P/N: B-15/13-622-TPM(3)-Sxx4x-60-G5

622 Mbps Bi-directional Single Fiber Transceiver

Features

- Coaxial single mode single fiber package with optional SC/FC/ST connector
- Wavelength Tx 1550 nm/Rx 1310 nm
- SONET OC-12 SDH STM-4 Compliant
- Single +5V/+3.3V Power Supply
- PECL/LVPECL Differential Inputs and Outputs
- Wave Solderable and Aqueous Washable
- Class 1 Laser Int. Safety Standard IEC 825 Compliant
- Uncooled Laser diode with MQW structure
- Complies with Telcordia (Bellcore) GR-468-CORE
- Optical Isolation > 30 dB
- Cross talk < -33 dB
- Optical Return Loss >14 dB
- RoHS compliance available

Table 1 – Absolute Maximum Rating

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Power Supply Voltage	Vcc	0	-	6	V	
Power Supply Voltage	Vcc	0	-	3.6	V	
Output Current	I_{out}	-	-	30	mA	
Soldering Temperature	-	-	-	260	ºC	1
Storage Temperature	T_{stg}	-40	-	85	ºC	

Note 1: 10 senconds on leads only

Table 2 – Recommended Operating Condition

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Power Supply Voltage	Vcc	4.75	5	5.25	V	
Power Supply Voltage	Vcc	3.1	3.3	3.5	V	
Operating Temperature (Case)	T_{opr}	0	-	70	ºC	
Operating Temperature (Case)	T_{opr}	-40	-	85	ºC	
Data Rate	DR	-	622	-	Mbps	

Table 3 – Transmitter Specifications (Optical)

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Optical Transmit Power	P_o	-3	-	+2	dBm	2
Output Center Wavelength	λ_c	1500	1550	1600	nm	
Output Spectrum Width	$\Delta\lambda$	-	-	2.5	nm	
Optical Rise/Fall Time	t_r/t_f	-	-	1.2	ns	3
Extinction Ratio	ER	8.2	-	-	dB	
Output Eye	Compliant with ITU-T recommendation G.957/STM-1					
Optical Isolation	-	30	-	-	dB	4
Optical Return Loss	-	14	-	-	dB	
Relative Intensity Noise	RIN	-	-	-120	dB/Hz	
Total Jitter	T_J	-	-	0.55	ns	5

Note 2: Output power is coupled into a 9/125 μm single mode fiber

Note 3: 10% to 90% Values

Note 4: Tx: 1310 nm/ Rx: 1550 nm

Note 5: Measured with 2^{23}-1 PRBS with 72 ones and 72 zeros.

Table 4 – Transmitter Specifications (Electrical)

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Power Supply Current	I_{CC}	-	-	180	mA	6
Data Input Current-Low	I_{IL}	-350	-	-	μA	
Data Input Current-High	I_{IH}	-	-	350	μA	
Differential Input Voltage	V_{IH}-V_{IL}	300	-	-	mV	
Data Input Voltage-Low	V_{IL}-V_{CC}	-2.0	-	-1.58	mV	
Data Input Voltage-High	V_{IH}-V_{CC}	-1.1	-	-0.74	mV	7

Note 6: Maximum current is specified at Vcc=Maximum @ maximum temperature

Note 7: These inputs are compatible with 10K, 10KH and 100K ECL and PECL inputs

Table 5 – Receiver Specifications (Optical)

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Sensitivity	-	-	-	-28	dBm	8
Maximum Input Power	P_{in}	-3	-	-	dBm	
Signal Detect-Asserted	Pa	-	-	-28	dBm	9
Signal Detect-Deasserted	Pd	-40	-	-	dBm	10
Signal Detect-Hysteresis	-	-	3.0	-	dB	
Cross Talk	-	-	-	-33	dB	
Wavelength of Operation		1290	-	1330	nm	

Note 8: Measured with 2^{23}-1 PRBS with 72 ones and 72 zeros, (ITU-T recommendation G.958)

Note 9: Measured on transition: low to high,

Note 10: Measured on transition: high to low.

