

RRK0-Sxxx

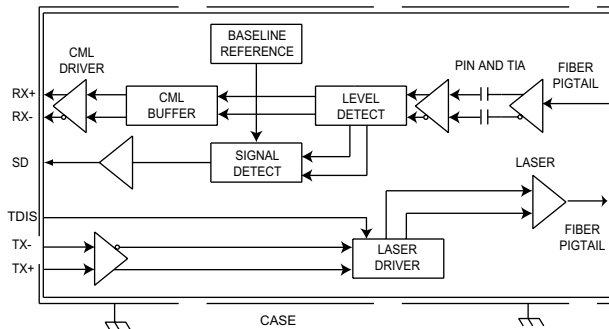
ROUGH RIDER -- PIGTAIL LOW PROFILE OPTICAL TRANSCEIVER

Gigabit Ethernet / 1x Fibre Channel Applications
3.3V, 850nm VCSEL, Multimode, Up to 550M

FEATURES

- Pigtailed Low Profile Design - 0.386 inches max. height
- Low Profile Design - 0.386 inches max. height
- Surface mount I/O pins for high speed signal integrity
- All metal body, solder or screw mount options
- Industrial Temp Range, Vibration tolerant design
- RX data squelch on Signal Detect deassert
- Individual (separate) +3.3 V power supply per port
- Industry standard duplex multimode LC receptacle
- Full compliance to IEEE and ANSI requirements
- EN-60825 / IEC-825 / CDRH Class 1 Compliant
- Optional Parylene C Conformal Coating

BLOCK DIAGRAM



APPLICATIONS

The Roughrider Optical optical fiber transceiver family provide low profile, cost effective solutions for Gigabit Ethernet and 1x Fibre Channel multimode optical fiber data links with a pigtail fiber cable interface. The pigtail interface is most useful for high vibration or high moisture environments, such as open frame avionics chassis.

The RRK0-Sxxx transceivers are fully compliant with the IEEE Gigabit Ethernet and 1x Fibre Channel standards but can be used for any other data communications purpose within their operating parameters.

DESCRIPTION

The RRK0-Sxxx optic transceivers provide low profile, small footprint, pigtail fiber, with conformal coat option. The optical transmitter is an 850nm VCSEL. The transmitter input lines are driven with differential LVPECL signals applied to the Transmit (TX+ and TX-) pins. A Transmit Disable (TDIS) function is provided to enable control of the VCSEL optical output.

Outputs from the receivers consist of differential CML data signals on the Receive (RX+ and RX-) pins and a single ended LVTTTL signal detect function on the Signal Detect (SD) pin. The RX data is squelched (JAM) upon Signal Detect deassert to prevent garbage data output when no optical signal is present.

ORDERING INFORMATION

RR **K** **0** **-** **S** **X** **XX** **X** **X**

Product Family	Application	Extended Link Margin	Wavelength/ Mode	Fiber Type & Termination	Pigtail Length	Temperature and Coating	Mounting
RR= RoughRider Low Profile	K= GigE / FC (1.0625 - 1.25 Gbps)	0= Standard Output Power	S= 850 nm Multimode	A-Z= Fiber Type and Termination ID	00-99= Pigtail Length (inches)	H= -40 to 85 C, No Coating	BLANK= Solder Posts (0.125 length)
						M= -40 to 85 C, Conformal Coating	B= Screw Posts (0.050 length)



RRK-S-003
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ABSOLUTE MAXIMUM RATINGS

