



# Ruijie RG-S6220H Switch Series Datasheet

Ruijie's industry-leading RG-S6220H Switch Series, designed to power next-generation data centers and cloud computing services, delivers non-blocking, unified and virtualized switching performance with high transparency and sustainability. The high-performance and cost-efficient RG-S6220H Switch Series solves the problems such as traffic surge and high deployment cost, serving as the solid foundation for cloud computing network solutions.

The RG-S6220H Switch Series pushes the frontier with its 10G cloud-computing data center switches for the IP network. To comply with the trend of data center and cloud computing virtualization, the RG-S6220H Switch Series adopts the industry-leading VSU 2.0 technology, which enables virtualization of multiple physical equipments into one, significantly simplifying the network structure and increasing the equipment reliability. The RG-S6220H Switch Series also supports virtual machine discovery, automated migration of security policies and other next-gen data center virtualization features. Gearing up with the IPv4/IPv6 dual-stack multi-layer switching features, the RG-S6220H Switch Series offers abundant Tunnel technologies which can be applied to IPv4, IPv6 or IPv4/IPv6 hybrid network.

Featuring a smart traffic classification from Layer 2 to Layer 7 as well as a refined Quality of Service strategy, the RG-S6220H Switch Series can scale the service flow classification according to different applications to ensure the low-latency data transmission.

The feature-rich switches provide end-to-end QoS, and excellent virtualization performance for next-generation data centers. The series is ideal for the access layer of large data center networks, the convergence or core layer of medium and small data center networks, the convergence layer of large campus networks, as well as the core layer of medium and small networks.

## Feature Highlights

- **Data Centre Virtualization (EVPN VXLAN, VSU 2.0, Openflow) Support**
- **Non-Blocking Performance with Powerful Caching Capacity**
- **Up to 48 x 10G BASE-X/BASE-T Ports and 32 x 40G BASE-X Ports**
- **Advanced Layer 3 Routing Support**
- **Power and Fan Redundancy Support (Power module and Transceiver are hot-swappable )**



RG-S6220-32QXS-H



RG-S6220-48XS6QXS-H



RG-S6220-48XT6QXS-H

Figure 1: RG-S6220H Switch Series Product Family

## Product Features

### Non-blocking Performance with Powerful Caching Capacity

The RG-S6220H Series is a powerful collection of line-rate switches customized to power the next-generation data centers and cloud computing. Within the 1RU configuration, the series supports up to 48 x 10G ports and 32 x 40G ports offering line-rate forwarding from all ports. The switches employ an advanced cache scheduling mechanism to maximize the device's cache capability, ensuring truly non-blocking transmission in the increasingly demanding data center environment.

#### Hardware Highlights

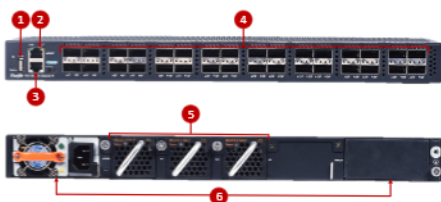


Figure 2: RG-S6220-32QXS-H

#### Interfaces

1. 1 USB 2.0 port
2. 1 MGMT port for 10/100/1000M BASE-T out-of-band management
3. 1 console port
4. 32 fixed 40G QSFP+ ports
5. 3 fan slots
6. 2 modular power slots

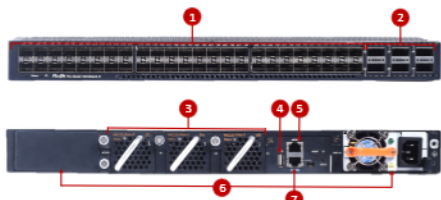


Figure 3: RG-S6220-48XS6QXS-H

#### Interfaces

1. 48 fixed 10G SFP+ ports
2. 6 40G QSFP+ ports
3. 3 fan slots
4. 1 USB 2.0 port
5. 1 MGMT port for 10/100/1000M BASE-T out-of-band management
6. 2 modular power slots
7. 1 console port

