LTP1362 SFP+ Optical Transceiver

2Gb/s to 6.25Gb/s 1310nm 2km

Product Description

The LTP1362 SFP+ transceiver is intended for 2km reach service from 2Gb/s to 6.25Gb/s 1310nm single mode high-speed communications equipment where low-cost, extraordinary performance and reliability are essential. It consumes low power, operates from a 3.3V DC power supply and is offered in the commercial and industrial temperature ranges. The low jitter and low bit error rate optical assembly features a 1310nm F-P laser transmitter and PIN/TIA receiver. It incorporates the SFP+ MSA LVTTL Loss of Signal (Rx_LOS), Tx Fault (Tx_FAULT), MOD_ABS and Tx Disable (Tx_DIS) monitor and control functions and the SFF-8472 compliant digital diagnostic monitor feature . The differential AC coupled Tx and Rx data interfaces are CML compatible. The device is Class I laser safety compliant.

Applications

- LTE Optical Repeater Application
- High-Speed Storage Area Networks
- High-Speed Data Pipes

Features

- LC Duplex Optical Interface
- Reach:2km
- 2Gb/s to 6.25Gb/s Data Rate
- BER<10^{-12}, 6.25 Gb/s, PRBS 2^{31}-1
- 1310nm F-P Laser and PIN Receiver
- High Sensitivity PIN/TIA Optical Receiver
- Single 3.3V DC Supply
- Low Power Consumption
- Hot Pluggable
- 2x10 SFP+ Package Outlines
- LC Receptacle Optical Connector
- Case Operating Temperature Ranges:

  Commercial: 0 to 70 ºC

  Industrial : -40 to 85 ºC

- Data and Control Interfaces:
  - Tx Data CML/AC Coupled
  - Rx Data CML/AC Coupled
  - Tx_DIS LVTTL
  - Tx_FAULT LVTTL
  - Rx_LOS LVTTL
  - 2-wire I^2C Data Bus
- Low EMI and Excellent ESD Protection
- RoHS Compliance

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Absolute Maximum Ratings (EXCEEDING THESE RATINGS MAY CAUSE IRREVERSIBLE DAMAGE TO THE DEVICE)					
Parameter	**Symbol**	**Min**	**Max**	**Units**	**Notes**
Storage Ambient Temperature	T_{stg}	-40	+85	ºC	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.
Case Operating Temperature	T_O	-40	+85	ºC	
Relative Humidity - Storage	RH_S	0	95	%	
Relative Humidity - Operating	RH_O	0	85	%	
Module Supply Voltage	V_{CC}	0	3.6	V	

Recommended Operating Conditions						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Case Operating Temperature	T_{case}	0	+25	+70	ºC	Temperature Range = C
		-40	+25	+85	ºC	Temperature Range = H
Module Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Module Supply Current	I_{IN}	-	200	300	mA	

Ordering Information						
Part Number	**Package Type (X)**		**Temperature Option (Y)**		**RoHS Compliance (Z)**	
LTP1362 - XYZ	**B**	Bail Latch	**C**	0 to 70 ºC	**+**	RoHS compliance
			H	-40 to 85 ºC		

Transmitter Electrical Characteristics						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Tx_Data Differential Input Voltage	V_{IN}	180	-	700	mV	
Tx Differential Input Impendence	Z_{IN}	-	100	-	Ω	
Tx_DIS = HIGH (Transmitter OFF / DISABLED)	V_{TDH}	2.0	-	V_{CC}+0.3	V	
Tx_DIS = LOW (Transmitter ON / ENABLED)	V_{TDL}	0	-	0.8	V	

Receiver Electrical Characteristics						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Rx_Data Differential Output Voltage	V_{OUT}	300	-	850	mV	
Rx Differential Output Impendence	Z_{OUT}	-	100	-	Ω	
Rx_LOS = HIGH (Receiver OFF / LOS)	V_{OH}	2.0	-	V_{CC}+0.3	V	
Rx_LOS = LOW (Receiver ON / NORMAL)	V_{OL}	0	-	0.8	V	

