

# Technical Datasheet

## AFCT-5944LZ-C

### Avago Broadcom® Compatible SFF 2.5Gbps Transceiver

+3.3V, LC Duplex, FP, Single-Mode, 1300nm, 2km, Industrial Temperature

#### FEATURES

- 2x10 Pin Package, Single-Mode Transceiver
- RoHS Compliant, Lead Free
- FP Laser Diode Transmitter
- Up to 2km on 50/125µm or 1.5km on 62.5/125µm MMF Fiber 3.3V power supply
- LC duplex optical interface
- CML Differential Inputs, Outputs and (LV)TTL signal detect Class 1 Laser International Safety Standard IEC 825 Compliant
- Industrial Operating Temperature Range: -40°C to 85°C

#### APPLICATIONS

- Fiber Channel Switch Infrastructure
- STM16 Optical Interface
- SONET / SDH Switch Infrastructure
- Other optic links

#### DESCRIPTION

ATGBICS AFCT-5944LZ-C transceiver module is the perfect solution for high -speed communication networks. It supports data rates up to 3.1Gbps. The module is fully compliant with the 2X10 standard package defined by the Small Form Factor Multi-Sourcing Agreement (MSA). It provides the system designer with Telecom, Datacom, and other Fibre Channel applications.

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## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Temperature	T <sub>o</sub>	-40		85	°C
Storage Temperature	T <sub>s</sub>	-40		85	°C
Supply Voltage	V <sub>cc</sub>	0		+3.6	V
Relative Humidity	RH	5		95	%

## 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
		-40	-	+85		2
Data Rate	B	100	2500	3100	Mbps	-
Soldering temperature		-	-	260	°C	3
Soldering duration		-	-	10	Sec	3

### Notes:

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

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Optical Parameters (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	Unit	Not
<b>Transmitter</b>						
Data rate	B	100	2500	3100	Mbp	-
Output Center Wavelength	$\lambda_C$	1260	1310	1360	nm	-
Output Spectral width (RMS)	$\lambda$	-	-	4.0	nm	-
Average Optical Output Power	Po	-10	-	-3	dBm	1,2
Extinction Ratio	ER	8	-	-	dB	-
<b>Optic Output Eye: Compliant ITU-T G.957</b>						1,2
<b>Receiver</b>						
Receiver Sensitivity	S	-	-	-18	dBm	1,2
Maximum Input Power	P <sub>MAX</sub>	-3	-	-	dBm	1,2
Operation Center Wavelength	$\lambda_c$	1200	-	1600	nm	-
Signal Detect	Deassert	PD	-35	-	dBm	1,2
	Assert	PA	-	-18	dBm	1,2
Signal Detect--Hysteresis	PHYS	0.5	-	-	dB	-

**Notes:**

1. The optical power is launched into 9/125 $\mu\text{m}$  SMF
2. With a PRBS 223-1 test pattern at 2500Mbps

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Electrical Parameters (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	Note
Supply Voltage	VCC	+3.1	+3.3	+3.5	V	-
Supply Current	ICC	-	-	260	mA	-
<b>Transmitter</b>						
Differential Input Voltage	V <sub>in</sub>	200	-	1000	mVP-P	-
Input Differential Impedance	Z <sub>in</sub>	90	100	110	Ω	-
Data Input Voltage - Low	V <sub>IL</sub>	VCC -1.81	-	VCC -1.48	V	-
Data Input Voltage - High	V <sub>IH</sub>	VCC -1.17	-	VCC -0.88	V	-
<b>Receiver</b>						
Differential Output Voltage	V <sub>OUT</sub>	100	-	1000	mVP-P	-
Data Output Voltage – Low	V <sub>OL</sub>	VCC -1.83	-	VCC -1.56	V	-
Data Output Voltage – High	V <sub>OH</sub>	VCC -1.09	-	VCC -0.88	V	-
SD Output Voltage-Low	V <sub>OL</sub>	0	-	0.8	V	1
SD Output Voltage-High	V <sub>OH</sub>	2	-	VCC	V	1

**Notes:**

- (LV)TTL signal detect

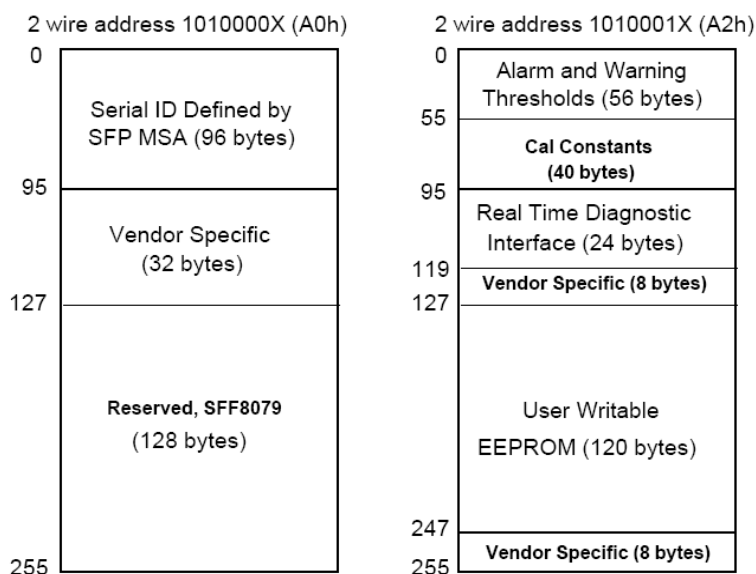
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## EEPROM Information Function

