FSAN ONU/ONT Optical Transceiver
-G983.1/3 Option.1 (OC3) ClassB-

OAT1521S-ONU-V4-B-10

Data Sheet

Modification History

Rev.	Date	Author / Project Manager	Comment
Rev.1	Jun.5, 2002	*H. Okada / K. Yusa*	

1. General Description

The OAT1521S-ONU-V4-B-10 optical transceiver is compliant with recommendation of ITU-T G.983.1 / 983.3 option1 class B for use in ATM-PON application. It is applicable for the optical interface of the ONU /ONT which is located on the subscriber side. These modules have the following functions.

-1-fiber bi-directional transmission by incorporated wavelength division multiplexer (WDM).
-Conversion of 156Mbit/s electric signal to 1.3um optical signal by laser diode (E/O conversion).
-Stabilization of optical output power and waveform with laser diode driving current temperature compensation circuit.
-Transmit failure (TF) detection.
-Optical signal output shut down (LS).
-Conversion of 156Mbit/s 1.55um optical signal to electric signal by PIN-photo diode (O/E conversion).
- w/ CDR function
-Incoming signal lost detection (LOS).

The specifications are shown on the table 1.1

Table1.1 Specifications

Parameter	Unit	OAT1521S-ONU-V4-B-10
Bit rate	Mbps	Up-stream:155.52 Down-stream:155.52
Transmission mode	–	Tx: burst Rx: continuous
Transfer code	–	NRZ
Bi-directional transmission	–	1-fibre WDM
Transmission distance	km	20
Laser diode	–	1.31nm FP-LD
photo detector	–	PIN-PD
Operating temperature range	°C	-40 to 85
Operating humidity	%	5 to 90
Fiber/Connector type	–	Single mode fiber (10/125um) / PC polished SC connector
Power supply voltage	V	+3.3 +/- 5%
Power consumption	W	1.1 (typ.) ,1.5(max)
Dimension	mm	40 x 60 x 9.5

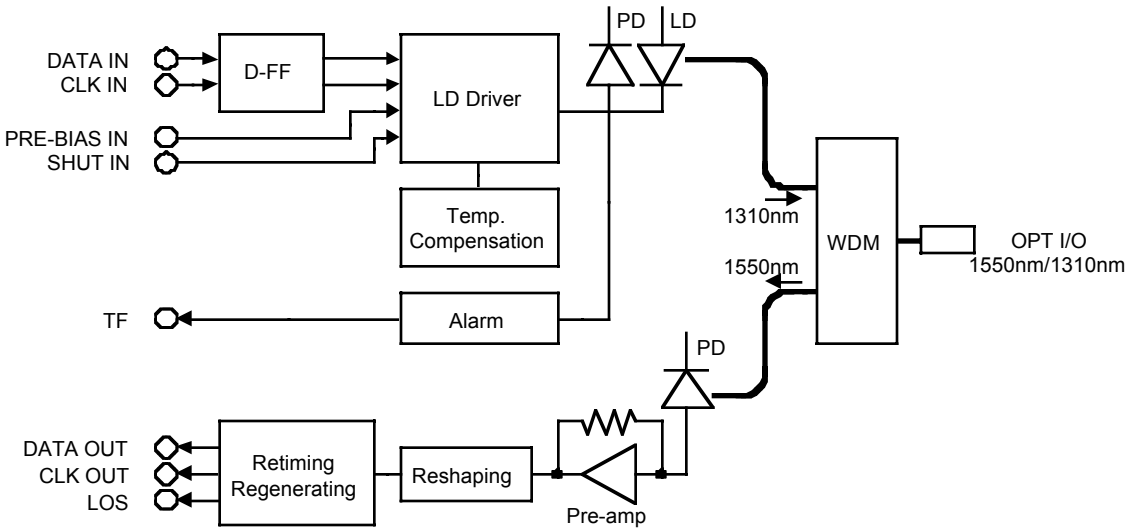
2. Absolute Maximum Ratings

Stress in excess of the maximum absolute ratings can cause permanent damage to the module.

Table2.1 Absolute maximum ratings

Parameter	Symbol	Conditions	Ratings	Unit
Power supply voltage	Vcc	Ta = 25°C	0 to +4.6	V
Input voltage	Vi		0 to Vcc	V
Maximum output current	Io		30	mA
Operating temperature	Top		ONU:-40 to +85	°C
Storage temperature	Tstg		-40 to +85	°C
Soldering temperature/time		Ta = 25°C	250/10	°C/sec
Maximum tension of fiber			500	g
Minimum bending radius			30	mm
Maximum optical input power			0	dBm

3.Block diagram



Figuer3.1 Block diagram (OAT1521S-ONU-V4-B-10)

4.Package outline

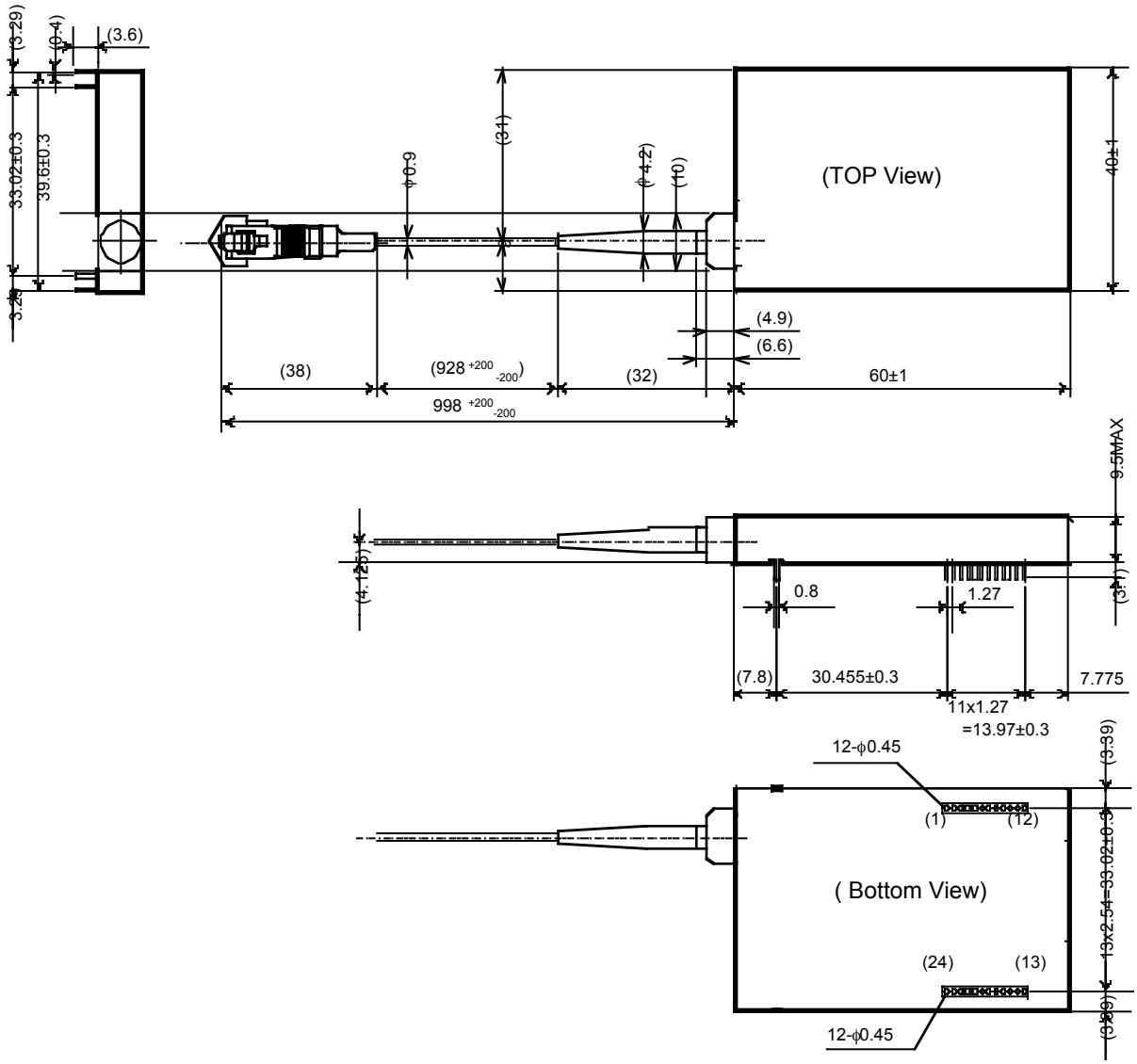


Figure4.2 (OA1521S-ONU-V4-B-10)

5. Pin description

Table 5.1 Pin descriptions (OAT1521S-ONU-V4-B-10)

No.	I/O	Symbol	Level	Logic	Functionality
01		SVCC			Transmitter power supply (+3.3V)
02		GND			Ground
03	I	SHUT	LVTTL	P	Optical output shut down
04	O	TF	LVTTL	P	Transmitter Failure alarm
05		GND			Ground
06	I	BIASP	LVPECL	P	Pre-bias input(pos)
07	I	BIASN	LVPECL		Pre-bias input(neg)
08		GND			Ground
09	I	SDATAP	LVPECL	P	Data input(pos)
10	I	SDATAN	LVPECL		Data input(neg)
11	I	SCLKP	LVPECL	P	Clock input(pos)
12	I	SCLKN	LVPECL		Clock input(neg)
13		GND			Ground
14	O	LOS	LVTTL	P	Loss of incoming signal alarm
15		GND			Ground
16	O	RDATAN	LVPECL	P	Data output (neg)
17	O	RDATAP	LVPECL		Data output (pos)
18		GND			Ground
19	O	RCLKN	LVPECL	P	Clock output (neg)
20	O	RCLKP	LVPECL		Clock output (pos)
21		GND			Ground
22		GND			Ground
23		RVCC1			Receiver power supply (+3.3V)
24		RVCC2			Receiver power supply (+3.3V)

6.Optical and electrical characteristics

Table6.1 Optical characteristics

Parameter	Unit	OAT1521S-ONU-V4-B-10
Operating wavelength	nm	Tx: 1260 ~ 1360 Rx: 1480 ~ 1580
Mask of the transmitter eye diagram		Figure6.1
Maximum reflectance of equipment, measured at transmitter wavelength	dB	less than -6
Mean launched power range	dBm	SOL: -3.5 to +2.0/EOL: -4.0 to +2.0
Minimum extinction ratio	dB	10
Tolerance to the transmitter incident light power	dB	more than -15
Launched optical power w/o input to the transmitter	dBm	less than –43
Maximum spectral width	nm	5.8 (@rms)
Side mode suppression ratio	dB	-
Jitter transfer		0.1 (fc=130kHz) Figure6.2
Jitter generation in 1.3kHz bandwidth	UIpp	0.2
Maximum reflectance of equipment, measured at receiver wavelength	dB	less than -20
Bit error ratio	–	less than 10^{-10}
Minimum sensitivity	dBm	SOL: -30.5 /EOL: -30.0
Minimum overload	dBm	SOL: -7.5/EOL: -8.0
Consecutive identical digit immunity	–	more than 72
Jitter tolerance	–	Figure6.3
Tolerance to the reflected optical power	dB	More than -10

Table6.2 Electrical characteristics

Parameter	Unit	OAT1521S-ONU-V4-B-10		
		MIN	TYP	MAX
PECL input high voltage	V	VCC-1.17		VCC-0.88
PECL input low voltage		VCC-1.81		VCC-1.47
PECL output high voltage		VCC-1.02		VCC-0.88
PECL output low voltage		VCC-1.81		VCC-1.62
LVTTL input high voltage		2.0		Vcc+0.3
LVTTL input low voltage		-0.3		0.8
LVTTL output high voltage		2.4		Vcc
LVTTL output low voltage		0		0.4
Clock input duty	%	40	50	60
Data output rise/fall time (20 - 80 %)	ns			1.2
Clock/Data input setup & hold time		Figure6.4		
Clock/Data output timing		Figure6.5		
Data/Prebias Input Timing		Figure6.6		