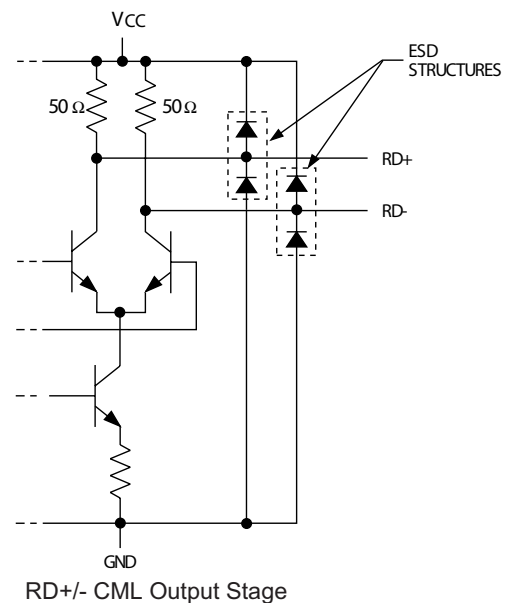
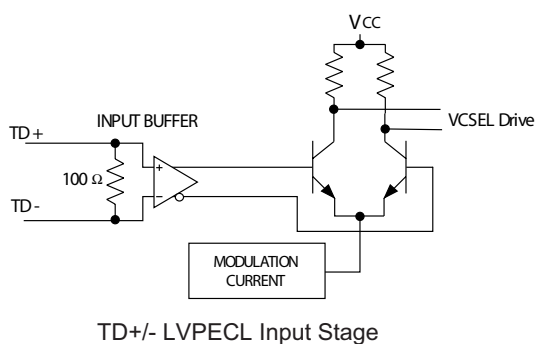
Absolute maximum limits mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided each limiting parameter is in isolation and all other parameters have values within the performance specification. It should not be assumed that limiting values of more than one parameter can be applied to the product at the same time.

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Storage Temperature	T_S	-55		+100	°C
Lead Soldering Temperature	T_{SOLD}			+260	°C
Lead Soldering Time	t_{SOLD}			10	Seconds
Supply Voltage	V_{CC}	-0.5		+4.5	V
Data Input Voltage	V_I	-0.5		V_{CC}	V
Differential Input Voltage (p-p)	V_D			2.2	V
Output Current	I_O			50	mA

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature Limit	T_A	-40		+85	°C
Supply Voltage	V_{CC}	+3.135		+3.465	V
TX Common Mode Voltage	V_{CM}		2.0		V
TX Differential Input Voltage (p-p)	V_D	0.20		2.20	V
Transmit Disable Voltage	V_{TD}	2.0		V_{CC}	V
Transmit Enable Voltage	V_{TEN}	V_{EE}		0.8	V
RX Data Output Load	R_L		50		Ohms

DETAIL OF DATA I/O STAGES



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TRANSMITTERS

VCCTX = 3.135V to 3.465V, T_A = Operating Temperature Range

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power ¹	P_o	-9.5		-4	dBm
Optical Output Wavelength	λ_{OUT}	830	850	860	nm
Spectral Width	$\Delta\lambda_{RMS}$			0.85	nm
Extinction Ratio	ER		10		dB
Supply Current	I_{CC}		55	75	mA
Optical Rise / Fall Time (20% - 80%)	$t_{R,F}$			0.26	nS
RIN				-117	dB/Hz
Coupled Power Ratio	CPR	9			dB
Total Jitter ¹			80	153	pS

1. BER=10⁻¹² @ 1.25Gbps, PRBS 2⁷-1, NRZ, Compliant with ANSI X3.297 / FC-PH-2

RECEIVERS

VCCR_X = 3.135V to 3.465V, T_A = Operating Temperature Range

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity ¹ Date Code 0105 and later (Jan 2005) Date Code 5204 and before (Dec 2004)	P_i	-21 -17		0 0	dBm
Optical Input Wavelength	λ_{IN}	770		860	nm
Optical Return Loss	ORL	12			dB
Supply Current	I_{CC}		70	120	mA
Signal Detect Assert Time	t_{SDAS}		<10	100	μ S
Signal Detect Deassert Time	t_{SDDA}		<10	350	μ S
Signal Detect Deassert Level ²	SD_{OFF}	-31			dBm
Signal Detect Assert Level Date Code 0105 and later (Jan 2005) Date Code 5204 and before (Dec 2004)	SD_{ON}			-21 -17	dBm
Signal Detect Hysteresis	HYS	1.5	2.25	3.5	dB
RX Data Output - Low	$V_{OL} - V_{CC}$	-1.810		-1.475	V
RX Data Output - High	$V_{OH} - V_{CC}$	-1.165		-0.880	V

1. BER=10⁻¹² @ 1.25Gbps, PRBS 2⁷-1, NRZ, Compliant with ANSI X3.297 / FC-PH-2

2. RX Data outputs are squelched when Signal Detect is deasserted to prevent garbage data output when no optical signal is present.