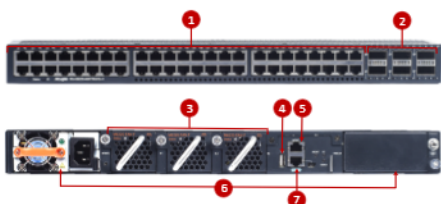


Figure 4: RG-S6220-48XT6QXS-H

#### Interfaces

1. 48 fixed 10GBASE-T ports (RJ 45)
2. 6 40G QSFP+ ports
3. 3 fan slots
4. 1 USB 2.0 port
5. 1 MGMT port for 10/100/1000M BASE-T out-of-band management
6. 2 modular power slots
7. 1 console port

### Data Center Virtualization

The RG-S6220H Switches adopt the industry-leading Virtual Switch Unit 2.0 (VSU 2.0) technology to achieve unified network management, reduce network nodes and enhance network reliability. The failover time for link failure is within 50 to 200ms to guarantee uninterrupted operation for mission-critical applications. The cross-device link aggregation feature enables access to servers or switches to achieve active-active uplinks.

The series supports EVPN VXLAN (Ethernet VPN Virtual Extensible LAN). The network offers up to 16 million VXLAN network segments to improve the scalability problem caused by insufficient VLAN in traditional data center network. By encapsulating Layer 2 packets within UDP packets, the VXLAN technology constructs a logical Layer 2 network based on the Layer 3 network, so that users can deploy VXLAN without altering the existing network architecture and achieve flexible migration of data center host (virtual machine) by eliminating the restriction of the physical network. In addition, the network can be divided into new subnets without altering the physical topology, which is not restricted by the physical network IP address and broadcast domain. Introducing a reliable control plane protocol EVPN can achieve VTEP (VXLAN tunnel endpoint) auto discovery and authentication in order to reduce VXLAN data plane flooding and eliminates the need for multicast in the underlay network. Learning the Layer 2 and Layer 3 information of the device via the control plane enhances the robustness and scalability



Figure 5: Data Center Virtualization

of the VXLAN network. The RG-S6220H Series also supports Anycast gateway which facilitates optimal east-west routing, provides Layer 3 gateway redundancy and supports virtual machine migration.

### Cost-effective 10GBASE-T Port

The RG-S6220H Series supports a high-density 10G Base-T port. The 10GB port can be compatible with 1/10GB transceiver. The port supports the IEEE 802.3an standard and offers a 10 GE access bandwidth using the general RJ-45 twisted pair. The easy deployment of twisted pair keeps the original cabling of the data center in place with no disruption. It is also much more cost-effective than optical fiber. The RG-S6220H Series greatly minimizes the construction costs of data centers.

### Carrier-Class Reliability Protection

The RG-S6220H Series supports built-in redundant power modules and modularized fan components. All the interface boards, power modules, and fan modules are hot-pluggable to guarantee undisturbed switching operation. In addition, the switches support fault detection and automatic alarms for the power and fan modules. The rotation speed of the fans automatically adjusts to the ambient temperature. The switches further provide device-level and link-level reliability protection with the over-current, over-voltage, and overheating protection measures.

The RG-S6220H Switches also feature Graceful Restart (GR) and Bidirectional Forwarding (BFD) mechanisms. All the features ensure the network convergence time is unaffected even when the network bears abundant services and heavy traffic, and therefore ensure normal operation.

### IPv4/IPv6 Dual-Stack Multi-Layer Switching

The hardware of the RG-S6220H Series



supports line-rate IPv4/IPv6 dual-stack multi-layer switching, and distinguishes and processes IPv4 and IPv6 protocol packets. The switches also support multiple tunneling technologies including manually configured tunnels, automatic tunnels, ISATAP tunnels and so on. The switches provide flexible IPv6 inter-network communication solutions to be realized according the requirement plan and status quo of the IPv6 networks. The switch series is also applicable to an IPv4-only or IPv6-only network, or a hybrid of IPv4 and IPv6 network, fulfilling the transition requirements from IPv4 to IPv6 network.

The series supports a wide range of IPv4 routing protocols including static routing, RIP, OSPF, and BGP4, which can be selected flexibly according to the network environment.

The series also supports an abundant list of IPv6 routing protocols, such as static routing, RIPng, OSPFv3, and BGP4+, which can be selected flexibly either to upgrade the existing network to IPv6 network or to construct a new IPv6 network.

### Flexible and Comprehensive Security Policies

The RG-S6220H Switch Series features multiple security features, which effectively defend against and control virus flooding and hacker attacks. These features include anti-DoS attack, validity check of ARP packets on ports, and multiple hardware-based ACL policies.

The switches support hardware-based IPv6 ACLs, which can easily control IPv6 users' access to edge devices even when IPv6 users exist within an IPv4 network. It allows coexistence of IPv4 and IPv6 users on the network and can control access permissions of IPv6 users, such as restricting access to sensitive resources on the network.

The switch series adopts Ruijie's industry-leading CPU Protection Policy (CPP) technology, which is an advanced hardware-

based CPU protection mechanism, to distinguish data traffic destined to the CPU and process data according to queue priorities. The switches implement bandwidth control to protect the CPU against unauthorized traffic consumption, malicious attacks and resource consumption and hence to ensure switch security. The hardware of the RG-S6220H Series allows flexible binding of a user IP address or a MAC address to a port or a switch to strictly control user access. The switches support DHCP snooping, which allows only a DHCP response to a trusted port to prevent spoofing by unauthorized DHCP servers. Based on DHCP snooping, the switches dynamically monitor ARP packets, check user IP addresses, and directly discard packets that do not comply with the bound entries. The RG-S6220H Series effectively defends against ARP spoofing and source IP address spoofing.

The switches also support Telnet access control based on source IP addresses. The measure prevents unauthorized users or hackers from attacking or controlling devices and thereby enhances security of the device NMS. The RG-S6220H Switches also implement Secure Shell (SSH) and SNMPv3 to encrypt management information in Telnet and SNMP processes, thereby ensuring security of management device information and preventing hacker from waging attacks or controlling devices.

The series prevents unauthorized users from network access through multiple functions. These functions include multi-element binding, port security, time ACL, and bandwidth limit based on data traffic. The RG-S6220H Series highly strengthens access security and are perfect match for large-sized networks.

### Advanced Management

The RG-S6220H Series supports a family of management ports such as Console, MGMT and USB. The switches also support SNMP

v1/v2c/v3, a universal network management platform. In addition, the switch console port can be managed via Telnet / SSHv2, HTTP or HTTPS. Also the switches enable Command Line Interface (CLI), Telnet, and cluster management, which simplify device management and provide various encryption modes such as SSH2.0 to enhance network security.

The switches support SPAN/RSPAN mirroring and multiple mirroring observation ports, offering users high visibility and transparency for easy maintenance. The switches also provide a wide range of network traffic reports to help users optimize network structure and adjust resources deployment accordingly.

### Congestion Management

The RG-S6220H Switch Series supports synchronous hash to ensure consistent hash key calculated by the bi-directional flow so that the session uplink and downlink are processed by the same device in the firewall cluster. Standard ECMP (Equal-cost multi-path routing) is adopted in the network for better flow balancing result. The switches support more than 2 devices for cluster expansion to improve cluster performance.

The switches support flexible hash. All packets of the same session are balanced to the same scheduling server. When one server fails, the traffic of the failed links can be balanced to other active links via ECMP without interrupting the current session. The traffic of the failed server will be shared equally by the active servers. One flexible hash ECMP group supports 8 member devices.

The series also supports hash perturbation to solve the hash polarization problem. For the same type of devices, the hash algorithm will calculate the same path so that the traffic cannot be balanced to all links.

