10 Gb/s BIDI SFP+ Transceiver 20 km

SFPP Series



- **Up to 11.3 Gb/s data links**
- **Hot-Pluggable SFP Footprint and Single LC Connector**
- **Up to 20 km reach for G.652 SMF**
- **Compliant with SFF-8431, SFF-8432, SFF-8472 and IEEE802.3ae**

Ascent's SFPP-LP-XXXX-20 transceivers are designed expressly for high-speed communication applications that require rates up to 11.3 Gb/s. They are designed to be compliant with the SFF-8472 SFP+ MSA. The module is suitable for data links up to 20 km in distance over a 9/125 µm single mode fiber.

ASCENT SFP+ transceivers provide a unique 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.

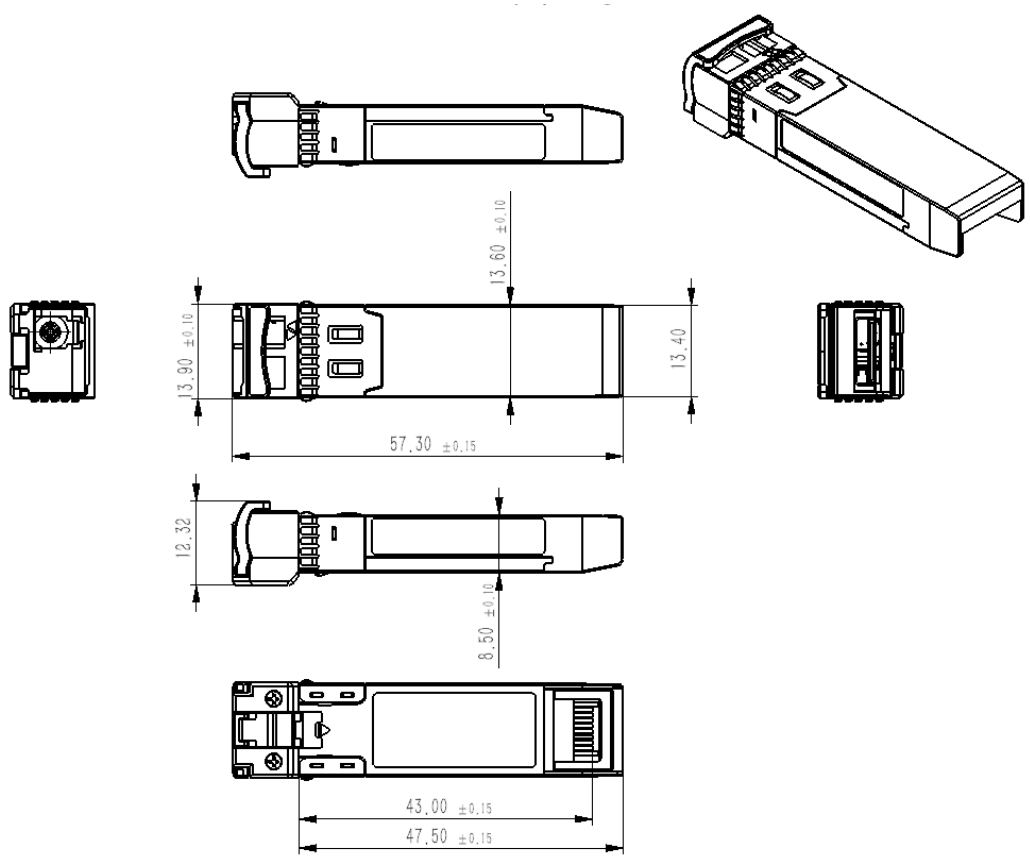
Key Features

- Support data rate up to 11.3Gb/s
- Hot-Pluggable SFP Footprint and Single LC Connector
- Up to 20km reach for G.652 SMF
- 1270nm DFB Transmitter and PIN receiver for SFPP-LP-2733-20
- 1330nm DFB Transmitter and PIN receiver for SFPP-LP-3327-20
- Temperature Range:

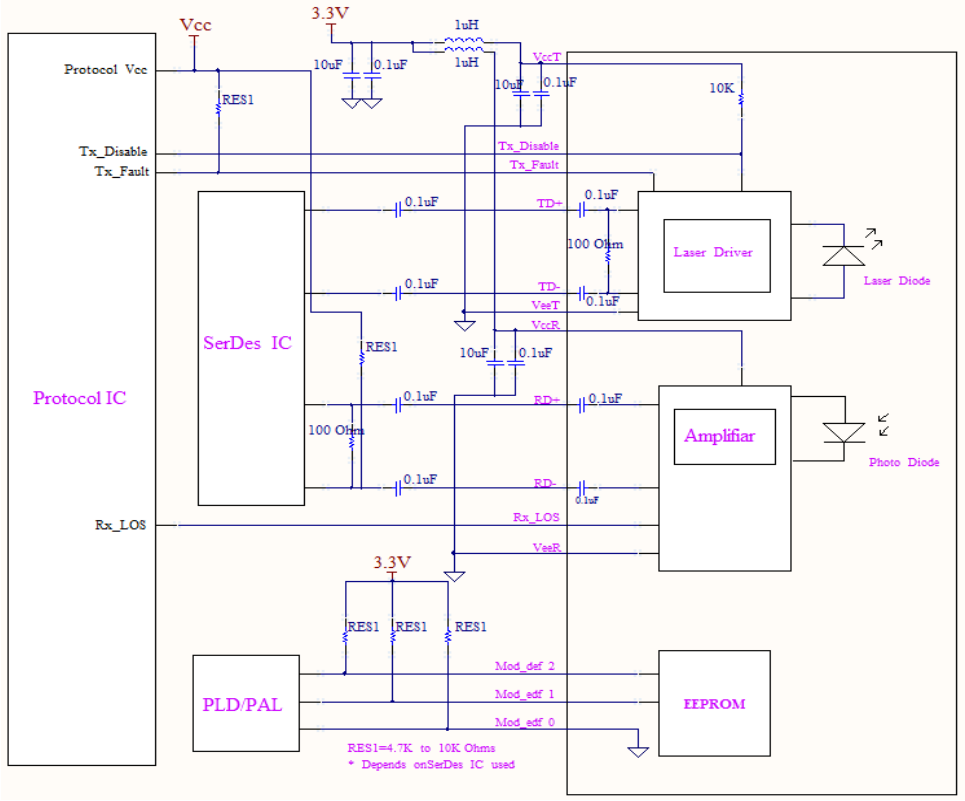
  Commercial:0°C ~ +70°C

  Industrial:-40°C ~ +85°C
- Compliant with SFF-8431
- Compliant with SFF-8432
- Compliant with SFF-8472
- Compliant with IEEE802.3ae

Outline Dimensions



Host - Transceiver Interface Block Diagram



Regulatory Compliance

Feature	Reference	Performance
ROHS	BSTDG211221022111CR	Compatible with standards
EMC CE	BSTXD211221003610ER	Compatible with standards
FCC	BSTXD211221022119EC	Compatible with standards

Digital Diagnostic Functions

ASCENT SFPP-LP-XXXX-20 transceivers 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, ASCENT SFP+ transceivers provide a unique 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). The digital diagnostic monitoring interface makes use of the 8-bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

Parameter	Range	Unit	Accuracy	Calibration
Commercial Temperature	0 to +70	°C	±3°C	Internal / External
Industrial Temperature	-40 to +85	°C	±3°C	Internal / External
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	10 to 100	mA	±10%	Internal / External
TX Power	-6 to +1	dBm	±3dB	Internal / External
RX Power	-15 to +0.5	dBm	±3dB	Internal / External

SFP Module EEPROM Information and Management

The SFP modules implement the 2-wire serial communication protocol as defined in the SFF -8472. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I2C interface at address A0h and A2h.

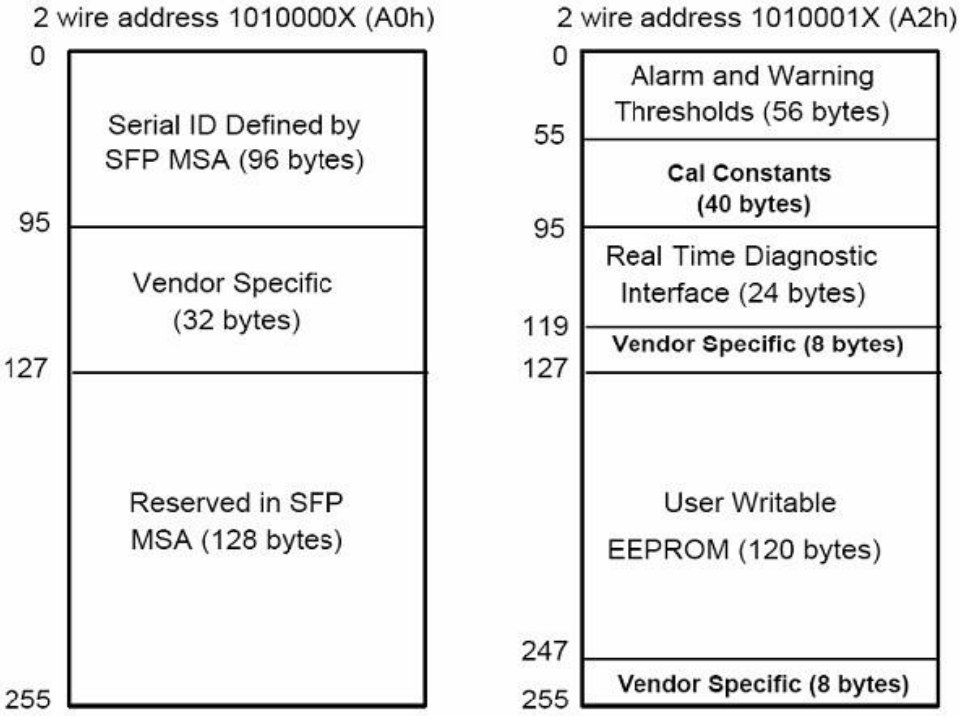
The memory is mapped in Digital Diagnostic Memory Map (Specific Data Field Descriptions) table .

