LinkPro™

# DSFP56 100G Active Redriver Cable Assembly

## Application

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

## Highlight

- Support 53.125G 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 DSFP/NGSFP MSA
- Compliant with IEEE 802.3cd
- Compliant with IEEE 802.3by
- I2C for EEPROM Communication
- Compliant with CMIS 5.0 and SFF-8636
- Compliant with SFF-8472, SFF-8402, SFF-8419, SFF-8432, SFF-8071, SFF-8433

# 1.0 General Description

This datasheet pertains to the **DSFP56 to DSFP56 100G Direct Attached Cable Assembly**, meticulously designed for application in the telecommunications and data center sectors. It facilitates bi-directional transmission of 100Gb traffic per cable, accommodating 2 lanes of 50G PAM4. The cable adheres to the standardized DFP and NGSFP 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 | | 56G PAM-4 | | | |
| Bit Rate | Gbps | 2*50G to 2*50G | | | |

## 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 13.28 GHz | 17.16 dB (Max.) | IEEE 802.3cd Section<br>Section 136.11.2 |
| 2 | ILdd<br>Insertion loss at 13.28 GHz | 8 dB (Min.) | IEEE 802.3cd Section<br>Section 136.11.2 |
| 3 | ERL<br>Minimum cable assembly | >11 dB* | IEEE 802.3cd Section<br>Section 136.11.3 |
| 4 | RLcd<br>Differential-mode to common-mode return loss | 0.01GHz – 19GHz<br>Equation (92–28) | IEEE 802.3cd Section<br>136.11.4 |
| 5 | ILcd<br>Differential-mode to common-mode insertion loss | 0.01GHz – 19GHz<br>Equation (92–29) | IEEE 802.3cd Section<br>136.11.5 |
| 6 | RLcc<br>Common-mode to common-mode return loss | 0.01GHz – 19GHz<br>Equation (92–30) | IEEE 802.3cd Section<br>Section 136.11.6 |
| 7 | COM | 3dB (Min.) | IEEE 802.3cd Section<br>Section 136.11.7 |
| *Cable assemblies with a com greater than 4 dB are not required to meet minimum ERL | | | |

