

Features

- SMPTE 297-2006 compatible
- Robust error free transmission of signals from 50Mbps to 3Gbps
- Supports video pathological patterns for SD-SDI, HD-SDI and 3G-SDI
- SFP Package.Hot-pluggable
- Metal enclosure for lower EMI
- +3.3V single power supply.
- Digital diagnostics and control via I²C interface, including:
 - Monitoring of receive optical power, supply voltage and temperature
 - Alarm reporting
 - Module ID polling
- Compliant ROHS and lead free

Applications

- SMPTE 297-2006 compatible optical -to- electrical interfaces

Descriptions

The 2RP13F6-11-SDI is a dual channel optical receiver module designed to convert optical serial digital signals to electrical serial digital signals as defined in SMPTE 297-2006 . The 2RP13F6-11-SDI is specifically designed for robust performance in the presence of SDI pathological patterns for SMPTE 259M, SMPTE 292M and SMPTE 424M serial rates.

Ordering Information

Part Number	Package	Temperature Range
2RP13F6-11-SDI	SFP	0°C to 70°C

Functional Block Diagram

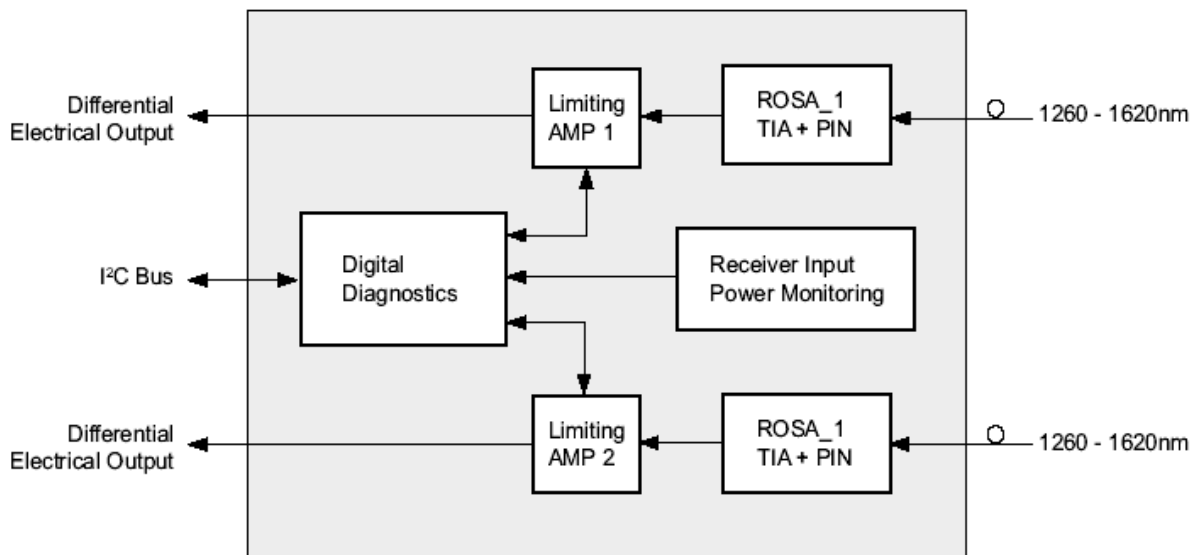


Figure 1: 2RP13F6-11-SDI Functional Block Diagram

Pin Description

Pin Out Diagram

20 NC	1 VEE
19 NC	2 RD2-
18 NC	3 RD2+
17 VEE	4 VEE
16 VCC	5 SCL
15 VCC	6 SDA
14 VEE	7 VEE
13 RD1+	8 NC
12 RD1-	9 NC
11 VEE	10 NC

Pin Function Definitions

Pin#	Name	Description	Notes
1	VEE	Ground	-
2	RD2-	Inv. Received Data Out	Note 1
3	RD2+	Receiver Data out	Note 1
4	VEE	Ground	-
5	SCL	I ² C Clock	-
6	SDA	I ² C Data	-
7	VEE	Ground	-
8	NC	No Connection	-
9	NC	No Connection	-
10	NC	No Connection	-
11	VEE	Ground	-
12	RD1-	Inv. Received Data Out	Note 1
13	RD1+	Receiver Data out	Note 1
14	VEE	Ground	-
15	VCC	Receiver Power Supply	Note 2, 3.3V ± 5%
16	VCC	Receiver Power Supply	Note 2, 3.3V ± 5%
17	VEE	Ground	-
18	NC	No Connection	-
19	NC	No Connection	-
20	NC	No Connection	-

Note:

1. **RD-/+:** These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
2. **VCC** is the receiver power supplies. It is defined as 3.3V ±5% at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hotplugging of the SFP transceiver module will result in an inrush current of no more than 30 mA greater than the steady state value.

