JCP-SFP-RJ45 Series

10GBASE-T Copper SFP+ Transceiver
RoHS Compliant

Features

- Support 10GBASE-T Operation in Host Systems and auto-negotiation to lower speed.
- Support RX_LOS as Link indication function
- Hot-Pluggable SFP Footprint
- Compact RJ-45 Connector Assembly
- Compliant with SFP MSA
- Operating Case Temperature：
  Extended：-10℃~70℃
  Industrial: -40℃~85℃
- Safety Certification: TUV/UL/FDA*(Note1)
- RoHS Compliant

Applications

- 10G BASE-T IEEE 802.3an
- 5GBASE-T 802.3bz
- 2.5GBASE-T 802.3bz
- 1000BASE-T IEEE 802.3ab
- 100BASE-TX IEEE 802.3u
- 5GBASE-T Broadcom MGBASE-T
- 2.5GBASE-T Broadcom MGBASE-T

Ordering Information

Part No.	Data Rate	Media type	Distance	Connector	Temperature
JCP-SFP-RJ45* Note2	10G	CAT6A/CAT7 S/FTP	30m	RJ45	Extended
	10G	CAT6A/CAT7 UTP	20m	RJ45	Extended
	5G	CAT6 or better	50m	RJ45	Extended
	2.5G	CAT5E or better	100m	RJ45	Extended
	1G	CAT5E or better	100m	RJ45	Extended
	100M	CAT5E or better	100m	RJ45	Extended
JCP-SFP-RJ45(WT)* Note2	10G	CAT6A/CAT7 S/FTP	30m	RJ45	Industrial
	10G	CAT6A/CAT7 UTP	20m	RJ45	Industrial
	5G	CAT6 or better	50m	RJ45	Industrial
	2.5G	CAT5E or better	100m	RJ45	Industrial
	1G	CAT5E or better	100m	RJ45	Industrial
	100M	CAT5E or better	100m	RJ45	Industrial

Note1. For the latest certification information, please check with Data Controls Inc..

Note2. For more about the auto-negotiation to other bitrate, please reference the Application note 'JCP-SFP-RJ45 Application note 001' and 'JCP-SFP-RJ45 Application note 002'

*The product image only for reference purpose.

Product Description

JCP-SFP-RJ45 10G BASE-T Copper Small Form Pluggable (SFP) modules are based on the SFP Multi Source Agreement (MSA). It is compliant with the 10G BASE-T,1000BASE-T, 100BASE-TX standards as specified in IEEE STD 802.3an, 802.3ab and 802.3au.

Absolute Maximum Ratings*

Parameter	Symbol	Min	Typ.	Max	Units
Maximum Supply Voltage	Vcc	-0.5		4.0	V
Storage Temperature	T_S	-40		85	°C

*Exceeding any one of these values may destroy the device permanently.

Normal operating condition

Parameter	Symbol		Min	Typ.	Max	Units
Operating Case Temperature	Tc	JCP-SFP-RJ45	-10		70	°C
		JCP-SFP-RJ45(WT)	-40		85	°C
Supply Voltage	Vcc		3.15	3.3	3.45	V

Electrical Characteristics

Parameter	Symbol	Min	Typ.	Max	Units	Notes/Conditions
+3.3 Volt Electrical Power Interface						
Supply Current	Icc			710	mA	For JCP-SFP-RJ45
				730	mA	For JCP-SFP-RJ45(WT)
Input Voltage	Vcc	3.15	3.3	3.45	V	
Low-Speed Signals, Electronic Characteristics						
SFP Output LOW	V_{OL}	0		0.5	V	4.7k to 10k pull-up to host_Vcc, measured at host side of connector
SFP Output HIGH	V_{OH}	Vcc – 0.5		Vcc + 0.3	V	4.7k to 10k pull-up to host_Vcc, measured at host side of connector
SFP Input LOW	VIL	0		0.4	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector
SFP Input HIGH	VIH	2.8		Vcc + 0.3	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector
High-Speed Electrical Interface, Transmission Line-SFP						

Tx Output impedance	Zout,TX		100		Ohm	
Rx Input Impedance	Zin,RX		100		Ohm	
High-Speed Electrical Interface, Host-SFP						
CML Inputs(Differential)	Vin	250		1200	mV	AC coupled inputs
CML Outputs (Differential)	Vout	350		800	mV	CML Outputs (Differential)
Rise/Fall Time	Tr,Tf		20		psec	20%-80%
Tx Input Impedance	Zin		100		Ohm	Differential ended
Rx Output Impedance	Zout		100		Ohm	Differential ended

Pin Descriptions

Pin No.	Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Not used
3	TX Disable	Transmitter Disable	3	Note3
4	MOD-DEF2	Module Definition 2	3	Note4
5	MOD-DEF1	Module Definition 1	3	Note4
6	MOD-DEF0	Module Definition 0	3	Note4
7	RS0	No Connection required	3	
8	LOS	Loss of Signal	3	RX_LOSS
9	RS1	No Connection required	1	
10	VeeR	Receiver Ground	1	
11	VeeR	Receiver Ground	1	
12	RD-	Inv. Received Data Out	3	
13	RD+	Received Data Out	3	
14	VeeR	Receiver Ground	1	
15	VccR	Receiver Power	2	
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	
18	TD+	Transmit Data In	3	
19	TD-	Inv. Transmit Data In	3	
20	VeeT	Transmitter Ground	1	

Notes:

The power dissipation of JCP-SFP-RJ45(WT)s higher than normal 10G optical transceiver. Please Note:

The number of JCP-SFP-RJ45 needs to be determined according to the power supply capability of equipment.

Make sure the air flow is well for SFP in equipment.

Leave the adjacent port empty if possible.

Note3. TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7 – 10 KΩ resistor. Its states are:

Low (0 – 0.8V): Transmitter on

(>0.8, < 2.0V): Undefined

High (2.0 – 3.465V): Transmitter Disabled

Open: Transmitter DisabledNote2

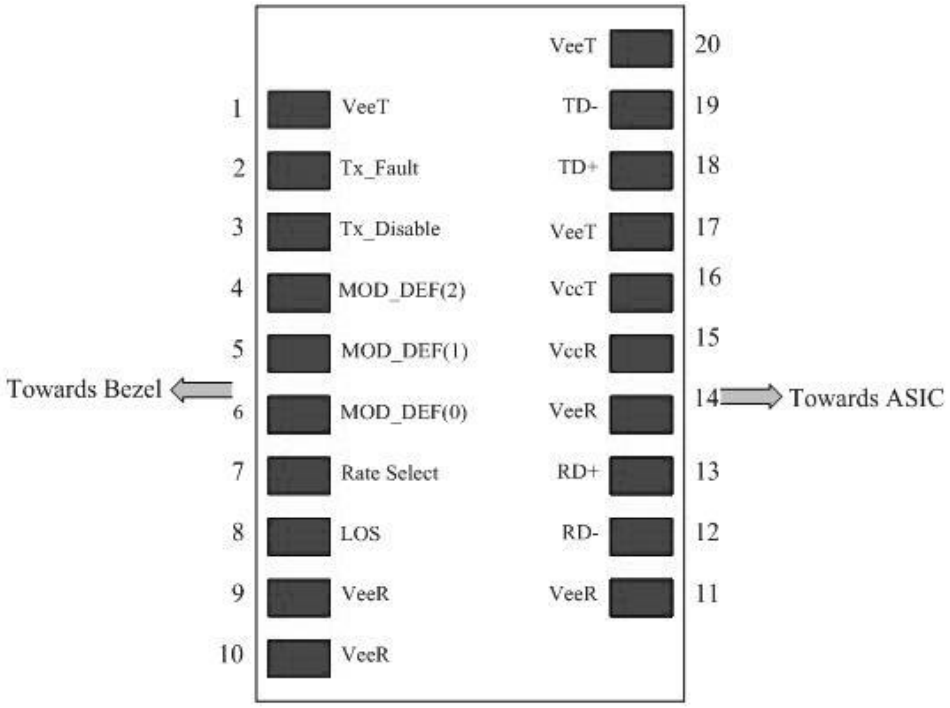
Note4. Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K – 10KΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.

Mod-Def 0 is grounded by the module to indicate that the module is present.

Mod-Def 1 is the clock line of two wire serial interface for serial ID.

Mod-Def 2 is the data line of two wire serial interface for serial ID.

The following is the Diagram of host board connector block pin numbers and names



Serial Communication Protocol

Data Controls Inc. Copper SFPs support the 2-wire serial communication protocol outlined in the SFP MSA, These SFP use a 128 byte EEPROM with an address of A0H.

EEPROM Serial ID Memory Contents

Accessing Serial ID Memory uses the 2 wire address 1010000X (A0H). Memory Contents of Serial ID are shown in Table 1.

Table 1 Serial ID Memory Contents

Data Addr	Field Size (Byte)	Name Of filed	Description of field	Coded value	Hex
BASE ID FIELDS					
0	1	Identifier	Type of serial transceiver	SFP+	03
1	1	Ext.Identifier	Extended identifier of Type of serial transceiver	MOD_DEF 4	04
2	1	Connector	Code for connector type	RJ45	22
3	8	Transceiver	10G Ethernet Compliance Codes & Infiniband Compliance Codes		00
4			Part of SONET Compliance Codes		00
5			SONET Compliance Codes		00
6			Ethernet Compliance Codes		00
7			Fiber Channel link length & part of Fibre Channel technology		00
8			Part of Fiber Channel transmitter technology		00
9			Fiber Channel Transmission media		00
10			Fiber Channel speed		00
11	1	Encoding	Code for high speed serial encoding algorithm	64B/66B	06
12	1	BR, Nominal	Nominal signalling rate, units of 100MBd.	10.3Gbps	67
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 (Copper)	Link length supported for	30m	1E

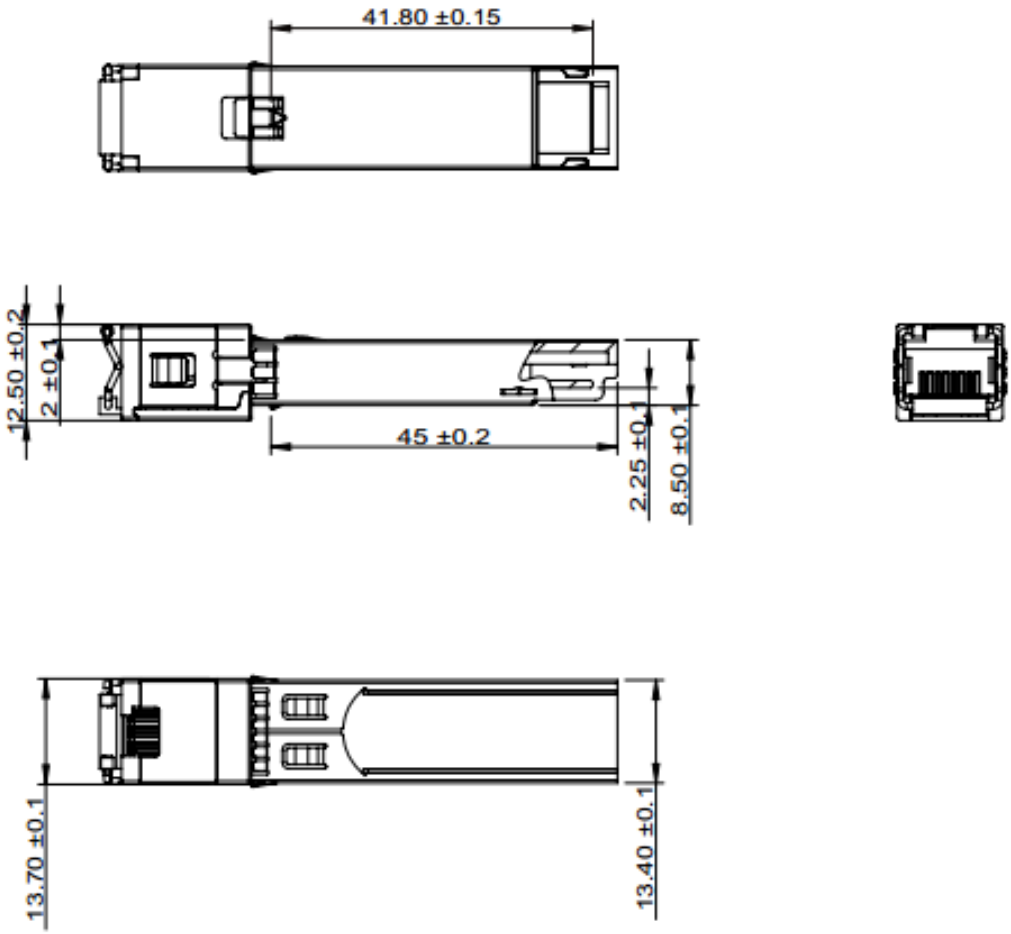
			copper, units of meters		
19	1	Length (OM3)	Link length supported for 50 um OM3 fiber, units of 10 m		00
20	16	Vendor name	Vendor name (ASCII)	D	
21				A	
22				T	
23				A	
24				C	
25				O	
26				N	
27				T	
28				R	
29				O	
30				L	
31				S	
32				<space>	20
33				<space>	20
34				<space>	20
35				<space>	20
36	1	Transceiver	Extended Compliance Codes	10GBASE-T Short Reach (30 meters)	1C
37	3	Vendor OUI	SFP vendor IEEE company ID		00
38					00
39					00
40	16	Vendor PN	Part number provided by vendor (ASCII)	J	
41				C	
42				P	
43				-	
44				S	
45				F	
46				P	
47				-	
48				R	
49				J	
50				4	
51				5	
52				<space>	20
53				<space>	20
54				<space>	20
55				<space>	20
56	4	Vendor rev	Revision level for part number provided by vendor (ASCII)	1	31
57				.	2E