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CONFORMAL COATING OPTION

Parameter	Value
Specification	MIL-I-46058C, Type XY
Coating:	Parylene type C
Deposition:	Vacuum deposited
Film Thickness:	1 MIL +/- 0.0002

PIGTAIL BOND AND BACK-FILL

Parameter	Value
Adhesive Bond Line:	Ablelux AA50T, High viscosity, low shrinkage, low outgas for optics
Backfill Encapsulant:	Ablebond BF-4, Silica based, high shear strength, low moisture, low outgas for optics

LINK DISTANCES

Application	Fiber Specification	Distance
Gigabit Ethernet - IEEE 802.3z	62.5/125 - 160MHz*Km	220M
	62.5/125 - 200MHz*Km	275M
	50/125 - 400MHz*Km	500M
	50/125 - 500MHz*Km	550M
Fibre Channel - ANSI X3.297	62.5/125 - 160MHz*Km	300M
	50/125 - 500MHz*Km	500M

REGULATORY COMPLIANCE

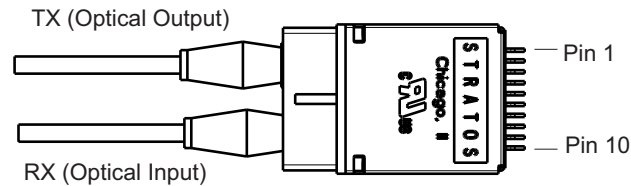
Requirement	Feature	Condition	Notes
MIL-STD-883-3015.7	ESD	Class II	2200V
IEC-801-2	ESD	Human Body Model	25KV
IEC-801-3	EMI	Immunity	10V/M
FCC	EMI	Class B	>20dB
EN 55022 (CISPR 22A)	EMI	Class B	10V/M
IEC-825 Issue 1993-11	Eye Safety	Class 1	TUV Certificate Number One File
FDA CDRH 21-CFR 1040	Eye Safety	Class 1	CDRH Accession Number On File



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Roughrider Optical Transceiver
(Top View Shown)



