

1.25Gbps SFP Bi-Directional Transceiver, 2km Reach

ABL53-24-02-D/ABS53-24-02-D

ABL35-24-02-D/ABS35-24-02-D

Features

- Dual data-rate of 1.25Gbps/1.063Gbps operation
- FP laser and PIN photodetector for 2km transmission
- Compliant with SFP MSA and SFF-8472 with simplex LC or SC receptacle
- Digital Diagnostic Monitoring:
- Internal Calibration or External Calibration
- Compatible with SONET OC-24-LR-1
- Compatible with RoHS
- +3.3V single power supply
- Operating case temperature range of 0°C to +70°C (Commercial) or -40°C to +85°C (Industrial)



Applications

- Gigabit Ethernet
- Fiber Channel
- Switch to Switch interface
- Switched backplane applications
- Router/Server interface
- Other optical transmission systems

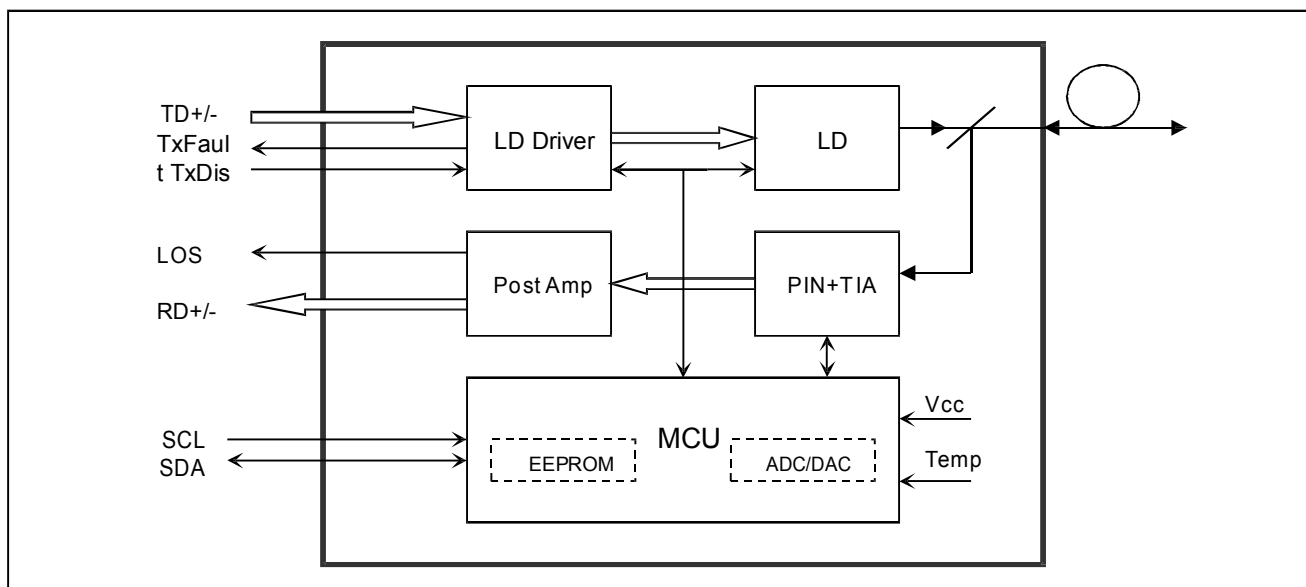
Description

The SFP-BIDI transceivers are high performance, cost effective modules supporting dual data-rate of 1.25Gbps/1.0625Gbps and 20km transmission distance with SMF.

The transceiver consists of three sections: a FP laser transmitter, a PIN 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 (MSA) and SFF-8472. For further information, please refer to SFP MSA.

