

# Stratos

## LxF-LP11xx Low Profile Optical Transceiver

Connectivity for  
Business Critical Continuity™

**Fast Ethernet Applications**  
3.3V, 1310nm LED, Multimode, Up to 2.0Km

### Key Features & Benefits

- 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 802.3u Fast Ethernet
- EN-60825/ IEC-825 / CDRH Class 1 Compliant
- Optional Parylene C Conformal Coating
- Optional addition of fiber pigtail

### Applications

The LxF-LP11xx multimode glass optical fiber transceivers provide low profile, cost effective solutions for Fast Ethernet multimode (up to 2.0 Km) optical fiber data links with a duplex LC connector interface. These transceivers are fully compliant with the IEEE 802.3u Fast Ethernet standard but can be used for any other data communications purpose within their operating parameters.

### Product Overview

The Emerson Network Power Connectivity Solutions LxF-LP11xx fiber optic transceivers consist of transmitter and receiver functions combined in a Low Profile module. The optical transmitter is a high output 1310nm LED. The transmitter input lines are driven with differential LVPECL signals applied to the Transmit (TX+ and TX-) pins. These signals are internally converted to a suitable modulation current by a CMOS integrated circuit.

The optical receivers consist of PIN and Preamplifier assemblies and CMOS limiting post-amplifier integrated circuits. Outputs from the receivers consist of differential LVPECL data signals on the Receive (RX+ and RX-) pins and a single ended LVPECL 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

Low Rider	L	X	F	-	LP11	X	X
Roughrider <sup>1</sup>	RR		F	-	LP11	X	X

#### Shell Options

N= No GND Tabs  
(Flat Shell)

T= GND Tabs

#### Temperature and coating

H= -40 to 85 C, No

Coating

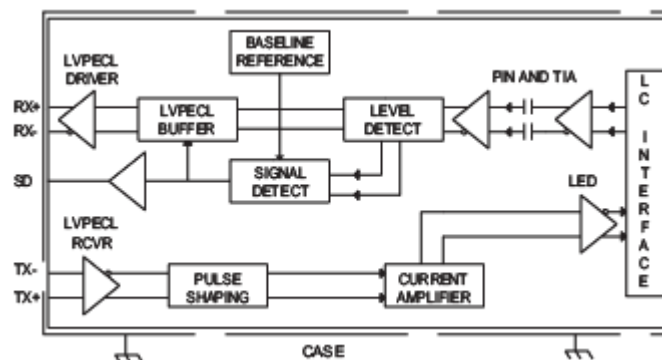
M= -40 to 85 C,  
Conformal Coating

#### Mounting

BLANK= Solder  
Posts  
(0.125 length)  
B= Screw Posts  
(0.050 length)

1. Consult the Roughrider worksheet on pg. 13 for pigtail options.

### Block Diagram



# Stratos

## LxF-LP11xx Low Profile Optical Transceiver

Connectivity for  
Business-Critical Continuity™

### 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	MIN	Typical	MAX	Unit
Storage Temperature	$T_s$	-55		+100	°C
Lead Soldering Temperature	$T_{SOLD}$			+260	°C
Lead Soldering Time <sup>1</sup>	$t_{SOLD}$			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)	$V_D$			2.0	V
Output Current	$I_O$			50	mA

1. Recommended for hand solder or hot bar soldering only. Convection or IR reflow oven profiles may damage internal solder joints. Reference Low Rider Soldering Application Note.

### Recommended Operating Conditions

Parameter	Symbol	MIN	Typical	MAX	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)	$V_D$	0.35		1.25	V
RX Data Output Load	$R_L$		50		$\Omega$

# Stratos

## LxF-LP11xx Low Profile Optical Transceiver

Connectivity for  
Business-Critical Continuity™

**Transmitters:** VCCTX = 3.15V to 3.45V, T<sub>A</sub> = Operating Temperature Range

Parameter	Symbol	MIN	Typical	MAX	Unit
Optical Output Power <sup>1</sup>	P <sub>O</sub>	-19.0		-14.0	dBm
Optical Output Wavelength	λ <sub>OUT</sub>	1285	1310	1355	nm
Spectral Width	Δλ <sub>RMS</sub> Δλ <sub>FWHM</sub>			63 175	nm
Extinction Ratio	ER	13			dB
Supply Current	I <sub>CC</sub>		120	160	mA
Optical Rise/Fall Time (20% - 80%)	t <sub>R,F</sub>			3.0	nS

1. BER=10<sup>-10</sup> @ 125Mbps, PRBS 2<sup>7</sup>-1, NRZ, Compliant with FDDI PMD ISO / IEC 9314-3 and IEEE-802.3u testing with 62.5 MM Fiber.

