



## DQF8503 QSFP28 AOC

### 4X25.78Gb/s QSFP28 Active Optical Cable

The DQF8503 is a QSFP28 active optical cable (AOC) for 100Gb/s optical links. It is compliant with the QSFP28 MSA, IEEE P802.3bm 100GBASE-SR4 specifications. It operates at 25.78Gb/s and the cable length is up to 100m .

#### Applications

- Infiniband EDR interconnects.
- 100GBASE-SR4 Ethernet
- High performance computing interconnect

#### Features

- 4 independent parallel optical channels
- Channel data rate up to 25.78Gb/s
- Hot Pluggable
- Up to 100m link over OM4 Multi-mode Fiber
- CML Compatible electrical I/O
- QSFP28 MSA Compliance
- Case Operating Temperature Range:
  - Commercial: 0 to 70°C
- RoHS compliance

Ordering Information		
Part Number	Case Operating Temperature	Standard Cable Length
DQF8503-4C03	0 to 70 °C	3m
DQF8503-4C05	0 to 70 °C	5m
DQF8503-4C10	0 to 70 °C	10m
DQF8503-4C15	0 to 70 °C	15m
DQF8503-4C20	0 to 70 °C	20m
DQF8503-4C30	0 to 70 °C	30m
DQF8503-4C40	0 to 70 °C	40m
DQF8503-4C50	0 to 70 °C	50m
DQF8503-4C60	0 to 70 °C	60m
DQF8503-4C70	0 to 70 °C	70m
DQF8503-4C80	0 to 70 °C	80m
DQF8503-4C90	0 to 70 °C	90m
DQF8503-4CA0	0 to 70 °C	100m

Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Ambient Temperature	T <sub>stg</sub>	-40	+85	°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 <sub>s</sub>	0	95	%	
Relative Humidity - Operating	RH <sub>o</sub>	0	85	%	
Module Supply Voltage	V <sub>cc</sub>	-0.5	3.6	V	



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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	
Single Module Supply Current	$I_{IN}$	-	540	-	mA	
Signaling Speed Per Channel	S	-	25.78	-	Gb/s	

Transmitter Electrical Interfaces							
Parameter	Symbol	Min	Typ	Max	Units	Notes	
Tx_Data Differential Input Voltage	$V_{IN}$	200	-	900	mV		
Tx_Data Differential Input Impedance	$Z_{IN}$	-	100	-	$\Omega$		
Differential Input Return Loss	SDD11	Compatible with IEEE P802.3bm		-	-	dB	10MHz to 19GHz
Differential to Common Mode Conversion Loss	SCD11	10	-	-	dB	10MHz to 19GHz	

Receiver Electrical Interfaces						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Rx_Data Differential Output Voltage	$V_{OUT}$	-	440	-	mV	
Rx_Data Differential Output Impedance	$Z_{OUT}$	90	100	110	$\Omega$	
Differential Output Return Loss		Per IEEE P802.3bm			dB	10MHz to 19GHz
Common Mode Output Return Loss		Per IEEE P802.3bm			dB	10MHz to 19GHz

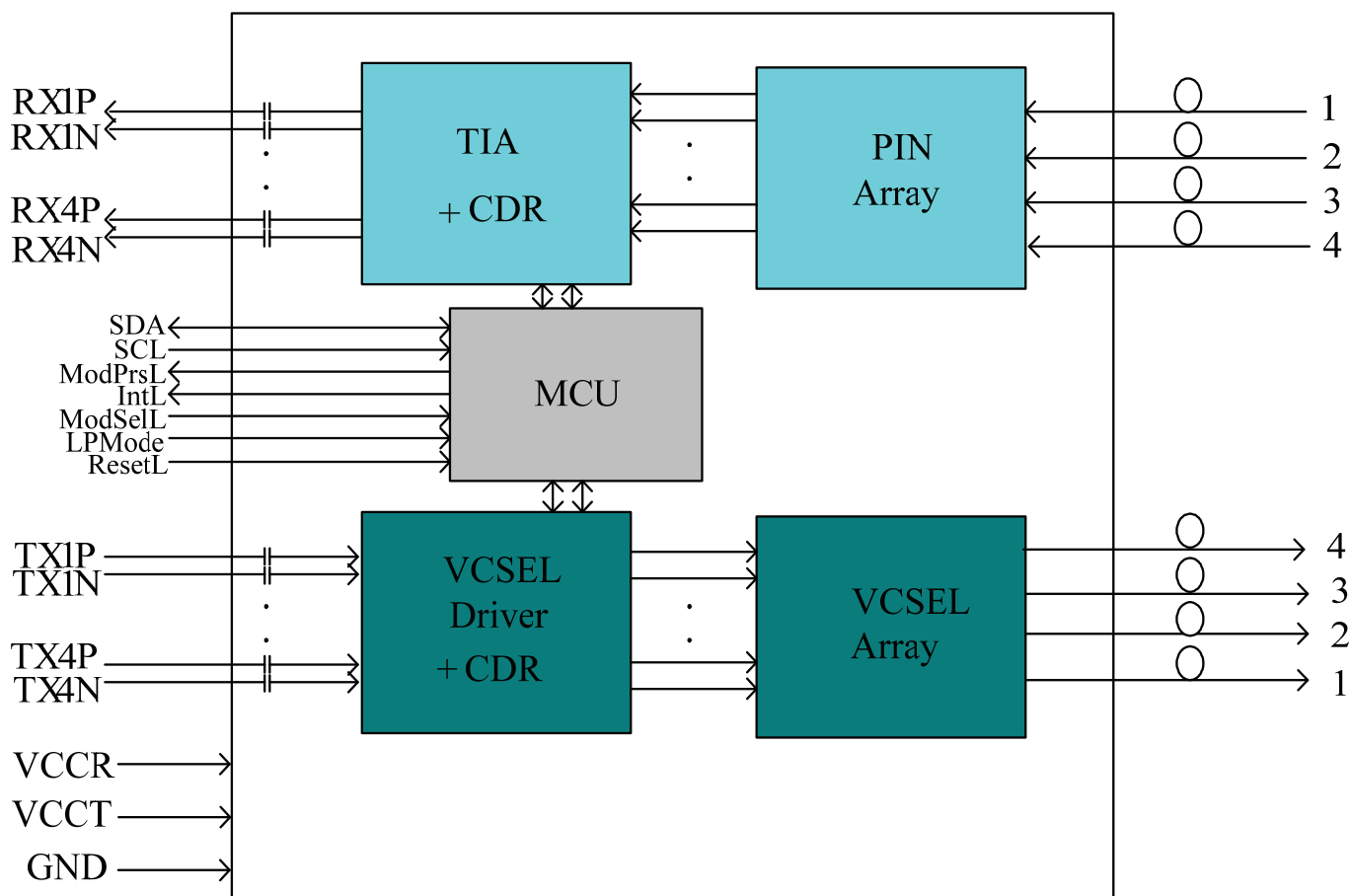
Cable specification	
Parameter	Value
Minimum Bend radius (mm)	30
Cable diameter (mm)	$3.0 \pm 0.15$



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DQF8503 Block Diagram





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QSFP28 end I <sup>2</sup> 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	11
129	1	Ext. Identifier	Extended Identifier of Serial Module	CC
130	1	Connector	Code for connector type	23
131-138	8	Specification compliance	Code for electronic compatibility or optical compatibility	80 00 00 00 40 40 02 08
139	1	Encoding	Code for serial encoding algorithm	05
140	1	BR, nominal	Nominal bit rate, units of 100 Mbps	FF
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	Refer to Cable Length in Ordering information
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	10
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)	Refer to Hisense Part Number in Ordering information
184-185	2	Vendor rev	Revision level for part number provided by vendor (ASCII)	01
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	46
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	01 07 C8 9A
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	Diagnostic Monitoring Type	Indicates which types of diagnostic monitoring are implemented (if any) in the Module. Bit 1,0 Reserved	08
221	1	Enhanced Options	Indicates which optional enhanced features are implemented in the Module.	00
222	1	BR,nominal	Units of 250M	67
223	1	CC_EXT	Check code for the Extended ID Fields (addresses 192-222)	
224-255	32	Vendor Specific EEPROM		



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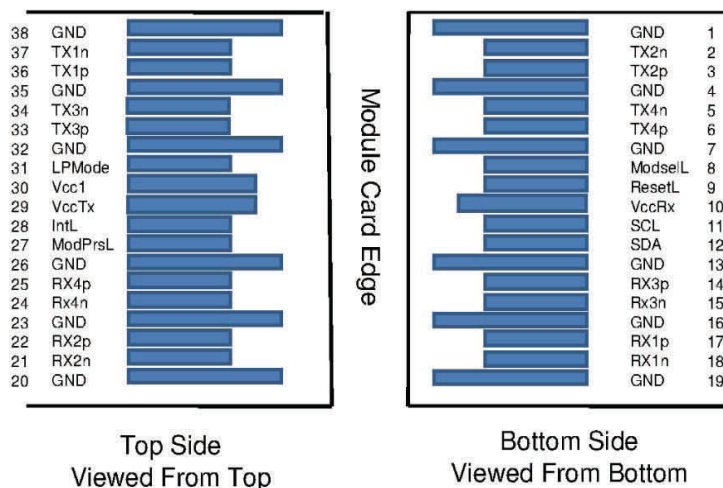
### 4X25.78Gb/s QSFP28 Active Optical Cable

QSFP28 end I <sup>2</sup> 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	3.63
146-147	2	Vcc Low Alarm (V)	MSB at low address	2.97
148-149	2	Vcc High Warning (V)	MSB at low address	3.465
150-151	2	Vcc Low Warning (V)	MSB at low address	3.135
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	-12.9
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	-9.9
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
192-193	2	TX Power High Alarm (dBm)	MSB at low address	2.9
194-195	2	TX Power Low Alarm (dBm)	MSB at low address	-10.6
196-197	2	TX Power High Warning (dBm)	MSB at low address	2.4
198-199	2	TX Power Low Warning (dBm)	MSB at low address	-7.6
200-207	8	Reserved		
208-223	16	Reserved		
224	1	TX input equalization magnitude identifier RX output emphasis magnitude identifier		0XA7
225	1	Output amplitude		0X07

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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 <sub>CC</sub> Rx	Receiver +3.3V DC Power Supply	
11	SCL	I <sup>2</sup> C Serial Clock	
12	SDA	I <sup>2</sup> 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	

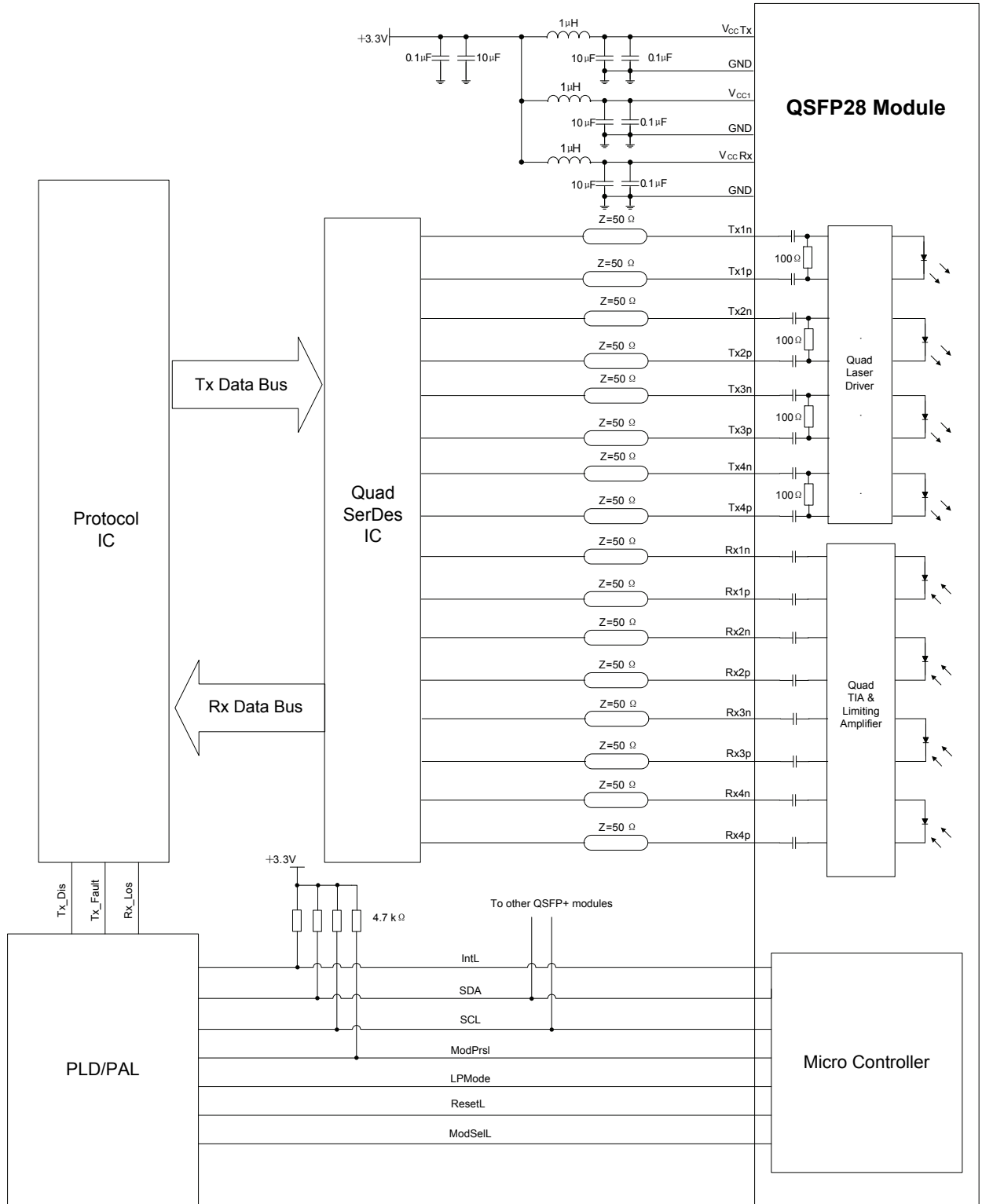


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### 4X25.78Gb/s QSFP28 Active Optical Cable

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 <sub>CC</sub> Tx	Transmitter +3.3V DC Power Supply	
30	V <sub>CC1</sub>	+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



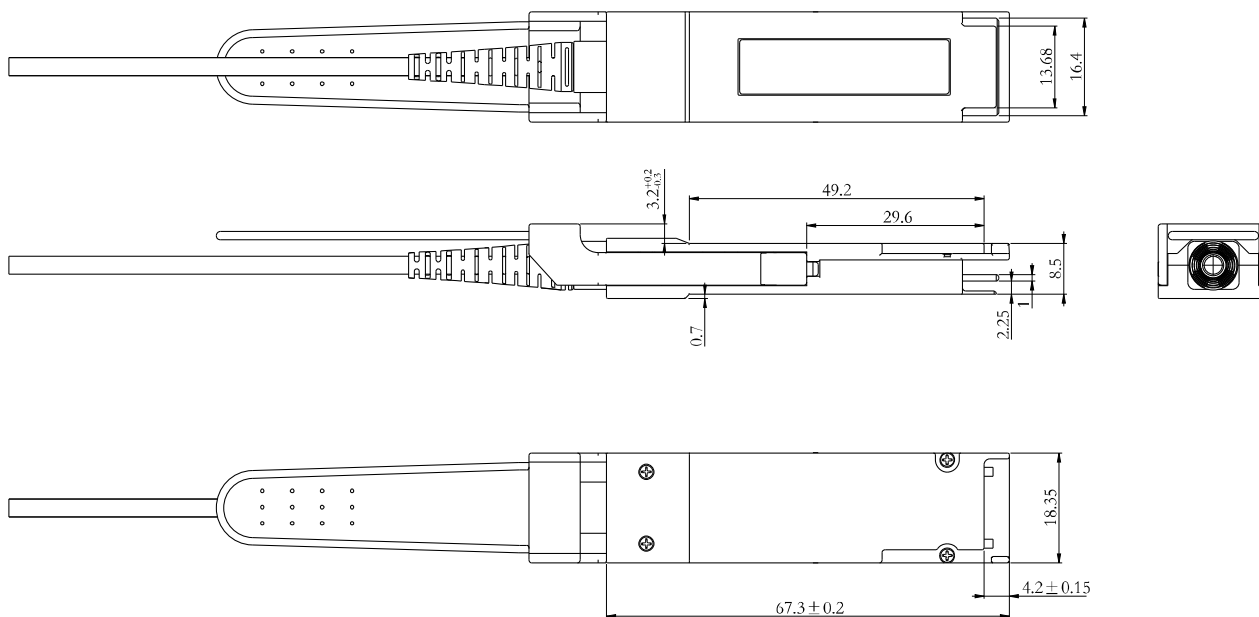




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### Mechanical Dimensions



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

### Label





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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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