DATASHEET

DESCRIPTION:

PCSP-24-335178133F & PCSP-24-353278133F are 2 single fiber duplex transmissions in current SFP form factor. There it could double the port density of current equipment or line card. This module is designed for Single-Mode single fiber, operates at the normal wavelength of 1310/1550nm.Standard AC coupled CML for high speed signal and LVTTL control and monitor signals. The transmitter section incorporates FP or DFB and driver IC with temperature compensation and automatic power control circuit, which make the transmitter section output power and Extinction ration stabled in operation temperature. The receiver section incorporates an efficient InGaAs photodiode and transimpedance with AGC for wide dynamic range.

FEATURES:

- Two Bi-Directional Transceivers in One SFP Package
- Compliant with CSFP MSA 2.0 (Option 2)
- Up to 1.25Gb/s Data Links
- Hot-Pluggable Capability
- Up to 20 km on 9/125µm SMF
- Single +3.3V Power Supply
- Built-in Filter WDM
- Monitoring Interface Compliant with SFF-8472
- Isolation > 30dB, Cross Talk < -45dB
- Metal Enclosure, Excellent EMI & ESD Protection
- Compliant with Specifications for IEEE802.3ah
- Compliant with Bellcore TA-NWT-000983
- Eye Safety Designed to Meet Laser Class1, Compliant with IEC60825-1
- Operating temperature range: 0°C to 70°C
- RoHS Compliant

APPLICATIONS:

- Gigabit Ethernet
- Switch to switch interface
- WDM application

SPECIFICATIONS:

Absolute Maximum Ratings:

Parameter		Symbol	Min.	Typical	Max.	Unit
Storage Temperature		T_S	-40		+85	°C
Supply Voltage		$V_{CC}T, R$	-0.5		4	V
Relative Humidity		RH	0		85	%
Case Operating Temperature	Commercial	Top	0		70	·C

Recommended Operating Environment:

Parameter		Symbol	Min.	Typical	Max.	Unit
Case operating Temperature	Commercial	Top	0		70	·C
Supply Voltage		$V_{CCT, R}$	3.0		3.6	V
Power Supply Rejection			100			mV_{P-P}

Electrical Characteristics (T_{OP} = 0 to 70 °C, VCC = 3.0 to 3.60 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Supply Voltage	Vcc	3.0	3.30	3.60	V	
Supply Current	Icc		280	400	mA	
Inrush Current	I_{surge}			Icc+30	mA	
Maximum Power	P_{max}			1.0	W	
Transmitter Section: (Each Channel)						
Input differential impedance	R_{in}	90	100	110	.	.
Single ended data input swing	$V_{in\ PP}$	200		1200	mVp-p	
Transmit Disable Voltage	V_D	Vcc − 1.3		Vcc	V	2
Transmit Enable Voltage	V_{EN}	Vee		Vee+ 0.8	V	
Transmit Disable Assert Time	$T_{dessert}$			10	us	
Receiver Section: (Each Channel)						
Single ended data output swing	Vout,pp	300		1000	mv	3
Data output rise time	t_r			150	ps	4
Data output fall time	t_f			150	ps	4
LOS Fault	$V_{losfault}$	Vcc − 0.5		V_{CC_host}	V	5
LOS Normal	$V_{los\ norm}$	V_{ee}		V_{ee}+0.5	V	5
Power Supply Rejection	PSR	100			mVpp	6
Deterministic Jitter Contribution	RXΔDJ			51.7	ps	7
Total Jitter Contribution	RXΔTJ			122.4	ps	

Note:

1. AC coupled.
2. Or open circuit.
3. Into 100 ohm differential termination.
4. 20 – 80 %
5. LOS is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
6. All transceiver specifications are compliant with a power supply sinusoidal modulation of 20 Hz to 1.5MHz up to specified value applied through the power supply filtering network shown on page 23 of the Small Form-factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 14, 2000.
7. Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and . DJ.

Optical Parameters (TOP = 0 to 70 °C, VCC = 3.00 to 3.60 Volts)

Parameter		Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section: (Each Channel)							
Center Wavelength	PCSP-24-335178133F	λ_c	1260	1310	1360	nm	1
	PCSP-24-353278133F		1530	1550	1570		
Spectral Width	PCSP-24-335178133F	σ			4	nm	RMS
	PCSP-24-353278133F				1		-20dB
Optical Output Power		P_{out}	-9		-3	dBm	2
Optical Rise/Fall Time		t_r / t_f			160	ps	3
Extinction Ratio		ER	9			dB	
Deterministic Jitter Contribution		TXΔDJ			56.5	ps	4
Total Jitter Contribution		TXΔTJ			119	ps	
Eye Mask for Optical Output		Compliant with Eye Mask Defined in IEEE 802.3 standard					
Relative Intensity Noise		RIN			-120	dB/Hz	
Receiver Section: (Each Channel)							
Optical Input Wavelength	PCSP-24-335178133F	$\cdot\lambda_c$	1530	1550	1570	nm	
	PCSP-24-353278133F		1260	1310	1360		
Optical Input Power		P_{in}	-23		-3	dBm	5.6
Receiver Reflectance			12			dB	
Receiver Overload		P_{ol}			-3	dBm	5.6
RX Sensitivity		Sen			-23	dBm	5.6
RX_LOS Assert		LOS$_A$	-33			dBm	
RX_LOS Deassert		LOS$_D$			-23	dBm	
RX_LOS Hysteresis		LOS$_H$		2	2.5	dB	
General Specifications							
Data Rate		BR	1062		1250	Mb/s	
Bit Error Rate		BER			10^{-12}		
Max. Supported Link Length on 9/125µm SMF@1.25G		LMAX		20		km	7
Total System Budget		LB	13			dB	8

Note

1. AC coupled.
2. Or open circuit.
3. Into 100 ohm differential termination.
4. 20 – 80 %
5. LOS is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
6. All transceiver specifications are compliant with a power supply sinusoidal modulation of 20 Hz to 1.5MHz up to specified value applied through the power supply filtering network shown on page 23 of the Small Form-factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 14, 2000.
7. Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and . DJ.

![PeakOptical logo]

1.25Gb/s Compact SFP Dual BI-DI 20km
Hot Pluggable, CSFP, Dual LC, +3.3V, 1310 FP/
1550nm DFB, DDMI
PCSP-24-335178133F/PCSP-24-353278133F

Digital Diagnostic Monitor Characteristics

The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF8472 Rev10.2 with internal calibration mode. For external calibration mode please contact our sales stuff. .

Parameter	Symbol	Min.	Max.	Unit
Temperature monitor absolute error	DMI_Temp	-3	3	degC
Laser power monitor absolute error	DMI_TX	-3	3	dB
RX power monitor absolute error	DMI_RX	-3	3	dB
Supply voltage monitor absolute error	DMI_VCC	-0.1	0.1	V
Bias current monitor absolute error	DMI_Ibias	-10%	10%	mA

Pin Assignment:

PeakOptical®
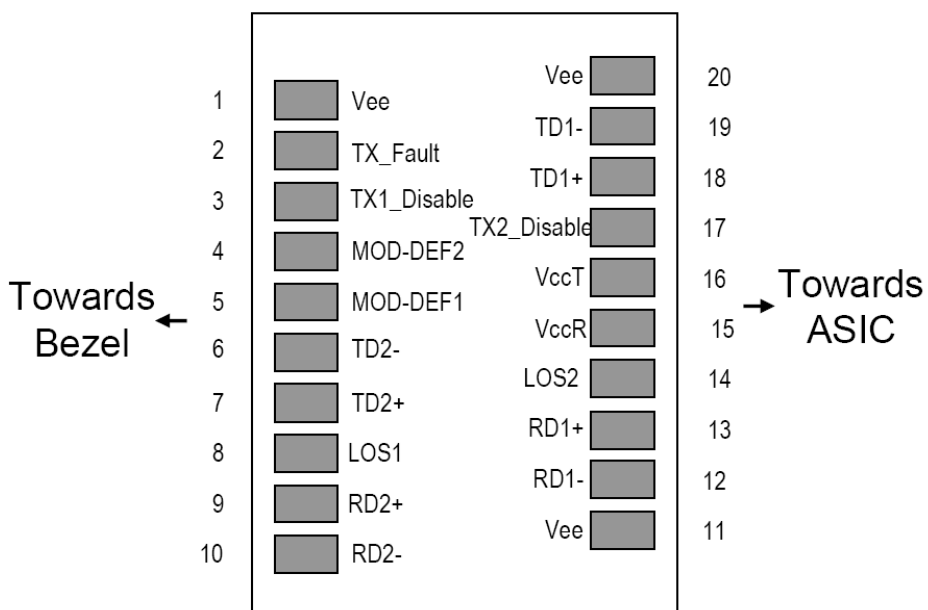
Pin Description:

Pin Num.	Name	Function	Plug Seq.	Notes
1	Vee	Transceiver Ground	1	Note1
2	TX_Fault	Transmitter Fault indication	3	Note2
3	TX1_DISABLE	Transmitter Disable of Ch1;Turns off transmitter laser output of Ch1	3	Note3
4	MOD-DEF2	2-wire Serial Interface Data Line (SDA)	3	Note4
5	MOD-DEF1	2-wire Serial Interface Clock (SCL)	3	Note4
6	TD2-	Inverted Transmit Data Input of Ch2	3	Note5
7	TD2+	Transmit Data Input of Ch2	3	Note5
8	LOS1	Loss of Signal for ch1	3	Note6
9	RD2+	Received Data Output of Ch2	3	Note7
10	RD2-	Inverted Received Data Output of Ch2	3	Note7
11	Vee	Transceiver Ground	1	Note1
12	RD1-	Inverted Received Data Output of Ch1	3	Note7
13	RD1+	Received Data Output of Ch1	3	Note7
14	LOS2	Loss of signal for ch2	3	Note6
15	VCCR	Receiver Power	2	Note8
16	VCCT	Transmitter Power	2	Note8
17	TX2_DISABLE	Transmitter Disable of Ch2;Turns off transmitter laser output of Ch2	3	Note3
18	TD1+	Transmit Data Input of Ch1	3	Note5
19	TD1-	Inverted Transmit Data Input of Ch1	3	Note5
20	Vee	Transceiver Ground	1	Note1

Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

1)   VeeR and VeeT may be internally connected within the SFP module.

2) TX_Fault is internally OR output for TX fault conditions in either channel 1 or channel 2. In order to determine which channel is at fault, the Host can read the internal memory bits for status:

> – Bit2 in (A2h:110) for TX1 fault
> – Bit2 in (B2h:110) for TX2 fault

Tx_Fault is an open collector/drain output, which should be pulled up with a 4.7k – 10kΩ resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind at either channel. Low indicates normal operation. In the low state, the output will be pulled to < 0.4V.

3) TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7 ¨C 10 K resistor. It's states are:

Low (0 to 0.8V): Transmitter on (>0.8, < 2.0V): Undefined High (2.0 to 3.465V): Transmitter Disabled Open: Transmitter Disabled.

4) Mod-Def 1,2. These are the module definition pins. They should be pulled up with a 4.7K to 10K resistor on the host board. The pull-up voltage shall be VccT or VccR

Mod-Def 1 is the clock line of two wire serial interface for serial ID

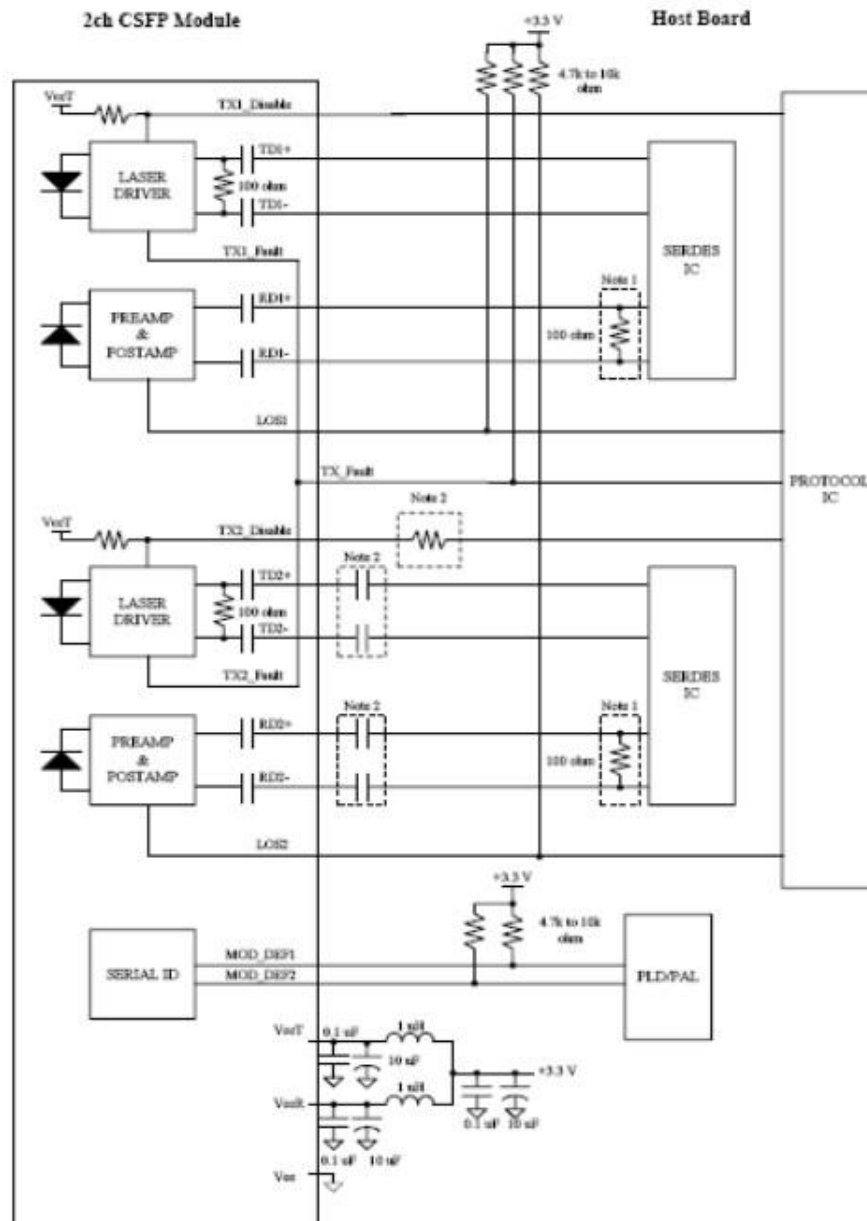Mod-Def 2 is the data line of two wire serial interface for serial ID

5) TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 differential terminations inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 500 to 2400 mV (250 to 1200 mV single-ended), though it is recommended that values between 500 and 1200 mV differential (250 to 600 mV single-ended) be used for best EMI performance.

6) LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.4V.

7) RD-/+: These are the differential receiver outputs. They are AC coupled 100 differential lines which should be terminated with 100 (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 370 and 2000 mV differential (185 to 1000 mV single ended) when properly terminated.

8) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP connector pin. Maximum supply current is 300 mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than1Ωshould be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30 mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.

Recommended Circuit:

PeakOptical®

1.25Gb/s Compact SFP Dual BI-DI 20km
Hot Pluggable, CSFP, Dual LC, +3.3V, 1310 FP/
1550nm DFB, DDMI
PCSP-24-335178133F/PCSP-24-353278133F

Serial ID Memory Contents:（A0h CH1，B0h CH2）

Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (07=LC)
3-10	8	Transceiver	SONET
11	1	Encoding	SONET Scrambled
12	1	BR,Nominal	Nominal baud rate, unit of 100Mbps
13	1	Reserved	(0000h)
14	1	Length(9um,km)	Link length supported for 9/125um fiber, units of km
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m
17	1	Length(62.5um)	Link length supported for 62.5/125um fiber, units of 10m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name:
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: "PCSPXXXXXXX" (ASCII)
56-59	4	Vendor rev	Revision level for part number
60-61	2	Wavelength	Laser wavelength
62	1	Reserved	
63	1	CCID	Least significant byte of sum of data in address 0-62
Extended ID Fields			
64-65	2	Option	Indicates which optical SFP signals are implemented(001Ah = LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	Manufacturing date code
92	1	Diagnostic Type	Diagnostics
93	1	Enhanced Options	Diagnostics
94	1	SFF-8472	Diagnostics
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)
Vendor Specific ID Fields			
96-127	32	Readable	Vendor specific date, read only

Diagnostics Memory Contents: (A2h CH1,B2h CH2)

Data Address	Length (Byte)	Name of Length	Description and Contents
Diagnostic and control/status fields			
0-39	40	A/W Thresholds	Diagnostic Flag Alarm and Warning Thresholds
40-55	16	Unallocated	
56-91	16	Ext Cal Constants	Diagnostic calibration constants for optional External Calibration
92-94	3	Unallocated	
95	1	CC_DMI	Check code for Base Diagnostic Fields (addresses 0 to 94)
96-105	10	Diagnostics	Diagnostic Monitor Data (internally or externally calibrated)
106-109	4	Unallocated	
110	1	Status/Control	Optional Status and Control Bits
111	1	Reserved	Reserved for SFF-8079
112-113	2	Alarm Flags	Diagnostic Alarm Flag Status Bits
114-115	2	Unallocated	
116-117	2	Warning Flags	Diagnostic Warning Flag Status Bits
118-119	2	Ext Status/Control	Extended module control and status bytes
General use fields			
120-127	8	Vendor Specific	Vendor specific memory addresses
128-247	120	User EEPROM	User writable non-volatile memory
248-255	8	Vendor Control	Vendor specific control addresses

Mechanical Dimensions: