

# SO-SFP-10GE-BX40D

SFP+, BIDI, 10GBase, 1270/1330nm, SM, DDM, 16dB, 40km, LC

## OVERVIEW

The SO-SFP-10GE-BX40D 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. It is with the SFP+ 20-pin connector to allow hot plug capability. The SO-SFP-10GE-BX40D-2733 module is designed for single mode fiber and operates at a nominal wavelength of 1270nm; SO-SFP-10GE-BX40D-3327 module is designed for single mode fiber 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

- Operating data rate up to 10.3Gbps
- Two types:
  - A: 1270nm DFB Transmitter/ 1330nm Receiver
  - B: 1330nm DFB Transmitter/ 1270nm Receiver
- Power budget up to 16dB
- Single 3.3V Power supply and TTL Logic Interface
- LC Connector Interface
- Hot Pluggable
- Power Dissipation < 1.5W
- Operating Case Temperature
  - Standard: 0°C to +70°C
  - Extended: -10°C to +85°C
- Compliant with SFP+ MSA Specification SFF-8431
- Compliant with IEEE 802.3ae 10GBASE-LR
- Compliant with IEEE 802.3ae 10GBASE-LW

## ORDERING INFORMATION

Part Number	Description
SO-SFP-10GE-BX40D-2733	SFP+, BIDI, 10GBase, TX/RX=1270/1330nm, DDM, 16dB, 40km, LC
SO-SFP-10GE-BX40D-3327	SFP+, BIDI, 10GBase, TX/RX=1330/1270nm, DDM, 16dB, 40km, LC
SO-SFP-10GE-BX40D-2733-E	SFP+, BIDI, 10GBase, TX/RX=1270/1330nm, DDM, 16dB, 40km, LC ext. temp
SO-SFP-10GE-BX40D-3327-E	SFP+, BIDI, 10GBase, TX/RX=1330/1270nm, DDM, 16dB, 40km, LC ext. temp

## APPLICATIONS

- 10GBASE-LR at 10.3125Gbps

Subject to change without notice.

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

- 10GBASE-LW at 9.953Gbps
- Other Optical Links

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Storage Temperature	$T_s$	-40	+85	°C
Supply Voltage	$V_{cc}$	-0.5	3.6	V

## RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	$T_A$	0		+70	°C
Power Supply Voltage	$V_{cc}$	3.15	3.3	3.45	V
Power Supply Current	$I_{cc}$			430	mA
Surge Current	$I_{Surge}$			+30	mA
Operating Case Temperature	$T_c$	SO-SFP-10GE-BX40D-XXYY	0	70	°C
		SO-SFP-10GE-BX40D-XXYY-E	-10	85	°C
Baud rate			9.953/10.3125		Gbps

## PERFORMANCE SPECIFICATIONS – ELECTRICAL TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Inputs(Differential)	$V_{in}$	150		1200	mVpp	AC coupled inputs
Input Impedance (Differential)	$C_{in}$	85	100	115	ohms	$R_{in} > 100$ kohms @ DC
Tx_DISABLE Input Voltage – High		2		$V_{cc}+0.3$	V	
Tx_DISABLE Input Voltage – Low		0		0.8	V	
Tx_FAULT Output Voltage – High		2		$V_{cc}+0.3$	V	$I_o = 400\mu A$ ; Host $V_{cc}$
Tx_FAULT Output Voltage – Low		0		0.5	V	$I_o = -4.0Ma$

## PERFORMANCE SPECIFICATIONS – ELECTRICAL RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Outputs (Differential)	$V_{out}$	350		700	mVpp	AC coupled inputs
Output Impedance (Differential)	$Z_{out}$	85	100	115	ohms	
Rx_LOS Output Voltage – High		2		$V_{cc}+0.3$	V	$I_o = 400\mu A$ ; Host $V_{cc}$
Rx_LOS Output Voltage – Low		0		0.8	V	$I_o = -4.0Ma$
MOD_DEF ( 2:0)	$V_{oH}$	2.5			V	With Serial ID
	$V_{oL}$	0		0.5	V	

## OPTICAL AND ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
Power Budget		16			dB

Subject to change without notice.