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Transmitter Optical Characteristics						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Transmitter Laser Type		1310nm FP Laser				
Average Output Power (9/125μm SMF)	P	-8.2	-	+0.5	dBm	
Optical Output with Tx OFF	P_{OFF}	-	-	-30	dBm	
Optical Center Wavelength	λ	1260	-	1360	nm	
Extinction Ratio	ER	3.5	-	-	dB	
Dispersion Penalty	DP	-	-	3.2	dB	
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	
Output Eye Diagram	IEEE802.3ae					

Receiver Optical Characteristics						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Conditions / Notes**
Receiver Type		1310nm PIN/TIA Receiver				
Receiver Sensitivity	P_{IN}	-	-	-14.4	dBm	BER<10^{-12}, PRBS 2^{31}-1
Receiver Sensitivity (OMA)	P_{IN}(OMA)	-	-	-12.6	dBm	
Optical Power Overload	P_{IN}(SAT)	0.5	-	-	dBm	
Optical Center Wavelength	λ	1260	-	1600	nm	
Receiver Reflectance	RFL	-	-	-12	dB	
Rx_LOS of Signal Assert	P_A	-30	-	-	dBm	
Rx_LOS of Signal De-assert	P_D	-	-	-17	dBm	
Rx_LOS of Signal Hysteresis	P_{Hy}	0.5	-	5	dB	

General Optical Parameter						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Data rate	BR	2	-	6.25	Gb/s	
Bit Error Rate	BER	-	-	10^{-12}		PRBS 2^{31}-1
Maximum Supported Link Length	LMAX	-	-	2	km	

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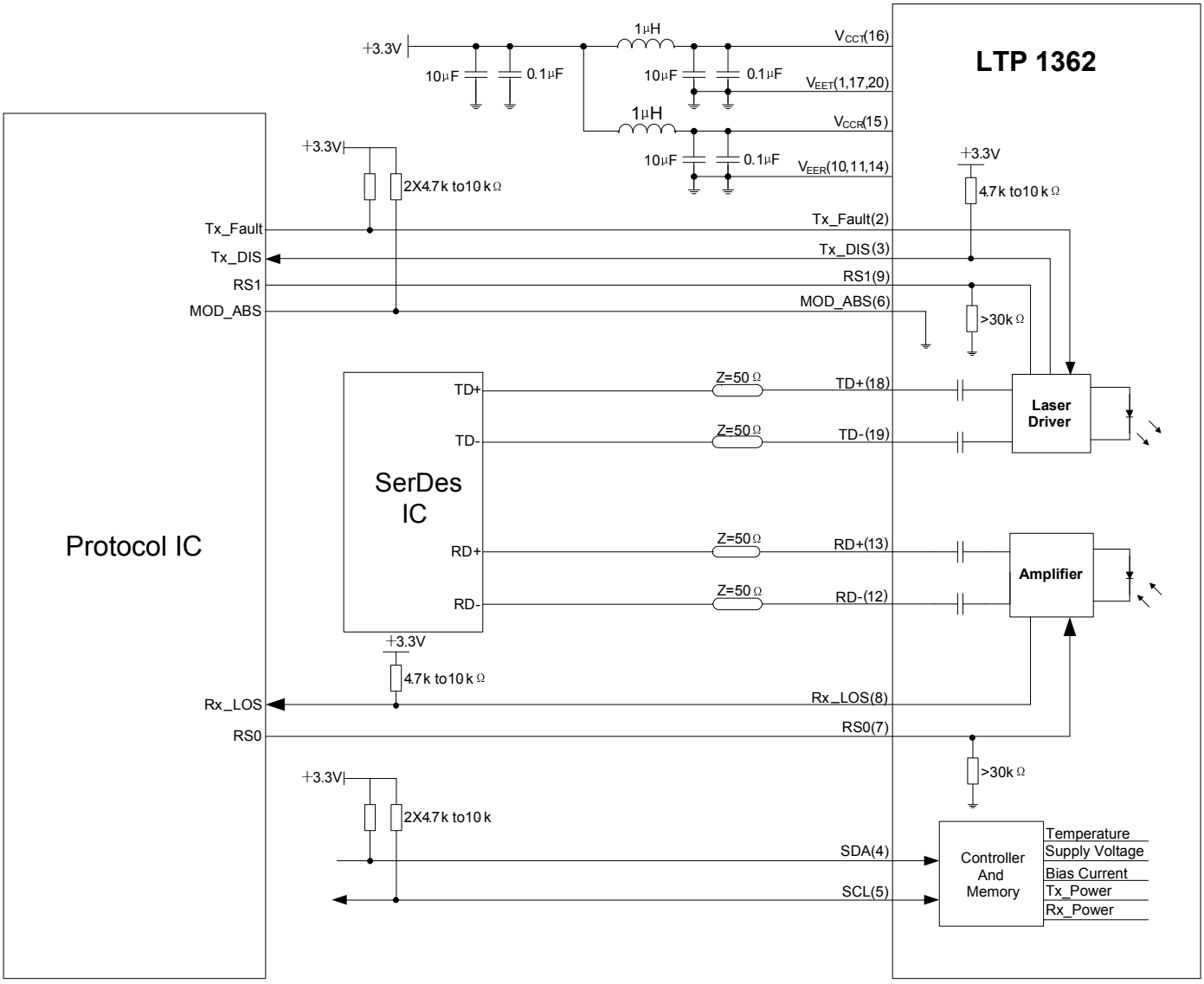
Electrical Interface