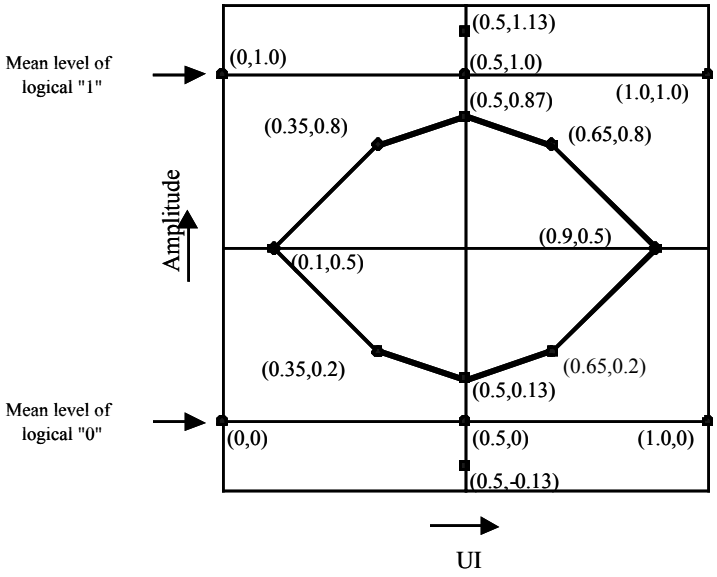


Figure6.1 Eye pattern mask

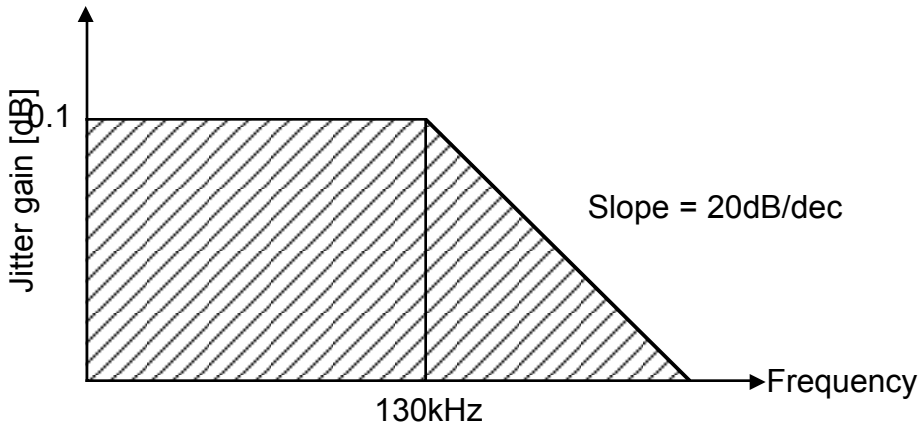


Figure6.2 Jitter transfer

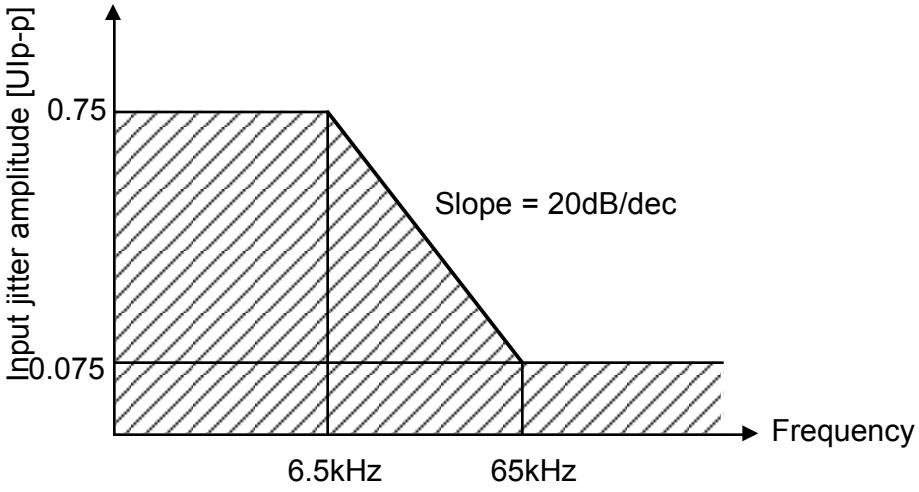
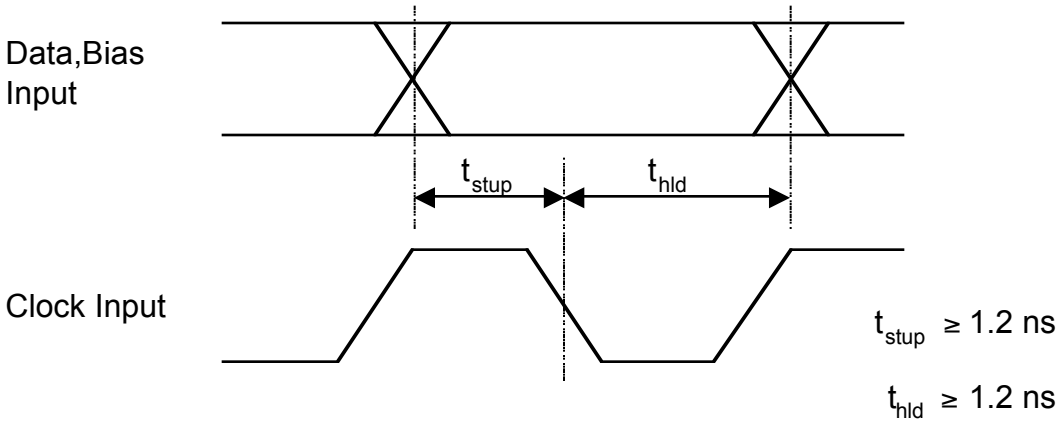
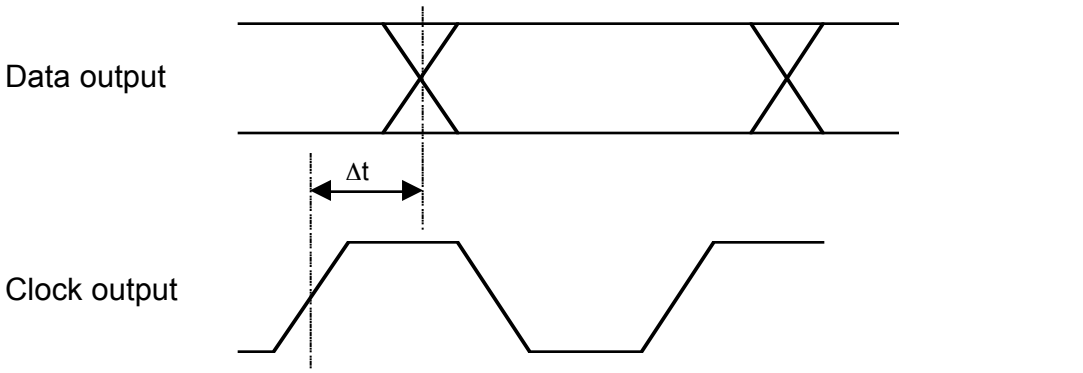


