

# MDS-G4012-L3 Series

12G-port Layer 3 full Gigabit modular managed Ethernet switches



## Features and Benefits

- Layer 3 routing interconnects multiple LAN segments
- Multiple interface type modules for greater versatility
- Tool-free design for effortlessly adding or replacing modules without shutting down the switch
- Ultra-compact size and multiple mounting options for flexible installation
- Rugged die-cast design for use in harsh environments
- Intuitive, HTML5-based web interface for a seamless experience across different platforms
- High EMC immunity compliant with IEC 61850-3 and IEEE 1613
- Hardware-based IEEE 1588 PTP for high-precision time synchronization

## Certifications



## Introduction

The MDS-G4012-L3 Series modular switches support up to 12 Gigabit ports, including 4 embedded ports, 2 interface module expansion slots, and 2 power module slots to ensure sufficient flexibility for a variety of applications. The highly compact MDS-G4000-L3 Series is designed to meet evolving network requirements, ensuring effortless installation and maintenance, and features a hot-swappable module design that enables you to easily change or add modules without shutting down the switch or interrupting network operations.

The multiple types of interface modules (RJ45, SFP, and PoE++) and power units (24/48 VDC, 110/220 VAC/VDC) provide even greater flexibility as well as suitability for different operating conditions, delivering an adaptive full Gigabit platform that provides the versatility and bandwidth necessary to serve as an Ethernet aggregation/edge switch. Featuring a compact design that fits in confined spaces, multiple mounting methods, and convenient tool-free module installation, the MDS-G4000-L3 Series switches enable versatile and effortless deployment without the need for highly skilled engineers. With multiple industry certifications and a highly durable housing, the MDS-G4000-L3 Series can reliably operate in tough and hazardous environments such as power substations, mining sites, ITS, and oil and gas applications. Support for dual power modules provides redundancy for high reliability and availability while LV and HV power module options offer additional flexibility to accommodate the power requirements of different applications.

Support for Layer 3 routing functionality enables these switches to facilitate the deployment of applications across different networks, making them ideal for large-scale industrial networks. In addition, the MDS-G4000-L3 Series features an HTML5-based, user-friendly web interface providing a responsive, smooth user experience across different platforms and browsers.

## Specifications

### Ethernet Interface

Pre-installed Modules	4 embedded Gigabit ports
Module	2 slots for optional FE/GbE modules

Slot Combination	<p>See the LM-7000H module series datasheet for more information.</p> <p>Note: The required power module depends on the choice of LM-7000H module. Refer to the following power/module combination requirements.</p> <p>LM-7000H non-PoE modules: Any power module</p> <p>LM-7000H PoE modules: PWR-HV-P48, PWR-LV-P48 only</p>
Standards	<p>IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) and 100BaseFX IEEE 802.3ab for 1000BaseT(X) IEEE 802.3z for 1000BaseX IEEE 802.3x for flow control IEEE 802.3ad for Port Trunk with LACP IEEE 802.1Q for VLAN Tagging IEEE 802.1D-2004 for Spanning Tree Protocol IEEE 802.1w for Rapid Spanning Tree Protocol IEEE 802.1p for Class of Service IEEE 802.1X for authentication</p>

### Ethernet Software Features

Management	<p>IPv4 Flow control Back Pressure Flow Control ARP RARP LLDP DHCP Relay Agent (Option 82) Fiber Check Port Mirroring (SPAN, RSPAN) Linkup Delay SMTP SNMP Trap SNMP Inform SNMPv1/v2c/v3 RMON TFTP SFTP HTTP HTTPS Telnet Syslog Private MIB Loopback interface</p>
Filter	<p>GMRP GVRP GARP 802.1Q VLAN IGMP Snooping v1/v2/v3 IGMP Querier</p>
Redundancy Protocols	<p>Link Aggregation MRP MRP Interconnection MSTP Multiple Dual Homing Multiple Network Coupling Network Loop Protection Ring Coupling RSTP STP Tracking Turbo Chain Turbo Ring v2</p>
Routing Redundancy	<p>VRRP</p>
Security	<p>Access control list</p>

