



DQF8502 QSFP+ SR4 FDR AOC

4X14.0625Gb/s QSFP+ SR4 Active Optical Cable

Product Description

The DQF8502 is a QSFP+ active optical cable (AOC) for 56Gb/s optical links. It is compliant with the QSFP+ MSA. It operates at 14.0625Gb/s and the cable length is up to 100m .

Applications

- Infiniband FDR interconnects.
- High performance computing interconnection

Features

- 4 independent parallel optical channels
- Channel data rate up to 14.0625Gb/s
- Hot Pluggable
- Up to 100m link on OM3 Multi-mode Fiber
- CML Compatible electrical I/O
- QSFP+ MSA Compliance
- Case Operating Temperature:
- Commercial: 0 to 70°C
- RoHS compliance

Ordering Information				
Part Number	Temperature Option (X)		Standard Cable Length (YZ)	
DQF8502-4XYZ	C	0 to 70 °C	03	3m
			05	5m
			10	10m
			15	15m
			20	20m
			30	30m
			40	40m
			50	50m
			60	60m
			70	70m
			80	80m
			90	90m
A0	100m			



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Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Ambient Temperature	T_{stg}	-40	+100	°C	Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device.
Relative Humidity - Storage	RH_S	0	95	%	
Relative Humidity - Operating	RH_O	0	85	%	
Module Supply Voltage	V_{CC}	-0.5	3.6	V	

Recommended Operating Conditions						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Case Operating Temperature	T_{case}	0	+25	+70	°C	Temperature Range = C
Module Supply Voltage	V_{CC}	3.14	3.3	3.46	V	
Module Supply Current	I_{IN}	-	-	350	mA	
Signaling Speed Per Channel	S	-	14.0625	-	Gb/s	

Transmitter Electrical Interfaces						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Tx_Data Differential Input Voltage	V_{IN}	200	-	1600	mV	
Tx_Data Differential Input Impedance	Z_{IN}	-	100	-	Ω	
Differential Input Return Loss	SDD11	-	-	-	dB	10MHz to 11.1GHz
Differential to Common Mode Conversion Loss	SCD11	10	-	-	dB	10MHz to 11.1GHz
J2 Jitter Tolerance	T_{J2}	-	-	0.17	UI	
J9 Jitter Tolerance	T_{J9}	-	-	0.29	UI	



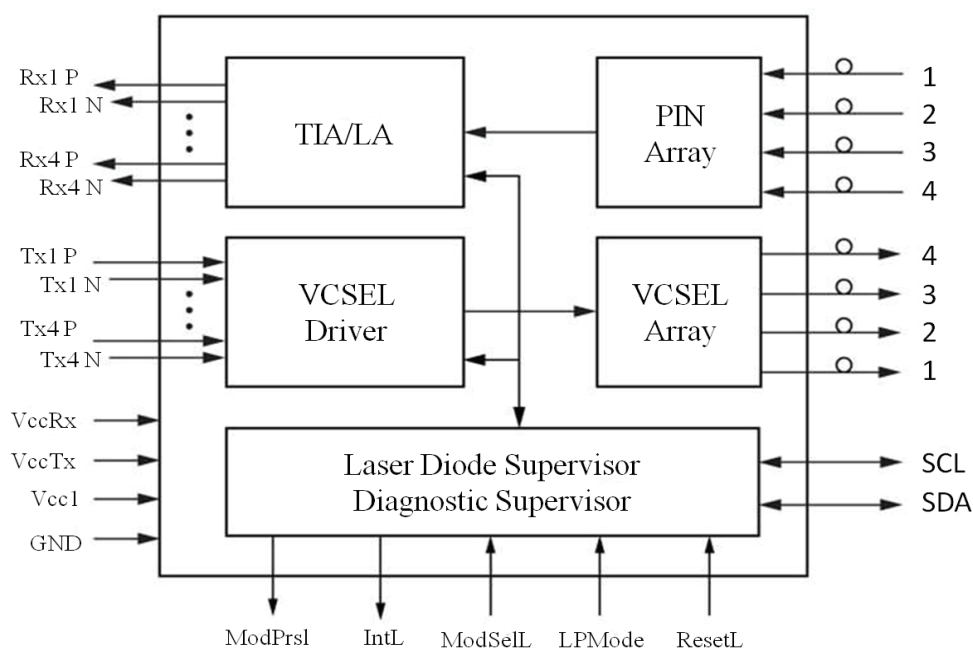
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Receiver Electrical Interfaces						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Rx_Data Differential Output Voltage	V_{OUT}	-	600	-	mV	
Rx_Data Differential Output Impedance	Z_{OUT}	90	100	110	Ω	
Differential Output Return Loss		-			dB	10MHz to 11.1GHz
Common Mode Output Return Loss		-			dB	10MHz to 11.1GHz
J2 Jitter Output	T_{J2}	-	-	0.42	UI	
J9 Jitter Output	T_{J9}	-	-	0.65	UI	
Rx Output Data Rising Time (20% to 80%)	T_r	28	-	-	ps	
Rx Output Data Falling Time (20% to 80%)	T_f	28	-	-	ps	