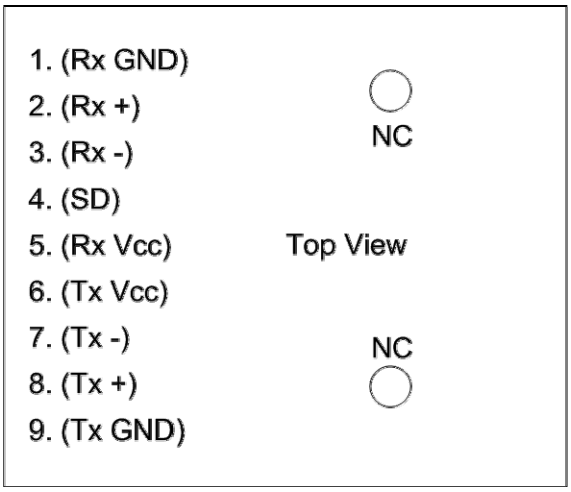
Table 6 – Receiver Specifications (Electrical)

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Power Supply Current	I_{CC}	-	-	100	mA	11
Data Output Voltage-Low	V_{OL}-V_{CC}	-1.9	-	-1.6	V	12
Data Output Voltage-High	V_{OH}-V_{CC}	-1.1	-	-0.8	V	
Signal Detect Output Voltage-Low	V_{SDL}-V_{CC}	-1.9	-	-1.6	V	
Signal Detect Output Voltage-High	V_{SDH}-V_{CC}	-1.1	-	-0.8	V	

Note 11: The current excludes the output load current

Note 12: These outputs are compatible with 10K, 10KH and 100KECL and LVPECL outputs.

Connection Diagram

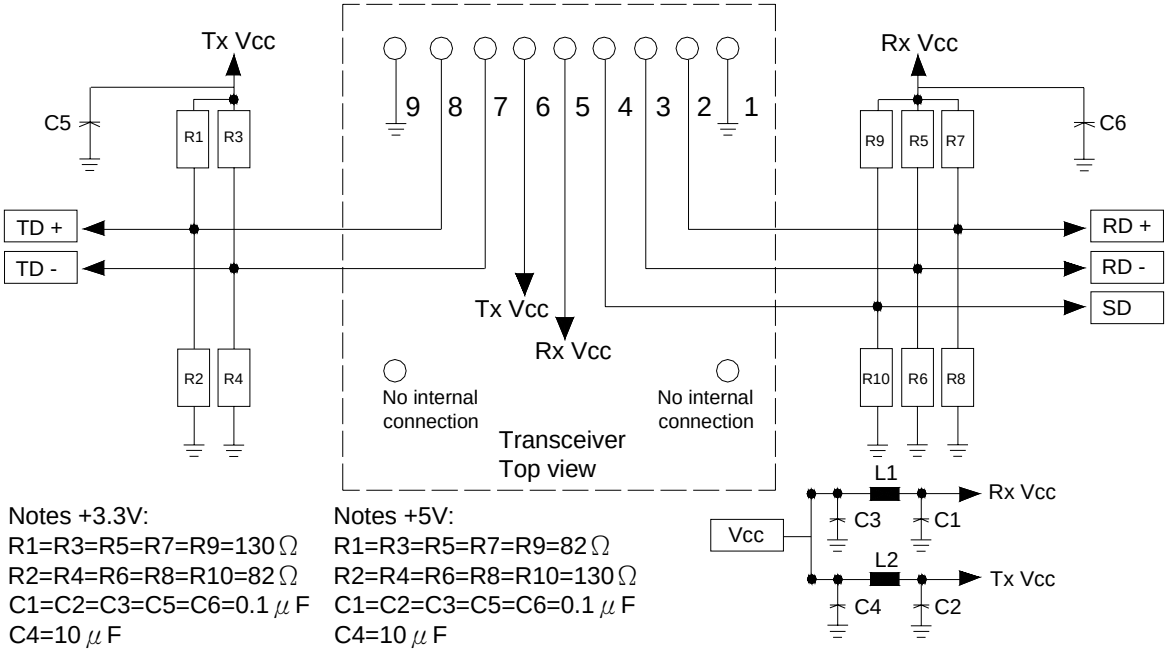


Receiver Signal Ground
Receiver Data Out
Receiver Data Out Bar
Signal Detect
Receiver Power Supply
Transmitter Power Supply
Transmitter Data In Bar
Transmitter Data in
Transmitter Signal Ground