	Broadcast storm protection DHCP Snooping Dynamic ARP Inspection HTTPS/SSL IEEE 802.1AE MAC security IP Source Guard Login and Password Policy MAC authentication bypass MAC Sticky RADIUS Rate Limit SSH Static Port Lock TACACS+ Trust access control
Time Management	SNTP IEEE 1588v2 PTP (hardware-based) Supported power profiles: IEEE 1588 Default 2008, IEC 61850-9-3-2016, IEEE C37.238-2017 NTP Server/Client NTP Authentication
Protocols	802.1X ARP DNS HTTP HTTPS ICMP IPv4 NTP Client QoS RARP RMON SMTP SNMPv1/v2c/v3 Syslog TCP/IP Telnet TFTP UDP VLAN Assignment
Industrial Protocols	EtherNet/IP Modbus TCP PROFINET
Unicast Routing	OSPF Static Route
Multicast Routing	Multicast Local Route PIM-DM PIM-SM
MIB	P-BRIDGE MIB Q-BRIDGE-MIB IEEE8021-SPANNING-TREE-MIB IEEE8021-PAE-MIB IEEE8023-LAG-MIB LLDP-EXT-DOT1-MIB LLDP-EXT-DOT3-MIB SNMPv2-MIB RMON MIB Groups 1, 2, 3, 9
Power Substation	1588 PTP Power Profile C37.238-2017 1588 PTP Power Profile IEC 61850-9-3 GOOSE Check MMS

## Switch Properties

MAC Table Size	16 K
Max. No. of VLANs	256
VLAN ID Range	VID 1 to 4094
IGMP Groups	1024
Jumbo Frame Size	9.216 KB
Priority Queues	8
Packet Buffer Size	12 Mbits

## LED Interface

LED Indicators	PWR, EPS, STATE, SYNC, FAULT, MSTR/HEAD, CPLR/TAIL
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## Serial Interface

Console Port	RS-232 (RJ45)
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## USB Interface

USB Connector	USB Type A
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## Input/Output Interface

Digital Input Channels	1 (On MGMT Module)
Digital Inputs	+13 to +30 V for state 1 -30 to +3 V for state 0 Max. input current: 8 mA
Alarm Contact Channels	3 (On MGMT, PWR1, PWR2 Module) Relay output with current carrying capacity of 2 A @ 30 VDC
Buttons	Reset button

## Power Parameters

Input Voltage	With PWR-HV-P48 installed: 110/220 VDC, 110 VAC, 60 HZ, 220 VAC, 50 Hz, PoE: 48 VDC  With PWR-LV-P48 installed: 24/48 VDC, PoE: 48 VDC  With PWR-HV-NP installed: 110/220 VDC, 110 VAC, 60 HZ, 220 VAC, 50 Hz  With PWR-LV-NP installed: 24/48 VDC
Operating Voltage	With PWR-HV-P48 installed: 88 to 300 VDC, 90 to 264 VAC, 47 to 63 Hz, PoE: 46 to 57 VDC  With PWR-LV-P48 installed: 18 to 72 VDC (24/48 VDC for hazardous location), PoE: 46 to 57 VDC (48 VDC for hazardous location)  With PWR-HV-NP installed: 88 to 300 VDC, 90 to 264 VAC, 47 to 63 Hz  With PWR-LV-NP installed: 18 to 72 VDC
Input Current	With PWR-HV-P48/PWR-HV-NP installed: Max. 0.42 A @ 110 VDC Max. 0.21 A @ 220 VDC Max. 0.62 A @ 110 VAC