Cable specification	
Parameter	Value
Type	Multimode loose tube fiber
Minimum Bend radius (mm)	30
Cable diameter (mm)	3.0 ± 0.15
Cable length (m)	3.0 ± 0.15

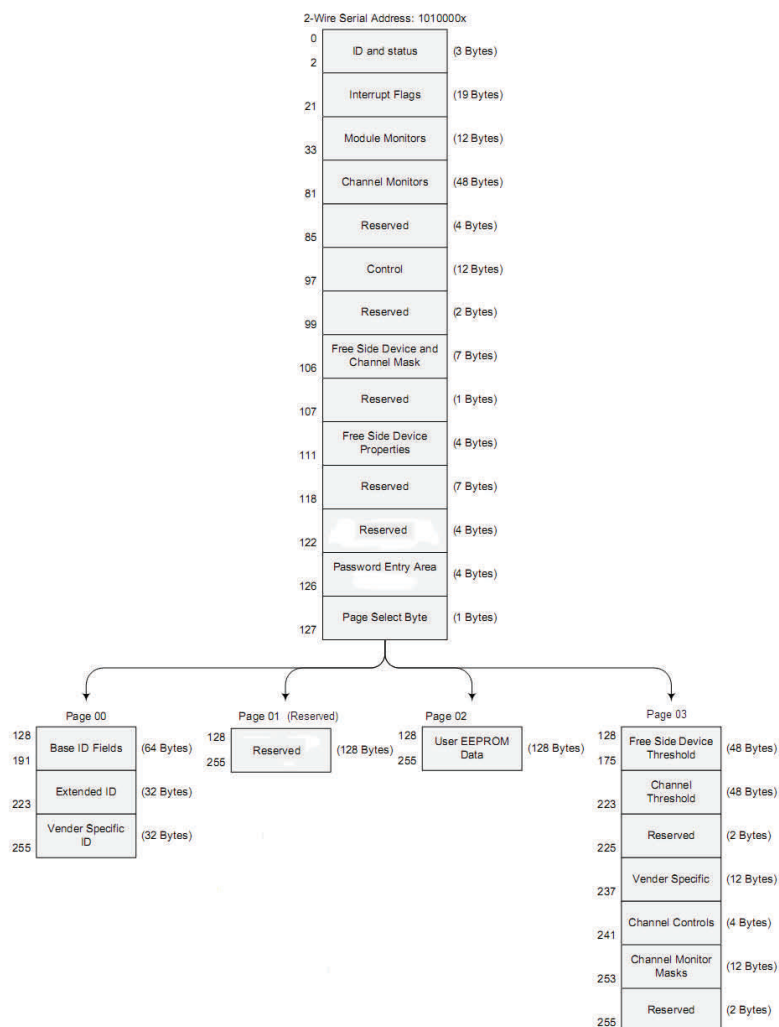
DQF8502 Block Diagram



QSFP Monitoring Interface

Monitoring is available on the QSFP+ AOC modules. A 2-wire serial interface provides user to contact with module. The module provides real-time per channel received power monitoring (optional), per channel transmitted laser bias current monitoring, supply voltage and temperature monitoring.

The memory is structured as a single address, multiple page approach. The address is given as A0h. The structure of the memory is shown in followed figure. The memory space is arranged into a lower, single page, address space of 128 bytes and multiple upper address space pages of 128 bytes each. This structure permits timely access to addresses in the lower page, e.g. Interrupt Flags and Monitors. Less time critical entries, e.g. serial ID information and threshold settings are available with the Page Select function.