Detailed ID information (A0h) is listed in EEPROM Serial ID Memory Contents (A0h) table.

And the DDM specification at address A2h.

For more details of the memory map and byte definitions, please refer to the SFF-8472, “Digital Diagnostic Monitoring Interface for Optical Transceivers”. The DDM parameters have been internally calibrated.

Digital Diagnostic Memory Map (Specific Data Field Descriptions)



EEPROM Serial ID Memory Contents (A0h)

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	10G Base-LR
11	1	Encoding	64B/66B
12	1	BR, Nominal	Nominal baud rate, unit of 100Mbps
13-14	2	Reserved	(0000h)

Data Address	Length(Byte)	Name of Length	Description and Contents
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: ASCENT
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: “SFPP-LP-XXXX-20” (ASCII)
56-59	4	Vendor rev	Revision level for part number
60-62	3	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	ASCENT’s Manufacturing date code
92-94	3	Reserved	
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)
Vendor Specific ID Fields			
96-127	32	Readable	ASCENT specific date, read only
128-255	128	Reserved	Reserved for SFF-8079

Alarm and Warning Thresholds (A2h)

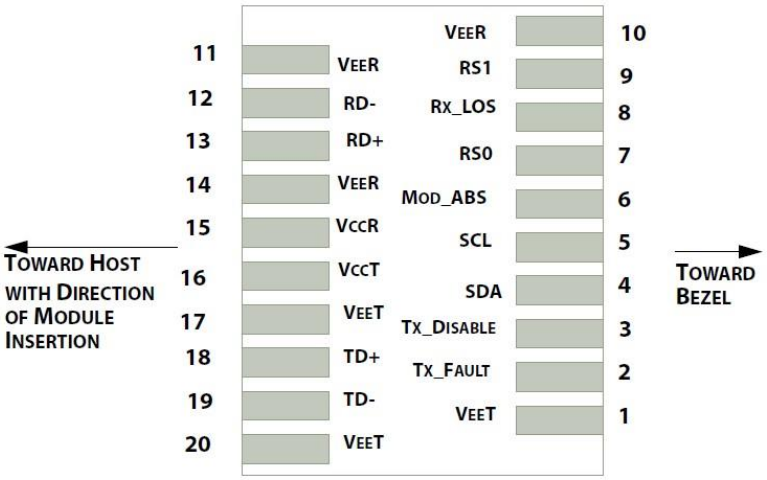
Data Address	Length(Byte)	Name of Length	Description and Contents
Base ID Fields			
00-01	2	Temp High Alarm	MSB at low address
02-03	2	Temp Low Alarm	MSB at low address
04-05	2	Temp High Warning	MSB at low address
06-07	2	Temp Low Warning	MSB at low address
08-09	2	Voltage High Alarm	MSB at low address
10-11	2	Voltage Low Alarm	MSB at low address
12-13	2	Voltage High Warning	MSB at low address
14-15	2	Voltage Low Warning	MSB at low address
16-17	2	Bias High Alarm	MSB at low address
18-19	2	Bias Low Alarm	MSB at low address
20-21	2	Bias High Warning	MSB at low address

