

# SO-XFP-10GE-BX60D-3327

XFP, BIDI, 10GBase, Multirate 9.95-11.1 Gbps, TX/RX=1330/1270nm, DDM, 21dB, 60km, LC

## OVERVIEW

The SO-XFP-10GE-BX60D series single mode transceiver is small form factor pluggable module for duplex optical data communications such as 10GBASE-LR/LW defined by IEEE 802.3ae and 10G Fibre Channel 1200-SM-LL-L. It is with the XFP 30-pin connector to allow hot plug capability. The SO-XFP-10GE-BX60D-2733 module is designed for single mode fibre and operates at a nominal wavelength of 1270nm; SO-XFP-10GE-BX60D-3327 module is designed for single mode fibre and operates at a nominal wavelength of 1330nm. The transmitter section uses a multiple quantum well DFB, which is class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

## PRODUCT FEATURES

- Supports 9.95Gb/s to 10.5Gb/s data rates
- Power budget 21dB at least
- 1270nm DFB transmitter/ 1330nm receiver and 1330nm DFB transmitter/ 1270nm receiver
- LC connector
- +3.3V power supply only
- Power dissipation <2W
- Built-in digital diagnostic functions
- Case temperature range:
  - Standard: 0 ~ +70 °C
  - Extended: -10 ~ +85 °C
- Complaint with XFP MSA
- Complaint with IEEE 802.3ae 10GBASE-LR/LW
- Complaint with 10GFC 1200-SM-LL-L

## APPLICATIONS

- 10GBASE-LR 10G Ethernet at 10.3125Gbps
- 10GBASE-LW 10G Ethernet at 9.953Gbps
- 1200-SM-LL-L 10G Fiber Channel at 10.51875Gbps

## ORDERING INFORMATION

Part Number	Description
SO-XFP-10GE-BX60D-3327	XFP, BIDI, 10GBase, Multirate 9.95-11.1 Gbps, TX/RX=1330/1270nm, DDM, 21dB, 60km, LC
SO-XFP-10GE-BX60D-3327 -E	XFP, BIDI, 10GBase, Multirate 9.95-11.1 Gbps, TX/RX=1330/1270nm, DDM, 21dB, 60km, LC, ext. temp

Subject to change without notice.

For more information, visit [smaroptics.com](http://smaroptics.com).

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit	
Maximum Supply Voltage	Vcc	-0.5	4.0	V+	
Storage Temperature	Ts	-40	85	°C	
Case Operating Temperature	Tc	SO-XFP-10GE-BX60D-3327	0	70	°C
		SO-XFP-10GE-BX60D-3327-E	-10	85	

## RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Case Operating Temperature	Tc	SO-XFP-20GE-BX60D-3327	0	+70	°C
		SO-XFP-20GE-BX60D-3327-E	-10	+85	
Power Supply Voltage	Vcc	3.15	3.3	3.45	V
Power Supply Current	Icc			580	mA

## ELECTRICAL CHARACTERISTICS - TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit
Data Rate		9.95		10.52	Gbps
Input differential impedance	Rin	90	100	110	Ω
Differential data input swing	Vin,pp	120		820	mV
Transmit Disable Voltage	VD	2.0		Vcc	V
Transmit Enable Voltage	VEN	GND		GND+0.8	V
Transmit Disable Assert Time				10	us

## ELECTRICAL CHARACTERISTICS - RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit
Differential data output swing	Vout,pp	340	650	850	mV
Data output rise time	tr			38	ps
Data output fall time	tf			38	ps
LOS Fault	VLOS fault	2.4		Vcc	V
LOS Normal	VLOS norm	GND		GND+0.5	V

## OPTICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
Power Budget		21			dB
Data Rate			9.953/10.3125		Gbps

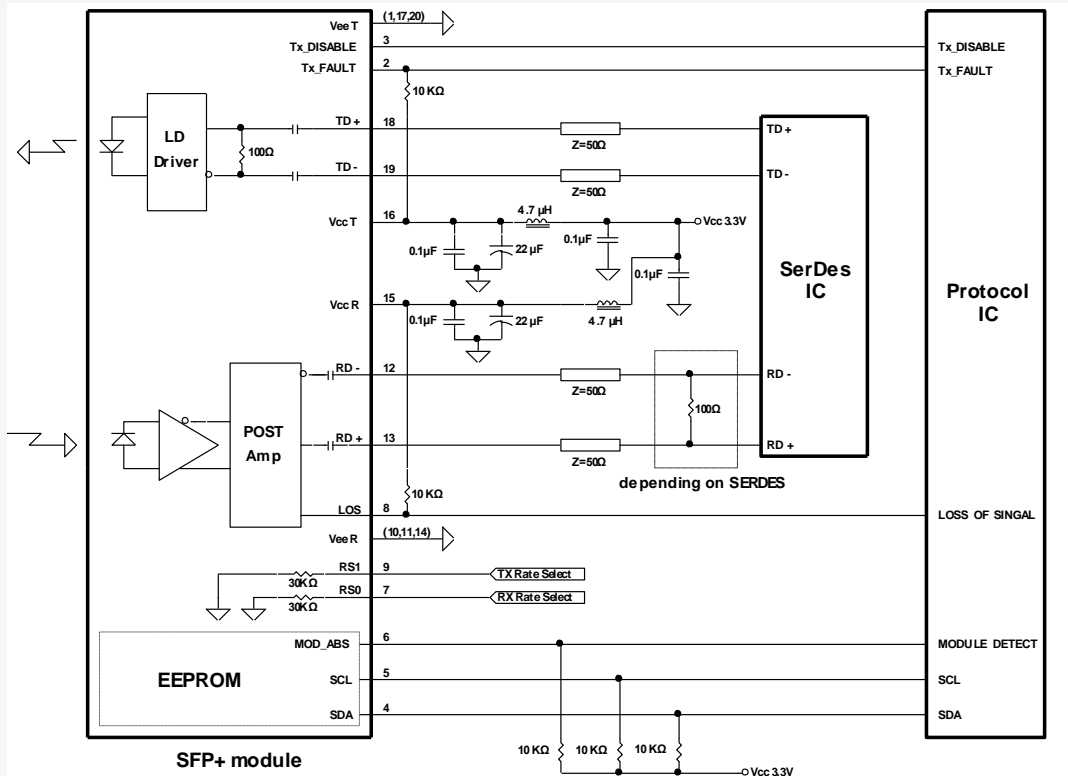
## OPTICAL CHARACTERISTICS – TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength	$\lambda_c$	1320	1330	1340	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Average Output Power	$P_{out, AVG}$	1		5	dBm
Extinction Ratio	$ER$	3.5			dB
Side Mode Suppression Ratio	$SMSR$	30			dB
Transmitter and Dispersion Penalty	$TDP$			2	dB
Average Power of OFF Transmitter				-30	dBm
Relative Intensity Noise	$RIN$			-128	dB/Hz
Input Differential Impedance	$Z_{in}$	90	100	110	$\Omega$
TX Disable	Disable	2.0		$V_{cc}+0.3$	V
	Enable	0		0.8	
TX Fault	Fault	2.0		$V_{cc}+0.3$	V
	Normal	0		0.8	
TX Disable Assert Time	$t_{off}$			10	us

## OPTICAL CHARACTERISTICS – RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength	$\lambda_c$	1260		1280	nm
Sensitivity	$P_{IN}$			-20	dBm
Receiver Overload	$P_{MAX}$	-6			dBm
Output Differential Impedance	$P_{IN}$	90	100	110	$\Omega$
LOS De-Assert	$LOSD$			-22	dBm
LOS Assert	$LOSA$	-34			dBm
LOS	High	2.0		$V_{CC}+0.3$	V
	Low	0		0.8	