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I ² C Memory Map (Upper memory map Page00-Serial ID: Data Fields , Unlisted Fields are Blank / Empty)				
IIC Addr	Size (byte)	Name	Description	Values (HEX)
128	1	Identifier	Identifier Type of serial Module	0D
129	1	Ext. Identifier	Extended Identifier of Serial Module	00
130	1	Connector	Code for connector type	23
131-138	8	Specification compliance	Code for electronic compatibility or optical compatibility	04 00 00 00 40 40 0E D5
139	1	Encoding	Code for serial encoding algorithm	05
140	1	BR, nominal	Nominal bit rate, units of 100 Mbps	8C
141	1	Extended rateselect	Tags for extended rate select compliance	00
142	1	Length(SMF)	Link length supported for SMF fiber in km (note 1)	00
143	1	Length(OM3 50 um)	Link length supported for EBW 50/125 um fiber (OM3), units of 2m (note 1)	00
144	1	Length(OM2 50 um)	Link length supported for 50/125 um fiber (OM2), units of 1m (note 1)	00
145	1	Length(OM1 62.5 um)	Link length supported for 62.5/125 um fiber (OM1), units of 1m (note 1)	00
146	1	Length (Copper/AOC)	Link length of copper or active cable, units of 1 m	YZ (note 2)
147	1	Device tech	Device technology	00
148-163	16	Vendor name	QSFP+ vendor name (ASCII)	Hisense
164	1	Extended Module	Extended Module codes for Module	04
165-167	3	Vendor OUI	QSFP+ vendor IEEE company ID	AC 4A FE
168-183	16	Vendor PN	Part number provided by QSFP+ vendor (ASCII)	DQF8502-4XYZ (note 3)
184-185	2	Vendor rev	Revision level for part number provided by vendor (ASCII)	1
186-187	2	Wave length	Nominal laser wavelength (wavelength=value/20 in nm)	42 68
188-189	2	Wavelength tolerance	Guaranteed range of laser wavelength(+/-value) from nominal wavelength.(wavelength Tol.=value/200 in nm)	07 D0
190	1	Max case temp.	Maximum case temperature in degrees C	00
191	1	CC_BASE	Check code for base ID fields (addresses 128-190)	
192-195	4	Options	Rate Select, TX Disable, TX Fault, LOS, Warning indicators for: Temperature, VCC, RX power, TX Bias	00 00 04 98
196-211	16	Vendor SN	Serial number provided by vendor (ASCII)	Programmed by Factory
212-219	8	Date Code	Vendor's manufacturing date code	Programmed by Factory
220	1	Monitoring Type	Indicates which types of monitoring are implemented (if any) in the Module. Bit 1,0 Reserved	00
221	1	Enhanced Options	Indicates which optional enhanced features are implemented in the Module.	00
222	1	Reserved		
223	1	CC_EXT	Check code for the Extended ID Fields (addresses 192-222)	
224-255	32	Vendor Specific		



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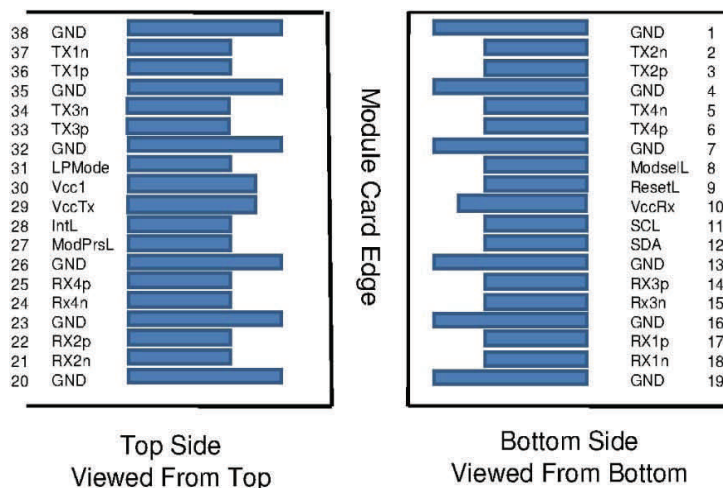
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I ² C Memory Map (Module and Channel Thresholds (Page 03))				
IIC Addr	Byte	Name	Description	Values
128-129	2	Case temp High Alarm (°C)	MSB at low address	80
130-131	2	Case temp Low Alarm (°C)	MSB at low address	-10
132-133	2	Case temp High Warning (°C)	MSB at low address	75
134-135	2	Case temp Low Warning (°C)	MSB at low address	-5
136-143	8	Reserved	MSB at low address	
144-145	2	Vcc High Alarm (V)	MSB at low address	3.6
146-147	2	Vcc Low Alarm (V)	MSB at low address	3.0
148-149	2	Vcc High Warning (V)	MSB at low address	3.5
150-151	2	Vcc Low Warning (V)	MSB at low address	3.1
152-159	8	Reserved		
160-175	16	Reserved		
176-177	2	RX Power High Alarm (dBm)	MSB at low address	4.4
178-179	2	RX Power Low Alarm (dBm)	MSB at low address	-9
180-181	2	RX Power High Warning (dBm)	MSB at low address	3.4
182-183	2	RX Power Low Warning (dBm)	MSB at low address	-8
184-185	2	Tx Bias High Alarm (mA)	MSB at low address	12
186-187	2	Tx Bias Low Alarm (mA)	MSB at low address	0
188-189	2	Tx Bias High Warning (mA)	MSB at low address	10
190-191	2	Tx Bias Low Warning (mA)	MSB at low address	0
192-199	8	Reserved		
200-207	8	Reserved		
208-223	16	Reserved		

