

## SP-SM27WD040D-GP

## SP-SM33WD040D-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
- ◆ Power budget 16dB 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~+70°C
- ◆ Compliant with SFP+ MSA Specification SFF-8431
- ◆ Compliant with IEEE 802.3ae 10GBASE-ER
- ◆ Compliant with IEEE 802.3ae 10GBASE-EW
- ◆ Compliant with SFF-8472

### Applications

- ◆ 10GBASE-ER at 10.3125Gbps
- ◆ 10GBASE-EW at 9.953Gbps
- ◆ Other Optical Links

### Ordering information

Part No.	Description
SP-SM27WD040D-GP	SFP+ BIDI SM 1270nm/1330nm LC 40km 10G
SP-SM33WD040D-GP	SFP+ BIDI SM 1330nm/1270nm LC 40km 10Gb

**Absolute Maximum Ratings\***

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	
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-SM27/33WD040D-GP		0	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	$R_{in} > 100 \text{ kohms}$ @ 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	$I_o = 400\mu A$ ; 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 )	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

**Optical and Electrical Characteristics**  
**(SP-SM27WD040D-GP, 1270nm DFB & PIN/TIA)**

Parameter	Symbol	Min.	Typical	Max.	Unit
Power budget		16			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 <sup>*note4</sup>	$P_{out, AVG}$	1		5	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 <sup>*note5</sup>	$P_{IN}$			-15	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-SM33WD040D-GP, 1330nm DFB & PIN/TIA)**

Parameter	Symbol	Min.	Typical	Max.	Unit
Power budget		16			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 <sup>*note4</sup>	$P_{out, AVG}$	1		5	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			-15	dBm
Receiver Overload		P <sub>MAX</sub>			0.5	dBm
Output Differential Impedance		P <sub>IN</sub>	90	100	110	Ω
LOS De-Assert		LOS <sub>D</sub>			-18	dBm
LOS Assert		LOS <sub>A</sub>	-30			dBm
LOS	High		2.0		V <sub>CC</sub> +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**