Serial ID provides access to identification information that describes the transceiver’s capabilities, standard interfaces, manufacturer, and other information.

SFF transceivers provide digital diagnostic monitoring interface, which allows real- time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, and received optical power and transceiver supply voltage.

Defines a 256 byte memory map in E2PROM that is accessible over a 2- wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), The interface is identical to, and compatible with both the GBIC Specification and the SFP Multi Source Agreement. The complete interface is described in “Digital Diagnostics Monitoring Interface for SFF Optical Transceivers”.



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## Digital Diagnostic Monitor

Digital diagnostic monitoring Characteristics

Parameter	Symbol	Range	Accuracy	Note
Transceiver Internal Temperature	T	Recommended Operation Condition	±3°C	-
Transceiver Internal Supply Voltage	VCC	Recommended Operation Condition	±3%	-
Laser Bias Current	ID	ID:1-100mA, Recommended Operation Condition	±10%	-
TX Output Power	PO	PO:min~max dBm, Recommended Operation Condition	±3dBm	-
RX Input Power	PI	PI:min~max dBm, Recommended Operation Condition	±3dBm	-

## EPROM Serial ID Memory Contents:

Serial ID Memory Map:A0h

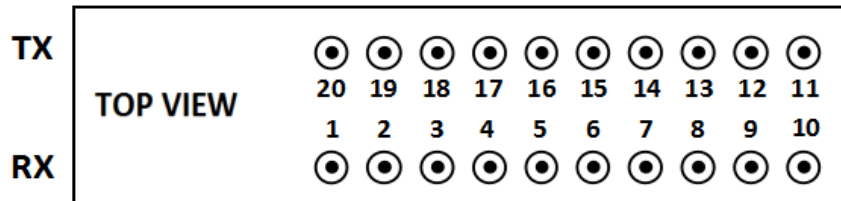
Data Address	Size (Byte)	Name of Field	Description
Base ID Fields			
0	1	Identifier	SFF
1	1	Ext. Identifier	SFP function is defined by serial ID only
2	1	Connector	LC Connector
3-10	8	Transceiver	Transceiver Codes
11	1	Encoding	NRZ
12	1	BR, Nominal	2488Mbps
13	1	Reserved	
14	1	Length(9µm)km	Transceiver transmit distance
15	1	Length(9µm)100m	
16	1	Length(50µm)10m	
17	1	Length(62.5µm)10m	
18	1	Length(Copper)	Not compliant
19	1	Reserved	

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20-35	16	Vendor Name	SFP vendor name: ATGBICS
36	1	Reserved	
37-39	3	Vendor OUI	
40-55	16	Vendor PN	Part Number: AFCT-5944LZ-C
56-59	4	Vendor rev	
60-61	2	Wavelength	Transceiver wavelength
62	1	Reserved	
63	1	CC_BASE	Check code for Base ID Fields
Extended ID Fields			
64-65	2	Options	TX_FAULT, TX_DISABLE and Loss of Signal implemented.
66	1	BR, max	
67	1	BR, min	
68-83	16	Vendor SN	Serial number
84-91	8	Date code	Manufactory date code
92	1	Diagnostic Monitoring Type	Digital diagnostic monitoring implemented, "internally calibrated" is implemented, RX measurement type is "Average Power".
93	1	Enhanced Options	Optional Alarm/Warning flags implemented for all monitored quantities, Optional Soft RX_LOS monitoring implemented.
94	1	SFF-8472 Compliance	Includes functionality described in Rev 9.3 SFF-8472.
95	1	CC_EXT	Check sum for the extended ID Fields
Vendor Specific ID Fields			
96-127	32	Vendor Specific	Vendor Specific EEPROM
128-255	128	Reserved	Reserved for SFF-8079