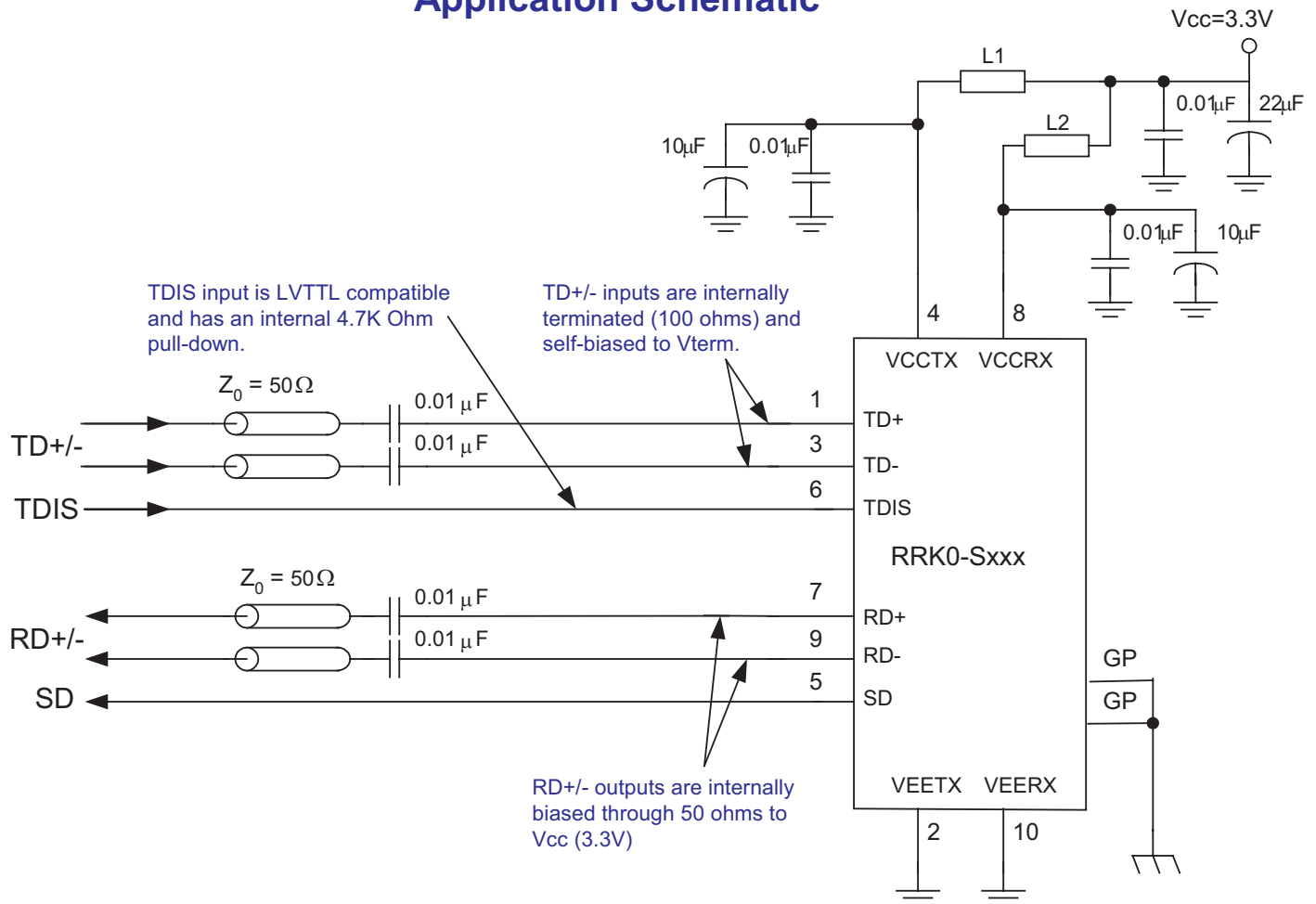
PIN FUNCTIONS

Pin Number	Symbol	Description	Logic Family
GP	GP	Grounding Posts Connect to chassis ground	N/A
1	TD+	Transmitter DATA In	LVPECL
2	VEETX	Transmitter Signal Ground	N/A
3	TD-	Transmitter DATA In	LVPECL
4	VCCTX	Transmitter Power Supply	N/A
5	SD	Signal Detect output Satisfactory Optical Input: Logic "1" Output Fault Condition: Logic "0" Output	LVTTL
6	TDIS	Transmit Disable input Logic 1 = Disable Optical Output Logic 0 = Enable Optical Output Internal 4.7K ohm pull-down (enable)	LVTTL
7	RD+	Receiver DATA Out	CML
8	VCCR _X	Receiver Power Supply	N/A
9	RD-	Receiver DATA Out	CML
10	VEER _X	Receiver Signal Ground	N/A

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Application Schematic



Notes:

- 1) L1 and L2 = MuRata BLM21A601S or equivalent (600Ω at 100MHz or better).
- 2) Route the differential pairs (TD +/- and RD +/-) together using 50Ω impedance matched traces.
- 3) Use separate power supply filtering for VCCTX and VCCR X, as shown.
- 4) Use low ESR capacitors such as NPO or COG for AC Coupling of the TD+/- and RD+/- data signals.
- 5) Ground Posts (GP) are isolated from Signal Ground (Vee), and may be connected to Chassis Ground (as shown) or to Signal Ground if a Chassis Ground is not available.