## 2.5 Pin Assignments

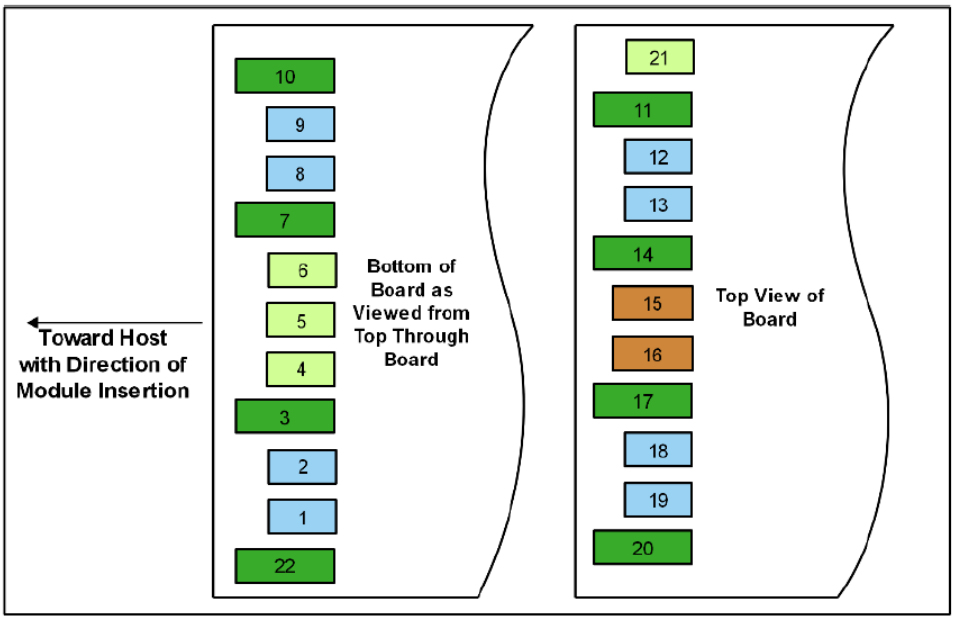



**Figure 1 DSFP56 Module Contact Assignment**

## 2.6 Pin Description

**Table 1 DSFP56 Module Pin Description**

| Contacts | Logic [1] | Symbol | Power Sequence Order | Name/Description | Note |
|---|---|---|---|---|---|
| case | | case | See2 | Module case | |
| 1 | CML-I | TD2- | 3rd | Transmitter Inverted Data Input Lane 2 | |
| 2 | CML-I | TD2+ | 3rd | Transmitter Non-Inverted Data Input Lane 2 | |
| 3 | | Gnd | 1st | Module Ground | 5 |
| 4 | LVTTL-I/O | SDA | 3rd | 2-wire Serial Interface Data Line | 3 |
| 5 | LVTTL-I/O | SCL | 3rd | 2-wire Serial Interface Clock | 3 |
| 6 | Multilevel -I/O | LPWn/ PRSn | 3rd | Low Power Mode/ Module Present (Mod_Abs) | |
| 7 | | Gnd | 1st | Module Ground | 5 |
| 8 | CML-O | RD2+ | 3rd | Receiver Non-Inverted Data Output Lane 2 | |
| 9 | CML-O | RD2- | 3rd | Receiver Inverted Data Output Lane 2 | |
| 10 | | Gnd | 1st | Module Ground | 5 |
| 11 | | Gnd | 1st | Module Ground | 5 |
| 12 | CML-O | RD1- | 3rd | Receiver Inverted Data Output Lane 1 | 4 |
| 13 | CML-O | RD1+ | 3rd | Receiver Non-Inverted Data Output Lane 1 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| 14 | | Gnd | 1st | Module Ground | 5 |
| 15 | | Vcc | 2nd | Module 3.3 V Supply | |
| 16 | | Vcc | 2nd | Module 3.3 V Supply | |
| 17 | | Gnd | 1st | Module Ground | 5 |
| 18 | CML-I | TD1+ | 3rd | Transmitter Non-Inverted Data Input Lane 1 | 4 |
| 19 | CML-I | TD1- | 3rd | Transmitter Inverted Data Input Lane 1 | 4 |
| 20 | | Gnd | 1st | Module Ground | 5 |
| 21 | Multilevel-I/O | INT/RSTn | 3rd | Dual Function Module Interrupt and Reset Pin | |
| 22 | | Gnd | 1st | Module Ground | 5 |

Note1:

Labeling as inputs (I) and outputs (O) are from the perspective of the module.

Note2:

The case makes electrical contact to the cage before any of the board edge contacts are made.

Note3:

DSFP 2-wire interface is based on Low Voltage TTL (LVTTL) operating with a module supply of 3.3 V +/-5% and with a host supply range of 2.38 to 3.46 V.

The 2-wire interface protocol and electrical specifications are defined in SFF-8431 and compatible with I2C bus specifications.

Note4:

Backward compatible with SFF-8431 SFI interface.

Note5:

The module ground contacts Gnd recommended to be isolated from the module case by offering flexibility in the host EMI control strategy.

## 2.7 Cable Wiring

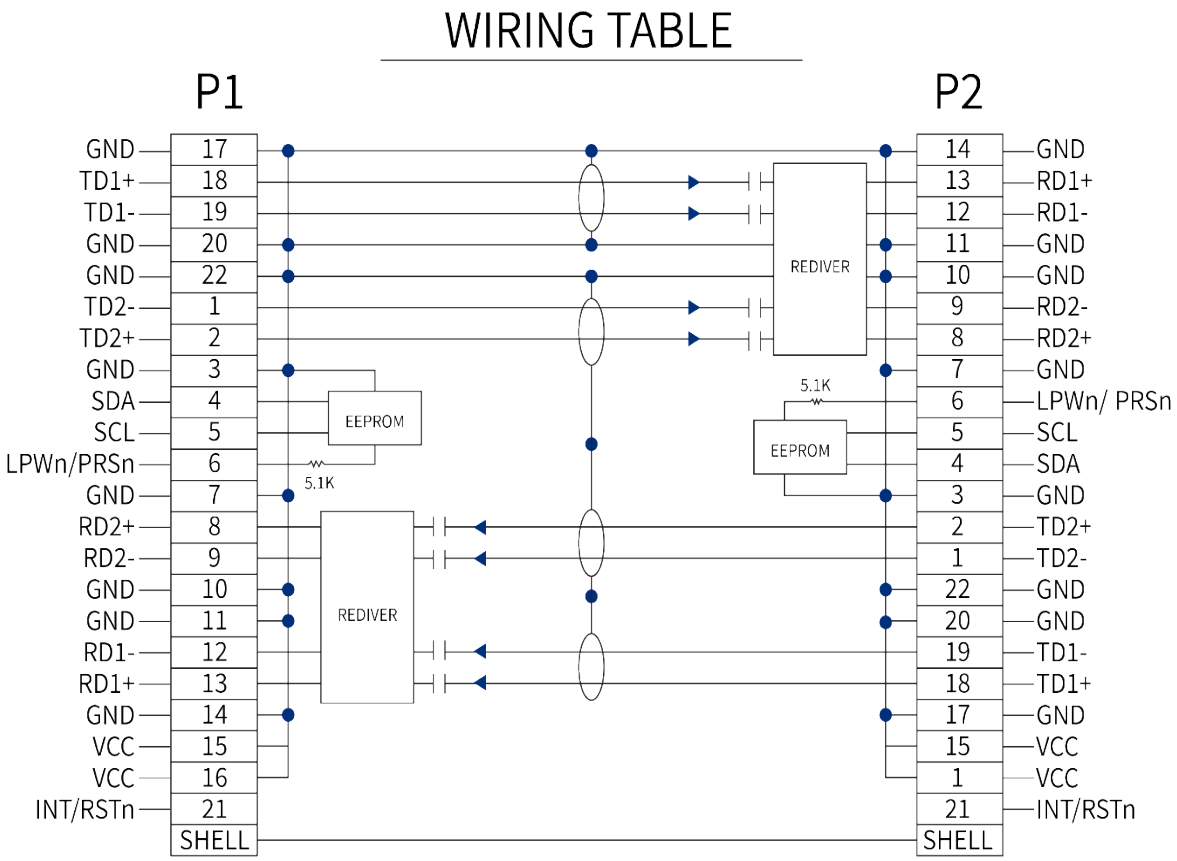



**Figure 2 DSFP56 to DSFP56 Active Redriver Cable Assembly Wiring**

## 2.1 MCIS Memory Map

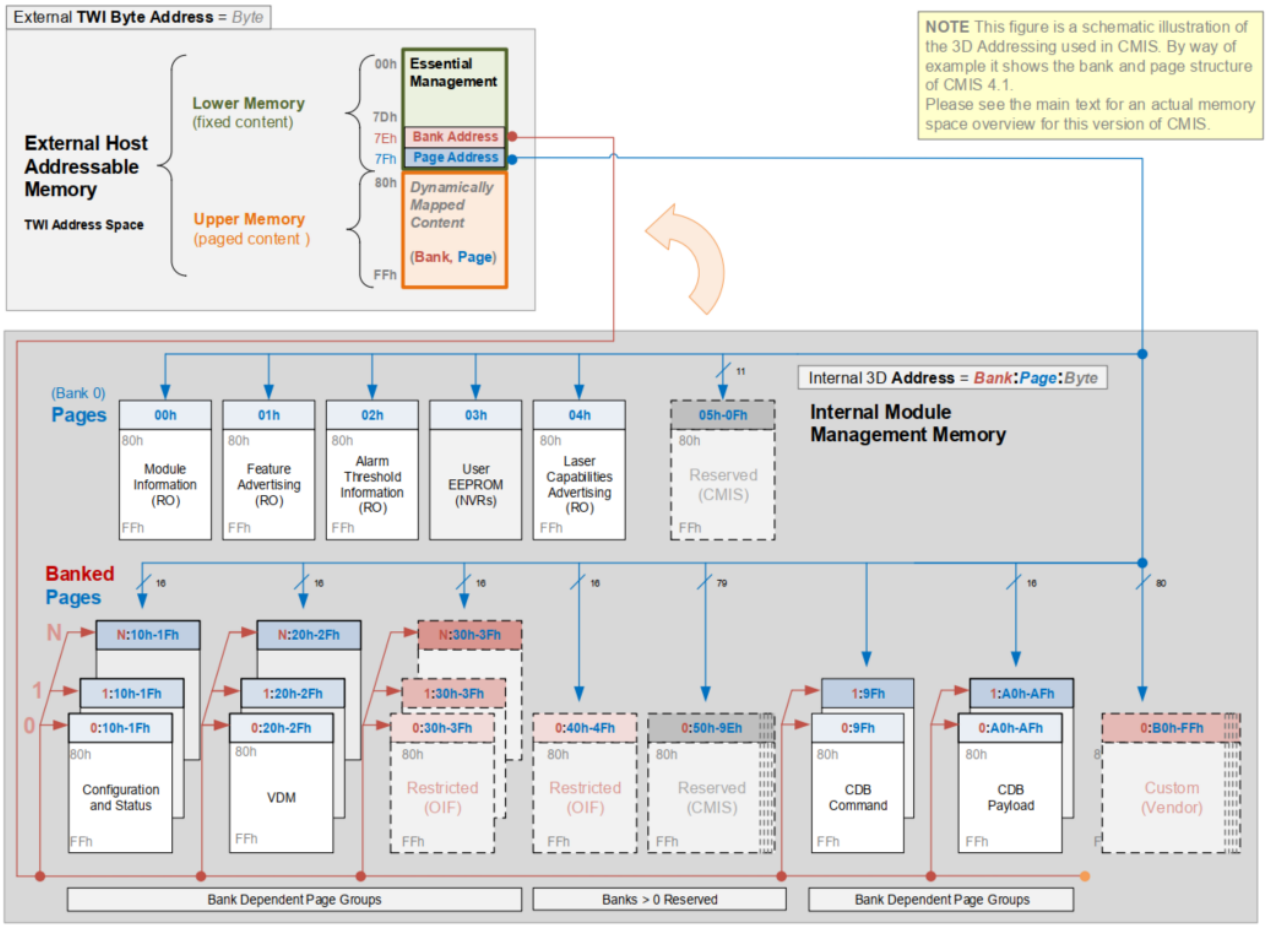



Figure 3 CMIS Module Memory Map (Conceptual View)

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<br>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.**

## 2.2 Mechanical Specifications

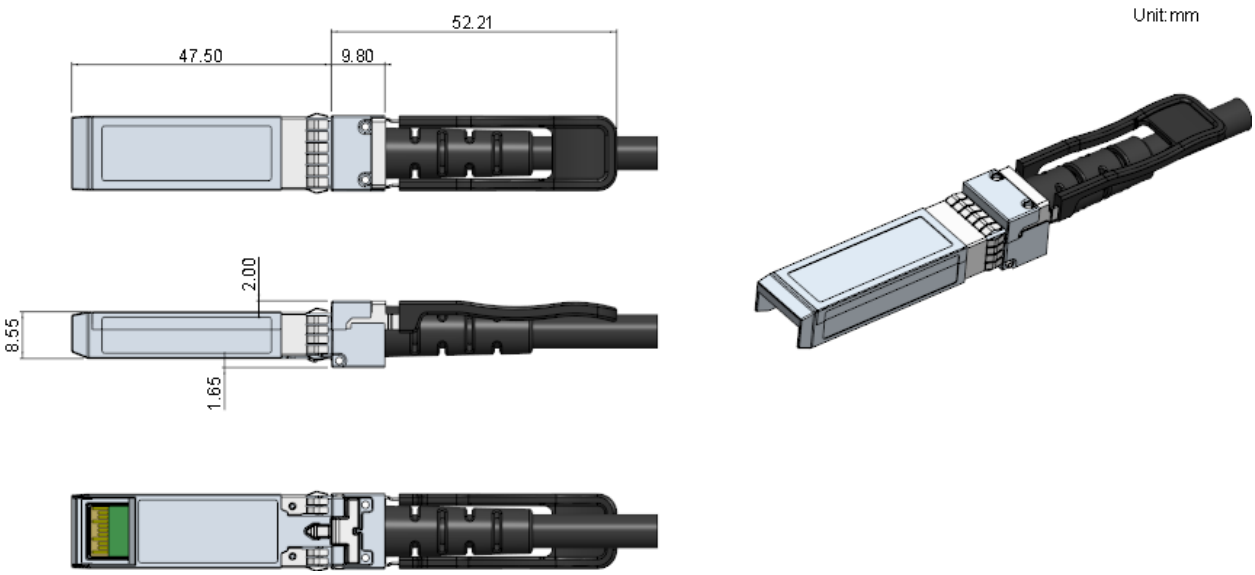
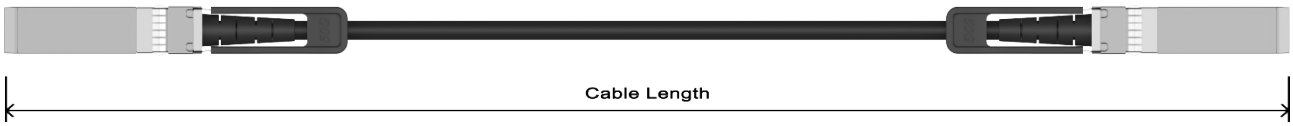



**Figure 4 DSFP56 Form Factor**

## 3.0 Product Information

Unit:mm




| Product ID | Product Description | Tolerance | AWG |
|---|---|---|---|
| DSFP56-100G-ACC-3025 | DSFP56 100G Active Redriver Copper Cable, 30AWG-2.5M | ±50 | 30 |
| DSFP56-100G-ACC-3030 | DSFP56 100G Active Redriver Copper Cable, 30AWG-3.0M | ±50 | 30 |
| DSFP56-100G-ACC-3035 | DSFP56 100G Active Redriver Copper Cable, 30AWG-3.5M | ±60 | 30 |
| DSFP56-100G-ACC-2840 | DSFP56 100G Active Redriver Copper Cable, 28AWG-4.0M | ±60 | 30 |
| DSFP56-100G-ACC-2830 | DSFP56 100G Active Redriver Copper Cable, 28AWG-3.0M | ±50 | 28 |
| DSFP56-100G-ACC-2835 | DSFP56 100G Active Redriver Copper Cable, 28AWG-3.5M | ±60 | 28 |
| DSFP56-100G-ACC-2840 | DSFP56 100G Active Redriver Copper Cable, 28AWG-4.0M | ±60 | 28 |
| DSFP56-100G-ACC-2845 | DSFP56 100G Active Redriver Copper Cable, 28AWG-4.5M | ±70 | 28 |
| DSFP56-100G-ACC-2640 | DSFP56 100G Active Redriver Copper Cable, 26AWG-3.5M | ±60 | 26 |
| DSFP56-100G-ACC-2640 | DSFP56 100G Active Redriver Copper Cable, 26AWG-4.0M | ±60 | 26 |
| DSFP56-100G-ACC-2645 | DSFP56 100G Active Redriver Copper Cable, 26AWG-4.5M | ±70 | 26 |
| DSFP56-100G-ACC-2650 | DSFP56 100G Active Redriver Copper Cable, 26AWG-5.0M | ±70 | 26 |

**Important Notice**

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## 4.0 Revision Record

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