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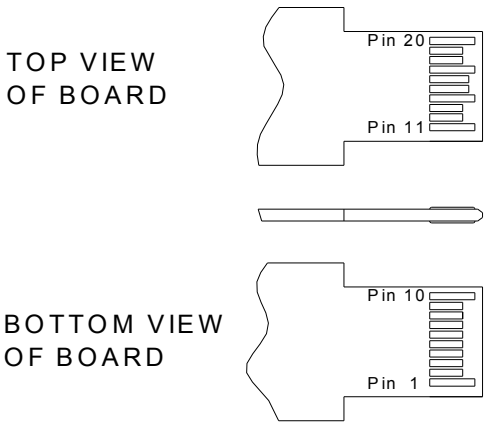
PIN Assignment



PIN Description			
PIN	**Symbol**	**Name/Description**	**Note**
1	V_{EET}	Transmitter Ground	
2	T_{FAULT}	Transmitter Fault.	1
3	T_{DIS}	Transmitter Disable. Laser output disabled on high.	
4	SDA	2-wire Serial Interface Data Line (MOD-DEF2)	
5	SCL	2-wire Serial Interface Clock (MOD-DEF1)	
6	MOD_ABS	Module Absent, connected to V_{EET} ,Transmitter Ground	
7	RS0	Rx Rate Select: NOT implement	2
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	1
9	RS1	Tx Rate Select: NOT implement	2
10	V_{EER}	Receiver Ground	
11	V_{EER}	Receiver Ground	
12	RD-	Receiver Inverted Data out. AC Coupled	
13	RD+	Receiver Non-inverted Data out. AC Coupled	
14	V_{EER}	Receiver Ground	
15	V_{CCR}	Receiver Power Supply	
16	V_{CCT}	Transmitter Power Supply	
17	V_{EET}	Transmitter Ground	
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V_{EET}	Transmitter Ground	

Notes

1. Shall be pulled up with 4.7k-10kΩ to a voltage between 3.15V and 3.6V on the host board.
2. The pins are pulled low to V_{EET} with a > 30k resistor in the module.

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I²C Vendor (Page A0 HEX, Unlisted Fields are Blank / Empty)				
IIC Addr	**Size**	**Name**	**Description**	**Values (HEX)**
0	1	Identifier	SFP	03
1	1	Extended Identifier		04
2	1	Connector	Connector Type = LC	07
3-10	8	Transceiver	Compatibility	00 00 00 00 00 00 00 00
11	1	Encoding	Encoding Type = NRZ	03
12	1	BR, Nominal	Nominal Bit Rate 6250Mb/s	3F
13	1	Reserved	Reserved	00
14	1	Length(9μm)-km	2km Link Length in Kilometers / SMF	02
15	1	Length (9μm)-100m	2km Link Length in Hundreds of Meters / SMF	14
16	1	Length (50μm)-10m	50-micron MMF Link Length = N/A	00
17	1	Length (62.5μm)-10m	62.5-micron MMF Link Length = N/A	00
18	1	Length (Copper)	Copper Link Length = N/A	00
19	1	Reserved	Reserved	00
20-35	16	Vendor name	Hisense	ASCII Format
36	1	Reserved	Reserved	00
37-39	3	Vendor OUI	SFP+ Vendor IEEE Company ID	00 00 00
40-55	16	Vendor PN	The Partnumber in the Ordering Information	ASCII Format
56-59	4	Vendor Revision Number	Programmed by Factory	Programmed by Factory
60-61	2	Wavelength	Laser Wavelength = 1310nm	05 1E
62	1	Reserved	Reserved	00
64-65	2	Transceiver Options	1. Rx_LOS 2. Tx_DISABLE 3. Tx_FAULT	00 1A
66	1	BR, max	20	14
67	1	BR, min	20	14
68-83	16	Vendor SN	Programmed by Factory	Programmed by Factory
84-91	8	Date code	Programmed by Factory	Programmed by Factory
92	1	Diagnostic Monitoring Type	Compliant with SFF-8472 V10.2 Internally Calibrated Received Power Measurement Type-Average Power	68
93	1	Enhanced Options	1. Alarm/Warning Flags 2. Soft Tx_FAULT Monitor 3. Soft Rx_LOS Monitor and Control	B0
94	1	SFF-8472 Compliance	SFF 8472 Revision 10.2 Implemented	03
95	1	CC_EXT	Check_Sum (64 to 94) = TBD	Programmed by Factory
96-127	32	Vendor Specific	Vendor Specific EEPROM	Programmed by Factory

A2 (hex) 8472 Digital Diagnostic Table - Summary of Parameters in the A2 (hex) Parametric Table

The data in the parameter tables are compared with the data in the measured data tables in order to create a warning or alarm status bit

The Warning or Alarm bit is set when the parameter drops below or exceeds the Low or High values stored in memory.

SFF-8472 Rev 9.3 A2 (HEX) Address Table for Alarm and Warning Data														
8472 Parameter	Alarm Threshold Data				Warning Threshold Data				Measured Values		Alarm Bit (Set) Address + Position		Warning Bit (Set) Address + Position	
	High Value		Low Value		High Value		Low Value							
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	High	Low	High	Low
Temperature	00	01	02	03	04	05	06	07	96	97	112 (7)	112 (6)	116 (7)	116 (6)
Vcc	08	09	10	11	12	13	14	15	98	99	112 (5)	112 (4)	116 (5)	116 (4)
Tx Bias	16	17	18	19	20	21	22	23	100	101	112 (3)	112 (2)	116(3)	116 (2)
Tx Output	24	25	26	27	28	29	30	31	102	103	112 (1)	112 (0)	116 (1)	116 (0)
Rx Input	32	33	34	35	36	37	38	39	104	105	113 (7)	113 (6)	117 (7)	117 (6)

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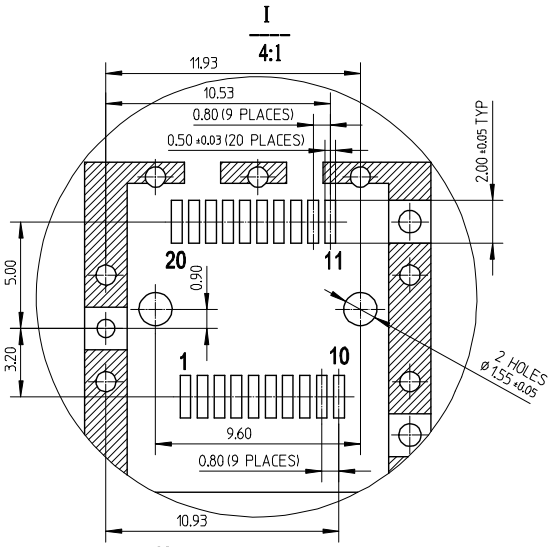
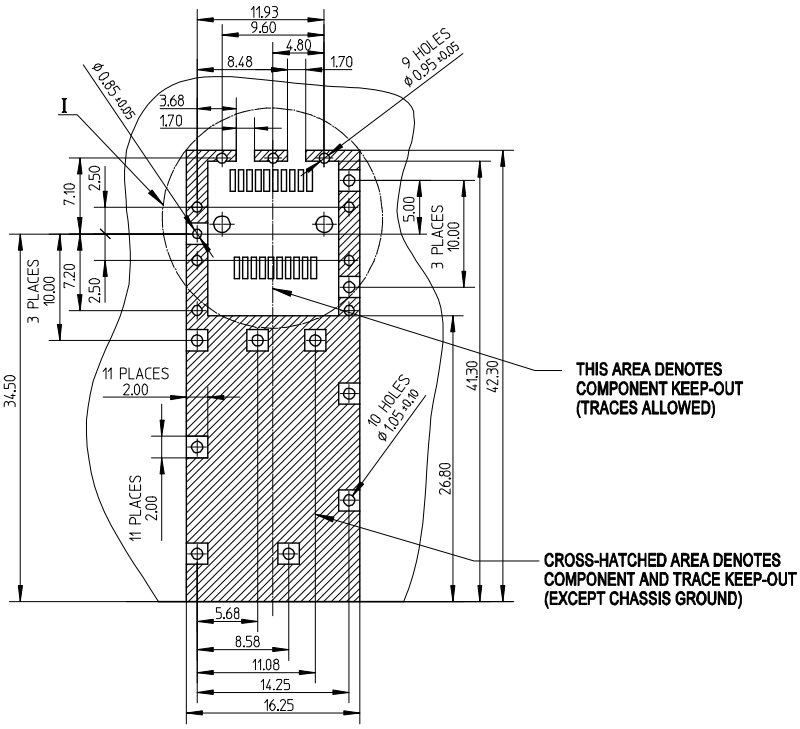
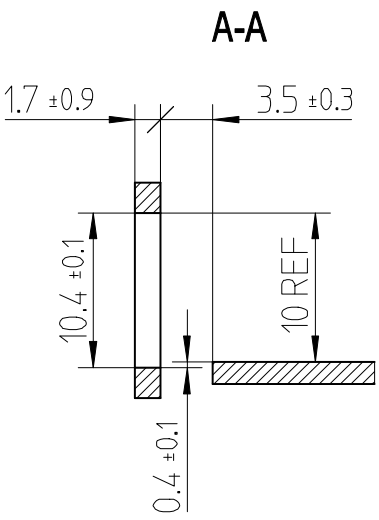
Recommended PCB Layout

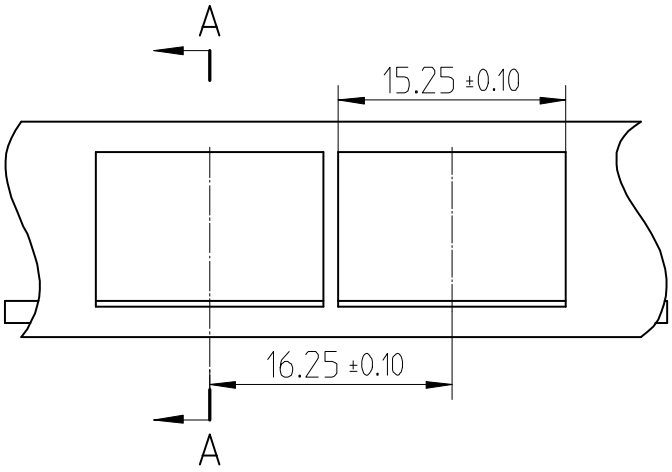


Notes:
1. Datum and basic dimensions established by customer
2. Pads and vias are chassis ground, 11 places
3. Thru holes,plating optional