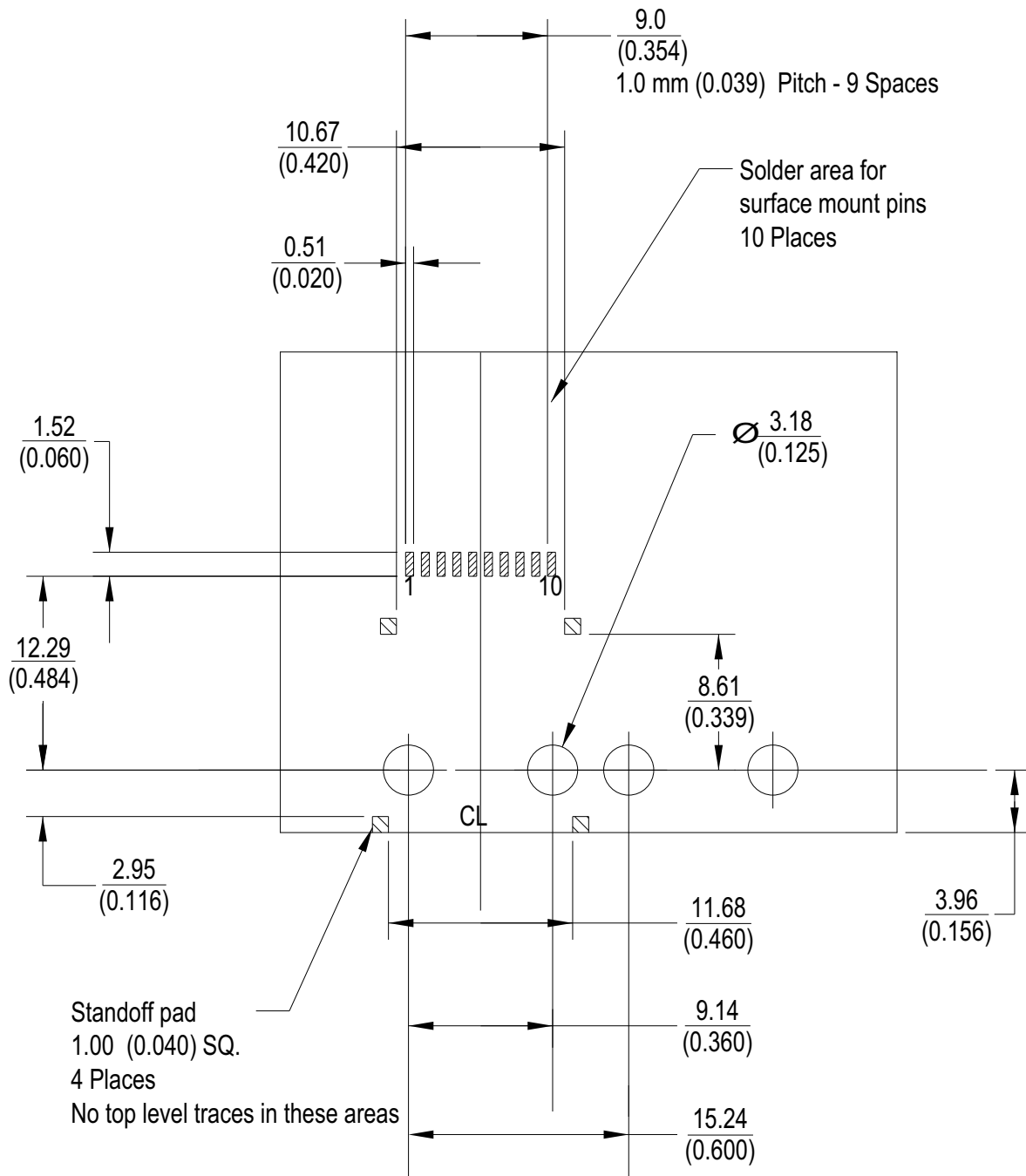
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LOW PROFILE OPTICAL TRANSCEIVER PCB FOOTPRINT

