SEPITAM

ONE STEP SMARTER

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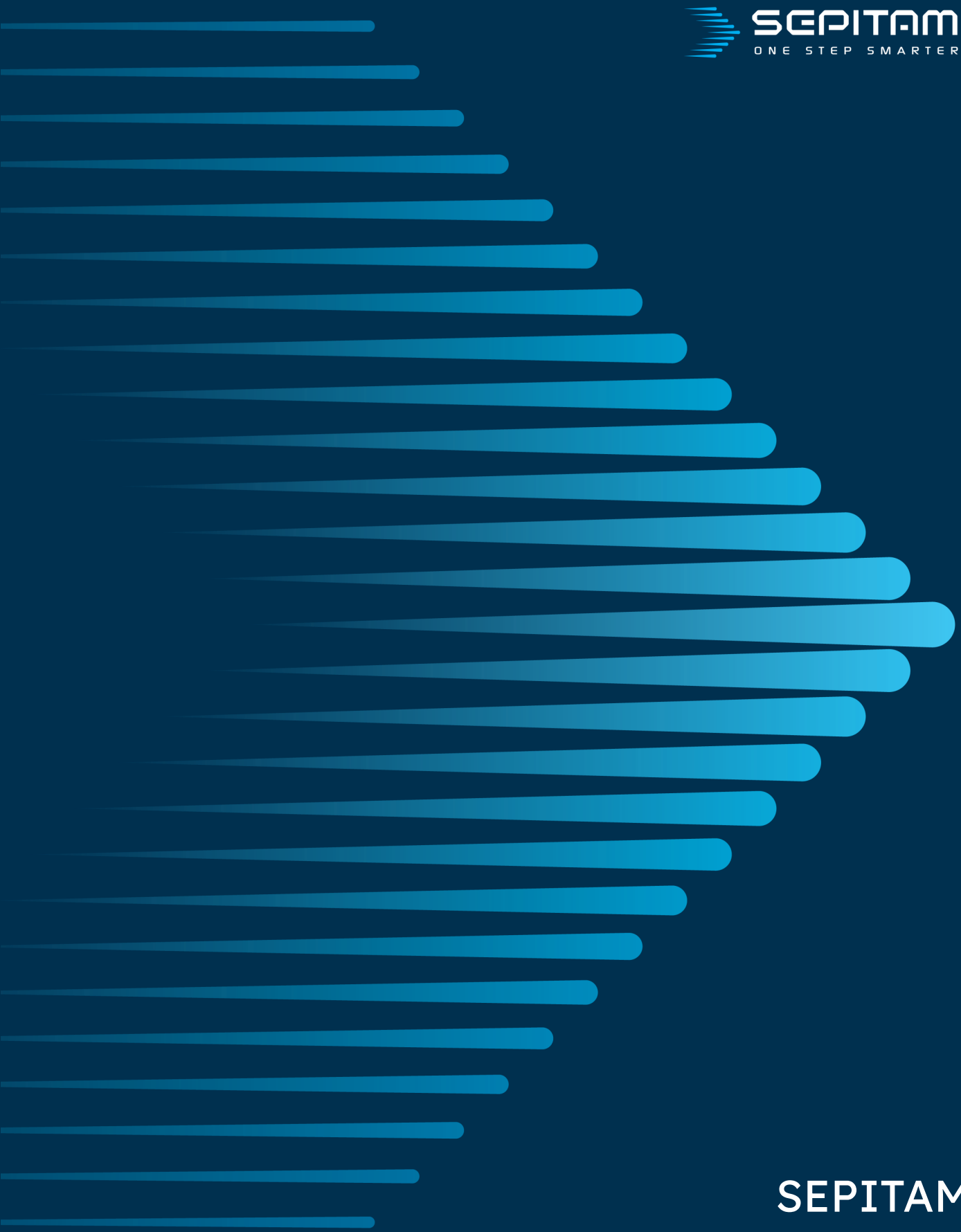

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SFP10G-SM-DX-20KM

TYPE:

Sepitam-SFP10G-SM-DX-20KM

Sepitam SFP optical transceiver modules support data transmission rates ranging from 1Gbps to 10Gbps. These modules operate at basic and WDM wavelengths and are available in both industrial and non-industrial grades. They are compatible with single-mode and multi-mode optical fibers, covering transmission distances from 20 km to 120 km.

- TYPE: Sepitam-SFP10G-SM-DX-20KM
- RoHS Compliant 10Gbps SFP+ 1310nm
- 20km Optical Transceiver

Description:

The Sepitam-SFP10G-SM-DX-20KM, Enhanced Small Form Factor Pluggable SFP+ transceivers are designed for use in 10-Gigabit Ethernet links up to 20km over Single Mode fiber. They are compliant with SFF-8431, SFF-8432 and IEEE 802.3ae 10GBASE-LR/LW. The transceiver designs are optimized for high perform-ance and cost effec-tive to supply customers the best solutions for telecommunication.

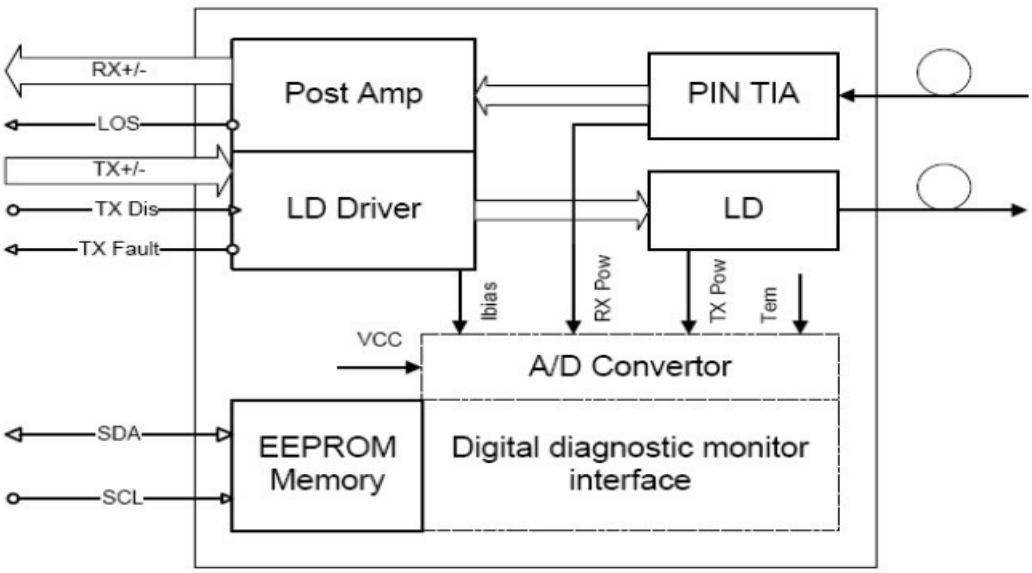
Properties:

- Supports 9. 95 to 10.5Gb/s bit rates
- Duplex LC connector
- Hot pluggable SFP+ footprint
- Uncooled 1310nm DFB transmitter, PIN photo-detector
- Applicable for 20km SMF connection
- Low power consumption, < 1W
- Digital Diagnostic Monitor Interface
- Optical interface compliant to IEEE 802.3ae 10GBASE-LR
- Electrical interface compliant to SFF-8431
- Operating case temperature: Commerical: 0 to 70 °C

Applications:

- 10GBASE-LR/LW at 10.3125Gbps
- 10G Fiber Channel
- Other optical links

Functional Diagram:



Absolute Maximum Ratings:

Parameter	Symbol	Min.	Max.	Unit	Note
Supply Voltage	Vcc	-0.5	4.0	V	_
Storage Temperature	TS	-40	85	°C	_
Relative Humidity	RH	0	85	%	_

General Operating Characteristics:

Parameter	Symbol	Min.	Type	Max.	Unit	Note
Data Rate	_	9.953	10.3125	10.518	Gb/s	_
Supply Voltage	Vcc	3.13	3.3	3.47	V	_
Supply Current	Icc_5	_	_	285	mA	_
Operating Case Temp.	Tc	0	_	70	°C	_

Electrical Characteristics (TOP(C) = 0 to 70 °c, VCC = 3.13 to 3.47 V):

Parameter	Symbol	Min.	Type	Max.	Unit	Note
Transmitter						
Differential data input swing	VINPP	180	_	700	mVpp	1
Transmit Disable Voltage	VD	VCC-0.8	_	Vcc	V	_
Transmit Enable Voltage	VEN	Vee	_	Vee+0.8		
Input differential impedance	Rin	_	100	_	Ω	_
Receiver						
Differential data output swing	Vout, pp	300	_	850	mVpp	2
Output rise time and fall time	Tr, Tf	28	_	_	Ps	3
LOS asserted	VLOS_F	VCC-0.8	_	Vcc	V	4
LOS de-asserted	VLOS_N	Vee	_	Vee+0.8	V	4

Note:

1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.

2. Into 100Ω differential termination.

3. 20 – 80%. Measured with Module Compliance Test Board and OMA test pattern. Use of four 1's and four 0's sequence in the PRBS 9 is an acceptable alternative.

4. LOS is an open collector output. Should be pulled up with 4.7kΩ – 10kΩ on the host board. Normal operation is logic 0; loss of signal is logic 1.

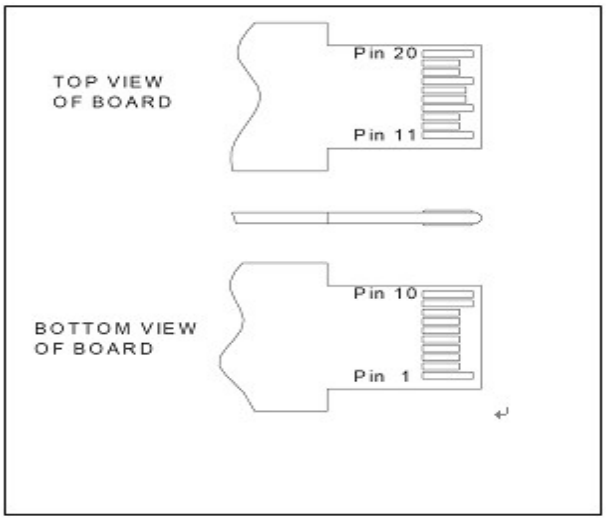
Optical Characteristics (TOP(C) = 0 to 70 °C , VCC = 3.13 to 3.47 V):

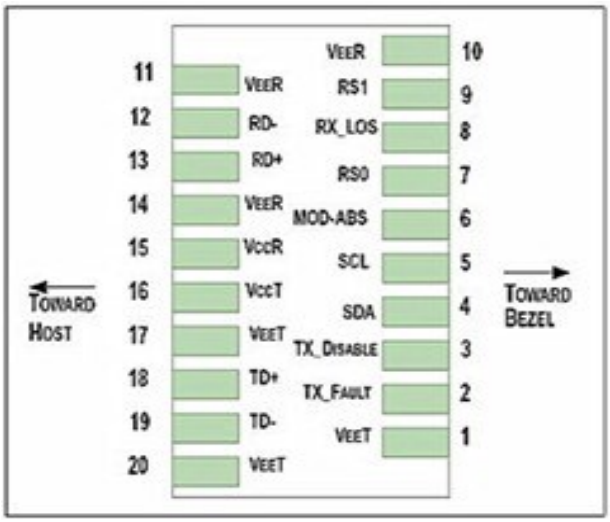
Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Transmitter						
Operating Wavelength	λ	1260	1310	1355	nm	-
Ave. output power (Enabled)	PAVE	-5	-	1	dBm	1
Side-Mode Suppression Ratio	SMSR	30	-	-	dB	-
Extinction Ratio	ER	4	4.5	-	dB	-
RMS spectral width	Δλ	-	-	1	nm	-
Rise/Fall time (20%~80%)	Tr/Tf	-	-	50	ps	2
Dispersion penalty	TDP	-	-	3.2	dB	-
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	-
Output Optical Eye	Compliant with IEEE 0802.3ae					
Receiver						
Operating Wavelength	_	1270	-	1600	nm	-
Receiver Sensitivity（ER=4.5）	PSEN1	-	-	-13.6	dBm	3
Receiver Sensitivity（ER=6）	PSEN2	-	-	-14.4	dBm	3
Overload	PAVE	-	-	0.5	dBm	-
LOS Assert	Pa	-30	-	-	dBm	-
LOS De-assert	Pd	-	-	-18	dBm	-
LOS Hysteresis	Pd-Pa	0.5	-	-	dB	-

Notes:

1. Average power figures are informative only, per IEEE 802.3ae.
2. Valid between 1260 and 1355 nm.; BER<10-12; 231 – 1 PRBS.
3. Valid between 1260 and 1355 nm.Per IEEE 802.3ae.

Pin Definitions and Functions:





PIN#	Name	Function	Notes
1	VEET [1]	Transmitter Ground	-
2	Tx_FAULT [2]	Transmitter Fault	1
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open	2
4	SDA [2]	2-wire Serial Interface Data Line	3
5	SCL [2]	2-wire Serial Interface Clock Line	3
6	MOD_ABS [4]	Module Absent. Grounded within the module	3
7	RS0 [5]	Rate Select 0	-
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation	4
9	RS1 [5]	Rate Select 1	-
10	VEER [1]	Receiver Ground	-
11	VEER [1]	Receiver Ground	-

PIN#	Name	Function	Notes
12	RD-	Receiver Inverted DATA out. AC Coupled	-
13	RD+	Receiver DATA out. AC Coupled	5
14	VEER [1]	Receiver Ground	5
15	VCCR	Receiver Power Supply	-
16	VCCT	Transmitter Power Supply	-
17	VEET [1]	Transmitter Ground	-
18	TD+	Transmitter DATA in. AC Coupled	-
19	TD-	Transmitter Inverted DATA in. AC Coupled	6
20	VEET [1]	Transmitter Ground	6

Notes:

1.Module circuit ground is isolated from module chassis ground within the module.

2.should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.

3.Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.

4.Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to10 kΩ.Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.

5. RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

Serial Interface for ID and DDM:

The **Sepitam-SFP10G-SM-DX-20KM** transceiver support the 2-wire serial communication protocol as defined in the SFP+ MSA. The standard SFP+ serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information. Additionally, This SFP+ transceivers provide an enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.
The SFP MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X(A0h), so the originally monitoring interface makes use of the 8 bit address(A2h), so the originally defined serial ID memory map remains unchanged. The structure of the memory map is shown in Table1.

2 wire address 1010000X (**A0h**)	
Address	**Information**
0~95	Serial ID Defined by SFP MSA (96 bytes)
96~127	Vendor Specific (32 bytes)
128~255	Reserved,SFF8079 (128 bytes)

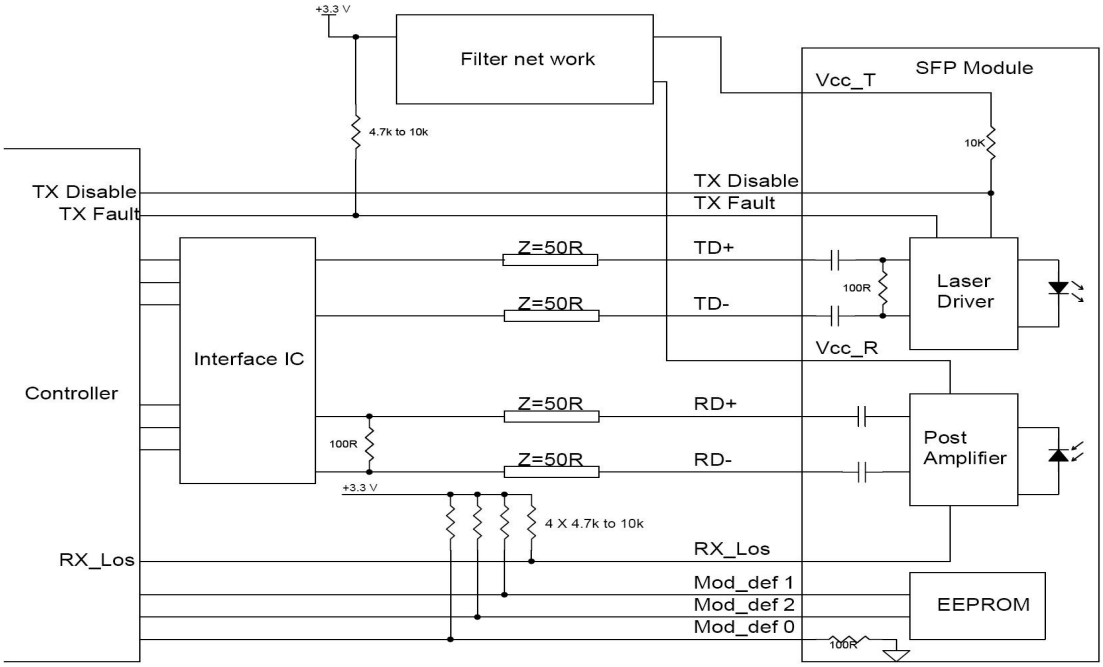
2 wire address 1010001X (**A2h**)	
Address	**Information**
0~55	Alarm and Warning Thresholds (56 bytes)
56~95	Calibration Constants (40 bytes)
96~119	Real Time Diagnostic Interface (24 bytes)
120~127	Vender Specific (8 bytes)
128~247	User Writable EEPROM (120 bytes)
248~255	Vender Specific (8 bytes)

Digital Diagnostic Specifications:

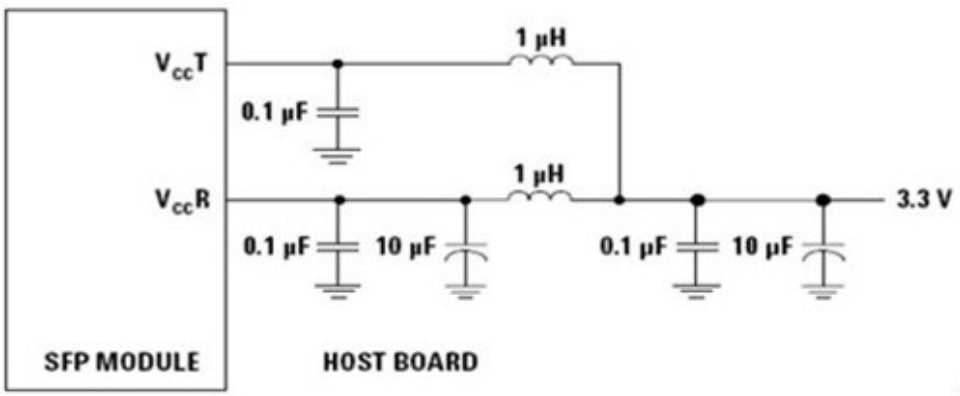
The Sepitam-SFP10G-SM-DX-20KM transceivers can be used in host systems that require either internally or externally calibrated digital diagnostics.

Parameter	Symbol	Units	Min.	Max.	Accuracy	Note
Transceiver temperature	DTemp-E	℃	-5	+70	±5℃	1
Transceiver supply voltage	DVoltage	V	2.8	4.0	±3%	_
Transmitter bias current	DBias	mA	0	80	±10%	2
Transmitter output power	DTx-Power	dBm	-8	+2	±2dB	_
Receiver average input power	DRx-Power	dBm	-16	0	±2dB	_