Data Address	Length(Byte)	Name of Length	Description and Contents
22-23	2	Bias Low Warning	MSB at low address
24-25	2	TX Power High Alarm	MSB at low address
26-27	2	TX Power Low Alarm	MSB at low address
28-29	2	TX Power High Warning	MSB at low address
30-31	2	TX Power Low Warning	MSB at low address
32-33	2	RX Power High Alarm	MSB at low address
34-35	2	RX Power Low Alarm	MSB at low address
36-37	2	RX Power High Warning	MSB at low address
38-39	2	RX Power Low Warning	MSB at low address
40-41	2	Optional Laser Temp High Alarm	MSB at low address
42-43	2	Optional Laser Temp Low Alarm	MSB at low address
44-45	2	Optional Laser Temp High Warning	MSB at low address
46-47	2	Optional Laser Temp Low Warning	MSB at low address
48-49	2	Optional TEC Current High Alarm	MSB at low address
50-51	2	Optional TEC Current Low Alarm	MSB at low address
52-53	2	Optional TEC Current High Warning	MSB at low address
54-55	3	Optional TEC Current Low Warning	MSB at low address
Calibration Constants for External Calibration Option			
56-91	36	Calibration Constants for External Calibration Option	Refer to the SFF 8472 Rev12.4
92-94	3	Reserved	
95	1	Checksum	Byte 95 contains the low order 8 bits of the sum of bytes 0-94
Real Time Diagnostic and Control Registers			
96-110	15	A/D Values and Status Bits	Refer to the SFF 8472 Rev12.4
111	1	Reserved	Reserved (was assigned to SFF-8079)
Alarm and Warning Flag Bits			
112-117	6	Optional Alarm and Warning Flag Bits	Refer to the SFF 8472 Rev12.4
Extended Module Control/Status Bytes			
118-119	2	Extended Module Control/Status Bytes	Refer to the SFF 8472 Rev12.4
Optional Page Select Byte			
120-126	7	Vendor Specific	Vendor specific memory addresses
127	1	Optional Page Select	Defines the page number for subsequent reads and writes to locations A2h

User Accessible EEPROM Locations			
128-247	120	User EEPROM	User writable EEPROM
Vendor Specific Control Function Locations			
248-255	8	Vendor Specific	Vendor specific control functions

Pin Assignment

Diagram of Host Board Connector Block Pin Numbers and Name.



Pin	Name	Description	Notes
1	VeeT	Module transmitter ground	1
2	Tx Fault	Module transmitter fault	2
3	Tx Disable	Transmitter Disable; Turns off transmitter laser output	3
4	SDL	2 wire serial interface data input/output (SDA)	4
5	SCL	2 wire serial interface clock input (SCL)	4
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	4
7	RS0	Rate select0, optionally control SFP+ receiver. When high, input data rate >4.5Gb/ s; when low, input data rate <=4.5Gb/s	5
8	LOS	Receiver Loss of Signal Indication	6
9	RS1	Rate select0, optionally control SFP+ transmitter. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	1
10	VeeR	Module receiver ground	1
11	VeeR	Module receiver ground	1
12	RD-	Receiver inverted data out put	
13	RD+	Receiver non-inverted data out put	
14	VeeR	Module receiver ground	1
15	VccR	Module receiver 3.3V supply	
16	VccT	Module transmitter 3.3V supply	
17	VeeT	Module transmitter ground	1
18	TD+	Transmitter inverted data out put	
19	TD-	Transmitter non-inverted data out put	
20	VeeT	Module transmitter ground	1

Note:

1. Circuit ground is internally isolated from chassis ground
2. Tx FAULT is an open collector/drain output, which should be pulled up with a 4.7k to 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V.A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on Tx DIS >2.0V or open, enabled on Tx DIS <0.8V.
4. Should be pulled up with 4.7kΩ to 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5. Internally pulled down per SFF-8431 Rev 4.1.
6. LOS is open collector output. It should be pulled up with 4.7kΩ to 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T_S	-40		+85	°C	
Maximum Supply Voltage	V_{CC}	-0.5		3.6	V	
Operating Relative Humidity	RH			95	%	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Case Temperature	T_{op}	0	-	70	°C	Commercial
	T_{op}	-40	-	85	°C	Industrial
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Data Rate	BR	-	10.3125	11.3	Gbps	
Transmission Distance	TD	-	-	20	km	
Coupled Fiber	Single-mode fiber					9/125 µm SMF

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Data Rate			10.3125	11.3	Gbps	
Transmitter						
Center Wavelength Range	λ_C	1260	1270	1280	nm	SFPP-LP-2733-20
		1320	1330	1340		SFPP-LP-3327-20
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Output Power	Pout	-6		-1	dBm	1
Extinction Ratio	ER	3.5			dB	
Average Power of OFF Transmitter	Poff			-30	dBm	
Relative Intensity Noise	RIN			-128	dB/Hz	2
Receiver						
Wavelength Range	λ_C	1320	1330	1340	nm	SFPP-LP-2733-20
		1260	1270	1280	nm	SFPP-LP-3327-20
Receiver Sensitivity	Pmin			-14.4	dBm	3
Receiver Overload	Pmax	0.5			dBm	
LOS De-Assert	LOSD			-18	dBm	
LOS Assert	LOSA	-30			dBm	
LOS-Hysteresis	Phys	0.5		6	dB	

Notes:

1. Output is coupled into a 9/125um SMF.
2. 12dB reflection.
3. Measured with worst ER, BER less than 1E-12 and PRBS 2^{31}-1 at 10.3125Gbps.

Electrical Characteristics(TOP = Tc, Vcc = 3.135 to 3.465 Volts)

Parameter	Symbol	Min	Typ.	Max	Unit	Note
Supply Voltage	Vcc	3.135		3.465	V	
Supply Current(Commercial)	Icc			300	mA	
Supply Current(Industrial)	Icc			450	mA	
Power Consumption(Commercial)	P			1.0	W	
Power Consumption(Industrial)	P			1.5	W	
Transmitter						
CML Inputs(Differential)	Vin	150		1200	mVpp	1
Input Impedance(Differential)	Zin	85	100	115	ohm	
TX_DIS Disable		2		Vcc+0.3	V	
TX_DIS Enable		0		0.8	V	
TX_FAULT Fault		2		Vcc+0.3	V	
TX_FAULT Normal		0		0.5	V	
Receiver						
CML Outputs (Differential)	Vout	350		700	mVpp	1
Output Impedance (Differential)	Zout	85	100	115	Ohm	
RX_LOS LOS		2		Vcc+0.3	V	2
RX_LOS Normal		0		0.8	V	2
MOD_DEF (0:2) VoH		2.5			V	With Serial ID
MOD_DEF (0:2) VoL		0		0.5	V	With Serial ID

Note:

1. CML logic, internally AC coupled.
2. Loss Of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Timing Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Note
TX_Disable Assert Time	t_off			100	us	
TX_Disable Negate Time	t_on			2	ms	
Time to Initialize Include Reset of TX_FAULT	t_int			300	ms	
TX_FAULT from Fault to Assertion	t_fault			100	us	
TX_Disable Time to Start Reset	t_reset	10			us	
Receiver Loss of Signal Assert Time	T_A,RX_LOS			100	us	
Receiver Loss of Signal Deassert Time	T_d,RX_LOS			100	us	
Rate-Select Chage Time	t_ratesel			10	us	
Serial ID Clock Time	t_serial-clock			100	kHz	

Ordering Information

Product Name	Product Description
SFPP-LP-2733-20	SFP+ Plug-in, 10 Gbps, 20 km, TX=1270/RX=1330, on one single mode fiber, LC/PC Blue
SFPP-LP-3327-20	SFP+ Plug-in, 10 Gbps, 20 km, TX=1330/RX=1270, on one single mode fiber, LC/PC Blue
SFPP-LP-2733-20A	SFP+ Plug-in, 10Gbps, 20km, TX=1270/RX=1330 , on one single mode fiber, LC/PC Blue, Industrial Temp -40 °C to +85 °C
SFPP-LP-3327-20A	SFP+ Plug-in, 10Gbps, 20km, TX=1330/RX=1270 , on one single mode fiber, LC/PC Blue, Industrial Temp -40 °C to +85 °C

Contact Information

Ascent Communication Technology Ltd

AUSTRALIA
140 William Street, Melbourne
Victoria 3000, AUSTRALIA
Phone: +61-3-8691 2902

Hong Kong SAR
Room 1210, 12th Floor, Wing Tuck Commercial Centre
181 Wing Lok Street, Sheung Wan , Hong Kong SAR
Phone: +852-2851 4722

CHINA
Unit 1933, 600 Luban Road
200023, Shanghai, CHINA
Phone: +86-21-60232616

USA
2710 Thomes Ave
Cheyenne, WY 82001, USA
Phone: +1 203 350 9822

EUROPE
Pfarrer-Bensheimer-Strasse 7a
55129 Mainz, GERMANY
Phone: +49 (0) 6136 926 3246

VIETNAM
11th Floor, Hoa Binh Office Tower
106 Hoang Quoc Viet Street, Nghia Do Ward
Cau Giay District, Hanoi 10649, VIETNAM
Phone: +84-24-37955917

WEB: www.ascentcomtec.com

EMAIL: sales@ascentcomtec.com

Specifications and product availability are subject to change without notice.
Copyright © 2026 Ascent Communication Technology Limited. All rights reserved.
Ver. ACT_SFPP-LP-XXXX-20_Datasheet_V1c_Dec_2024