Dimensions Are Shown As: $\frac{\text{mm}}{\text{(inches)}}$

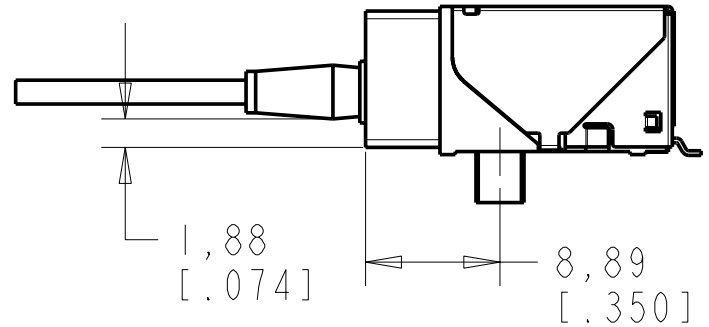
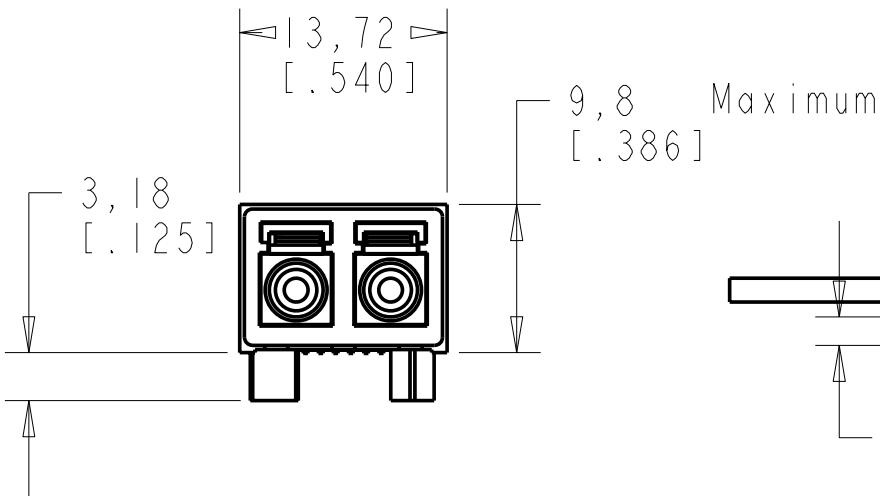
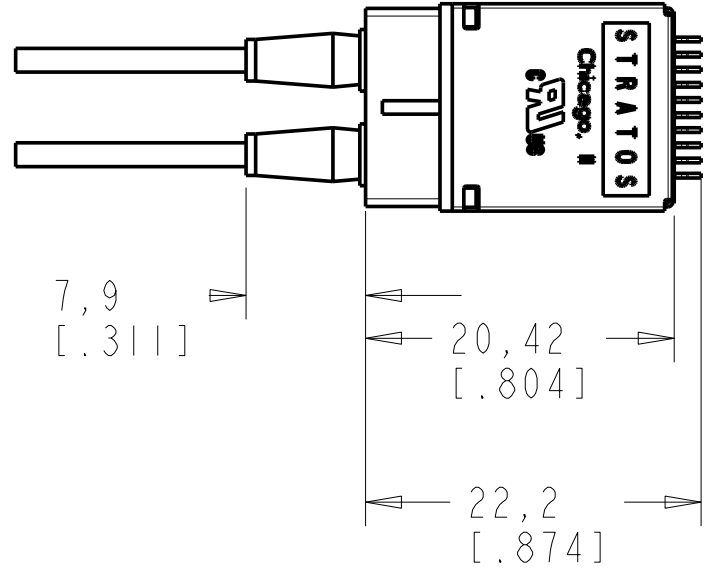
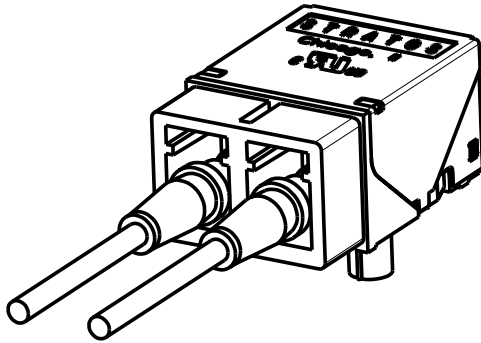


Top View Shown

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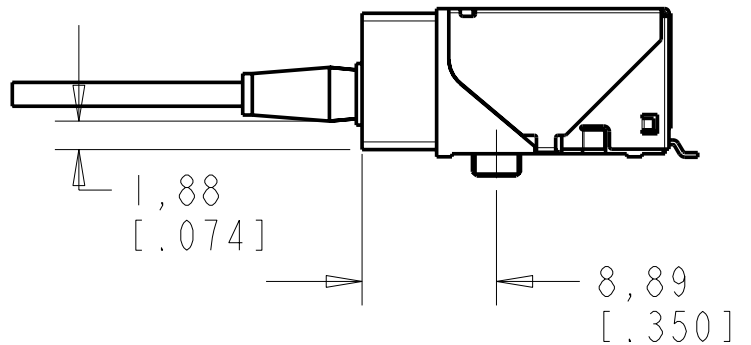
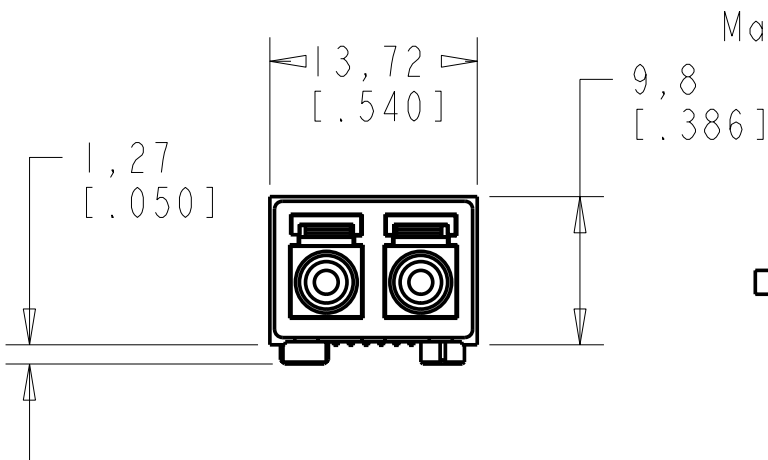
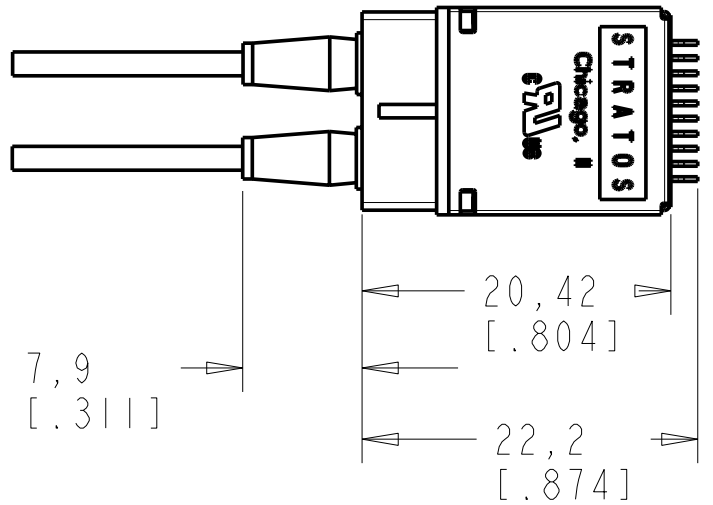
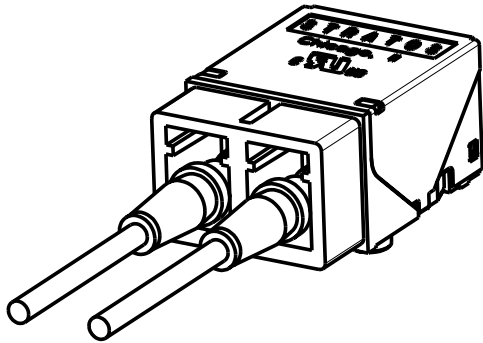
MECHANICAL DETAIL (SOLDER POST VERSION)



