GBC PHOTONICS
DRIVING OPTICAL NETWORKS

SP-SM31010D-GP

1310nm SFP+ single-Mode Transceiver, With Diagnostic Monitoring
10G BASE-LW/LR
Duplex SFP+ Transceiver, RoHS 6 Compliant

Features

- Operating data rate up to 11.1Gbps
- 1310nm DFB-LD Transmitter
- Distance up to 10km
- Single 3.3V Power supply and TTL Logic Interface
- Duplex LC Connector Interface
- Hot Pluggable
- Power Dissipation < 1.0W
- Compliant with MSA SFP+ Specification SFF-8431
- Compliant with IEEE 802.3ae 10GBASE-LR/LW
- Operating Case Temperature

  Standard: -5℃~+70℃

  Industrial: -40℃~+85℃

Applications

- 10GBASE-LR at 10.31Gbps
- 10GBASE-LW at 9.95Gbps
- Other optical links

Ordering information

Part No.	Description
SP-SM31010D-GP	SFP+ LR 10Gbs 1310nm LC DDM SMF 10km

Absolute Maximum Ratings*[note3]

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T_S	-40	+85	°C
Supply Voltage	V_{CC}	-0.5	3.6	V
Input Voltage	Vin	-0.5	Vcc	V
Output Current	Io	-	50	mA

Note3: Exceeding any one of these values may destroy the device permanently.

Recommended Operating Conditions

Parameter	Symbol		Min.	Typical	Max.	Unit
Operating Case Temperature	T_c	SP-SM31010D-GP	-5		+70	°C
		SP-SM31010DI-GP	-40		+85	
Power Supply Voltage	V_{CC}		3.15	3.3	3.45	V
Power Supply Current	I_{CC}				300	mA
Surge Current	I_{Surge}				+30	mA
Baud Rate			0.6		11.1	Gbps

Performance Specifications – Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
CML Inputs(Differential)	Vin	150		1200	mVpp	AC coupled inputs
Input AC Common Mode Voltage		0		25	mV	RMS
Input Impedance (Differential)	Zin	85	100	115	ohm	Rin > 100 kohms @ DC
Differential Input S-parameter	$S_{DD}11$	-	-	-10	dB	
Differential to Common Mode Conversion	$S_{CD}11$	-	-	-10	dB	
Tx_DISABLE Input Voltage – High		2		3.45	V	
Tx_DISABLE Input Voltage – Low		0		0.8	V	
Tx_FAULT Output Voltage – High		2		Vcc+0.3	V	Io = 400μA; Host Vcc
Tx_FAULT Output Voltage – Low		0		0.5	V	Io = -4.0mA
Receiver						
CML Outputs (Differential)	Vout	350		700	mVpp	AC coupled outputs
Output AC Common Mode Voltage		0		15	mV	RMS
Output Impedance (Differential)	Zout	90	100	110	ohm	

Differential Output S-parameter	S_D22	-	-	-10	dB	
Rx_LOS Output Voltage – High		2		Vcc+0.3	V	Io = 400μA; Host Vcc
Rx_LOS Output Voltage – Low		0		0.8	V	Io = -4.0mA
MOD_DEF (0:2)	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

Performance Specifications – Optical

Parameter		Symbol	Min.	Typical	Max.	Unit
9μm Core Diameter SMF				10		Km
Data Rate			0.6		11.1	Gbps
Transmitter						
Centre Wavelength		λ_C	1270	1310	1355	nm
Spectral Width (-20dB)		Δλ			1	nm
Average Output Power*note4		P_{out}	-6		0	dBm
Extinction Ratio		ER	3.5			dB
Average Power of OFF Transmitter		P_{off}			-30	dBm
Side Mode Suppression Ratio		SMSR	30			dB
Transmitter Dispersion Penalty		TDP			3.2	dB
Input Differential Impedance		Z_{IN}	90	100	110	Ω
TX Disable Assert Time		t_off	-	-	10	us
TX_DISABLE Negate Time		t_on	-	-	1	ms
TX_BISABLE time to start reset		t_reset	10	-	-	us
Time to initialize, include reset of TX_FAULT		t_init	-	-	300	ms
TX_FAULT from fault to assertion		t_fault	-	-	100	us
Total Jitter		TJ	-	-	0.28	UI(p-p)
Data Dependant Jitter		DDJ	-	-	0.1	UI(p-p)
Uncorrelated Jitter		UJ	-	-	0.023	RMS
Receiver						
Centre Wavelength		λ	1260		1565	nm
Sensitivity*note5		P_{min}			-14.4	dBm
Receiver Overload		P_{max}	0.5			dBm
Optical Return Loss		ORL			-12	dB
LOS De-Assert		LOS_D			-16	dBm
LOS Assert		LOS_A	-28			dBm
LOS	High		2.0		V_{CC}+0.3	V
	Low		0		0.8	

Note4: Output is coupled into a 9/125um SMF. The -4.7dBm is reference IEEE 802.3ae, the typical value is -1dBm.

Note5: Minimum average optical power measured at the BER less than 1E-12, back to back. The measure pattern is PRBS 2^{31}-1.

Mechanical Specifications