	<p>Max. 0.43 A @ 220 VAC</p> <p>With PWR-LV-P48/PWR-LV-NP installed:  Max. 1.87 A @ 24 VDC  Max. 0.94 A @ 48 VDC</p> <p>EPS (PoE models only):  Max. 8.2 A @ 48 VDC</p> <p>Note: Maximum input current ratings are dependent on the installed power and interface modules. The listed values are based on the highest port density model in the MDS-G4000 Series fully slotted with the highest power consumption modules.</p>
Power Consumption (Max.)	<p>With PWR-HV-P48/PWR-HV-NP installed:  Max. 45.8 W @ 110 VDC  Max. 46.2 W @ 220 VDC  Max. 45.7 W @ 110 VAC  Max. 47.9 W @ 220 VAC</p> <p>With PWR-LV-P48/PWR-LV-NP installed:  Max. 44.9 W @ 24 VDC  Max. 44.9 W @ 48 VDC</p> <p>Note: Maximum power consumption ratings are dependent on the installed power and interface modules. The listed values are based on the highest port density model in the MDS-G4000 Series fully slotted with the highest power consumption modules.</p>
Max. PoE Power Output per Port	<p>IEEE 802.3at: up to 30 W (Up to 36 W in high-power mode)  IEEE 802.3bt: up to 90 W (Only supported with LM-7000H-4PoE/-4GPoE modules HW rev 3.0.0 and later.)</p>
Total PoE Power Budget	<p>Max. 360 W (with one power supply) for total PD consumption at 48 VDC input for PoE systems</p> <p>Max. 360 W (with one power supply) for total PD consumption at 53 to 57 VDC input for PoE+/PoE++ systems</p> <p>Max. 720 W (with two power supplies) for total PD consumption at 48 VDC input for PoE systems</p> <p>Max. 720 W (with two power supplies) for total PD consumption at 53 to 57 VDC input for PoE+/PoE++ systems</p>
Overload Current Protection	Supported
Reverse Polarity Protection	Supported
<b>Physical Characteristics</b>	
IP Rating	IP40
Dimensions	134 x 115 x 163.25 mm (5.28 x 4.53 x 6.44 in)
Weight	2000 g (4.41 lb)
Installation	DIN-rail mounting Wall mounting (with optional kit) Rack mounting (with optional kit)
<b>Environmental Limits</b>	
Operating Temperature	Standard Temp Models: -10 to 60°C (14 to 140°F) Wide Temp Models: -40 to 75°C (-40 to 167°F)
Storage Temperature (package included)	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (non-condensing)

## Standards and Certifications

Safety	EN IEC 62368-1 IEC 60950-1 IEC 62368-1 UL 62368-1
EMC	EN 55032/35 EN 61000-6-2/-6-4
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 20 V/m IEC 61000-4-4 EFT: Power: 4 kV; Signal: 4 kV IEC 61000-4-5 Surge: Power: 4 kV; Signal: 4 kV IEC 61000-4-6 CS: 10 V IEC 61000-4-8 PFMF IEC 61000-4-11 Voltage Dips & Interruptions
Railway	EN 50121-4
Traffic Control	NEMA TS2
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-31
Vibration	IEC 60068-2-6
Hazardous Locations	Class I Division 2 ATEX
Power Substation	IEEE 1613 IEC 61850-3

## MTBF

Time	1,008,160 hrs
Standards	Telcordia Standard SR-332

## Warranty

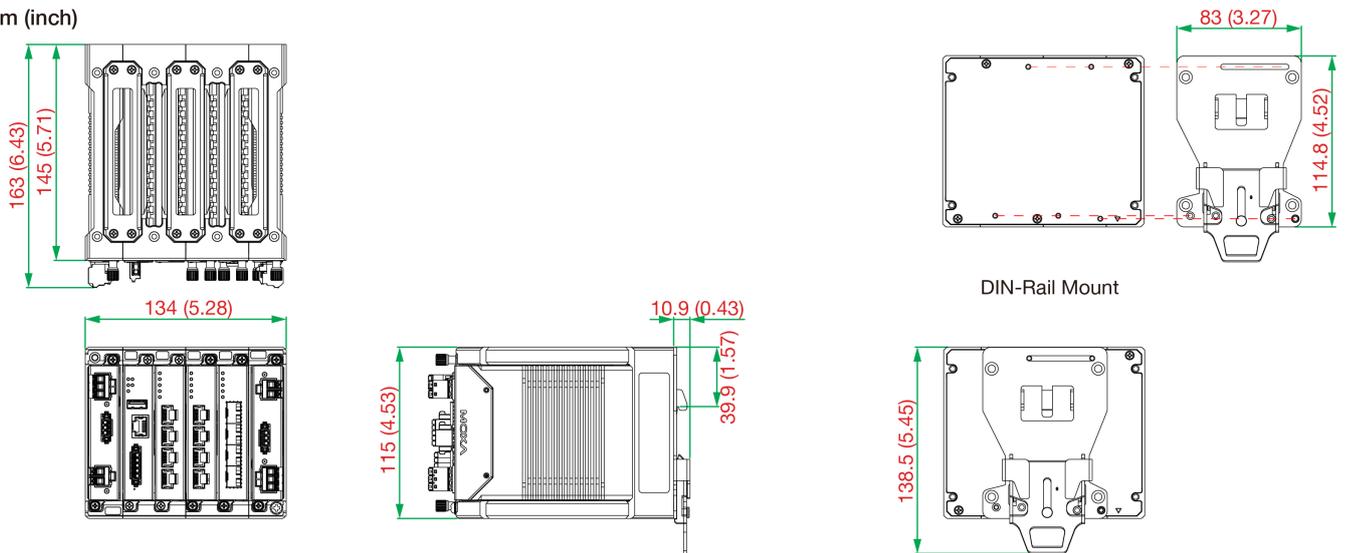
Warranty Period	5 years
Details	See <a href="http://www.moxa.com/warranty">www.moxa.com/warranty</a>