## Technical Specifications

Model	RG-S6220-48XS6QXS-H	RG-S6220-48XT6QXS-H	RG-S6220-32QXS-H
Ports	48 fixed 10G SFP+ ports 6 40G QSFP+ ports	48 fixed 10GBASE-T ports (RJ 45) 6 40G QSFP+ ports	32 fixed 40G QSFP+ ports
Modular Power Slots	2		
Fan Slots	3		
Management Ports	1 console port 1 MGMT port 1 USB 2.0 port 1 mini USB console port		
Switching Capacity	2.56Tbps		
Packet Forwarding Rate	1,080Mpps	1,080Mpps	1,440Mpps
Port Buffer	16MB		
RAM	2GB		
ARP Table	Up to 40K		
MAC Address	Up to 96K		
Routing Table Size (IPv4/IPv6)	12K/6K		
Multicast Entries (IPv4/IPv6)	Up to 16K		
ACL Entries	Up to 8K		
VLAN	4K VLANs, Port-based VLAN, MAC-based VLAN, Super VLAN, Protocol-based VLAN, Private VLAN, IP subnet-based VLAN, GVRP		
QinQ	Basic QinQ, Flexible QinQ		
Link Aggregation	Support LACP		
Port Mirroring	Many-to-one mirroring, One-to-many mirroring, Flow-based mirroring, Over devices mirroring, VLAN-based mirroring, VLAN-filtering mirroring, AP-port mirroring, RSPAN, ERSPAN		
Spanning Tree Protocols	IEEE802.1d STP, IEEE802.1w RSTP, Standard 802.1s MSTP, Port fast, BPDU filter, BPDU guard, TC guard, TC protection, Loop guard, Root guard, Spanning Tree Root Guard(STRG)		
DHCP	DHCP server, DHCP client, DHCP snooping, DHCP relay, IPv6 DHCP relay		
Multiple Spanning Tree Protocol (MSTP) Instances	64 (not include default 0)		
Maximum Aggregation Port (AP)	Up to 256		
Virtual Routing and Forwarding (VRF) Instances	Up to 2K		
Data Center Unified Network Features	Virtualization: Virtual Switch Unit (VSU), EVPN VXLAN, OpenFlow		
VSU (Virtual Switch Unit)	Support (up to 4 stack members)		
L2 Features	MAC, ARP, VLAN, Basic QinQ, Felix QinQ, Link aggregation, Mirroring, STP, RSTP, MSTP, Broadcast storm control, IGMP v1/v2/v3 snooping, IGMP filter, IGMP fast leave, MLD snooping, DHCP, Jumbo frame, RLD, LLDP		
Layer 2 Protocols	IEEE802.3 (10BASE-T), IEEE802.3u (100BASE-T), IEEE802.3z (1000BASE-X), IEEE802.3ab (1000BASE-T), IEEE802.3ae (10GBASE-T), IEEE802.3an (10GBASE-T), IEEE802.3ak, IEEE802.3an, IEEE802.3x, IEEE802.3ad (link aggregation), IEEE802.1p, IEEE802.1x, IEEE802.1Q, IEEE802.1D (STP), IEEE802.1w (RSTP), IEEE802.1s (MSTP), IGMP snooping, Jumbo Frame (9Kbytes), IEEE802.1ad (QinQ and flexible QinQ), GVRP		
Layer 3 Features	ARP, IPv4/v6, PBRv4/v6		
Layer 3 Protocols (IPv4)	BGP4, OSPFv2, RIPv1, RIPv2, MBGP, LPM routing, Policy-based routing, Route-policy, ECMP, WCMP, VRRP, IGMP v1/v2/v3, DVMRP, PIM-SSM/SM/DM, MSDP, Any-RP, ISIS		
IPv4 Features	Ping, Traceroute, Equal-cost routing, URPF, IPIP, GRE tunnel, VRF		
IPv6 Features	Static routing Equal-cost routing, Policy-based routing, OSPFv3, RIPv6, BGP4+, MLDv1/v2, PIM-SMv6, Manual tunnel, Auto tunnel, IPv4 over IPv6 tunnel, ISATAP tunnel		
Basic IPv6 Protocols	ND, ICMPv6, Path MTU Discovery, DNSv6, DHCPv6, ICMPv6, ICMPv6 redirection, ACLv6, TCP/UDP for IPv6, SNMP v6, Ping /Traceroute v6, IPv6 RADIUS, Telnet/SSH v6, FTP/TFTP v6, NTP v6, VRRP for IPv6, ISISv6		
IPv6 Routing Protocols	Static routing, Equal-cost routing, Policy routing, RIPv6, OSPFv2/v3, BGP4+, IS-IS		
IPv6 Tunnel Features	Manual tunnel, Auto tunnel, 6to4 manual tunnel, 6to4 auto tunnel, ISATAP, IPv4 over IPv6 tunnel, IPv6 over IPv6 tunnel, GRE tunnel		
Multicast	IGMP v1/v2/v3, IGMP proxy, MSDP, PIM-DMv4 (PIM-DM), PIM-SMv4 (PIM-SM, PIM-SSM), PIM-SM v6, MLD, MLD Proxy		
ACL	Standard/Extended/Expert ACL, Extended MAC ACL, ACL 80, IPv6 ACL		
QoS	EXP priority mapping based on 802.1p, DSCP, TOS and IP Precedence; ACL traffic classification; Priority marking/re-marking; Multiple queue scheduling mechanisms, such as SP, WRR, DRR, SP+WRR, and SP+DRR		
Reliability	VSU (virtualization technology for virtualizing multiple devices into 1); GR for OSPF/IS-IS/BGP; BFD detection; REUP dual-link fast switching technology; RLD (Rapid Link Detection Protocol); 1+1 power redundancy; 2+1 fan redundancy; Hot-swappable line cards and power modules, Dynamic ARP Inspection(DAI)		

