

SP10-SM55ZR80x

SFP+ 10Gb/s 1550nm 80km Transceiver

PRODUCT FEATURES

- Supports up to 10.7Gbps bit rates
- Hot-pluggable SFP+ footprint
- 1550nm Cooled EML and APD photodiode
- Up to 80km for SMF transmission
- Duplex LC, compliant with SFP+ MSA SFF-8472
- Compatible with RoHS
- Single +3.3V power supply
- Real Time Digital Diagnostic Monitoring
- Operating case temperature:

Commercial: 0°C to +70°C

Industrial: -40°C to +85°C



APPLICATIONS

- 10Gbps Optical systems
- 10GBASE-ZR at 10.3125Gbps
- 10GBASE-ZW at 9.953Gbps
- LTE systems

PRODUCT DESCRIPTION

Photonics Valley's SP10-SM55ZR80x SFP+ 10Gbps transceiver is designed to transmit and receive optical data over single mode optical fiber for link length 80km at 1550nm, consists of three sections: a Cooled EML laser transmitter, an APD photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements. The transceivers are compatible with SFP Multi-Source Agreement and SFF-8472 digital diagnostics functions.

Ordering information

Part Number	Data Rate (Gbps)	Media	Wavelength (nm)	Transmission Distance(km)	Temperature Range T _{case} / °C	
SP10-SM55ZR80C	10.3	SMF	1550	80	0~70	Commercial
SP10-SM55ZR80I	10.3	SMF	1550	80	-40~85	Industrial

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V _{cc}	-0.5	4.5	V
Storage Temperature	T _s	-40	+85	°C
Operating Humidity	-	5	85	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	T _c	0		+70	°C
Power Supply Voltage	V _{cc}	3.135	3.30	3.465	V
Power Supply Current	I _{cc}			550	mA
Data Rate		1.0	10.3	10.7	Gbps

Electrical and timing

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t _{on}			2	ms
Tx Disable Assert Time	t _{off}			100	μs
Time To Initialize, including Reset of Tx Fault	t _{init}			300	ms
Tx Fault Assert Time	t _{fault}			100	μs
Tx Disable To Reset	t _{reset}	10			μs
LOS Assert Time	t _{loss_on}			100	μs
LOS De-assert Time	t _{loss_off}			100	μs
Serial ID Clock Rate	f _{serial_clock}		100	400	KHz
MOD_DEF (0:2)-High	V _H	2		V _{cc}	V
MOD_DEF (0:2)-Low	V _L			0.8	V

Optical Characteristics

Parameter		Symbol	Min	Typical	Max	Unit	Notes
Transmitter							
Centre Wavelength		λ_c	1530	1550	1565	nm	
Spectral Width (-20dB)		$\Delta\lambda$			1	nm	
Side-Mode Suppression Ratio		SMSR	30	-		dB	
Average Output Power		P_{out}	0		+4	dBm	1
Extinction Ratio		ER	6.0			dB	
Data Input Swing Differential		V_{IN}	180		850	mV	2
Input Differential Impedance		Z_{IN}	90	100	110	Ω	
TX Disable	Disable		2.0		V_{cc}	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		V_{cc}	V	
	Normal		0		0.8	V	
Receiver							
Centre Wavelength		λ_c	1260		1600	nm	
Receiver Sensitivity					-23	dBm	3
Receiver Overload			0.5			dBm	3
LOS De-Assert		LOS_D			-24	dBm	
LOS Assert		LOS_A	-35			dBm	
LOS Hysteresis			0.5		4	dB	
Data Output Swing Differential		V_{out}	300		900	mV	4
LOS	High		2.0		V_{cc}	V	
	Low				0.8	V	

Notes:

1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS $2^{31}-1$ test pattern @10312Mbps, $BER \leq 1 \times 10^{-12}$.
4. Internally AC-coupled.

Pin Description

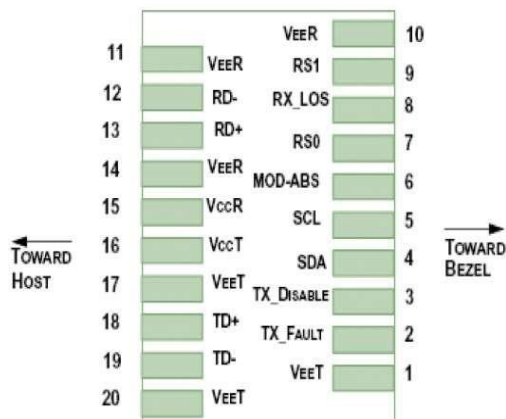
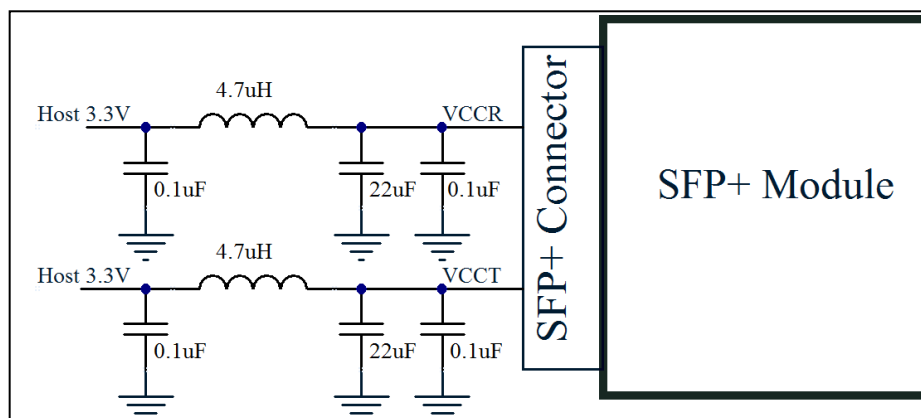


