



QFX5230-64CD SWITCH DATASHEET

Product overview

With the current growth in [artificial intelligence \(AI\)](#) and [machine learning \(ML\)](#) developments, networks are expected to perform at their best to support heavy workloads. Higher bandwidth requirements between the server and the top-of-rack switch result in higher [400GbE](#) radix requirements at the spine and super-spine layer of the IP fabric multitier architecture.

[Juniper Networks QFX5230-64CD](#) switch supports:

- high-speed, high-density, spine-and-leaf IP fabrics
- 400GbE, 200GbE, 100GbE, 50GbE, 40GbE, 25GbE, and 10GbE connections
- advanced L2/L3 features and secure ZTP
- large, next-generation IP fabrics with best-in-class automation capabilities

Product description

Juniper Networks® QFX5230-64CD switch is a high-radix class switch, dedicated for high-bandwidth network switching devices supporting up to 64 × 400GbE, 128 × 200GbE, 256 × 100GbE, 64 × 40GbE, 256 × 25GbE, 256 × 10GbE ports in 2 U form factor. This makes the QFX5230-64CD optimal for [AI data center deployments](#) and spine and super-spine roles within IP and [Ethernet VPN-Virtual Extensible LAN \(EVPN-VXLAN\)](#) fabrics. The additional Remote Direct Memory Access over Converged Ethernet (RoCEv2) capabilities of the QFX5230-64CD support IP storage deployments where instead of relying on deep buffer switching, the [QoS](#) mechanisms such as priority-based flow control-distributed services code point (PFC-DSCP) and explicit congestion notification (ECN) deliver high performance for the storage workloads. Support for ZR/ZR-M optics makes it suitable for edge and data center interconnect (DCI) use cases.

Automation and monitoring

[Juniper® Apstra®](#) intent-based networking delivers full Day 0 through Day 2+ capabilities for IP/EVPN fabrics with closed-loop assurance in the data center. Apstra is a fabric management solution that empowers organizations to automate and manage their networks across virtually any data center design, vendor, and topology, making private data center as easy as cloud. Apstra provides full Day 2+ operations assurance with multiple built-in intent-based analytics probes to assure your network is running as designed. In addition, Apstra provides a simple UI workflow to create custom intent-based analytics to capture, enrich, and visualize data from the managed devices. Apstra also provides the capability to capture and analyze flow data to provide complete network visibility.

For additional automation, [Junos® OS Evolved](#) supports a robust API set to support HashiCorp® Terraform®, Ansible, zero-touch provisioning (ZTP), operations and event scripts, automatic rollback, and Python scripts. The QFX5230-64CD supports Junos Telemetry Interface, a modern telemetry streaming tool that provides performance monitoring in complex, dynamic data centers.

Features and benefits

Software

- Operating System: Junos OS Evolved (recommended releases)
- Latency: 600 ns with unicast traffic in cut-through mode
- MAC addresses per system: 128,000
- VLAN IDs: 4,000
- Number of link aggregation groups (LAGs): 128
- Number of ports per LAG: 64

- Firewall filters: 9,000
 - Ingress: 3,000 Routed ACL(RACL), 768 VLAN ACL(VACL) and 3,000 Port ACL (PACL) rules
 - Egress: 2,000 RACL; 512 VACL; 2,000 PACL rules
- IPv4 unicast FIB routes: 720,000 prefixes; 720,000 host routes (shared b/w host and LPM table)
- IPv6 unicast FIB routes: 366,000 prefixes; 366,000 host routes (shared b/w host and LPM table)
- IPv4 RIB routes: 2 million
- IPv6 RIB routes: 2 million
- Address Resolution Protocol (ARP) entries: 32,000
- Generic routing encapsulation (GRE) tunnels: 1,000
- Jumbo frame: 9216 bytes
- Traffic mirroring
 - Mirroring destination ports per switch: 4
 - Maximum number of mirroring sessions: 8
 - Mirroring destination VLANs per switch: 4

Layer 2 features

- STP—IEEE 802.1D (802.1D-2004)
- Rapid Spanning Tree Protocol (RSTP) (IEEE 802.1w); MSTP (IEEE 802.1s)
- Bridge protocol data unit (BPDU) protect
- Loop protect
- Root protect
- VLAN—IEEE 802.1Q VLAN trunking
- Routed VLAN interface (RVI)
- Static MAC address assignment for interface
- Global MAC learning disable
- Link Aggregation and Link Aggregation Control Protocol (LACP) (IEEE 802.3ad)
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)

Layer 3 features

- Static routing
- OSPF v2/v3
- Filter-based forwarding
- Virtual Router Redundancy Protocol (VRRP/VRRPv3)
- IPv6
- Virtual routers
- Loop-free alternate (LFA)
- BGP
- IS-IS

- Dynamic Host Configuration Protocol (DHCP) v4/v6 relay(stateless)
- VRF-aware DHCP
- IPv4/IPv6 over GRE tunnels

Multicast

- Internet Group Management Protocol (IGMP) v1/v2/v3
- Multicast Listener Discovery (MLD) v2
- IGMP proxy, querier
- IGMP v1/v2/v3 snooping
- Intersubnet multicast using IRB interface
- MLD snooping
- Protocol Independent Multicast PIM-SM, PIM-SSM, PIM-DM, PIM-Bidir

Quality of Service (QoS)

- L2 and L3 QoS: Classification, rewrite, queuing
- Rate limiting:
 - Ingress policing: 1 rate 2 color, 2 rate 3 color
 - Egress policing: Policer, policer mark down action
 - Egress shaping: Per queue, per port
- 10 hardware queues per port (8 unicast and 2 multicast)
- Strict priority queuing (LLQ), shaped-deficit weighted round robin (SDWRR)
- Layer 2 classification criteria: Interface, MAC address, Ether type, 802.1p, VLAN
- Congestion avoidance capabilities: WRED, ECN
- Trust IEEE 802.1p
- Configurable shared buffer and buffer monitoring
- Congestion Notification Profile
- Priority-based flow control (PFC)—IEEE 802.1Qbb

High availability

- Bidirectional Forwarding Detection (BFD)

Visibility and analytics

- Switched Port Analyzer (SPAN)
- Remote SPAN (RSPAN)
- Encapsulated Remote SPAN (ERSPAN)
- sFlow v5
- Junos Telemetry Interface management and operations
- Role-based CLI management and access
- Junos OS Evolved configuration rescue and rollback
- Image rollback
- SNMP v1/v2/v3

- Junos OS Evolved XML management protocol
- Automation and orchestration
- Zero-touch provisioning (ZTP)
- Python
- Junos OS Evolved event, commit, and OP scripts

Junos Telemetry Interface

Streaming data to a performance management system lets network administrators measure trends in link and node utilization and troubleshoot issues such as network congestion in real time.

Junos Telemetry Interface provides:

- Application visibility and performance management by provisioning sensors to collect and stream data and analyze the application and workload flow path through the network
- Capacity planning and optimization by proactively detecting hotspots and monitoring latency and microbursts
- Troubleshooting and root cause analysis via high-frequency monitoring and correlating overlay and underlay networks



Specifications

Hardware specifications

Table 1: QFX5230-64CD System Capacity

Parameter	Specification
System throughput	Up to 25.6/51.2 Tbps (uni/bidirectional)
Forwarding capacity	10.53 billion packets per second
Port density without breakout	64 ports of QSFP56-DD 400GbE
Maximum ports with breakout	128 × 200GbE, 256 × 100GbE, 64 × 40GbE, 256 × 25GbE, or 256 × 10GbE
Dimensions (W × H × D)	17.4 × 3.43 × 25.6 in
Rack units	2 U
Weight	55 lbs (25 kg) with power supplies and fans installed
Operating system	Junos OS Evolved
Switch chip	Broadcom Tomahawk4
CPU	Intel Hewitt Lake (6 core)
Memory	32GB (16GBx2) of DDR4
Storage	2x100GB
Power	Redundant (1+1) hot-pluggable 3000 W AC/2400W DC power supplies
Cooling	Ports-to-FRUs (AFO) and FRUs-to-ports (AFI) cooling Redundant (5x2+1) +1 hot-pluggable fan modules
Total packet buffer	112 MB
Warranty	Juniper standard one-year warranty

Environmental ranges

Table 2: QFX5230-64CD operating parameters

Parameter	Specification
Operating temperature	0° to 40°C @6000 ft for AFO system, 0° to 40°C @sea level for AFI systems.
Storage temperature	-40° to 70° C
Operating altitude	AFO: 6000 ft AFI: Sea level
Relative humidity operating	5 to 90% non-condensing
Relative humidity nonoperating	5 to 90% non-condensing
Seismic	Zone 4 earthquake rating

Safety and compliance

- UL 60950-1:2007 R5.19 Information Technology Equipment—Safety
- CAN/CSA-C22.2 No. 60950-1-07+A1:2011+A2:2014 Information Technology Equipment—Safety
- IEC 62368-1:2014 Audio/Video, Information and Communication Technology Equipment—Safety (All country deviations): CB Scheme
- IEC 62368-1:2018 Audio/Video, Information and Communication Technology Equipment—Safety (All country deviations): CB Scheme
- EN 62368-1:2014+A11:2017 Audio/Video, Information and Communication Technology Equipment—Safety
- UL 62368-1:2019 R10.21 Audio/Video, Information and Communication Technology Equipment—Safety
- CSA C22.2 No. 62368-1:19, Audio/Video, Information and Communication Technology Equipment—Safety
- IEC/EN 60825-1 Safety of Laser Products—Part 1: Equipment Classification and Requirements
- IEC/EN 60825-2 Safety of Laser Products—Part 2: Safety of Optics Fibre Communication Systems

Table 3: Power Consumption

Parameter	QFX5230-64CD
Maximum power draw	220-240 V : 1396 W (AC), 1446 W (DC)
Typical power draw	220-240 V : 498 W (AC), 487 W (DC)

Note: Max power consumption measured at 40°C ambient temperature with SR optics at 100% load with IMIX traffic. Typical power consumption measured at 25°C ambient temperature with DACs at 50% load with IMIX traffic, excluding transceivers.

