

DUAL CHANNEL OPTICAL RECEIVER

TRPV3GXR2C000E2G



Product Description

The TRPV3GXR2C000E2G is a dual channel optical receiver module engineered for exceptional performance with SDI pathological patterns.

The receiver feature best-in-class optical receive sensitivity for SMPTE 259M, SMPTE 344M, SMPTE 292M and SMPTE 424M serial rates, thus providing superior optical link budget and robustness.

The receiver exceeds the SMPTE 297-2006 specifications and is designed to provide error-free reception of signals from 50Mbps to 3Gbps. The receiver connects to standard 20-pad SFP connector for hot plug capability. This allows the system designer to make configuration changes or maintenance by simply plugging in different transceivers without removing the power supply from the host system

The SFP receiver also provides extensive operational status monitoring through an I²C interface. Input optical power, supply voltage and operating temperature monitored. If a parameter monitored is outside the pre-defined range, the alarm flag associated with the parameter will be raised.



Features

- ☑ Features two Receivers in one SFP Package
- ☑ Excellent optical receive sensitivity over supported video rates with pathological data
- ☑ Robust error free reception of signals from 50Mbps to 3Gbps
- ☑ Supports video pathological patterns for SD-SDI, HD-SDI and 3G-SDI
- ☑ Digital diagnostics and control via I²C interface
- ☑ Low Power Consumption (Typically 300mW)
- ☑ RoHS compliant
- ☑ Operating temperature rang from -5°C to 70°C
- ☑ Exceeds SMPTE 297-2006 specifications

Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Storage Temperature Range	T_{ST}	- 40	+ 85	°C
Case Operating Temperature ¹	"Commercial" T_{OP}	- 5	+ 70	°C
Operating Relative Humidity ²	RH	5	95	%
Supply Voltage Range	V_{CC}	- 0.5	+ 3.6	V

¹ Measured on top side of SFP module at the front center vent hole of the cage.
² Non condensing

Receiver Performance Characteristics (Over Operating Case Temperature. $V_{CC} = 3.13$ to $3.47V$)

Parameter		Symbol	Minimum	Typical	Maximum	Units
Data Rate		B	0.06	-	3	Gb/s
Center Wavelength		λ_c	1260	-	1620	nm
Sensitivity ¹	SMPTE 259M, SMPTE 344M, SMPTE 292M Pathological, SMPTE 424M Pathological and PRBS 2 ²³ -1	P_{min}	-	-24	-21	dBm
Overload		P_{max}	0	-	-	dBm
LOS Thresholds ¹	Increasing Light Input	P_{los+}	-	-	-23	dBm
	Decreasing Light Input	P_{los-}	-31	-	-	dBm
LOS Hysteresis		-	0.5	-	6	dB
Maximum back Reflection		-	-	-	-27	dB
Input Power Monitoring Accuracy		-	-2	-	+2	dB
¹ Specified at a BER of 10^{-12}						
² Specified with PRBS 2.97Gb/s signal, ER= 7dB						

Electrical Characteristics (Over Operating Case Temperature. $V_{CC} = 3.13$ to $3.47V$)

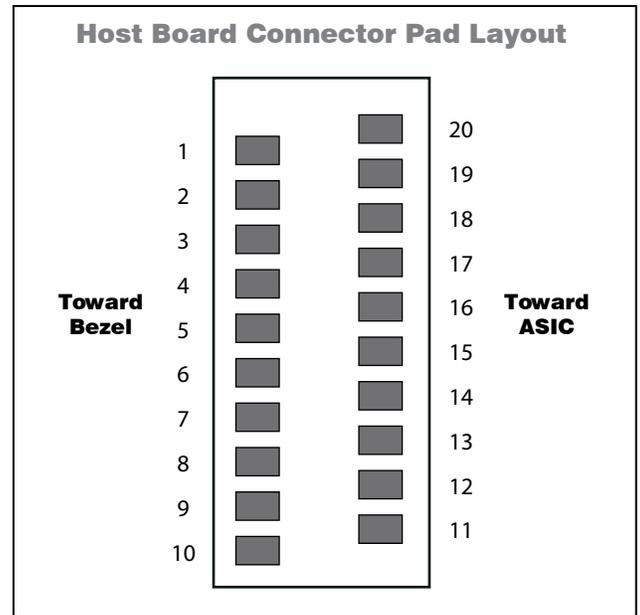
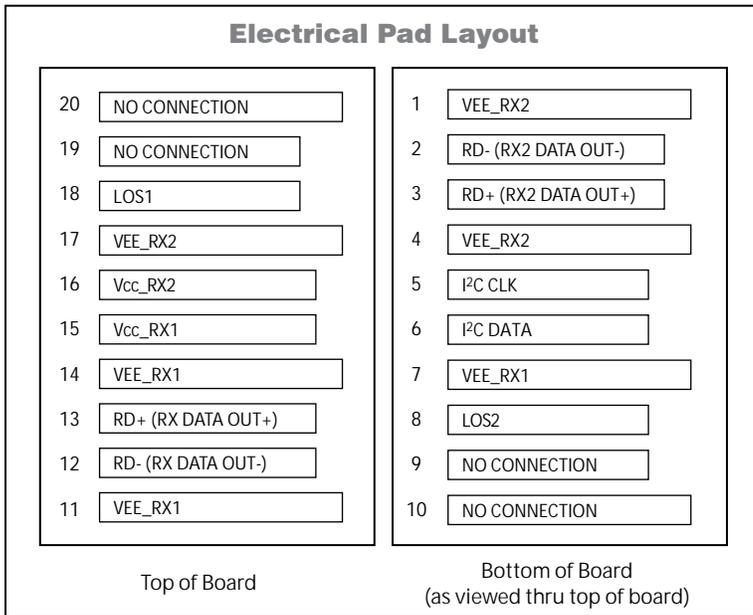
Parameter		Symbol	Minimum	Typical	Maximum	Units
Differential Input Voltage Swing		$V_{PP-DIFF}$	550	-	850	mV
Output Rise and Fall time 20% to 80%		t_r, t_f	-	-	135	ps
Input High Voltage		V_{IH}	2	-	V_{CC}	V
Input Low Voltage		V_{IL}	0	-	0.8	V
Output High Voltage (LOS) ¹		V_{OH}	2	-	V_{CC}	V
Output LOW Voltage (LOS) ¹		V_{OL}	0	-	0.8	V
¹ Open collector compatible, 4.7k Ω to 10k Ω pull-up resistor to Vcc (Host Supply Voltage).						

Electrical Power Supply Characteristics (Over Operating Case Temperature. $V_{CC} = 3.13$ to $3.47V$)

Parameter		Symbol	Minimum	Typical	Maximum	Units
Power Supply Voltage		V_{CC}	3.13	3.3	3.47	V
DC Common Mode Voltage		V_{CM}	0	-	3.6	V
Supply Current		I_{VCC}	-	-	240	mA
Power Consumption		P_W	-	-	800	mW
Maximum Allowable Power Supply Noise	0.02-1000kHz	-	-	-	66	mV
	1000-10000kHz	-	-	-	99	

Timing Specifications

Parameter	Symbol	Minimum	Typical	Maximum	Units
Time to Initialize (from power on)	t_{init}	-	-	300	ms
LOS Assert Time	t_{los_on}	-	-	10	ms
LOS Negate Time	t_{los_off}	-	-	10	ms
I ² C Clock Rate	-	0	-	400	kHz



Application Notes

Electrical Interface: Signal interfaces are compatible with the SFP MSA specification. The high speed DATA interface is differential AC-coupled internally and can be directly connected to a 3.3V SERDES IC. All low speed control and sense output signals are open collector TTL compatible and should be pulled up with a 4.7 - 10kΩ resistor on the host board.

Loss of Signal (LOS): The Loss of Signal circuit monitors the level of the incoming optical signal and generates logic HIGH when an insufficient photocurrent is produced.

Serial Identification and Monitoring: The module definition of SFP is indicated by the MOD_ABS pin and the 2-wire serial interface. Upon power up, the 2-wire interface appears as NC (no connection), and MOD_ABS is TTL LOW. When the host system detects this condition, it activates the serial protocol (standard two-wire I²C serial interface) and generates the serial clock signal (SCL). The positive edge clocks data into the EEPROM segments of the device that are not write protected,

and the negative edge clocks data from the device. The serial data signal (SDA) is for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The supported monitoring functions are temperature, voltage, average receiver signal, all alarms and warnings, and software monitoring of LOS. The device is internally calibrated.

The data transfer protocol and the details of the mandatory and vendor specific data structures are defined in the SFP MSA, and SFF-8472, Rev. 9.4.

Power Supply and Grounding: The power supply line should be well-filtered. All power supply bypass capacitors should be as close to the transceiver module as possible.

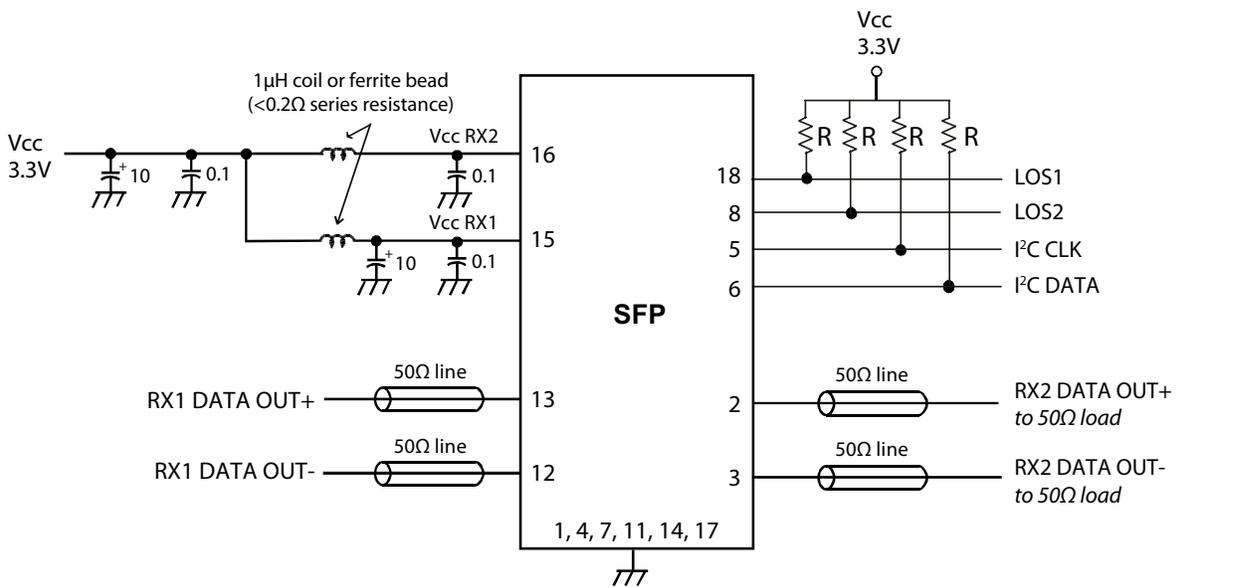
Interfacing the Transceivers

Communication is via a serial 2-wire serial interface. As described in the document SFF-8472 (REV. 9.4) there are two distinct address spaces:

Base Address A0(hex)	
Byte Address	Content
0 – 95	Serial Transceiver ID as defined in SFP MSA
96 – 127	OPLINK Specific
128 – 255	Reserved

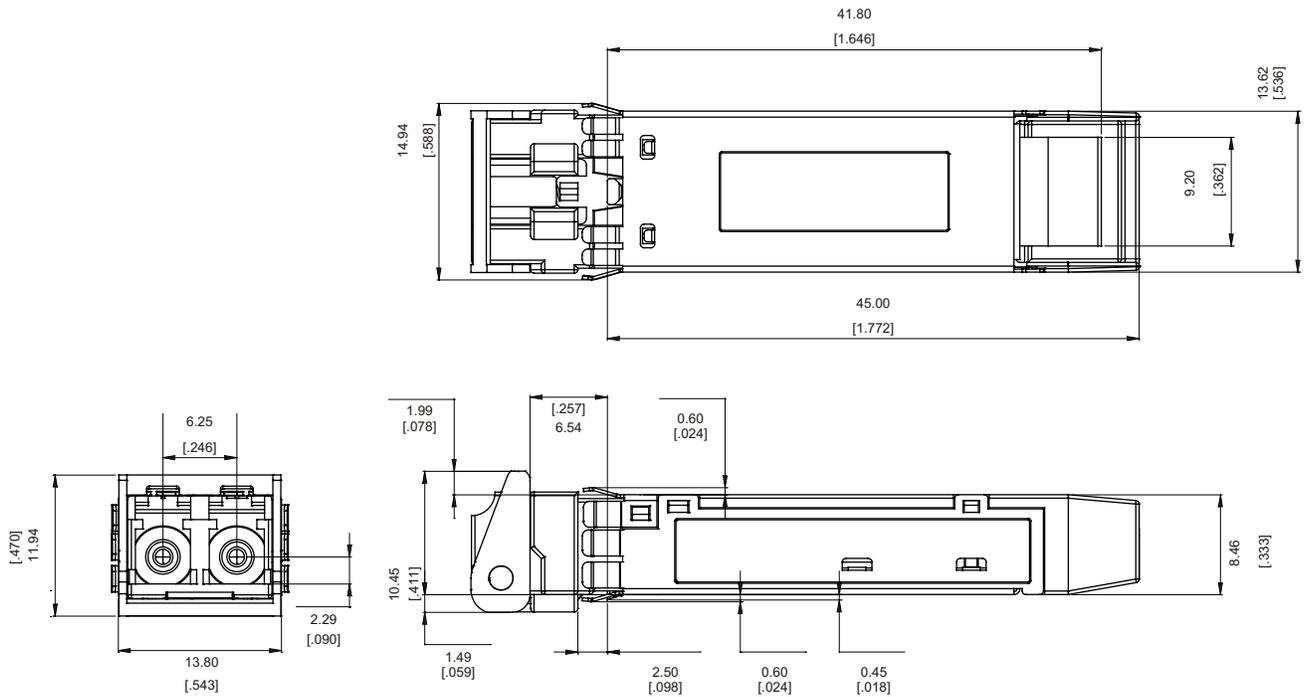
Base Address A2(hex)	
Byte Address	Content
0 - 55	Alarm & Warnings thresholds & limits
56 - 95	External calibration constants (not used)
96 – 119	Values from real time diagnostic monitoring
120 – 127	Not used
128 – 247	Customer specific, writable area
248 - 255	Not used

Application Schematics



R: 4.7 to 10kΩ
CAP Values in µF

No Connection: 9, 10, 19, 20

Module Outline


All dimensions shown are in [inches] and Millimeters. Millimeters are the primary units. Tolerances are in accordance with SFF-8432 Rev.5.

Ordering Information

Model Name	Operating Temperature		Latch Color
	Min	Max	
TRPV3GXR2C000E2G	-5°C	+70°C	Blue

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