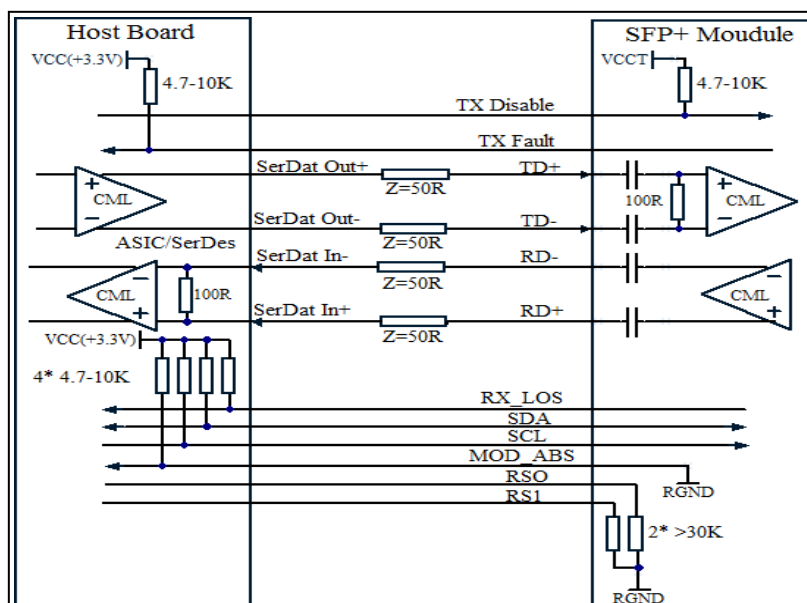
Diagram of Host Board Connector Block Pin Numbers and Name

Pin	Symbol	Description	Notes
1	VEET	Transmitter Ground	1
2	TFAULT	Transmitter Fault	2
3	TDIS	Transmitter Disable. Laser output disabled on high or open	3
4	SDA	2-wire Serial Interface Data Line	2
5	SCL	2-wire Serial Interface Clock Line	2
6	MOD_ABS	Module Absent. Grounded within the module	
7	RS0	Rate Select 0. Not Used.	4
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation	2
9	RS1	Rate Select 1. Not Used.	4
10	VEER	Receiver Ground	1
11	VEER	Receiver Ground	1
12	RD-	Receiver Inverted DATA out. AC Coupled.	
13	RD+	Receiver Non-inverted DATA out. AC Coupled.	
14	VEER	Receiver Ground	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground	1
Notes			
1. Circuit ground is internally isolated from chassis ground. 2. Shall be pulled up with 4.7k-10k Ohms to a voltage between 3.15V and 3.6V on the host board. 3. Laser output disabled on $T_{DIS} > 2.0V$ or open, enabled on $T_{DIS} < 0.8V$. 4. Internally pulled down per SFF-8431 Rev 4.1.			

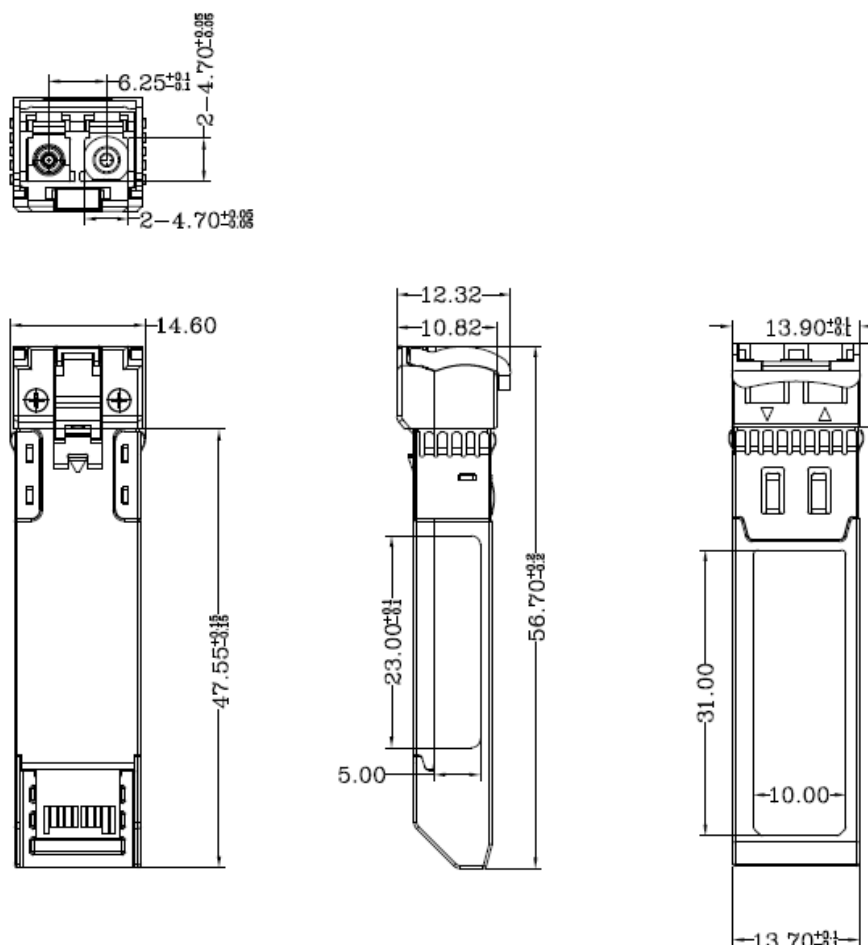
● Recommended Host Board Supply Filtering Circuit



Recommended Interface Circuit



Mechanical Dimensions



Regulatory Compliance

Feature	Reference	Performance
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	IEC/EN 60825-1, 2	Class 1 laser product
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards