

High-Power Optics for SmartFabric OS10

Dell EMC PowerSwitch Z9332F-ON and Z9432F-ON

Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

OS10 High-power optics

The following describes important considerations for the PowerSwitch Z9332F-ON and Z9432F-ON devices running OS10 when using a mix of lower-power and higher-power optics.

Document revision history

Table 1. Revision history

Version	Date	Change
A00	October 2020	Initial release.
A01	April 2021	Reorganized tables for clarity. Added two NOTES regarding optics warnings.
A02	July 2021	Updated <i>Introduction</i> section and table information.

Introduction

Inconsistent environmental conditions in data centers can impact performance, reduce the lifespan of the infrastructure, and increase costs. Data centers use systems that regulate the temperature to keep the infrastructure operating in optimum conditions.

Dell EMC PowerSwitch devices, such as the Z9332F-ON and Z9432F-ON, use air to dissipate the heat generated by the internal electronics. Each PowerSwitch data center platform can be installed in two types to adjust the airflow direction to the data center cooling systems: normal airflow (I/O-to-PSU), where air flows from the I/O panel to the power supply unit (PSU) modules, and reverse airflow (PSU-to-I/O), where air flows from the PSU modules to the I/O panel.

By design, some optics validated on the Z9332F-ON and Z9432F-ON function at a high rate of power.

Although these optics are qualified and their power consumption is within the operating range, you must be aware of some limitations when using high-power optics.

First, high-power optics increase the demand for power and can cause a rise in temperatures that requires more cooling.

Second, rack-installed reverse airflow devices increase the amount of warm air that flows over the optics. This warm airflow increases the temperature of the optics and thus, can limit their maximum operating power.

For the Z9332F-ON, the high-power quad small form-factor pluggable-double density media (QSFP56-DD) must not exceed their critical power levels: 14 W per port in normal airflow (I/O-to-PSU) and 12 W per port in reverse airflow (PSU-to-I/O). For the Z9432F-ON, the QSFP56-DD media must not exceed their critical power levels: 20 W for four ports and 15 W for the remaining ports. To avoid issues with a rise in temperature when using QSFP56-DD media, you must monitor the power consumption of all optics and ensure their values stay below the critical threshold. This limit keeps the ports within a safe operating range and within total device power specifications.

In addition, you must monitor the overall power that is drawn by all optics.

- The Z9332F-ON has two power banks that feed the optics: Bank A for ports 1 to 16 and Bank B for ports 17 to 32. Each power bank can supply 224 watts. Do not exceed the power that each bank delivers to all optics in their group.
- The Z9432F-ON has one DC power bank. The front panel port power limit is 500 W.

Dell EMC has made specific supplier selections for solutions that both satisfy stringent quality requirements and provide lower power characteristics.

400 GbE optics incorporate integrated digital signal processors (DSPs). These DSPs can exhibit appreciably different power requirements that are based on the chip, port speed, and signal modulation.

The next section provides the safe operating power limits for high-power optics.

⚠ WARNING: Third-party optics may pose a high risk of exceeding thresholds. Dell EMC only evaluates and supports Dell-supplied media.

i NOTE: Dell EMC continues to update the supported high-power optics, including the 100 GbE QSFP28 and 400 GbE QSFP56-DD media types.

For an updated list of supported optics, contact your Dell EMC representative.

i NOTE:

- If you insert a 12W optic in a 10W port, a warning message displays and the port operates.
- If you insert a 14W optic in a 12W port, a warning message displays but the port does not operate.

List of high-power optics, thresholds, and switch ports

The following tables list the thresholds for the PowerSwitch Z9332F-ON running version OS10.5.2.0 and beyond, and the PowerSwitch Z9432F-ON running version OS10.5.2.1 and beyond.

i NOTE: The CLI does not report the critical threshold. Be sure to monitor max-module-power per the thresholds listed in the following tables.

⚠ CAUTION: If your deployment must exceed the critical thresholds, consult your Dell EMC representative immediately for specific guidelines.

Table 2. Z9332F-ON 400G QSFP56-DD normal airflow (I/O-to-PSU)

Type	Model	Module power rating (W)	High threshold (W)	Critical threshold (W)	Panel port number allowed
Optic	QSFP56-DD-400G-SR8	12	12	14	All ports (1 ... 32)
Optic	AOC-QSFP56-DD-400G-10 m, 15 m	12	12	14	All ports (1 ... 32)
Active copper	ACC-QSFP56-DD-400G-3 m, 5 m	10	12	14	All ports (1 ... 32)
Optic	QSFP56-DD-400G-FR4	10	12	14	All ports (1 ... 32)
Optic	QSFP56-DD-400G-EDR4	10	12	14	All ports (1 ... 32)

Table 3. Z9332F-ON 400G QSFP56-DD reverse airflow (PSU-to-I/O)