Recommended Front Panel Layout Opening For LC





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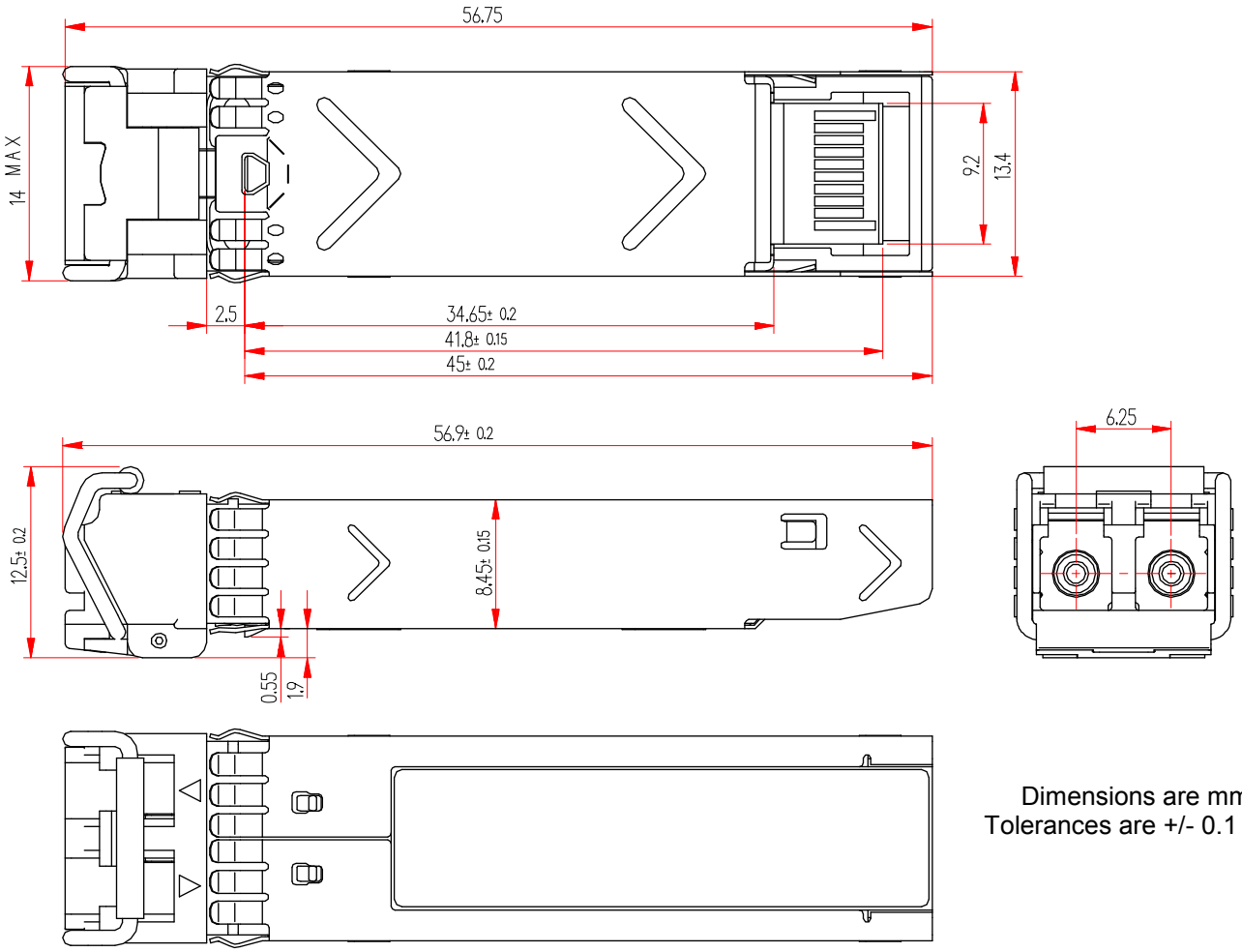
Mechanical Dimensions



Dimensions are mm
Tolerances are +/- 0.1 mm

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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