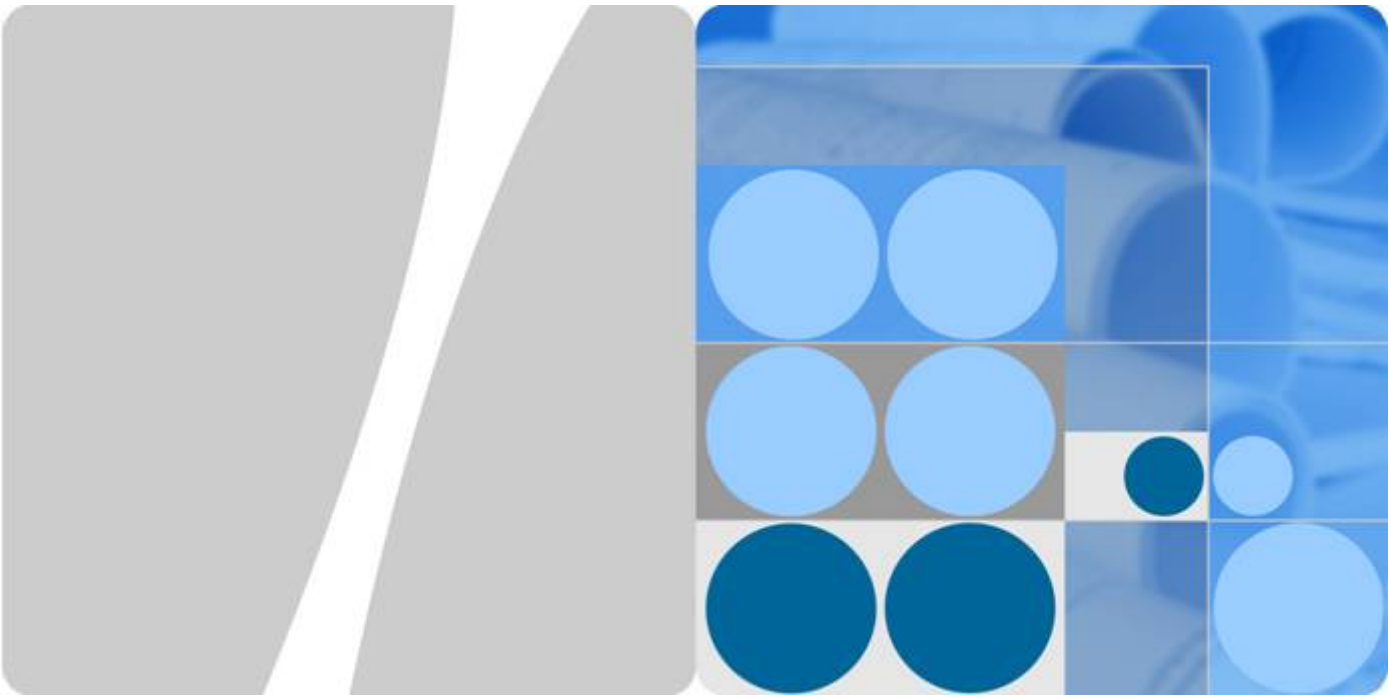

S2350 Series Ethernet Switches

Product Description

Issue 06

Date 2015-02-12

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About This Document

Intended Audience

This document describes the positioning, characteristics, architecture, link features, service features, application scenarios, operation and maintenance functions, and technical specifications of the switch.

This document helps you understand the characteristics and features of the switch.

This document is intended for:

- Network planning engineers
- Hardware installation engineers
- Commissioning engineers
- Data configuration engineers
- On-site maintenance engineers
- Network monitoring engineers
- System maintenance engineers

Statement

The device provides the mirroring function for network monitoring and fault management, during which communication data may be collected. Huawei alone is unable to collect or save the content of users' communications. It is suggested that you activate the functions based on the applicable laws and regulations in terms of purpose and scope of usage. You are obligated to take considerable measures to ensure that the content of users' communications is fully protected when the content is being used and saved.

Declaration

This manual is only a reference for you to configure your devices. The contents in the manual, such as web pages, command line syntax, and command outputs, are based on the device conditions in the lab. The manual provides instructions for general scenarios, but do not cover all usage scenarios of all product models. The contents in the manual may be different from your actual device situations due to the differences in software versions, models, and configuration files. The manual will not list every possible difference. You should configure your devices according to actual situations.

The specifications provided in this manual are tested in lab environment (for example, the tested device has been installed with a certain type of boards or only one protocol is run on the device). Results may differ from the listed specifications when you attempt to obtain the maximum values with multiple functions enabled on the device.

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
 NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
NOTE	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Updates between document issues are cumulative. Therefore, the latest document version contains all updates made to previous versions.

Changes in Issue 06 (2014-10-25)

The sixth commercial release has the following updates:

The documentation is modified according to updates in product features.

Changes in Issue 05 (2014-05-25)

The fifth commercial release has the following updates:

The documentation is modified according to updates in product features.

Changes in Issue 04 (2014-04-30)

The fourth commercial release has the following updates:

The documentation is modified according to updates in product features.

Changes in Issue 03 (2014-03-20)

The third commercial release has the following updates:

The documentation is modified according to updates in product features.

Changes in Issue 02 (2013-07-25)

The second commercial release has the following updates:

The documentation is modified according to updates in product features.

Changes in Issue 01 (2013-05-30)

Initial commercial release.

Contents

1 Mapping Between the S2350 Series Switches and Software Versions

Figure 1-1 shows S2350 version evolution.

Figure 1-1 S2350 version evolution

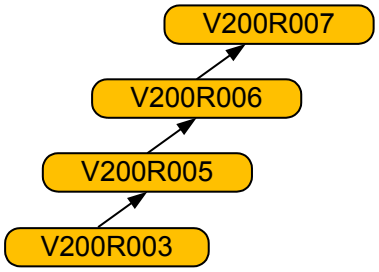


Table 1-1 lists the mapping between S2350 series switches and software versions.

Table 1-1 Mapping between the S2350-EI series switches and software versions

Device Series	Device Model	Available Version
S2350-EI	S2350-28TP-EI-AC	V200R003C00 and later versions
	S2350-20TP-PWR-EI-AC	V200R003C00 and later versions
	S2350-28TP-PWR-EI-AC	V200R003C00 and later versions
	S2350-28TP-EI-DC	V200R005C00 and later versions

NOTE

Unless otherwise specified, this document describes matching hardware and software performance of the switch in the latest version.

2 Product Overview

About This Chapter

2.1 Product Positioning

The S2350 Series Ethernet Switches (S2350 for short) provide the access and data transport functions. They are developed by Huawei to meet the requirements for reliable access and high-quality transmission of multiple services on the metropolitan area network (MAN).