**Receivers:** VCCTX = 3.15V to 3.45V, T<sub>A</sub> = Operating Temperature Range

Parameter	Symbol	MIN	Typical	MAX	Unit
Optical Sensitivity <sup>1</sup>	P <sub>I</sub>	-32.0		-8.0	dBm
Optical Wavelength	λ <sub>IN</sub>	1260		1380	nm
Supply Current	I <sub>CC</sub>		70	120	mA
Signal Detect Assert Time	t <sub>SDAS</sub>		<10	100	μS
Signal Detect Deassert Time	t <sub>SDDA</sub>		<10	350	μS
Signal Detect Threshold <sup>2</sup>					
Decreasing Light	LSTD	-45.0		-32.5	dBm
Increasing Light	LSTI	-45.0		-32.0	dBm
Signal Detect Hysteresis	HYS	0.5	2.25	3.5	dB
RX Data Output – Low	V <sub>OL</sub> -V <sub>CC</sub>	-1.810		-1.475	V
RX Data Output – High	V <sub>OH</sub> -V <sub>CC</sub>	-1.165		-0.880	V

1. BER=10<sup>-10</sup> @ 125Mbps, PRBS 2<sup>7</sup>-1, NRZ, Compliant with FDDI PMD ISO / IEC 9314-3 and IEEE-802.3u testing with 62.5 MM Fiber.

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

# Stratos

## LxF-LP11xx Low Profile Optical Transceiver

Connectivity for  
Business-Critical Continuity™

### 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

Application	Fiber Specification	Distance
Fast Ethernet – IEEE 802.3u	62.5/125 – 500MHz * Km	2.0Km
FDDI PMD ISO / IEC 9314-3	50/125 – 500MHz * Km	2.0Km

### Regulatory Compliance

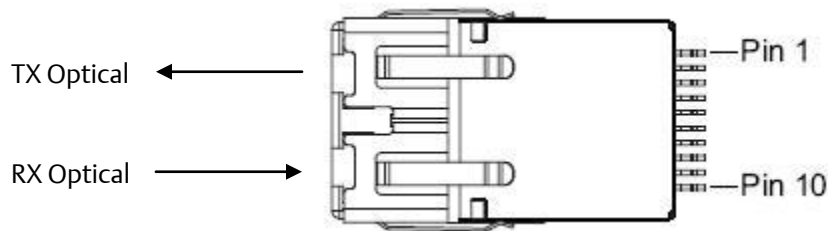
Requirement	Feature	Condition	Notes
MIL-STD-883-3015.7	ESD	Class II	2200V
IEC-801-2	ESD	Human Body Model	25KV
IEC-801-3	EMI	Immunity	10V/M
FCC	EMI	Class B	>20dB
EN 55022 (CISPR 22A)	EMI	Class B	10V/M
IEC-825 Issue 1993-11	Eye Safety	Class 1	TUV Certificate Number on File
FDA CDRH 21-CFR 1040	Eye Safety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