Module Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Commercial	Tc		+70	°C
	Industrial			-40	+85
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Power Supply Current	Icc			300	mA
Data Rate	Gigabit Ethernet		1.25		Gbps
	Fiber Channel		1.063		

Optical and Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Centre Wavelength ABL53-24-02-D ABS53-24-02-D	λ_c	1530	1550	1570	nm	
Centre Wavelength ABL35-24-02-D ABS35-24-02-D	λ_c	1260	1330	1360	nm	
Spectral Width (RMS)	σ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Output Power	P _{out}	-10		-4	dBm	1
Extinction Ratio	ER	9			dB	
Optical Rise/Fall Time (20%~80%)	t _r /t _f			0.26	ns	
Data Input Swing Differential	V _{IN}	400		1800	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 ABL53-24-02-D ABS53-24-02-D	λ_c	1260		1360	nm	
Centre Wavelength ABL35-24-02-D ABS35-24-02-D	λ_c	1530		1570		
Receiver Sensitivity				-22	dBm	3
Receiver Overload		-3			dBm	3
LOS De-Assert	LOS _D			-23	dBm	
LOS Assert	LOS _A	-35			dBm	
LOS Hysteresis		1		4	dB	
Data Output Swing Differential	V _{out}	400		1800	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 2⁷-1 test pattern @1250Mbps, BER ≤1×10⁻¹².
4. Internally AC-coupled.

Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_on			1	ms
Tx Disable Assert Time	t_off			10	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			400	KHz
MOD_DEF (0:2)-High	VH	2		Vcc	V
MOD_DEF (0:2)-Low	VL			0.8	V

Diagnostics Specification

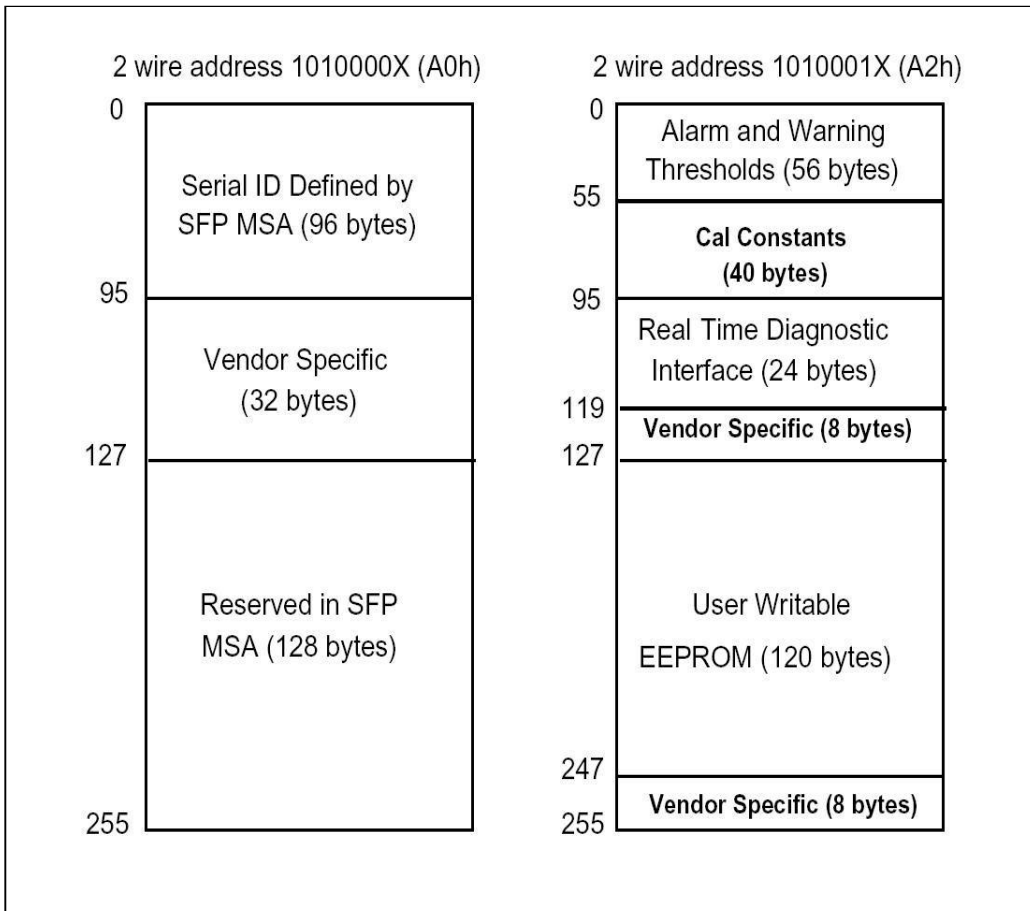
Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal / External
	-40 to +85			
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	0 to 100	mA	±10%	Internal / External
TX Power	-10 to 4	dBm	±3dB	Internal / External
RX Power	-30to -8	dBm	±3dB	Internal / External

