



**LxP2-ST11xx (+2dB Link Margin)**

**LxP3-ST11xx (+3dB Link Margin)**

**LxP5-ST11xx (+5dB Link Margin)**

## LOW PROFILE OPTICAL TRANSCEIVER

Infiniband Applications

3.3V, 850nm VCSEL, Multimode,

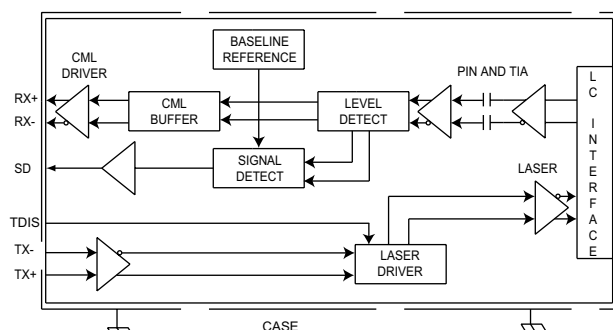
Extended Link Budget

**PRELIMINARY**

## FEATURES

- 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
- Compliant with Infiniband 1x Architecture
- EN-60825/ IEC-825 / CDRH Class 1 Compliant
- Optional Parylene C Conformal Coating
- Extended Link Margin options

## BLOCK DIAGRAM



## ORDERING INFORMATION

**L X P - X S T 1 1 X X**

Product Family	Shell Options	Application	Extended Link Margin	Optical Wavelength, Signal Detect, Fiber	Temperature and Coating	Mounting
<b>L=</b> Low Profile RJ XCVR	<b>N=</b> No GND Tabs (Flat Shell)	<b>P=</b> Infiniband (2.5 Gbps)	<b>2=</b> +2 dB Margin	<b>ST11=</b> 850 nm Mutimode, LVTTL Signal Detect 3.3VDC Power	<b>H=</b> -40 to 85 C, No Coating	<b>BLANK=</b> Solder Posts (0.125 length)
			<b>3=</b> +3 dB Margin			
	<b>T=</b> GND Tabs		<b>5=</b> +5 dB Margin		<b>M=</b> -40 to 85 C, Conformal Coating	<b>B=</b> Screw Posts (0.050 length)

**L \_ P - \_ S T 1 1 \_ \_**

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TDS-HP213P-002

October 5, 2004

# LxP2-ST11x, LxP3-ST11x, LxP5-ST11x LOW PROFILE OPTICAL TRANSCEIVERS

InfiniBand Applications, Extended Link Margin

3.3V, 850nm VCSEL, Multimode

**PRELIMINARY**

## ABSOLUTE MAXIMUM RATINGS

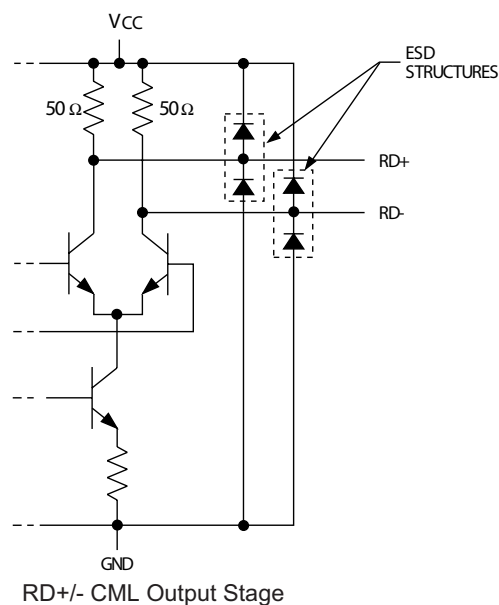
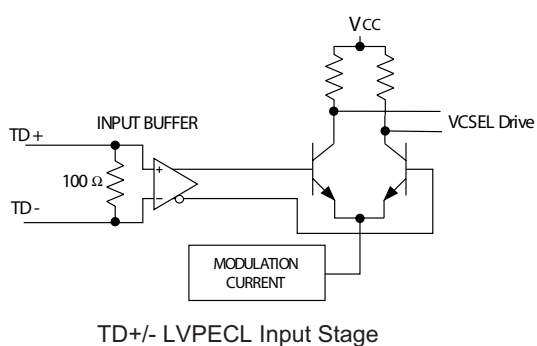
Absolute maximum limits mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided each limiting parameter is in isolation and all other parameters have values within the performance specification. It should not be assumed that limiting values 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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**PRELIMINARY**

## TRANSMITTERS $T_A$ = Operating Temperature Range, VCCTX = 3.135V to 3.465V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power <sup>1</sup> LxP2-ST11x (+2dB Margin) LxP3-ST11x (+3dB Margin) LxP5-ST11x (+5dB Margin)	$P_o$	-8.0 -7.0 -5.0		-1.5 -1.5 -1.5	dBm
Optical Output Wavelength	$\lambda_{OUT}$	830	850	860	nm
Spectral Width	$\Delta\lambda_{RMS}$			0.85	nm
Extinction Ratio	ER		9		dB
Supply Current	$I_{CC}$		55	75	mA
Optical Rise / Fall Time (20% - 80%) <sup>1</sup>	$t_{R,F}$			0.15	nS
RIN				-117	dB/Hz
Optical Modulation Amplitude (p-p)	OMA	196			$\mu W$

Notes:

1. BER=10<sup>-12</sup> @ 2.5 GigaBaud, PRBS = 2<sup>7</sup>-1, NRZ, Compliant with InfiniBand Architecture Specification

## RECEIVERS $T_A$ = Operating Temperature Range, VCCR<sub>X</sub> = 3.135V to 3.465V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity <sup>1,2</sup>	$P_i$	-15.0		0	dBm
Optical Wavelength	$\lambda_{IN}$	830		860	nm
Optical Modulation Amplitude	OMA	50			$\mu W$
Stressed Receiver Sensitivity (OMA)		102			$\mu W$
Signal Detect Assert Time	$t_{SDAS}$		<10	100	$\mu S$
Signal Detect Deassert Time	$t_{SDDA}$		<10	350	$\mu S$
Signal Detect Deassert Level <sup>3</sup>	$SD_{OFF}$	-31			dBm
Signal Detect Assert Level	$SD_{ON}$			-15.5	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
Supply Current	$I_{CC}$		70	120	mA

Notes:

1. BER=10<sup>-12</sup> @ 2.5 GigaBaud, PRBS = 2<sup>7</sup>-1, NRZ, Compliant with InfiniBand Architecture Specification

2. Assuming an Extinction Ratio of 9 dB.

3. 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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# LxP2-ST11x, LxP3-ST11x, LxP5-ST11x LOW PROFILE OPTICAL TRANSCEIVERS

InfiniBand Applications, Extended Link Margin

3.3V, 850nm VCSEL, Multimode

**PRELIMINARY**

## CONFORMAL COATING OPTION

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

## LINK DISTANCES

Fiber Specification	Application	Distance
62.5/125 (200MHz*Km)	Infiniband (2.5Gbps)	125M
50/125 (500MHz*Km)	Infiniband (2.5Gbps)	150M

## 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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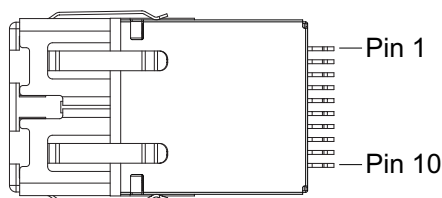
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**PRELIMINARY**

**Low Profile 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	VCCRX	Receiver Power Supply	N/A
9	RD-	Receiver DATA Out	CML
10	VEERX	Receiver Signal Ground	N/A