## Package Contents

Device	1 x MDS-G4012-L3 Series switch
Installation Kit	(Pre-installed) 2 x DIN-rail kit 2 x cap, plastic, for RJ45 port
Documentation	1 x quick installation guide 1 x product notice, Simplified Chinese 1 x product certificates of quality inspection, Simplified Chinese 1 x warranty card
Note	This product requires additional modules (sold separately) to function.

## Dimensions

Unit: mm (inch)



## Ordering Information

Model Name	Layer	Total No. of Ports	100/1000BaseSFP Slots	10/100/1000BaseT(X) Ports (RJ45 Connector)	PoE 10/100/1000BaseT(X) Ports (RJ45 Connector)	10/100BaseT(X) Ports (RJ45 Connector)	PoE 10/100BaseT(X) Ports (RJ45 Connector)	Operating Temp.
MDS-G4012-L3	3	12	Up to 8	Up to 12	Up to 8	Up to 8	Up to 8	-10 to 60°C
MDS-G4012-L3-T	3	12	Up to 8	Up to 12	Up to 8	Up to 8	Up to 8	-40 to 75°C

## Accessories (sold separately)

### LM-7000H Module Series

LM-7000H-4GTX	Gigabit Ethernet module with 4 10/100/1000BaseT(X) ports
LM-7000H-4GPoE	Gigabit Ethernet module with 4 10/100/1000BaseT(X) IEEE 802.3bt PoE++ ports
LM-7000H-4GSFP	Gigabit Ethernet module with 4 100/1000BaseSFP slots
LM-7000H-4TX	Fast Ethernet module with 4 10/100BaseT(X) ports
LM-7000H-4PoE	Fast Ethernet module with 4 10/100BaseT(X) IEEE 802.3bt PoE++ ports

### Power Modules

PWR-LV-P48	Power supply module (24/48 VDC) with system power input, relay, PoE power input
PWR-HV-P48	Power supply module (110/220 VAC/VDC) with system power input, relay, PoE power input
PWR-LV-NP	Power supply module (24/48 VDC) with system power input, relay
PWR-HV-NP	Power supply module (110/220 VAC/VDC) with system power input, relay

### Wall-Mounting Kits

WK-112-01	Wall-mounting kit, 2 plates, 8 screws
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### Rack-Mounting Kits

RK-3U-02	Rack-mounting kit with 4 L-shaped plates for the MDS-G4000 and MDS-G4000-4XGS Series
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### SFP Modules

SFP-1FEMLC-T	SFP module with 1 100Base multi-mode, LC connector for 2/4 km transmission, -40 to 85°C operating temperature
SFP-1FESLC-T	SFP module with 1 100Base single-mode with LC connector for 40 km transmission, -40 to 85°C operating temperature

