

# Technical Datasheet

## AFBR-5921ALZ-KT1-C

### Avago Broadcom® Compatible 2x5 SFF 2.5Gbps Transceiver

+3.3V, LC, Multi-Mode, 850nm, 300m, Extended Temperature

#### FEATURES

- 2x5 Pin Package, Single-Mode Transceiver
- RoHS Compliant, Lead Free
- FP Laser Diode Transmitter
- 3.3V power supply
- LC duplex optical interface
- CML Differential Inputs
- CML Outputs and (LV)TTL signal detect
- Class 1 Laser International Safety Standard IEC 825 Compliant
- Extended Operating Temperature Range: -10°C to 85°C
- 850nm VCSEL Transmitter
- Link lengths at 2.125 GBd:
  - 0.5 to 300 m – 50/125 µm MMF
  - 0.5 to 150 m – 62.5/125 µm MMF
- Link lengths at 1.0625 GBd:
  - 0.5 to 500 m – 50/125 µm MMF
  - 0.5 to 300 m – 62.5/125 µm MMF

#### APPLICATIONS

- Fiber Channel Switch Infrastructure
- Other optic links

#### DESCRIPTION

ATGBICS AFBR-5921ALZ-KT1-C transceiver module is the perfect solution for high-speed communication networks. These transceiver modules support data rates up to 2.5Gbps. The module is fully compliant with the 2X5 standard package defined by the Small Form Factor Multi-Sourcing Agreement (MSA).

This transceiver module provides the system designer with solutions for Telecom, Datacom, and other Fiber Channel applications.

# Technical Datasheet

## Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units	Note
Storage Temperature	TST	-40	+85	°C	-
Relative Humidity	RH	5	95	%	-
Supply Voltage	VCC	0	+3.6	V	-

## Recommended Operating Environment and Electrical Characteristics:

Parameter	Symbol	Min	Typ	Max	Units	Note
Supply Voltage	VCC	+3.1	+3.3	+3.5	V	-
Supply Current	I <sub>cc</sub>	-	-	260	mA	-
Operating Case Temperature	TOP	0	-	+70	°C	1
		-10	-	+85		2
Data Rate	B			5	Gbps	-
Soldering temperature		-	-	260	°C	3
Soldering duration		-	-	10	Sec	3

### Notes:

1. Standard level
2. Industrial level
3. Not recommended wave soldering

# Technical Datasheet

## Optical Parameters

**Transceiver Optical Characteristics** (Ambient Operating Temperature  $T_a = +25 \pm 5^\circ\text{C}$ ,  $V_{CC} = 3.3 \pm 0.2\text{V}$ )

Parameter	Symbol	Min	Typ	Max	Units	Notes
Average Launch Power	$P_{o, \text{Avg}}$	-8		0	dBm	
Output Center Wavelength	c	840	850	860	nm	
Output Spectrum Width	$\sigma$			0.45	nm	RMS( $\sigma$ )
Laser Off Power	$P_{\text{off}}$			-30	dBm	
Extinction Ratio	ER	8.2			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	12dB reflection
Transmitter Dispersion Penalty	TDP			3.9	dB	
Optical Return Loss Tolerance				12	dB	

**Receiver Optical Specifications** ( $T_a = +25 \pm 5^\circ\text{C}$ ,  $V_{CC} = 3.3 \pm 0.2\text{V}$ )

Parameter	Symbol	Min	Typ	Max	Units	Notes
Input Center Wavelength	c	840	850	860	nm	
Receiver Sensitivity	Sen1			-16	dBm	
Receiver Overload	P <sub>MAX</sub>	-1			dBm	
LOS -- Deasserted	LOSD			-16	dBm	Transition: low to high
LOS -- Asserted	LOSA	-30			dBm	Transition: high to low
Los Hysteresis	LOSH	0.5	-	-	dB	
Receiver Reflectance				-12	dB	

# Technical Datasheet

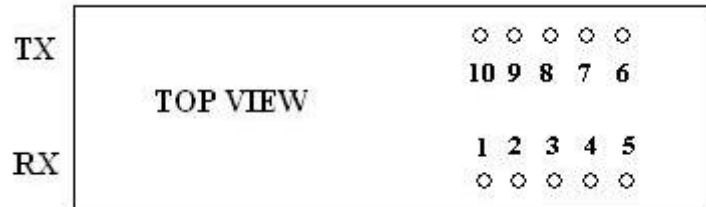
## Electrical Parameters

**Transceiver Electrical Characteristics** (Ambient Operating Temperature  $T_a = +25 \pm 5^\circ\text{C}$ ,  $V_{CC} = 3.3 \pm 0.2\text{V}$ )