Positioned for the access layer of the multi-service metropolitan area network (MAN), the S2350 provides large capacity, high port density, and cost-effective packet forwarding capabilities. In addition, the S2350 provides multi-service access capabilities, excellent extensibility, quality of service (QoS) guarantee, powerful multicast replication, and carrier-class security, and can be used to build ring or tree topologies of high reliability.

2.2 Product Characteristics

Carrier-Class Maintainability

- The carrier-class design of the S2350 is as follows:
  - The chassis is small, which effectively saves the space in an equipment room and reduces the Capital Expenditure (CAPEX). The chassis can be easily installed in various types of cabinets, which facilitates deployment.
  - The fan modules and power supplies are field-replaceable, which facilitates maintenance.
- The S2350 provides in-service patching and upgrading of the system software.
- The S2350 supports the Rapid Ring Protection Protocol (RRPP), a fast protective switchover mechanism, to implement fast switchover of services at the link level and service level. This ensures carrier-class reliability.

Powerful Multi-service Access Capabilities

The S2350 is usually deployed on the access layer of the MAN to aggregate service traffic from downstream devices such as the access media gateway (AMG), digital subscriber line access multiplexer (DSLAM), and LAN switch (LSW) to upstream devices. It supports the following services:

- Voice services of the next generation network (NGN)
- IPTV and video-on-demand (VoD) services
- Broadband access services

The S2350 adopts the mature and economical IP core technology and the high-performance Application Specific Integrated Circuit (ASIC) chip to provide a large switching capacity, thus satisfying the requirements for low delay and high reliability of traditional telecommunications services. In addition, the S2350 guarantees high bandwidth and supports multi-service access by:

- Adopting the Ethernet networking
- Supporting multicast services
- Providing QoS guarantee mechanisms and various protective switchover technologies

Flexible Networking Capability

The S2350 provides 10/100BASE-T Ethernet electrical interfaces and 100/1000BASE-X Ethernet optical interfaces. It supports multiple interface types such as access, trunk, and hybrid.

The S2350 provides swappable Small Form-Factor Pluggable (SFP) optical modules for optical fiber connections.The length of optical fibers can be selected according to the transmission distance.

The S2350 can be used to construct a tree, star, or ring Ethernet network. In the tree toplogy, the S2350 can use Smart Link to implement dual-homing uplink redundancy, improving network reliability. For the ring Ethernet, the S2350 supports the Spanning Tree Protocol (STP), SEP, ERPS and RRPP to prevent loops and provide rapid switchover.

Network-Level QoS Guarantee

The S2350 provides comprehensive QoS mechanisms. It can intelligently identify services and classify traffic according to Layer 2 to Layer 4 information in the Open System Interconnection (OSI) model. Then, it provides various policies such as access traffic filter, traffic policing, and queue scheduling to provide differentiated services.

High Extensibility

Based on the Huawei proprietary Versatile Routing Platform (VRP), the S2350 provides high-speed switching and various service features by integrating network management technologies.

Comprehensive Security Measures

The S2350 guarantees security of network devices and data transmission. It provides the following security measures to protect a network against attacks initiated by malicious users:

- Comprehensive mechanisms to defend against MAC-based attacks
- Various ACL policies
- Many anti-attack functions such as MAC forced forwarding, IP source guard, ARP security, and CPU defense
- Mechanism of forwarding table search based on VLAN IDs and MAC addresses
- Traffic suppression

In addition, the S2350 provides the following functions to ensure secure login of users:

- Provides login passwords and password encryption for login users.
- Protects commands through users levels and command levels.
- Locks the configuration terminal through a certain command to prevent illegal use of the device.
- Displays confirm messages for important commands that affect system performance.

The S2350 provides the Automatic Laser Shutdown (ALS) function, which enables the S2350 to stop transmitting laser when a fiber is broken. This function protects users against the laser.

Convenient Operation and Maintenance

In addition to collecting traffic statistics based on interfaces, the S2350 provides fault detection and location tools such as ping and traceroute on an IP network. It can also work with the Huawei

U2000 network management system (NMS) to implement performance monitoring, alarm report, and fast fault location.

Through the U2000, you can configure and manage the S2350, for example, manage interfaces, VLANs, multicast services, software upgrading, and configuration files. The U2000 supports various personalized configuration modes such as end-to-end configuration, batch configuration, and configuration wizard. In addition, it provides default configuration templates for management functions.

Energy-Saving Design

The S2350 adopts the following measures to save energy:

- It adopts natural heat dissipation so that power consumed by fans is saved.
- The chip switches to the power saving mode when no connected device is detected on a service interface, that is, the interface is idle.
- It uses highly-integrated and energy-saving chips produced through advanced processing techniques. With the help of the intelligent device management system, the chips not only improve system performance but also greatly reduce power consumption of the entire system.

Natural heat dissipation has the following advantages:

- The product reliability is high.
- There is no noise pollution.
- You do not need to maintain the fans, which saves the maintenance cost.
- The system does not have additional power consumption generated by fans, which improves the power efficiency.
- Boards are prevented from being eroded.

Advanced Lightning Protection Technologies

The S2350 adopts the Huawei patented surge protection technologies to protect the equipment. The surge protection technologies reduce the probability of damages caused by lightning, thus greatly improving the device reliability.

Intelligent PoE Power Supply

The S2350 PoE switches has the PoE function. It provides centralized power supply for the attached IP phone, wireless access point (AP), portable device charger, POS machine, camera, and data collector through twisted pairs.

The PoE function of the S2350 PoE switches complies with IEEE 802.3af and IEEE 802.3at. The S2350 can provide power for the devices of different vendors remotely. In IEEE 802.3at, the maximum power supply capability is 30 W. This capability ensures adequate power for IP video phone, dualband WiFi AP, IP camera, multi-function STB11, and RFID and simplifies the network.

