SICHUAN HUIYUAN

Huiyuan POF Transceiver Technical Data

5MBd Red light transceiver HY-1521/HY-2521

10MBd Red light transceiver HY-1528/HY-2528

10MBd Green light transceiver HY-1428/HY-2428

（Version V6.0）

Sichuan Huiyuan Plastic Optical Fiber Co., Ltd

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CONTENTS

1 Scope

This manual specifies the requirements for the structure, performance, environmental suitability, quality assurance and inspection of the POF transceiver.

2 Product composition

The POF transceiver, including the transmitting device and the receiving device。

The transmitter consists of DATALINK LED chips。

The receiver includes a photodiode, a transimpedance amplifier, an output NPN, and a pull-up resistor，Circuit diagram shown in Figure 1：

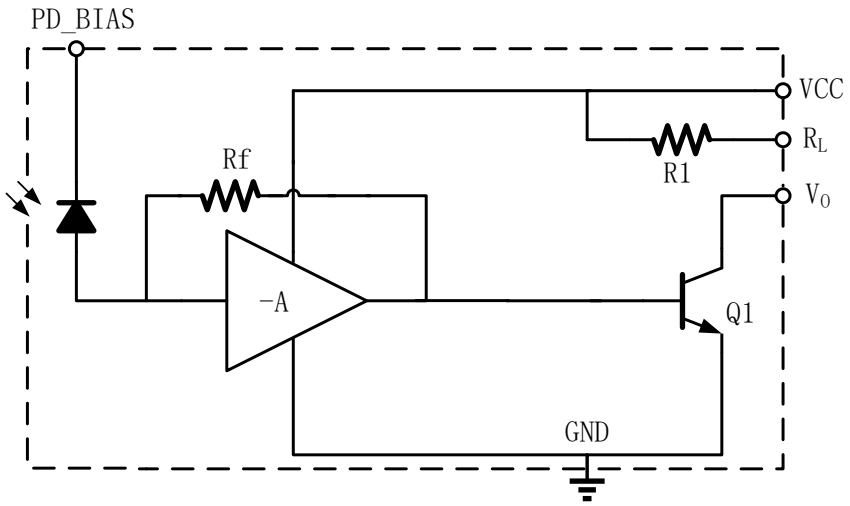

Figure 1 Schematic diagram of the receiver circuit

3 Product shape

3.1 Structure and interface

3.1.1 Dimensions

Huiyuan POF transmitter and receiver have the same size，Its dimensions are shown in Figure 2：

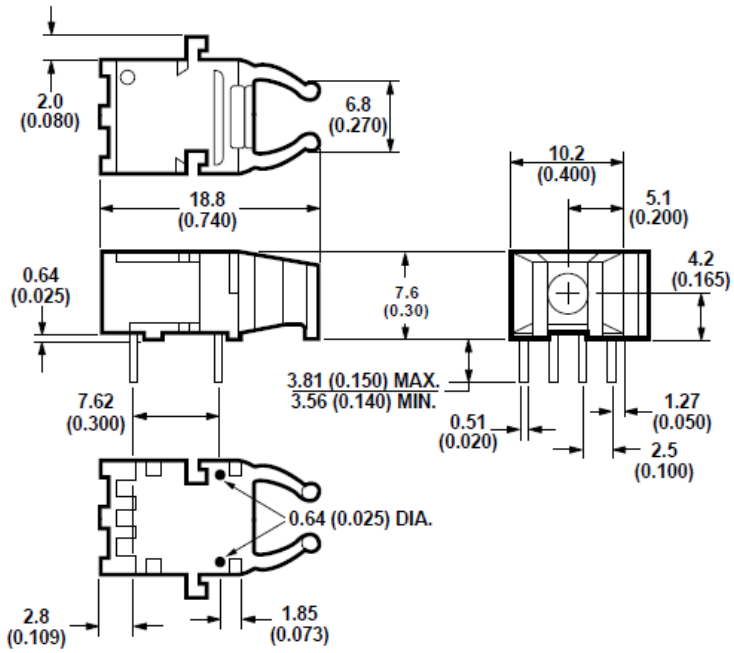

Figure 2 Dimension drawing

3. 1. 2 Interface definition

- Transmitter interface and pin definition as shown in Figure 3：

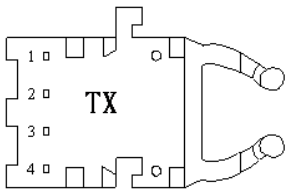

Figure 3 Transmitter interface and pin diagram

Table 1 Description of the transmitter interface

Serial number	**Pin name**	**Pin definition**
1	Anode	LED anode
2	Cathode	LED cathode
3	Open	open circuit
4	Open	open circuit

- Receiver device interface and pin definition shown in Figure 4：

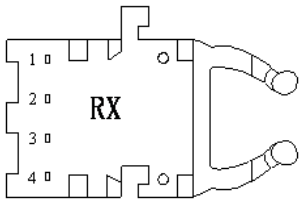

Figure 4 shows the device interface and pin diagram

Table 2 Description of the receiver interface

Serial number	**Pin name**	**Pin definition**
1	V_O	TTL output
2	Ground	Chip ground
3	V_{CC}	Chip power supply
4	R_L	Load side

3.1.3 Material requirements

The chip is made of semiconductor material, the chip package is made of transparent epoxy resin material, the device shell is made of RoHS-compliant flame-retardant plastic.

4 5MBd Red light transceiver products HY-1521 / HY-2521 technical parameters

4.1 HY-1521Transmitter Characteristics

Table 3 Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Reference
Storage Temperature	Ts	-40	+85	℃	
Operating Temperature	T_A	-40	+85	℃	
Forward DC input current	I_F		80	mA	
Reverse Input voltage	V_R		5	V	Ta=25℃
Lead Soldering Cycle			260/10	℃/s	

Table 4 Electrical/Optical Characteristics

Operating temperature range：-40°C to 85°C，Power supply voltage range：4.75V<V_{CC}<5.25V

Parameter	Symbol	Min.	Typ.	Max.	Units	Reference
Transmitter output optical power	P_T	-7.5	-6	-5	dBm	I_F=60mA，Remarks 1
Output optical power temperature coefficient	$\Delta P_T/\Delta T$		-0.02		%/℃	
Peak emission wavelength	λ_{PK}		650		nm	
Forward Voltage	V_F	1.85	2	2.4	V	I_F=60mA
Effective Diameter	D		1.1		mm	
Reverse Input Breakdown Voltage	V_{BR}	5.0	11.0		V	I_F= 10 uA，T_A = 25℃
Numerical Aperture	NA		0.5			

Remarks 1：Measured at the end of the fiber optic cable with large area detector.the length of the standard fiber is 0.5m.

4. 2 HY-2521 Receiver Characteristics

Table 3 Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Reference
Storage Temperature	Ts	-40	+85	℃	
Operating Temperature	T_A	-40	+85	℃	
Lead Soldering Cycle			260/10	℃/s	Remarks 1
Supply Voltage	V_{CC}	-0.5	6	V	Remarks 2
Output Collector Current	I_{OAV}		8	mA	
Output Collector Power Dissipation	P_{OD}		40	mW	
Output Voltage	V_O	0	6	V	
Pull-up Voltage	V_P	-5	V_{CC}	V	
Fan Out （TTL）	N		5		

Remarks 1： 1.6 mm below seating plane.

Remarks 2：When applying this receiver chip, a 0.1 μ F filter capacitor is required between the VCC and GND pins. The filter capacitor is as close as possible to the PIN pin of GND and Vcc.