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

Data Rate	9.953/10.3125	Gbps
-----------	---------------	------

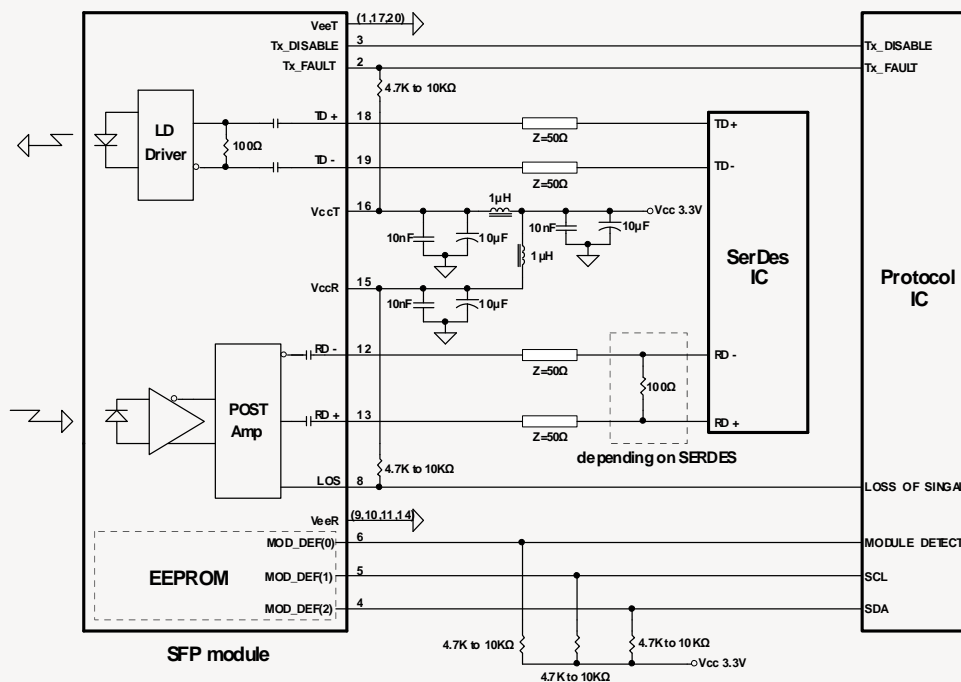
## OPTICAL AND ELECTRICAL CHARACTERISTICS TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength SO-SFP-10GE-BX40D-2733	$\lambda_c$	1260	1270	1280	nm
Centre Wavelength SO-SFP-10GE-BX40D-3327		1320	1330	1340	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Average Output Power	$P_{out}$	+1		+5	dBm
Extinction Ratio	$E_r$	3.5			dB
Side Mode Suppression Ratio	$SMSR$	30			dB
Transmitter 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 Assert Time	$t_{off}$			10	us

## OPTICAL AND ELECTRICAL CHARACTERISTICS RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength SO-SFP-10GE-BX40D-2733	$\lambda_c$	1320	1330	1340	nm
Centre Wavelength SO-SFP-10GE-BX40D-3327		1260	1270	1280	nm
Sensitivity	$P_{in}$			-15	dBm
Receiver Overload	$P_{max}$	0.5			dBm
Output Differential Impedance	$P_{in}$	90	100	110	$\Omega$
LOS De-Assert	$LOSD$			-18	dBm
LOS Assert	$LOSA$	-30			dBm
LOS	High	2.0		VCC+0.3	V
	Low	0		0.8	

RECOMMENDED CIRCUIT SCHEMATIC



PIN FUNCTION DEFINITIONS

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

Subject to change without notice.

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

MECHANICAL DRAWING

