



## Application

- Data center & Networking Equipment
- Servers/Storage Devices
- High Performance Computing (HPC)
- Switches/Routers
- Telecom Central Offices (CO)
- Test and Measurement Equipment

## Highlight

- Support 106.25G PAM4
- 100G to 100G Data Rate
- 3.3V Power Supply
- Hot Pluggable
- BER  $< 10^{-6}$  (pre FEC)
- BER  $< 10^{-15}$  (post FEC)
- Excellent SI performance
- RoHS Compliance

## Standards Compliance

- Compliant with SFP-DD MSA
- Compliant with IEEE 802.3ck
- Compliant with IEEE 802.3cd
- I2C for EEPROM Communication
- Compliant with CMIS 5.x
- SFF-TA-1031, FF-8665, SFF-8661, SFF-8679, SFF-8636

## 1.0 General Description

This datasheet pertains to the **SFP112 to SFP112 100G Direct Attached Cable Assembly**, meticulously designed for application in the telecommunications and data center sectors. It helps carry 100Gb of traffic per cable in both directions. The cable adheres to the standardized SFP112 form factor and complies rigorously with Multi-Source Agreement (MSA) specifications.

## 2.0 Product Specification

### 2.1 Absolute Maximum Ratings

| Parameter                          | Unit |  | Min. | Max. | Notes |
|------------------------------------|------|--|------|------|-------|
| Supply Voltage                     | V    |  | -0.3 | 3.6  |       |
| Data Input Voltage                 | V    |  | -0.3 | 3.6  |       |
| Control Input Voltage              | V    |  | -0.3 | 3.6  |       |
| Operating Temperature              | °C   |  | 0    | 70   |       |
| Storage Temperature                | °C   |  | -40  | +85  |       |
| Relative Humidity (Non-Condensing) | %    |  | 5    | 85   |       |

### 2.2 Operational Specification

| Parameter                   | Unit | Min        | Typical | Max   | Notes   |
|-----------------------------|------|------------|---------|-------|---------|
| Supply Voltage (Vcc)        | V    | 3.135      | 3.3     | 3.465 | Per End |
| Power Consumption           | W    |            |         | 1.5   | Per End |
| Operating Case Temperature  | °C   | 0          |         | 70    |         |
| Operating Relative Humidity | %    | 0          |         | 85    |         |
| Modulation Format           |      | 112G PAM-4 |         |       |         |
| Bit Rate                    | Gbps |            | 100     |       |         |

### 2.3 Electrical Characteristics

| Parameter                            | Unit | Min   | Typical | Max | Notes |
|--------------------------------------|------|-------|---------|-----|-------|
| Characteristic Impedance             | ohm  | 90    | 100     | 110 |       |
| Time Propagation Delay (Informative) | ns   | ..... | .....   | 4.9 |       |

## 2.4 SI performance

| Item | Parameter   | Require                              | Reference                        |
|------|---|--------------------------------------|----------------------------------|
| 1    | ILdd<br>Insertion loss at 26.56 GHz                     | 19.75 dB (Max.)                      | IEEE 802.3ck<br>Section 162.11.2 |
| 2    | ILdd<br>Insertion loss at 26.56 GHz                     | 11 dB (Min.)                         | IEEE 802.3ck<br>Section 162.11.2 |
| 3    | ERL<br>Minimum cable assembly                           | >8.25 dB*.                           | IEEE 802.3ck<br>Section 162.11.3 |
| 4    | RLcd<br>Differential-mode to common-mode return loss    | 0.01GHz – 40GHz<br>Equation (162-20) | IEEE 802.3ck Section<br>162.11.4 |
| 5    | ILcd<br>Differential-mode to common-mode insertion loss | 0.01GHz – 40GHz<br>Equation (162-21) | IEEE 802.3ck Section<br>162.11.5 |
| 6    | RLcc<br>Common-mode to common-mode return loss          | 0.01GHz – 40GHz<br>Equation (162-22) | IEEE 802.3ck<br>Section 162.11.6 |
| 7    | COM   | 3dB (Min.)                           | IEEE 802.3ck<br>Section 162.11.7 |

\*Cable assemblies with a com greater than 4 dB are not required to meet minimum ERL