Table 7 – Pin Definitions

Pin	Unit	Notes
1	RxGND	Directly connect this pin to the receiver ground plane
2	RD+	See recommended circuit schematic
3	RD-	See recommended circuit schematic
4	SD	Active high on this indicates a received optical signal
5	RxVcc	DC power for the receiver section
6	TxVcc	DC power for the transmitter section
7	TD-	See recommended circuit schematic
8	TD+	See recommended circuit schematic
9	TxGND	Directly connect this pin to the transmitter ground plane

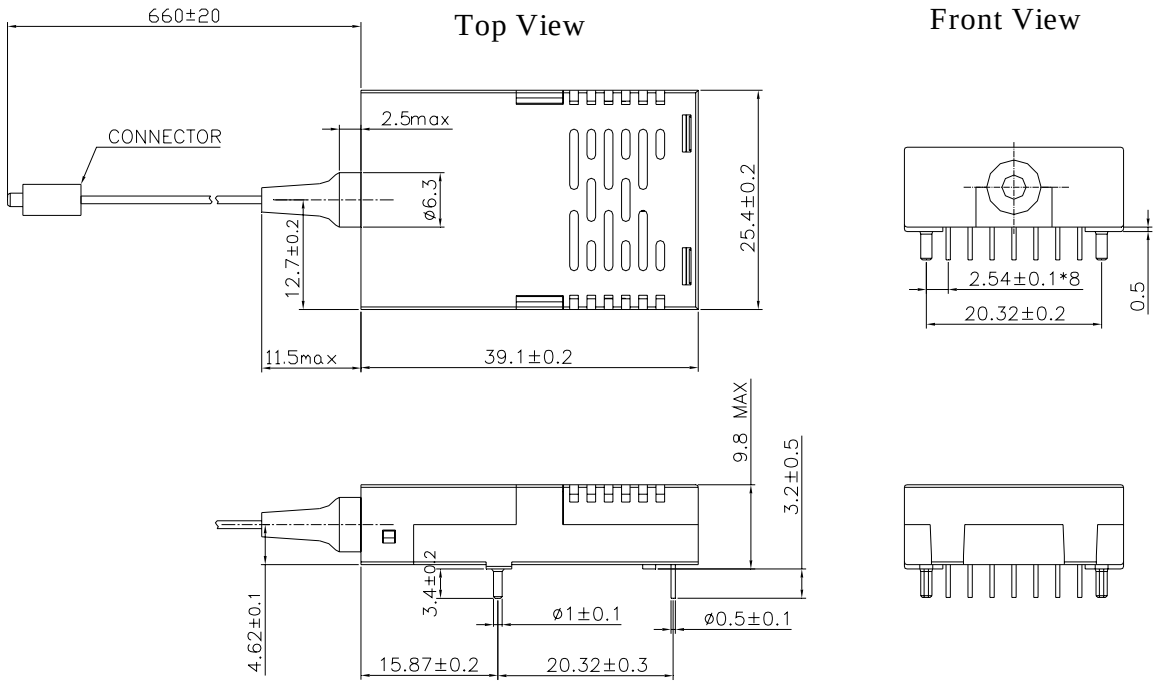
Recommended Circuit Schematic



Notes +3.3V:
R1=R3=R5=R7=R9=130Ω
R2=R4=R6=R8=R10=82Ω
C1=C2=C3=C5=C6=0.1μF
C4=10μF
L1=L2=1μH

Notes +5V:
R1=R3=R5=R7=R9=82Ω
R2=R4=R6=R8=R10=130Ω
C1=C2=C3=C5=C6=0.1μF
C4=10μF
L1=L2=1μH