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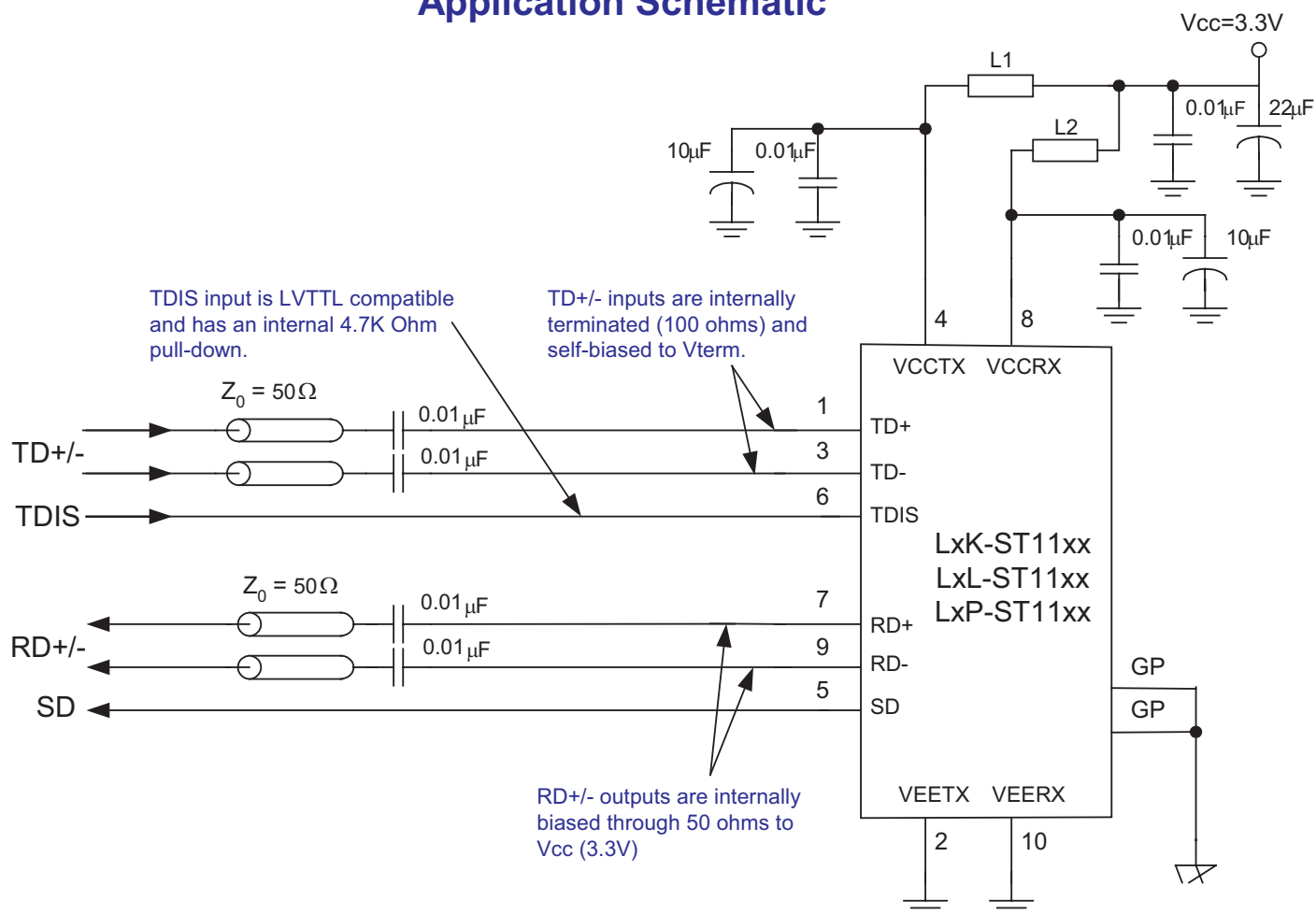
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InfiniBand Applications, Extended Link Margin

3.3V, 850nm VCSEL, Multimode

**PRELIMINARY**

## 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, 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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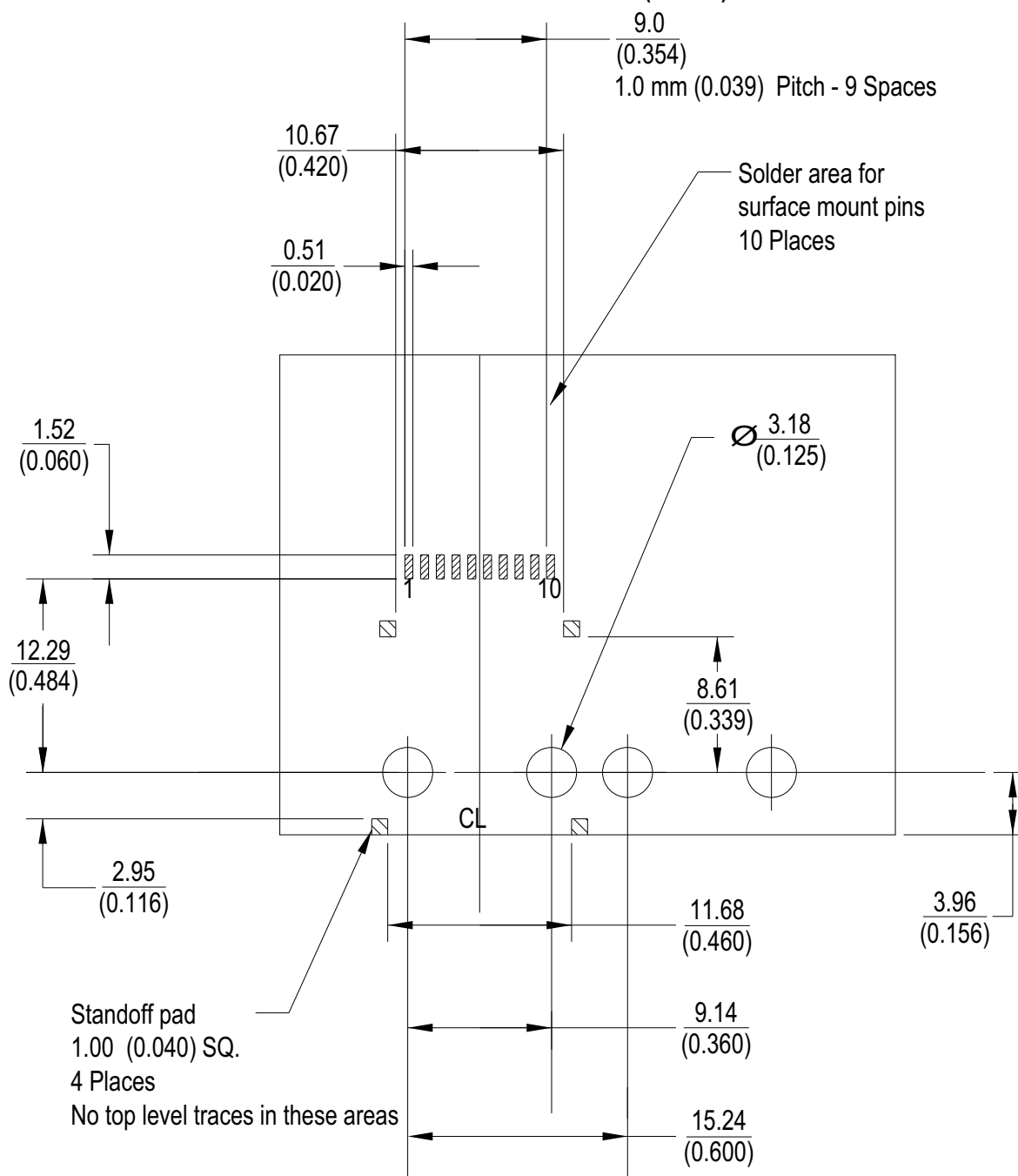
InfiniBand Applications, Extended Link Margin

3.3V, 850nm VCSEL, Multimode

**PRELIMINARY**

## LOW PROFILE OPTICAL TRANSCEIVER PCB FOOTPRINT

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



Top View Shown

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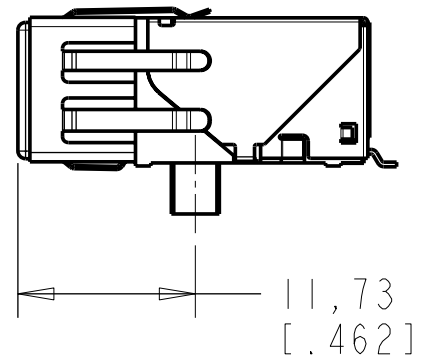
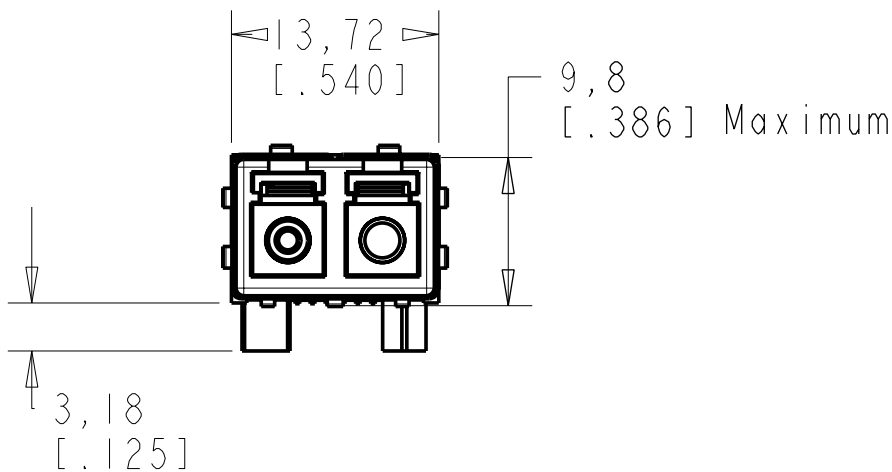
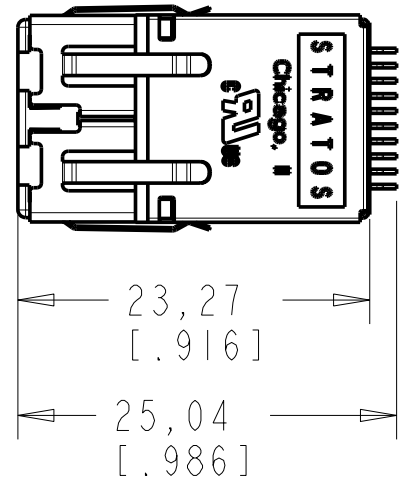
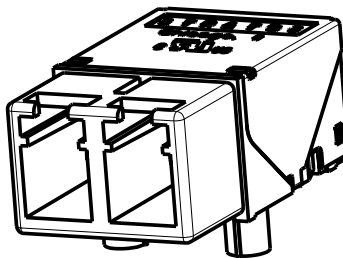
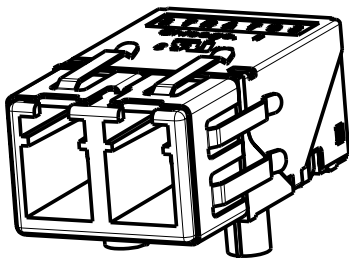
3.3V, 850nm VCSEL, Multimode

**PRELIMINARY**

## MECHANICAL DETAIL (SOLDER POST VERSION)

GROUND CLIP SHELL

FLAT SHELL



RECOMMENDED PANEL CUT-OUT  
for PROPER GROUND CLIP CONTACT  
is 0.400 X 0.560 INCHES.

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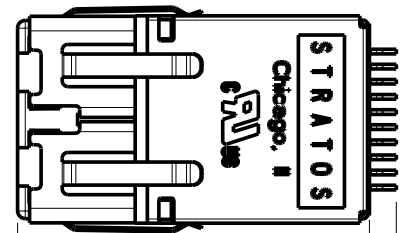
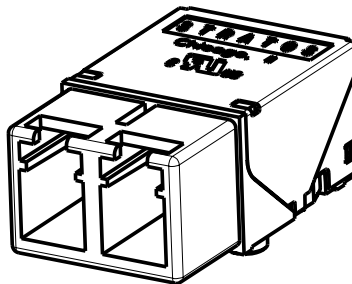
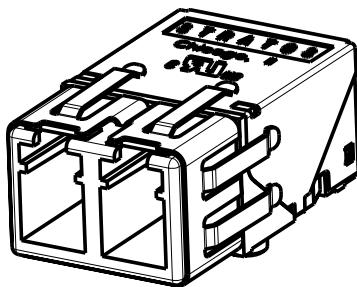
3.3V, 850nm VCSEL, Multimode

**PRELIMINARY**

## MECHANICAL DETAIL (SCREW POST VERSION)

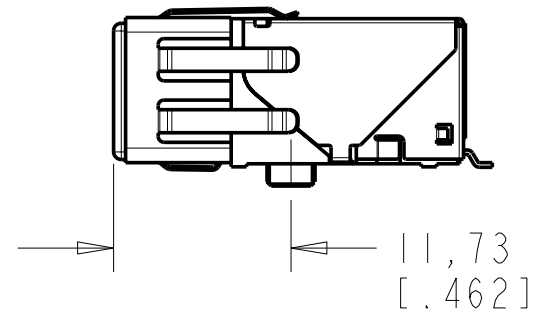
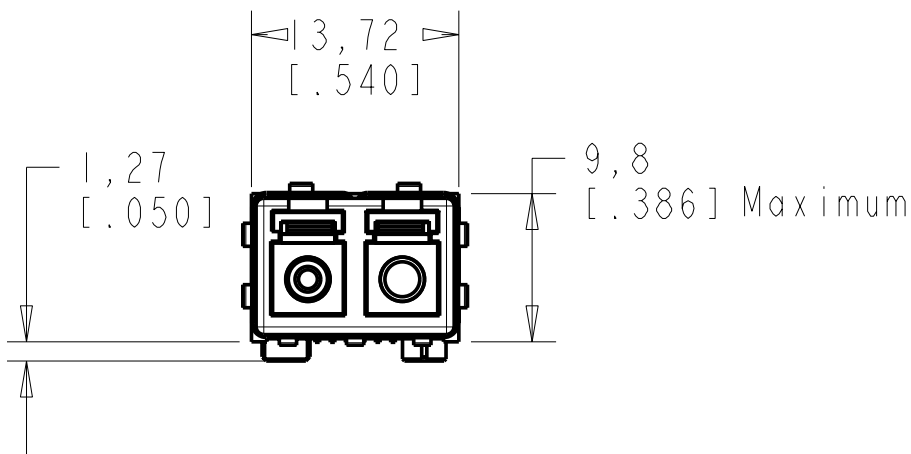
GROUND CLIP SHELL

FLAT SHELL



23,27  
[.916]