## 2.5 Pin Assignments

Bottom side as viewed from top through the board

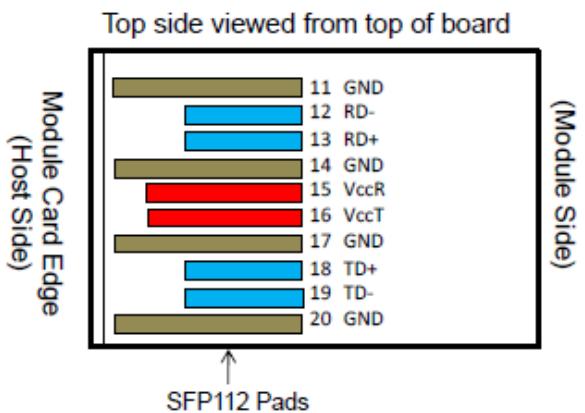
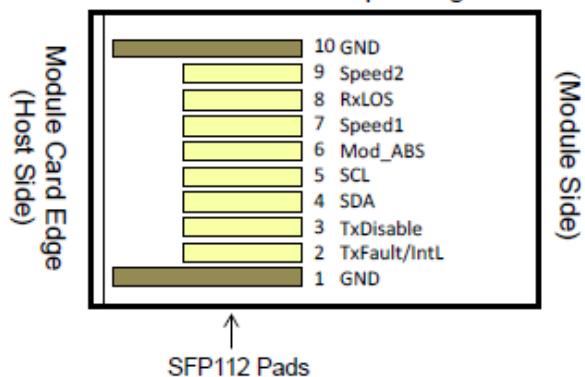


Figure 1 SFP112 Module Contact Assignment

## 2.6 Pin Description

Table 1 SFP112 Module Pin Description

| Contacts | Logic <sup>1</sup> | Symbol     | Power Sequence Order | Name/Description  | Note |
|----------|--------------------|------------|----------------------|---|------|
| 0        |                    | case       | 0                    | Module case   |      |
| 1        |                    | GND        | 1                    | Ground  | 1    |
| 2        | LVTTL-O            | Tx_Fault   | 3                    | Module Fault Indication<br>optionally can be configured IntL via TWI as described in the CMIS | 4    |
| 3        | LVTTL-I            | Tx_Disable | 3                    | Transmitter Disable   |      |
| 4        | LVTTL-I/O          | SDA        | 3                    | Management I/F data line  |      |
| 5        | LVTTL-I/O          | SCL        | 3                    | Management I/F clock  |      |
| 6        |                    | Mod_ABS    | 3                    | Module Absent   |      |

|    |         |        |   |                           |   |
|----|---------|--------|---|---------------------------|---|
| 7  | LVTTI-I | Speed1 | 3 | Rx Rate Select            |   |
| 8  | LVTTI-O | Rx_LOS | 3 | Rx Loss of Signal         |   |
| 9  | LVTTI-I | Speed2 | 3 | Tx Rate Select            |   |
| 10 |         | GND    | 1 | Ground                    | 1 |
| 11 |         | GND    | 1 | Ground                    | 1 |
| 12 | CML-O   | RD0-   | 3 | Inverse Received Data Out |   |
| 13 | CML-O   | RD0+   | 3 | Received Data Out         |   |
| 14 |         | GND    | 1 | Ground                    | 1 |
| 15 |         | VccR   | 2 | Receiver Power            | 2 |
| 16 |         | VccT   | 2 | Transmitter Power         | 2 |
| 17 |         | GND    | 1 | Ground                    | 1 |
| 18 | CML-I   | TD0+   | 3 | Transmit Data             |   |
| 19 | CML-I   | TD0-   | 3 | Inverse Transmit Data     |   |
| 20 |         | GND    | 1 | Ground                    | 1 |

## Note1:

SFP112 uses common ground (GND) for all signals and supply (power). All are common within the SFP112 module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.

## Note2:

VccR, VccT shall be applied concurrently. Requirements defined for the host side of the Host Card Edge Connector are listed in Table 11. VccR and VccT may be internally connected within the module in any combination. The connector Vcc pins are each rated for a maximum current of 1000 mA.

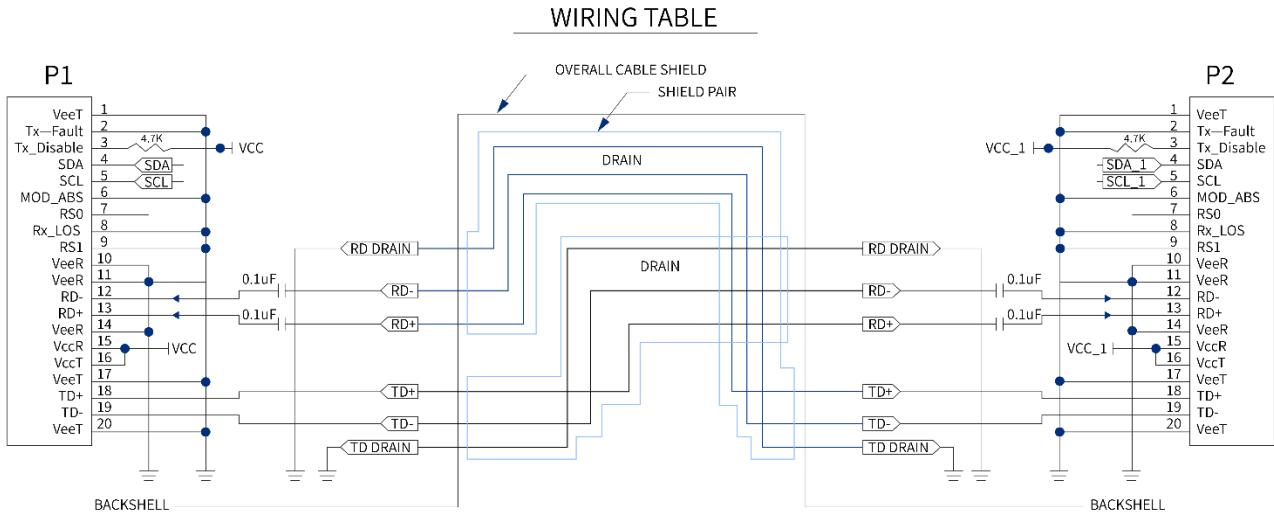
## Note3:

Plug Sequence specifies the mating sequence of the host connector and module. The sequence is 0, 1, 2, 3.

## Note4:

Support to configure TXFault/IntL will be provided in future CMIS revisions 5.1.

#### 2.7 Cable Wiring



**Figure 2 SFP112 to SFP112 Direct Attached Cable Assembly Wiring**

## 2.8 Memory Map information (CMIS Version)

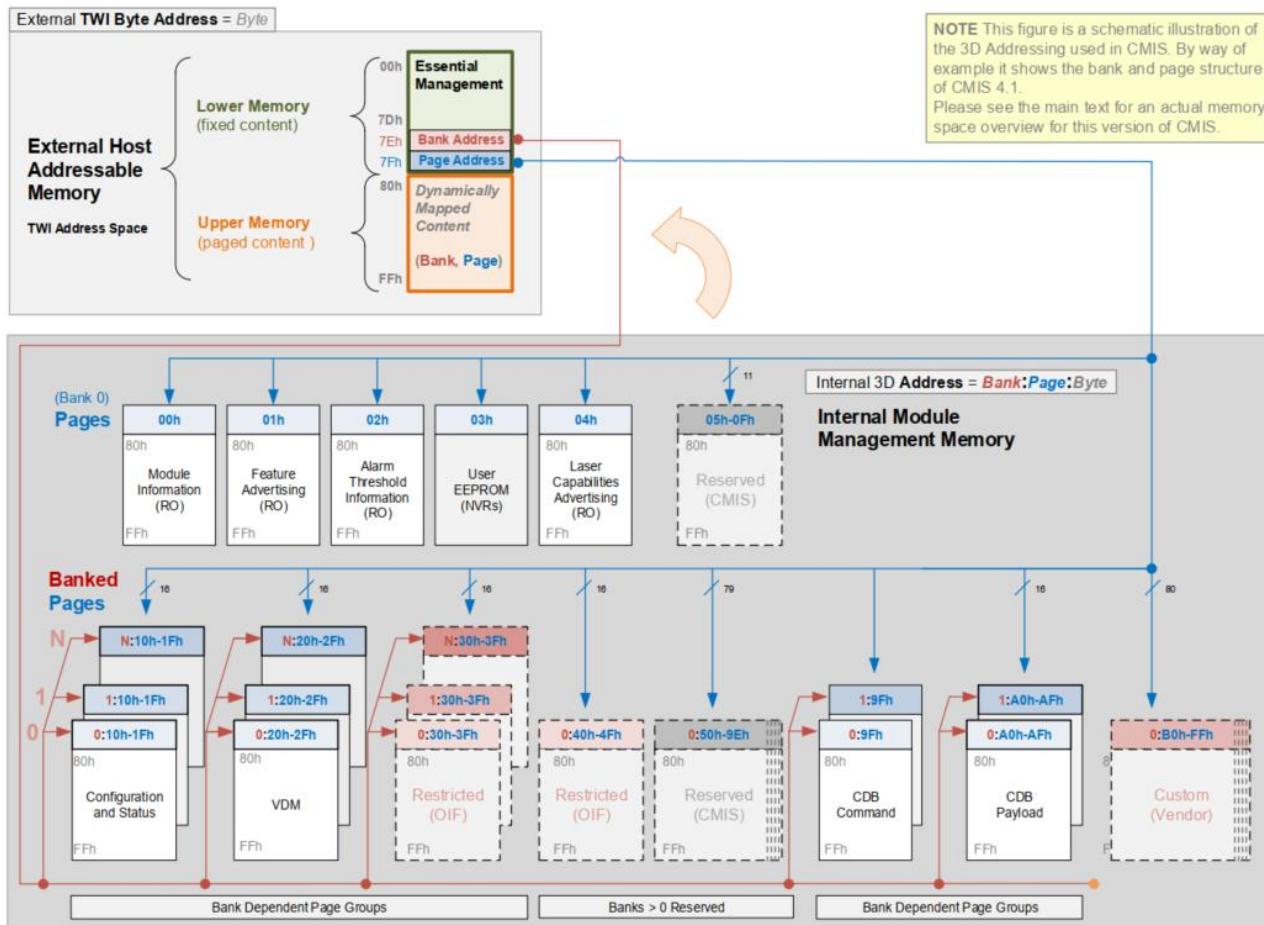


Figure 3 CMIS Module Memory Map (Conceptual View)

## ■ Lower Memory Overview

| Address | Size | Subject Area            | Description  |
|---------|------|-------------------------|--|
| 0-3     | 4    | ID and Status Area      | Module ID from SFF-8024 list, version number, Type and status  |
|         |      |                         | Flat mem indication, CLEI present indicator, Maximum TWI speed, Current state of Module, Current state of the Interrupt signal |
| 4-7     | 4    | Lane Flag Summary       | Flag summary of all lane flags on pages 10h-1Fh  |
| 8-13    | 6    | Module-Level Flags      | All flags that are not lane or data path specific  |
| 14-25   | 12   | Module-Level Monitors   | Monitors that are not lane or data path specific   |
| 26-3    | 5    | Module Global Controls  | Controls applicable to the module as a whole   |
| 31-36   | 6    | Module-Level Flag Masks | Masking bits for the Module-Level flags  |
| 37-38   | 2    | CDB Status Area         | Status of most recent CDB command  |
| 39-40   | 2    | Module Firmware Version | Module Firmware Version  |
| 41-63   | 23   | Reserved Area           | Reserved for future standardization  |

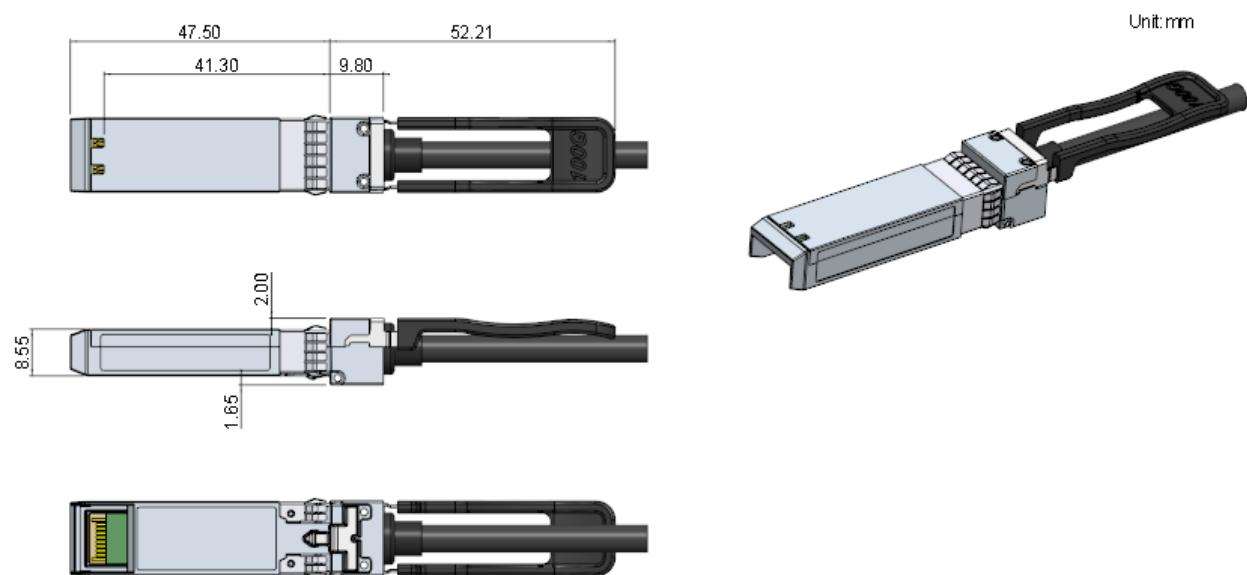
|         |    |                           |   |
|---------|----|---------------------------|---|
| 64-82   | 19 | Custom Area               | Vendor or module type specific use  |
| 83-84   | 2  | Inactive Firmware Version | Version Number of Inactive Firmware. Values of 00h indicates module supports only a single image. |
| 85-117  | 33 | Application Advertising   | Combinations of host and media interfaces that are supported by module data path(s)               |
| 118-125 | 8  | Password Entry and Change |   |
| 126     | 1  | Bank Select Byte          | Bank address of currently visible Page  |
| 127     | 1  | Page Select Byte          | Page address of currently visible Page  |

