SFP - Small Form-factor Pluggable
1.25 Gigabit Ethernet (1000 Base-SX)
## 2.125/1.0625 Gbit/s Fibre Channel (200-M5/M6-SN-I / 100-M5/M6-SN-I)
Multimode 850 nm Transceiver with LC™ Connector

V23838-M305-M56

Features

- Small Form-factor Pluggable (SFP) MSA compatible transceiver[1]
- Advanced release mechanism
- Easy access, even in belly to belly applications
- Wire handle release for simplicity
- Color coded black tab (multimode)
- PCI height compatible
- Excellent EMI performance
- Common ground concept
- RJ-45 style LC™ connector system
- Single power supply (3.3 V)
- Extremely low power consumption of 530 mW typical
- Small size for high channel density
- UL-94 V-0 certified
- ESD Class 1C per JESD22-A114-B (MIL-STD 883D Method 3015.7)
- According to FCC (Class B) and EN 55022
- For distances of up to 860 m (50 µm fiber)
- Laser safety according to Class 1 FDA and IEC
- AC/AC Coupling according to MSA
- Extended operating temperature range of –20°C to 85°C
- SFP evaluation kit V23848-S5-V4 available upon request
- A press fit cage and cage plugs are available as accessory products from Infineon (see **SFP Accessories**)
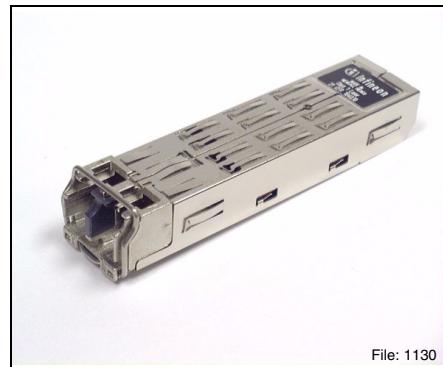
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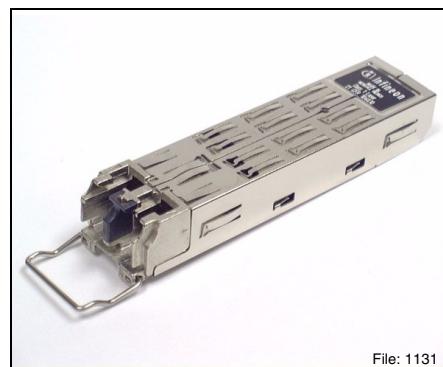
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[1] MSA documentation can be found at **www.infineon.com/fiberoptics** under Transceivers, SFP Transceivers.

LC™ is a trademark of Lucent

Pin Configuration
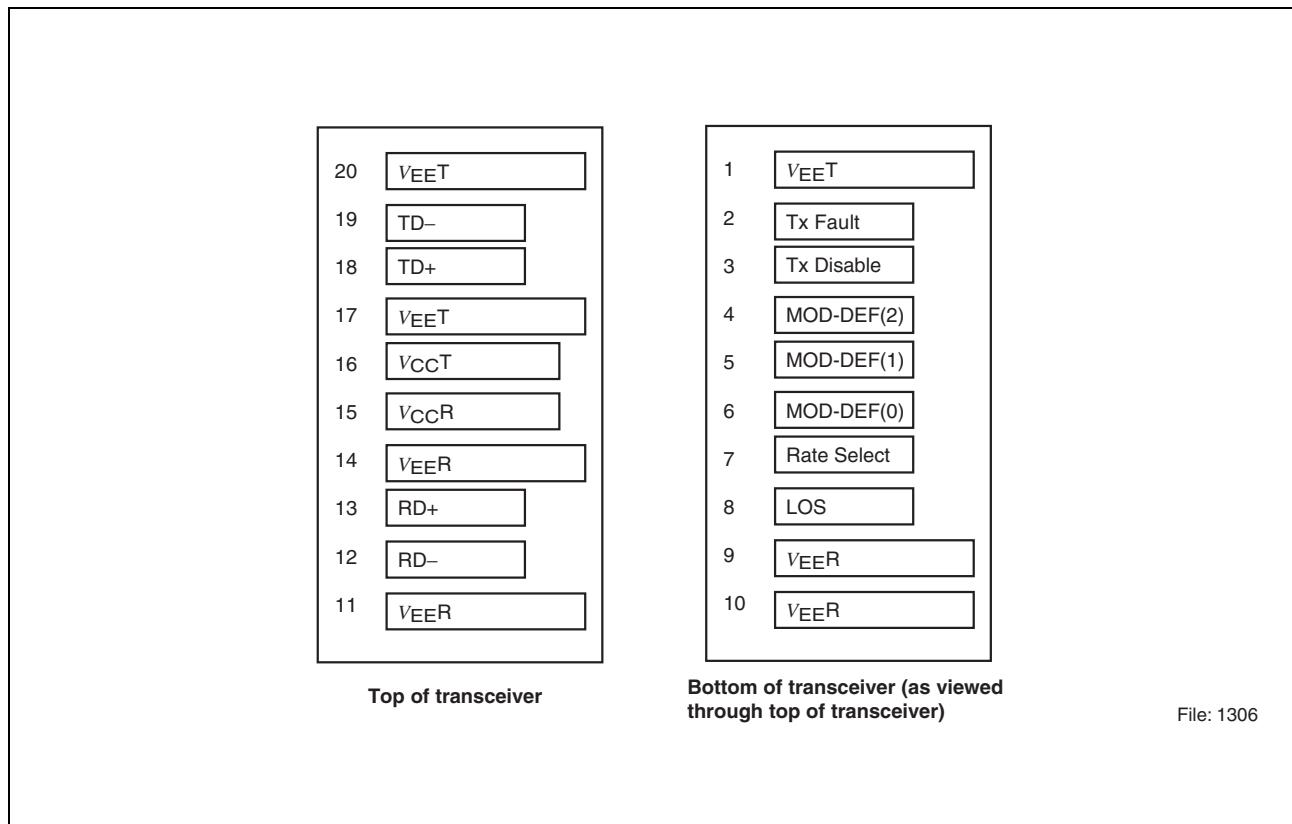
Figure 1   SFP Transceiver Electrical Pad Layout

Pin Description

Pin No.	Name	Logic Level	Function
1	$V_{EE}T$	N/A	Transmitter Ground[1]
2	Tx Fault	LVTTL	Transmitter Fault Indication[2] [8]
3	Tx Disable	LVTTL	Transmitter Disable[3]
4	MOD-DEF(2)	LVTTL	Module Definition 2[4] [8]
5	MOD-DEF(1)	LVTTL	Module Definition 1[5] [8]
6	MOD-DEF(0)	N/A	Module Definition 0[6] [8]
7	Rate Select	N/A	Not connected
8	LOS	LVTTL	Loss Of Signal[7] [8]
9	$V_{EE}R$	N/A	Receiver Ground[1]
10	$V_{EE}R$	N/A	Receiver Ground[1]
11	$V_{EE}R$	N/A	Receiver Ground[1]
12	RD–	LVPECL	Inv. Received Data Out[9]
13	RD+	LVPECL	Received Data Out[9]
14	$V_{EE}R$	N/A	Receiver Ground[1]
15	$V_{CC}R$	N/A	Receiver Power
16	$V_{CC}T$	N/A	Transmitter Power
17	$V_{EE}T$	N/A	Transmitter Ground[1]
18	TD+	LVPECL	Transmit Data In[10]
19	TD–	LVPECL	Inv. Transmit Data In[10]
20	$V_{EE}T$	N/A	Transmitter Ground[1]

[1] Common transmitter and receiver ground within the module.

[2] A high signal indicates a laser fault of some kind and that laser is switched off.

[3] A low signal switches the transmitter on. A high signal or when not connected switches the transmitter off.

[4] MOD-DEF(2) is the data line of two wire serial interface for serial ID.

[5] MOD-DEF(1) is the clock line of two wire serial interface for serial ID.

[6] MOD-DEF(0) is grounded by the module to indicate that the module is present.

[7] A low signal indicates normal operation, light is present at receiver input. A high signal indicates the received optical power is below the worst case receiver sensitivity.

[8] Should be pulled up on host board to V_{CC} by 4.7 - 10 kΩ.

[9] AC coupled inside the transceiver. Must be terminated with 100 Ω differential at the user SERDES.

[10] AC coupled and 100 Ω differential termination inside the transceiver.

Description

The Infineon Fibre Channel / Gigabit Ethernet multimode transceiver – part of Infineon SFP family – is compatible to the Physical Medium Depend (PMD) sublayer and baseband medium, type 1000 Base-SX (short wavelength) as specified in IEEE Std 802.3 and Fibre Channel
FC-PI-2 (Rev. 5.0) 200-M5-SN-I, 200-M6-SN-I for 2.125 Gbit/s, and
FC-PI-2 (Rev. 5.0) 100-M5-SN-I, 100-M6-SN-I for 1.0625 Gbit/s.

The appropriate fiber optic cable is 62.5 µm or 50 µm multimode fiber with LC™ connector.

Link Length as Defined by IEEE and Fibre Channel Standards

Fiber Type	Reach		Unit
	min.[1]	max.[2]	
at 1.0625 Gbit/s			
50 µm, 2000 MHz*km	2	860	meters
50 µm, 500 MHz*km	2	500	
50 µm, 400 MHz*km	2	450	
62.5 µm, 200 MHz*km	2	300	
62.5 µm, 160 MHz*km	2	250	
at 1.25 Gbit/s			
50 µm, 500 MHz*km	2	550	meters
50 µm, 400 MHz*km	2	500	
62.5 µm, 200 MHz*km	2	275	
62.5 µm, 160 MHz*km	2	220	
at 2.125 Gbit/s			
50 µm, 2000 MHz*km	2	500	meters
50 µm, 500 MHz*km	2	300	
50 µm, 400 MHz*km	2	260	
62.5 µm, 200 MHz*km	2	150	
62.5 µm, 160 MHz*km	2	120	

[1] Minimum reach as defined by IEEE and Fibre Channel Standards. A 0 m link length (loop-back connector) is supported.

[2] Maximum reach as defined by IEEE and Fibre Channel Standards. Longer reach possible depending upon link implementation.

Description

The Infineon SFP multimode transceiver is a single unit comprised of a transmitter, a receiver, and an LC™ receptacle.

This transceiver supports the LC™ connectorization concept. It is compatible with RJ-45 style backpanels for high end datacom and telecom applications while providing the advantages of fiber optic technology.

The module is designed for low cost SAN, LAN, Fibre Channel and Gigabit Ethernet applications. It can be used as the network end device interface in mainframes, workstations, servers, and storage devices, and in a broad range of network devices such as bridges, routers, hubs, and local and wide area switches.

This transceiver operates at 1.0625 Gbit/s / 1.25 Gbit/s / 2.125 Gbit/s from a single power supply (+3.3 V). The 100 Ω differential data inputs and outputs are LVPECL and CML compatible.

Functional Description of SFP Transceiver

This transceiver is designed to transmit serial data via multimode cable.
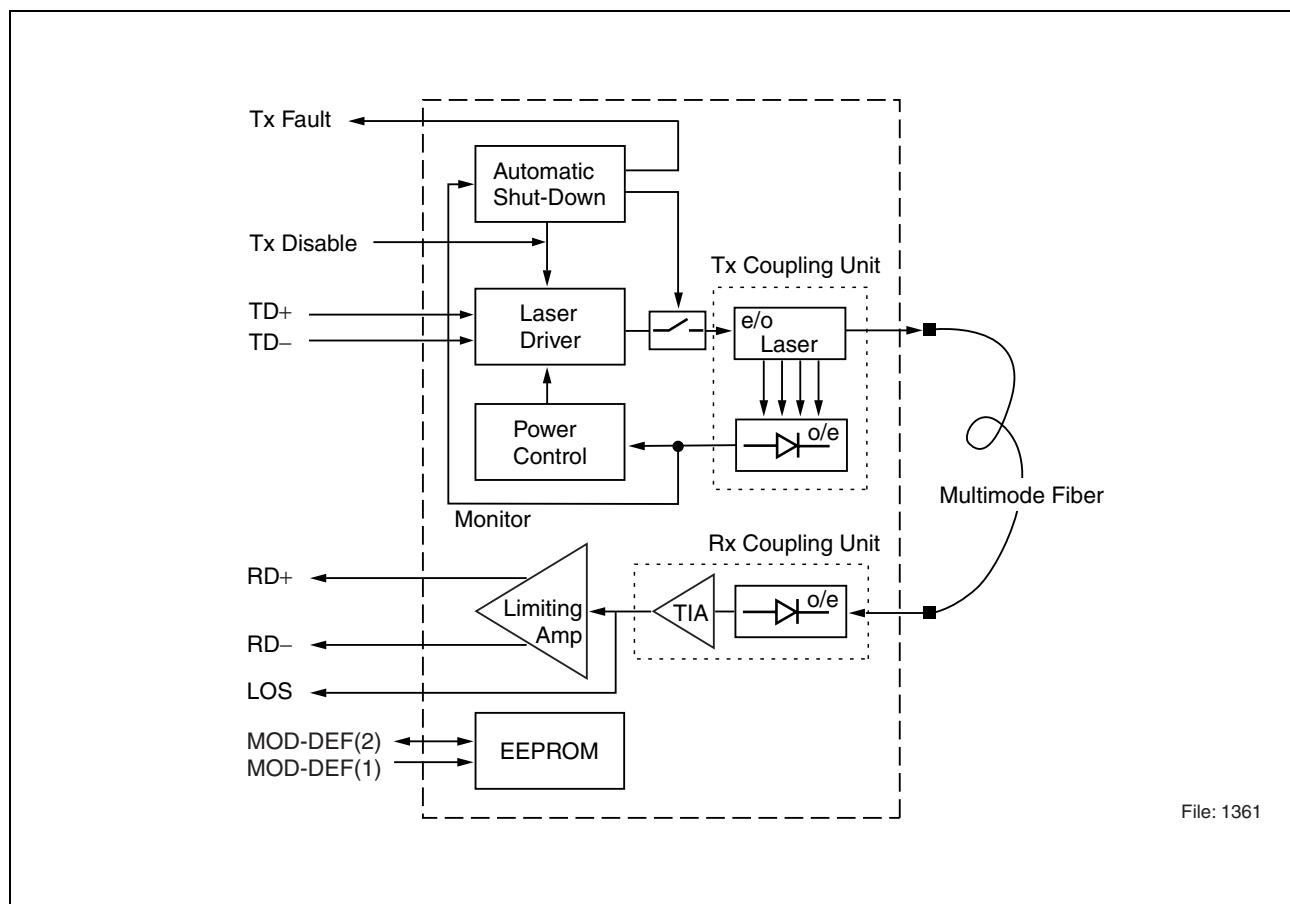
Figure 2   Functional Diagram