Power consumption is subject to operating condition and unit-to-unit variations.

Electromagnetic compatibility

- FCC 47 CFR Part 15
- ICES-003 / ICES-GEN
- BS EN 55032
- BS EN 55035
- EN 300 386 V1.6.1

- EN 300 386 V2.2.1
- BS EN 300 386
- EN 55032
- CISPR 32
- EN 55035
- CISPR 35
- IEC/EN 61000 Series
- IEC/EN 61000-3-2
- IEC/EN 61000-3-3
- AS/NZS CISPR 32
- VCCI-CISPR 32
- BSMI CNS 15936
- KS C 9835 (Old KN 35)
- KS C 9832 (Old KN 32)
- KS C 9610
- BS EN 61000 Series
- NEBS GR-1089-Core Issue 8 EMC and Electrical Safety for Network Telecommunications Equipment

ETSI

- ETSI EN 300 019: Environmental Conditions & Environmental Tests for Telecommunications Equipment
- ETSI EN 300 019-2-1—Storage (ETSI EN 300 019-2-1), Class 1.2
- ETSI EN 300 019-2-2—Transportation (ETSI EN 300 019-2-2), Class 2.3
- ETSI EN 300 019-2-3—Stationary Use at Weather protected Locations, non-condensing. Class 3.2
- ETSI 300753 (1997)—Acoustic noise emitted by telecommunications equipment

Environmental compliance

- Restriction of Hazardous Substances (RoHS)
- Toxic Substances Control Act (TSCA)
- Persistent Organic Pollutants (POPs)
- Recycled Material Waste Electronics and Electrical Equipment (WEEE)
- Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
- Substances of Concern in Products (SCIP)

Telco

- Common Language Equipment Identifier (CLEI) code

Ordering information

QFX5230-64CD-AFO	QFX5230-64CD (hardware with base software), 2U, 64 QSFP56-DD ports, redundant fans, 2 AC power supplies, front-to-back airflow
QFX5230-64CD-AFI	QFX5230-64CD (hardware with base software), 2U, 64 QSFP56-DD ports, redundant fans, 2 AC power supplies, back-to-front airflow
QFX5230-64CD-D-AFO	QFX5230-64CD (hardware with base software), 2U, 64 QSFP56-DD ports, redundant fans, 2 DC power supplies, front-to-back airflow
QFX5230-64CD-D-AFI	QFX5230-64CD (hardware with base software), 2U, 64 QSFP56-DD ports, redundant fans, 2 DC power supplies, back-to-front airflow
QFX5230-64CD-CHAS	QFX5230-64CD (hardware with base software), 2U, 64 QSFP56-DD ports w/o PSU & Fans
JNP-3000W-AC-AFO	QFX5230-64CD-AFO 2U AC power supply unit
JNP-3000W-DC-AFO	QFX5230-64CD-D-AFO 2U DC power supply unit
JNP-2700W-AC-AFI	QFX5230-64CD-AFI 2 U AC power supply unit
JNP-2400W-DC-AFI	QFX5230-64CD-D-AFI 2U DC power supply unit
QFX5230-64CD-FANAI	Airflow in (AFI) back-to-front airflow fans for QFX5230-64CD
QFX5230-64CD-FANAO	Airflow out (AFO) front-to-back airflow fans for QFX5230-64CD
QFX5230-2RU-4PRMK	4-Post Rack Mount Kit for QFX5230-64CD
Software	
S-QFX5K-C4-A1-X	Advanced 1 Software Subscription (X=Term Lengths (1,3,5,P): 1-year, 3-year, 5-year, Perpetual) License for QFX5230-64CD
S-QFX5K-C4-A2-X	Advanced 2 Software Subscription (X=Term Lengths (1,3,5,P): 1-year, 3-year, 5-year, Perpetual) License for QFX5230-64CD
S-QFX5K-C4-P1-X	Premium Software Subscription (X=Term Lengths (1,3,5,P): 1-year, 3-year, 5-year, Perpetual) License for QFX5230-64CD

Optics and transceivers

QFX5230-64CD supports varying port speeds at 400G, 200G, 100G, 50G, 40G, 25G, and 10G with different transceiver options of direct attach copper cables, active optical cables, break out cables (DACBO and AOCBO). Up-to-date information on supported optics can be found on the Hardware Compatibility Tool at <https://apps.juniper.net/hct/product/?prd=QFX5230-64CD>.

Useful links

[Feature Explorer](#)

[Hardware Compatibility tool](#)

[Recommended Releases](#)

About Juniper Networks

Juniper Networks believes that connectivity is not the same as experiencing a great connection. Juniper's AI-Native Networking Platform is built from the ground up to leverage AI to deliver the best and most secure user experiences from the edge to the data center and cloud. Additional information can be found at Juniper Networks (www.juniper.net) or connect with Juniper on [X](#) (Twitter), [LinkedIn](#), and [Facebook](#).

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