58				0	30
59				<space>	20
60	2	Wavelength	Laser Wavelength		00
61					00
62	1	Reserved			00
63	1	CC_BASE	Check code for Base ID Fields (addresses 0 to 62)	Note 5	xx
64	2	Options	Indicates which optional transceiver signals are implemented	TX_DISABLE,signal,Rx_LOS	00
65					12
66	1	BR, max	Upper bit rate margin, units of %		00
67	1	BR, min	Lower bit rate margin, units of %		00
68	16	Vendor SN	Serial number provided by vendor (ASCII)	x	xx
69				x	xx
70				x	xx
71				x	xx
72				x	xx
73				x	xx
74				x	xx
75				x	xx
76				x	xx
77				x	xx
78				<space>	20
79				<space>	20
80				<space>	20
81				<space>	20
82				<space>	20
83				<space>	20
84	8	Date code	Vendor's manufacturing date code	Year	xx
85				Year	xx
86				Month	xx
87				Month	xx
88				Day	xx
89				Day	xx
90				<Space>	20
91				<Space>	20
92	1	Diagnostic Monitoring Type	Type of diagnostic monitoring is implemented	diagnostic monitoring is not implemented	00
93	1	Enhanced Options	Optional enhanced features	Optional	00

			are implemented	enhanced features are not implemented	
94	1	SFF-8472 Compliance	Revision of SFF-8472 the transceiver complies with	Digital diagnostic functionality not included or undefined	00
95	1	CC_EXT	Check code for the Extended ID Fields (addresses 64 to 94)	Note 6	xx
Note5. The check code shall be the low order 8 bits of the sum of the contents of all the bytes from byte 0 to byte 62, inclusive.					
Note6. The check code shall be the low order 8 bits of the sum of the contents of all the bytes from byte 64 to byte 94, inclusive.					

Mechanical Specifications

Data Controls Inc.'s Copper SFP transceivers are compliant with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).



*This 2D drawing only for reference, please check with Data Controls Inc. before ordering.

Obtaining Document

You can visit our website:

https://www.dci.jp

Or contact Data Controls Inc.. Listed at the end of the documentation to get the latest documents.

Revision History

Revision	Revision History	Release Date
V1.a	Released.	Dec 21,2016
V1.b	Updated distance, operation temperature ,2D drawing and added the power dissipation note	Mar 3,2017
V1.c	Updated the electrical interface description and EEPROM	July 1,2017
1.d	Added 5G/2.5G/1G/100M/10M description, and modified power dissipation of New version. Update the contact.	Jan 4, 2018
V1.e	Modified the description of 5G/2.5G/1G/100M/10M	August 23, 2018
V1.f	Added the Industrial PN	Mar 26, 2019
V1.g	Added the pin descriptions of Note2. Updated the regulatory compliance.	Jun 26, 2019
V1.h	Delete 'Note4' in page2	Mar 20,2021
V1.i	Add CAT6A/CAT7 UTP 10G transmission info.	Mar 09,2022

Notice:

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