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Pin Assignment



Pin Description			
Pin	Symbol	Description	Notes
1	GND	Ground	
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non Inverted Data Input	
4	GND	Ground	
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non Inverted Data Input	
7	GND	Ground	
8	ModselL	Module Select	
9	RetsetL	Module Reset	
10	V _{CC} Rx	Receiver +3.3V DC Power Supply	
11	SCL	I ² C Serial Clock	
12	SDA	I ² C Serial Data	
13	GND	Ground	
14	Rx3p	Receiver Non Inverted Differential Output	
15	Rx3n	Receiver Inverted Differential Output	
16	GND	Ground	
17	Rx1p	Receiver Non Inverted Differential Output	
18	Rx1n	Receiver Inverted Differential Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Differential Output	
22	Rx2p	Receiver Non Inverted Differential Output	
23	GND	Ground	

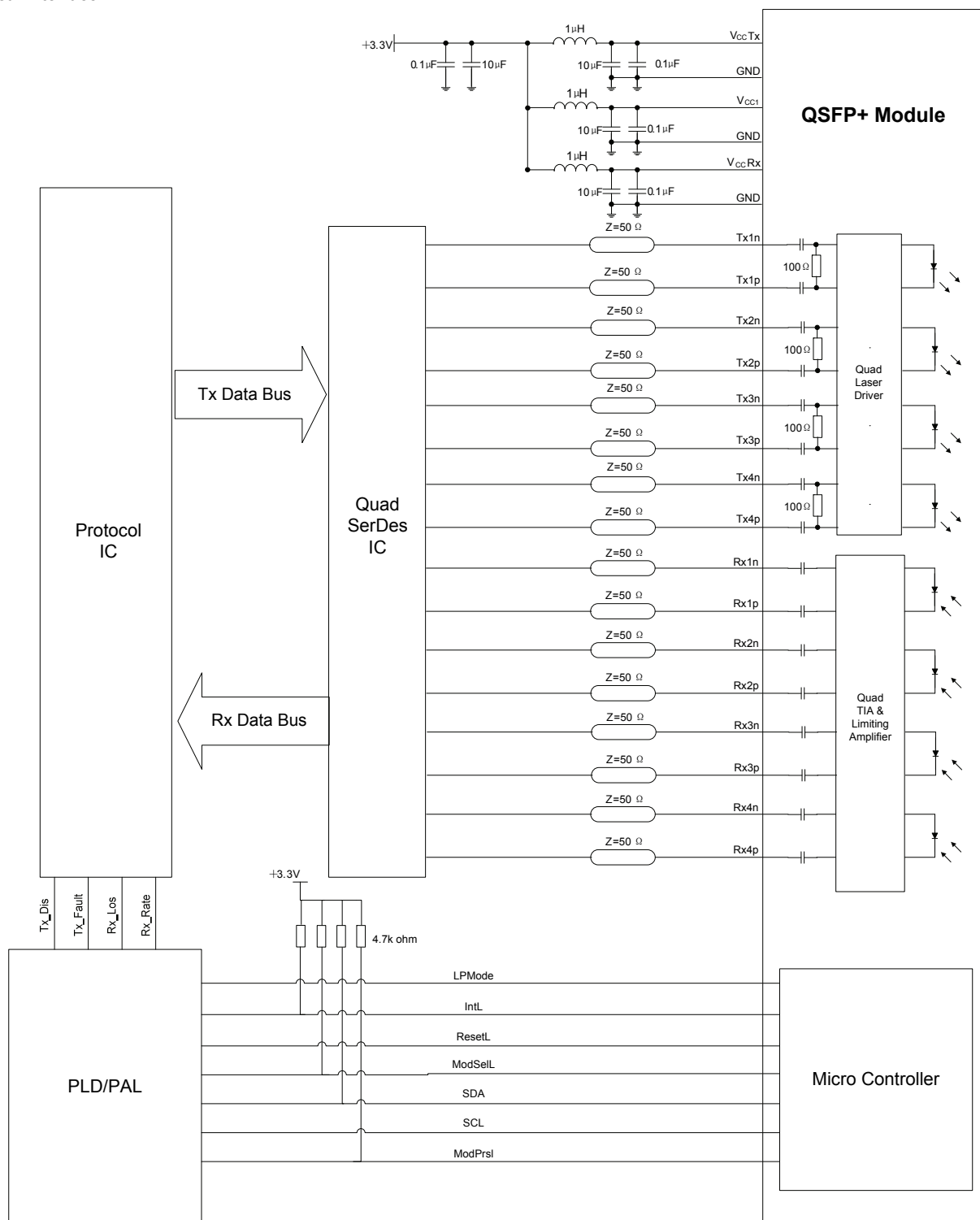


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24	Rx4n	Receiver Inverted Differential Output	
25	Rx4p	Receiver Non Inverted Differential Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	V _{CC} Tx	Transmitter +3.3V DC Power Supply	
