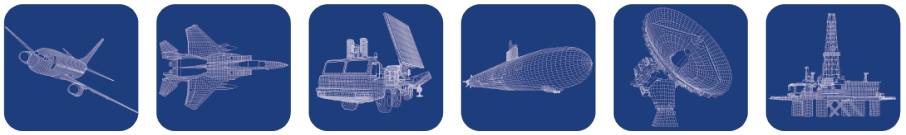
Features:

- Multi-Rate Compliant for FC-PI-2 Fibre Channel, ARINC 818, Infiniband
- 850nm Oxide VCSEL Lasers
- 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-TX2 is ideal for harsh environment connectivity because of its low cost, availability, and wide operating parameters



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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		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.
2) The components should not undergo Reflow Soldering under any circumstances.

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		170	300	mA	
Total Module Power Dissipation	P_{DISS}		0.75	1	W	
Input Differential Impedance	R_{IN}		100		Ω	AC Coupled
Single Ended Data Input Swing	$V_{in, pp}$	250		1200	mV	
Transmit Disable Voltage	V_D	V_{cc}–1.3		Vcc	V	
Transmit Enable Voltage	V_{EN}	V_{ee}		0.8+ V_{ee}	V	Or Leave disconnected
Transmit Disable Assert Time				10	µs	

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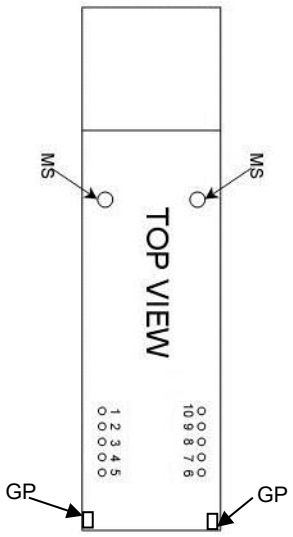
Pin Configuration



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.	NA
1	V_{EET1}	Transmitter 1 Ground (Common with Rx Ground)	NA
2	V_{CCT1}	Transmitter 1 Power Supply	NA
3	$T1_{DIS}$	Transmitter 1 Disable	LVTTL
4	TD1–	Transmitter 1 Inverted DATA in. AC Coupled	See Tx
5	TD1+	Transmitter 1 Non-Inverted DATA in, AC Coupled	See Tx
6	TD2+	Transmitter 2 Non-Inverted DATA in, AC Coupled	See Tx
7	TD2–	Transmitter 2 Inverted DATA in. AC Coupled	See Tx
8	$T2_{DIS}$	Transmitter 2 Disable	LVTTL
9	V_{CCT2}	Transmitter 2 Power Supply	NA
10	V_{EET2}	Transmitter 2 Ground (Common with Rx Ground)	NA
GP	GP	Grounding Posts are for additional mechanical attachment and connected to chassis ground. See notes above for Mounting Studs.	NA

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Optical Output Power	P_{OUT}	–9		–2.5	dBm	(1)
Optical Output Power (HP Version)	P_{OUT}	–5		–1	dBm	(1)
Optical Wavelength	λ		850		nm	
Spectral Width	σ			2	nm	
Optical Modulation Amplitude	OMA	196		1000	µW	Min.=1G, Typ.=3G (2)
Optical Rise/Fall Time	t_r/t_f		100	120	ps	(3)
Relative Intensity Noise	RIN		–130	–122	dB/Hz	
Deterministic Jitter Contribution	TXΔDJ		20	56.5	ps	(4)
Total Jitter Contribution	TXΔTJ		<65	119	ps	(5)

Notes:

1) Class 1 Laser Safety in accordance with FDA/CDRH and IEC-825-1 regulations.
2) Equivalent extinction ratio specifications for Fibre Channel. Allows smaller ER at higher average power.
3) Unfiltered, 20% to 80%
4) Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and ΔDJ
5) If measured with TJ-free data input signal, 10^{-12} BER.

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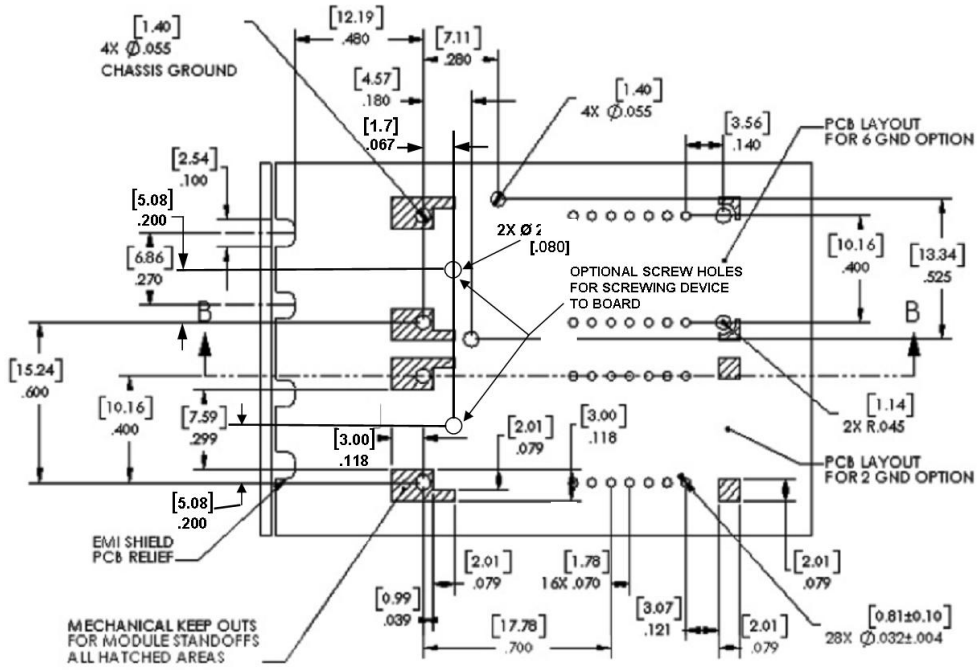
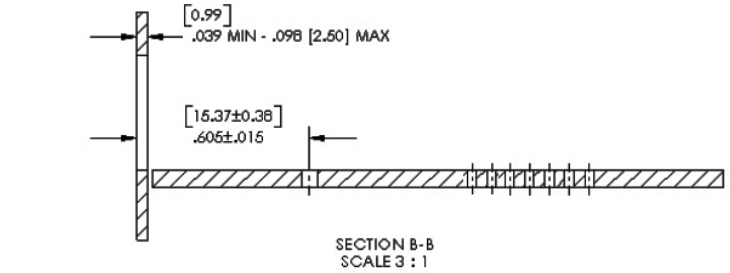
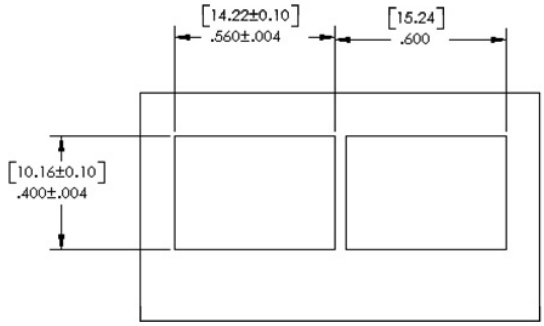
PCB Design Guidelines



Note: Dimensions in mm [inches]

Panel Cutout





Minimum recommended pitch is 0.600"

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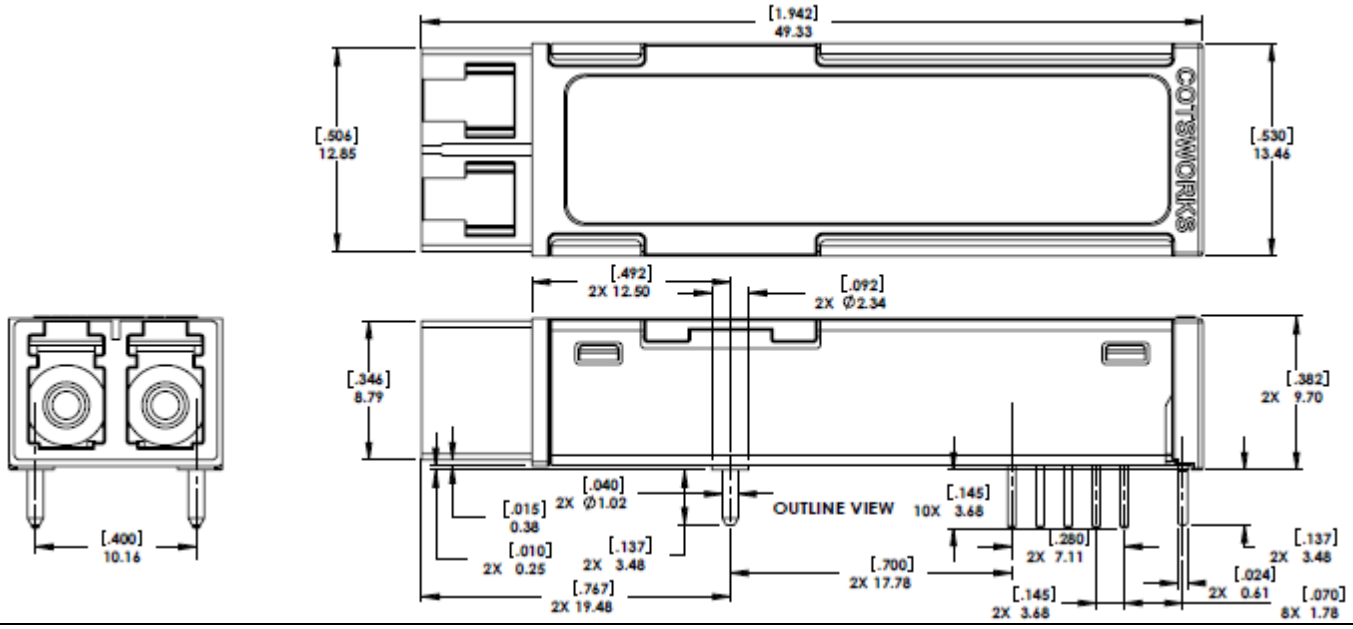
Mechanical Dimensions

SFF-3Gx-TX2-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 below in mm [inches]



Ruggedization Notes

- Parylene Type C coating can be used at a 1.0mil ± 0.2mil thickness through a deposition process. Parylene C coating material 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 comply with US FDA regulations for Class 1 Laser Products.
- These products are designed to comply with TÜV and CSA 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.

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Ordering Information

SFF-3G	()	-TX2	-xx	-x	-x	-x	-x	-x
SFF Form Factor **3Gbps Max Data Rate**	**Output Power** (): *–9 to –3dBm (Std)* HP: *–1 to –5dBm*	**850nm** **Dual Transmitter**	**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*

Example Part Number: SFF-3G-TX2-LC-R-M-6-NP
[3G Small Form Factor Dual Transmitter, 850nm, dual LC connectors, Parylene-coated, military operating temp. range, RoHS 6/6, no posts]

Contact COTSWORKS for mechanical dimensional information and other configuration options.

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