Digital Diagnostic Memory Map

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

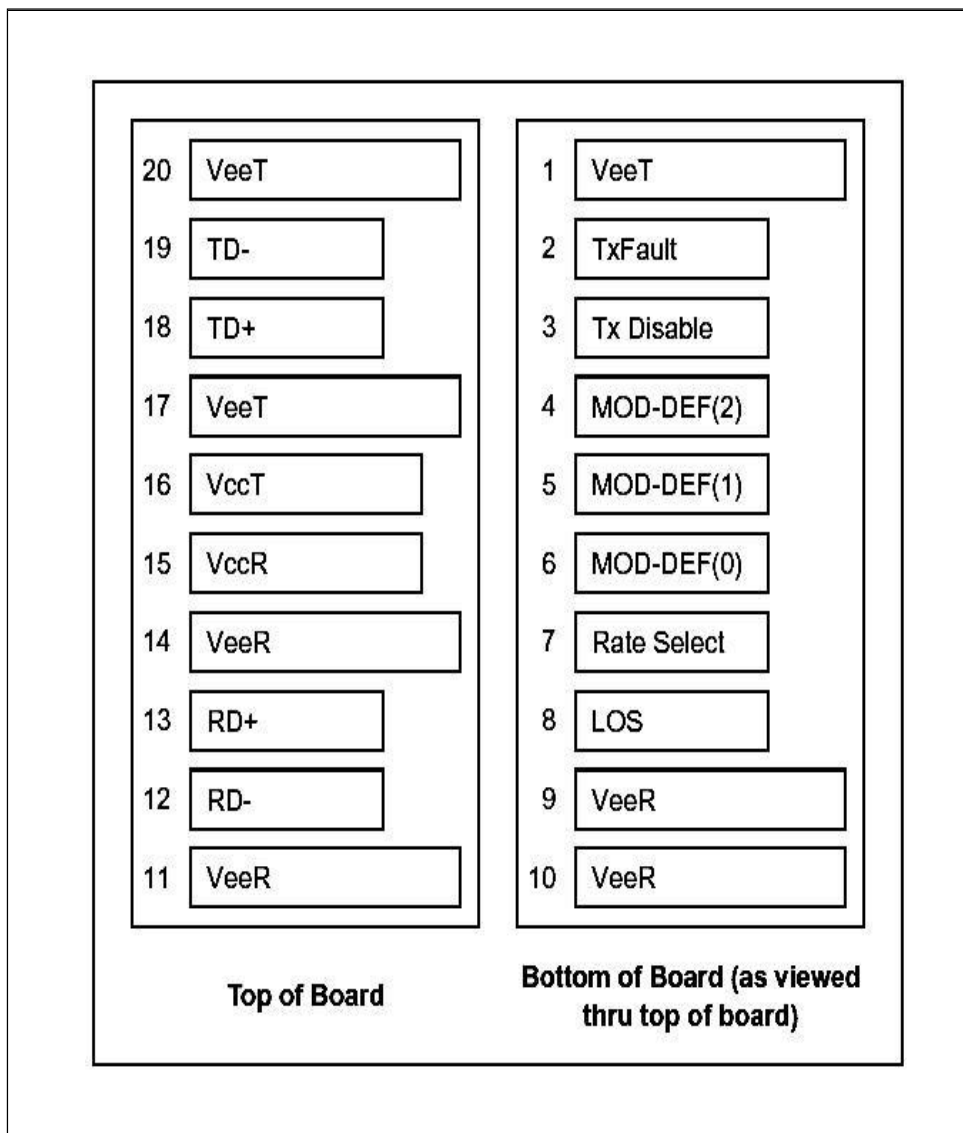
The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

The digital diagnostic memory map specific data field defines as following.



