

1.25Gb/s CWDM SFP Optical Transceiver with DDMI

HCSFP-24-2XXY1-22F

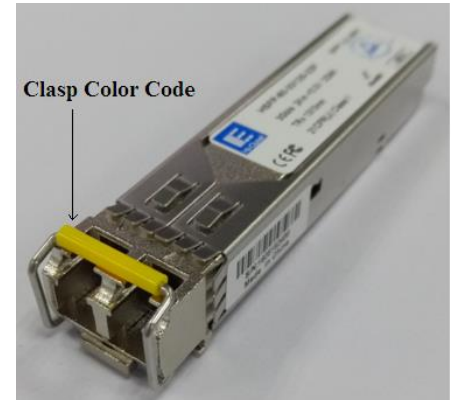
1271~1611nm DFB-LD/PIN-TIA

XX=27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59,61



Features:

- ✧ Multi-Source Package with Duplex LC Connector
- ✧ Up to 1.25Gb/s Data Links
- ✧ 19dB Power budget
- ✧ Single +3.3V Power Supply
- ✧ Hot-Pluggable
- ✧ Compliant with Specifications for ITU-T G.957, G.958
- ✧ Eye Safety Designed to Meet Laser Class1, Compliant with IEC60825
- ✧ Monitoring Interface Compliant with SFF-8472
- ✧ Compliant with Bellcore TA-NWT-000983
- ✧ Operating Case Temperature
Standard(Y=1):0°C~+70°C
Industrial(Y=2):-20°C~+85°C
- ✧ RoHS Compliant Products



Applications:

- ✧ Gigabit Ethernet
- ✧ Metro/Access Networks
- ✧ SDH/SONET/ATM
- ✧ Fiber Channel
- ✧ Other Optical Links

Specification:

Product Selection:

HCSFP-24-2XXY1-22F

XX	Centre Wavelength(λ)	Clasp Color Code.	XX	Centre Wavelength(λ)	Clasp Color Code.
27	1271nm	Gray	45	1451nm	Yellow
29	1291nm	Purple	47	1471nm	Gray
31	1311nm	Blue	49	1491nm	Purple
33	1331nm	Green	51	1511nm	Blue
35	1351nm	Yellow	53	1531nm	Green
37	1371nm	Orange	55	1551nm	Yellow
39	1391nm	Red	57	1571nm	Orange
41	1411nm	Brown	59	1591nm	Red
43	1431nm	Green	61	1611nm	Brown

*For the relation between transmission distance and power budget, it is related to the power penalty, the value is about 0.20~0.35dB/km under 1271~1611nm.

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Electrical and Optical Characteristics: (Condition: T_a=T_{OP})

Parameter	Symbol	Min.	Typical	Max.	Unit
Transmitter Differential Input Volt	+/-TX_DAT	200		2400	mV p-p
Supply Current	ICC		160	350	mA
Tx_Disable Input Voltage – Low	V _{IL}	0		0.8	V
Tx_Disable Input Voltage – High	V _{IH}	2.0		V _{CC}	V
Tx_Fault Output Voltage – Low	V _{OL}	0		0.8	V
Tx_Fault Output Voltage – High	V _{OH}	2.0		V _{CC}	V
Receiver Differential Output Volt	+/-RX_DAT	400		1400	mV p-p
Rx_LOS Output Voltage- Low	V _{OL}	0		0.8	V
Rx_LOS Output Voltage- High	V _{OH}	2.0		V _{CC}	V

Transmitter:

Parameter	Symbol	Min.	Typical	Max.	Unit
Data Rate	B	-	1.25	-	Gb/s
Centre Wavelength*Note1	λ_c	$\lambda-6.5$	λ	$\lambda+6.5$	nm
Output Spectral Width	$\Delta\lambda(-20dB)$	-	-	1	nm
Side Mode Suppression Ratio	SMSR	30			dB
Average Output Power*Note2	P _o	-5	-	0	dBm
Extinction Ratio*Note3	E.R.	8.2	-	-	dB
Supply Current	ICC	-	100	230	mA
Rise/Fall Time(20%~80%)	tr/tf	-	-	260	ps
Average Output Power@TX_DISABLE	P _{o_dis}			-45	dBm
Output Optical Eye	Compatible with IEEE 802.3ah-2004				

Receiver:

Parameter	Symbol	Min.	Typical	Max.	Unit
Date Rate	B	-	1.25	-	Gb/s
Receive Sensitivity*Note4	P _{min}	-	-	-24	dBm
Maximum Input Power	P _{max}	0	-	-	dBm
Signal Detect Threshold-De-Assert	S _D			-26	dBm
Signal Detect Threshold-Assert	S _A	-35			dBm
Hysteresis	-		2.0		dB
Return Loss	RL	12	-	-	dB
Supply Current	ICC	-	60	120	mA
Operating Wavelength	λ_c	1100	-	1620	nm

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Note1: Wavelengths from 1271 nm to 1611 nm, with 20 nm span. Please contact Hi-Optel to confirm the wavelength availability.

Note2: Measured with 9/125μm single-mode fiber.

Note3: Filtered, measured with a PRBS 2⁷-1 test pattern @1.25Gbps

Note4: Measured with ER=8.2dB, 2⁷-1 PRBS data pattern, BER ≤ 1E-12.

Absolute Maximum Ratings:

Parameter		Symbol	Min.	Max.	Unit
Storage Temperature		T _{ST}	-40	+85	°C
Operating Temperature	Y=1	T _{IP}	0	+70	°C
	Y=2		-20	+85	
Input Voltage		T _{CC}	0	+3.6	V

Recommended Operating Environment:

Parameter		Symbol	Min.	Typical	Max.	Unit
Supply Voltage		V _{CC}	+3.0	+3.3	+3.6	V
Operating Temperature	Y=1	T _{OP}	0	-	+70	°C
	Y=2		-20	-	+85	

Timing Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
TX_DISABLE Assert Time	t _{off}		3	10	usec
TX_DISABLE Negate Time	t _{on}		0.5	1	msec
Time to Initialize Include Reset of TX_FAULT	t _{int}		30	300	msec
TX_FAULT from Fault to Assertion	t _{fault}		20	100	usec
TX_DISBEL Time to Start Reset	t _{reset}	10			usec
Receiver Loss of Signal Assert Time (Off to On)	Ta,RX_LOS			100	usec
Receiver Loss of Signal Assert Time (On to Off)	Td,RX_LOS			100	usec

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Rev2.0

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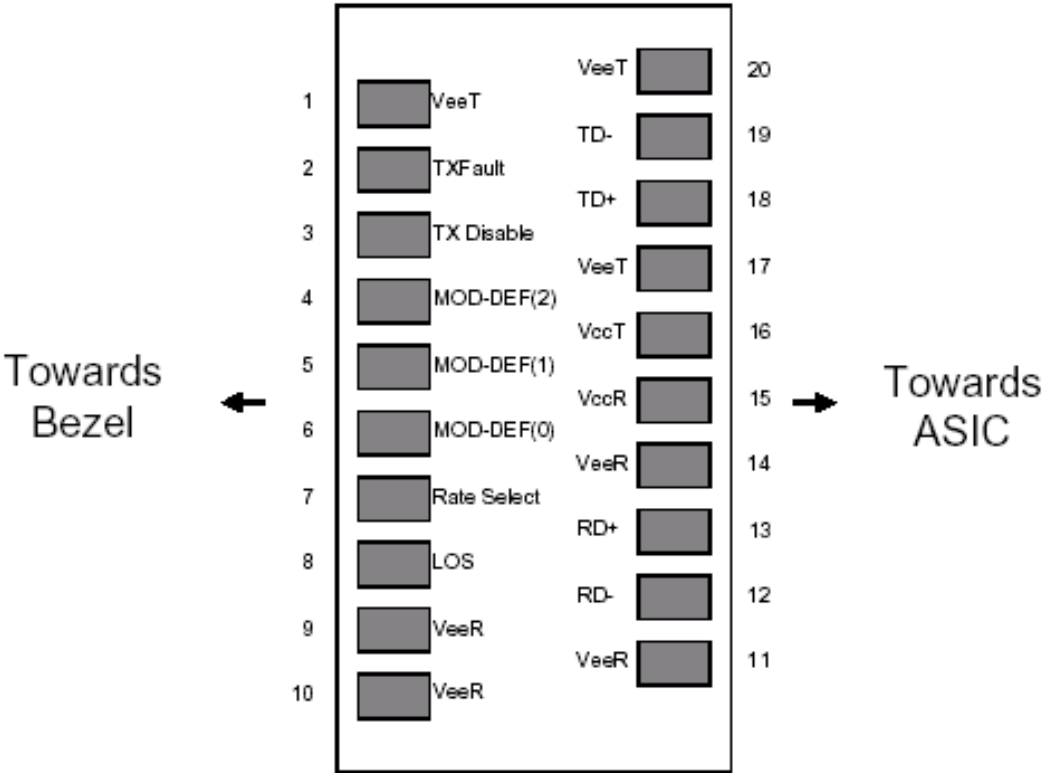


Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge(ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>500 V)
Electrostatic Discharge(ESD) To the Duplex Receptacle	IEC61000-4-2	Class 2(>4000V)
Electromagnetic Interference (EMI)	FCC Part 15 Class B	Compatible with standards
Immunity	IEC61000-4-3	Compatible with standards
Laser eye safety	FDA21CFR1040.10and1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class I laser product
Component Recognition	UL and CE	Compatible with standards
ROHS	ROHS6	Compatible with standards

Note: For the latest certification information, please check with Hi-Optel.

Pin Assignment



Pin out of Connector Block on Host Board

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Pin Description

Pin	Symbol	Name/Description	Ref
1	VEET	Transmitter Ground(Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault.Low normal operation,High Fault indication	
3	TDIS	Transmitter Disable.Laser output disabled on high or open	2
4	MOD_DEF(2)	Module Definition 2.Data line for Serial ID	3
5	MOD_DEF(1)	Module Definition 1.Clock line for Serial ID	3
6	MOD_DEF(0)	Module Definition 0.Grounded within the moudle	3
7	Rate Select	No connection required	
8	LOS	Loss of Signal indication.Logic 0 indicates normal operation.	4
9	VEER	Receiver Ground(Common with Transmitter Ground)	1
10	VEER	Receiver Ground(Common with Transmitter Ground)	1
11	VEER	Receiver Ground(Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out.AC Coupled	
13	RD+	Receiver Non-inverted DATA out.AC Coupled	
14	VEER	Receiver Ground(Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground(Common with Receiver Ground)	1
18	TD+	Transmitter Non-inverted DATA in.AC Coupled	
19	TD-	Transmitter Inverted DATA in.AC Coupled	
20	VEET	Transmitter Ground(Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V.
MOD_DEF(0) pulls line low to indicate module is plugged in.
4. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

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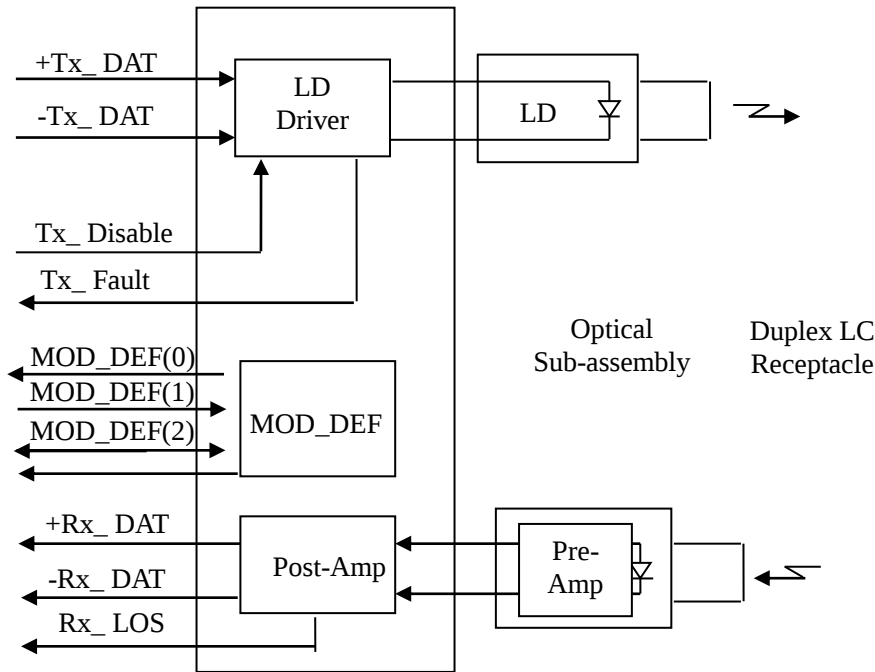
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Block Diagram of Transceiver



Data Field Descriptions

Address(1010000X) (A0h)	Address(1010001X) (A2h)
0	0
Serial ID Information: Defined by SFP MSA	Alarm and Warning Limits
95	55
Hi-Optel Specific Information	Reserved for External Calibration Constants
127	95
Reserved for SFP MSA	Real Time Diagnostic Information
	119
	Hi-Optel Specific Information
	127
	Non-volatile, customer- writeable, field-writeable
	247
	Hi-Optel Specific Information
255	255

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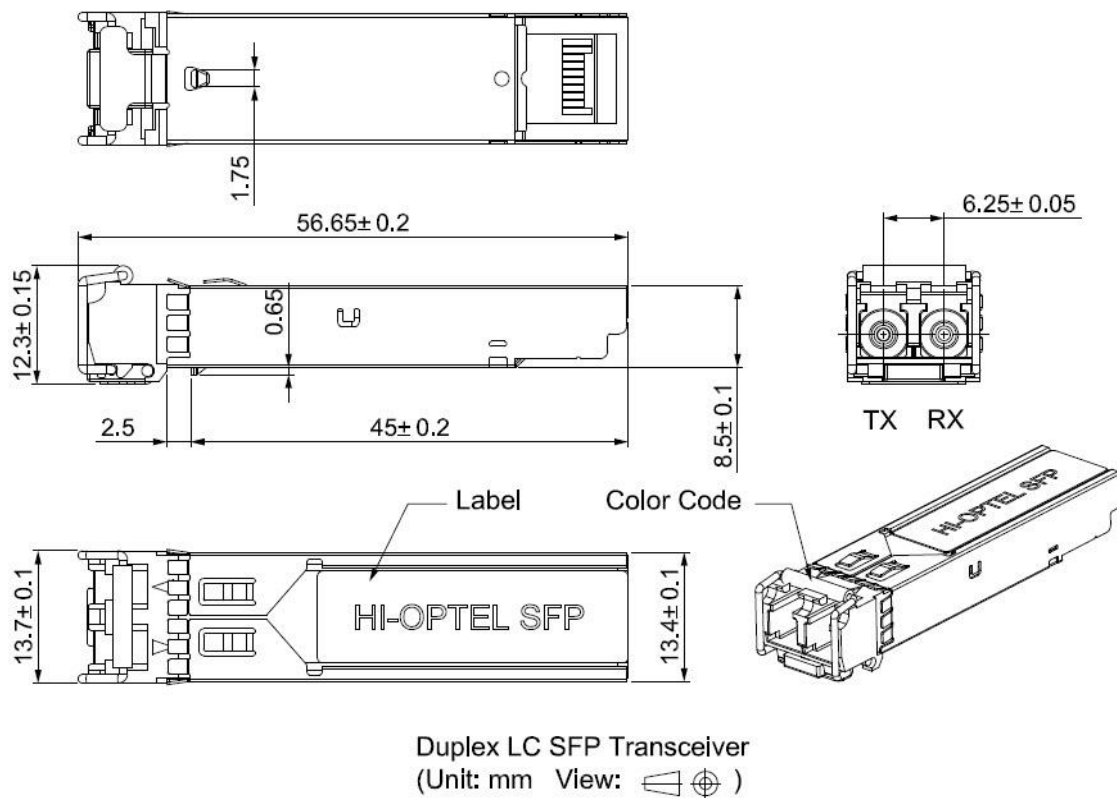
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Digital Diagnostic Monitor Characteristics

A2h address	Parameter	Calibration	Accuracy	Unit
96-97	Temperature	Internal	+/- 3	°C
98-99	Vcc	Internal	+/- 3%	V
100-101	Tx bias	Internal	+/- 10%	mA
102-103	Tx power	Internal	+/- 3	dB
104-105	Rx Power	Internal	+/- 3	dB

Mechanical Dimensions:



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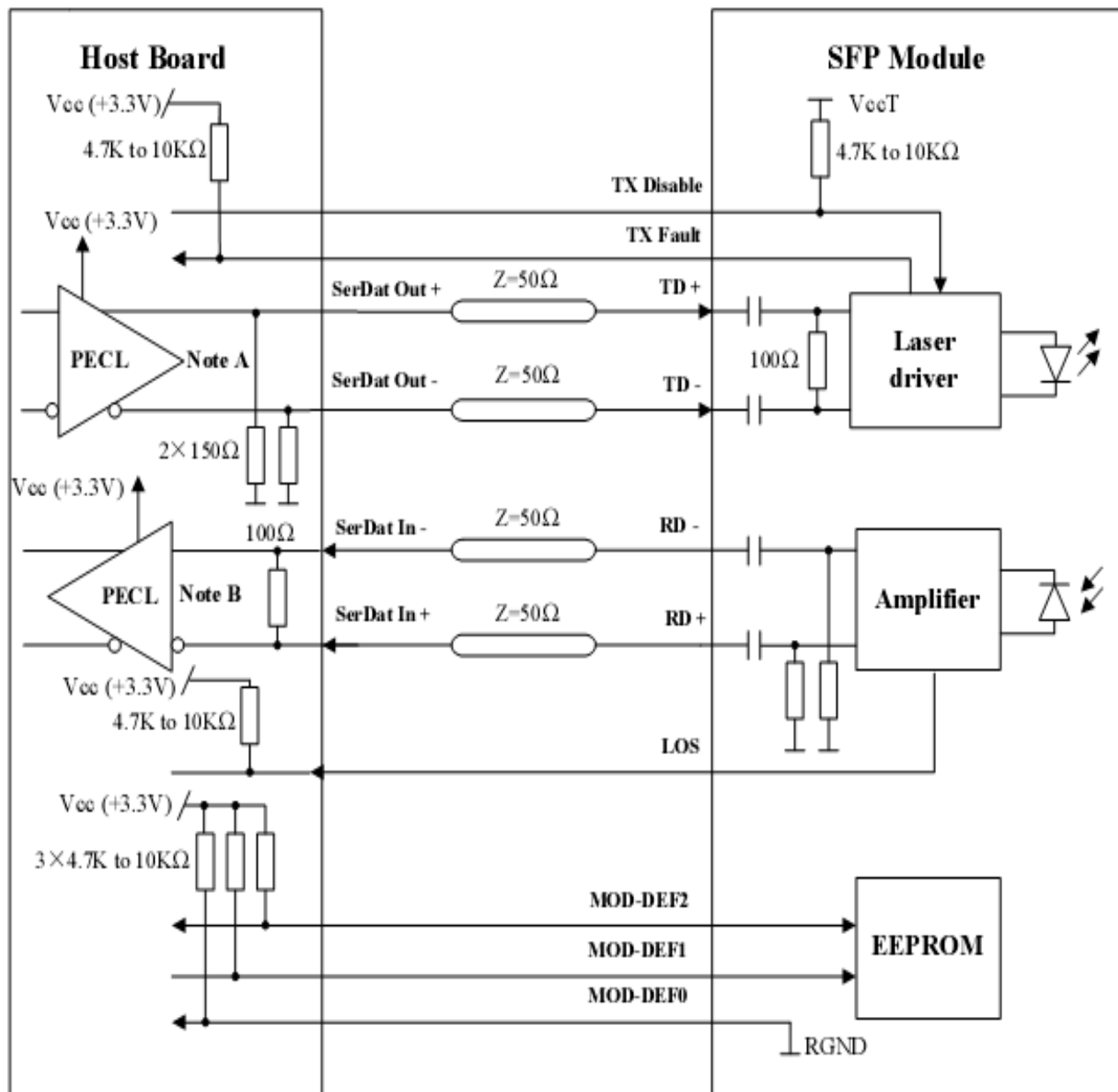
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Recommended Circuit:



Note A: Circuit assumes open emitter output

Note B: Circuit assumes high impedance internal bias @Vcc-1.3V