

## DATA SHEET

### MODULETEK : DAC-SFP-25G-P-xxAWG-aa.aaM-C2C2B

SFP 25Gbps Passive Direct Attach Copper Cable Assembly

#### Overview

ModuleTek's 25G passive cable uses shielded high-speed differential cables, compliant with 25G Ethernet IEEE802.3by standard and SFF-8402 standard, it supports 25G transmission rate and can be backward compatible with low-rate applications. The SFP 25G passive cable is the preferred solution for 25G rate short-distance applications. It is commonly used for data transmission between data centers and cabinets or adjacent cabinets, its biggest features are low cost, ultra low power consumption (less than 0.1 watt) and high reliability.

#### Product Features

- Up to 25Gb/s bi-directional data links
- Compliant with SFF-8402
- Hot-pluggable
- AC coupled inputs and outputs
- 100 Ohm differential impedance
- Enhanced EMI design
- Single power supply 3.3V
- RoHS Compliant
- Operating temperature range (Case Temperature):  
Commercial Level: 0°C to 70°C



#### Applications

25GBASE Ethernet

## Ordering Information

Part Number	Product ID	Description	Gauge	Length
DAC-SFP-25G-P-30AWG-aa.aaM-C2C2B	M265803	SFP 25G Passive Direct Attach Copper Black Cable Assembly, aa.aa $\leq$ 3	30AWG	$\leq$ 3m
DAC-SFP-25G-P-28AWG-aa.aaM-C2C2B	M405803	SFP 25G Passive Direct Attach Copper Black Cable Assembly, aa.aa $\leq$ 3	28AWG	$\leq$ 3m
DAC-SFP-25G-P-26AWG-aa.aaM-C2C2B	M044503	SFP 25G Passive Direct Attach Copper Black Cable Assembly, aa.aa $\leq$ 5	26AWG	$\leq$ 5m
<p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. "P" indicates passive cable</li> <li>2. "aa.aa" indicates the cable length in meters.</li> <li>3. The product with write protection.</li> <li>4. The wire diameter of the products in the above list is the default value under different lengths. We can also provide other wire products to customers with special requirements.</li> <li>5. Product ID is the short order number of our product standard model.</li> </ol>				
<p><b>For More Information:</b>            ModuleTek Limited            Web: <a href="http://www.moduletek.com">www.moduletek.com</a>            Email: <a href="mailto:sales@moduletek.com">sales@moduletek.com</a></p>				

## General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	DR		25		Gb/s	1
Bit Error Rate	BER			$10^{-12}$		
Operating Temperature	T <sub>C</sub>	0		70	°C	2
Storage Temperature	T <sub>STO</sub>	-40		85	°C	3
Supply Current	I <sub>CC</sub>			4	mA	4
Input Voltage	V <sub>CC</sub>	3.14	3.3	3.46	V	4

**Notes:**

1. IEEE 802.3by
2. Case temperature
3. Ambient temperature
4. For electrical power interface

## I2C Memory Map

Address A0					
IIC Addr	Size	Name	Description	Values (HEX)	Remarks
0	1	Identifier	SFP or SFP+	03	
1	1	Ext. Identifier	GBIC/SFP function is defined by two-wire interface ID only	04	
2	1	Connector	Copper pigtail	21	
3-10	8	Transceiver	Passive Cable	00 00 00 00 00 04 00 00	
11	1	Encoding	Code for high speed serial encoding algorithm	00	
12	1	BR, Nominal	Nominal Bit Rate 25.5GB/s	FF	
13	1	Rate Identifier	Type of rate select functionality	00	
14	1	Length(SMF,km)	Link length supported for single mode fiber, units of km	00	
15	1	Length (SMF)	Link length supported for single mode fiber, units of 100 m	00	
16	1	Length (50um)	Link length supported for 50 um OM2 fiber, units of 10 m	00	
17	1	Length (62.5um)	Link length supported for 62.5 um OM1 fiber, units of 10 m	00	
18	1	Length (OM4 or copper cable)	Link length supported for 50um OM4 fiber, units of 10m. Alternatively copper or direct attach cable, units of m	01	
19	1	Length (OM3)	Link length supported for 50 um OM3 fiber, units of 10 m	00	
20-35	16	Vendor name	MODULETEK	4D 4F 44 55 4C 45 54 45 4B 20 20 20 20 20 20 20	
36	1	Transceiver	Code for electro nic or optical compatibility	0D	
37-39	3	Vendor OUI	SFP vendor IEEE company ID	00 00 00	

40-55	16	Vendor PN	Part number in Order information	-	
56-59	4	Vendor rev	Revision level for part number provided by vendor (ASCII)	-	
60-61	2	Wavelength	Laser wavelength (Passive/Active Cable Specification Compliance)	00 00	
62	1	Unallocated		00	
63	1	CC BASE	Check code for Base ID Fields (addresses 0 to 62)	-	
64-65	2	Options	Indicates which optional transceiver signals are implemented	00 00	
66	1	BR, max	Upper bit rate margin	64	
67	1	BR, min	Lower bit rate margin	00	
68-83	16	Vendor SN	Serial number provided by vendor	Programmed by Factory	
84-91	8	Date code	Year,Month,Day	Programmed by Factory	
92	1	Diagnostic Monitoring Type	Indicates which type of diagnostic monitoring is implemented (if any) in the transceiver	00	
93	1	Enhanced Options	Indicates which optional enhanced features are implemented (if any) in the transceiver	00	
94	1	SFF-8472 Compliance	Indicates which revision of SFF-8472 the transceiver complies with.	00	
95	1	CC EXT	Check code for the Extended ID Fields (addresses 64 to 94)	-	
96-127	32	Vendor Specific	Vendor Specific EEPROM	-	
128-255	128	Vendor Specific	Vendor Specific EEPROM	-	
<b>Address A2 Low</b>					
IIC Addr	Size	Name	Description	Values (HEX)	Remarks
0-94	95	Reserved	Reserved	FF	
95	1	Checksum	0-94 Byte Checksum	-	
96-121	26	Reserved	Reserved	00	

122	1	Security Level	Security Level: 00=Normal Mode; 01=User Mode (Level 1); 02=Factory Mode (Level 2);	00	
123-126	4	Password Entry	Password Entry Area	00 00 00 00	
127	1	Table Selection	Page Select Byte	00	
<b>Address A2 Page 00h/01h</b>					
<b>IIC Addr</b>	<b>Size</b>	<b>Name</b>	<b>Description</b>	<b>Values (HEX)</b>	<b>Remarks</b>
128-255	128	Upper Memory Map	User Code Area	FF	
<b>Address A2 Page 8Ah</b>					
<b>IIC Addr</b>	<b>Size</b>	<b>Name</b>	<b>Description</b>	<b>Values (HEX)</b>	<b>Remarks</b>
128-131	4	Firmware Version Number[4]	Firmware Version Number	-	
132-135	4	Total Running Time In Second	Total Running Time In Second	-	
<b>Address A2 Page F0h</b>					
<b>IIC Addr</b>	<b>Size</b>	<b>Name</b>	<b>Description</b>	<b>Values (HEX)</b>	<b>Remarks</b>
128-131	4	Password1 Long	Level 1 Password	00 00 10 11	
132	1	DisableA0WP	00=A0 With Write Protection; 01=A0 Without Write Protection	00	
133	1	DisableA2T00T01WP	00=A2 T00T01 With Write Protection; 01=A2 T00T01 Without Write Protection	00	

**Notes:**

- 1.Password entry area default 00000000, read out as last written value
- 2.Module with write protection, enter the security level 1 writeable

**User Mode**

Level 1 Default Password	Password Can Be Changed	Permissions
00 00 10 11	YES(A2 TF0)	1. Read And Write A0
		2. Read And Write A2 T00/T01
		3. Read A2 T8A
		4. Read And Write A2 TF0

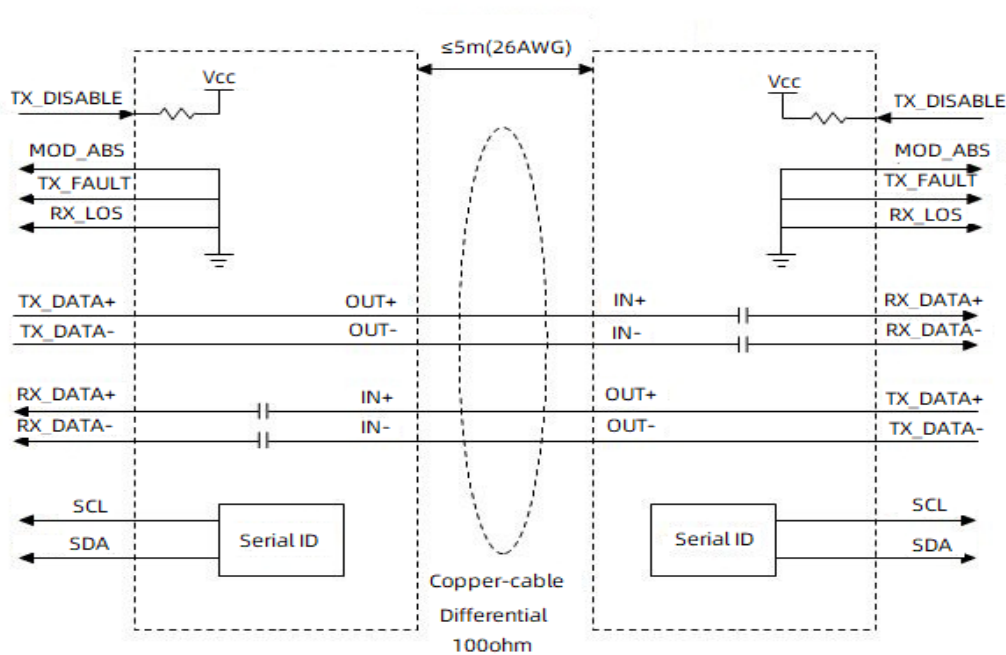
## Insertion Loss Level

Part Number	Insertion loss level
DAC-SFP-25G-P-30AWG-1M	CA-25G-N
DAC-SFP-25G-P-30AWG-2M	CA-25G-N
DAC-SFP-25G-P-30AWG-2.5M	CA-25G-N
DAC-SFP-25G-P-30AWG-3M	CA-25G-S
DAC-SFP-25G-P-28AWG-3M	CA-25G-N
DAC-SFP-25G-P-26AWG-5M	CA-25G-L

**Note:**

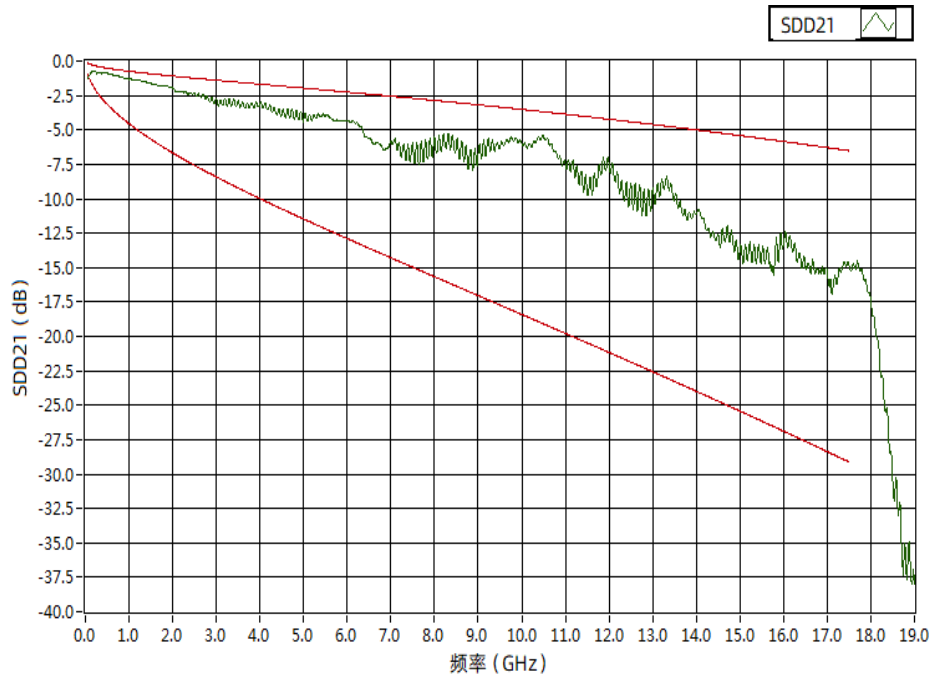
1. Cable insertion loss classification standard: IEEE 802.3by 110-10

## Block Diagram of Transceiver

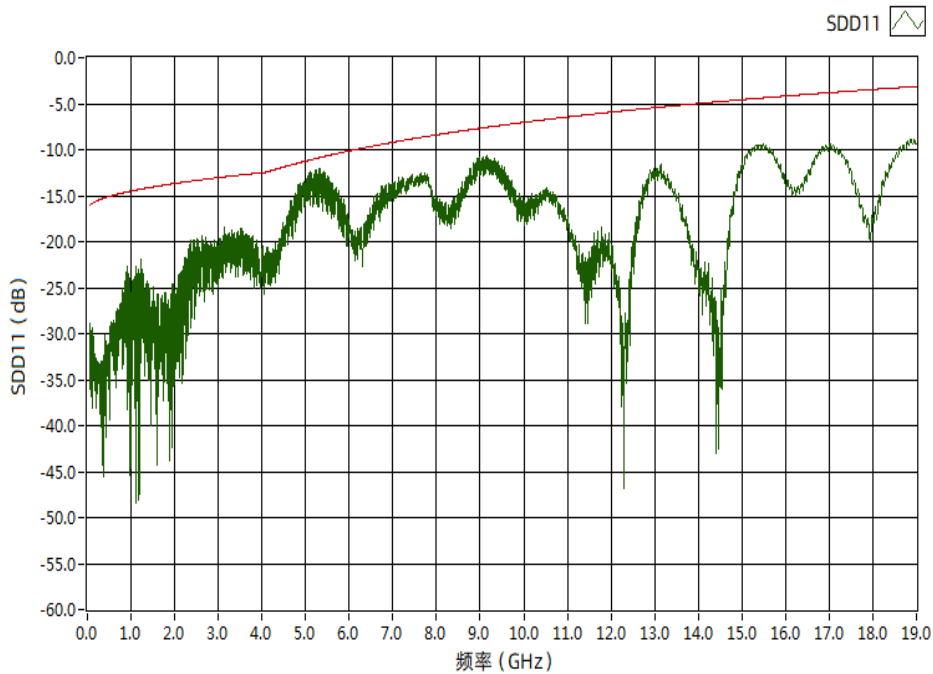


## Typical S parameter

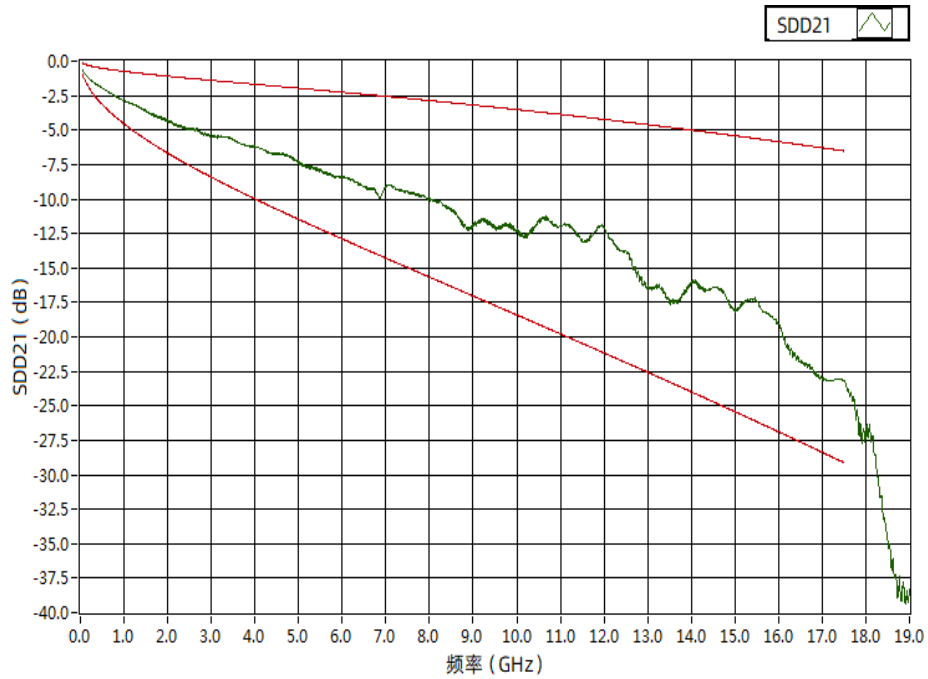
### 1m 30AWG typical insertion loss curve



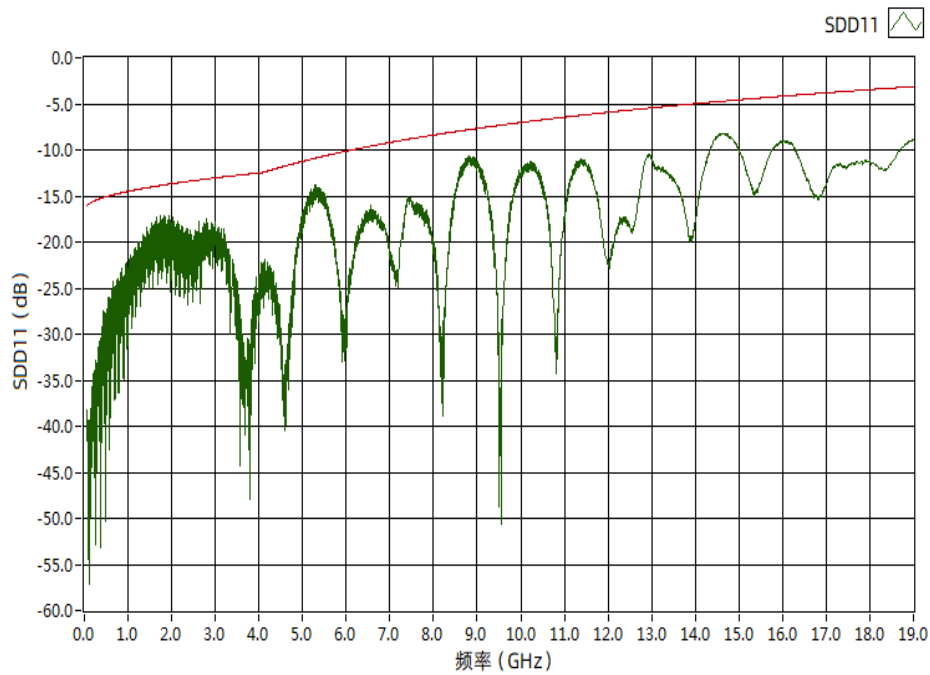
### 1m 30AWG typical reflection curve



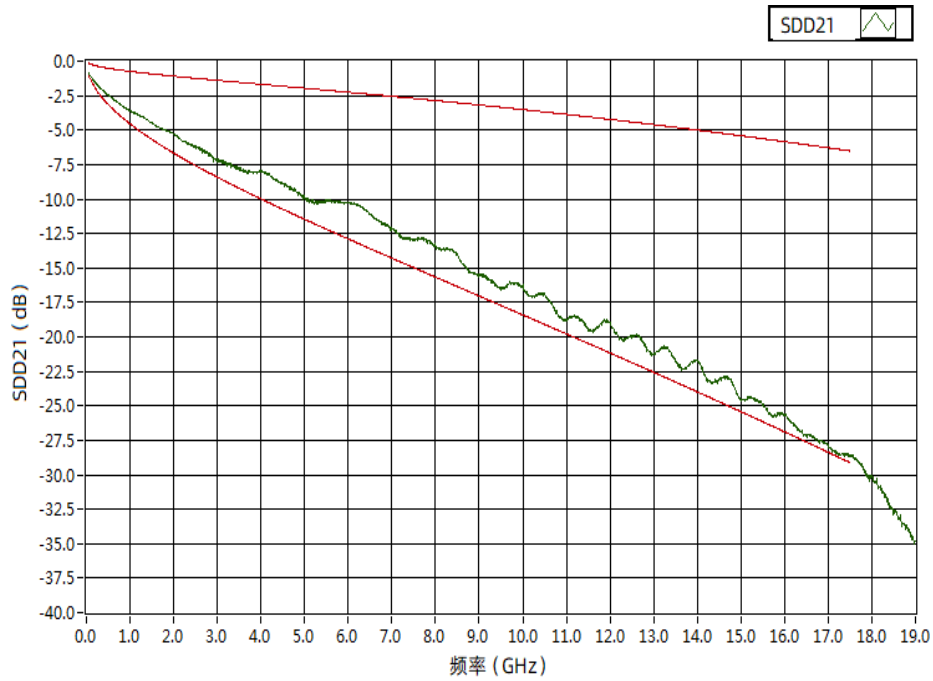
## 3m 28AWG typical insertion loss curve