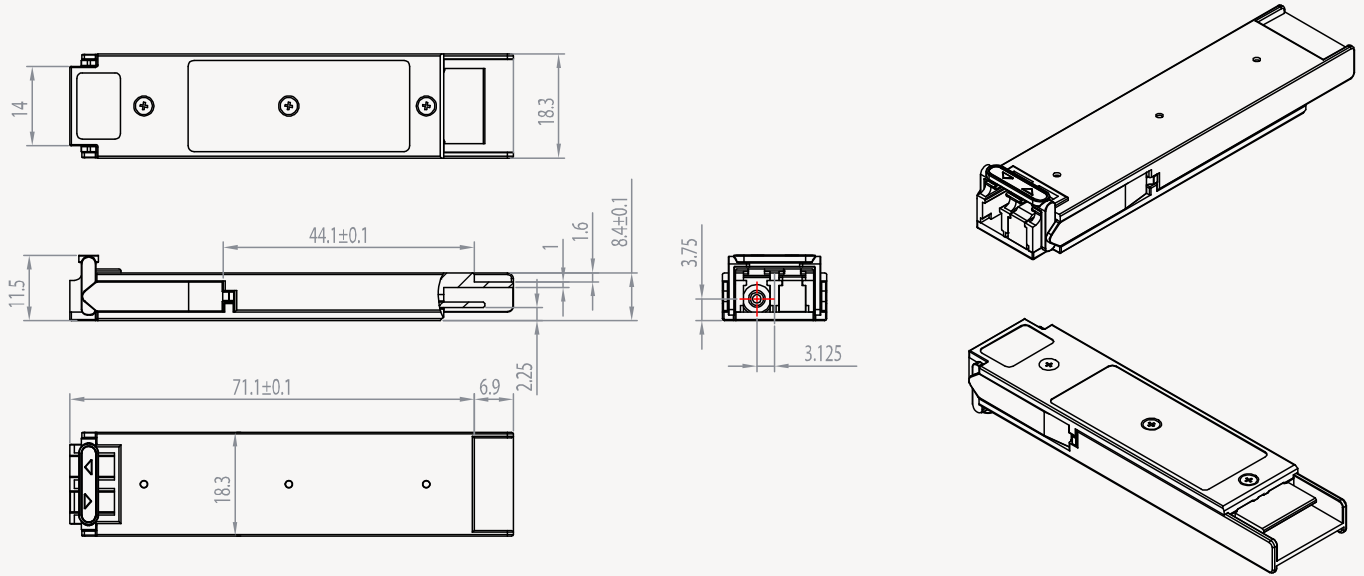
FUNCTIONAL DIAGRAM OF TRANSCEIVER AND RECOMMENDED CIRCUIT SCHEMATIC



PIN ASSIGNMENT ACCORDING TO MSA

PIN	Signal Name	Description	PIN	Signal Name	Description
1	V <sub>EE</sub> T	Transmitter Signal Ground	11	V <sub>EE</sub> R	Receiver Signal Ground
2	TX_Fault	Transmitter Fault Indication. Logic "1" Output = Laser Fault. Logic "0" Output = Normal Operation	12	RD-	Inverse Receiver Data Out
3	TX_Disable	Logic "1" Input (or no connection) = Laser off, Logic "0" = Laser on.	13	RD+	Receiver Data Out
4	SDA	Modulation Definition 2 – Two wires serial ID Interface	14	V <sub>EE</sub> R	Receiver Signal Ground
5	SDL	Modulation Definition 1 – Two wires serial ID Interface	15	V <sub>CC</sub> R	Receiver Power – 3.3V±5%
6	MOD-ABS	Modulation Definition 0 – Ground in Module	16	V <sub>CC</sub> T	Transmitter Power – 3.3V±5%
7	RS0	RX Rate Select (LVTTTL). This pin has an internal 30k pulldown to ground. A signal on this pin will not affect module performance.	17	V <sub>EE</sub> T	Transmitter Signal Ground
8	RX_LOS	Loss of Signal Out (OC).	18	TD+	Transmitter Data In
9	RS1	TX Rate Select (LVTTTL). This pin has an internal 30k pulldown to ground. A signal on this pin will not affect module performance.	19	TD-	Inverse Transmitter Data In
10	V <sub>EE</sub> R	Receiver Signal Ground	20	V <sub>EE</sub> T	Transmitter Signal Ground

MECHANICAL DIMENSIONS



Subject to change without notice.

For more information, visit [smartoptics.com](http://smartoptics.com).