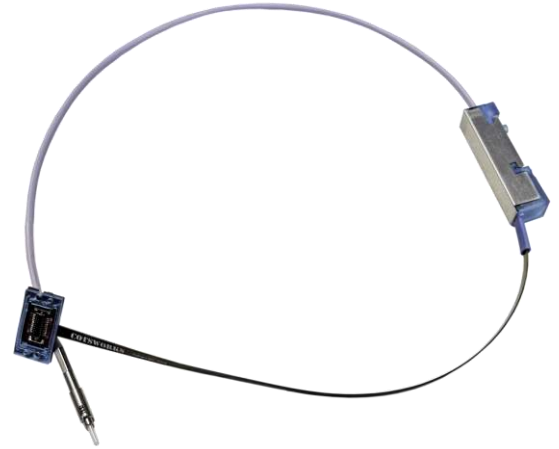


Features:

- Inline 8.0 to 10.3125 Gb/s Transmitter or Receiver
- LAC-10G-SR-T: 850 nm VCSEL laser transmitter
- LAC-10G-SR-R: PIN receiver
- Multi-protocol support
- MMF Pigtail with ARINC-801 termini, other options available
- Flex Circuit Electrical interface with pluggable board-to-board connector
- -40 to +85°C operating temperature standard
- Single +3.3V power supply
- AC-Coupled Transmitter or Receiver Data
- Multiple mounting options
- Mountable to LRU Wall or PCB



The LAC-10G-SR is ideal for harsh environment connectivity because of its low cost, size, and benefits of design flexibility



Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	NOTES
Maximum Supply Voltage	V _{CC}	-0.3	4.0	V	
Storage Temperature	T _{stg}	-55	105	°C	
Operating Temperature	T _{OP}	-40	85	°C	
Relative Humidity	RH	0	85	%	Based on conformal coating
Conformal Coating		0.8	1.2	mil	See ruggedization notes

General Specifications

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTES
Supply Voltage	V _{CC}	3.14	3.3	3.47	V	+/- 5%
Data Rate	BR	8.0	-	10.3125	Gbps	Balanced NRZ data protocols
Operating Temperature	TOP	-40	-	85	°C	

Electrical Specifications (T_{OP} = -40 to 85°C, V_{CC} = 3.14 to 3.47 Volts)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTES
Transmitter (LAC-10G-SR-T)						
Supply Current	I _{CC}	-	-	100	mA	0°C to +85°C -40°C to 0°C (1)
		-	-	250		
Input Differential Impedance	Z _{IN}	90	100	110	Ω	
TX Single-Ended Input Voltage Swing	V _{IN}	100	-	600	mV	
TX Fault Assert Output Voltage	V _{FH}	2.4	-	-	V	LVTTL
TX Fault De-Assert Output Voltage	V _{FL}	-	-	0.4	V	LVTTL
TX Disable Input Voltage	V _{DIS}	2.0	-	-	V	LVTTL
TX Enable Input Voltage	V _{EN}	-	-	0.8	V	LVTTL
Receiver (LAC-10G-SR-R)						
Supply Current	I _{CC}	-	-	120	mA	
Output Differential Impedance	Z _{OUT}	90	100	110	Ω	
RX Single-Ended Output Voltage Swing	V _O	250	-	400	mV	
Data Output Rise Time	t _r	-	35	45	ps	(2)
Data Output Fall Time	t _f	-	35	45	ps	(2)
Loss of Signal De-Assert	V _{LOSD}	2.4	-	-	V	(3)
Loss of Signal Assert	V _{LOSA}	-	-	0.4	V	(3)
Loss of Signal De-Assert Time	t _d	2.5	10	80	μs	
Loss of Signal Assert Time	t _a	2.5	10	80	μs	
Serial Bus						
Data, Clock Input Low Voltage	V _{IL}	-0.5	-	0.8	V	
Data, Clock Input High Voltage	V _{IH}	2.1	-	V _{CC}	V	
Data, Clock Output Low Voltage	V _{OL}	-	-	0.4	V	

Notes:

- 1) Heater used for transmitter optical sub-assembly (TOSA), resulting in additional current draw.
- 2) 20% to 80%
- 3) LOS is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal is detected.

