Dell Force10 S-Series S60 high-performance 1/10 GbE access switch with Ultra-deep packet buffering

Non-blocking, line-rate switching and routing; stackable 48-port GbE switch with up to four 10 GbE ports in just 1RU; ultra-deep packet buffering; integrated network automation and virtualization technology with Dell Force10's Open Automation Framework; flexible, resilient and energy-efficient design.

S-Series S60 high-performance access switch

The Dell Force10 S-Series S60 is a high-performance 1/10 GbE access switch optimized for lowering operational costs at the network edge. The S60 answers the key challenges related to network congestion in data center ToR (Top-of-Rack) and service provider aggregation deployments. As the use of bursty applications and services continue to increase, huge spikes in network traffic that can cause network congestion and packet loss, also become more common. The S60 is equipped with the industry's largest packet buffer (1.25 GB), enabling it to deliver lower application latency and maintain predictable network performance even when faced with significant spikes in network traffic. Providing 48 line-rate GbE ports and up to four optional 10 GbE uplinks in just 1-RU, the S60 conserves valuable rack space. Further, the S60 design delivers unmatched configuration flexibility, high reliability, and power and cooling efficiency to reduce costs.

In addition to delivering a compact and scalable design, the S60 also supports the Dell Force10 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

- Line-rate 1/10 GbE server aggregation at the ToR in high-performance data center environments
- Design with the E-Series virtualized switch/router to create a flat, two-tier, non-blocking 1/10 GbE data center network design
- High-performance GbE aggregation, switching and routing in service provider edge or access networks

Key features

- The 1-RU S60 switch delivers 48 GbE access interfaces
  - 44 10/100/1000Base-T copper ports (RJ45)
  - 4 GbE ports that can be configured for fiber or copper (SFP)
- Plus, the S60 provides two optional high-speed slots that support any of the following uplink modules:
  - 2-port 10 GbE (SFP+ modules)
  - 2-port 12 Gbps stacking module
  - 1-port 24 Gbps stacking module
- Ultra-deep packet buffering (1.25 GB) eliminates congestion associated with bursty applications and services
- Energy-efficient, versatile design supports the lowest power consumption in its class as well as reversible front-to-back or back-to-front airflow
- High-capacity 176 Gbps switch fabric delivers line-rate, low-latency switching
- Highly scalable Layer-2 and Layer-3 switching with a full complement of standards-based IPv4 and IPv6 features for unicast and multicast applications
- Force10's Open Automation Framework adds VM-awareness as well as automated configuration and provisioning capabilities to simplify the management of virtual network environments
- Carrier-class, NEBS Level 3 Certified product design supports redundant, hot-swappable power supplies (AC or DC) and fans
- Stacking technology enables up to 12 S60 switches to be managed as a single unit
- Modular Dell Force10 Operating System (FTOS) software delivers inherent stability as well as advanced monitoring and serviceability functions
- VirtualView™ real-time network and application traffic monitoring for virtualized data centers
- Supports 9,252 byte jumbo frames

Wire-speed 1/10GbE with Ultra-deep packet buffering delivers consistent & efficient application performance
### Specifications: S60 high-performance 1/10 GbE access switch

#### Ordering Information

<table>
<thead>
<tr>
<th>Order Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>225-2499</td>
<td>S60 switch, AC, rear to front airflow</td>
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<tr>
<td>225-2450</td>
<td>S60 switch, AC, front to rear airflow</td>
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<tr>
<td>225-2451</td>
<td>S60 switch, DC, rear to front airflow</td>
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<tr>
<td>225-2560</td>
<td>S60 switch, DC, front to rear airflow</td>
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</tbody>
</table>
| 331-5233     | 2-port 10 GbE high-speed uplink module (SFP+)
| 331-5235     | 2-port 12 Gigabit high-speed stacking module |
| 331-5234     | 1-port 24 Gigabit high-speed stacking module |
| 331-5261     | 4m 12 Gbps 560/560/525 stacking cable
| 331-5263     | 4m 24 Gbps 560/550/525 stacking cable
| 331-5264     | 60 cm 12 Gbps 560/550/525 stacking cable
| 331-5265     | 60 cm 24 Gbps 560/550/525 stacking cable
| 331-5261     | Fan module with rear to front airflow |
| 331-5323     | Fan module with front to rear airflow |
| 331-5225     | AC power supply module |
| 331-5226     | AC power supply module, reverse airflow |
| 331-5227     | DC power supply module, reverse airflow |
| 421-6935     | Layer 3 FCOs software upgrade, latest version |

**SFP and SFP+ modules are ordered separately**

*Each S60 switch includes 44 10/100/1000 Base-T ports, 4 GbE (SFP) interfaces and 2 high-speed slots, dual hot-swappable fans, and 1 AC or DC power supply module. The S60 I/O panel is considered the rear, the power supply panel is considered the front.*