Recommended Host Board Supply Filtering

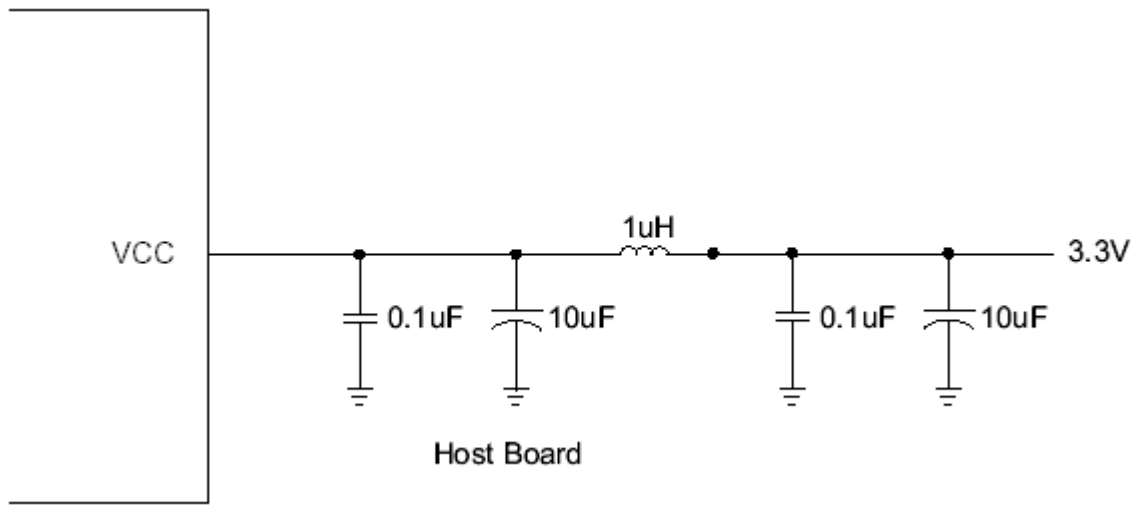


Figure 2: Recommended Host Board Supply Filtering

Optical Connector Requirements

An LC connector with PC/UPC polish is required for each port.

Performance Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T _{ST}	-40	+85	°C
Operating case Temperature	T _{case}	-20	+85	°C
Input Voltage	-	GND	VCC	V
Power Supply Voltage	VCC-VEE	-0.5	+3.6	V

Operating Environment

Parameter	Symbol	Min.	Max.	Unit
Power Supply Voltage	VCC	+3.1	+3.5	V
Operating Temperature	T _o	0	+70	°C

Receiver O-E characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Bit Rate	BR	50	-	3000	Mbps	-
Wavelength	λ	1260	-	1620	nm	-
Saturation	P _s	0	-	-	dBm	-
LOS Asserted	-	-35	-	-	dBm	-
LOS De-Assert	-	-	-	-22	dBm	-
LOS Hysteresis	-	-	3	-	dB	-
LOS LOW voltage	V _{Lout}	0	-	0.8	V	-
LOS HIGH voltage	V _{Hout}	2.0	-	V _{cc}	V	-
Sensitivity for SMPTE 259M 143-360Mbps	-	-	-22	-20	dBm	Pathological PRBS
		-	-24	-22	dBm	
Sensitivity for SMPTE 292M 1.485Gbps	-	-	-22	-20	dBm	Pathological PRBS
		-	-24	-22	dBm	
Sensitivity for SMPTE 424M 2.97Gbps	-	-	-20	-18	dBm	Pathological PRBS
		-	-22	-20	ps	
Data Outputs Voltage	V _{pp}	400	800	1000	mV	-
Input Power Monitoring Accuracy		-1		+1	dB	-

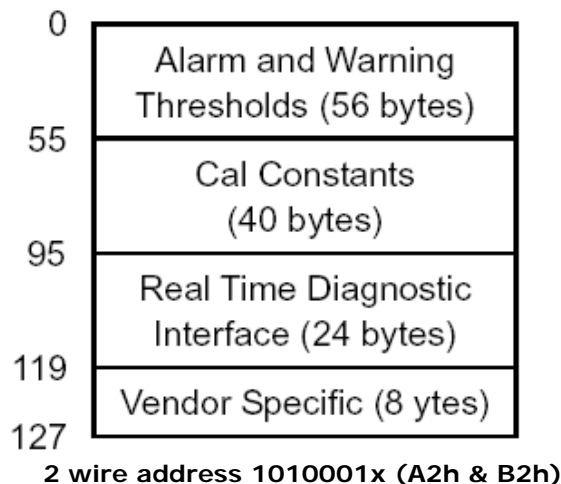
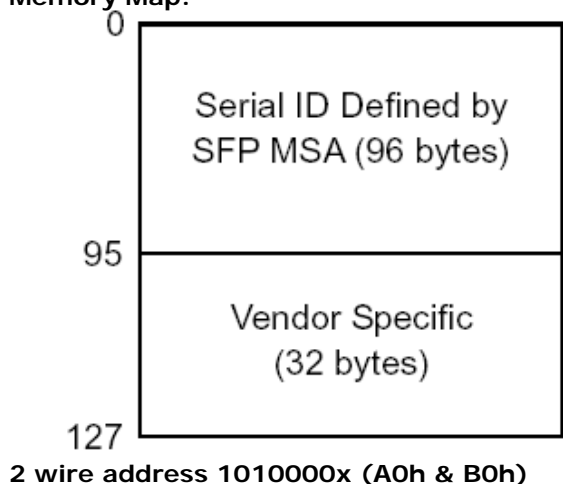
Note: The sensitivity specification refers to the input power levels for BER = 1E-12 against PRBS 2²³-1.

Serial Interface

The optical receiver contains an EEPROM. It provides access to sophisticated identification information that describes the transceiver’s capabilities, standard interfaces, manufacturer, and other information. The serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C01A/02/04 family of components. When the serial protocol is activated, the host generates the serial clock signal (SCL). The positive edge clocks data into those segments of the EEPROM that are not write protected within the receiver. The negative edge clocks data from the receiver. The serial data signal (SDA) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

The Module provides diagnostic information about the present operating conditions. The receiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, supply voltage monitoring and temperature monitoring all are implemented. The diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56 – 95 at wire serial bus address A2h and B2h. The digital diagnostic memory map specific data field define as following.

Memory Map:



2-wire address Aoh & B0h

Addr. (DEC)	Hex value	ASCII	Description	Addr. (DEC)	Hex value	ASCII	Description
0	82		Dual Receiver Video SFP	56	41		Vendor revision
1	04		SFP function is defined by serial ID only	57	31		
2	07		LC Connector	58	20		
3	41		SFP MSA does not specify SMPTE compliance codes	59	20		Wavelength
4	00			60	20		
5	00			61	20		
6	00			62	00		Reserved
7	00			63	XX		CC_BASE
8	00			64	00		Options
9	00			65	02		
10	00			66	00		BR, Maximum
11	03		NRZ	67	00		BR, Minimum
12	1E		BR in 100Mbps	68	XX		Vendor serial number
13	00		Reserved	69	XX		
14	02		Length(9u)*km	70	XX		
15	14		Length(9u)100m	71	XX		
16	00		Length(50u)10m	72	XX		
17	00		Length(62.5u)	73	XX		
18	00		Length(Copper)	74	XX		
19	00		Reserved	75	XX		
20	54	T	Vendor name: TRANSWAN	76	XX		
21	52	R		77	XX		
22	41	A		78	XX		
23	4E	N		79	XX		
24	53	S		80	XX		
25	57	W		81	XX		
26	41	A		82	XX		
27	4E	N		83	XX		
28	20			84	XX		
29	20			85	XX		
30	20		86	XX		Vendor date code	
31	20		87	XX			
32	20		88	XX			
33	20		89	XX			
34	20		90	XX			
35	20		91	XX			

36	00		Reserved	92	68		Diag. Monitoring type
37	00		Vendor OUI	93	90		Enhanced options
38	00			94	01		SFF-8472 compliance
39	00			95	XX		CC_EXT
40	32	2	Vendor part number	96-123			2RP13F6-11-SDI
41	52	R		123-127			A1
42	50	P		128-255			Reserved
43	31	1					
44	33	3					
45	46	F					
46	36	6					
47	2D	-					
48	31	1					
49	31	1					
50	2D	-					
51	53	S					
52	44	D					
53	49	I					
54	20						
55	20						

Note: "XX" denotes hex value which varies from module to module.