25,04  
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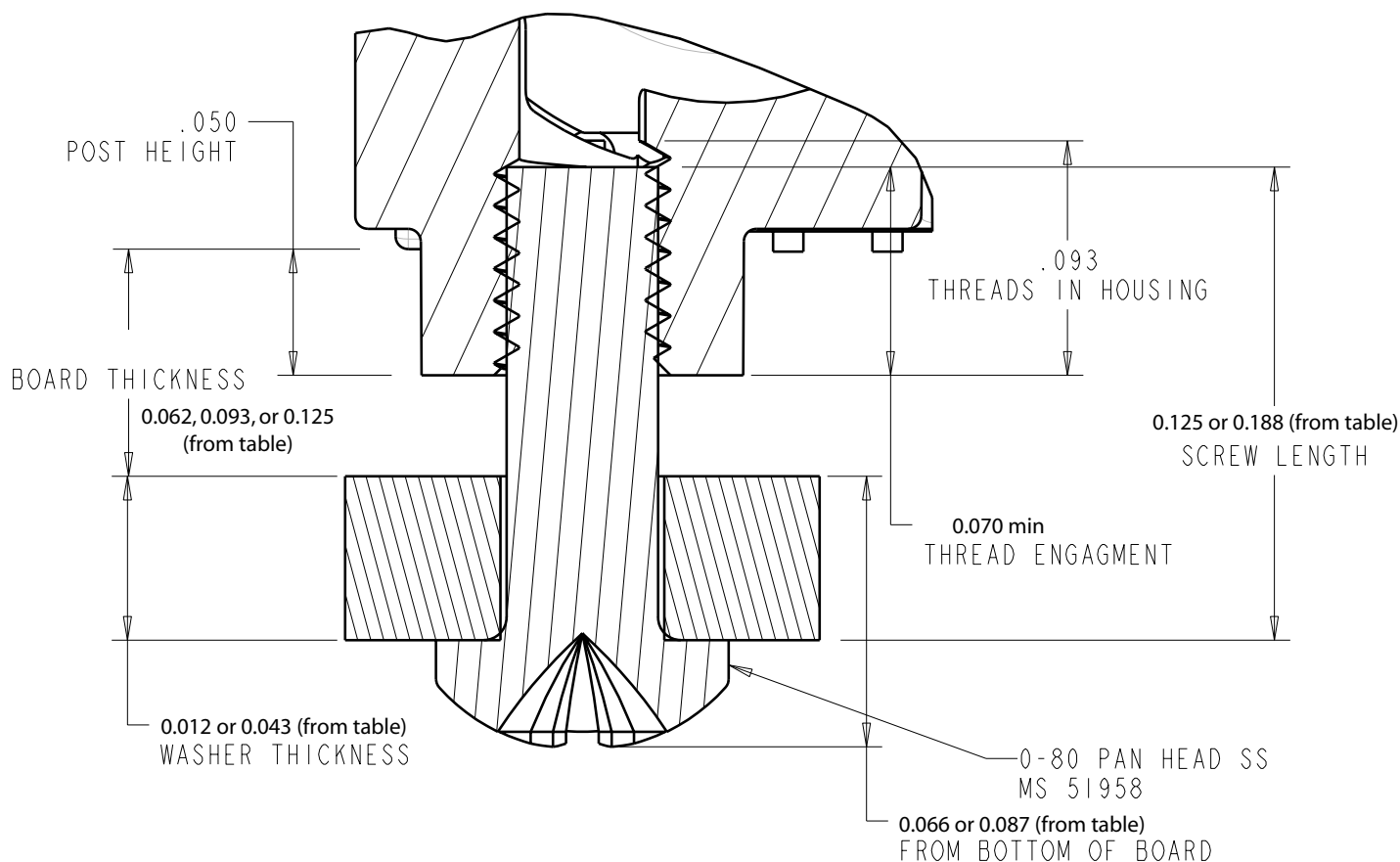
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**PRELIMINARY**



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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**PRELIMINARY**

Part Number	Link Margin (dB)	Flat Shell	Clip Shell	Conf Coat	Solder Posts	Screw Posts
LNP2-ST11H	2	X			X	
LNP2-ST11M	2	X		X	X	
LNP2-ST11HB	2	X				X
LNP2-ST11MB	2	X		X		X
LTP2-ST11H	2		X		X	
LTP2-ST11M	2		X	X	X	
LTP2-ST11HB	2		X			X
LTP2-ST11MB	2		X	X		X
LNP3-ST11H	3	X			X	
LNP3-ST11M	3	X		X	X	
LNP3-ST11HB	3	X				X
LNP3-ST11MB	3	X		X		X
LTP3-ST11H	3		X		X	
LTP3-ST11M	3		X	X	X	
LTP3-ST11HB	3		X			X
LTP3-ST11MB	3		X	X		X
LNP5-ST11H	5	X			X	
LNP5-ST11M	5	X		X	X	
LNP5-ST11HB	5	X				X
LNP5-ST11MB	5	X		X		X
LTP5-ST11H	5		X		X	
LTP5-ST11M	5		X	X	X	
LTP5-ST11HB	5		X			X
LTP5-ST11MB	5		X	X		X

## IMPORTANT NOTICE

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