# Stratos

## LxF-LP11xx Low Profile Optical Transceiver

Connectivity for  
Business-Critical Continuity™

Low Profile Optical Transceiver  
Top View Shown



### Pin Functions

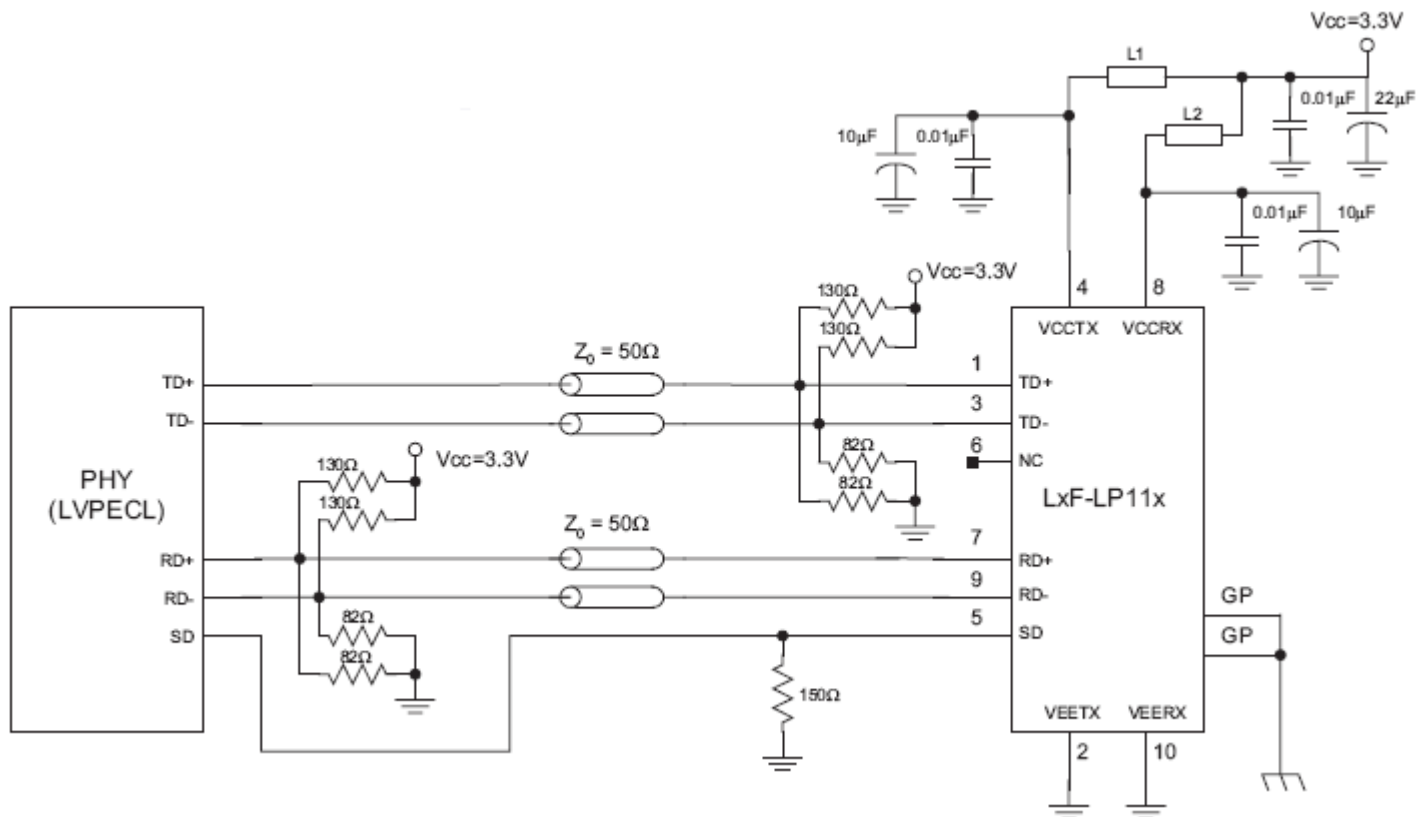
Pin Number	Symbol	Description	Logic Family
GP	GP	Grounding Posts Connect to chassis ground	N/A
1	TD+	Transmitter DATA In	LVPECL
2	VEETX	Transmitter Signal Ground	N/A
3	TD-	Transmitter DATA In	LVPECL
4	VCCTX	Transmitter Power Supply	N/A
5	SD	Signal Detect Output Satisfactory Optical Input: Logic "1" Output Fault Condition: Logic "0" Output External 150Ω pull-down recommended	LVPECL
6	N/C	No Connect – leave open	N/A
7	RD+	Receiver DATA Out	LVPECL
8	VCCR <sub>X</sub>	Receiver Power Supply	N/A
9	RD-	Receiver DATA Out	LVPECL
10	VEER <sub>X</sub>	Receiver Signal Ground	N/A

# Stratos

## LxF-LP11xx Low Profile Optical Transceiver

Connectivity for  
Business-Critical Continuity™

### Parallel Termination (Thevenin Equivalent) For DC Coupled LVPECL PHY Devices



#### Notes:

- 1) L1 and L2 = MuRata BLM21A601S or equivalent (600Ω at 100MHz or better).
- 2) Place LVPECL termination resistors (130 / 82Ω) as close as possible to termination points.
- 3) Route the differential pairs (TD +/- and RD +/-) together using 50Ω impedance matched traces.
- 4) Other DC coupled LVPECL termination techniques are also valid.
- 5) Use separate power supply filtering for VCCTX and VCCRXX, as shown.
- 6) 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.