2-wire address A2h & B2h

Addr	Size	Name	Description
00-01	2	Temp High Alarm	MSB at low address, +70°C
02-03	2	Temp Low Alarm	MSB at low address, 0°C
04-05	2	Temp High Warning	MSB at low address, +65°C
06-07	2	Temp Low Warning	MSB at low address, +5°C
08-09	2	Voltage High Alarm	MSB at low address, 3.5V
10-11	2	Voltage Low Alarm	MSB at low address, 3.1V
12-13	2	Voltage High Warning	MSB at low address, 3.45V
14-15	2	Voltage Low Warning	MSB at low address, 3.15V
16-31	16	N/A	-
32-33	2	RX Power High Alarm	MSB at low address, 0dBm
34-35	2	RX Power Low Alarm	MSB at low address, -20dBm
36-37	2	RX Power High Warning	MSB at low address, -3dBm
38-39	2	RX Power Low Warning	MSB at low address, -18dBm
40-94	58	Reserved	Reserved for future monitored quantities
95	1	CC_EXT	

Addr	Bit	Name	Description
96	All	Temperature MSB	Internally measured module temperature.
97	All	Temperature LSB	
98	All	Vcc MSB	Internally measured supply voltage in transceiver.
99	All	Vcc LSB	
100-103	All	N/A	-
104	All	RX Power MSB	Measured RX input power.
105	All	RX Power LSB	
106	All	Reserved MSB	Reserved for 1st future definition of digitized analog input
107	All	Reserved LSB	Reserved for 1st future definition of digitized analog input
108	All	Reserved MSB	Reserved for 2nd future definition of digitized analog input
109	All	Reserved LSB	Reserved for 2nd future definition of digitized analog input
110	7	TX Disable State	Digital state of the TX Disable Input Pin. Not supported. Read/write bit that allows software disable of laser. Not supported.
110	6	Soft TX Disable	supported.
110	5	Reserved	
110	4	RX Rate Select State	Digital state of the SFP RX Rate Select Input Pin. Not supported.
110	3	Soft RX Rate Select	Read/write bit that allows software RX rate select. Not supported.
110	2	TX Fault	Digital state of the TX Fault Output Pin. Not supported.
110	1	LOS	Digital state of the LOS Output Pin.
110	0	Data Ready	Indicates transceiver has achieved power up and data is ready
111	7-0	Reserved	Reserved.

2RP13F6-11-SDI		Preliminary	Data sheet
112	7	Temp High Alarm	Set when internal temperature exceeds high alarm level.
112	6	Temp Low Alarm	Set when internal temperature is below low alarm level.
112	5	Vcc High Alarm	Set when internal supply voltage exceeds high alarm level.
112	4	Vcc Low Alarm	Set when internal supply voltage is below low alarm level.
112	3-0	N/A	-
113	7	RX Power High Alarm	Set when Received Power exceeds high alarm level.
113	6	RX Power Low Alarm	Set when Received Power is below low alarm level.
113	5	Reserved Alarm	
113	4	Reserved Alarm	
113	3	Reserved Alarm	
113	2	Reserved Alarm	
113	1	Reserved Alarm	
113	0	Reserved Alarm	
114	All	Reserved	
115	All	Reserved	
116	7	Temp High Warning	Set when internal temperature exceeds high warning level.
116	6	Temp Low Warning	Set when internal temperature is below low warning level.
116	5	Vcc High Warning	Set when internal supply voltage exceeds high warning level.
116	4	Vcc Low Warning	Set when internal supply voltage is below low warning level.
116	3-0	N/A	-
117	7	RX Power High Warning	Set when Received Power exceeds high warning level.
117	6	RX Power Low Warning	Set when Received Power is below low warning level.
117	5	Reserved Warning	
117	4	Reserved Warning	
117	3	Reserved Warning	
117	2	Reserved Warning	
117	1	Reserved Warning	
117	0	Reserved Warning	
118	All	Reserved	
119	All	Reserved	
120-127	8	Vendor Specific	00h.
128-255	128		Writable Memory