Model	RG-S6220-48XS6QXS-H	RG-S6220-48XT6QXS-H	RG-S6220-32QXS-H
Security	Network Foundation Protection Policy (NFPP); CPU Protection (CPP); DoS protection; Detection of unauthorized data packets; Data encryption; IP source guard; RADIUS / TACACS+; IPv4 / IPv6 ACL packet filtering based on standard or extended VLANs; Plaintext authentication and MD5 cipher-text authentication of OSPF, RIPv2, and BGPv4 packets; Telnet login through limited IP addresses and the password mechanism; uRPF; Broadcast packet suppression; DHCP snooping; DHCP option 82; Anti-gateway ARP spoofing; ARP check		
Manageability	SNMP v1/v2c/v3; Telnet; Console; Hardware support RCMII (combo interface for MGMT); RMON; SSHv1/v2; FTP/TFTP for file upload and download management; NTP clock; Syslog; SPAN/RSPAN; sFlow		
Hot Patch	Support		
Smart Temperature Control	Auto fan speed adjustment; Fan malfunction alerts; Fan status check		
Smart Power Supply	Support power monitor		
Other Protocols	DHCP client, DHCP relay, DHCP server, DNS client, UDP relay, ARP proxy, Syslog		
Dimensions (W x D x H) (mm)	420 × 420 × 44	442 × 500 × 44	442 × 420 × 44
Rack Height	1RU		
Weight	9.5kg (incl. fan modules and power modules)	11kg (incl. fan modules and power modules)	9kg (incl. fan modules and power modules)
MTBF	>200K hours		
Safety Standards	IEC 60950-1, EN 60950-1		
Emission Standards	EN 300 386, EN 55022/55032, EN 61000-3-2, EN 61000-3-3, EN 55024, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11		
Power Supply	AC input: Rated voltage range: 100V to 240V AC Frequency: 50/60Hz Rated current: 5.29A to 2.2A HVDC input: Input voltage range: 192V to 290V DC Input current range: 2.66A to 2.03A		
Power Consumption	<200W	<250W	<250W
Temperature	Operating temperature: 0°C to 50°C	Operating temperature: 0°C to 45°C	Operating temperature: 0°C to 45°C
Humidity	Operating humidity: 10% to 90%RH		

## Typical Applications

The topology diagram of the government and enterprise Active/Active data center and the large-scale Internet data center is shown in figure below:

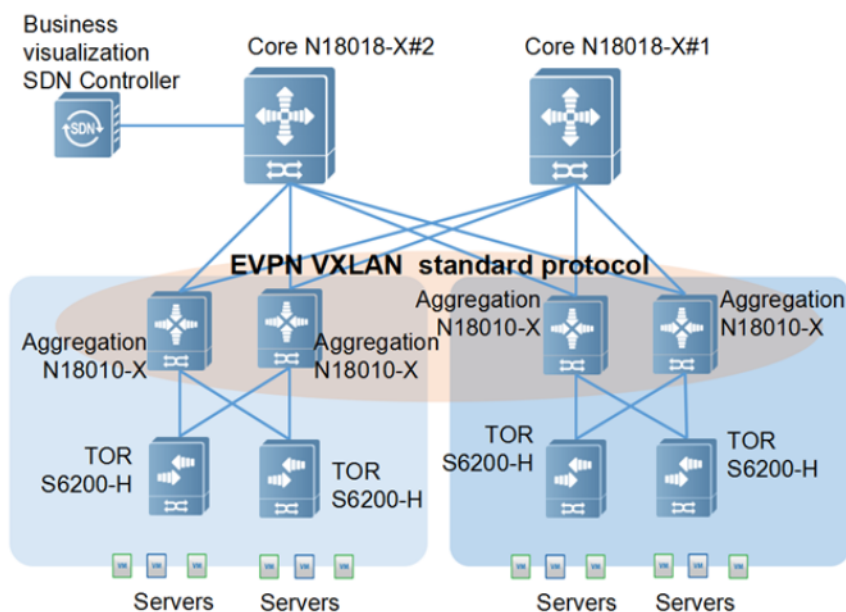


Figure 6: Typical Application of the RG-S6220H Switch Series

## Ordering Information

### 1. Chassis, expansion modules, fans, and power modules

Model	Description
RG-S6220-48XS6QXS-H	48 fixed 10G SFP+ Ports, 6 40G QSFP+ Ports
RG-S6220-48XT6QXS-H	48 fixed 10GBASE-T Ports, 6 40G QSFP+ Ports
RG-S6220-32QXS-H	32 fixed 40G QSFP+ Ports
M6220-FAN-F	Fan Module, front-to-rear airflow
M6220-FAN II-F	Fan Module, front-to-rear airflow
RG-M6220-AC460E-F	AC power supply module (front-to-rear airflow) with up to 2 power modules, support 1+1 redundancy,
RG-M6220-DC460E-F	DC power supply module (front-to-rear airflow) with up to 2 power modules, support 1+1 redundancy

### 2. Optional 40G and 10G fiber modules

Model	Description
40G-QSFP-SR-MM850	40G SR Fiber Module for QSFP+ ports, 100m (OM3) / 150m (OM4) (8 cores, 850nm)
40G-QSFP-LSR-MM850	40G SR Fiber Module for QSFP+ ports, 300m (OM3) / 400m (OM4) (8 or 12 cores, 850nm)
40G-QSFP-LR4-PSM-SM1310	40G LR Single-mode 1-to-4 Fiber Module for QSFP+ ports, 10km (LC) (1310nm)
40G-QSFP-LR4-SM1310	40G LR Single-mode Fiber Module for QSFP+ ports, 10km (LC) (2 cores, 1310nm)
XG-SFP-SR-MM850	10G SR Fiber Module for SFP+ ports, 300m
XG-SFP-LR-SM1310	10G LR Fiber Module for SFP+ ports, 10km
XG-SFP-ER-SM1550	10G ER Fiber Module for SFP+ ports, 40km
XG-SFP-ZR-SM1550	10G ZR Fiber Module for SFP+ ports, 80km

### 3. Optional 40G and 10G copper cables

Model	Description
40G-AOC-5M	40G QSFP+ Optical Stack Cable (included both side transceivers), 5 Meters
XG-SFP-AOC1M	10GBASE SFP+ Optical Stack Cable (included both side transceivers), 1 Meter
XG-SFP-AOC3M	10GBASE SFP+ Optical Stack Cable (included both side transceivers), 3 Meter
XG-SFP-AOC5M	10GBASE SFP+ Optical Stack Cable (included both side transceivers), 5 Meter

### 4. Optical Gigabit modules

Model	Description
Mini-GBIC-GT	1000BASE-GT mini GBIC Transceiver
Mini-GBIC-SX	1000BASE-SX mini GBIC Transceiver (LC)
Mini-GBIC-LX	1000BASE-LX mini GBIC Transceiver (LC)
Mini-GBIC-LH40	1000BASE-LH, mini GBIC Transceiver (40km, LC)
Mini-GBIC-ZX50	1000BASE-ZX, mini GBIC Transceiver (50km, LC)
Mini-GBIC-ZX80	1000BASE-ZX, mini GBIC Transceiver (80km, LC)
Mini-GBIC-ZX100	1000BASE-ZX mini GBIC Transceiver (100km, LC)

