

深圳市恒宝通光电子股份有限公司
产品说明书

HSFP28-2C21xx

HPT3-D-S-0283

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25Gb/s SFP28 LR Optical Transceiver
HSFP28-2C21xx
CWDM DFB/PIN-TIA, 10Km, 0~70℃



Features

- ✧ Compliant with MSA SFP+ Specification SFF-8402
- ✧ Monitoring Interface Compliant with SFF-8472
- ✧ Single +3.3V Power Supply
- ✧ Hot-Pluggable
- ✧ Built-in dual CDR
- ✧ Support 25.78 Gb/s Data Links
- ✧ Up to 10Km on 9/125um SMF
- ✧ Very low EMI and excellent ESD protection
- ✧ Operating Case Temperature: 0℃~+70℃
- ✧ Power Dissipation < 1.2W
- ✧ RoHS Compliant Products



Applications

- ✧ 25GbE
- ✧ CPRI
- ✧ Other Optical Links

Product Selection

Product Code	Bail Color	Center Wavelength
HSFP28-2C2101	Gray	1271nm
HSFP28-2C2102	Violet	1291nm
HSFP28-2C2103	Blue	1311nm
HSFP28-2C2104	Green	1331nm
HSFP28-2C2105	Yellow	1351nm
HSFP28-2C2106	Orange	1371nm

Shenzhen Hi-Optel Technology Co., Ltd.

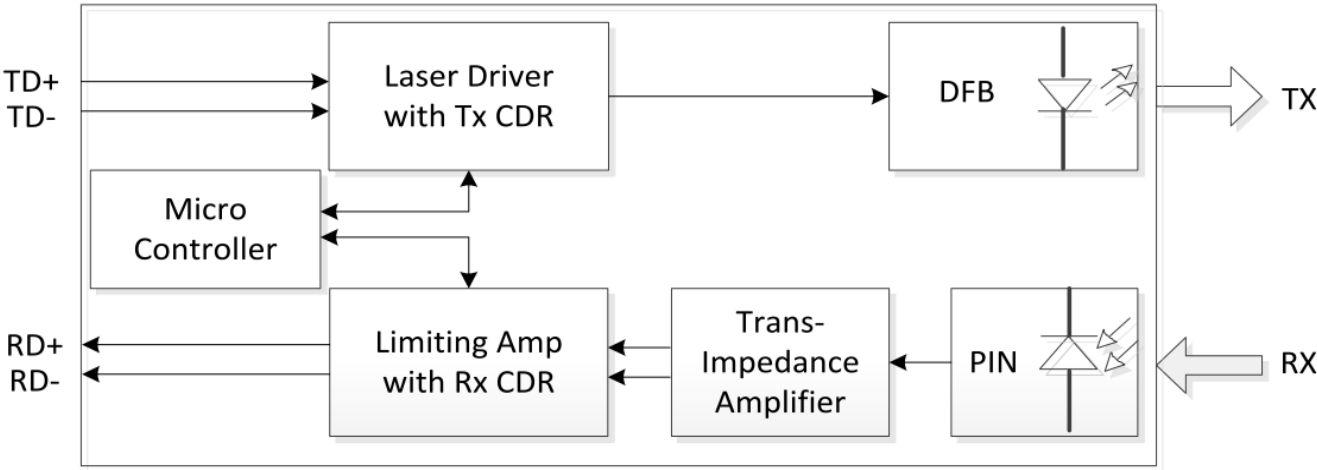
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Description

HSFP28-2C21xx is SFP28 module for duplex optical data communications support 25.78Gb/s data links. It is with the SFP+ 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I2C. It has built-in dual clock and data recovery (CDR).This module is designed for single-mode fiber and operates at a nominal wavelength of 1310nm.The transmitter section uses a high performance CWDM DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs detector pre-amplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.



Specification

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

Parameter	Symbol	Min.	Typical	Max.	Unit
Link Distance with G.652	-	-	-	10	Km
Power Dissipation	-	-	-	1.2	W
Transmitter:					
Transmitter Differential Input Volt ^{*Note1}	+/-TX_DAT	180		1600	mV p-p
Input Impedance (Differential)	Z _{in}		100		Ω
Tx_Disable Input Voltage – Low	V _{IL}	-0.3		0.8	V
Tx_Disable Input Voltage – High	V _{IH}	2.0		V _{cc} +0.3	V
Tx_Fault Output Voltage – Low	V _{OL}	-0.3		0.8	V
Tx_Fault Output Voltage – High	V _{OH}	2.0		V _{cc} +0.3	V

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Receiver:

Receiver Differential Output Volt ^{*Note1}	+/-RX_DAT	370		850	mV p-p
Output Impedance (Differential)	Z _{out}		100		Ω
Rx_LOS Output Voltage- Low	V _{OL}	-0.3		0.8	V
Rx_LOS Output Voltage- High	V _{OH}	2.0		V _{cc} +0.3	V

Note1: AC coupled.

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

Transmitter:

Parameter	Symbol	Min.	Typical	Max.	Unit
Data Rate	B	-	25.78	-	Gb/s
Centre Wavelength	λ _c	λ _c - 6.5	λ _c	λ _c + 6.5	nm
Output Spectral Width	Δλ(-20dB)	-	-	1	nm
Average Output Power ^{*Note1}	P _o	-7	-	2	dBm
Extinction Ratio ^{*Note2}	E.R.	3	-	-	dB
Transmitter Dispersion Penalty	TDP	-		3.2	dB
Eye Mask{X1, X2, X3, Y1, Y2, Y3}	{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}			Hit ratio 5x10 ⁻⁵ per sample	

Receiver:

Parameter	Symbol	Min.	Typical	Max.	Unit
Date Rate	B	-	25.78	-	Gb/s
Receiver Sensitivity (OMA) ^{*Note3}	SEN			-12	dBm (for BER =5x10 ⁻⁵)
Maximum Input Power	P _{max}	2.0	-	-	dBm
Signal Detect Threshold-De-Assert	S _D			-17	dBm
Signal Detect Threshold-Assert	S _A	-30			dBm
Hysteresis	-	0.5	-		dB
Optical Return Loss	ORL	-	-	-26	dB
Operating Wavelength	λ _c	1260	-	1355	nm

Note1: Measured with 9/125μm single-mode fiber.

Note2: Measured with a PRBS 2³¹-1 test pattern @25.78Gb/s

Note3: Measured with ER=3.5dB, 2³¹-1 PRBS data pattern, BER less than 5E-5@25GBE and less than 1E-6@32GFC.

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Absolute Maximum Ratings: ($T_C=25^{\circ}\text{C}$)

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T_{ST}	-40	+85	℃
Operating Temperature	T_{IP}	0	+70	℃
Input Voltage	T_{CC}	0	+4.0	V
Operating Relative Humidity	RH	5	95	%

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

Recommended Operating Environment:

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	V_{CC}	+3.135	+3.3	+3.465	V
Operating Temperature	T_{OP}	0	-	+70	℃

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

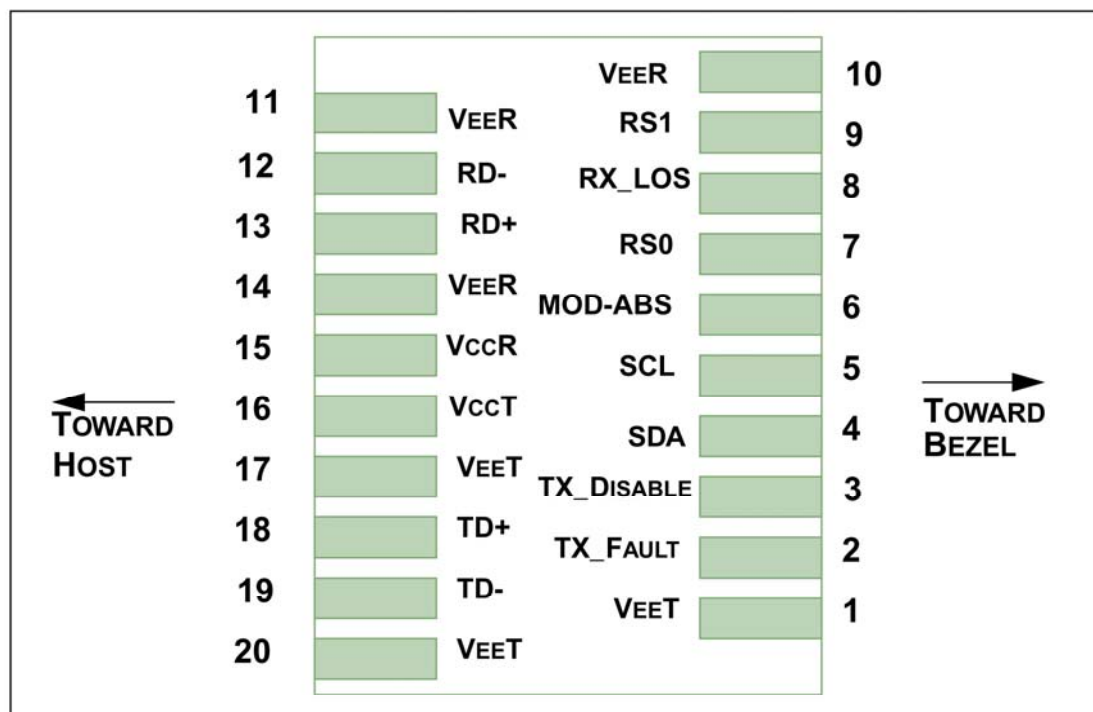


Figure 1 Host PCB SFP+ Pad Pinout Top View

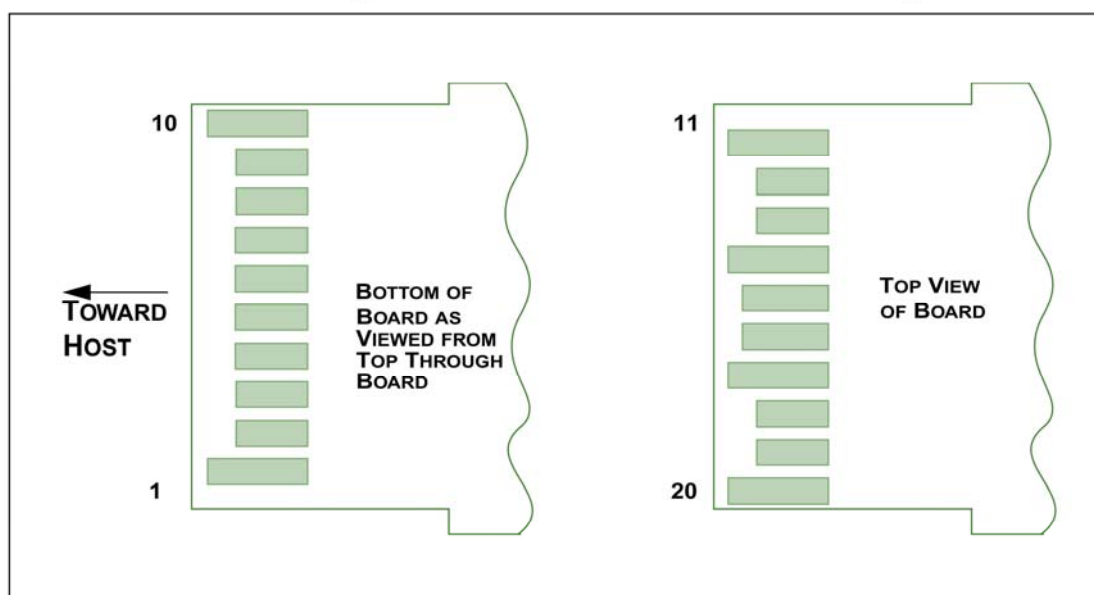


Figure 2 SFP+ Module PCB Pinout

Pin Description

Pin	Symbol	Name/Description	Ref
1	VeeT	Transmitter Ground(Common with Receiver Ground)	1
2	Tx Fault	Transmitter Fault. Low normal operation, High Fault indication	
3	Tx Disable	Transmitter Disable. Laser output disabled on high or open	2
4	SDA	Module Definition 2.Data line for Serial ID	3
5	SCL	Module Definition 1.Clock line for Serial ID	3
6	MOD-ABS	Module Definition 0.Grounded within the module	
7	RS0	Rate Select 0, optionally controls SFP28 module receiver. LVTTTL Logic.	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	4
9	RS1	Rate Select 1, optionally controls SFP28 module transmitter. LVTTTL Logic.	5
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

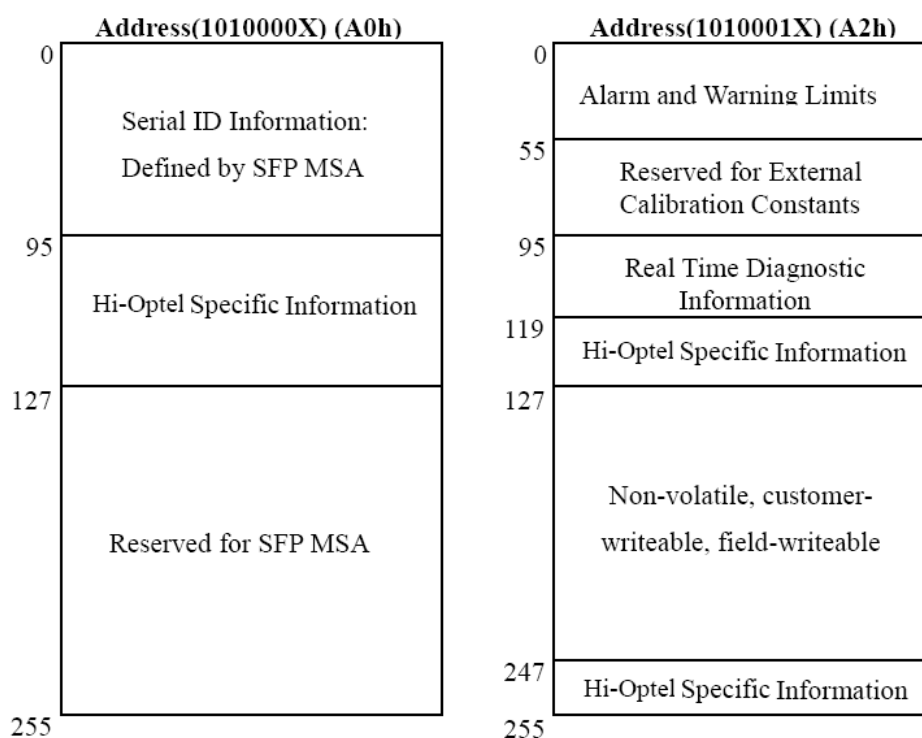
Notes:

1. Circuit ground is internally isolated from chassis ground. VeeR and VeeT may be internally connected within the SFP28 module.
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.
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.
5. Pulled low to VeeR or VeeT with a >30K resistor within the SFP28 module.

Data Field Descriptions

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented.

The digital diagnostic memory map specific data field define as following .For detail EEPROM information, please refer to the related document of SFF 8472 Rev 12.2.



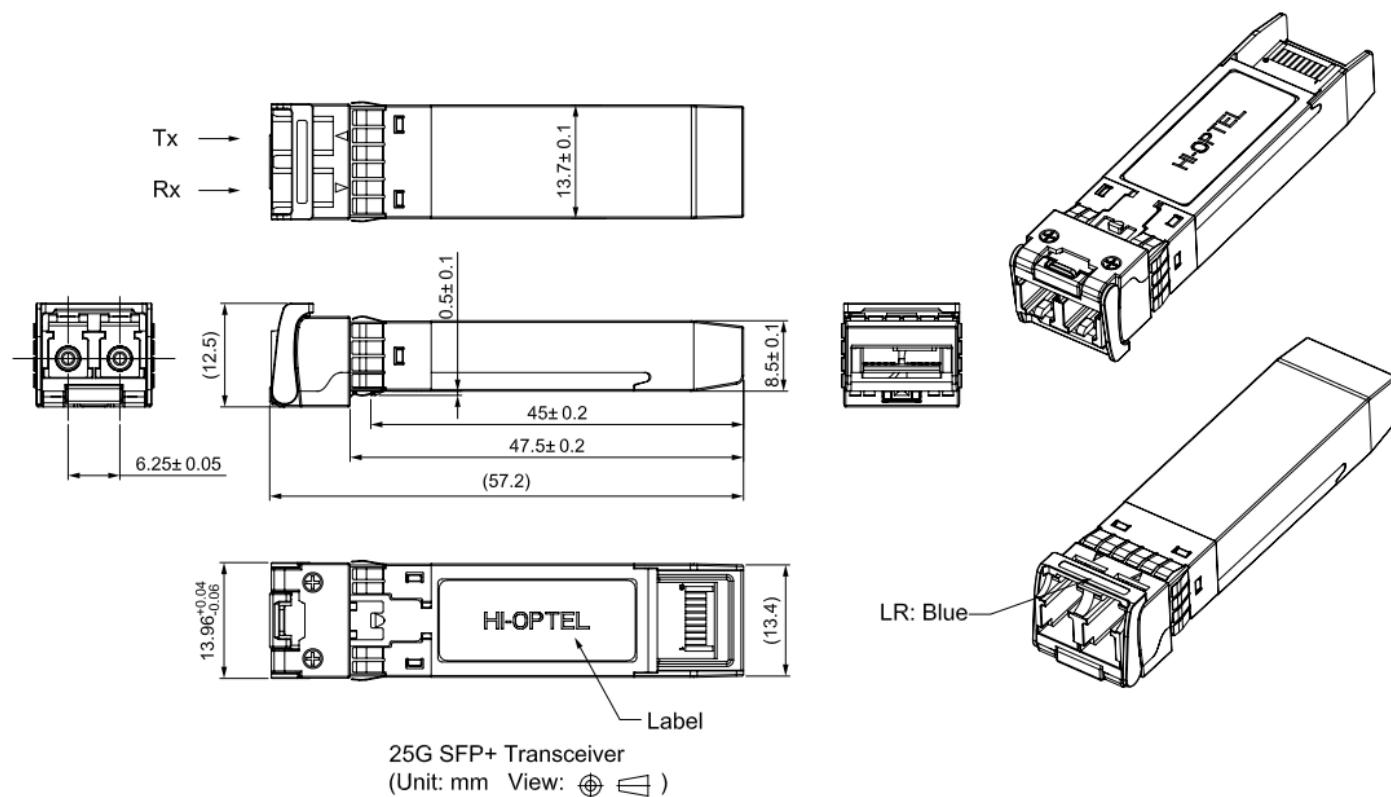
Digital Diagnostic Monitor Characteristics

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

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Mechanical Dimensions:



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