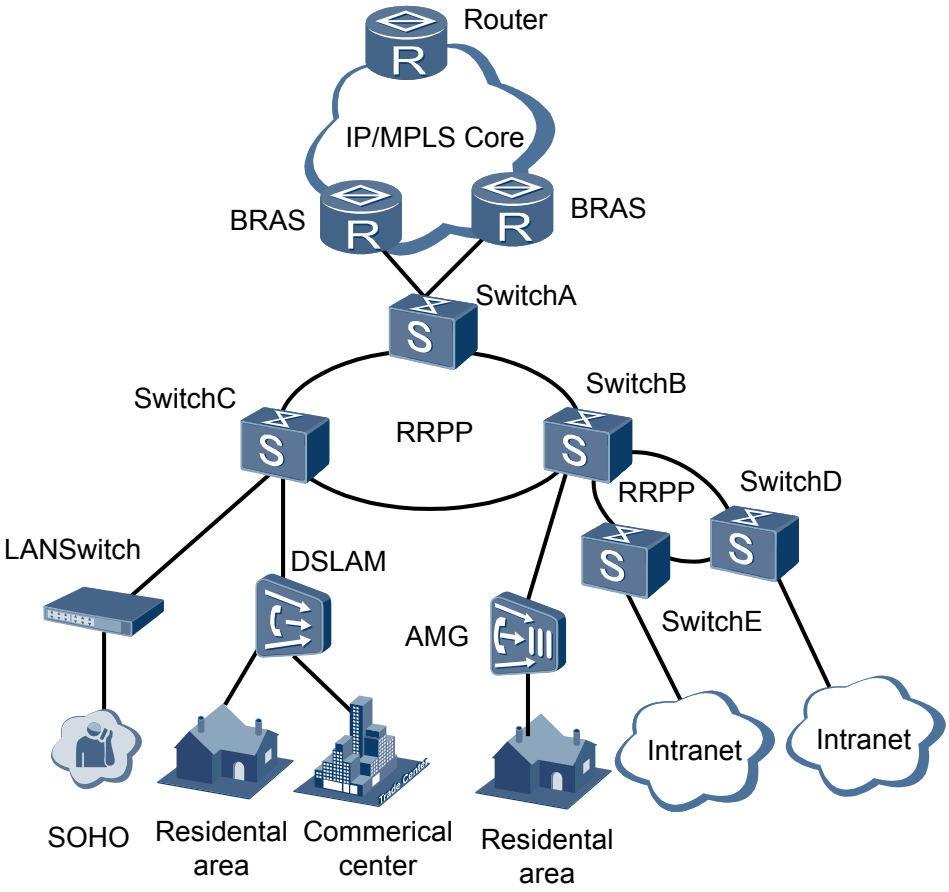
The S2350 PoE switches has the ability to control power supply based on time range, thus effectively managing network devices, reducing power consumption, and lowering the OPEX.

3 Application Scenarios

About This Chapter

3.1 Application on a MAN

Figure 3-1 Application of the S2350 on a MAN



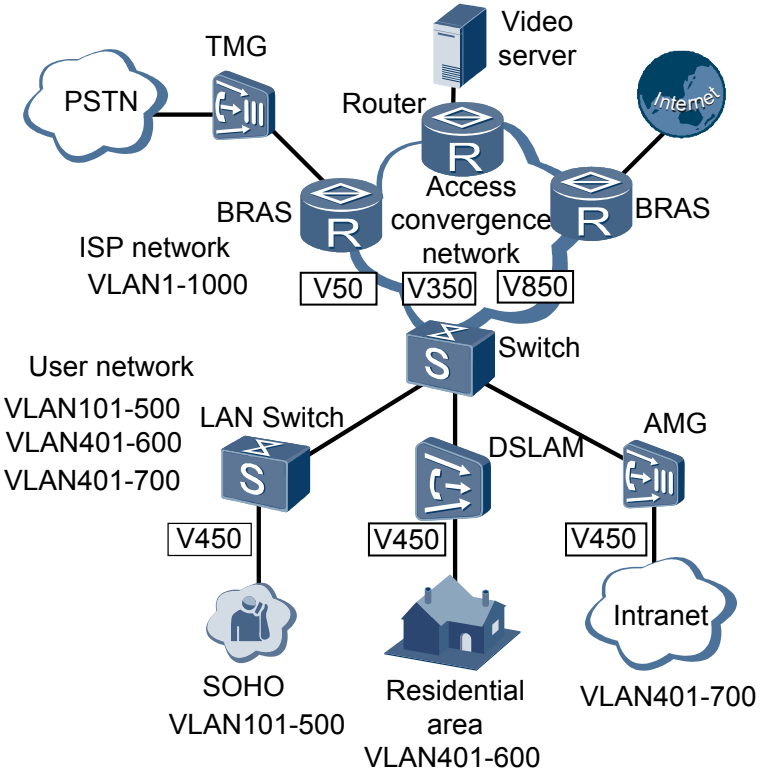
On a MAN, the S2350 provides the following functions:

- SwitchD and switchE are directly connected to the user hosts and aggregate the user services to switchB.
- SwitchA, SwitchB, and SwitchC form an STP ring, and SwitchB, SwitchD, and SwitchE form another STP ring. The rings improve service reliability through the rapid switchover mechanism.

3.2 VLAN Mapping

The S2350 provides the VLAN mapping function. **Figure 3-2** shows the networking of VLAN mapping.

Figure 3-2 VLAN mapping networking



After VLAN mapping is configured, ISPs need to manage only VLAN tags on the MAN, and different user networks can use same VLAN tags. The S2350 aggregates traffic from user networks to the ISP network and implements VLAN mapping between user networks and the ISP network. VLAN mapping implements communication between VLANs and facilitates service deployment.

When the S2350 receives service packets sent from a user network to the ISP network, it replaces the C-VLAN tag of the packets with the S-VLAN tag specified by the ISP. For example:

- Replaces C-VLAN 450 of Small Office/Home Office (SOHO) with S-VLAN 850.
- Replaces C-VLAN 450 of the residential community with S-VLAN 50.
- Replaces C-VLAN 450 of an enterprise intranet with S-VLAN 350.

