

SO-SFP-10GE-BX60D

SFP+, BIDI, 10GBase, 1270/1330nm, DDM, 21dB, 60km, LC

OVERVIEW

The SO-SFP-10GE-BX60D XYYY 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-BX60D-2733 module is designed for single mode fiber and operates at a nominal wavelength of 1270nm; SO-SFP-10GE-BX60D-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 21dB at least
- 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-ER
- Compliant with IEEE 802.3ae 10GBASE-EW

ORDERING INFORMATION

Part Number	Description
SO-SFP-10GE-BX60D-2733	SFP+, BIDI, 10GBase, TX/RX=1270/1330nm, DDM, 21dB, 60km, LC
SO-SFP-10GE-BX60D-3327	SFP+, BIDI, 10GBase, TX/RX=1270/1330nm, DDM, 21dB, 60km, LC
SO-SFP-10GE-BX60D-2733-E	SFP+, BIDI, 10GBase, TX/RX=1270/1330nm, DDM, 21dB, 60km, LC ext. temp
SO-SFP-10GE-BX60D-3327-E	SFP+, BIDI, 10GBase, TX/RX=1270/1330nm, DDM, 21dB, 60km, LC ext. Temp

APPLICATIONS

- 10GBASE-ER at 10.3125Gbps

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- 10GBASE-EW 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	SO-SFP-10GE- XXYY	0		70	°C
	T_c				
	SO-SFP-10GE- XXYY-E	-10		85	
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
Baud rate			10.31		Gbaud
			9.95		

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	$R_{in} > 100 \text{ kohms @ DC}$
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	$I_o = 400\mu\text{A}; \text{Host } V_{cc}$
Tx_FAULT Output Voltage – Low		0		0.5	V	$I_o = -4.0\text{Ma}$

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)	C_{out}	85	100	115	ohms	
Rx_LOS Output Voltage – High		2		$V_{cc}+0.3$	V	$I_o = 400\mu\text{A}; \text{Host } V_{cc}$
Rx_LOS Output Voltage – Low		0		0.8	V	$I_o = -4.0\text{Ma}$
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
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Power budget	21				dB
Data Rate		9.953/10.3125			Gbps

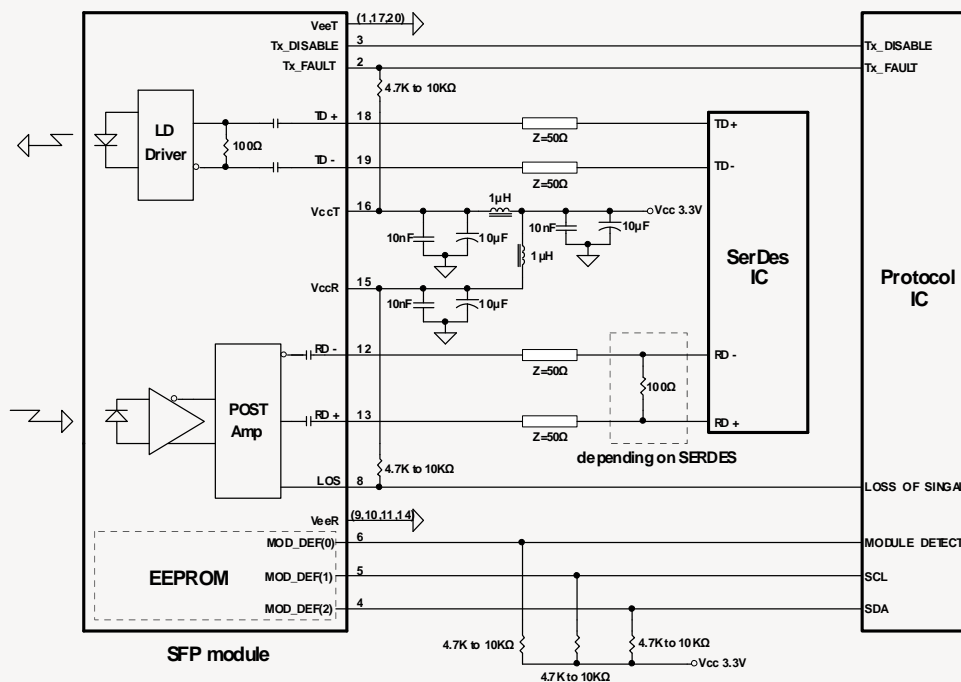
OPTICAL AND ELECTRICAL CHARACTERISTICS TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength SO-SFP-10GE-BX60D-2733	λ_c	1260	1270	1280	nm
Centre Wavelength SO-SFP-10GE-BX60D-3327		1320	1330	1340	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Average Output Power	P_{out}	1		6	dBm
Extinction Ratio	Er	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	ZIN	90	100	110	Ω
TX Disable Assert Time	t_{off}		-	10	us

OPTICAL AND ELECTRICAL CHARACTERISTICS RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength SO-SFP-10GE-BX60D-2733	λ_c	1320	1330	1340	nm
Centre Wavelength SO-SFP-10GE-BX60D-3327		1260	1270	1280	nm
Receiver Sensitivity	P_{in}			-20	dBm
Receiver Overload	P_{max}	-6			dBm
Output Differential Impedance	P_{in}	90	100	110	Ω
LOS De-Assert	$LOSD$			-21	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 _{EE} T	Transmitter Signal Ground	11	V _{EE} 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 _{EE} R	Receiver Signal Ground
5	SDL	Modulation Definition 1 – Two wires serial ID Interface	15	V _{CC} R	Receiver Power – 3.3V±5%
6	MOD-ABS	Modulation Definition 0 – Ground in Module	16	V _{CC} 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 _{EE} 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 _{EE} R	Receiver Signal Ground	20	V _{EE} T	Transmitter Signal Ground

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MECHANICAL DRAWING