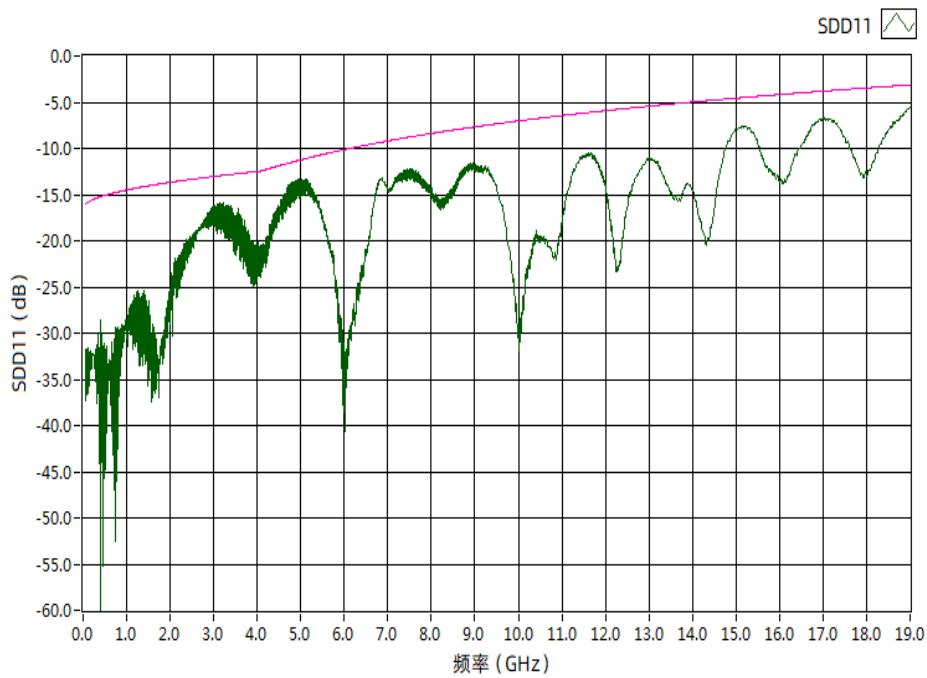
## 3 m 28AWG typical reflection curve



## 5m 26AWG typical insertion loss curve



## 5m 26AWG typical reflection curve



### Notes:

1. Insertion loss standard reference IEEE802.3bj 92.10.2:  $IL < 22.48 \text{ dB} @ 12.89 \text{ GHz}$
2. Reflection curve standard reference IEEE802.3bj 92.10.3:  $SDD_{xx}(\text{dB}) = 16.5 - 2 \times \text{SQRT}(f)$ ,  $0.05 \leq f < 4.1 \text{ GHz}$ .
3. Reflection curve standard reference IEEE802.3bj 92.10.3:  $SDD_{xx}(\text{dB}) = 10.66 - 14 \times \log_{10}(f/5.5)$ ,  $4.1 \leq f \leq 19 \text{ GHz}$ .

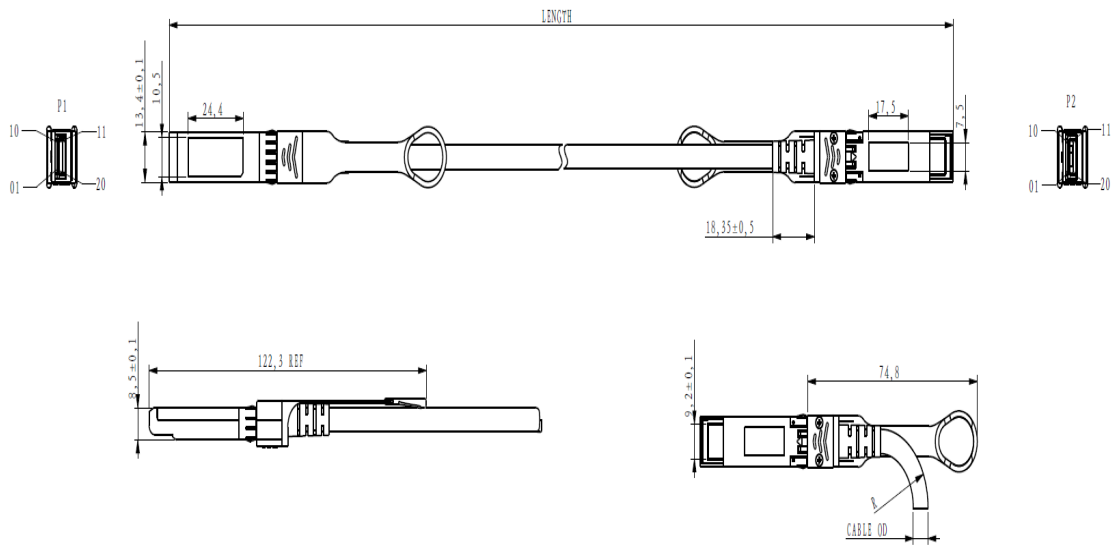
## Weight

Parameter	Symbol	Typ	Unit	Remarks
30AWG Product Weight	$G_{D30}$	78	g/PCS	1
28AWG Product Weight	$G_{D28}$	84	g/PCS	1
26AWG Product Weight	$G_{D26}$	90	g/PCS	1
30AWG Cable Weight	$G_{C30}$	32	g/M	
28AWG Cable Weight	$G_{C28}$	38	g/M	
26AWG Cable Weight	$G_{C26}$	44	g/M	
Dust Cap Weight	$G_S$	0.80	g/PCS	

### Notes:

1.The weight of DAC-SFP-25G-P-xxAWG-1M-C2C2B.For example:the weight of DAC-SFP-25G-P-26AWG-5M-C2C2B is: $90+44*(5-1)+0.80*2=267.6g$

## Dimensions



ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED  
UNIT: mm

## Cable Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Wire Gauge		30		26	AWG	
Cable Impedance	Z	90	100	110	Ohm	

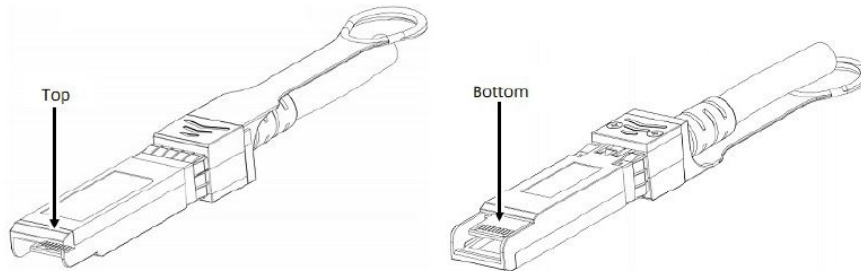
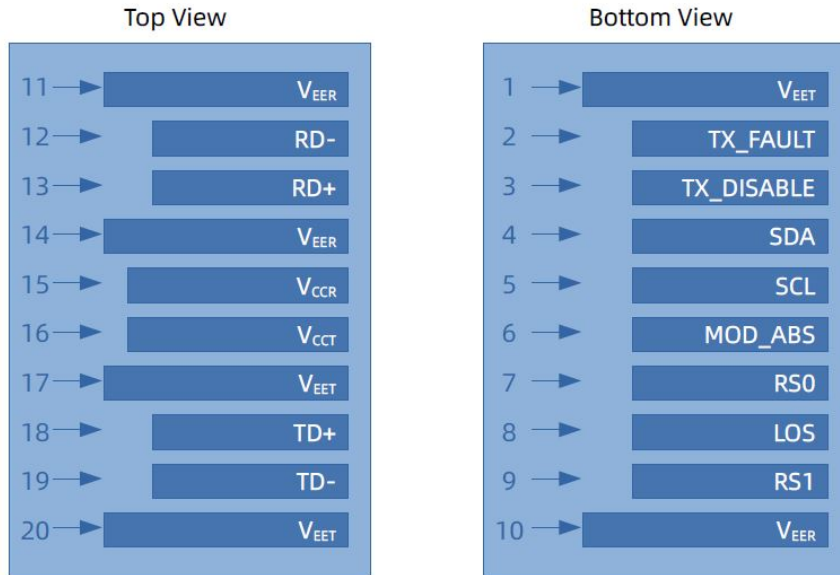
## Cable Dimension

Serial number	Standard Wire Gauge AWG	Cable diameter OD (mm)	Minimum bending radius R (mm)
1	30	4.6	26
2	28	5.0	28
3	26	5.6	30

## Length Tolerance

Serial number	Nominal length (m)	Tolerance range ±(cm)
1	Length ≤ 2	2
2	2 < Length ≤ 4	4
3	4 < Length ≤ 5	6

## SFP Electrical Pad Layout



## Pin Assignment

PIN #	Symbol	Description	Remarks
1	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1
2	TX_FAULT	Transmitter failure alarm, not used	
3	TX_DISABLE	The signal turns off the module transmitter when it is high or open, not used.	
4	SDA	Data line for serial ID	2
5	SCL	Clock line for serial ID	2
6	MOD_ABS	Module Absent. Grounded within the module	2
7	RS0	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	
9	RS1	No connection required	
10	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	1
11	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	1
12	RD-	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	1
15	V <sub>CCR</sub>	Receiver power supply	
16	V <sub>CCT</sub>	Transmitter power supply	
17	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD-	Transmitter Inverted DATA in. AC coupled	
20	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1

### Notes:

1. Circuit ground is isolated from chassis ground
2. Should Be pulled up with 4.7k - 10k ohm on host board to a voltage between 2V and 3.6V

## References

1. IEEE standard 802.3by. IEEE Standard Department.
2. IEEE standard 802.3bj. IEEE Standard Department.