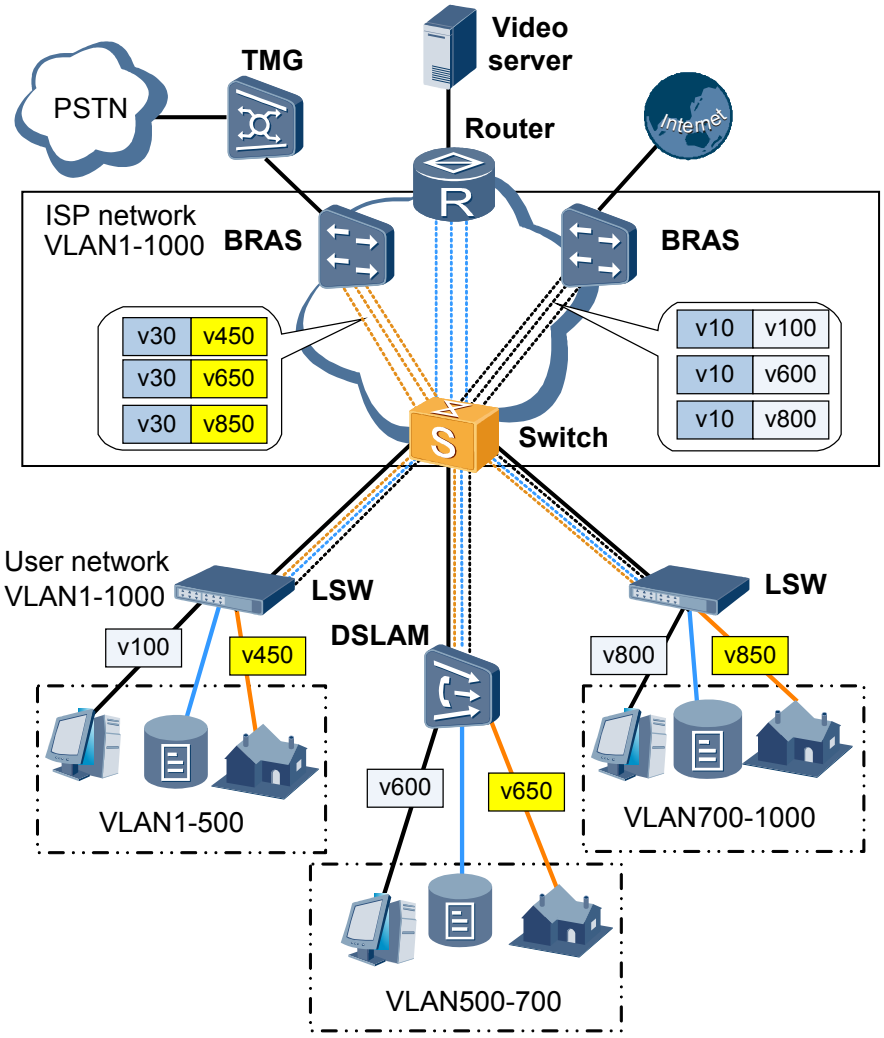
When receiving service packets sent from the ISP network to an enterprise intranet, the S2350 replaces the S-VLAN tag with the C-VLAN tag of the enterprise intranet.

3.3 Application of Selective QinQ

This section describes how selective QinQ functions on a network.

Selective QinQ networking is demonstrated in **Figure 3-3**, where "Switch" represents the S2350.

Figure 3-3 Selective QinQ



The three enterprise networks shown in **Figure 3-3**, all need to transmit data, voice, and video services. The Switch can append an outer ISP VLAN tag to packets belonging to each kind of access service. For example:

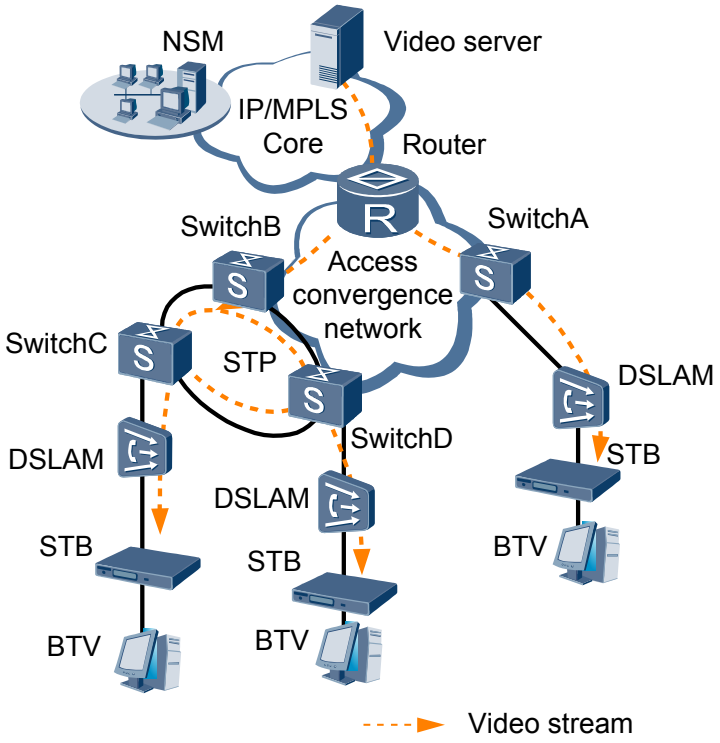
- Add an outer ISP VLAN tag VLAN 10 for data services belonging to VLAN 100, VLAN 600, and VLAN800 from the customer networks.
- Add an outer ISP VLAN tag VLAN 30 for video services belonging to VLAN 450, VLAN 650, and VLAN850 from the customer networks.

Using selective QinQ, the S2350 can converge services and choose different paths for various services to more effectively facilitate network deployment.

3.4 Application in IPTV Services

Figure 3-4 shows the application of the S2350 in IPTV services.

Figure 3-4 Application of the S2350 in IPTV services



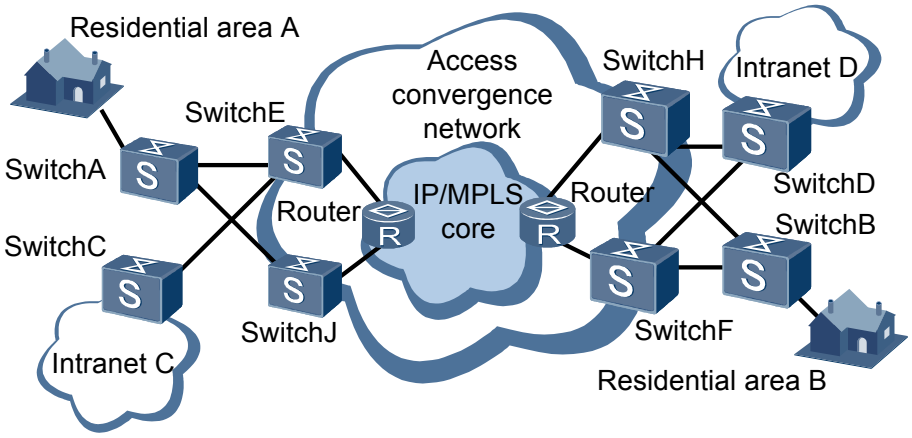
SwitchC and SwitchD function as UPEs and provide the IGMP snooping function. They can serve as the replication and control point for multicast services at the access layer of the MAN to meet the demand for large-capacity multicast services. The DSLAM provides the IGMP proxy function to control user access to multicast services based on the user authority configured on the NSM.

In addition, SwitchA, SwitchB, SwitchC, and SwitchD allow interfaces to join or leave multicast groups quickly, which implements fast switching of services.

3.5 Partitioned STP at Access and Aggregation Layers

Figure 3-5 shows the networking of partitioned STP supported by the S2350.

Figure 3-5 Partitioned STP supported by the S2350



As shown in the figure, enterprise intranets C and D, and residential communities A and B are all connected to a MAN. SwitchA, SwitchB, SwitchC, and SwitchD function as UPEs and connect to the enterprise intranets and residential communities directly. The UPEs are dual-homed to SwitchE, SwitchF, SwitchH, and SwitchJ to improve link reliability.

