

## Product Datasheet

### SPM-8100WG

### FTLF8524P2BNL-MD Compatible (UL)

### UL Certified Finisar® Compatible 4.25Gb/s SFP+ SR Transceiver

Hot Pluggable, Duplex LC, +3.3V, 850nm, VCSEL MMF 300m DDM

#### FEATURES

- Up to 4.25 Gb/s Bi-directional Data Link
- Hot-Pluggable SFP Footprint LC Optical Transceiver
- Small Form-Factor Pluggable (SFP) MSA compatible
- SFF-8472 Digital Diagnostic Function
- Link Distance at 4.25 Gbd  
150 m links with 50/125 µm MMF Cables 70 m links with 62.5/125 µm MMF Cables
- Link Distance at 2.125 Gbd  
300 m links with 50/125 µm MMF Cables 150 m links with 62.5/125 µm MMF Cables
- Link Distance at 1.063 Gbd  
500 m links with 50/125 µm MMF Cables 300 m links with 62.5/125 µm MMF Cables
- AC/AC Coupling according to MSA
- Single +3.3 V Power Supply
- RoHS Compliant
- Operating Temperature Range: -10 ~ 85°C
- Class 1 Laser International Safety Standard IEC 60825 Compliant

#### APPLICATIONS

- Tri-Rate 4.25/2.125/1.063 Gb/s Fibre Channel
- 1.25 Gb/s 1000BASE-SX Ethernet

#### DESCRIPTION

ATGBICS® Finisar FTLF8524P2BNL-MD Compatible UL Certified SPM-8100WG multi-mode transceiver is small form factor pluggable module for bi-directional serial optical data communications such as 4x/2x/1x Fibre Channel and Gigabit Ethernet 1000BASE-SX. It has an SFP 20-pin connector to enable hot plug capability. Digital diagnostic functions are available via an I<sup>2</sup>C series bus specified in the SFP MSA SFF-8472.

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This module is designed for multi-mode fibre and operates at a nominal wavelength of 850 nm. The transmitter section uses a Vertical Cavity Surface Emitted Laser (VCSEL) and is a Class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses an integrated GaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

This multi-mode transceiver is a Class 1 laser product. It complies with IEC 60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	T <sub>s</sub>	-40		+85	°C
Case Operating Temperature	T <sub>opr</sub>	-10		+85	°C
Maximum Supply Voltage	V <sub>cc</sub>	-0.5		+3.6	V
Relative Humidity	RH	0		85	%

### Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Power Supply Voltage	V <sub>cc</sub>	3.1	3.3	3.5	V
Case Operating Temperature	T <sub>opr</sub>	-10		+85	°C
Power Supply Current	I <sub>CC</sub>		180	240	mA
Data Rate		1062	4250		Mb/s

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Transmitter Specifications (0°C < Topr < 70°C, 3.1V < Vcc < 3.5V)

Parameter	Symbol	Min	Typ	Max	Units	Notes
<b>Optical</b>						
Optical Transmit Power	Po	-9	---	-2.5	dBm	1
Output Center Wavelength	$\lambda$	830		860	nm	
Output Spectrum Width	$\Delta\lambda$	---	---	0.85	nm	RMS ( $\sigma$ )
Optical Modulation Amplitude@4.25Gb/s	OMA	247			$\mu$ W	2
Optical Modulation Amplitude@2.125Gb/s	OMA	196			$\mu$ W	
Optical Modulation Amplitude@1.063Gb/s	OMA	156			$\mu$ W	
Optical Rise Time	tr			90	ps	20 % to 80% Values
Optical Fall Time	tr			90	ps	20 % to 80% Values
Relative Intensity Noise	RIN			-118	dB/Hz	
<b>Electrical</b>						
Data Input Current – Low	IIL	-350			$\mu$ A	
Data Input Current – High	IiH			350	$\mu$ A	
Differential Input Voltage	VIH - VIL	0.5		2.4	V	Peak-to-Peak
TX Disable Input Voltage – Low	TDIS, L	0		0.5	V	3
TX Disable Input Voltage – High	TDIS, H	2.0		Vcc	V	3
TX Disable Assert Time	TASSE RT			10	$\mu$ s	
TX Disable Deassert Time	TDEASS ERT			1	ms	
TX Fault Output Voltage -- Low	TFault L	0		0.5	V	4
TX Fault Output Voltage -- High	TFault H	2.0		Vcc+0. 3	V	4

Notes:

1. Output power is power coupled into a 62.5/125  $\mu$ m MM fibre.
2. Equivalent extinction ratio specification for Fibre Channel. Allows smaller ER at higher average power.
3. There is an internal 4.7K to 10K ohm pull-up resistor to VccTX.
4. Open collector compatible, 4.7K to 10K ohm pull-up to Vcc (Host Supply Voltage).

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### Receiver Specifications (0°C < Topr < 70°C, 3.1V < Vcc < 3.5V)

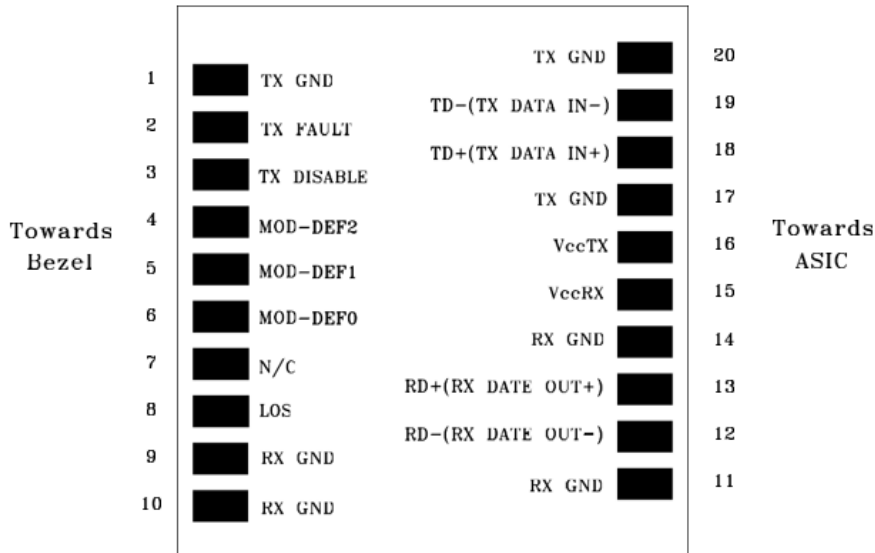
Parameter	Symbol	Min	Typ	Max	Units	Notes
<b>Optical</b>						
Sensitivity at 4.25Gbps	Sens			-15 40	dBm μW	5
Sensitivity at 2.125Gbps	Sens			-17	dBm	5
Sensitivity at 1.063Gbps	Sens			-18		5
Maximum Input Power	Pin	0			dBm	
Signal Detect -- Asserted	Pa	---		-18	dBm	Transition: low to high
Signal Detect -- Deasserted	Pd	-30	---	---	dBm	Transition: high to low
Signal detect -- Hysteresis		1.0	---		dB	
Wavelength of Operation		770	---	860	nm	
<b>Electrical</b>						
Differential Output Voltage	VOH – VOL	0.6		2.0	V	
Output LOS Voltage -- Low	VOL	0		0.5	V	6
Output LOS Voltage -- High	VOH	2.0		Vcc+0.3	V	6

#### Notes:

1. Measured at 2<sup>7</sup>-1 PRBS at BER 1E-12 at 9dB Extinction Ratio. For example, an OMA of 40 μW is approximately equal to an average power of -15.9 dBm, average with an Extinction Ratio of 9 dB.
2. Open collector compatible, 4.7K to 10K ohm pull-up to Vcc (Host Supply Voltage).

