Features:

- Compliant to IEEE std 802.3 Ethernet and FC-PI-2 Fibre Channel
- Certified for 3.1875Gb/s dual channel data links
- 850nm PIN receiver
- Industrial temperature range standard: –40°C to +85°C
- Extended temperature range optional: –40°C to +95°C
- Up to 300m on 62.5/125µm MM Fiber
- Industry standard MSA 2x5 footprint
- Duplex LC connector
- MIL STD 883 certified
- Class 1 Laser Int. Safety Std. IEC-825 compliant
- Single +3.3V Power Supply, isolated power per channel
- Conformal coated PCB option, compliant with IPC-CC-830B, IPC-2221, and J-STD-001

The SFF-3G-RX2 is ideal for harsh environment connectivity because of its low cost, availability, and wide operating parameters

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Maximum Supply Voltage	V_{cc}	–0.5	4.5	V	
Storage Temperature	T_{sto}	–55	105	°C	
Case Operating Temperature	T_{OP}	–40	95	°C	
Relative Humidity	RH	0	85	%	Non-condensing
Lead Soldering Temperature	-	-	260	°C	10 seconds, leads only
Conformal Coating Thickness		0.8	1.2	mil	See Ruggedization Notes

Notes:

1) SFF transceivers may be water washed. However, the process must be followed by a baking step at 80°C for one hour, to ensure the drying of any water which may be trapped inside the shells of the modules

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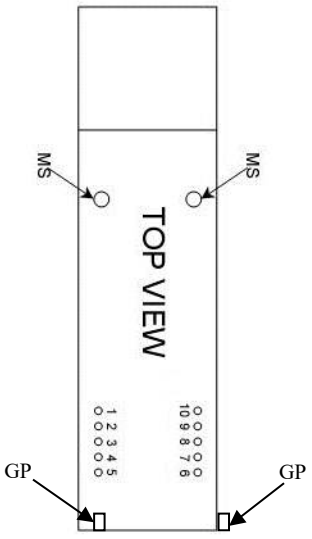
Electrical Specifications (T_{OP} = –40 to 95˚C, V_{cc} = 3.00 to 3.60 Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Supply Current	Icc		180	240	mA	
Total Module Power Dissipation	P_{DISS}		0.75	1	W	
Single Ended Data Output Swing[1]	$V_{out, pp}$	250	375	550	mV	
Data Rate	B		2.8	3.1875	Gbps	
Data Output Rise Time[2]	t_r		100	150	ps	
Data Output Fall Time[2]	t_f		70	103	ps	
Signal Detect Asserted[3]	$V_{SD\ NORM}$	V_{cc}-0.5		Vcc	V	LVTTL
Signal Detect De-Asserted[3]	$V_{SD\ fault}$	Vee		0.5+ Vee	V	LVTTL
Power Supply Rejection[4]	PSR	100			mV_{pp}	
Deterministic Jitter (DJ) Contribution (p-p)[5]	RX DJ			50	ps	
Total Jitter Contribution (TJ) (p-p)[6]	RX TJ			80	ps	
Bit Error Rate[7]	BER			10^{-12}		PRBS 2^7-1

Notes:

1) Into 100 ohms (Ω) differential termination in accordance with Current Mode Logic (CML) standard.
2) 20% to 80%
3) Signal detect is LVTTL. Logic 1 indicates normal operation; logic 0 indicates no signal is detected.
4) Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Mertz (Hz) to 1.5 MegaHertz (MHz) up to a specified value applied through the recommended power supply filtering network.
5) Measured DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and ΔDJ.
6) If measured with TJ-free data input signal.
7) Tested with PRBS 2^7-1 test pattern.

Pin Configuration



PIN #	Symbol	Description	Logic Family
MS	MS	Mounting studs are for mechanical attachment and are connected to chassis ground. Chassis ground is internally isolated from circuit grounds. Connection to user's ground planes is recommended. No data is running on the pins and they do not need a complete fill like data pins.	NA
1	V_{EER1}	Receiver 1 Ground (Common with Transmitter Ground)	NA
2	V_{CCR1}	Receiver 1 Power Supply	NA
3	SD1	Signal Detect 1. Logic 1 indicates normal operation.	LVTTL
4	RD1–	Receiver Inverted DATA out. AC Coupled	See Rx
5	RD1+	Receiver Non-inverted DATA out. AC Coupled	See Rx
6	RD2+	Receiver 2 Non-inverted DATA out. AC Coupled	See Rx
7	RD2–	Receiver 2 Inverted DATA out. AC Coupled	See Rx
8	SD2	Signal Detect 2. Logic 1 indicates normal operation.	LVTTL
9	V_{CCR2}	Receiver 2 Power Supply	NA
10	V_{EER2}	Receiver 2 Ground (Common with Transmitter Ground)	NA
GP	GP	Grounding Posts are for additional mechanical attachment and connected to chassis ground. See notes above for Mounting Studs.	NA

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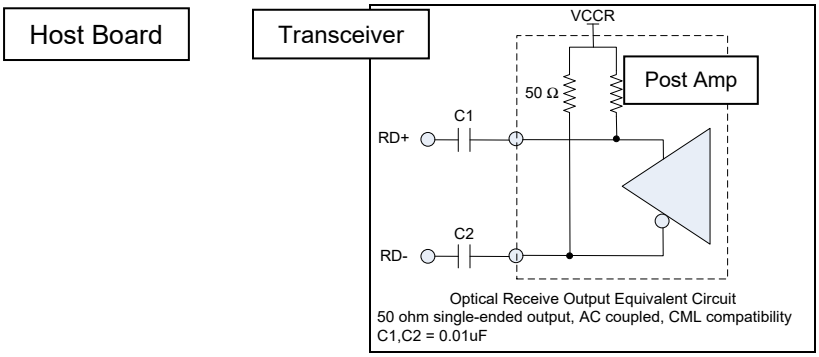
Optical Characteristics (T_{OP} = –40 to 95˚C, V_{cc} = 3.00 to 3.60 Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Receiver Sensitivity = 3.125Gbps[1]	Rx_{SENS}			–15	dBm	
Stressed RX Sensitivity		102			µW	
Average Receive Power	Rx_{MAX}			0	dBm	
Receiver Elec. 3 dB Cutoff Frequency		2000		4000	MHz	
Optical Center Wavelength	λ_C		850		nm	
Return Loss		12			dB	
Signal Detect Assert	P_A			–15	dBm	
Signal Detect De-Assert	P_D	–31			dBm	
Signal Detect Hysteresis	P_A- P_D	0.5		5	dB	
Link Loss Budget (up to 5 breaks) using 50 or 62.5 MMF			4	6.5	dB	

Notes:

1) Measured with conformance signal defined in FC-PI 13.0 specifications. Measured with PRBS 2^7-1 at 10^{-12} BER. Specifications are for 50 micrometer fiber.

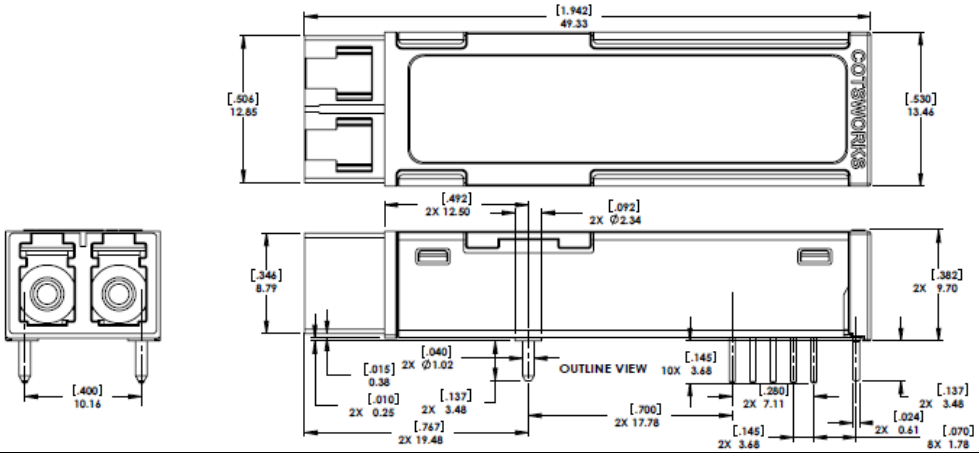
Equivalent Output Circuit



Optical Receive Output Equivalent Circuit
50 ohm single-ended output, AC coupled, CML compatibility
C1,C2 = 0.01uF

Mechanical Dimensions

SFF-3G-RX2-LC-R-x mechanical dimensions are defined by the Small Form Factor (SFF) Transceiver Multi-Source Agreement (MSA). July 5, 2000. Mechanicals do not show optional EMI shield. Dimensions are in mm [inches]



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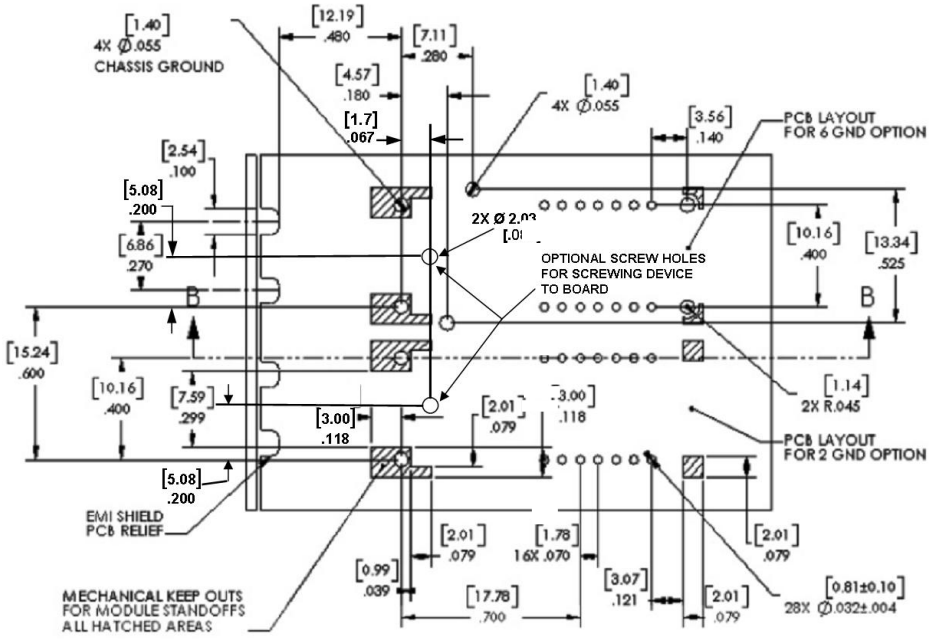
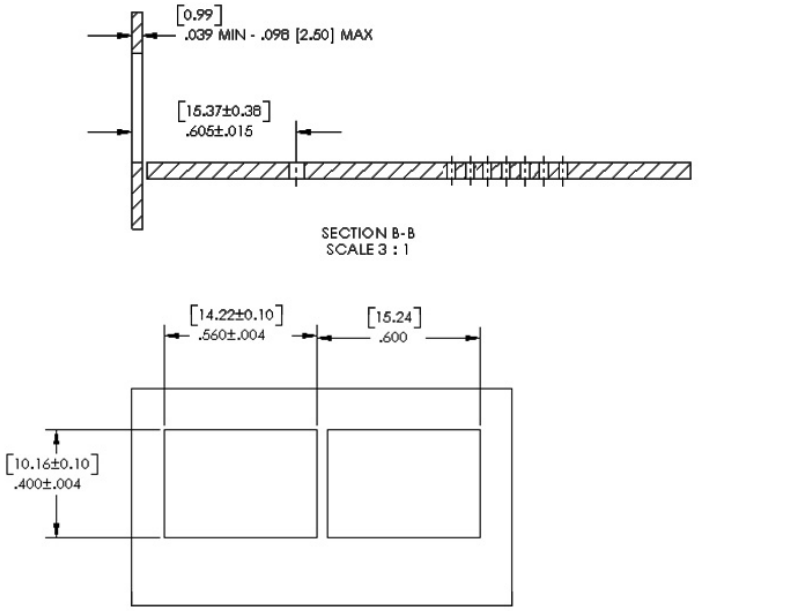
PCB Design Guidelines



Note: Dimensions are in mm [inches]

Bezel Recommendations



Minimum recommended pitch is 0.600"

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Ruggedization Notes

- The coating material is Parylene Type C, which is vacuum deposited to a 1.0mil ± 0.2mil thickness. It has a 5600VPM rating, withstands continuous temperatures of 350°F, and is extremely resistant to oil, dirt, and object impact.
- IPC-CC-830B, IPC-2221 and J-STD-001 compliant

Reference Information

1) Small Form Factor (SFF) Transceiver Multi-source Agreement (MSA). July 5, 2000
2) IEEE Standard 802.3, 2002 Edition, Clause 38, PMD Type 1000BASE-SX. IEEE Standards Department, 2002
3) "Fibre Channel Draft Physical Interface Specification (FC-PI-2 Rev. 7.0)". American National Standard for Information Systems
4) Directive 2002/95/EC of the European Council Parliament and of the Council, "on the restriction of the use of certain hazardous substances in electrical and electronic equipment." January 27, 2003

Regulatory Compliance

- COTSWORKS transceivers are designed to be compliant with US FDA regulations for Class 1 Laser Products.
- These products are designed to comply with TÜV and CSA regulations for Class 1 eye safety requirements of EN (IEC) 60825 and the electrical safety requirements of EN (IEC) 60950.

Warnings:

Handling Precautions: This device is susceptible to damage from electrostatic discharge (ESD). A static free environment is highly recommended.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Ordering Information

SFF-3G-RX2-	xx	-x-	x	-x-	x	-x
SFF Form Factor **3Gbps Max Data Rate** **Dual 850nm Transmitters**	**Connector** LC	***Ruggedized Coating*** (): *Non-coated* R: *Parylene*	***Operating Temp Range*** A: *–40 to 85°C* M: *–40 to 95°C*	***EMI Shield?*** (): *No Shield* E: *Shield*	***RoHS Level*** (): *Lvl 5* 6: *Lvl 6*	***Post*** (): *Posts** NP: *No Posts***

Solder post option includes **90/10 tin/lead plating to enable soldering to host PCB while mitigating tin-whiskering concerns.*
*** No post option includes no plating.*

Example part number: SFF-3G-RX2-LC-R-A
[3G Small Form Factor Dual Receiver, dual LC connectors,
Parylene-coated, industrial operating temp. range]

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