Pin Configuration

Host Top View				Pin	Symbol	Description	Logic/Protocol
GND	G4	G1	GND	1	SCL	2-Wire Bus Clock	I2C
GND	20	1	SCL	2	SDA	2-Wire Bus Data	I2C
TX-	19	2	SDA	3	GND	Ground	0V
TX+	18	3	GND	4	TX_VCC	Transmitter Supply	+3.3V
GND	17	4	TX_VCC	5	TX_VCC	Transmitter Supply	+3.3V
TX_DIS	16	5	TX_VCC	6	RX_VCC	Receiver Supply	+3.3V
FLT/LOS	15	6	RX_VCC	7	RX_VCC	Receiver Supply	+3.3V
GND	14	7	RX_VCC	8	GND	Ground	0V
RX+	13	8	GND	9	/RST	Controller /RST	Note 1
RX-	12	9	/RST	10	N/C	Do Not Connect, Internal Use Only	No Connect
GND	11	10	N/C	11	GND	Ground	0V
GND	G3	G2	GND	12	RX-	Receiver Data Negative	CML
				13	RX+	Receiver Data Positive	CML
				14	GND	Ground	0V
				15	FLT/LOS	Transmitter Fault / Receiver Loss of Signal	LVTTL
				16	TX_DIS	TX Disable	LVTTL
				17	GND	Ground	0V
				18	TX+	Transmitter Data Positive	CML
				19	TX-	Transmitter Data Negative	CML
				20	GND	Ground	0V
				G1-4	GND	Mounting Ground Pads for Connector	0V

Host Connector Part Number:
TE Connectivity 2-5353512-0

Notes:

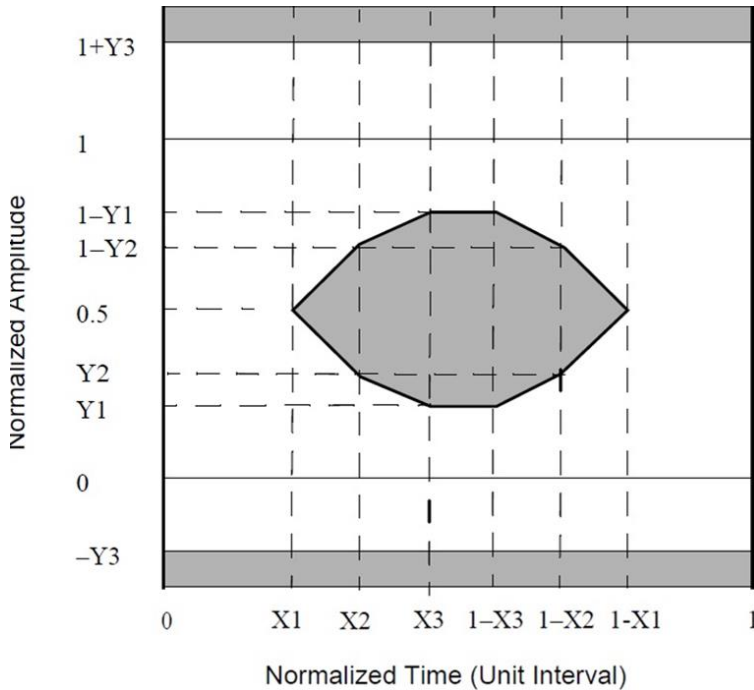
- 1) Pin 9 is tied to the /RST pin of the module's microcontroller. Reset supervisor internal to module ensures proper POR conditions. Leave unconnected for normal operation.

Optical Characteristics (T_{OP} = -40 to 85°C, V_{CC} = 3.14 to 3.47 Volts)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTES
Transmitter (LAC-10G-SR-T)						
Optical Output Power	P _{OUT}	-5	-	-1	dBm	(1)(3)
Optical Wavelength	λ	840	850	860	nm	
Extinction Ratio	ER	3	-	-	dB	
Relative Intensity Noise	RIN	-	-	-130	dB/Hz	
TX Mask Compliance	Compliant with Eye Mask Definition per IEEE 802.3-2015 Section 52.5.1					
Receiver (LAC-10G-SR-R)						
RX Sensitivity	RX _{SENS}	-	-	-11.1	dBm	(2)
Overload	RX _{MAX}	0	-	-	dBm	
Optical Center Wavelength	λ _c	840	850	860	nm	
Return Loss	RL	12	-	-	dB	
Loss of Signal Assert	LOS _A	-20	-	-	dBm	
Loss of Signal De-Assert	LOS _D	-	-	-9	dBm	

Notes:

- 1) Measured at the end of a 2m to 5m patch cord of 50μm OM3 or OM4 fiber.
- 2) Measured running 10.3125 Gb/s, using PRBS 2³¹-1 pattern
- 3) Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations

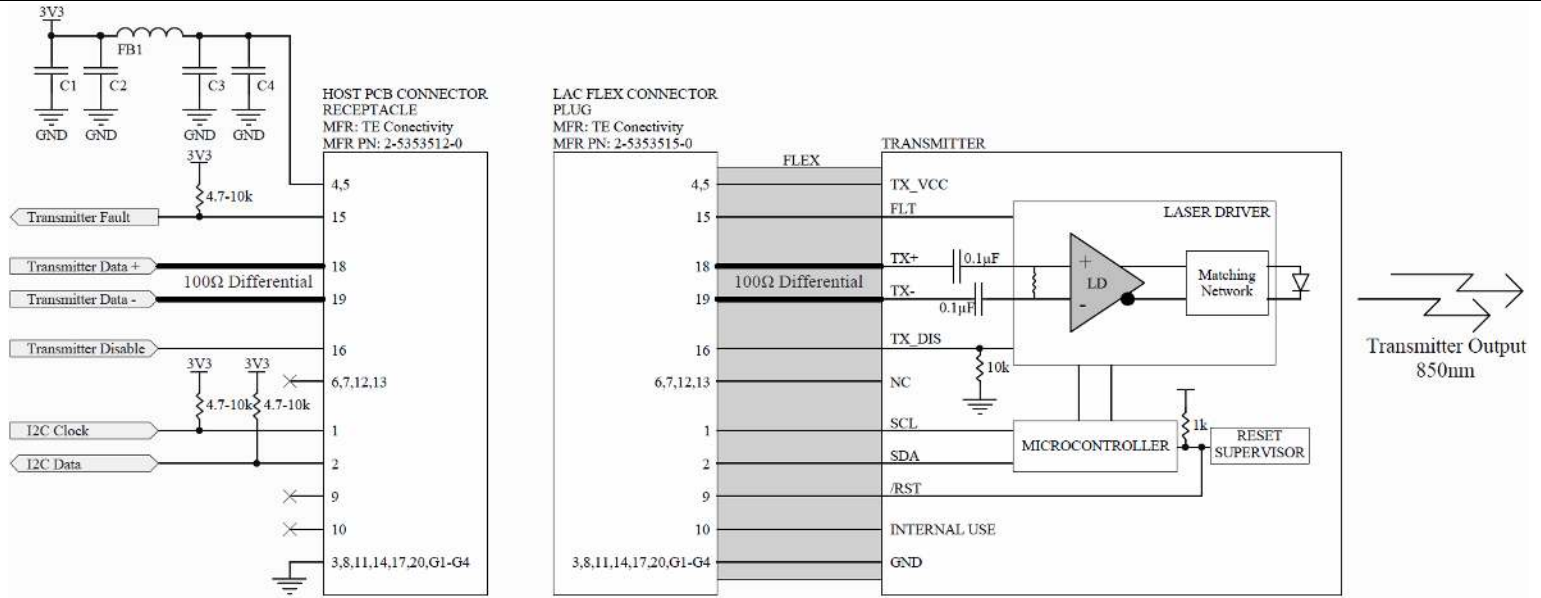


TX Compliance Mask

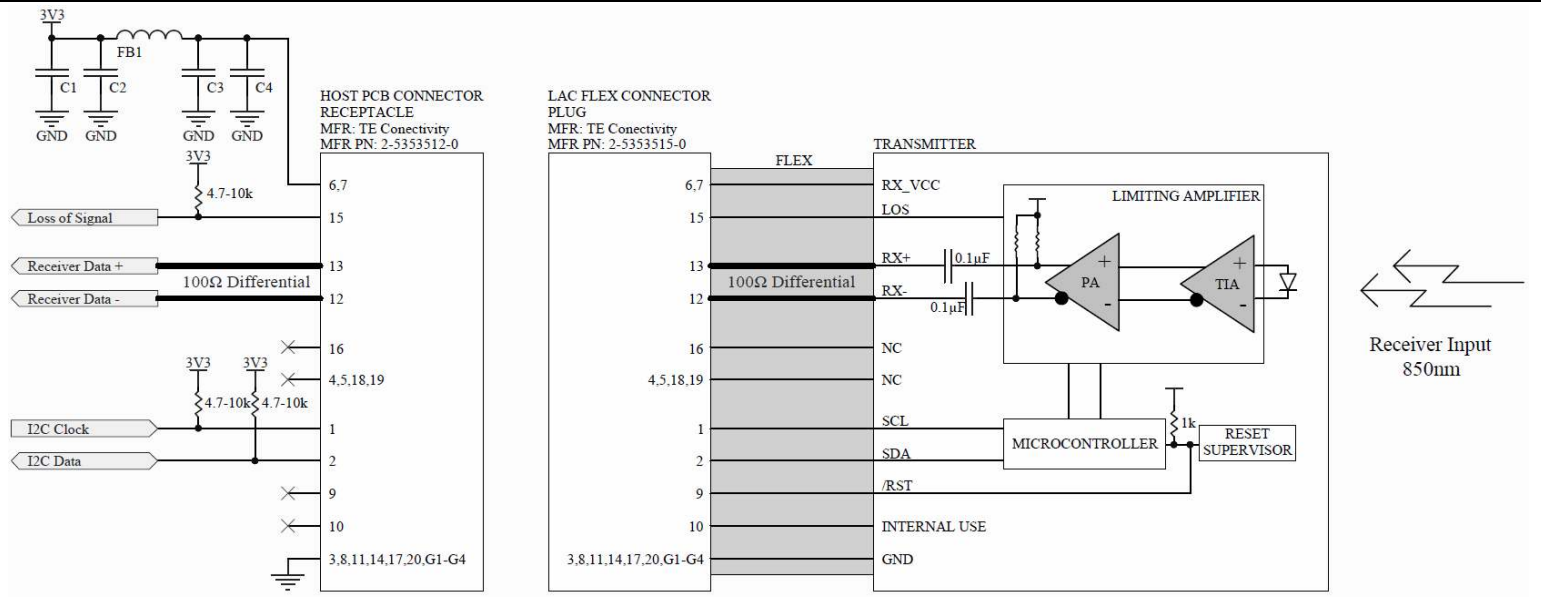
Coordinate	Value
X1	0.25
X2	0.40
X3	0.45
Y1	0.25
Y2	0.28
Y3	0.40

Application Schematics

LAC-10G-SR-T Application Schematic



LAC-10G-SR-R Application Schematic

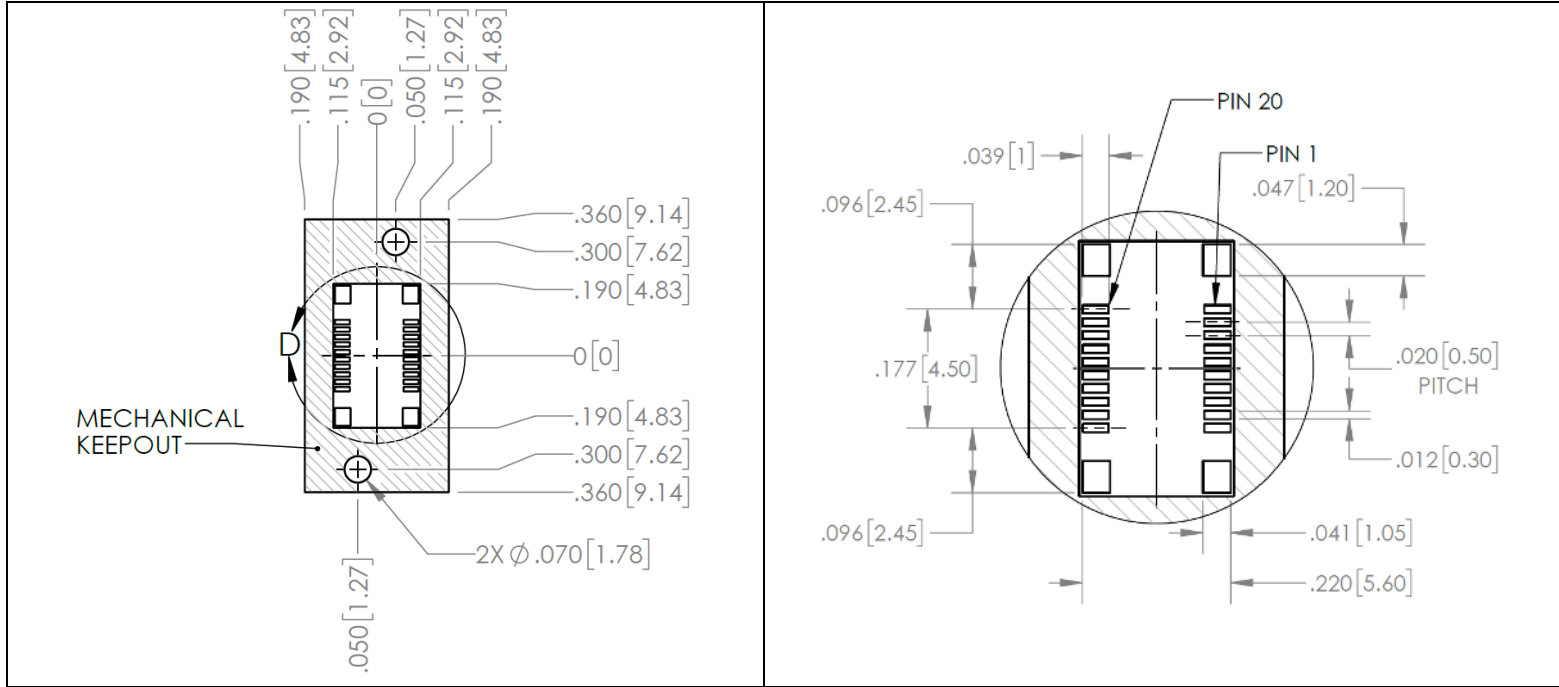


Power Supply Filtering

Recommended host power supply filtering is shown in above application schematics for both LAC-10G-SR-T and LAC-10G-SR-R

- FB1 ferrite bead for power supply noise suppression; Murata BLM18KG601SN1, 0603, 600Ω @ 100MHz, 1300mA
- C1/C4 bulk capacitance; Murata GRM21BR61C106KE15L, 0805, 10μF, 16V
- C2/C3 de-coupling capacitors; Murata GRM155R71C104KA88D, 0402, 0.1μF, 16V

PCB Design Guidelines



LAC-10G-SR Flex Connector PCB Footprint

Detail D - Footprint for Samtec PN: 2-5353512-0

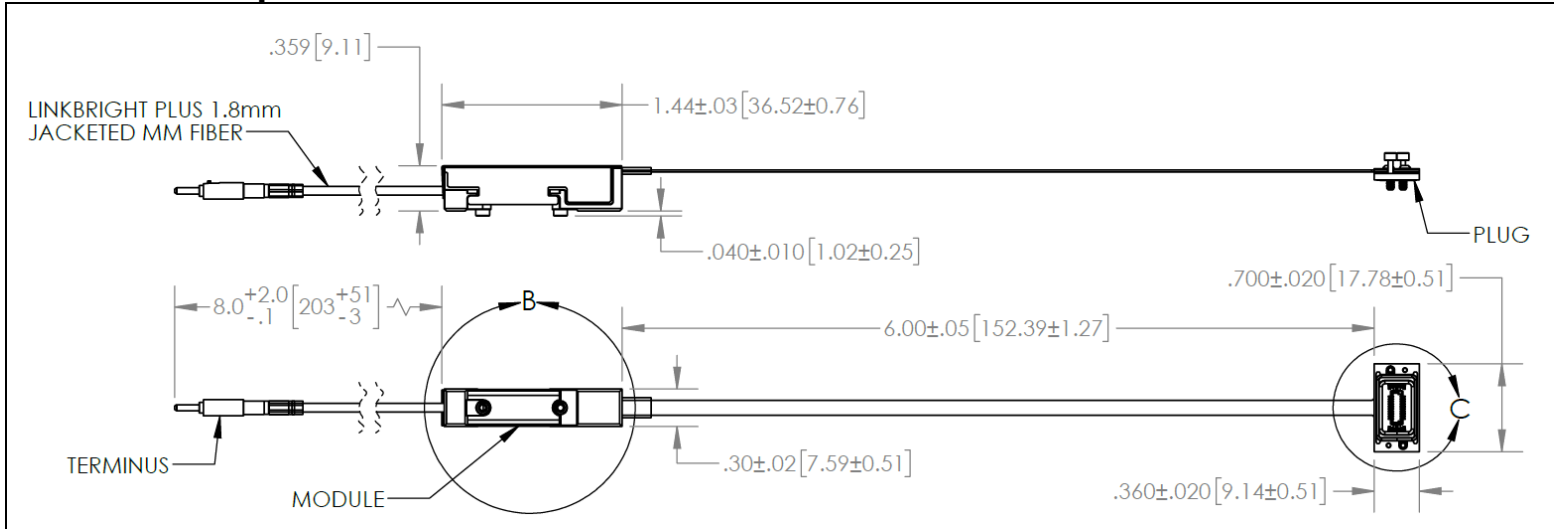
Notes:

- 1) **Case Grounding**
 - a. Chassis (case) ground is isolated from data ground.
 - b. The method of terminating chassis ground is application dependent.
 - i. The method chosen is usually based on EMI requirements of the end application.
 - c. The LAC is design to operate with chassis ground either floating or tied to data ground.
- 2) **20 Pin Connector Composition**
 - a. Contact: Copper Alloy (t=0.15) with Gold Plating
 - b. Solder Peg: Copper Alloy (t=0.15) with Tin Plating
 - c. Contact: Gold Plating (0.00076 mm)

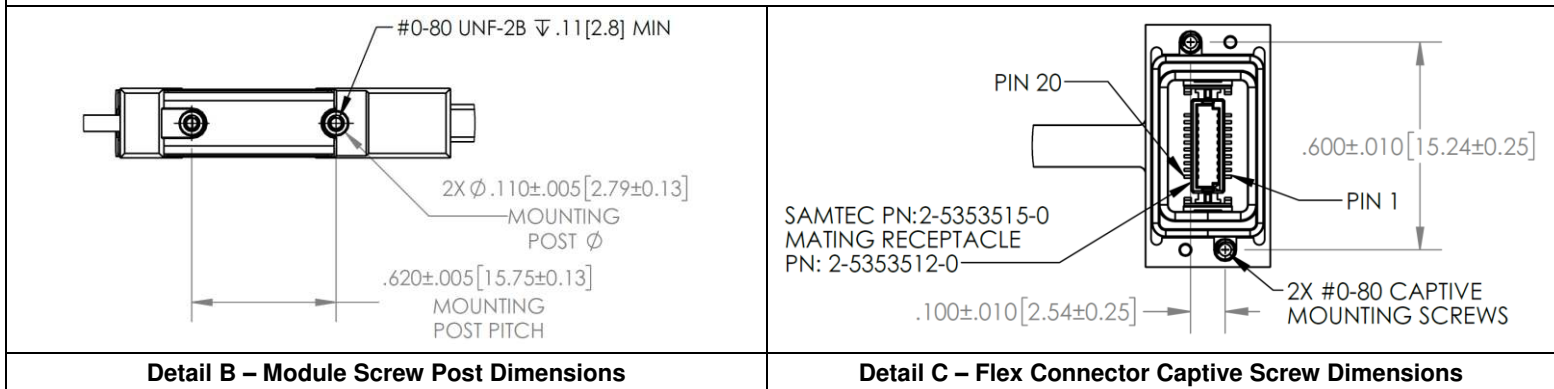
Ordering Information for 20 Pin Board-Mount Receptacle

COTSWORKS Part Number	Manufacturer	Manufacturer Part Number
110-00140	TE Connectivity	2-5353512-0

Mechanical Specifications



LAC-10G-SR Assembly Dimensions



Ruggedization Notes

- Parylene C coating can be used for conformal coating with a 1.0 mil \pm 0.2 mil thickness through a deposition process.
- Parylene Type C has a 5600 VPM rating, withstands high temperatures, and extremely resistant to oil/dirt, and object impact.
- Contact COTSWORKS for all MSDS, case composition, and burn analysis.

Reference Information

- IEEE Standard 802.3-2008
- Directive 2011/65/EU of the European Parliament and of the Council, "on the restriction of the use of certain hazardous substances in electrical and electronic equipment." June 8th, 2011

Regulatory Compliance

- COTSWORKS transceivers are Class 1 Laser Products and comply with US FDA regulations.
- These products are designed to comply with the Class 1 eye safety requirements of EN (IEC) 60825 and the electrical safety requirements of EN (IEC) 60950.
- This part has an option for compliance with Directive 2011/65/EU covering restriction on certain hazardous substances (RoHS)
 - Contact COTSWORKS support for a product compliance matrix

Warnings

Handling Precautions: This device is susceptible to damage as a result of 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

LAC-10G-SR-	x	-x-	xx	-x-	xx	-x
Form Factor LAC Bandwidth 10.3125Gbps Wavelength 850nm	Channel Configuration T: Transmitter R: Receiver	Fiber Interface A: ARINC-801 terminus P: M20504/4 pin S: M29504/5 socket L: LC connector	Fiber Length (nonfractional) (centimeters)	Fiber Type A: 50/125 μ 900 μ OM4 Buffered Cable B: 50/125 μ 1.8mm OM4 Jacketed Cable	Serial Bus Address (T, leave blank for C4 default) (R, leave blank for C0 default) C0, C2, C4, C6, C8, CA, CC, CE, D0, D2, D4, D6, D8, DA, DC, DE	RoHS Level (): Lvl 5 6: Lvl 6

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