

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°C~+70°C

Industrial: -40°C~+85°C

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	V _{in}	-0.5	V _{cc}	V
Output Current	I _o	-	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)	V _{in}	150		1200	mVpp	AC coupled inputs
Input AC Common Mode Voltage		0		25	mV	RMS
Input Impedance (Differential)	Z _{in}	85	100	115	ohm	R _{in} > 100 kohms @ DC
Differential Input S-parameter	S _{DD11}	-	-	-10	dB	
Differential to Common Mode Conversion	S _{CD11}	-	-	-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		V _{cc} +0.3	V	I _o = 400µA; Host V _{cc}
Tx_FAULT Output Voltage – Low		0		0.5	V	I _o = -4.0mA
Receiver						
CML Outputs (Differential)	V _{out}	350		700	mVpp	AC coupled outputs
Output AC Common Mode Voltage		0		15	mV	RMS
Output Impedance (Differential)	Z _{out}	90	100	110	ohm	

Differential Output S-parameter	S _{D22}	-	-	-10	dB	
Rx_LOS Output Voltage – High		2		V _{CC} +0.3	V	I _o = 400μA; Host V _{CC}
Rx_LOS Output Voltage – Low		0		0.8	V	I _o = -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		11.3	Gbps
Transmitter					
Centre Wavelength	λ _C	1270	1310	1355	nm
Spectral Width (-20dB)	Δλ			1	nm
Average Output Power*note4	P _{out}	-8.2		0.5	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 2³¹-1.

Mechanical Specifications