Description

The receiver component converts the optical serial data into CML compatible electrical data (RD+ and RD−). The Loss Of Signal (LOS) shows whether an optical signal is present.

The transmitter converts CML compatible electrical serial data (TD+ and TD−) into optical serial data. Data lines are differentially 100 Ω terminated.

The transmitter contains a laser driver circuit that drives the modulation and bias current of the laser diode. The currents are controlled by a power control circuit to guarantee constant output power of the laser over temperature and aging. The power control uses the output of the monitor PIN diode (mechanically built into the laser coupling unit) as a controlling signal, to prevent the laser power from exceeding the operating limits.

Single fault condition is ensured by means of an integrated automatic shutdown circuit that disables the laser when it detects laser fault to guarantee the laser Eye Safety.

The transceiver contains a supervisory circuit to control the power supply. This circuit makes an internal reset signal whenever the supply voltage drops below the reset threshold. It keeps the reset signal active for at least 140 milliseconds after the voltage has risen above the reset threshold. During this time the laser is inactive.

A low signal on TxDis enables transmitter. If TxDis is high or not connected the transmitter is disabled.

The serial ID interface defines a 256 byte memory map in EEPROM, accessible over a 2 wire, serial interface at the 8 bit address 1010000X (A0h).

Description

Regulatory Compliance (EMI)

Feature	Standard	Comments
ESD: Electrostatic Discharge to the Electrical Pins	EIA/JESD22-A114-B (MIL-STD 883D method 3015.7)	Class 1C
Immunity: Against Electrostatic Discharge (ESD) to the Duplex LC Receptacle	EN 61000-4-2 IEC 61000-4-2	Discharges ranging from ±2 kV to ±15 kV on the receptacle cause no damage to transceiver (under recommended conditions).
Immunity: Against Radio Frequency Electromagnetic Field	EN 61000-4-3 IEC 61000-4-3	With a field strength of 10 V/m, noise frequency ranges from 10 MHz to 2 GHz. No effect on transceiver performance between the specification limits.
Emission: Radiated Field Strength	FCC 47 CFR Part 15, Class B CISPR 22 EN 55022 Class B	Noise frequency range: 30 MHz to 18 GHz
$C\epsilon$ File: 1400	Compliant with 89/336/EEC	EN 55022 EN 55024
SFP V23838-M305-M56 **FC** Tested To Comply With FCC Standards FOR HOME OR OFFICE USE File: 1406		This device complies with part 15 of the FCC Rules[1]. Operation is subject to the following two conditions: 1 This device may not cause harmful interference. 2 This device must accept any interference received, including interference that may cause undesired operation.

[1] Any kind of modification not expressly approved by Infineon Technologies may affect the regulatory compliance of the concerned product. As a consequence thereof this could void the user's authority to operate the equipment.

Technical Data

Absolute Maximum Ratings

Parameter	Symbol	Limit Values		Unit
		min.	**max.**	
Data Input Voltage	$V_{\text{ID max}}$		V_{CC}+0.5	V
Differential Data Input Voltage Swing	V_{ID}pk-pk		5	V
Storage Ambient Temperature	T_{S}	−40	85	°C
Operating Case Temperature[1]	T_{C}	−20	85	°C
Storage Relative Humidity	RH_{s}	5	95	%
Operating Relative Humidity	RH_{o}	5	85	%
Supply Voltage	$V_{\text{CC max}}$		4	V
Data Output Current	I_{data}		50	mA
Receiver Optical Input Power	$Rx_{\text{P max}}$		3	dBm

[1] Operating case temperature measured at transceiver reference point (in cage through 2nd centre hole from rear, see **Figure 9**).

Exceeding any one of these values may permanently destroy the device.

Electrical Characteristics (V_{CC} = 2.97 V to 3.63 V, T_C = −20°C to 85°C)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Common					
Supply Voltage	V_{CC}–V_{EE}	2.97	3.3	3.63	V
In-rush Current[1]	$I_{IR\ max}$			30	mA
Power Dissipation	P	400		700	mW
Transmitter					
Differential Data Input Voltage Swing[2]	V_{ID}pk-pk	500		3200	mV
Tx Disable Voltage	Tx_{Dis}	2		V_{CC}	V
Tx Enable Voltage	Tx_{En}	V_{EE}		0.8	V
Tx Fault High Voltage	Tx_{FH}	2.4		V_{CC}	V
Tx Fault Low Voltage	Tx_{FL}	V_{EE}		0.5	V
Supply Current[3]	I_{Tx}		100	150	mA
Receiver					
Differential Data Output Voltage Swing[4]	V_{OD}pk-pk	500		1000	mV
LOS Active	LOS_A	2.4		V_{CC}	V
LOS Normal	LOS_N	V_{EE}		0.5	V
Receiver 3 dB Cut-off Frequency[5]				1.5	GHz
Receiver 10 dB Cut-off Frequency[5]				3	GHz
Rise Time[6]	t_{R-Rx}		125		ps
Fall Time[6]	t_{F-Rx}		170		ps
Contributed Deterministic Jitter[7]	DJ_{Rx}			47	ps
Contributed Total Jitter[8]	TJ_{Rx}			124	ps
Jitter (pk-pk)[9]	J_{Rx}		60		ps
Power Supply Noise Rejection[10]	PSNR		100		mV$_{pp}$
Supply Current[3] [11]	I_{Rx}		80	90	mA

[1] Measured with MSA recommended supply filter network (**Figure 7**). Maximum value above that of the steady state value.