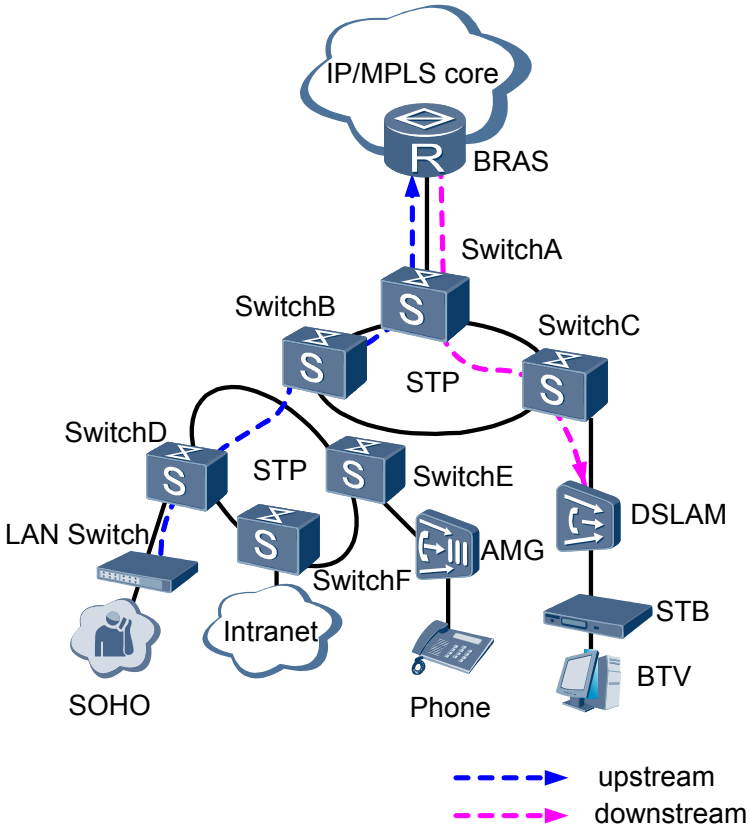
- Each UPE is dual-homed to the MAN and forms a partitioned STP network with two PE-AGGs. For example, SwitchA, SwitchE, and SwitchJ form a partitioned STP network.
- SwitchC and SwitchD at the egress of the intranets are on the same VLAN with SwitchE, SwitchF, SwitchH, and SwitchJ. BPDUs of intranet C and intranet D are transmitted transparently on this VLAN.
- SwitchA and SwitchB at the ingress of the residential communities are on the same VLAN with SwitchE, SwitchF, SwitchH, and SwitchJ. BPDUs of community A and community B are transmitted transparently on this VLAN.
- SwitchE, SwitchF, SwitchH, and SwitchJ on the MAN support BPDU tunneling and MSTP snooping.

The partitioned STP technology enables BPDUs of a user network to be transmitted transparently on the ISP network so that the user network can calculate a uniform spanning tree. In this way, users on the same network can communicate with each other even though they are in different geographical locations. In addition, the user network and ISP network use independent spanning trees.

3.6 End-to-End QoS

The S2350 provides the end-to-end QoS function. **Figure 3-6** shows the networking where the end-to-end QoS is configured.

Figure 3-6 End-to-end QoS provided by the S2350



SwitchC, switchD, switchE, and switchF function as the UPEs, and switchA and switchB function as UPEs or PE-AGGs. The UPE or PE-AGG provides end-to-end QoS guarantee for the services on the LAN switch and DSLAM.

- At the ingress of the access and aggregation layer, the S2350 classifies data, voice, and video services. The S2350 then polices traffic and re-marks the precedence of packets.
- At the egress of the access and aggregation layer, the S2350 performs queue scheduling and rate limit.

By mapping 802.1p priorities to different packets, the S2350 provides end-to QoS guarantee for the entire network.

4 Hardware Architecture

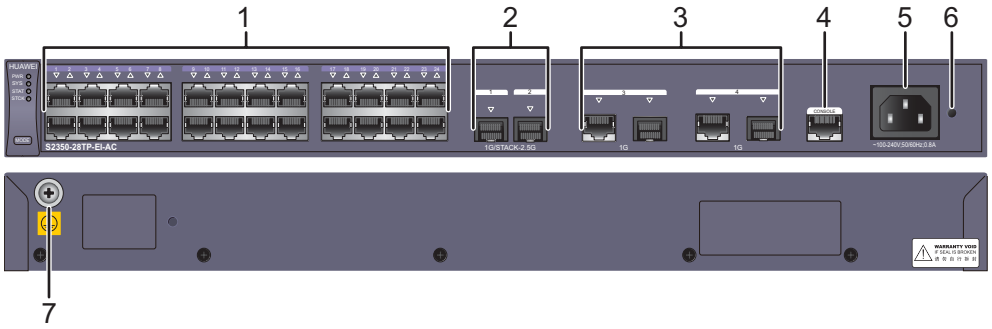
About This Chapter

4.1 Appearance and Structure

4.1.1 S2350-EI

S2350-28TP-EI-AC

Figure 4-1 Appearance of the S2350-28TP-EI-AC

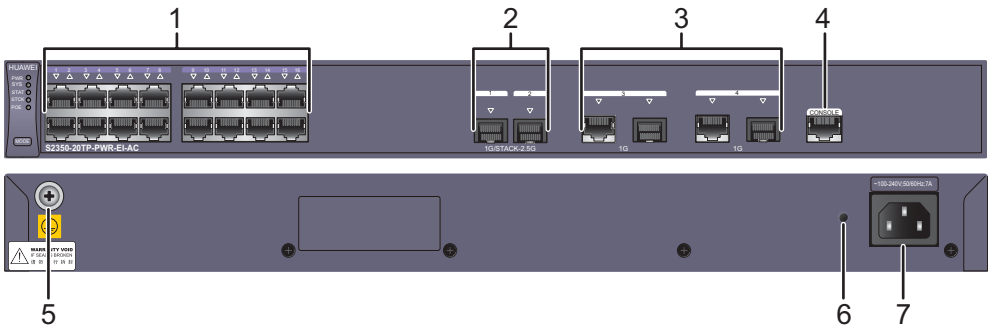


1	Twenty-four 10/100BASE-TX electrical ports	2	Two 1000BASE-X optical ports Applicable modules and cables: ● GE optical module ● GE-CWDM optical module ● GE-DWDM optical module ● GE SFP copper module ● Stack optical module ● 1 m, 10 m SFP+ copper cables ● 3 m, 10 m AOC cables
3	Two combo ports (10/100/1000BASE-T + 100/1000BASE-X) Modules applicable to combo optical ports: ● FE optical module ● GE optical module ● GE-CWDM optical module ● GE-DWDM optical module	4	One console port