#### Physical

- **44 10/100/1000 Base-T RJ-45 ports**
- **4 GbE SFP ports**
- **1 RJ-45 console/management port with RS232 signaling**
- **2 USB 2.0 ports (1 USB A, 1 USB B)**
- **Optional uplink** 2 line-rate ports 10 Gigabit Ethernet SFP+
- **modules:** 2 line-rate ports 12 Gigabit Stacking
- Size: 1 RU, 17.1 x 173.2 x 16.73 in (43.9 x 44 x 42.5 cm)
- 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, 1 A at 100/120 VAC, 2 A at 200/240 VAC
- Max. thermal output: 531 BTU/h
- Max. power consumption: 225 W
- **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:** 176 Gbps
- **Forwarding capacity:** 132 Mpps
- **Stacking capacity:** 96 Gbps per stack member
- **Queues per port:** 4 queues
- **VLANs:** Line-rate Layer 2 switching
- **Line-rate Layer 3 routing:** all protocols, including IPv4 and IPv6
- **LAG load balancing:** based on Layer 2, IPv4 or IPv6 headers
- **Packet buffer memory:** 1.25GB
- **CPU memory:** 2GB

#### IEEE Compliance

<table>
<thead>
<tr>
<th>IEEE Compliance</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>802.1D</td>
<td>LLDP</td>
</tr>
<tr>
<td>802.1Q</td>
<td>VLAN Tagging, Double VLAN Tagging, GVRP</td>
</tr>
<tr>
<td>802.1T</td>
<td>RSTP</td>
</tr>
<tr>
<td>802.1X</td>
<td>Network Access Control</td>
</tr>
<tr>
<td>802.3a</td>
<td>Gigabit Ethernet (1000BASE-T)</td>
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<tr>
<td>802.3ac</td>
<td>Frame Extensions for VLAN Tagging</td>
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<tr>
<td>802.3ad</td>
<td>Link Aggregation with LACP</td>
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<tr>
<td>802.3ae</td>
<td>10 Gigabit Ethernet (10GBASE-X)</td>
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<td>802.3br</td>
<td>Ethernet (100BASE-T)</td>
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<td>802.3u</td>
<td>Fast Ethernet (1000BASE-TX)</td>
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<tr>
<td>802.3v</td>
<td>Flow Control</td>
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<tr>
<td>802.3z</td>
<td>Gigabit Ethernet (1000BASE-X)</td>
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<tr>
<td>ANSI/TIA-568</td>
<td>LLDSP-MED</td>
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<tr>
<td>Force10</td>
<td>PVST+</td>
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<tr>
<td></td>
<td>MSTU</td>
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<td>9,252 bytes</td>
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#### RFC and I-D Compliance

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<th>RFC/ID</th>
<th>Description</th>
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<tr>
<td>876</td>
<td>LUDP</td>
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<tr>
<td>793</td>
<td>TCP</td>
</tr>
<tr>
<td>854</td>
<td>Teutron</td>
</tr>
<tr>
<td>959</td>
<td>FTP</td>
</tr>
</tbody>
</table>

#### General IPv4 Protocols

- **1981 IPv4**
- **1789 ICMP**
- **862 ARP**
- **1027 Proxy ARP**
- **1063 DNS (client)**
- **1042 Ethernet Transmission**
- **1101 Path MTU Discovery**
- **1025 NTPv3**
- **3019 CICR**
- **1542 BOOTP (relay)**

#### General IPv6 Protocols

- **1981 Path MTU Discovery**
- **2460 IPv6**
- **2461 Neighbor Discovery**
- **2462 Stateless Address Autoconfiguration**

#### RIP

- **1058 RIPv1**

#### OSPF

- **2154**
- **1587**
- **2328**
- **2370**

#### BGP

- **1997 Communities**
- **2385 MD5**
- **2439 Route Flap Damping**
- **2385 MD5**
- **1997 Communities**
- **1587 NSSA**
- **2154 MD5**
- **2338 VRRP**
- **3021 31-bit Prefixes (VRRP Option 82)**
- **3069 Private VLAN**
- **3128 Tiny Fragment Attack Protection**
- **4291 Addressing**

#### RIPv2

- **3058**

#### OSPF

- **3154**
- **3329**
- **5060 OSPF**

#### 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
- FDA Regulation 21 CFR 1040.10 and 1040.11

**Emissions**

- Australia/New Zealand: AS/NZS CISPR 22: 2006, Class A
- Canada: IECs-003, Issue-4, Class A
- USA: FCC CFR 47 Part 15, Subpart B, Class A
- Japan: VCCI V3/2007.04 Class A
- Canada: ICES-003, Issue-4, Class A
- Australia/New Zealand: AS/NZS CISPR 22: 2006, Class A
- FDA Regulation 21 CFR 1040.10 and 1040.11

**Immunity**

- EN 300 386 V1.3.3: 2005 EMC for Network Equipment
- 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
- IC: FCC CFR 47 Part 15, Subpart B, Class A

**RoHS**

- All S-Series components are EU RoHS compliant