

SO-CFP-SR10

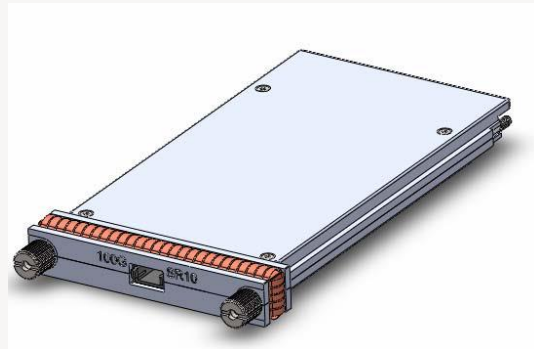
CFP, 100 Gbps, MM, DDM, 100m

OVERVIEW

The SO-CFP-100BASE-SR10 is a 100G transceiver module designed for applications over multimode (MM) fiber with transmission distances up to 100m. The module supports 100BASE-SR10 operation. It uses 10x 850nm 10.3125 Gbps optical signals and transmits them via an MPO connector into a multimode ribbon cable. Reversely, on the receiver side, the module optically receives 10x 10.3125 Gbps signals, and converts them to electrical data. The product is designed with form factor, optical/electrical connection and digital diagnostic interface according to the CFP MSA Hardware Specification Revision 1.4.

PRODUCT FEATURES

- Compliant to IEEE 802.3ba(100GBASE-SR10)
- Support interoperability with IEEE 802.3ae 10GBASE-SR modules of various form factors such as SFP+, XFP, X2
- Compliant to the CFP MSA specification
- Up to 100m on OM3 and 150m on OM4 MMF
- VCSEL array transmitter and PIN array receiver
- Single 3.3V power supply and power dissipation $\leq 8W$
- Operates at 10.3125Gbps per channel
- Operating case temperature: 0°C~+70°C
- MDIO digital diagnostic interface and control capabilities
- Utilizes a standard 24/20 lane optical fiber with MPO connector



APPLICATIONS

- 100GBE and 10GBE interconnects
- Datacom/Telecom switch & router connections
- Data aggregation and backplane applications
- Proprietary protocol and density application

ORDERING INFORMATION

Part Number	Description
SO-CFP-SR10	CFP, 100 Gbps, MM, DDM, 100m

FUNCTIONAL DIAGRAM

This product converts the 10-channel 10Gbps electrical input data into 10x 10.3125 Gbps optical signals operating around 850nm. A VCSEL array with 10 lasers is used to perform this task. The MPO connector interface couples the light into 10+10 multimode fibers. The receiver part accepts the 10x 850nm 10.3125 Gbps optical signals. Each signal is received by a photo diode (PIN) and converted into an electrical signal which is then converted into a 10-channel 10 Gbps electrical output data. Figure 1 shows the functional block diagram of this product.

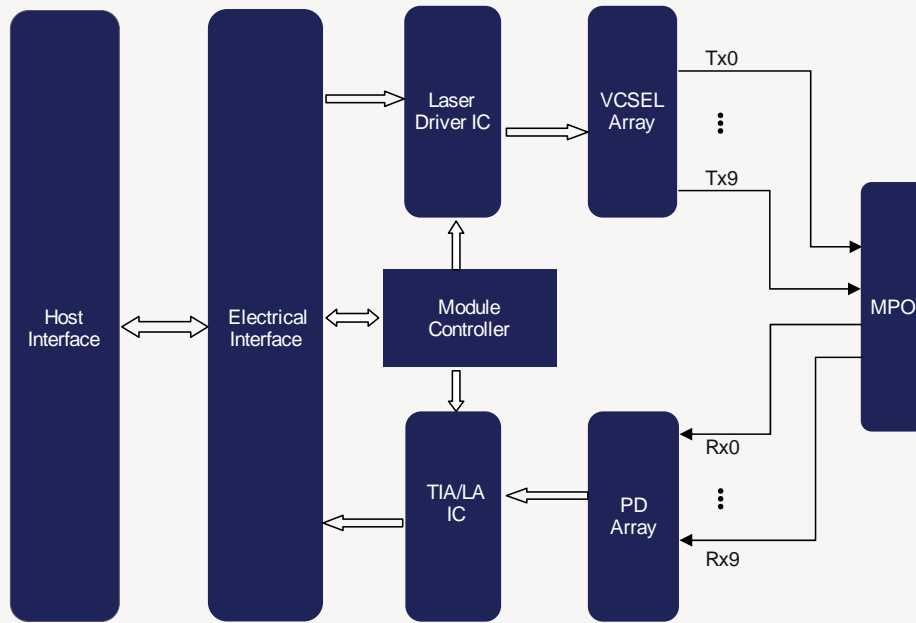


Figure 1. Functional diagram

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Storage Temperature	T_s	-40	+85	°C
Supply Voltage	V_{cc}	-0.5	3.6	V
Operating Relative Humidity (non-condensing)	RH	5	85	%

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_c	0		+70	°C
			SO-CFP-100BASE-SR10		
Power Supply Voltage	V_{cc}	3.2	3.3	3.4	V
Power Dissipation	P_m			8	W
Low Power Mode Dissipation	P_{low}			2	w
Aggregate Bit Rate	BR_{Aggr}		103.125		Gbps
Lane Bit Rate	BR_{LANE}		10.3125		Gbps

PERFORMANCE SPECIFICATIONS – ELECTRICAL - TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
AC common mode input voltage tolerance				20	mV	RMS
Input Impedance (Differential)	Z_{in}	90	100	110	ohms	
Input High Voltage	V_{IH}	2		$V_{cc}+0.3$	V	3.3V LVCMOS
		0.84		1.5	V	1.2V LVCMOS
Input Low Voltage	V_{IL}	-0.3		0.8	V	3.3V LVCMOS
		-0.3		0.36	V	1.2V LVCMOS

PERFORMANCE SPECIFICATIONS – ELECTRICAL – RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Differential output voltage, peak-to-peak				760	mV	
AC common mode output voltage				15	mV	RMS
Termination mismatch at 1MHz				5	%	
Output impedance (Differential)	Z_{out}	90	100	110	ohms	
Output rise and fall time		24			ps	20%~80%
Output High Voltage	V_{OH}	$V_{cc}-0.2$			V	3.3V LVCMOS (IOH=-100uA)
		1.0		1.5	V	1.2V LVCMOS
Output Low Voltage	V_{OL}			0.2	V	3.3V LVCMOS (IOH=-100uA)
		-0.3		0.2	V	1.2V LVCMOS

OPTICAL AND ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
OM3 MMF	L	0.5		100	m
Aggregate Bit Rate	BR_{Aggr}			103.125	Gbps
Per Lane Bit Rate	$BRLANE$			10.3125	Gbps

OPTICAL AND ELECTRICAL CHARACTERISTICS TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength	λ_c	840	850	860	nm
RMS spectral width	RMS			0.65	nm
Average Launch Power, Each Lane	$P_{out/lane}$	-7.6		2.4	dBm
Transmit OMA, per Lane	$TX_OMA/lane$	-5.6		3	dBm
Difference in launch power between any two lanes(OMA)				4	dB
Peak power, each lane				4	dBm
Transmitter and dispersion penalty, each lane	$TDP/lane$			3.5	dB
Extinction Ratio	ER	3			dB
Optical Return Loss Tolerance		-	-	12	dB
Average launch power of OFF transmitter, each lane				-30	dBm
Output Optical Eye			IEEE 802.3ba-2010 Compliant		

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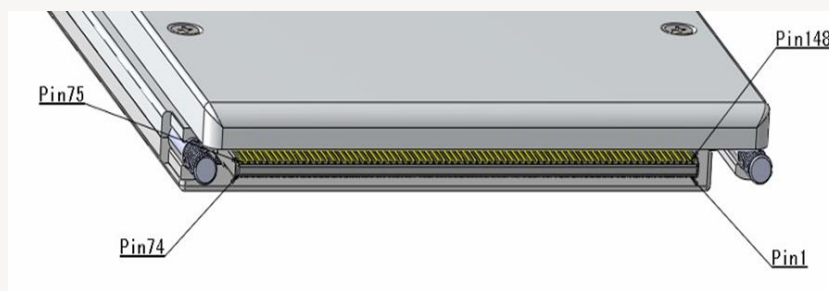
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OPTICAL AND ELECTRICAL CHARACTERISTICS RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength	λ_c	840	850	860	nm
Damage Threshold		3.4			dBm
Optical modulation amplitude, each lane				3	dBm
Stressed receiver sensitivity in OMA, each lane				-5.4	dBm
Average power at receiver input, each lane	$RX/lane$	-9.5		+2.4	dBm
Peak power, each lane				4	dBm
Receiver reflectance	R_r			-12	dB

PIN ASSIGNMENT AND FUNCTION DEFINITIONS

PIN ASSIGNMENT



PIN DEFINITION

PIN	Signal Name	Description	PIN	Signal Name	Description
1	GND	3.3V Module Supply Ground	148	GND	3.3V Module Supply Ground
2	GND	3.3V Module Supply Ground	147	REFCLKn	Reference Clock Input
3	GND	3.3V Module Supply Ground	146	REFCLKp	Reference Clock Input
4	GND	3.3V Module Supply Ground	145	GND	3.3V Module Supply Ground
5	GND	3.3V Module Supply Ground	144	NC	Not Connected
6	3.3V	3.3V Module Supply Voltage	143	NC	Not Connected
7	3.3V	3.3V Module Supply Voltage	142	GND	3.3V Module Supply Ground
8	3.3V	3.3V Module Supply Voltage	141	TX9n	CML Input
9	3.3V	3.3V Module Supply Voltage	140	TX9p	CML Input
10	3.3V	3.3V Module Supply Voltage	139	GND	3.3V Module Supply Ground
11	3.3V	3.3V Module Supply Voltage	138	TX8n	CML Input
12	3.3V	3.3V Module Supply Voltage	137	TX8p	CML Input
13	3.3V	3.3V Module Supply Voltage	136	GND	3.3V Module Supply Ground
14	3.3V	3.3V Module Supply Voltage	135	TX7n	CML Input
15	3.3V	3.3V Module Supply Voltage	134	TX7p	CML Input
16	GND	3.3V Module Supply Ground	133	GND	3.3V Module Supply Ground
17	GND	3.3V Module Supply Ground	132	TX6n	CML Input
18	GND	3.3V Module Supply Ground	131	TX6p	CML Input
19	GND	3.3V Module Supply Ground	130	GND	Ground (1)
20	GND	3.3V Module Supply Ground	129	TX5n	CML Input

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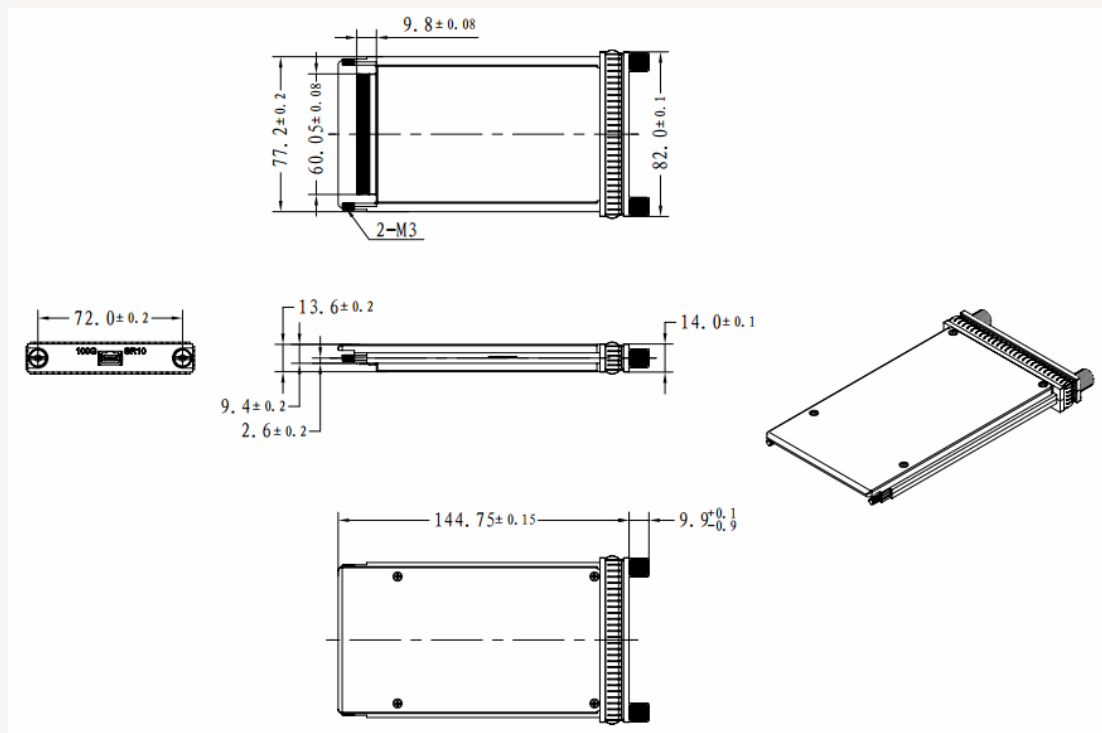
21	VND_IO_A	Module Vendor I/O, NC	128	TX5p	CML Input
22	VND_IO_B	Module Vendor I/O, NC	127	GND	3.3V Module Supply Ground
23	GND	3.3V Module Supply Ground	126	TX4n	CML Input
24	(TX_MCLKn)	Tx Monitor Clock Output	125	TX4p	CML Input
25	(TX_MCLKp)	Tx Monitor Clock Output	124	GND	3.3V Module Supply Ground
26	GND	3.3V Module Supply Ground	123	TX3n	CML Input
27	VND_IO_C	Module Vendor I/O, must not connect at host board	122	TX3p	CML Input
28	VND_IO_D	Module Vendor I/O, must not connect at host board	121	GND	3.3V Module Supply Ground
29	VND_IO_E	Module Vendor I/O, must not connect at host board	120	TX2n	CML Input
30	PRG_CNTL1	Input LVCOMS	119	TX2p	CML Input
31	PRG_CNTL2	Input LVCOMS	118	GND	3.3V Module Supply Ground
32	PRG_CNTL3	Input LVCOMS	117	TX1n	CML Input
33	PRG_ALRM1	Output LVCOMS	116	TX1p	CML Input
34	PRG_ALRM2	Output LVCOMS	115	GND	3.3V Module Supply Ground
35	PRG_ALRM3	Output LVCOMS	114	TX0n	CML Input
36	TX_DIS	"1" or NC: transmitter disabled "0": transmitter enabled	113	TX0p	CML Input
37	MOD_LOPWR	"1" or NC: module is low power(safe) mode "0": power-on enabled	112	GND	3.3V Module Supply Ground
38	MOD_ABS	"1" or NC: module absent "0": module present	111	GND	3.3V Module Supply Ground
39	MOD_RSTn	"0": resets the module "1" or NC: module enabled	110	NC	Not Connected
40	RX_LOS	"1": low optical signal "0": normal condition	109	NC	Not Connected
41	GLB_ALRMn	Global Alarm "0": alarm condition in any MDIO Alarm register "1": no alarm condition	108	GND	3.3V Module Supply Ground
42	PRTADR4	1.2V CMOS Input, MDIO Physical port address bit 4	107	RX9n	CML Output
43	PRTADR3	1.2V CMOS Input, MDIO Physical port address bit 3	106	RX9p	CML Output
44	PRTADR2	1.2V CMOS Input, MDIO Physical port address bit 2	105	GND	3.3V Module Supply Ground
45	PRTADR1	1.2V CMOS Input, MDIO Physical port address bit 1	104	RX8n	CML Output
46	PRTADR0	1.2V CMOS Input, MDIO Physical port address bit 0	103	RX8p	CML Output
47	MDIO	1.2V CMOS I/O, Management Data I/O bi-directional data	102	GND	3.3V Module Supply Ground
48	MDC	1.2V CMOS Input, Management Data Clock	101	RX7n	CML Output
49	GND	3.3V Module Supply Ground	100	RX7p	CML Output
50	VND_IO_F	Module Vendor I/O, Not Connected Internally	99	GND	3.3V Module Supply Ground
51	VND_IO_G	Module Vendor I/O, Not Connected Internally	98	RX6n	CML Output
52	GND	3.3V Module Supply Ground	97	RX6p	CML Output
53	VND_IO_H	Module Vendor I/O, Not Connected Internally	96	GND	3.3V Module Supply Ground
54	VND_IO_J	Module Vendor I/O, Not Connected Internally	95	RX5n	CML Output
55	GND	3.3V Module Supply Ground	94	RX5p	CML Output
56	GND	3.3V Module Supply Ground	93	GND	3.3V Module Supply Ground
57	GND	3.3V Module Supply Ground	92	RX4n	CML Output
58	GND	3.3V Module Supply Ground	91	RX4p	CML Output

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59	GND	3.3V Module Supply Ground	90	GND	3.3V Module Supply Ground
60	3.3V	3.3V Module Supply Voltage	89	RX3n	CML Output
61	3.3V	3.3V Module Supply Voltage	88	RX3p	CML Output
62	3.3V	3.3V Module Supply Voltage	87	GND	3.3V Module Supply Ground
63	3.3V	3.3V Module Supply Voltage	86	RX2n	CML Output
64	3.3V	3.3V Module Supply Voltage	85	RX2p	CML Output
65	3.3V	3.3V Module Supply Voltage	84	GND	3.3V Module Supply Ground
66	3.3V	3.3V Module Supply Voltage	83	RX1n	CML Output
67	3.3V	3.3V Module Supply Voltage	82	RX1p	CML Output
68	3.3V	3.3V Module Supply Voltage	81	GND	3.3V Module Supply Ground
69	3.3V	3.3V Module Supply Voltage	80	RX0n	CML Output
70	GND	3.3V Module Supply Ground	79	RX0p	CML Output
71	GND	3.3V Module Supply Ground	78	GND	3.3V Module Supply Ground
72	GND	3.3V Module Supply Ground	77	(RX_MCLKn)	Rx Monitor Clock Output
73	GND	3.3V Module Supply Ground	76	(RX_MCLKp)	Rx Monitor Clock Output
74	GND	3.3V Module Supply Ground	75	GND	3.3V Module Supply Ground

MECHANICAL DRAWING



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