Package Diagram

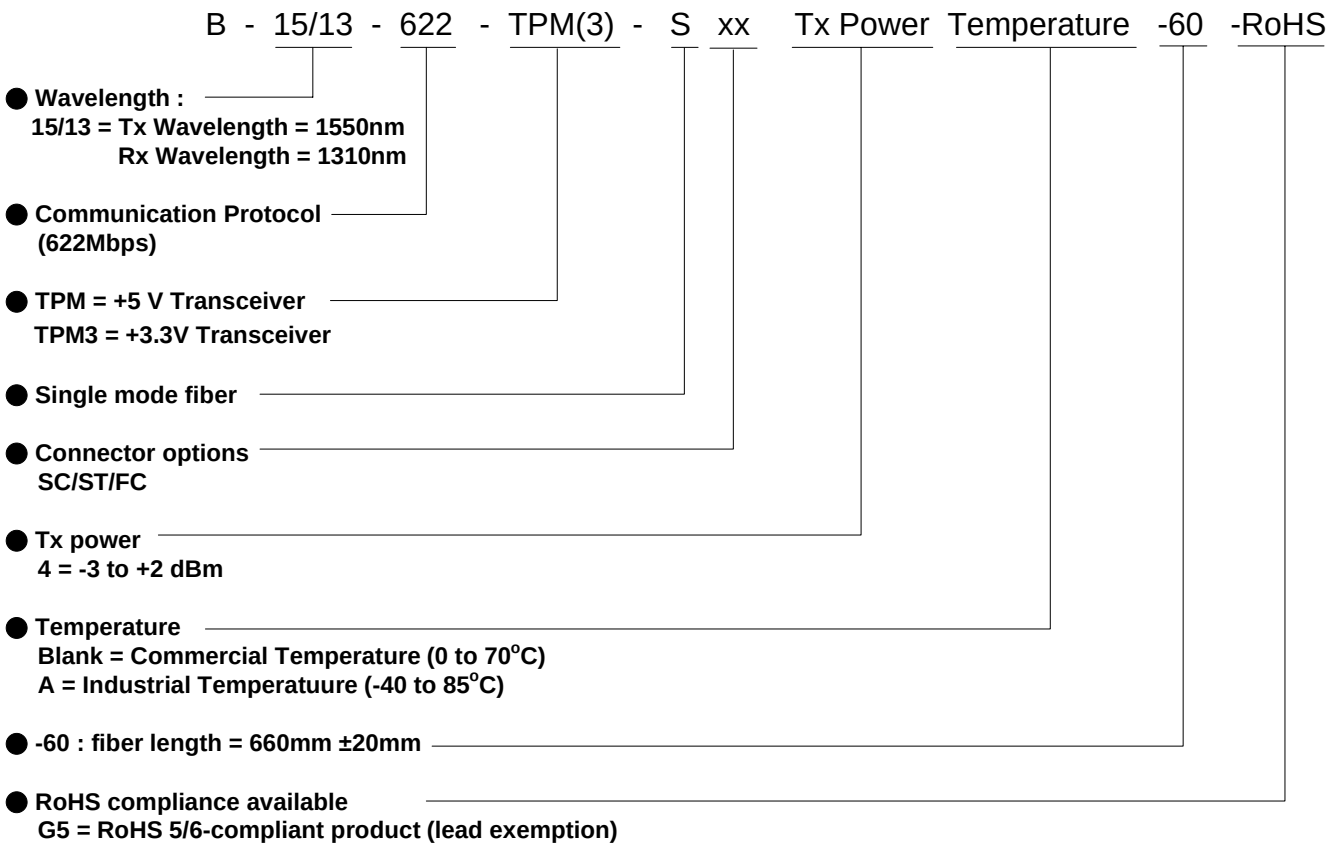


Order Information

Table 8 – Order Information

Part No.	Part No.
B-15/13-622-TPM-SSC4-60-G5	B-15/13-622-TPM3-SSC4-60-G5
B-15/13-622-TPM-SST4-60-G5	B-15/13-622-TPM3-SST4-60-G5
B-15/13-622-TPM-SFC4-60-G5	B-15/13-622-TPM3-SFC4-60-G5
B-15/13-622-TPM-SSC4A-60-G5	B-15/13-622-TPM3-SSC4A-60-G5
B-15/13-622-TPM-SST4A-60-G5	B-15/13-622-TPM3-SST4A-60-G5
B-15/13-622-TPM-SFC4A-60-G5	B-15/13-622-TPM3-SFC4A-60-G5

Part Numbering Definition:



Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

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Contact

U.S.A. Headquarters
20550 Nordhoff Street
Chatsworth, CA 91311
USA
Tel: +1-818-773-9044
Fax: +1-818-773-0261
sales@sourcephotonics.com

China
Building #2&5, West Export Processing Zone
No. 8 Kexin Road, Hi-Tech Zone
Chengdu, 611731, China
Tel: +86-28-8795-8788
Fax: +86-28-8795-8789
sales@sourcephotonics.com.cn

Taiwan
9F, No 81, Shui Lee Rd.
Hsinchu, 300, Taiwan
R.O.C.
Tel: +886-3-5169222
Fax: +886-3-5169213
sales@sourcephotonics.com.tw