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### Connection Diagram



### Pin Function Definitions

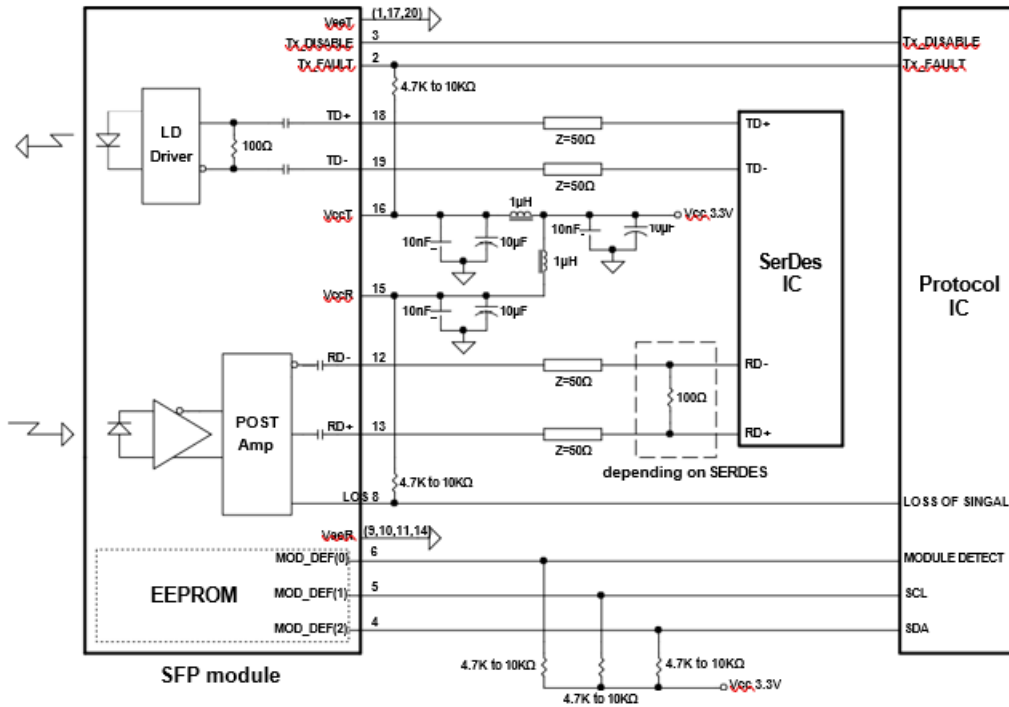
PIN	Signal Name	Description	PIN	Signal Name	Description
1	TX GND	Transmitter Ground	11	RX GND	Receiver Ground
2	TX Fault	Transmitter Fault Indication	12	RX DATA OUT-	Inverse Receiver Data Out
3	TX Disable	Transmitter Disable (Module disables on high or open)	13	RX DATA OUT+	Receiver Data Out
4	MOD-DFE2	Modulation Definition 2 – Two wires serial ID Interface	14	RX GND	Receiver Ground
5	MOD-DEF1	Modulation Definition 1 – Two wires serial ID Interface	15	Vcc RX	Receiver Power – 3.3V±5%
6	MOD-DEF0	Modulation Definition 0 – Ground in Module	16	Vcc TX	Transmitter Power – 3.3V±5%
7	N/C	Not Connected	17	TX GND	Transmitter Ground
8	LOS	Loss of Signal	18	TX DATA IN+	Transmitter Data In
9	RX GND	Receiver Ground	19	TX DATA IN-	Inverse Transmitter Data In
10	RX GND	Receiver Ground	20	TX GND	Transmitter Ground

Module Definition	MOD-DEF2 PIN 4	MOD-DEF1 PIN 5	MOD-DEF0 PIN 6	Interpretation by Host
4	SD A	SC L	LV-TTL Low	Serial module definition protocol

Module Definition 4 specifies a serial definition protocol. For this definition, upon power up, MOD-DEF (1:2) appear as no connector (NC) and MOD-DEF (0) is TTL LOW. When the host system detects this condition, it activates the serial protocol. The protocol uses the 2-wire serial CMOS E<sup>2</sup>PROM protocol of the ATMEL AT24C01A/02/04 family of components.

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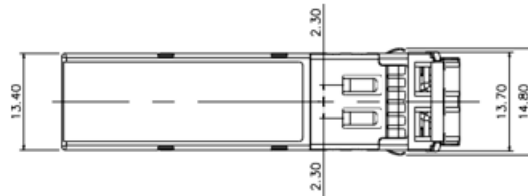
### Recommended Circuit Schematic



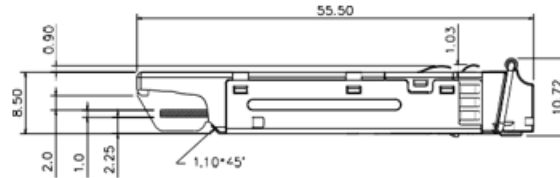
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### Mechanical Dimensions

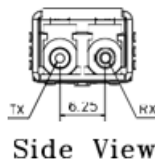
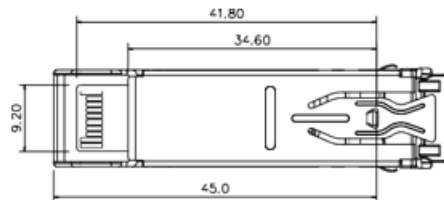
Top View



Front View



Bottom View



Side View