

## SP-SM27WD020D-GP

## SP-SM33WD020D-GP

Tx: 1270nm/Rx: 1330nm BIDI SFP+ Transceiver for 10GbE

Tx: 1330nm/Rx: 1270nm BIDI SFP+ Transceiver for 10GbE

RoHS 6 Compliant

### Features

- ◆ Operating data rate up to 10.3Gbps
- ◆ Two types:
  - A: 1270nm DFB Transmitter/ 1330nm Receiver
  - B: 1330nm DFB Transmitter/ 1270nm Receiver
- ◆ Single 3.3V Power supply and TTL Logic Interface
- ◆ LC Connector Interface
- ◆ Hot Pluggable
- ◆ Power Dissipation < 1.5W
- ◆ Operating Case Temperature
  - Standard: 0~+70°C
  - Industrial: -40+85C
- ◆ Compliant with SFP+ MSA Specification SFF-8431
- ◆ Compliant with IEEE 802.3ae 10GBASE-LR
- ◆ Compliant with IEEE 802.3ae 10GBASE-LW
- ◆ Compliant with SFF-8472

### Applications

- ◆ 10GBASE-LR at 10.3125Gbps
- ◆ 10GBASE-LW at 9.953Gbps
- ◆ Other Optical Links

### Ordering information

Part No.	Description
SP-SM27WD020D-GP	SFP+ BIDI SM 1270nm/1330nm LC 20km 10Gb
SP-SM33WD020D-GP	SFP+ BIDI SM 1330nm/1270nm LC 20km 10Gb
SP-SM27WD020DI-GP	SFP+ BIDI SM 1270nm/1330nm LC 20km 10Gb, ind. version
SP-SM33WD020DI-GP	SFP+ BIDI SM 1330nm/1270nm LC 20km 10Gb, ind. version

**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

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

**Recommended Operating Conditions**

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	$T_A$	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	$T_c$	SP-SM27/33WD020D-GP		70	°C
Baud Rate			9.953/10.3125		GBaud

**Performance Specifications - Electrical**

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
<b>Transmitter</b>						
CML Inputs(Differential)	$V_{in}$	150		1200	mVpp	AC coupled inputs
Input Impedance (Differential)	$Z_{in}$	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	$I_o = -4.0mA$
<b>Receiver</b>						
CML Outputs (Differential)	$V_{out}$	350		700	mVpp	AC coupled outputs
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  
(SP-SM27WD020D-GP, 1270nm DFB & PIN/TIA)**

Parameter	Symbol	Min.	Typical	Max.	Unit
Power budget		12			dB
Data Rate			9.953/10.3125		Gbps
<b>Transmitter</b>					
Centre Wavelength	$\lambda_c$	1260	1270	1280	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Average Output Power*note4	$P_{out, AVG}$	-2		3	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 Assert Time	$t_{off}$			10	us
<b>Receiver</b>					
Centre Wavelength	$\lambda_c$	1320		1340	nm
Sensitivity*note5	$P_{IN}$			-14	dBm
Receiver Overload	$P_{MAX}$	0.5			dBm
Output Differential Impedance	$P_{IN}$	90	100	110	$\Omega$
LOS De-Assert	$LOS_D$			-18	dBm
LOS Assert	$LOS_A$	-30			dBm
LOS	High		2.0	$V_{CC}+0.3$	V
	Low		0	0.8	

**(SP-SM33WD020D-GP, 1330nm DFB & PIN/TIA)**

Parameter	Symbol	Min.	Typical	Max.	Unit
Power budget		12			dB
Data Rate			9.953/10.3125		Gbps
<b>Transmitter</b>					
Centre Wavelength	$\lambda_c$	1320	1330	1340	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Average Output Power*note4	$P_{out, AVG}$	-2		3	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 Assert Time	$t_{off}$			10	us
<b>Receiver</b>					
Centre Wavelength	$\lambda_c$	1260		1280	nm
Sensitivity*note5	PIN			-14	dBm

Receiver Overload		$P_{MAX}$	0.5			dBm
Output Differential Impedance		$P_{IN}$	90	100	110	$\Omega$
LOS De-Assert		$LOS_D$			-18	dBm
LOS Assert		$LOS_A$	-30			dBm
LOS	High		2.0		$V_{CC}+0.3$	V
	Low		0		0.8	

\*Note4: Output is coupled into a 9/125um SMF.

\*Note5: Measured with worst ER, BER less than 1E-12 and PRBS 2<sup>31</sup>-1 at 10.3125Gbps.

### Mechanical Specifications