30	V _{CC} 1	+3.3V DC Power Supply	
31	LPMod	Low Power Mode	
32	GND	Ground	
33	Tx3p	Transmitter Non Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	
36	Tx1p	Transmitter Non Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	

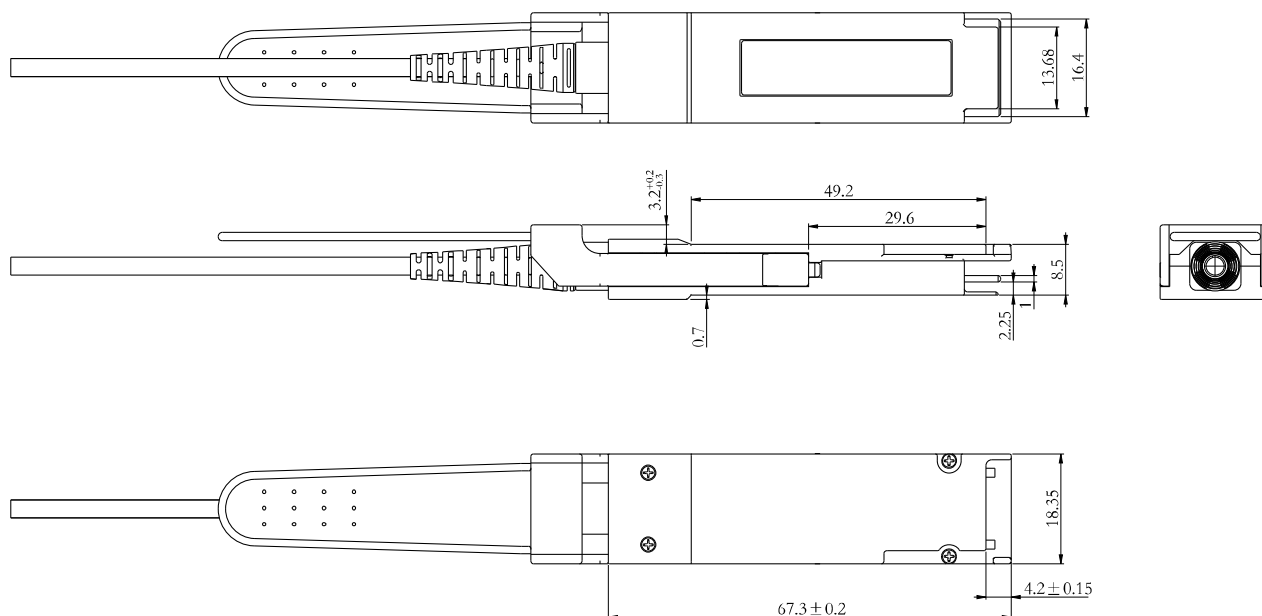
Electrical Interface



Hisense

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Mechanical Dimensions



Dimensions are mm
Tolerance is $\pm 0.1\text{mm}$
Others according to MSA drawing



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Warnings

Handling Precautions:

This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety:

Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Notice:

The information provided on this page contains the product target specifications which are subject to change without notice.

Check with your Hisense Sales Office for product updates, changes in specifications, sample availability and production release dates.

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