Type	Model	Module power rating (W)	High threshold (W)	Critical threshold (W)	Panel port number allowed
Optic	QSFP56-DD-400G-SR8	12	Not supported	Not supported	Not supported
Optic	AOC-QSFP56-DD-400G-10 m, 15 m	12	Not supported	Not supported	Not supported
Active copper	ACC-QSFP56-DD-400G-3 m, 5 m	10	5	10 W (ports 1, 2, 3, 4, 29, 30, 31, 32)	Ports 1, 2, 3, 4, 29, 30, 31, 32
Optic	QSFP56-DD-400G-FR4	10	5	10 W (ports 1, 2, 3, 4, 29, 30, 31, 32)	Ports 1, 2, 3, 4, 29, 30, 31, 32
Optic	QSFP56-DD-400G-EDR4	10	5	10 W (ports 1, 2, 3, 4, 29, 30, 31, 32)	Ports 1, 2, 3, 4, 29, 30, 31, 32

Table 4. Z9332F-ON 100G QSFP28 reverse airflow (PSU-to-I/O)

Type	Model	Module power rating (W)	High threshold (W)	Critical threshold (W)	Panel port number allowed
Optic	QSFP28-100G-ER4-LITE	4.5	5	<ul style="list-style-type: none"> • 10 W (ports 1, 2, 31, 32) • 7 W (ports 3, 4...29, 30) 	All ports (1 ... 32)
Optic	QSFP28-100G-FR	4.5	5	<ul style="list-style-type: none"> • 10 W (ports 1, 2, 3, 4, 29, 30, 31, 32) • 7 W (ports 3, 4...29, 30) 	All ports (1 ... 32)

Table 5. Z9432F-ON 400G QSFP56-DD normal airflow (I/O-to-PSU)

Type	Model	Module power rating (W)	High threshold (W)	Critical threshold (W)	Panel port number allowed
Optic	QSFP56-DD-400G-SR8	12	14	<ul style="list-style-type: none"> • 20 W (1, 9, 23, 31) • 15 W (2...8, 10...22, 24...30, 32) 	All ports (1 ... 32)
Optic	AOC-QSFP56-DD-400G-10m, 15m	12	14	<ul style="list-style-type: none"> • 20 W (1, 9, 23, 31) • 15 W (2...8, 10...22, 24...30, 32) 	All ports (1 ... 32)
Active copper	ACC-QSFP56-DD-400G- 3m, 5m	10	14	<ul style="list-style-type: none"> • 20 W (1, 9, 23, 31) • 15 W (2...8, 10...22, 24...30, 32) 	All ports (1 ... 32)
Optic	QSFP56-DD-400G-FR4	10	14	<ul style="list-style-type: none"> • 20 W (1, 9, 23, 31) • 15 W (2...8, 10...22, 24...30, 32) 	All ports (1 ... 32)
Optic	QSFP56-DD-400G-EDR4	10	14	<ul style="list-style-type: none"> • 20 W (1, 9, 23, 31) • 15 W (2...8, 10...22, 24...30, 32) 	All ports (1 ... 32)

Table 6. Z9432F-ON 100G QSFP28 normal airflow (I/O-to-PSU)

Type	Model	Module power rating (W)	High threshold (W)	Critical threshold (W)	Panel port number allowed
Optic	QSFP28-100G-ER4-LITE	4.5	14	<ul style="list-style-type: none"> • 20 W (1, 9, 23, 31) • 15 W (2...8, 10...22, 24...30, 32) 	All ports (1 ... 32)
Optic	QSFP28-100G-FR	4.5	14	<ul style="list-style-type: none"> • 20 W (1, 9, 23, 31) • 15 W (2...8, 10...22, 24...30, 32) 	All ports (1 ... 32)

Table 7. Z9432F-ON 400G QSFP56-DD reverse airflow (PSU-to-I/O)

Type	Model	Module power rating (W)	High threshold (W)	Critical threshold (W)	Panel port number allowed
Optic	QSFP56-DD-400G-SR8	12	10	12	All ports (1 ... 32)
Optic	AOC-QSFP56-DD-400G-10, 15m	12	10	12	All ports (1 ... 32)
Active copper	ACC-QSFP56-DD-400G-3m, 5m	10	10	12	All ports (1 ... 32)
Optic	QSFP56-DD-400G-FR4	10	10	12	All ports (1 ... 32)
Optic	QSFP56-DD-400G-EDR4	10	10	12	All ports (1 ... 32)

Table 8. Z9432F-ON 100G QSFP28 reverse airflow (PSU-to-I/O)

Type	Model	Power module rating (W)	High threshold (W)	Critical threshold (W)	Panel port number allowed
Optic	QSFP28-100G-ER4-LITE	4.5	10	12	All ports (1 ... 32)
Optic	QSFP28-100G-FR	4.5	10	12	All ports (1 ... 32)