SFP-1FELLC-T	SFP module with 1 100Base single-mode with LC connector for 80 km transmission, -40 to 85°C operating temperature
SFP-1G10ALC	WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 10 km transmission; TX 1310 nm, RX 1550 nm, 0 to 60°C operating temperature
SFP-1G10ALC-T	WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 10 km transmission; TX 1310 nm, RX 1550 nm, -40 to 85°C operating temperature
SFP-1G10BLC	WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 10 km transmission; TX 1550 nm, RX 1310 nm, 0 to 60°C operating temperature
SFP-1G10BLC-T	WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 10 km transmission; TX 1550 nm, RX 1310 nm, -40 to 85°C operating temperature
SFP-1G20ALC	WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 20 km transmission; TX 1310 nm, RX 1550 nm, 0 to 60°C operating temperature
SFP-1G20ALC-T	WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 20 km transmission; TX 1310 nm, RX 1550 nm, -40 to 85°C operating temperature
SFP-1G20BLC	WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 20 km transmission; TX 1550 nm, RX 1310 nm, 0 to 60°C operating temperature
SFP-1G20BLC-T	WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 20 km transmission; TX 1550 nm, RX 1310 nm, -40 to 85°C operating temperature
SFP-1G40ALC	WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 40 km transmission; TX 1310 nm, RX 1550 nm, 0 to 60°C operating temperature
SFP-1G40ALC-T	WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 40 km transmission; TX 1310 nm, RX 1550 nm, -40 to 85°C operating temperature
SFP-1G40BLC	WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 40 km transmission; TX 1550 nm, RX 1310 nm, 0 to 60°C operating temperature
SFP-1G40BLC-T	WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 40 km transmission; TX 1550 nm, RX 1310 nm, -40 to 85°C operating temperature
SFP-1GSXLC	SFP module with 1 1000BaseSX port with LC connector for 300m/550m transmission, 0 to 60°C operating temperature
SFP-1GSXLC-T	SFP module with 1 1000BaseSX port with LC connector for 300m/550m transmission, -40 to 85°C operating temperature
SFP-1GLSXLC	SFP module with 1 1000BaseLSX port with LC connector for 1km/2km transmission, 0 to 60°C operating temperature
SFP-1GLSXLC-T	SFP module with 1 1000BaseLSX port with LC connector for 1km/2km transmission, -40 to 85°C operating temperature
SFP-1GLXLC	SFP module with 1 1000BaseLX port with LC connector for 10 km transmission, 0 to 60°C operating temperature
SFP-1GLXLC-T	SFP module with 1 1000BaseLX port with LC connector for 10 km transmission, -40 to 85°C operating temperature
SFP-1GLHLC	SFP module with 1 1000BaseLH port with LC connector for 30 km transmission, 0 to 60°C operating temperature
SFP-1GLHLC-T	SFP module with 1 1000BaseLH port with LC connector for 30 km transmission, -40 to 85°C operating temperature
SFP-1GLHLC	SFP module with 1 1000BaseLHX port with LC connector for 40 km transmission, 0 to 60°C operating temperature
SFP-1GLHLC-T	SFP module with 1 1000BaseLHX port with LC connector for 40 km transmission, -40 to 85°C operating temperature
SFP-1GZXLC	SFP module with 1 1000BaseZX port with LC connector for 80 km transmission, 0 to 60°C operating temperature
SFP-1GZXLC-T	SFP module with 1 1000BaseZX port with LC connector for 80 km transmission, -40 to 85°C operating temperature
SFP-1GEZXLC	SFP module with 1 1000BaseEZXC port with LC connector for 110 km transmission, 0 to 60°C operating temperature
SFP-1GEZXLC-120	SFP module with 1 1000BaseEZXC port with LC connector for 120 km transmission, 0 to 60°C operating temperature
SFP-1GTXRJ45-T	SFP module with 1 1000BaseT port with RJ45 connector for 100 m transmission, -40 to 75°C operating temperature

## Power Supplies

HDR-60-24	60 W/2.5 A DIN-rail 24 VDC power supply, universal 85 to 264 VAC or 120 to 370 VDC input voltage, -30 to 70°C operating temperature
NDR-120-24	120 W/5.0 A DIN-rail 24 VDC power supply, universal 90 to 264 VAC or 127 to 370 VDC input voltage, -20 to 70°C operating temperature
NDR-120-48	120 W/2.5 A DIN-rail 48 VDC power supply, universal 90 to 264 VAC or 127 to 370 VDC input voltage, -20 to 70°C operating temperature
NDR-240-48	240 W/5.0 A DIN-rail 48 VDC power supply, universal 90 to 264 VAC or 127 to 370 VDC input voltage, -20 to 70°C operating temperature

## Cables

CN20070	10-pin RJ45 to DB9 female serial cable
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## Storage Kits

ABC-02-USB	Configuration backup and restoration tool, firmware upgrade, and log file storage tool for managed Ethernet switches and routers, 0 to 60°C operating temperature
ABC-02-USB-T	Configuration backup and restoration tool, firmware upgrade, and log file storage tool for managed Ethernet switches and routers, -40 to 75°C operating temperature

## Software

LIC-MXviewOne-NEW-XN-SR	MXview One node license with customizable node quantity (minimum 1 node)
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