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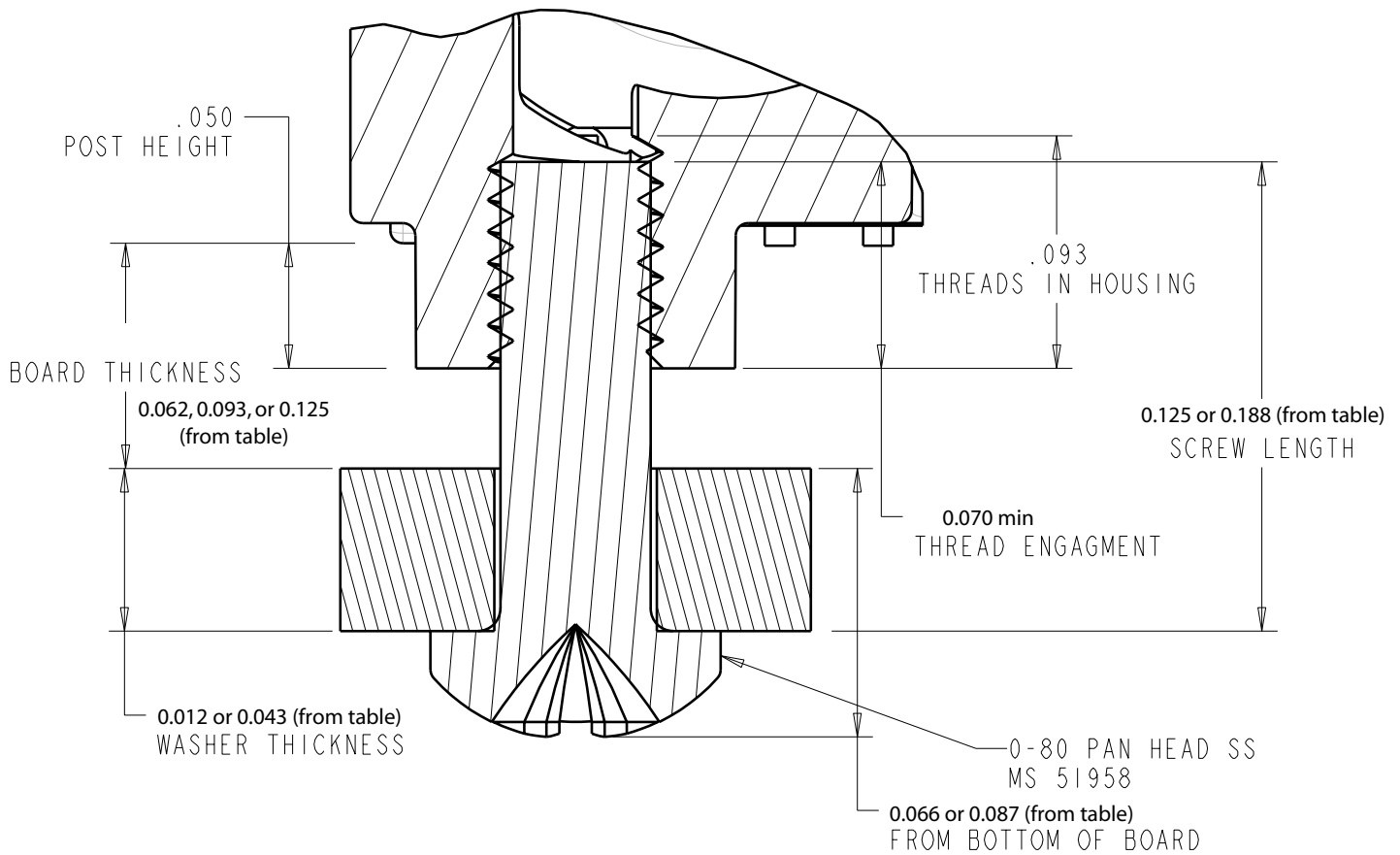
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MECHANICAL DETAIL (SCREW POST VERSION)



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PCB Nominal Thickness	Screw Length	Washer Thickness	Screw/Washer Height	Order Stratos Washer	Order Stratos Screw
0.062 in +/- 0.005	0.125 in	0.043 in	0.087 in	751-00002	618-00001
0.093 in +/- 0.005	0.125 in	0.012 in	0.066 in	751-00001	618-00001
0.125 in +/- 0.005	0.188 in	0.043 in	0.087 in	751-00002	618-00002

Notes:

1) Customer may choose to any type 0-80 Stainless Steel (SS) screw configuration (pan head, flat head, hex head, etc) as long as the thread engagement is less than 0.93 inches max into the Low Rider housing.

2) Customer can order 0-80 SS pan head screws and washers from Stratos for standard sized PCB thicknesses as identified in the table. The Stratos part number is identified for the screw/washer combination for each of three standard sized PCB thicknesses. Be sure to order 2 washers and 2 screws per Low Rider device.

3) Torque screws to 7 to 9 in-oz for a clamping force of 36 to 47 lbs per screw. Do not exceed 16 in-oz torque per screw.



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Pigtail Fiber Type and Termination ID Options

Part ID	Fiber Type	Termini / Connectors	Description
A	A01	M29504/14-4131C	Fiber terminus for 38999 / 28876 / TFOCA shells
B	A01	LuxCis	Fiber terminus for ARINC and Circular connectors
C	A01	LC	Industry standard LC
D	A01	MU	Industry standard MU
E	A01	SC	Industry standard SC
F	A01	ST	Industry standard ST
G	A01	FC	Industry standard FC

Fiber Types:

A01 = OCC A01-020G-WEU/900-HS (Multimode 62.5 /125 um, 85C thermal rated)

Pigtail Fiber Length Options

Fiber Length: Specified in Part Number field as a value from 04 to 99
4 inches min to 99 inches max, increments of 1 inch.
Pigtail length accuracy of +/- 0.5 inch or 10% total length, whichever is greater.
Pigtail length as measured from Roughrider body to terminus (does not include body or terminus)

Consult the factory for custom lengths, fiber types, or other terminus options

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