### ■ Page 00h Overview

| Address | Size (bytes) | Name                            | Description   |
|---------|--------------|---------------------------------|---|
| 128     | 1            | Identifier                      | Identifier Type of module                                 |
| 129-144 | 16           | Vendor name                     | Vendor name (ASCII)                                       |
| 145-147 | 3            | Vendor OUI                      | Vendor IEEE company ID                                    |
| 148-163 | 16           | Vendor PN                       | Part number provided by vendor (ASCII)                    |
| 164-165 | 2            | Vendor rev                      | Revision level for part number provided by vendor (ASCII) |
| 166-181 | 16           | Vendor SN                       | Vendor Serial Number (ASCII)                              |
| 182-189 | 8            | Date Code                       |   |
| 190-199 | 10           | CLEI code                       | Common Language Equipment Identification code             |
| 200-201 | 2            | Module power characteristics    |   |
| 202     | 1            | Cable assembly length           |   |
| 203     | 1            | Media Connector Type            |   |
| 204-209 | 6            | Copper Cable Attenuation        |   |
| 210-211 | 2            | Cable Assembly Lane Information |   |
| 212     | 1            | Media Interface Technology      |   |
| 213-220 | 8            | Reserved                        |   |
| 221     | 1            | Custom                          |   |
| 222     | 1            | Checksum                        | Includes bytes 128-221                                    |
| 223-255 | 33           | Custom Info NV                  |   |

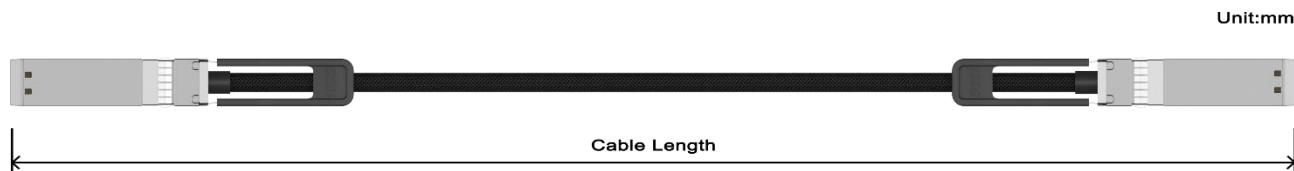
Note: For the above, refer to **Common Management Interface Specification Rev5.0**.

## 2.9 Mechanical Specifications



**Figure 4 SFP112 Form Factor**

### 3.0 Product Information



| Product ID         | Product Description                                  | Tolerance | AWG |
|--------------------|--|-----------|-----|
| S112-100G-DAC-3005 | SFP112 100G Direct Attached Copper Cable, 30AWG-0.5M | ±20       | 30  |
| S112-100G-DAC-3010 | SFP112 100G Direct Attached Copper Cable, 30AWG-1.0M | ±30       | 30  |
| S112-100G-DAC-2810 | SFP112 100G Direct Attached Copper Cable, 28AWG-1.0M | ±30       | 28  |
| S112-100G-DAC-2815 | SFP112 100G Direct Attached Copper Cable, 28AWG-1.5M | ±30       | 28  |
| S112-100G-DAC-2615 | SFP112 100G Direct Attached Copper Cable, 26AWG-1.5M | ±40       | 26  |
| S112-100G-DAC-2620 | SFP112 100G Direct Attached Copper Cable, 26AWG-2.0M | ±40       | 26  |

#### Important Notice

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## 4.0 Revision Record

| <b>Rev.</b> | <b>Comments</b> | <b>Author</b> | <b>Date</b> |
|-------------|-----------------|---------------|-------------|
| A01         | Initial Release | James Chen    | 10/01/2023  |
|             |                 |               |             |
|             |                 |               |             |
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