Pin Definitions

Pin Diagram



Top of Board

Bottom of Board (as viewed thru top of board)

Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	Notes
1	V _{EET}	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note 3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note 3
6	MOD_DEF(0)	TTL Low	3	Note 3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	V _{EER}	Receiver ground	1	
10	V _{EER}	Receiver ground	1	
11	V _{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	V _{EER}	Receiver ground	1	
15	V _{CCR}	Receiver Power Supply	2	
16	V _{CCT}	Transmitter Power Supply	2	
17	V _{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv. Transmit Data In	3	Note 6
20	V _{EET}	Transmitter Ground	1	

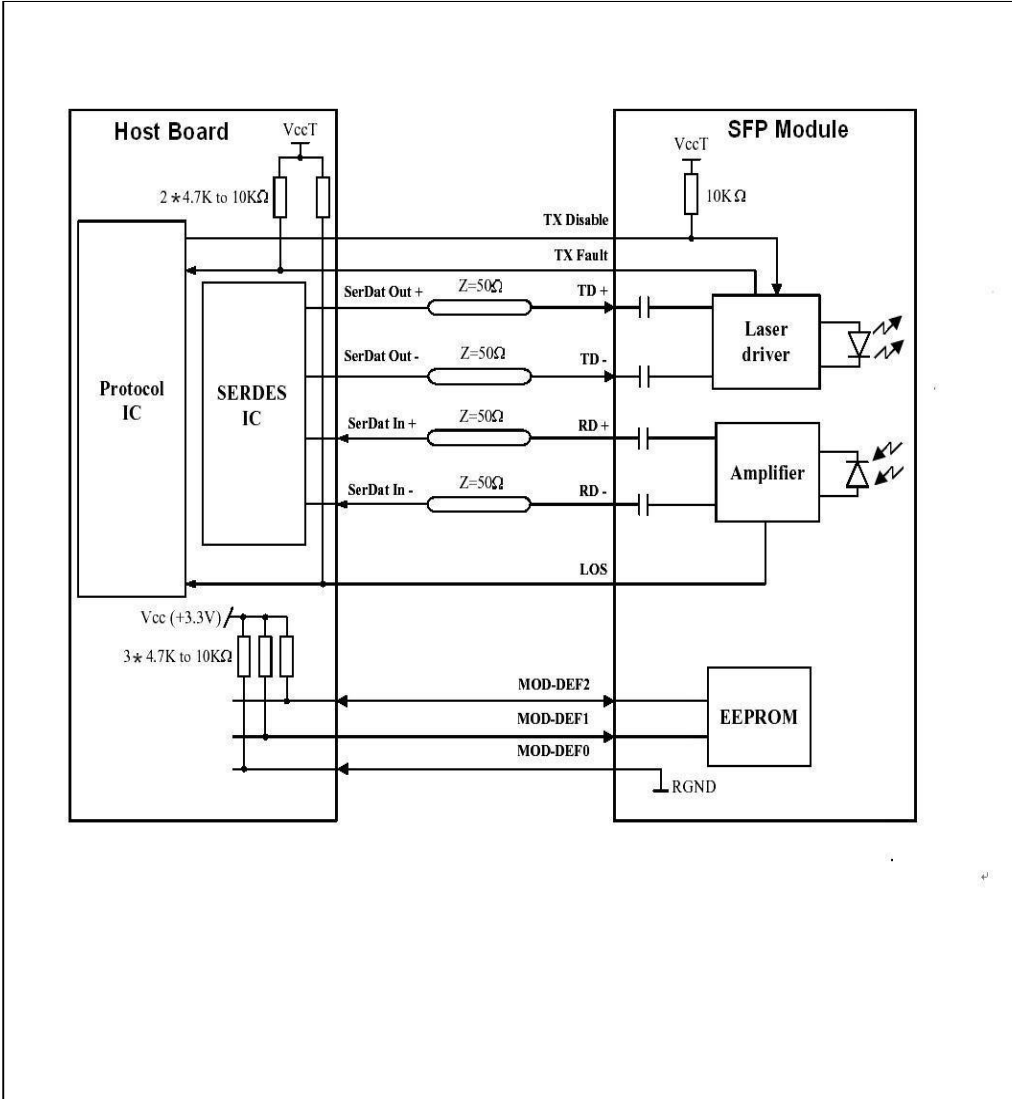
Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

- TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and V_{cc}+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k~10kΩ resistor. Its states are:

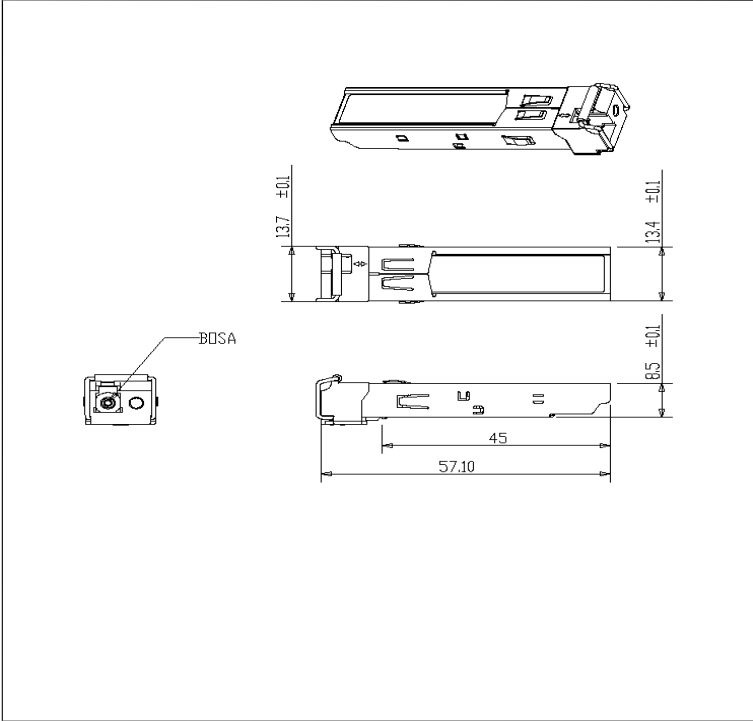
Low (0 to 0.8V):	Transmitter on
(>0.8V, < 2.0V):	Undefined
High (2.0 to 3.465V):	Transmitter Disabled
- Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be V_{ccT} or V_{ccR}.
Mod-Def 0 is grounded by the module to indicate that the module is present
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
- LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and V_{cc}+0.3V. Logic 1 indicates loss of signal; Logic 0 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.
- RD-/+ : These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
- TD-/+ : These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Recommended Interface Circuit

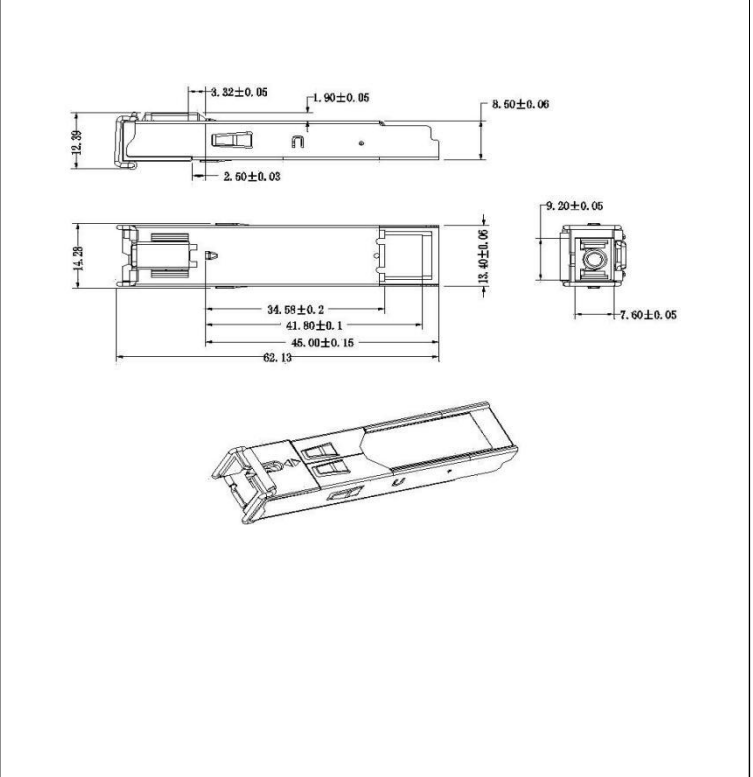


Mechanical Dimensions

A. LC



B. SC



Regulatory Compliance

10Gtek SFP-BIDI transceiver is designed to be Class I Laser safety compliant and is certified per the following standards:

Feature	Agency	Standard	Certificate / Comments
Laser Safety	FDA	CDRH 21 CFR 1040 annd Laser Notice No. 50	1120289-000
Product Safety	BST	EN 60825-1: 2007 EN 60825-2: 2004 EN 60950-1: 2006	BT0905142009
Environmental protection	SGS	RoHS Directive 2002/95/EC	GZ0902008347/CHE M
EMC	WALTEK	EN 55022:2006+A1:2007 EN 55024:1998+A1+A2:2003 -	WT10093768-D-E-E

Ordering information

Part Number	Product Description			
ABS53-24-02	1550nm	1.25Gbps	SC 2km	0°C~+70°C
ABS53-24-02-D	1550nm	1.25Gbps	SC 2km	0°C~+70°C With Digital Diagnostic Monitoring
ABS53-24-02+	1550nm	1.25Gbps	SC 2km	-40°C~+85°C
ABS53-24-02-D+	1550nm	1.25Gbps	SC 2km	-40°C~+85°C With Digital Diagnostic Monitoring
ABL53-24-02	1550nm	1.25Gbps	LC 2km	0°C~+70°C
ABL53-24-02-D	1550nm	1.25Gbps	LC 2km	0°C~+70°C With Digital Diagnostic Monitoring
ABL53-24-02+	1550nm	1.25Gbps	LC 2km	-40°C~+85°C
ABL53-24-02-D+	1550nm	1.25Gbps	LC 2km	-40°C~+85°C With Digital Diagnostic Monitoring
ABS35-24-02	1310nm	1.25Gbps	SC 2km	0°C~+70°C
ABS35-24-02-D	1310nm	1.25Gbps	SC 2km	0°C~+70°C With Digital Diagnostic Monitoring
ABS35-24-02+	1310nm	1.25Gbps	SC 2km	-40°C~+85°C
ABS35-24-02-D+	1310nm	1.25Gbps	SC 2km	-40°C~+85°C With Digital Diagnostic Monitoring
ABL35-24-02	1310nm	1.25Gbps	LC 2km	0°C~+70°C
ABL35-24-02-D	1310nm	1.25Gbps	LC 2km	0°C~+70°C With Digital Diagnostic Monitoring
ABL35-24-02+	1310nm	1.25Gbps	LC 2km	-40°C~+85°C
ABL35-24-02-D+	1310nm	1.25Gbps	LC 2km	-40°C~+85°C With Digital Diagnostic Monitoring

References

1. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA),September 2000.
2. Telcordia GR-253and ITU-T G.957 Specifications.

Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by 10Gtek before they become applicable to any particular order or contract. In accordance with the 10Gtek policy of continuous improvement specifications may change without notice.

The publication of information in this data sheet does not imply freedom from patent or other protective rights of 10Gtek or others. Further details are available from any 10Gtek sales representative.

Revision History

Revision	Initiated	Approved	content	Release Date
Ver1.0	Jacky	Nicky	Released	Dec/2011
Ver1.1	QR.HUANG	Nicky	Released	Apr/2017

Further Information

For further information, please contact info@10gtek.com

Tel : +86 755 2998 8100

Fax: +86 755 6162 4140

Web: www.10gtek.com