Typical Interface Circuit



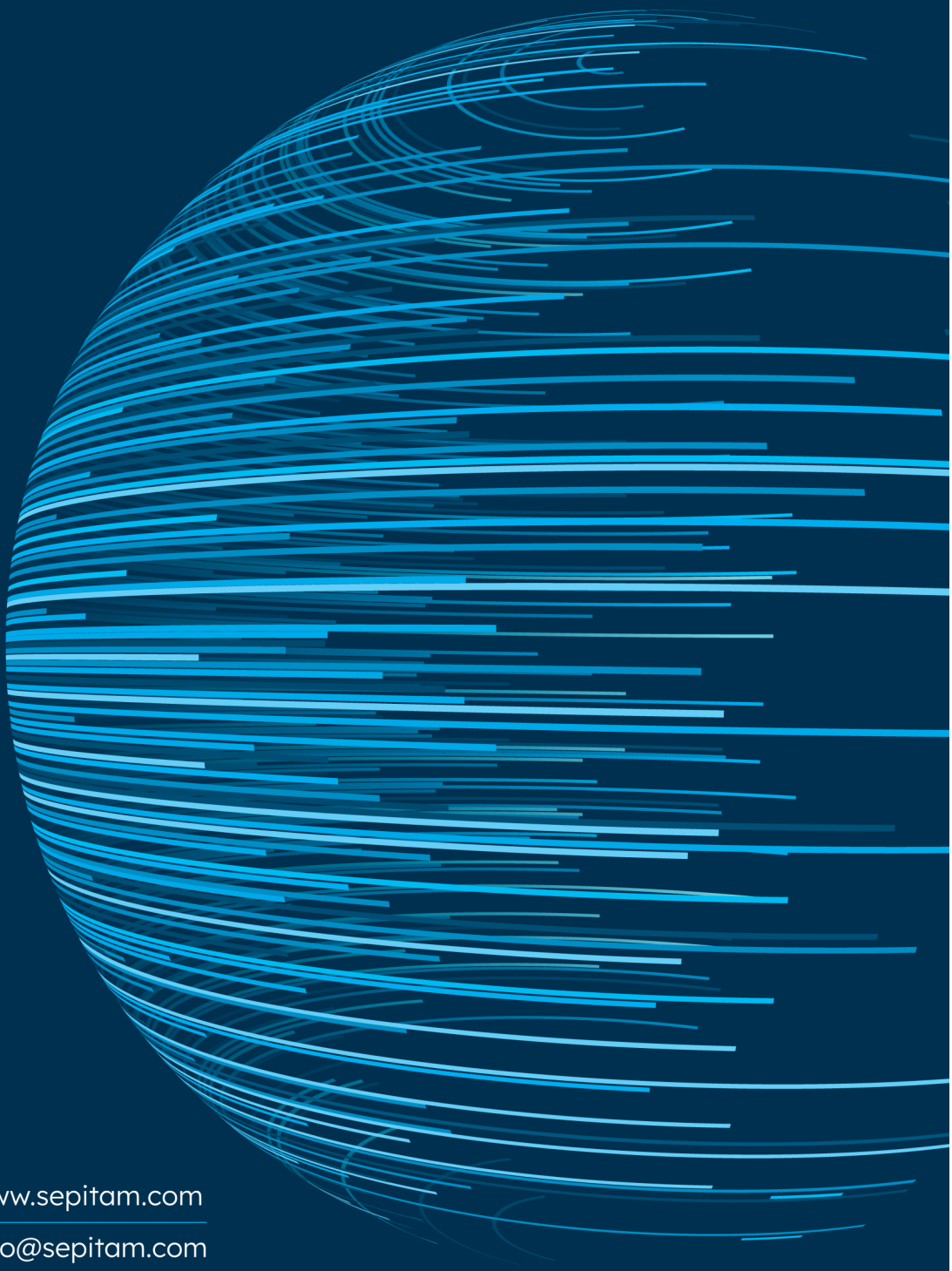
Recommended power supply filter



Note:

Inductors with DC resistance of less than 1Ω should be used in order to maintain the rquired 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

Technical Specification of
Sepitam-SFP10G-SM-DX-20KM



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