[2] Internally AC coupled. Typical 100 Ω differential input impedance.

[3] MSA defines maximum current at 300 mA.

[4] Internally AC coupled. Load 50 Ω to GND or 100 Ω differential. For dynamic measurement a tolerance of 50 mV should be added.

[5] Fibre Channel PI Standard.

[6] Measured values are 20% - 80%.

[7] Deterministic Jitter is that jitter measured by a bathtub scan, using a 2^7-1 NRZ PRBS, and extrapolating to 1 BER.

[8] Total Jitter is that jitter measured by a bathtub scan, using a 2^7-1 NRZ PRBS, and extrapolating to 1×10^{-12} BER.

[9] Jitter (pk-pk) is measured using a 2^7-1 NRZ PRBS and a Digital Communications Analyzer.

[10] Measured using a 20 Hz to 1 MHz sinusoidal modulation with the MSA recommended power supply filter network (**Figure 7**) in place. A change in sensitivity of less than 1 dB can be typically expected.

[11] Supply current excluding Rx output load.

Optical Characteristics (V_{CC} = 2.97 V to 3.63 V, T_C = −20°C to 85°C)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Transmitter					
Optical Modulation Amplitude[1] @ 2.125 Gbit/s @ 1.0625 Gbit/s	OMA	196 156	450 450		µW
Launched Power (Average)[2]	P_O	−8.5	−6	−4	dBm
Extinction Ratio (Dynamic)	ER	9	14.5		dB
Center Wavelength	λ_C	830	850	860	nm
Spectral Width (rms)	σ_I		0.15	0.85	nm
Relative Intensity Noise	RIN			−117	dB/Hz
Tx Disable Laser Output Power	$P_{O\text{-}TxDis}$			−50	dBm
Deterministic Jitter[3]	DJ_{Tx}			56	ps
Total Jitter[4]	TJ_{Tx}			120	ps
Jitter (pk-pk)[5]	J_{Tx}	20	35	85	ps
Rise Time[6]	$t_{R\text{-}Tx}$		85	150	ps
Fall Time[6]	$t_{F\text{-}Tx}$		135	150	ps
Receiver[7]					
Min. Optical Modulation Amplitude[8] @ 2.125 Gbit/s @ 1.0625 Gbit/s	OMA		24 19	49 31	µW
Sensitivity (Average Power)[9] @ 2.125 Gbit/s @ 1.25 Gbit/s @ 1.0625 Gbit/s	P_{IN}		−22	−19 −19 −19	dBm
Stressed Receiver Sensitivity 50 µm Fiber[10] @ 2.125 Gbit/s @ 1.0625 Gbit/s	S_{PIN} 50 µm		29 24	96 55	µW
Stressed Receiver Sensitivity 62.5 µm Fiber[10] @ 2.125 Gbit/s @ 1.0625 Gbit/s	S_{PIN} 62.5 µm		34 32	109 67	µW
LOS Assert Level[11]	P_{LOSA}	−30	−28		dBm

Optical Characteristics (V_{CC} = 2.97 V to 3.63 V, T_C = −20°C to 85°C) (cont'd)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
LOS Deassert Level[11]	P_{LOSD}		−25	−20	dBm
LOS Hysteresis[11]	P_{LOSA} $-P_{LOSD}$	1	2		dB
Input Center Wavelength	λ_C	770	850	860	nm
Optical Return Loss	ORL	12			dB

[1] Fibre Channel PI Standard. Typical OMA values based on −6 dBm launched power (average) and 15 dB extinction ratio.

[2] Into multimode fiber, 62.5 μm or 50 μm diameter.

[3] Deterministic Jitter is that jitter measured by a bathtub scan, using a 2^7−1 NRZ PRBS, and extrapolating to 1 BER.

[4] Total Jitter is that jitter measured by a bathtub scan, using a 2^7−1 NRZ PRBS, and extrapolating to 1×10^{-12} BER.

[5] Jitter (pk-pk) is measured using a 2^7−1 NRZ PRBS and a Digital Communications Analyzer.

[6] Values are 20% - 80%. Measured at nominal data rate, unfiltered, using an O/E plug-in with a bandwidth of 2.85 GHz or higher. Complies with FC 1x, FC 2x and Gigabit Ethernet eye mask when filtered.

[7] Receiver characteristics are measured with a worst case reference laser.

[8] Fibre Channel PI Standard.

[9] Average optical power at which the BER is 1×10^{-12}. Measured with a 2^7−1 NRZ PRBS and ER = 9 dB.

[10] Measured at the given Stressed Receiver Eye Closure Penalty and DCD component given in Fibre Channel PI Standard (2.03/2.18 dB & 40/80 ps).

[11] See **Figure 3**.
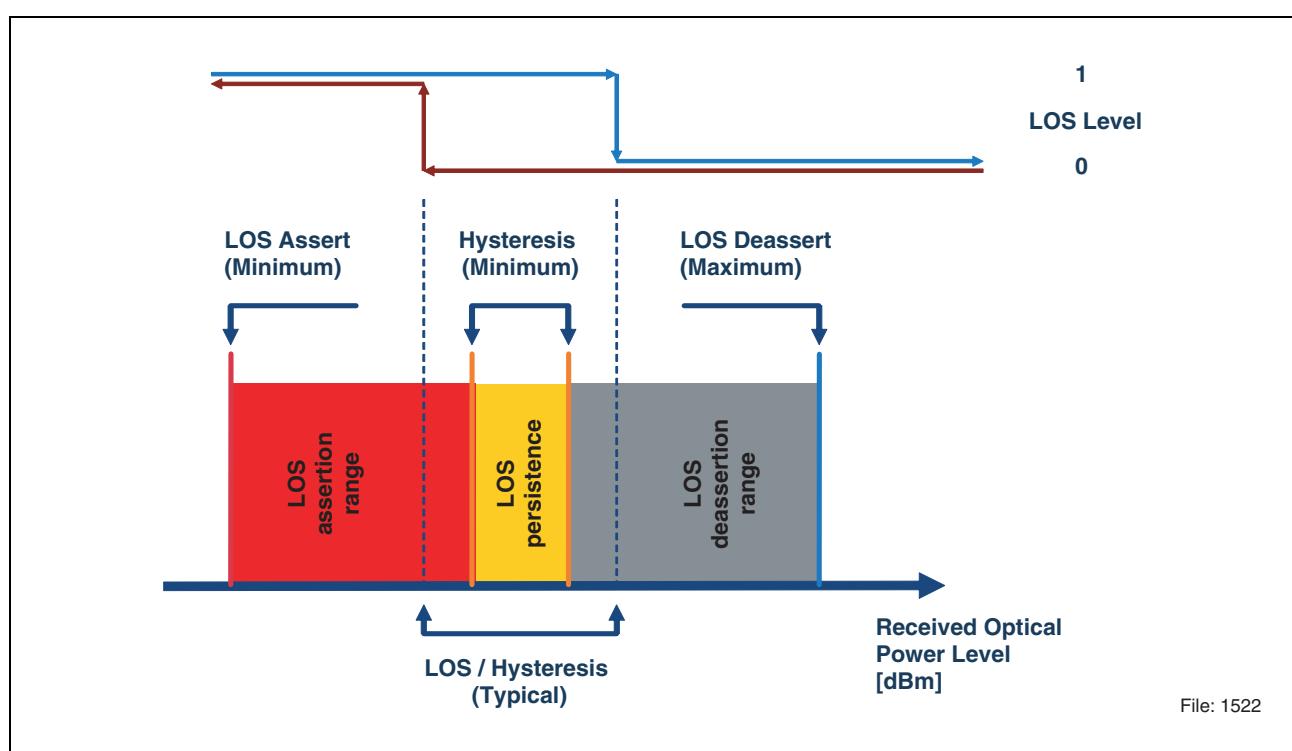
Figure 3

Timing of Control and Status I/O

Parameter	Symbol	Values		Unit	Condition
		min.	max.		
Tx Disable Assert Time	t_off		10	µs	Time from rising edge of Tx Disable to when the optical output falls below 10% of nominal
Tx Disable Negate Time	t_on		1	ms	Time from falling edge of Tx Disable to when the modulated optical output rises above 90% of nominal
Time to Initialize, Including Reset of Tx Fault	t_init		300	ms	From power on or negation of Tx Fault using Tx Disable
Tx Fault Assert Time	t_fault		100	µs	Time from fault to Tx Fault on
Tx Disable to Reset	t_reset	10		µs	Time Tx Disable must be held high to reset Tx Fault
LOS Assert Time	t_loss_on		100	µs	Time from LOS state to Rx LOS assert
LOS Deassert Time	t_loss_off		100	µs	Time from non-LOS state to Rx LOS deassert
I²C Bus Clock Rate	f_i2cbus_clock		100	kHz	

Eye Safety

This laser based multimode transceiver is a Class 1 product. It complies with IEC 60825-1/A2: 2001 and FDA performance standards for laser products (21 CFR 1040.10 and 1040.11) except for deviations pursuant to Laser Notice 50, dated July 26, 2001.

CLASS 1 LASER PRODUCT

To meet laser safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

Note: All adjustments have been made at the factory prior to shipment of the devices. No maintenance or alteration to the device is required.
Tampering with or modifying the performance of the device will result in voided product warranty.
Failure to adhere to the above restrictions could result in a modification that is considered an act of "manufacturing", and will require, under law, recertification of the modified product with the U.S. Food and Drug Administration (ref. 21 CFR 1040.10 (i)).

Laser Emission Data

| Wavelength	850 nm
Maximum total output power (as defined by IEC: 7 mm aperture at 14 mm distance)	709 µW / −1.5 dBm
Beam divergence (full angle) / NA (half angle)	20° / 0.18 rad
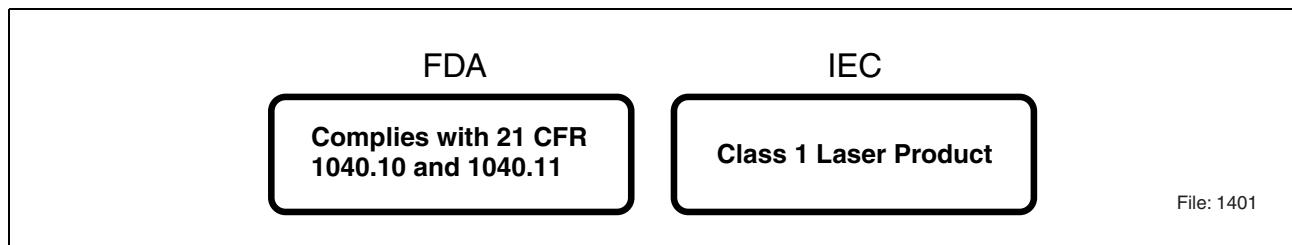


Figure 4   Required Labels
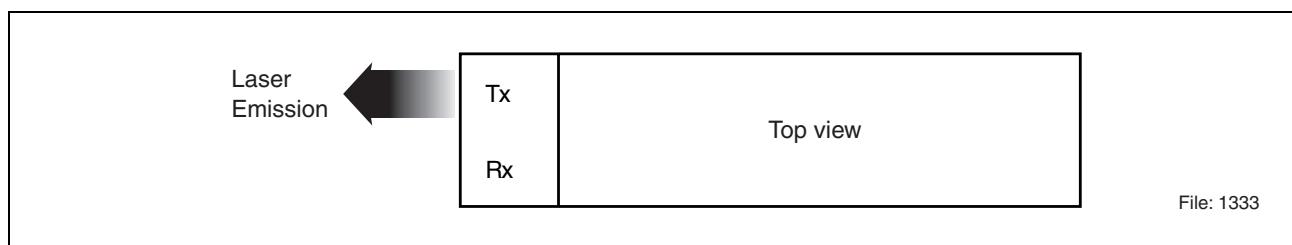
Figure 5   Laser Emission

Application Notes

EMI Recommendations

To avoid electromagnetic radiation exceeding the required limits set by the standards, please take note of the following recommendations.

When Gigabit switching components are found on a PCB (e.g. multiplexer, serializer-deserializer, clock data recovery, etc.), any opening of the chassis may leak radiation; this may also occur at chassis slots other than that of the device itself. Thus every mechanical opening or aperture should be as small as feasible and its length carefully considered.