Table 6 Electrical/Optical Characteristics

Temperature range：-40°C to 85°C，Power supply voltage range：4.75 V <V_{CC}<5.25 V

Parameter	Symbol	Min.	Typ.	Max.	Units	Reference
Peak wavelength	λ		650		nm	
Data rate	Sr	DC		5	MBd	BER≤10^{-9}，PRBS:2^7-1
Input optical power Level for Logic “0”	P_{RL}	-17.5		-2.5	dBm	V_{OL}=0.5V，I_{OL}=8mA，remarks 1
Input optical power Level for Logic “1”	P_{RH}			-20	dBm	V_{OL}=5V，I_{OH}≤250μA
High level output current	I_{OH}		5	250	μA	V_O=5V，P_R=0，R_L open
Low level output current	V_{OL}		0.4	0.5	V	I_{OL}=8mA，P_R=P_{RLMIN}，R_L open
High level supply current	I_{CCH}		4.2	5	mA	V_{CC}=5V，P_R=0，R_L open
Low level supply current	I_{CCL}		4.4	5	mA	V_{CC}=5V，P_R=-11.5 dBm，R_L open
Internal pull-up resistor	R_L	800	1000	1200	Ω	
Effective diameter	D		1.0		mm	
Numerical Aperture	NA		0.5			

Remarks 1：The dynamic range here is measured based on the duty cycle of the received waveform (50 ± 17%).

4.3 HY-1521/HY-2521 System Link Performance

Table 7 System Performance

Temperature range：-40°C to 85°C

Parameter	Symbol	Min.	Typ.	Max.	Units	Reference
Data rate	Sr	DC		5	MBd	BER≤10^{-9}，PRBS:2^7-1
Link Distance	L		20	40	m	I_{Fdc}=60mA，Refer to Figure 5，Fiber selection 650 attenuation 0.2dB / m,remarks 1
Propagation Delay(low to high)	t_{PLH}		68		ns	The fiber length is 0.5 m,P_R= -11dBm
Propagation Delay(high to low)	t_{PHL}		46		ns	
Pulse width Distortion t_{PLH}-t_{PHL}	Δt_w		22		ns	P_R= -11dBm

Remarks 1：The link distance here is measured based on the duty cycle of the received waveform (50 ± 17%).

5 10MBd Red device products HY-1528/HY-2528 technical parameters

5.1 HY-1528 Transmitter Characteristics

Table 8 Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Reference
Storage Temperature	Ts	-40	+85	℃	
Operating Temperature	T_A	-40	+85	℃	
Forward DC input current	I_F		80	mA	
Reverse Input voltage	V_R		5	V	Ta=25℃
Lead Soldering Cycle			260/10	℃/s	

Table 9 Electrical/Optical Characteristics

Operating temperature range：-40°C to 85°C，Power supply voltage range：4.75V<V_{CC}<5.25V

Parameter	Symbol	Min.	Typ.	Max.	Units	Reference
Transmitter output optical power	P_T	-5 .0	-3	-1	dBm	I_F=60mA，remarks 2
Output optical power temperature coefficient	$\Delta P_T/\Delta T$		-0.02		%/℃	
Peak emission wavelength	λ_{PK}		650		nm	
Forward Voltage	V_F	1.8	2	2.4	V	I_F=60mA
Effective Diameter	D		1.1		mm	
Reverse Input Breakdown Voltage	V_{BR}	5.0	11		V	I_F= 10 uA，T_A = 25℃
Numerical Aperture	NA		0.5			

Remarks 1：With a large area of the detector after 0.5m standard fiber after the measurement.

5.2 HY-2528 Receiver Characteristics

Table 10 Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Reference
Storage Temperature	Ts	-40	+85	℃	
Operating Temperature	T_A	-40	+85	℃	
Lead Soldering Cycle			260/10	℃/s	Remarks 1
Supply Voltage	V_{CC}	-0.5	6	V	Remarks 2
Output Collector Current	I_{OAV}		8	mA	
Output Collector Power Dissipation	P_{OD}		40	mW	
Output Voltage	V_O	0	6	V	
Pull-up Voltage	V_P	-5	V_{CC}	V	
Fan Out （TTL）	N		5		

Remarks 1： 1.6 mm below seating plane.

Remarks 2：When applying this receiver chip, a 0.1 μF filter capacitor is required between the VCC and GND pins. The filter capacitor is as close as possible to the PIN pin of GND and Vcc.

Table 11 Electrical/Optical Characteristics

Temperature range：-40°C to 85°C，Power supply voltage range：4.75 V <V_{CC}<5.25 V

Parameter	Symbol	Min.	Typ.	Max.	Units	Reference
Peak wavelength	λ		650		nm	
Data rate	Sr	DC		10	MBd	BER≤10^{-9}，PRBS:2^7-1
Input optical power Level for Logic “0”	P_{RL}	-26		-1	dBm	V_{OL}=0.5V，I_{OL}=8mA，remarks 1
Input optical power Level for Logic “1”	P_{RH}			-33	dBm	V_{OL}=5V，I_{OH}≤250μA
High level output current	I_{OH}		5	250	μA	V_O=5V，P_R=0，R_L open
Low level output current	V_{OL}	-0.5	0.4	0.5	V	I_{OL}=8mA，P_R=P_{RLMIN}，R_L open
High level supply current	I_{CCH}		4.2	5	mA	V_{CC}=5V，P_R=0，R_L open
Low level supply current	I_{CCL}		4.4	5	mA	V_{CC}=5V，P_R=-11.5 dBm，$R_L$open
Internal pull-up resistor	R_L	700	1000	1500	Ω	
Effective diameter	D		1.0		mm	
Numerical Aperture	NA		0.5			

Remarks 1：The dynamic range here is measured based on the duty cycle of the received waveform (50 ± 17%).

5. 3 HY-1528/HY-2528 System Link Performance

Table 12 System Characteristics

Temperature range：-40°C to 85°C

Parameter	Symbol	Min.	Typ.	Max.	Units	Reference
Data rate	Sr	DC		10	MBd	BER≤10^{-9}，PRBS:2^7-1
Link Distance	L		80	100	m	I_{Fdc}=60mA，Refer to Figure 5，Fiber selection 650 attenuation 0.2dB/m,remarks 1
Propagation Delay(low to high)	t_{PLH}		50		ns	The fiber length is 0.5 m P_R= -15dBm
Propagation Delay(high to low)	t_{PHL}		40		ns	
Pulse width Distortion t_{PLH}-t_{PHL}	Δt_w		10		ns	P_R= -15dBm

Remarks 1：The link distance here is measured based on the duty cycle of the received waveform (50 ± 17%).

6 10MBd Green device products HY-1428/HY-2428 technical parameters

6. 1 HY-1428 Transmitter Characteristics

Table 13 Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Reference
Storage Temperature	Ts	-40	+85	℃	
Operating Temperature	T_A	-40	+85	℃	
Forward DC input current	I_F		80	mA	
Reverse Input voltage	V_R		5	V	Ta=25℃
Lead Soldering Cycle			260/10	℃/s	

Table 14 Electrical/Optical Performance

Operating temperature range：-40°C to 85°C，Power supply voltage range：4.75V<V_{CC}<5.25V

Parameter	Symbol	Min.	Typ.	Max.	Units	Reference
Transmitter output optical power	P_T	-3	-1	-0.5	dBm	I_F=60mA，remarks 1
Output optical power temperature coefficient	$\Delta P_T/\Delta T$		-0.1		%/℃	
Peak emission wavelength	λ_{PK}		520		nm	
Forward Voltage	V_F	3.2	3.4	3.8	V	I_F=60mA
Effective Diameter	D		1.1		mm	
Reverse Input Breakdown Voltage	V_{BR}	5.0	11		V	I_F= 10 uA，T_A = 25℃
Numerical Aperture	NA		0.5			

Remarks 1：With a large area of the detector after 0.5m standard fiber after the measurement.

6. 2 HY-2428 Receiver Characteristics

Table 15 Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Reference
Storage Temperature	Ts	-40	+85	℃	
Operating Temperature	T_A	-40	+85	℃	
Lead Soldering Cycle			260/10	℃/s	Remarks 1
Supply Voltage	V_{CC}	-0.5	6	V	Remarks 2
Output Collector Current	I_{OAV}		8	mA	
Output Collector Power Dissipation	P_{OD}		40	mW	
Output Voltage	V_O	0	6	V	
Pull-up Voltage	V_P	-5	V_{CC}	V	
Fan Out （TTL）	N		5		

Remarks 1： 1.6 mm below seating plane.

Remarks 2：When applying this receiver chip, a 0.1 μF filter capacitor is required between the VCC and GND pins. The filter capacitor is as close as possible to the PIN pin of GND and Vcc.

Table 16 Electrical/Optical Characteristics

Temperature range：-40°C to 85°C，Power supply voltage range：4.75 V <V_{CC}<5.25 V

Parameter	Symbol	Min.	Typical value	Max.	Units	Reference
Peak wavelength	λ		520		nm	
Data rate	Sr			10	MBd	BER≤10^{-9}， PRBS:2^7-1
Input optical power Level for Logic “0”	P_{RL}	-26		0	dBm	V_{OL}=0.5V，I_{OL}=8mA，remarks 1
Input optical power Level for Logic “1”	P_{RH}			-33	dBm	V_{OL}=5V， I_{OH}≤250μA
High level output current	I_{OH}		5	250	μA	V_O=5V， P_R=0， R_L open
Low level output current	V_{OL}	-0.5	0.4	0.5	V	I_{OL}=8mA，P_R=P_{RLMIN}，R_L open
High level supply current	I_{CCH}		4.2	5	mA	V_{CC}=5V， P_R=0， R_L open
Low level supply current	I_{CCL}		4.4	5	mA	V_{CC}=5V， P_R=-11.5 dBm， R_L open
Internal pull-up resistor	R_L	700	1000	1500	Ω	
Effective diameter	D		1.0		mm	
Numerical Aperture	NA		0.5			

Remarks 1：The link distance here is measured based on the duty cycle of the received waveform (50 ± 17%).

6. 3 HY-1428/HY-2428 System Link Performance

Table 17 System Characteristics

Temperature range：-40°C to 85°C

Parameter	Symbol	Min.	Typical value	Max.	Units	Reference
Data rate	Sr	DC		10	MBd	BER≤10^{-9}，PRBS:2^7-1
Link Distance	L		200	240	m	IFdc=60mA，Refer to Figure 5 ， Fiber selection 520 attenuation0.1dB/ m,remarks 1
Propagation Delay(low to high)	t_{PLH}		66		ns	The fiber length is 0.5 m P_R= -11dBm
Propagation Delay(high to low)	t_{PHL}		46		ns	
Pulse width Distortion t_{PLH}-t_{PHL}	Δt_w		20		ns	P_R= -11dBm

Remarks 1：The link distance here is measured based on the duty cycle of the received waveform (50 ± 17%).

7 Typical application of optical transceiver devices

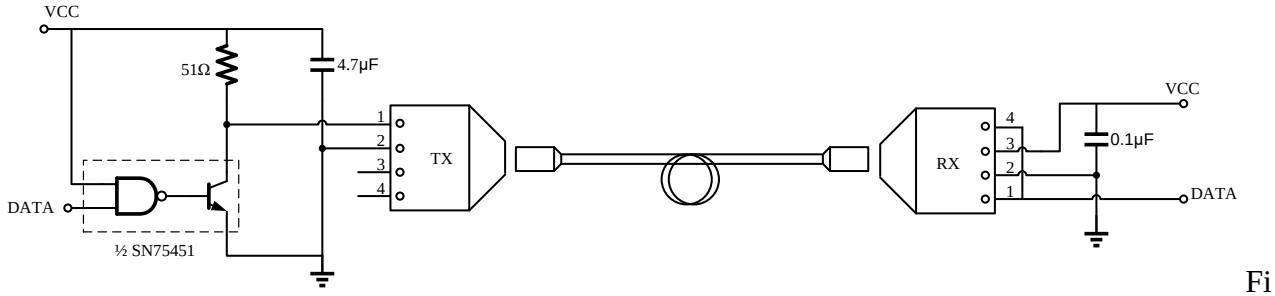

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Figure 5 system application circuit diagram

