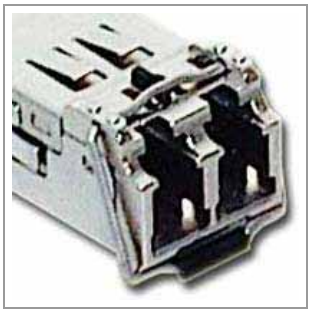
SFP SERIES

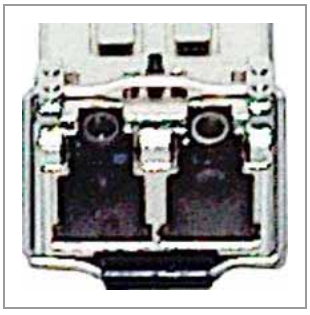
SMALL FROM FACTOR PLUGGABLE

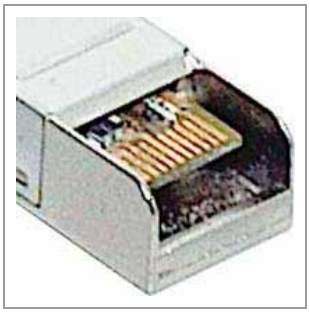
850nm 1.25Gbps Multi Mode SFP

LCS-MGBIC-SX

850 nm 1.25Gbps Multi Mode
SFP LC Transceiver Module 3.3V







SFP Series

LCS-MGBIC-SX

850nm 1.25Gbps Multi Mode SFP

Features

- Small From Factor Pluggable MSA compliant.
- For Multi Mode Applications.
- Standard LC Duplex Connector.
- Up to 850 nm & 1.25 Gb/s .
- Compliant for IEEE-802.3z Gigabit Ethernet.
- Power supply : +3.3V.
- EEPROM with serial ID functionality.
- TTL Signal detect indicator.
- PECL input & output logic levels.
- Uncooled VCSEL structure laser.
- 0□ ~ +70□ operating temperature.
- Class 1M laser safety compliance.
- 2^{23} –1 PRBS, BER=1*10^{-10}.
- 550 m reach

Specifications

Absolute Maximum Ratings				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
Operating temperature	T_{opr}	0	+70	°C
Storage temperature	T_{stg}	-40	+85	°C
Lead soldering limits	-	-	260/10	°C/sec
Supply voltage	VccT	-0.5	4	V

Electrical Characteristics					
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Transmitter:					
Data rate (NRZ)	B	-	1250	-	Mb/s
Data PECL Differential input (6)	V_{il}		-	1.85	V
	V_{ih}	2.15			
Supply voltage	VCCT	3.1	3.3	3.5	V
Supply current	ICCT	-	130	-	mA
Receiver:					
Data rate (NRZ)	B	-	1250	-	Mb/s
Output rise time (10-90%)	tr	-	-	400	ps
Output fall time (10-90%)	tf	-	-	400	ps
Data PECL output (6)	V_{OL}	-	-	1.65	V
	V_{OH}	2.25	-	-	V
Supply voltage	VCCR	3.1	3.3	3.5	V
Supply current	ICCR	-	120	-	mA
Hysteresis		-	2.5	-	dB

Optical Characteristics						
Parameter		**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Transmitter:						
Optical output (avg.) (1) (3)		P_o	-9.5	-	-4	dBm
Extinction ratio		ER	10	-	-	dB
Output rise time (10-90%)		tr	-	-	400	ps
Output fall time (10-90%)		tf	-	-	400	ps
Optical wavelength		λ	830	850	860	nm
Spectral width		Δλ	-	0.85	-	nm
Receiver:						
Optical input (avg.) sensitivity (1) (5)	P_{IN}		-	-20	-	-	dBm
Saturation			-	-	-	-3	dBm
Optical wavelength			λ	770	-	860	nm
Signal detect asserted (avg)			P_A	-	-	-20	dBm
Signal detect deasserted (avg)			P_D	-31	-	-	dBm
Signal Detect-Hysteresis			P_A-P_D	1.0	-	-	dB
Signal Detect Assert Time			T_{SD+}	-	-	100	μs
Signal Detect Deassert Time			T_{SD-}	-	-	100	μs
Differential Output Voltage			V_{DEF}	0.37	-	2.0	V
Receiver Loss of Signal Output Voltage-low			RX_LOS_L	0	-	0.35	V
Receiver Loss of Signal Output Voltage-High			RX_LOS_H	2.4	-	Vcc	V
Receiver Loss of Signal Assert Time (off to on)			I_{ARX_LOS}	-	-	100	μs
Receiver Loss of Signal Assert Time (on to off)			I_{DRX_LOS}	-	-	100	μs

Note	
1	With 0.275 NA, 62.5/125μm Fiber.
2	Driven with a differential signal
3	Class 1M eye safe per FDA and IEC.
4	Compliant with IEEE 802.3Z Gigabit Ethernet.
5	2^{23} - 1 PRBS, BER= $1*10^{-10}$.
6	PECL Differential Voltage Mode.
7	Take normal ESD precautions when handing this product.

SFP Series

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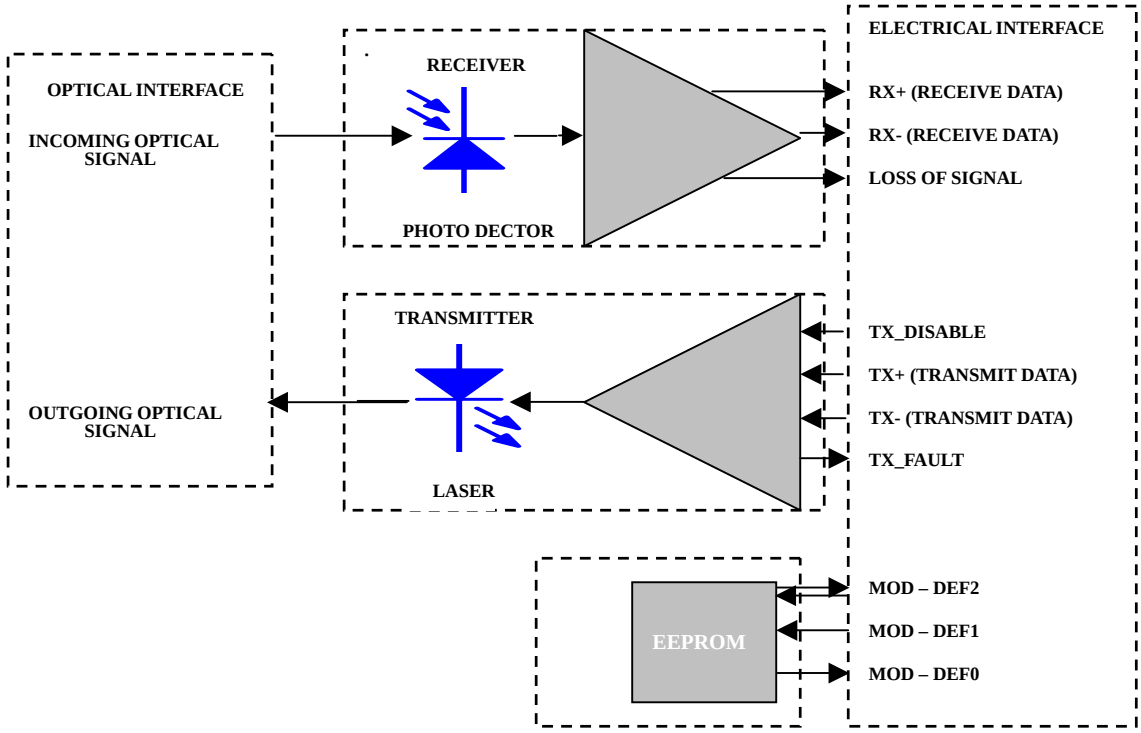
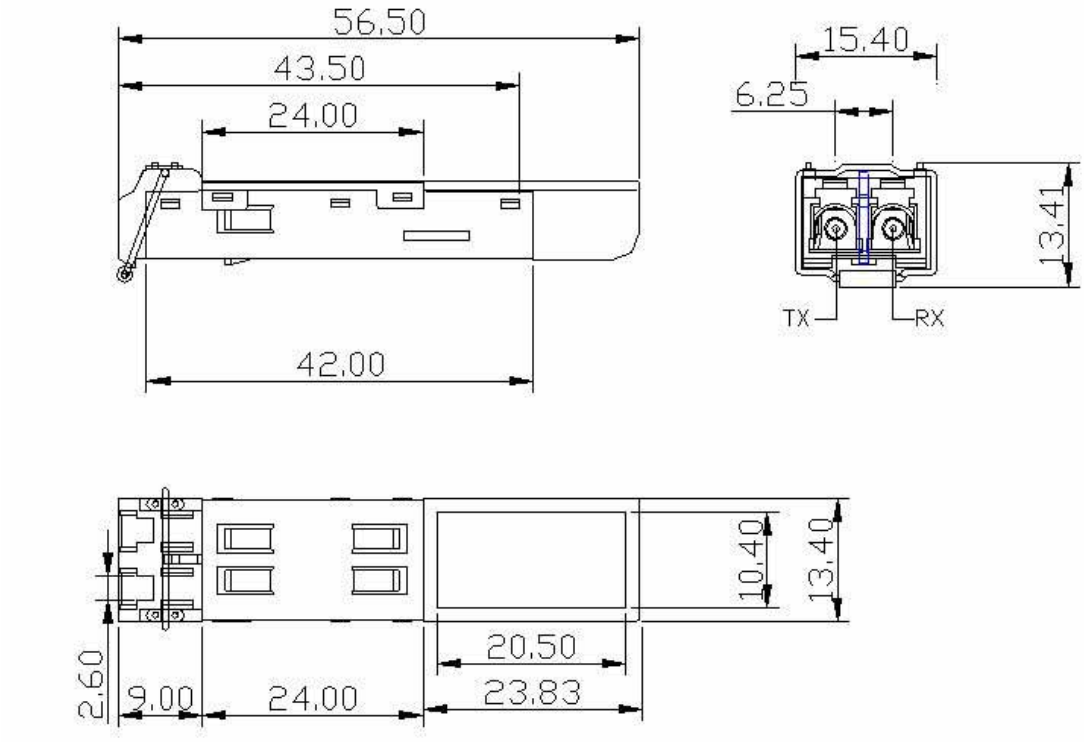
Function Diagram



Dimensions & Electrical Pin configuration



SFP Series

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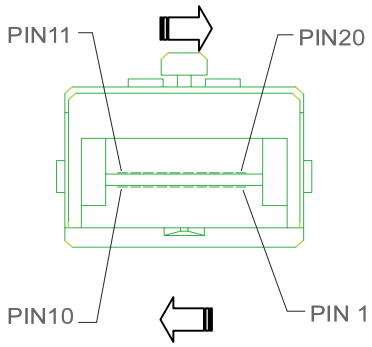
SFP to host connector Pin Assignment

AS the LCS-MGBIC-SX is inserted, first contact is made by the housing ground shield, Discharging any potentially component-damaging static electricity. Ground pins engage next and are followed by Tx and Rx power supplies. Finally, signal lines are connected. Pin functions and sequencing are listed in next Table



PINOUT TABLE		
Pin	**Symbol**	**Functional Description**
1	T_{GND}	Transmit Ground
2	TX_FAULT	Transmit Fault
3	TX_DISABLE	Transmit Disable
4	MOD_DEF(2)	SDA Serial Data Signal
5	MOD_DEF(1)	SCL Serial Clock Signal
6	MOD_DEF(0)	TTL Low
7	RATE SELECT	Open Circuit
8	RX_LOS	Receiver Loss of Signal, TTL High, open collector
9	R_{GND}	Transmitter Ground
10	R_{GND}	Transmitter Ground
11	R_{GND}	Receiver Ground
12	RX-	Receiver Data Bar, Differential PECL, ac coupled
13	RX+	Receiver Data, Differential PECL, ac coupled
14	R_{GND}	Receiver Ground
15	V_{CCR}	Receiver Power Supply
16	V_{CCT}	Transmitter Power Supply
!&	T_{GND}	Transmitter Ground
18	TX+	Transmit Data, Differential PCEL, ac coupled
19	TX+	Transmit Data, Differential PCEL, ac coupled
20	T_{GND}	Transmitter Ground

Tx Disable Characteristics

Input Level (LV-TTL)	Tx Function
Low	ON
High	OFF
Non-Connect	ON

(Disable Pin Truth Table)

SFP Series

LCS-MGBIC-SX

SFP Serial ID

DATA ADDRESS	LENGTH (BYTES)	NAME OF FIELD	DATA TO BE INCLUDE IN THE FIELD FOR SW
Base ID Fields			
0	1	Identifier	Type of serial transceiver (03h=Transceiver)
1	1	Reserved	
2	1	Connector	Code of optical connector type(07h=LC)
3-10	8	Transceiver	000000012040C00h=1000BASE-SX (Gigabit Ethernet compliance code for optical compatibility
11	1	Encoding	03h=NRZ Encoding
12	1	BR. Nominal	Nominal baud rate, units of 100MHz(0C=1.25Gbps)
13	1	Reserved	
14	1	Length(9μ)-km	Link length supported for 9/125 μm fiber, units of km (00h)
15	1	Length(9μ)	Link length supported for 9/125 μm fiber, units of 100m(00h)
16	1	Length(50μ)	Link length supported for 50/125 μm fiber, units of 10m(37h=550m)
17	1	Length(60μ)	Link length supported for 60/125 μm fiber, units of 10m(1Bh=270m)
18	1	Length(Copper)	Link length supported for copper, units of 10m(00h)
19	1	Reserved	
20-35	16	Vendor name	SFP vendor name:434F4E4153202020202020202020202020h
36-39	4	Vendor OUI	SFP transceiver vendor IEEE company ID
40-55	16	Vendor PN	Part Number
56-59	4	Vendor rev	Revision level for part number
60-62	3	Reserved	
63	1	CC_BASE	Check code for Base ID Fields(0 – 62)
EXTENDED ID FIELDS			
64	1	Reserved	
65	1	Options	Indicates which optional SFP signals are implemented (1Ah=RX_LOSS,TX_FAULT,TX_DISABLE all supported
66	1	BR. max	Upper baud rate margin, units of %(00h)
67	1	BR. min	Lower baud rate margin, units of %(00h)
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	Manufacturing date code
92-94	3	Reserved	
95	1	CC_EXT	Check code for Extended ID Fields(64 – 94)
VENDOR SPECIFIC ID FIELDS			
96-127	32	Readable	Vendor specific data, read only

SFP Series

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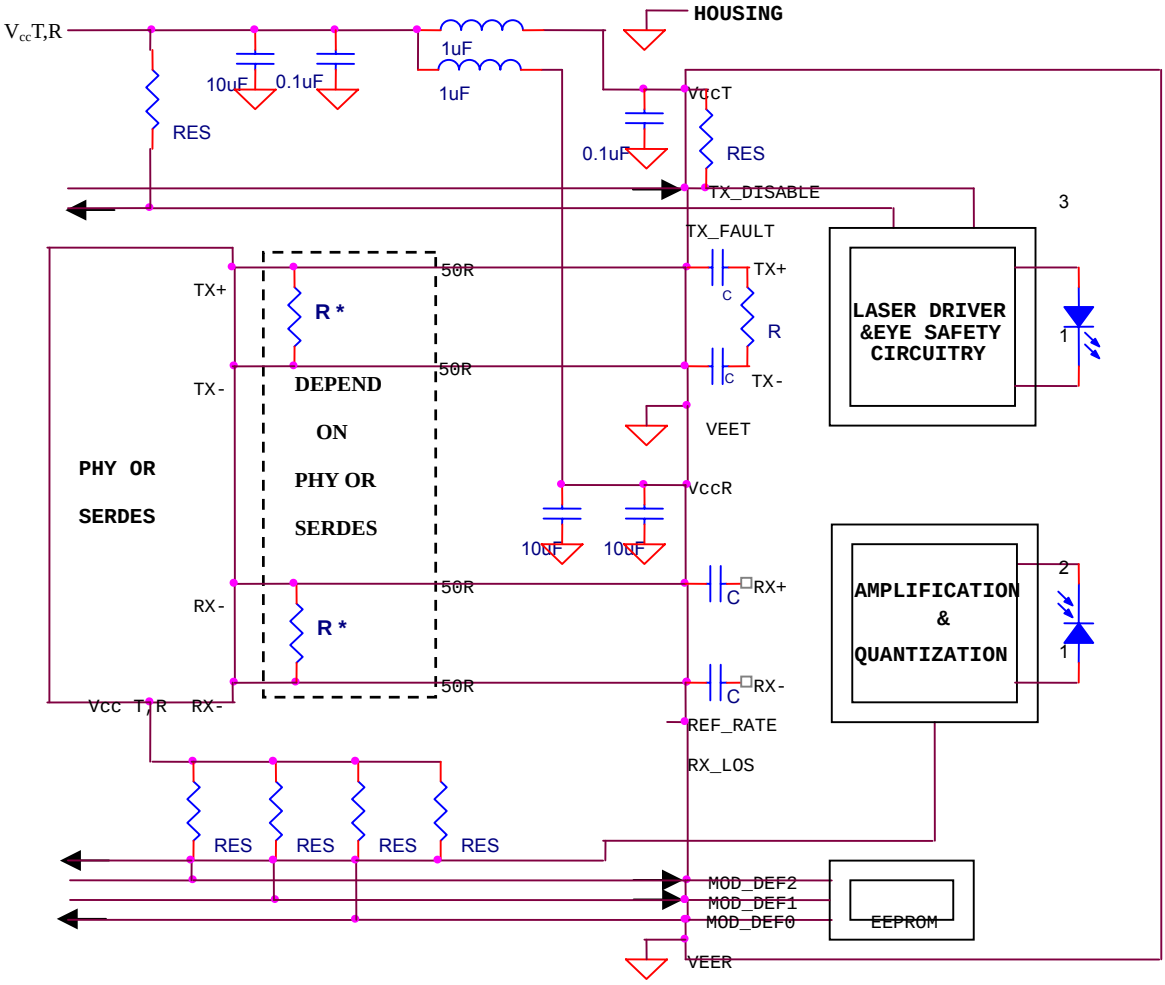
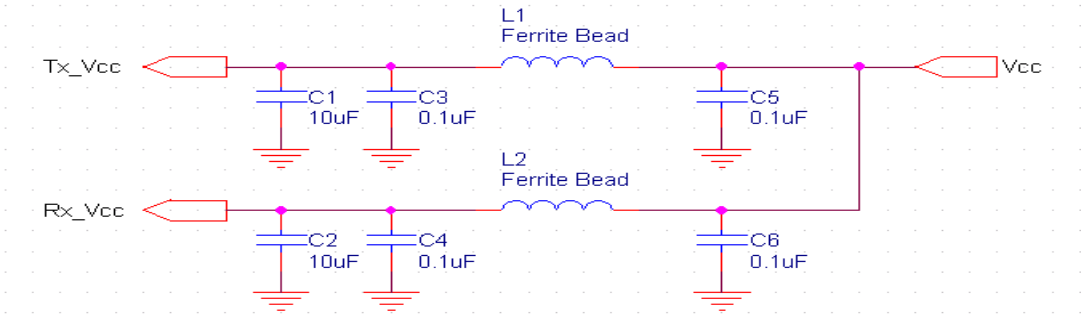
Typical application Circuit



***NOTE 4.7K<RES<10K**

Power Coupling

The L1 and L2 can use Ferrite Bead (BLM11A601S) or inductor (4.7μH)



L1/2 = 1 uH
Value of R5/6/9/10/11/12 may vary as long as proper 50Ω termination or 100Ω differential
Is Provided. For good EMI performance, the power supply filter is required. Use short tracks from the inductor
L1/2 to the module VccTx/VccRx.

Qualification Information

HEADING	TEST	CONDITIONS	SAMPLE SIZE	REFERENCE
Mechanical & Physical	Mechanical Shock	5 times/axis 500G , 1.0ms	11	MIL-STD-883 Method 2002
	Vibration	20G , 20Hz - 2000HZ 4min/cycle ,4cycles/axis	11	MIL-STD-883 Method 2007
	Thermal Shock	Delta T=100℃	11	MIL-STD-883 Method 2003
	Solderability	-	11	MIL-STD-883 Method 2007
	Fiber Pull	1Kg ; 3times ; 5sec	11	Bellcore 983
Endurance	Accelerated Aging	85℃ , 5000hrs	25	Bellcore 983 Section 5.18
	High Temperature Storage	85℃ , 2000hrs	11	Bellcore 983
	Low Temperature Storage	-40℃ , 2000hrs	11	Bellcore 983
	Temperature Cycling	500 cycles.	11	Bellcore 983 Section 5.20
	Cyclic Moisture Resistance	10 cycles	11	Bellcore 983 Section 5.23
	Damp Heat	40℃ , 95% RH , 1344hrs	11	MIL-STD-202 Method 103
Special Test	Internal Moisture	<5000ppm water vapor	11	MIL-STD-883 Method 1018
	Flammability	-	-	TR357 Sec.4.4.2.5
	ESD Threshold	-	6	Bellcore 983 Section 5.22