

## Technical Specifications TL-10GSFPP-SM10K

### Features at a Glance

- Hot-pluggable SFP+ footprint
- Supports 9.95 to 10.5Gb/s bit rates
- Power dissipation < 1W
- RoHS-6 compliant (lead-free)
- Commercial temperature range 0 to 70°C
- Single 3.3V power supply
- Maximum link length of 10km
- Uncooled 1310nm DFB laser Receiver limiting electrical interface
- Duplex LC connector
- Built-in digital diagnostic functions



The TL-10GSFPP-SM10K transceivers are designed for use in 10-Gigabit Ethernet links up to 10km over Single Mode fiber. They are compliant with SFF-8431, SFF-8432 and IEEE 802.3ae 10GBASE-LR/LW, and 10G Fibre Channel 1200-SM-LL-L Digital diagnostics functions are available via a 2-wire serial interface.

The transceiver is a “limiting module”, i.e., it employs a limiting receiver. Host board designers using an EDC PHY IC should follow the IC manufacturer’s recommended settings for interoperating the host-board EDC PHY with a limiting receiver SFP+ module. The optical transceiver is compliant per the RoHS Directive 2011/65/EU.

Basic Specifications	
Form Type	SFP+
Max Data Rate	10.3125Gbps
Wavelength	1310nm
Max Cable Distance*	10km
Interface	LC duplex
Optical Components	DFB 1310nm
Cable Type	SMF
DOM Support	Yes
TX Power	-8.2~0.5dBm
Receiver Sensitivity	< -14.4dBm
Commercial Temperature Range	0 to 70°C (32 to 158°F)

## Specifications

General Product Characteristics					
Parameter	Symbol	Min	Typ.	Max	Unit
Bit Rate	BR	9.95		10.5	Gbps
Bit Error Ratio	BER			$10^{-12}$	
Max. Supported Link Length	L <sub>MAX</sub>			10	km
Absolute Maximum Ratings					
Parameter	Symbol	Min	Typ.	Max	Unit
Storage Temperature	T <sub>S</sub>	-40		85	°C
Case Operating Temperature	T <sub>OP</sub>	0		70	°C
Supply Voltage	V <sub>CC</sub>	-0.5		4.0	V
Operating Relative Humidity	RH	0		85	%
Receiver Optical Damage Threshold	RxDamage	5			dBm
Electrical Characteristics (TOP = 0 to 70°C, V <sub>CC</sub> = 3.14 to 3.46 V)					
Parameter	Symbol	Min	Typ.	Max	Unit
Power Supply Voltage	V <sub>CC</sub>	3.14	3.30	3.46	V
Power Supply Current	I <sub>CC</sub>		200	285	Ma
Transmitter					
Parameter	Symbol	Min	Typ.	Max	Unit
Input Differential Impedance	R <sub>in</sub>		100	120	Ω
Differential Data Input Swing	V <sub>in,pp</sub>	180		850	mV
Transmit Disable Voltage	V <sub>D</sub>	2		V <sub>CC</sub>	V
Transmit Enable Voltage	V <sub>EN</sub>	V <sub>ee</sub>		0.8	V
Receiver					
Parameter	Symbol	Min	Typ.	Max	Unit
Differential Data Output Swing	V <sub>out,pp</sub>	300		850	mV
Output Rise Time and Fall Time	t <sub>r</sub>	28			ps
LOS Normal	V <sub>LOS norm</sub>	V <sub>ee</sub>		0.8	V
LOS Fault	V <sub>LOS fault</sub>	2		V <sub>CC</sub>	V
Power Supply Noise Tolerance	V <sub>CC</sub> T/V <sub>CC</sub> R		Per SFF-8431 Rev 4.1		mV <sub>DD</sub>
Optical Characteristics (TOP = 0 to 70°C, V <sub>CC</sub> = 3.14 to 3.46 V)					
Transmitter					
Parameter	Symbol	Min	Typ.	Max	Unit
Optical Modulation Amplitude	P <sub>OMA</sub>	-5.2			dBm
Average Launch Power	P <sub>AVE</sub>	-8.2		+0.5	dBm
Optical Wavelength	λ	1260		1355	nm
Side-Mode Suppression Ration	SMSR	30			dB
Optical Extinction Ratio	ER	3.5			dB
Transmitter and Dispersion Penalty	TDP			3.2	dB
Average Launch Power of OFF Transmitter	P <sub>OFF</sub>			-30	dBm
Tx Jitter	Tx <sub>j</sub>	Per IEEE 802.3ae requirements			
Encircled Flux	<4.5μm <19μm	86		30	%
Relative Intensity Noise	RIN <sub>12</sub> OMA			-128	dB/Hz
Receiver					
Parameter	Symbol	Min	Typ.	Max	Unit
Receiver Sensitivity (OMA) @ 10.3 Gbps	R <sub>SENS1</sub>			-12.6	dBm
Stressed Receiver Sensitivity (OMA) @ 10.3 Gbps	R <sub>SENS2</sub>			-10.3	dBm
Average Receive Power	P <sub>AVE</sub>	-4.2		+0.5	dBm
Wavelength Range	λ <sub>C</sub>	1260		1600	nm
Receiver Reflectance	R <sub>rx</sub>			-12	dB
LOS De-Assert	LOS <sub>D</sub>			-17	dBm
LOS Assert	LOS <sub>A</sub>	-30			dBm
LOS Hysteresis		0.5			dB

## Dimensional Drawings