5	AC power socket **NOTE** It is used with an AC power cable.	6	Jack reserved for AC terminal locking latch **NOTE** The AC terminal locking latch is not delivered with the switch.
7	Ground screw **NOTE** It is used with a ground cable.	-	-

S2350-20TP-PWR-EI-AC

Figure 4-2 Appearance of the S2350-20TP-PWR-EI-AC

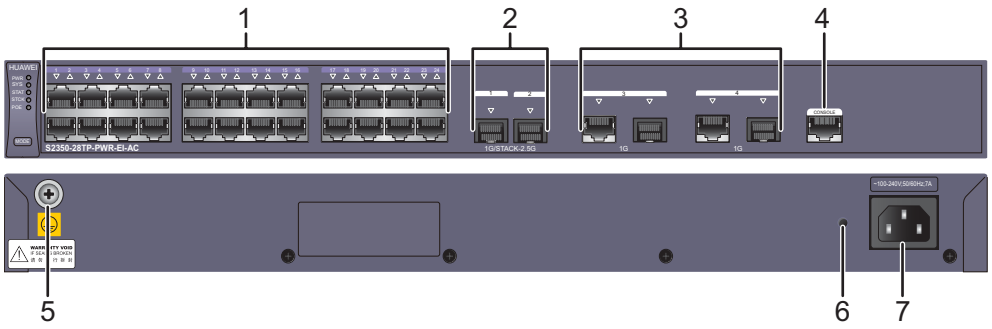


1	Sixteen PoE+ 10/100BASE-TX electrical ports	2	Two 1000BASE-X optical ports Applicable modules and cables: ● GE optical module ● GE-CWDM optical module ● GE-DWDM optical module ● GE SFP copper module ● Stack optical module ● 1 m, 10 m SFP+ copper cables ● 3 m, 10 m AOC cables
3	Two combo ports (10/100/1000BASE-T + 100/1000BASE-X) Modules applicable to combo optical ports: ● FE optical module ● GE optical module ● GE-CWDM optical module ● GE-DWDM optical module	4	One console port

5	Ground screw **NOTE** It is used with a ground cable.	6	Jack reserved for AC terminal locking latch **NOTE** The AC terminal locking latch is not delivered with the switch.
7	AC power socket **NOTE** It is used with an AC power cable.	-	-

S2350-28TP-PWR-EI-AC

Figure 4-3 Appearance of the S2350-28TP-PWR-EI-AC

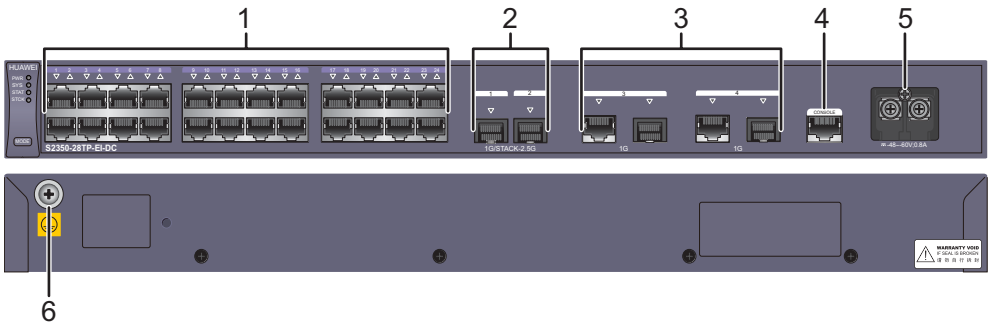


1	Twenty-four PoE+ 10/100BASE-TX electrical ports	2	Two 1000BASE-X optical ports Applicable modules and cables: ● GE optical module ● GE-CWDM optical module ● GE-DWDM optical module ● GE SFP copper module ● Stack optical module ● 1 m, 10 m SFP+ copper cables ● 3 m, 10 m AOC cables
3	Two combo ports (10/100/1000BASE-T + 100/1000BASE-X) Modules applicable to combo optical ports: ● FE optical module ● GE optical module ● GE-CWDM optical module ● GE-DWDM optical module	4	One console port

5	Ground screw **NOTE** It is used with a ground cable.	6	Jack reserved for AC terminal locking latch **NOTE** The AC terminal locking latch is not delivered with the switch.
7	AC power socket **NOTE** It is used with an AC power cable.	-	-

S2350-28TP-EI-DC

Figure 4-4 Appearance of the S2350-28TP-EI-DC



1	Twenty-four 10/100BASE-TX electrical ports	2	Two 1000BASE-X optical ports Applicable modules and cables: ● GE optical module ● GE-CWDM optical module ● GE-DWDM optical module ● GE SFP copper module ● Stack optical module ● 1 m, 10 m SFP+ copper cables ● 3 m, 10 m AOC cables
3	Two combo ports (10/100/1000BASE-T + 100/1000BASE-X) Modules applicable to combo optical ports: ● FE optical module ● GE optical module ● GE-CWDM optical module ● GE-DWDM optical module	4	One console port

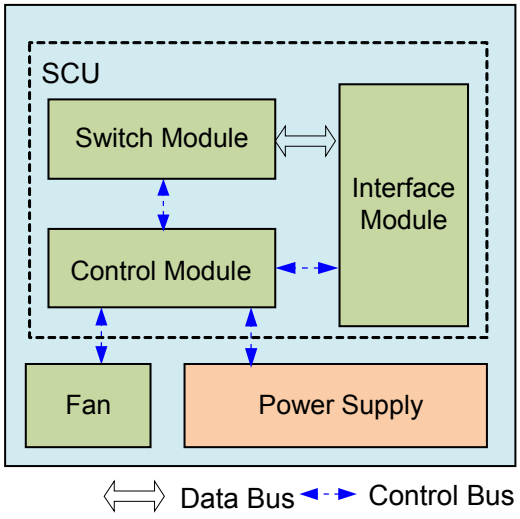
5	DC power terminal **NOTE** It is used with a DC power cable.	6	Ground screw **NOTE** It is used with a ground cable.

4.2 Hardware Modules

Figure 4-5 shows the logical structure of hardware modules of the switch.

Hardware modules of the S2350 refer to the SCU (Switch Control Unit), power supply,Pluggable Modules for Interfaces, and fan.

Figure 4-5 Logical structure of hardware modules



SCU

The SCU is fixed on the S2350. Each S2350 has one SCU.

The SCU is responsible for packet switching and device management. It integrates multiple functional modules, namely, the main control module, switching module, and interface module.

Main Control Module

The main control module implements the following functions:

- Processing protocols
- Functioning as an agent of the user to manage the system and monitor the system performance according to instructions of the user, and report the running status of the device to the user
- Monitoring and maintaining the interface module and switching module on the SCU

Switching Module

The switching module, also called the switching fabric, is responsible for packet exchange, multicast replication, QoS scheduling, and access control on the interface module of the SCU.

The switching module adopts high performance chips to implement line-speed forwarding and fast switching of data with different priorities.

Interface Module

The interface module provides Ethernet interfaces for accessing Ethernet services.

Power Supply

For details about S2350 power supply configuration, see *S2350 Hardware Description* - Chassis - S2350-EI - Power Supply.

Fan Modules

The S2350-28TP-EI-AC and S2350-28TP-EI-DC support fanless heat dissipation. S2350-28TP-PWR-EI-AC and S2350-20TP-PWR-EI-AC have built-in fan modules and use the forcible mode. In forcible mode, fan modules start to work as soon as the switch starts.

Pluggable Modules for Interfaces

For specifications of various pluggable Modules for Interfaces, see "Pluggable Modules for Interfaces" in the *S2350 Series Ethernet Switches Hardware Description*.

5 Product Performance

About This Chapter

5.1 Product Features

NOTE

Unless otherwise specified, this document describes switch features and software performance of the latest version.

Table 5-1 lists features supported by the S2350.

Table 5-1 Features supported by the S2350

Feature		Description
Ethernet features	Ethernet	Operating modes of full-duplex, half-duplex, and auto-negotiation
		Rates of an Ethernet interface: 10 Mbit/s, 100 Mbit/s, 1000 Mbit/s, and auto-negotiation
		Flow control on interfaces
		Jumbo frames
		Link aggregation
		Load balancing among links of a trunk
		Transparent transmission of Layer 2 protocol packets
		Device Link Detection Protocol (DLDP)
		Link Layer Discovery Protocol (LLDP)
		Link Layer Discovery Protocol-Media Endpoint Discovery (LLDP-MED)
		Interface isolation and forwarding restriction
		Broadcast storm suppression
	VLAN	Access modes of access, trunk, hybrid, and QinQ
		Default VLAN
		VLAN assignment based on interfaces, MAC addresses, protocols, and IP subnets
		VLAN assignment based on the following policies: ● MAC address + IP address ● MAC address + IP address + interface number ● DHCP policies
		VLAN stacking for untagged packets
		VLAN mapping

Feature		Description
		Selective QinQ
		MUX VLAN
		Voice VLAN
		Guest VLAN
	GVRP	Generic Attribute Registration Protocol (GARP)
		GARP VLAN Registration Protocol (GVRP)
	MAC	Automatic learning and aging of MAC addresses
		Static, dynamic, and blackhole MAC address entries
		Packet filtering based on source MAC addresses
		Interface-based MAC learning limiting
		Sticky MAC address entries
		MAC address flapping detection
		MAC address spoofing defense
		Port bridge
	ARP	Static and dynamic ARP entries
		RARP
		ARP in a VLAN
		Aging of ARP entries
Ethernet loop protection	MSTP	STP
		RSTP
		MSTP
		VBST
		BPDU protection, root protection, and loop protection
		TC-BPDU attack defense
		STP loop detection
	Loopback-detect	Loop detection on an interface
	SEP	Smart Ethernet Protection (SEP)
	Smart Link	Smart Link
		Smart Link multi-instance

Feature		Description
		Monitor Link
	RRPP	RRPP protective switchover
		Single RRPP ring, tangent RRPP ring, and intersecting RRPP ring
		Hybrid networking of RRPP rings and other ring networks
	ERPS	G.8032 v1/v2
		Single closed ring
		Subring
IPv4/ IPv6 forwarding	IPv4 and unicast routes	Static IPv4 routes
		VRF
		DHCP client
		DHCP server
		DHCP relay
	IPv6 features	IPv6 protocol stack
		ND and ND snooping
		DHCPv6 snooping
Layer 2 multicast features	-	IGMPv1/v2/v3 snooping
		Fast leave
		IGMP proxy
		MLD snooping
		Interface-based multicast traffic suppression
		Inter-VLAN multicast replication
		Controllable multicast
Stacking	-	Service interface supporting the stacking function
Ethernet OAM	EFM OAM (802.3ah)	Automatic discovery
		Link fault detection
		Link fault troubleshooting
		Remote loopback
	CFM OAM (802.1ag)	Software-level CCM
		MAC ping

Feature		Description
		MAC ping
	Y.1731	Delay and variation measurement
QoS features	Traffic classifier	Traffic classification based on ACLs
		Traffic classification based on outer 802.1p priorities, outer VLAN IDs, source MAC addresses, and Ethernet types
	Traffic behavior	Access control after traffic classification
		Traffic policing based on traffic classification
		Re-marking based on traffic classification
		Associating traffic classifiers with traffic behaviors
	Traffic policing	Rate limit on inbound and outbound interfaces
	Traffic shaping	Traffic shaping on interfaces and queues
	Congestion avoidance	Tail drop
	Congestion management	Queue mapping
		Priority Queuing (PQ)
		Deficit Round Robin (DRR)
		PQ+DRR
		Weighted Round Robin (WRR)
		PQ+WRR
Configuration and maintenance	Login and configuration management	Command line configuration
		Error message and help information in English and Chinese
		Login through console and Telnet terminals
		SSH1.5/SSH2
		Send function and data communication between terminal users
		Hierarchical user authority management and commands
		SNMP-based NMS management (U2000)
		Web page-based configuration and management
		Easy-Deploy (client)
	File system	File system

Feature		Description
		Directory and file management
		File upload and download through FTP, TFTP, SFTP, SCP, and FTPS
	Monitoring and maintenance	Hardware monitoring
		Reporting alarms on abnormal device temperature
		Second-time fault detection to prevent detection errors caused by instant interference
		Version matching check
		Information center and unified management over logs, alarms, and debugging information
		Electronic labels, and command line query and backup
		Virtual cable test (VCT)
		User operation logs
		Detailed debugging information for network fault diagnosis
		Network test tools such as traceroute and ping commands
		Port mirroring, flow mirroring, and remote mirroring
		Energy saving
	Version upgrade	Device software loading and online software loading
		BootROM online upgrade
		Remote in-service upgrade
		In-service patching
Security	AAA	Local authentication and authorization
		RADIUS authentication, authorization, and accounting
		HWTACACS authentication, authorization, and accounting
	NAC	802.1x authentication
		MAC address authentication
	ARP security	Dynamic ARP Inspection (DAI) and Static ARP Inspection (SAI)
		Egress ARP Inspection (EAI)
		ARP packet rate limiting based on source IP addresses, interfaces, and VLANs, and global ARP packet rate limiting
	IP security	ICMP attack defense

Feature		Description
		IP source guard
	CPU attack defense	CPU attack defense
	MFF	MAC-Forced Forwarding (MFF)
	DHCP snooping	DHCP snooping
		Option 82 function and dynamic rate limiting for DHCP packets
	Attack defense	Defense against flood attacks without IP payloads, attacks from IGMP null payload packets, LAND attacks, Smurf attacks, and attacks from packets with invalid TCP flag bits
		Defense against attacks from many fragments, attacks from many packets with offsets, attacks from repeated packet fragments, Tear Drop attacks, Syndrop attacks, NewTear attacks, Bonk attacks, Nesta attacks Rose attacks, Fawx attacks, Ping of Death attacks, and Jolt attacks
		Defense against TCP SYN flood attacks, UDP flood attacks (including Fraggle attacks and UDP diagnosis port attacks), and ICMP flood attacks
Network management	-	Ping and traceroute
		NQA
		Network Time Protocol (NTP)
		sFlow
		HTTP
		Hypertext Transfer Protocol Secure (HTTPS)
		SNMP v1/v2c/v3
		Standard MIB
		Remote network monitoring (RMON)

5.2 Performance Specifications

NOTE

- Unless otherwise specified, this document describes switch features and software performance of the latest version.
- The specifications provided in this manual are tested in lab environment (for example, the tested device has been installed with a certain type of boards or only one protocol is run on the device). Results may differ from the listed specifications when you attempt to obtain the maximum values with multiple functions enabled on the device.

Table 5-2 Performance specifications of the S2350

Attribute	Service Feature	Specifications
Ethernet	MAC	16K
	VLAN	4K
	Maximum number of Eth-Trunks	64
	Maximum number of member interfaces in an Eth-Trunk	8
	Maximum number of dynamic ARP entries in the system	256
QoS	Maximum number of outbound QoS queues on an interface	8
	CAR	8 Kbit/s
ACL	ACLv4	Supports a maximum of 500 inbound and outbound ACLv4 entries.
	ACLv6	Supports a maximum of 500 inbound and outbound ACLv6 entries.
IP unicast	IPv4 Route capacity	32
	IPv6 Route capacity	16
Multicast	Number of multicast groups on the switch	1K
Reliability	RRPP	● Maximum number of RRPP instances: 64 ● Maximum number of RRPP rings: 16 ● Maximum number of RRPP domains: 8
	Smart Link	● Maximum number of instances: 64 ● Maximum number of Smart Link groups: 16
	MSTP	Maximum number of MSTIs: 64
	VBST	Number of protected VLANs: 128
	SEP	Maximum number of segments: 16

6 Technical Specifications

About This Chapter

6.1 S2350-EI

Table 6-1 lists specifications of the S2350-EI series switches.

Table 6-1 Specifications of the S2350-EI

Item		Description
Memory (RAM)		256 MB
Flash		200 MB
Mean time between failures (MTBF)		● S2350-28TP-EI-AC: 44.3 years ● S2350-20TP-PWR-EI-AC: 78.68 years ● S2350-28TP-PWR-EI-AC: 78.29 years ● S2350-28TP-EI-DC: 44.3 years
Mean time to repair (MTTR)		2 hours
Availability		> 0.99999
Surge protection	Service port protection	Common mode: ±6 kV
	Power supply protection	● S2350-28TP-EI-AC: ±6 kV in differential mode; ±6 kV in common mode ● S2350-20TP-PWR-EI-AC: ±6 kV in differential mode; ±6 kV in common mode ● S2350-28TP-PWR-EI-AC: ±6 kV in differential mode; ±6 kV in common mode ● S2350-28TP-EI-DC: ±1 kV in differential mode; ±2 kV in common mode
Dimensions (W x D x H)		● S2350-28TP-EI-AC: 442.0 mm x 220.0 mm x 43.6 mm ● S2350-20TP-PWR-EI-AC: 442.0 mm x 310.0 mm x 43.6 mm ● S2350-28TP-PWR-EI-AC: 442.0 mm x 310.0 mm x 43.6 mm ● S2350-28TP-EI-DC: 442.0 mm x 220.0 mm x 43.6 mm
Weight		≤ 5 kg
Stack port		Two uplink 1000BASE-X optical ports
Maximum stack bandwidth (bidirectional)		10 Gbit/s

Item		Description
RPS		Not supported
PoE		Supported by PWR models
Input DC voltage	Rated input voltage range	-48 V DC to -60 V DC
	Maximum voltage range	-36 V DC to -72 V DC
AC input voltage	Rated voltage range	100 V AC to 240 V AC, 50/60 Hz
	Maximum voltage range	90 V AC to 264 V AC, 47 Hz to 63 Hz
Maximum power consumption (100% throughput, 100% PoE loads, full speed of fans)		● S2350-28TP-EI-AC: 15.7 W ● S2350-20TP-PWR-EI-AC: 435 W (power consumption: 65 W; PoE: 370 W) ● S2350-28TP-PWR-EI-AC: 445 W (power consumption: 75 W; PoE: 370 W) ● S2350-28TP-EI-DC: 15.3 W
Temperature	Operating temperature	-5°C to +50°C (at an altitude of 0 m to 1800 m) **NOTE** When the altitude is between 1800 m and 5000 m, the highest operating temperature reduces 1°C every time the altitude increases 220 m.
	Storage temperature	-40°C to +70°C
Noise under normal temperature (27°C, sound power)		● S2350-28TP-EI-AC: 0 (The device has no fans.) ● S2350-20TP-PWR-EI-AC: less than 52 dBA ● S2350-28TP-PWR-EI-AC: less than 52 dBA ● S2350-28TP-EI-DC: 0 (The device has no fans.)
Relative humidity		5% RH to 95% RH, noncondensing

Item	Description
Operating altitude	● S2350-28TP-EI-AC: 0 m to 5000 m ● S2350-20TP-PWR-EI-AC: 0 m to 5000 m ● S2350-28TP-PWR-EI-AC: 0 m to 5000 m ● S2350-28TP-EI-DC: 0 m to 2000 m
EMC	● CISPR22 Class A ● CISPR24 ● EN55022 Class A ● EN50024 ● ETSI EN 300 386 Class A ● CFR 47 FCC Part 15 Class A ● ICES 003 Class A ● AS/NZS CISPR22 Class A ● IEC61000-4-2 ● ITU-T K 20 ● ITU-T K 44
Environmental standards	● RoHS ● REACH ● WEEE
Safety	● IEC 60950-1 ● EN 60950-1/A11/A12 ● UL 60950-1 ● CSA C22.2 No 60950-1 ● AS/NZS 60950.1
Laser Safety	● IEC60825-1 ● IEC60825-2 ● EN60825-1 ● EN60825-2