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## Pin Definitions



## Pin Function Definitions

Pin #	Pin Name	Description	Note
1	NC	Not Connected	-
2	VEER	Receiver Ground	-
3	VEER	Receiver Ground	-
4	NC	Not Connected	-
5	NC	Not Connected	-
6	VEER	Receiver Ground	-
7	VEER	Receiver Power	-
8	SD	Signal Detect, LVTTTL	1
9	RD-	Inverted Receiver Data Output	-
10	RD+	Receiver Data Output	-
11	VCCT	Transmitter Power	-
12	VEET	Transmitter Ground	-
13	TX_DIS	Transmitter Enable Input, LVTTTL, Active Low	2
14	TD+	Transmitter Data Input	-
15	TD-	Inverted Transmitter Data Input	-
16	VEET	Transmitter Ground.	-
17	SCL	I2C Clock	-
18	SDA	I2C Data	-



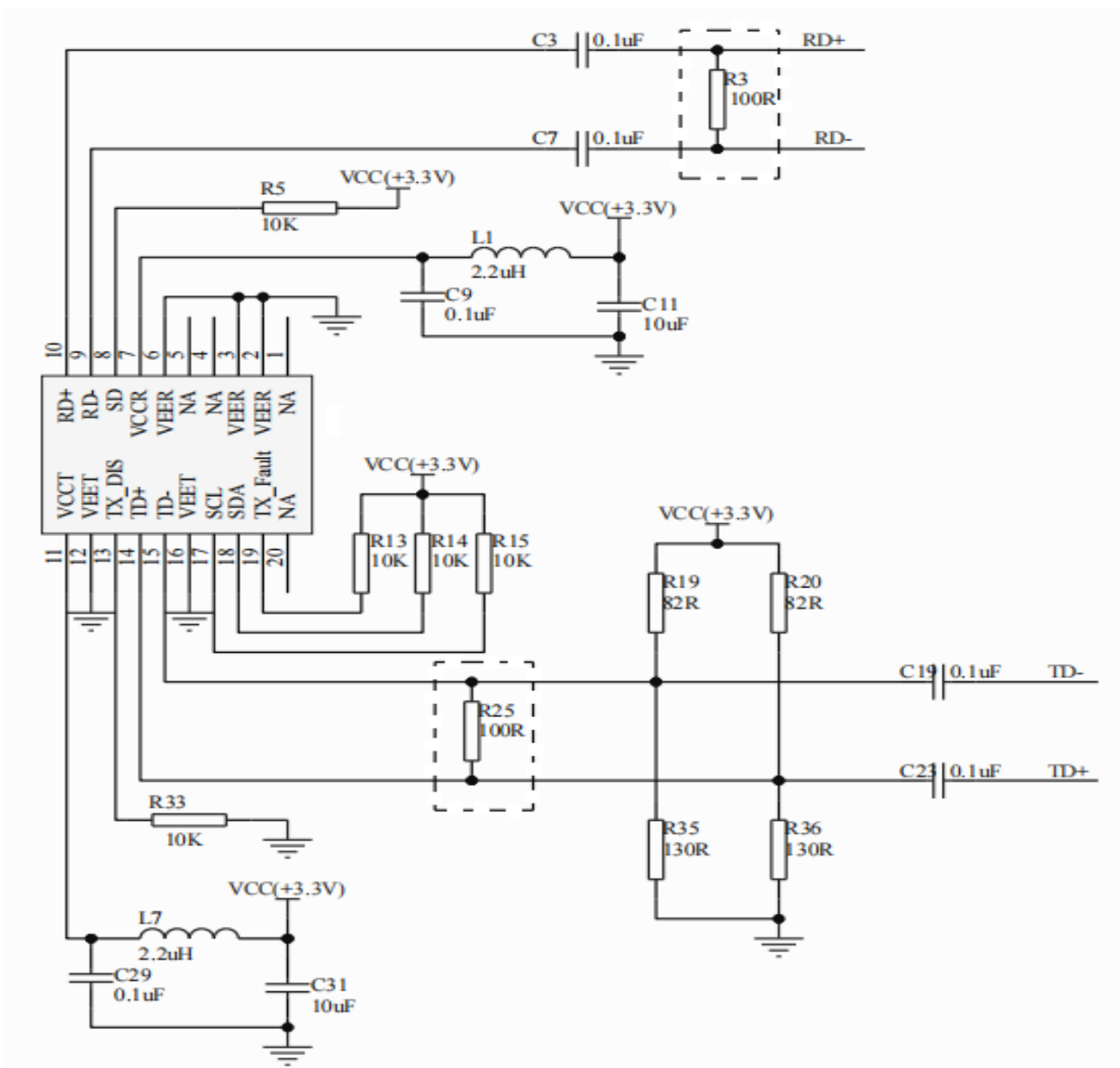
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19	TX_Fault	Transmitter Fault Indication, LVTTTL Output, Active High.	-
20	NC	Not Connected	-

**Notes:**

1. LVTTTL-Normal optical input levels to the receiver result in logic “1” output, pull-up 10kΩresistor.
2. The is an input that is used to shut down the transmitter optical output. Transmitter on in logic “0”.

**Recommended Circuit**



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**Mechanical Dimensions (Units: mm)**