On the board itself, every data connection should be an impedance matched line (e.g. strip line or coplanar strip line). Data (D) and Data-not (Dn) should be routed symmetrically. Vias should be avoided. Where internal termination inside an IC or a transceiver is not present, a line terminating resistor must be provided. The decision of how best to establish a ground depends on many boundary conditions. This decision may turn out to be critical for achieving lowest EMI performance. At RF frequencies the ground plane will always carry some amount of RF noise. Thus the ground and V_{CC} planes are often major radiators inside an enclosure. As a general rule, for small systems such as PCI cards placed inside poorly shielded enclosures, the common ground scheme has often proven to be most effective in reducing RF emissions. In a common ground scheme, the PCI card becomes more equipotential with the chassis ground. As a result, the overall radiation will decrease. In a common ground scheme, it is strongly recommended to provide a proper contact between signal ground and chassis ground at every location where possible. This concept is designed to avoid hotspots which are places of highest radiation, caused when only a few connections between chassis and signal grounds exist. Compensation currents would concentrate at these connections, causing radiation. However, as signal ground may be the main cause for parasitic radiation, connecting chassis ground and signal ground at the wrong place may result in enhanced RF emissions.

For example, connecting chassis ground and signal ground at a front panel/bezel/chassis by means of a fiber optic transceiver/cage may result in a large amount of radiation especially where combined with an inadequate number of grounding points between signal ground and chassis ground. Thus the transceiver becomes a single contact point increasing radiation emissions. Even a capacitive coupling between signal ground and chassis ground may be harmful if it is too close to an opening or an aperture. For a number of systems, enforcing a strict separation of signal ground from chassis ground may be advantageous, providing the housing does not present any slots or other discontinuities. This separate ground concept seems to be more suitable in large systems where appropriate shielding measures have also been implemented. The return path of RF current must also be considered. Thus a split ground plane between Tx and Rx paths may result in severe EMI problems.

The bezel opening for a transceiver should be sized so that all contact springs of the transceiver cage make good electrical contact with the face plate. Please consider that the PCB may behave like a dielectric waveguide. With a dielectric constant of 4, the wavelength of the harmonics inside the PCB will be half of that in free space. Thus even the smallest PCBs may have unexpected resonances.

Large systems can have many openings in the front panel for SFP transceivers. In typical applications, not all of these ports will hold transceivers; some may be intentionally left empty. These empty slots may emit significant amounts of radiation. Thus it is recommended that empty ports be plugged with an EMI plug as shown in **Figure 6**. Infineon offers an EMI/dust plug, P/N V23818-S5-B1.

SFP Accessories

Cage:
Infineon Technologies
Part Number: V23838-S5-N1/V23838-S5-N1-BB

Host Board Connector:
Tyco Electronics
Part Number: 1367073-1

Cage EMI/Dust Plug:
Infineon Technologies
Part Number: V23818-S5-B1

Cage Dust Plug:
Infineon Technologies
Part Number: V23818-S5-B2
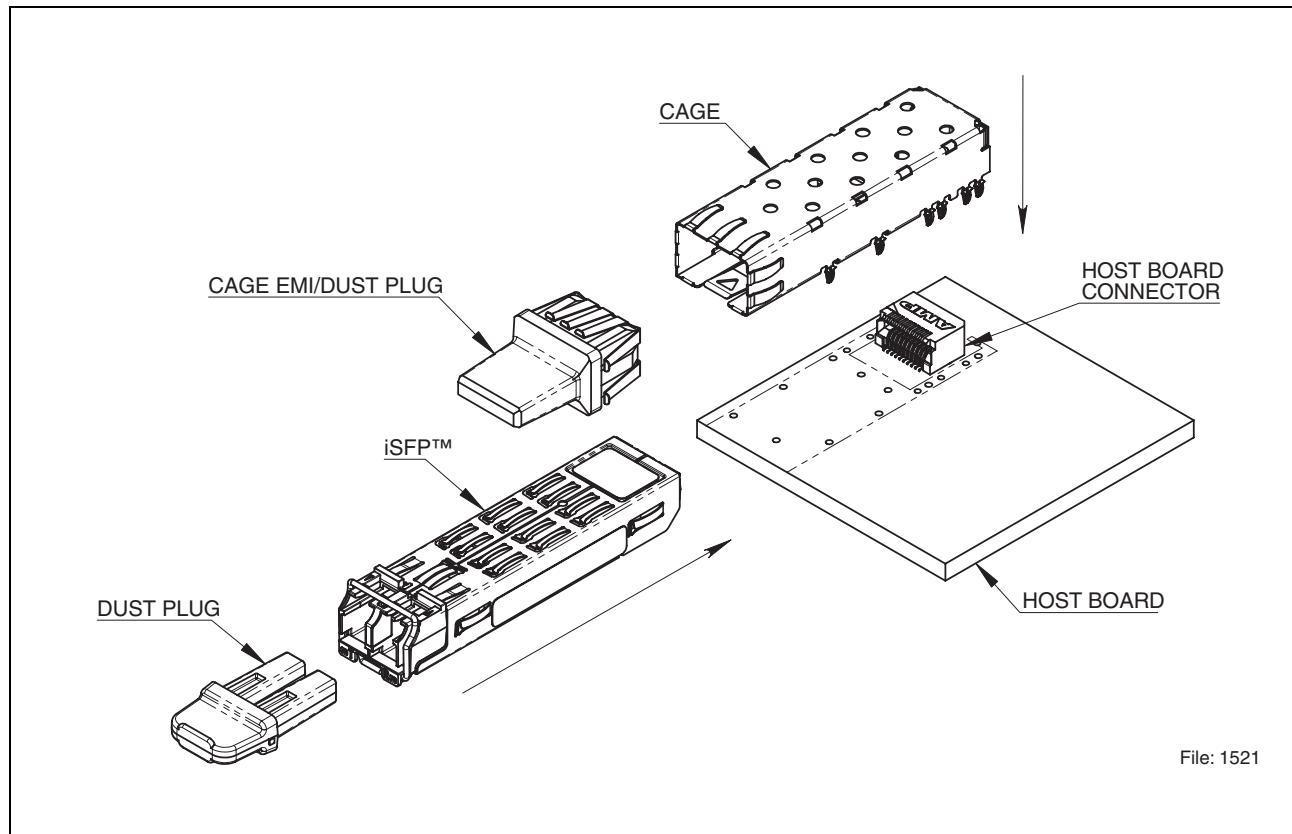
Figure 6

EEPROM Serial ID Memory Contents (A0h)

Addr.	Hex	ASCII	Name/Description	Addr.	Hex	ASCII	Name/Description
0	03		Identifier	32	47	G	Vendor name
1	04		Extended identifier	33	6D	m	
2	07		Connector	34	62	b	
3	00		Transceiver optical compatibility	35	48	H	
4	00			36	00		Reserved
5	00			37	00		Vendor OUI
6	01			38	03		
7	40			39	19		
8	40			40	56	V	Vendor part number
9	0C			41	32	2	
10	05			42	33	3	
11	01		Encoding	43	38	8	
12	15		BR, nominal	44	33	3	
13	00		Reserved	45	38	8	
14	00		Length (9 μm) - km	46	2D	-	
15	00		Length (9 μm)	47	4D	M	
16	1E		Length (50 μm)	48	33	3	
17	0F		Length (62.5 μm)	49	30	0	
18	00		Length (copper)	50	35	5	
19	00		Reserved	51	2D	-	
20	49	I	Vendor name	52	4D	M	
21	6E	n		53	35	5	
22	66	f		54	36	6	
23	69	i		55	20		
24	6E	n		56	41	A	Vendor revision, product status dependent
25	65	e		57	34	4	
26	6F	o		58	41	A	
27	6E	n		59	39	9	
28	20			60	03		Wavelength
29	46	F		61	52		
30	4F	O		62	00		Reserved
31	20			63	21		Check sum of bytes 0 - 62

EEPROM Serial ID Memory Contents (A0h) (cont'd)

Addr.	Hex	ASCII	Name/Description	Addr.	Hex	ASCII	Name/Description
64	00		Transceiver signal options	96	20		Vendor specific EEPROM
65	1A			97	20		
66	00		BR, maximum	98	20		
67	32		BR, minimum	99	20		
68			Vendor serial number	100	20		
69				101	20		
70				102	20		
71				103	20		
72				104	20		
73				105	20		
74				106	20		
75				107	20		
76	20			108	20		
77	20			109	20		
78	20			110	20		
79	20			111	20		
80	20			112	20		
81	20			113	20		
82	20			114	20		
83	20			115	20		
84			Vendor manufacturing date code	116	20		
85				117	20		
86				118	20		
87				119	20		
88				120	20		
89				121	20		
90	20			122	20		
91	20			123	20		
92	00		Diagnostic monitoring type	124	20		
93	00		Enhanced options	125	20		
94	00		SFF-8472 compliance	126	20		
95			Low order 8 bits of the sum of the contents of all the bytes from byte 64 to byte 94, inclusive	127	20		
				128 - 255	00		Vendor specific. Reserved for future use

Multimode 850 nm SFP Transceiver, AC/AC TTL

1) Design criterion of the capacitor used is the resonant frequency and its value must be in the order of the nominal data rate. Use of single layer capacitors recommended. Short trace lengths are mandatory.
2) Not implemented.

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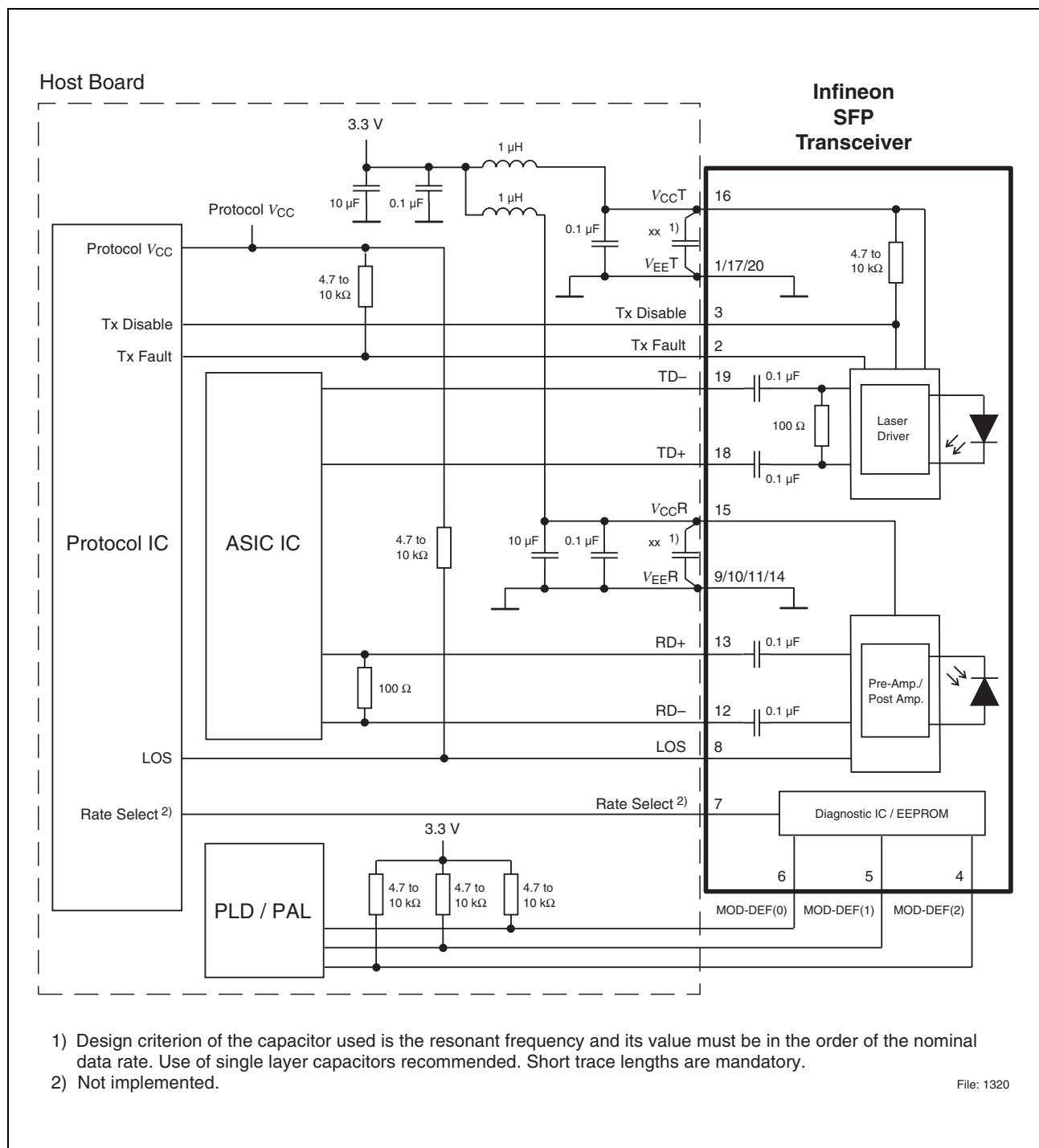
Figure 7   Example SFP Host Board Schematic and Recommended Host Board Supply Filtering Network

Package Outlines

Figure 8

Figure 9

V23838-M305-M56
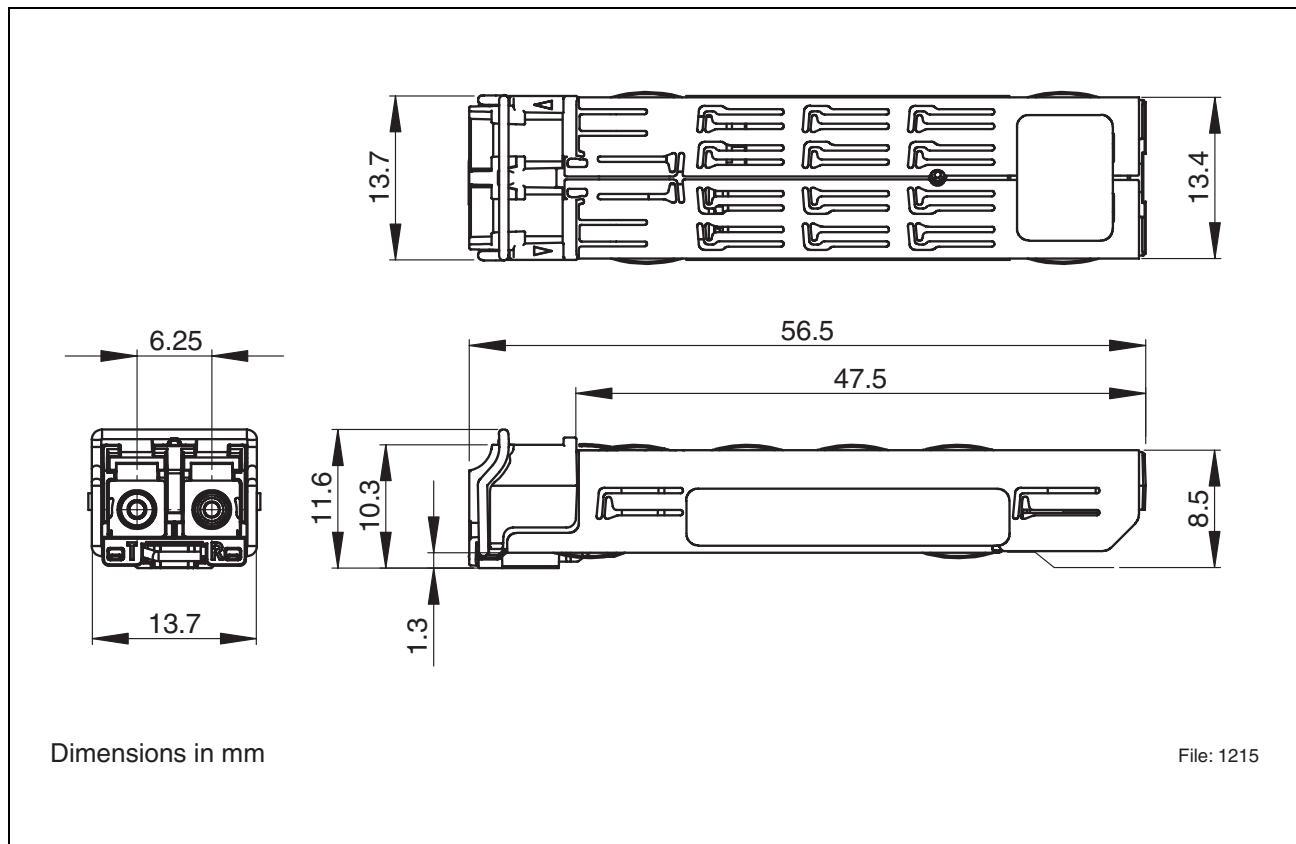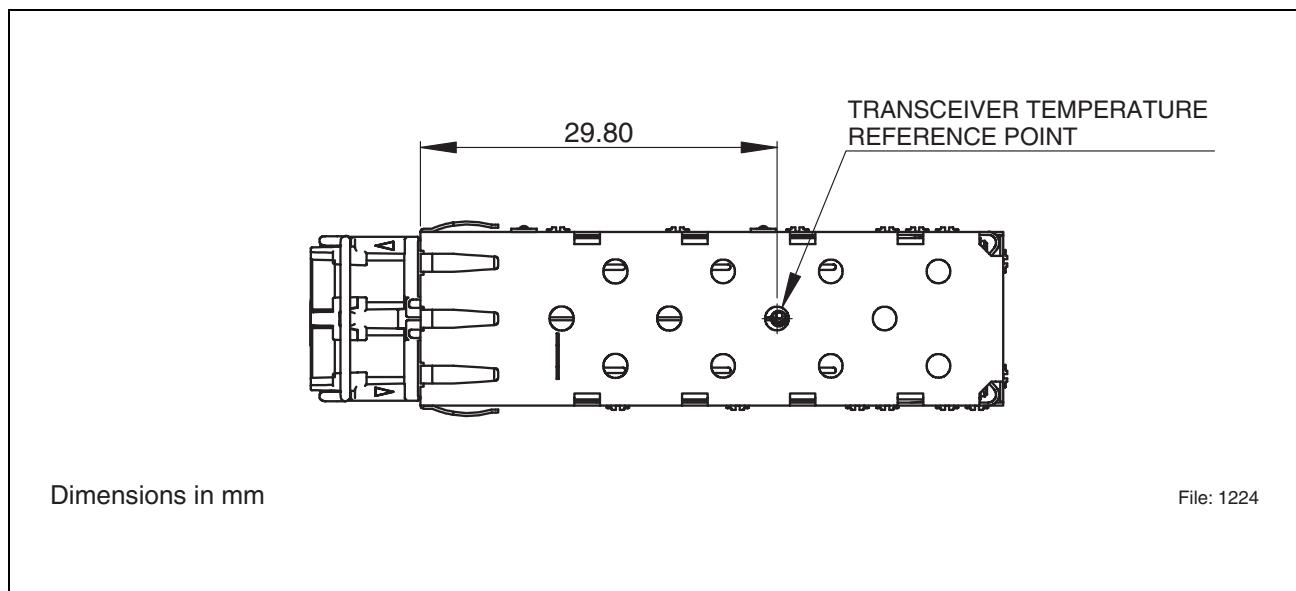
Revision History:	**2004-06-23**	DS3
Previous Version:	2004-01-09	

Page	**Subjects (major changes since last revision)**
1	**Features** changed
4	**Description** changed
9, **17**	Tables changed
19	**Figure 7** Host Board Schematic changed

Attention please!

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