Figure6.3 Jitter tolerance



This timing is based on the data cross point

Figure6.4 Clock/Data, Bias input setup & hold time



OAT1521S-ONU-V4-B-10 : 0.8ns ≤ Δt ≤ 1.8ns

This timing is based on the data cross point.

Figure6.5 Clock/Data output timing

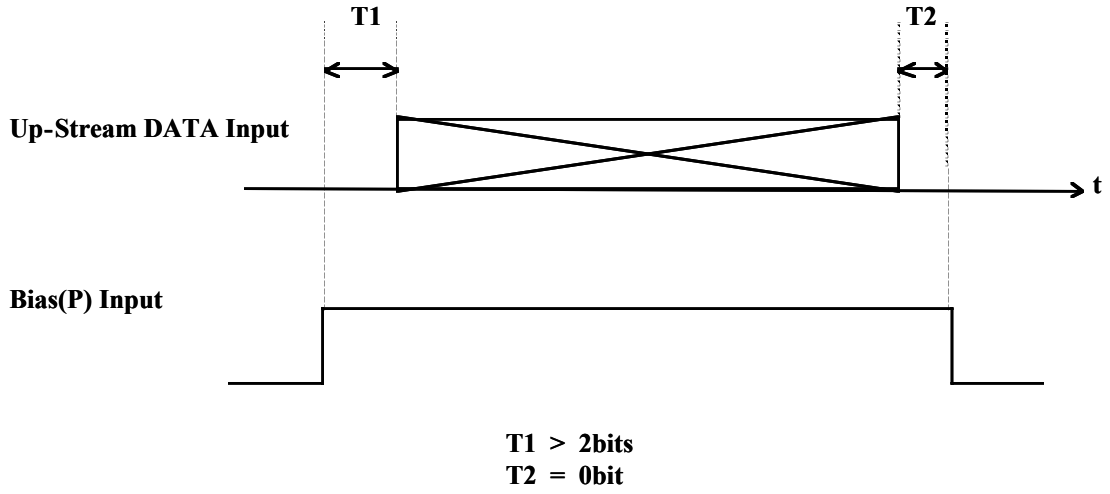


Figure6.6 Up-stream Data/Bias signal input timing

7. Recommended interface circuit

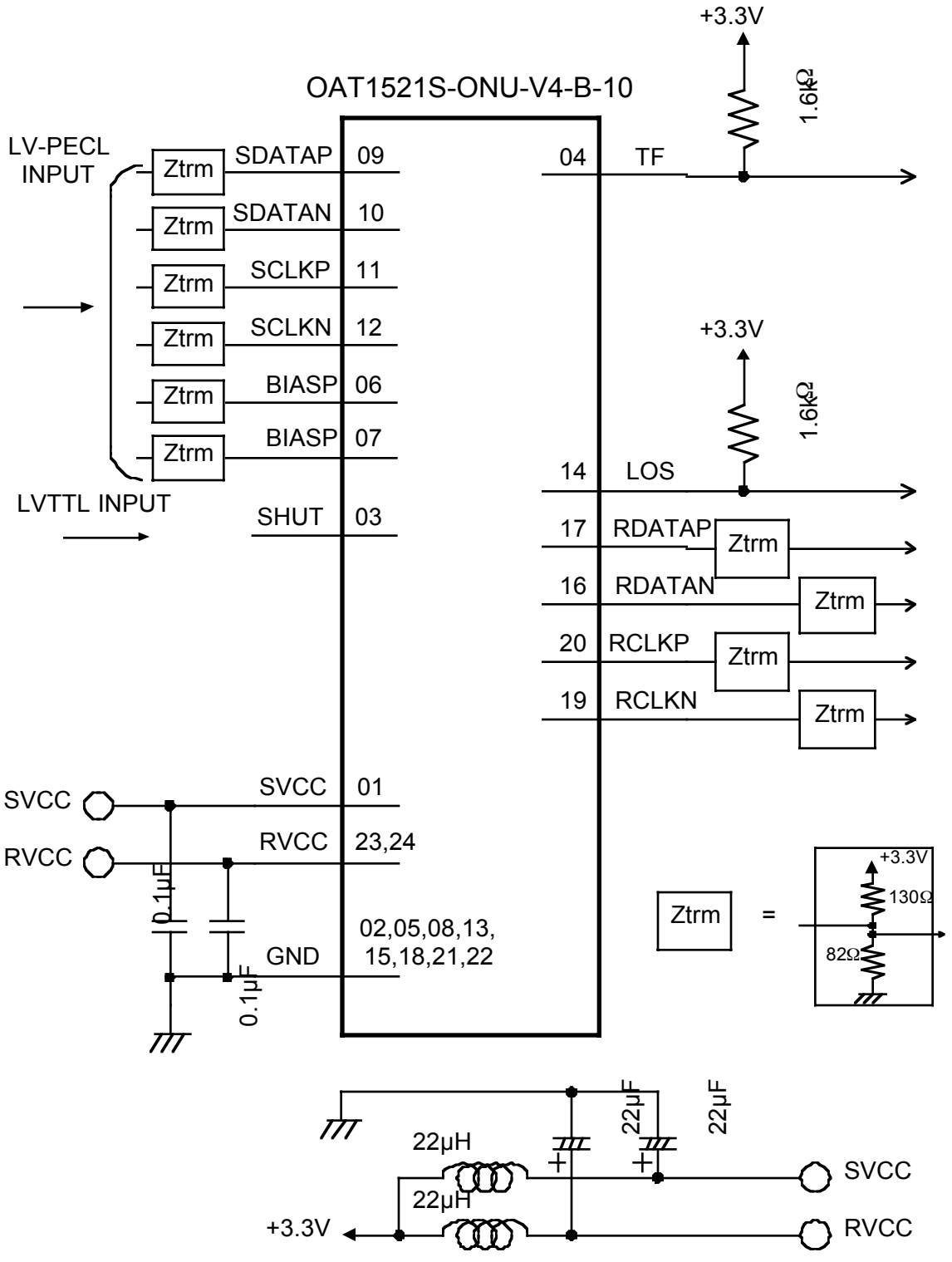


Figure7.1 Recommended interface circuit

8. Precautions for handling

The circuits of these modules operate at very small signal. In order to avoid the degradation of the optical sensitivity due to external noise, the bottom pattern of these modules on the PCB should be ground pattern with low impedance.
Do not mount/pattern device/circuits which generate high frequency noise close to the module.

In order to operate the module stable against the power noise, install the power supply noise reduction circuits.
The impedance between the power and ground pattern of the power circuit should be as low as possible. The elements around the module should be mounted close to the pins of the module.

If an optical power exceeding the absolute maximum ratings is fed to the module, the optical receiver may be damaged. Set the optical input power appropriately when in use of these modules.

9. Qualification and Reliability

To help ensure high product reliability and customer satisfaction, OKI is committed to an intensive quality program that starts in the design phase and proceeds through the manufacturing process.
Optical transceiver modules are qualified to OKI internal standards using MIL-STD-883 test methods and procedures and using sample techniques consistent with Telcordia requirements.
This qualification program fully meets the intent of Telcordia reliability practices GR-468-CORE.

10. Laser Safety

All version of transceiver are Class 1 Laser products FDA complies with 21 CFR 1040.10 and 1040.11 requirements.
Also, all versions are Class 1 Laser products pre IEC 825-1**.**