Typical application Circuit

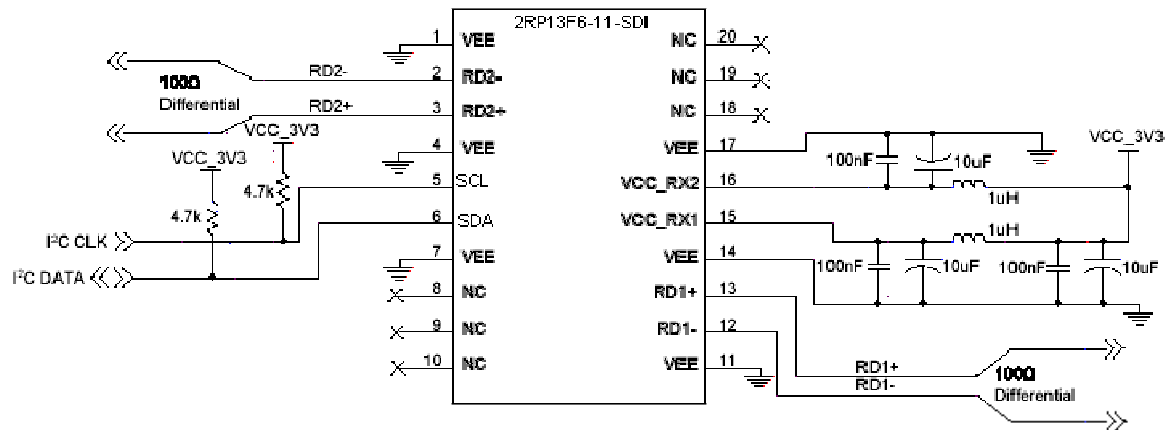
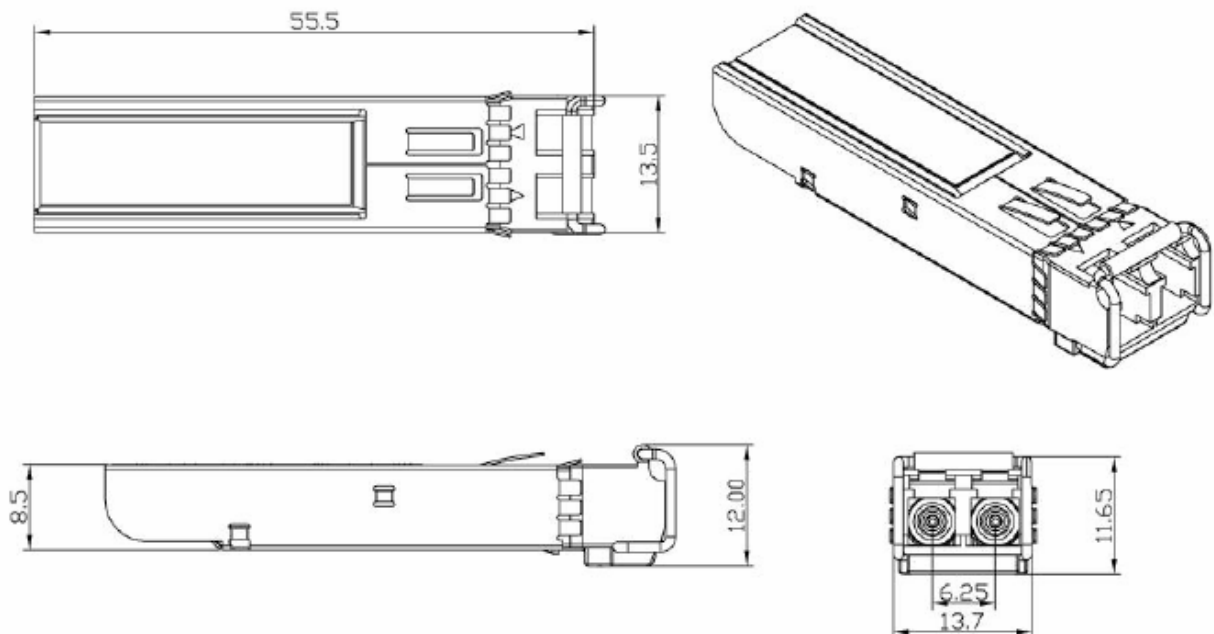


Figure 3: Typical application Circuit

Package information



Unit: mm

For More Information

Shenzhen Transwan Optoelectronic Technology co., Ltd

Add: 5F B Building, Zhi Xuan Han YuanLing Industrial Park, Shi Yan, Bao'an, Shenzhen, P.R.C

Tel: +86-755-29003393, 29003397 Fax: +86-755-29003396, 22630311

E-mail: sales@transwan.com.cn website: www.transwan.com.cn