Parameter	Symbol	Min	Typ	Max	Units	Notes
<b>High-Speed Signal (CML) Interface Specification</b>						
Input Data Rate			-	5	Gb/s	
Differential Input Impedance	R <sub>in</sub>		100		Ω	Internally AC coupled
Single Ended Output Voltage Tolerance		-0.3		4	V	
Common mode voltage tolerance		15			mV	
Tx Input Diff Voltage	V <sub>I</sub>	90		350	mV	
Tx Fault	V <sub>oL</sub>	-0.3		0.4	V	At 0.7mA
Output Data Rate			-	5	Gb/s	
Differential Output Impedance	R <sub>out</sub>		100		Ω	
Single Ended Output Voltage Tolerance		-0.3		4	V	
Rx Output Diff Voltage	V <sub>o</sub>	150		425	mV	
Rx Output Rise and Fall Time	Tr/Tf	30			ps	20% to 80%
<b>Low-Speed Signal (LVTTTL) Interface Specification</b>						
Input High Voltage		2.0		V <sub>cc</sub> +0.3	V	
Input Low Voltage		GND		0.8	V	
Output High Voltage		2.4		V <sub>cc</sub>	V	
Output Low Voltage		GND		0.5	V	

# Technical Datasheet

## Pin Assignment



## Pin Function Definitions

Pin #	Pin Name	Description	Note
1	VEER	Receiver Ground	-
2	VCCR	Receiver Power Supply	-
3	SD	Signal Detect. (LV)PECL or (LV)TTL output	1
4	RD-	Inv. Received Data Out	-
5	RD+	Received Data Out	-
6	VCCT	Transmitter Power Supply	-
7	VEET	Transmitter Ground	-
8	TDIS	Transmitter Disable	2
9	TD+	Transmit Data In	-
10	TD-	Inv. Transmit Data In	-

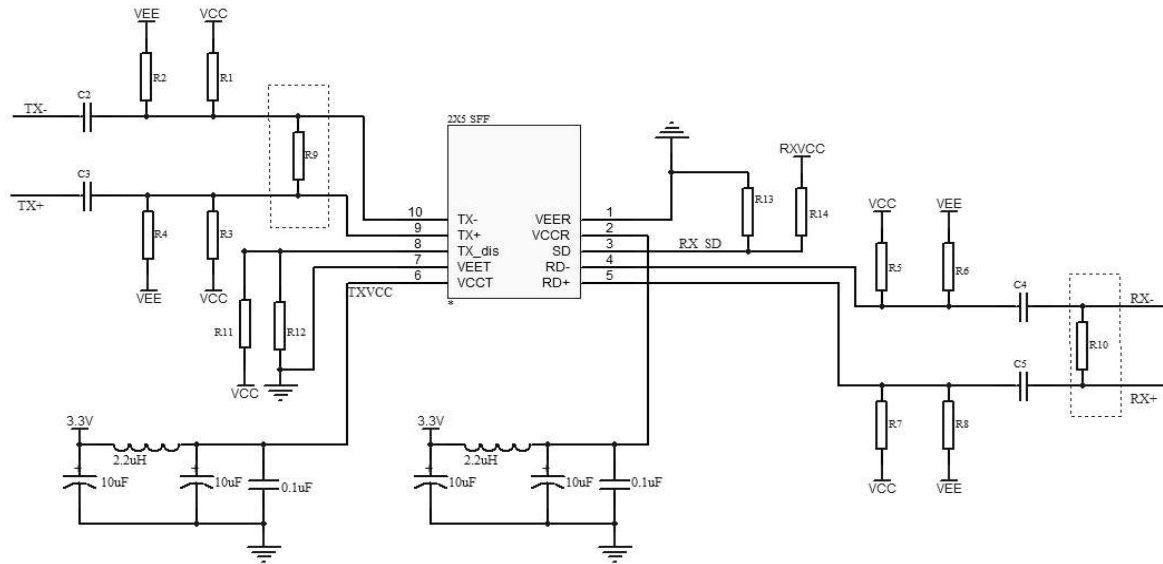
### Notes:

1: (LV)PECL-Normal optical input levels to the receiver result in logic “1” output, pull-down 130Ω or 270Ω resistor, (LV)TTL-Normal optical input levels to the receiver result in logic “0” output, pull-up 10kΩ resistor.

2: This is an input that is used to shut down the transmitter optical output. Transmitter on in logic “0”.

# Technical Datasheet

## Recommended Circuit



R1=R3=R5=R7=130Ω, R2=R4=R6=R8=82Ω, C2=C3=C4=C5=104p, R5=R10=100Ω=NC,  
R11=R12=10K,

SD=LVPECL:R14=10K=NC, R13=130Ω,SD=LVTTL:R14=10K, R12=130Ω=NC.

# Technical Datasheet

**Mechanical Dimensions (units: mm)**