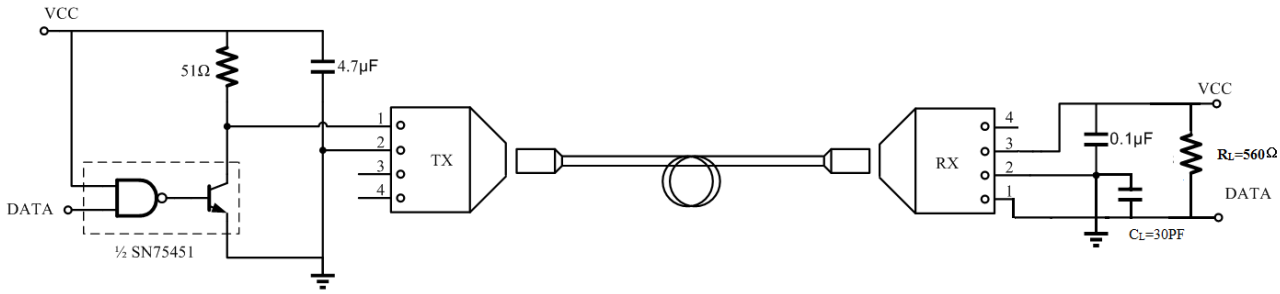

Figure6 . 5MBd propagation delay test circuit

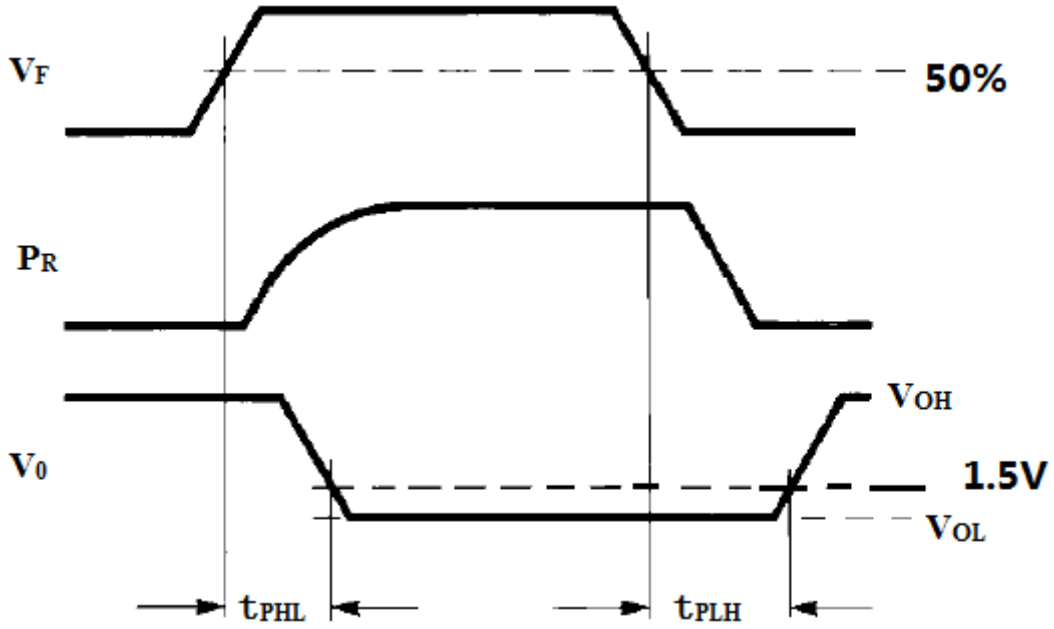

Figure7 Propagation delay test waveforms

8 Other

Product full range of no self-excited, and when the power ripple within 100mV performance to meet the requirements of parameters.

9 Storage

The product shall be packed in the corresponding packaging container provided by the purchaser. The packaging container should be stored in a drying oven or drying tower with a relative humidity of not more than 30% and maintained at a temperature range of 10 ℃ ~ 30 ℃. The chip satisfying the above conditions is valid Storage period is more than 4 years.