

Application

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

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

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

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

2.5 Pin Assignments

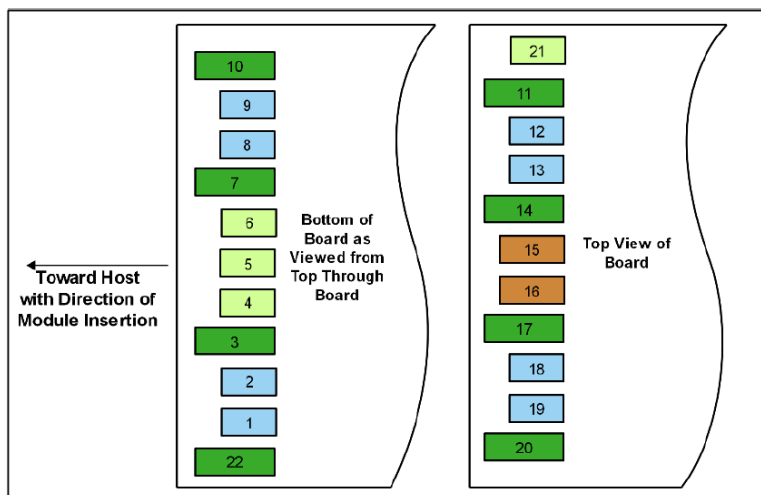


Figure 1 DSFP56 Module Contact Assignment

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 (LVTTTL) 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

WIRING TABLE

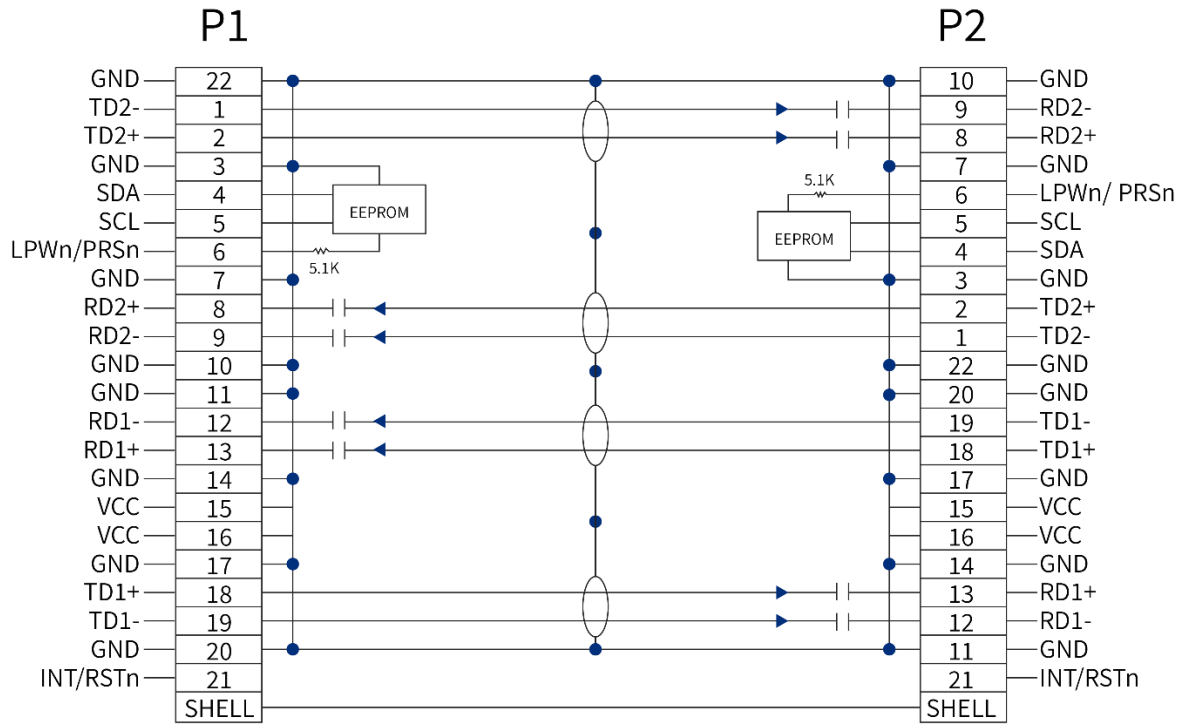


Figure 2 DSFP56 to DSFP56 Direct Attached Cable Assembly Wiring

2.1 MCIS Memory Map

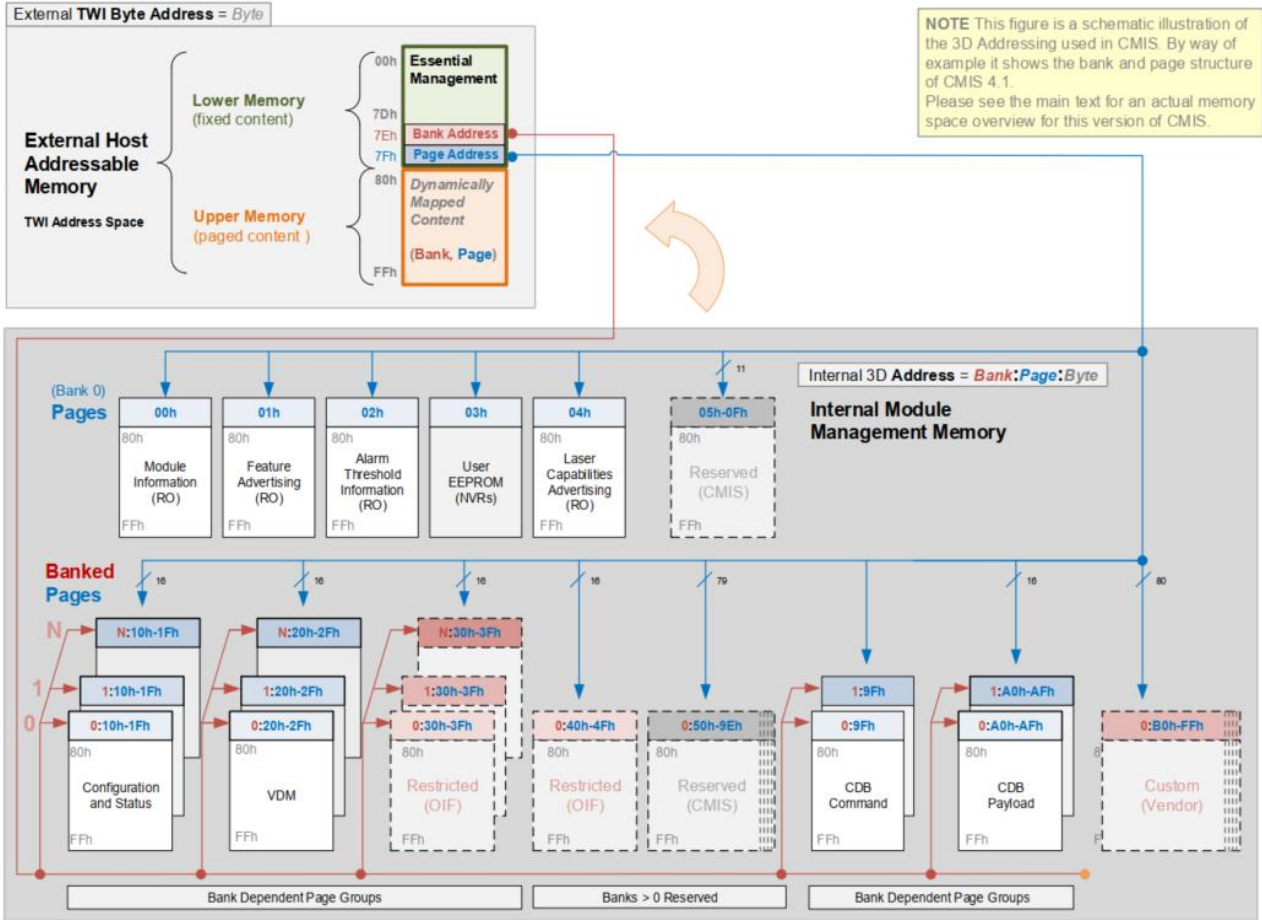


Figure 3 CMIS Module Memory Map (Conceptual View)

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 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

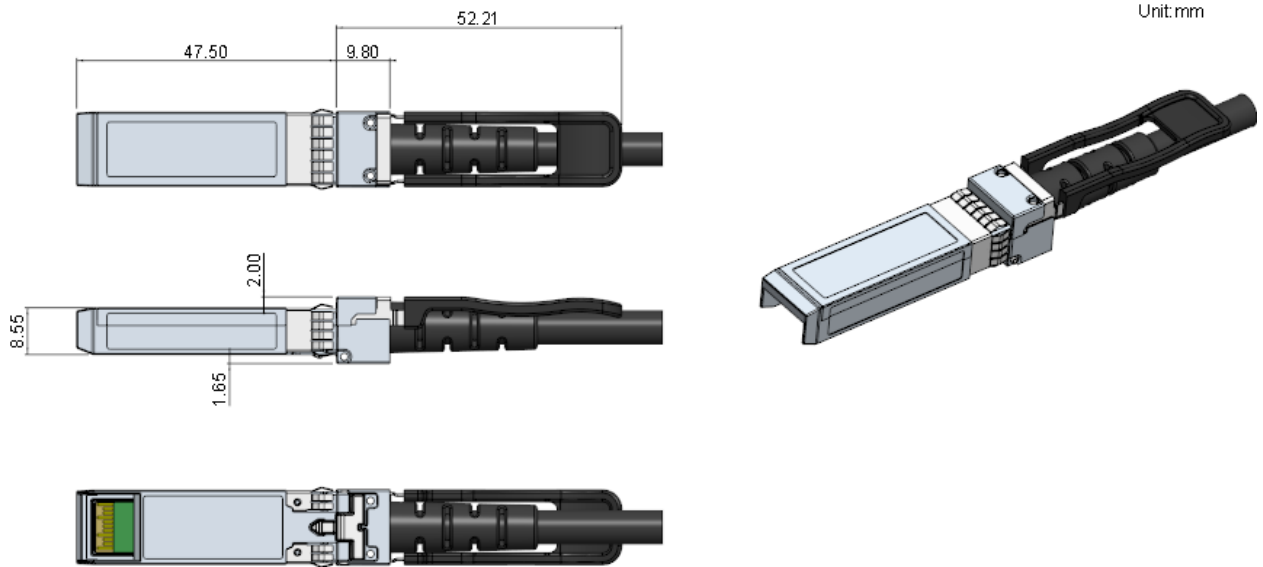
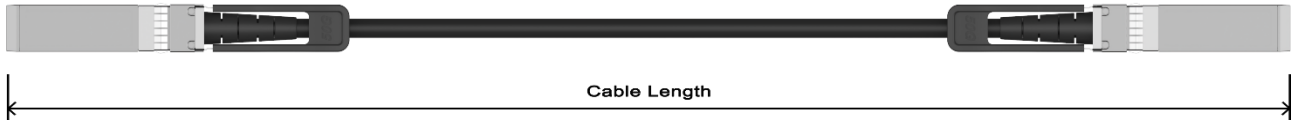


Figure 4 DSFP56 Form Factor

3.0 Product Information

Unit:mm



Product ID	Product Description	Tolerance	AWG
D56-100G-DAC-3005	DSFP56 100G Direct Attached Copper Cable, 30AWG-0.5M	±30	30
D56-100G-DAC-3010	DSFP56 100G Direct Attached Copper Cable, 30AWG-1.0M	±30	30
D56-100G-DAC-3015	DSFP56 100G Direct Attached Copper Cable, 30AWG-1.5M	±40	30
D56-100G-DAC-3020	DSFP56 100G Direct Attached Copper Cable, 30AWG-2.0M	±40	30
D56-100G-DAC-2820	DSFP56 100G Direct Attached Copper Cable, 28AWG-2.0M	±40	28
D56-100G-DAC-2825	DSFP56 100G Direct Attached Copper Cable, 28AWG-2.5M	±50	28
D56-100G-DAC-2625	DSFP56 100G Direct Attached Copper Cable, 26AWG-2.5M	±50	26
D56-100G-DAC-2630	DSFP56 100G Direct Attached Copper Cable, 26AWG-3.0M	±50	26

Important Notice

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4.0 Revision Record

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