24G-1S
S60-PWR-AC	AC Power Supply Module
S60-PWR-DC	DC Power Entry Module
SW-SB-LATEST	Layer 3 FTOS software upgrade

## Physical

44 line-rate 10/100/1000Base-T ports  
4 GbE SFP ports  
1 RJ45 console/management port with RS232 signaling

Optional uplink modules:

- 2 line-rate ports 10 Gigabit Ethernet SFP+
- 2 line-rate ports 12 Gigabit Stacking
- 1 line-rate port 24 Gigabit Stacking

Size: 1 RU, 1.7 h x 17.32 w x 16.73" d (4.3 h x 44 w x 42.5 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, –44 to –60 VDC

Max. thermal output: 531 BTU/h

Max. current draw per system:

- 2 A at 100/120 VAC, 1 A at 200/240 VAC, 3.6 A at –48 VDC

Max. power consumption: 156 W

Max. operating specifications:

- Operating temperature: 32° to 122°F (0° to 50°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  
Dual modular slots with up to four 10 GbE ports  
Link aggregation across stack members  
Hot swappable redundant AC or DC power  
Hot swappable redundant fans

## Performance

MAC addresses: 32K  
IPv4 routes: 16K  
IPv6 routes: 8K  
Switch fabric capacity: 136 Gbps  
Link aggregation: 8 links per group, 128 groups per stack  
Stacking capacity: 96 Gbps per stack member  
Queues per port: 4 queues  
VLANs: 1024 VLANs with 4096 tag value support  
Line-rate Layer 2 switching: all protocols, including IPv4 and IPv6  
Line-rate Layer 3 routing: IPv4 and IPv6  
LAG load balancing: based on Layer 2, IPv4 or IPv6 headers  
Switching latency: <10 µs for 64 byte frames

## IEEE Compliance

802.1AB LLDP  
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 Address Format (partial) 4291 Addressing

## RIP

1058 RIPv1 2453 RIPv2

## OSPF

2154 MD5 3623 Graceful Restart  
1587 NSSA 4222 Prioritization and  
2328 OSPFv2 Congestion Avoidance  
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  
rulin-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, 1st Edition  
EN 60950-1, 1st Edition  
IEC 60950-1, 1st 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 (CISPR 22: 2006), Class A  
Japan: VCCI V3/2007.04 Class A  
USA: FCC CFR 47 Part 15, Subpart B, Class A

### Immunity

EN 300 386 V1.3.3: 2005 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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