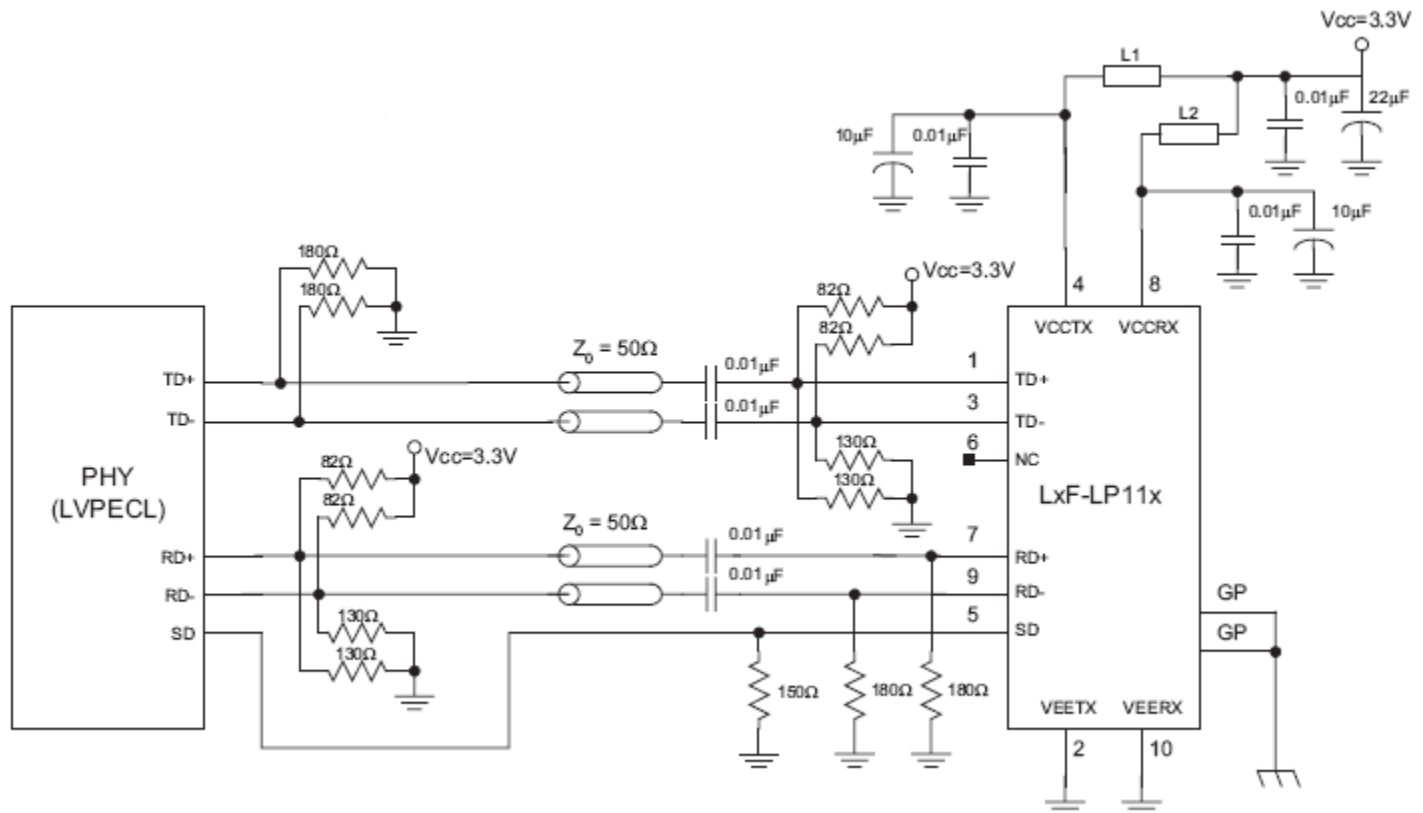
# Stratos

## LxF-LP11xx Low Profile Optical Transceiver

Connectivity for  
Business-Critical Continuity™

### Parallel Termination (Thevenin Equivalent) For AC Coupled LVPECL PHY Devices

Similar to DC-coupled, except addition of emitter follower pull-down resistors (180Ω), different Vt operating point (2.0V versus 1.1V), and addition of series RF capacitors.



#### Notes:

- 1) L1 and L2 = MuRata BLM21A601S or equivalent (600Ω at 100MHz or better).
- 2) Place LVPECL termination resistors (82 / 130Ω) as close as possible to termination points. Place LVPECL emitter follower pull-down (180Ω) as close as possible to source points.
- 3) Route the differential pairs (TD +/- and RD +/-) together using 50Ω impedance matched traces.
- 4) Other AC coupled LVPECL termination techniques are also valid.
- 5) Use separate power supply filtering for VCCTX and VCCR, as shown.
- 6) 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.
- 7) Use low ESR capacitors, such as NPO or COG, for AC coupling of TD+/- and RD+/- signals.

# Stratos

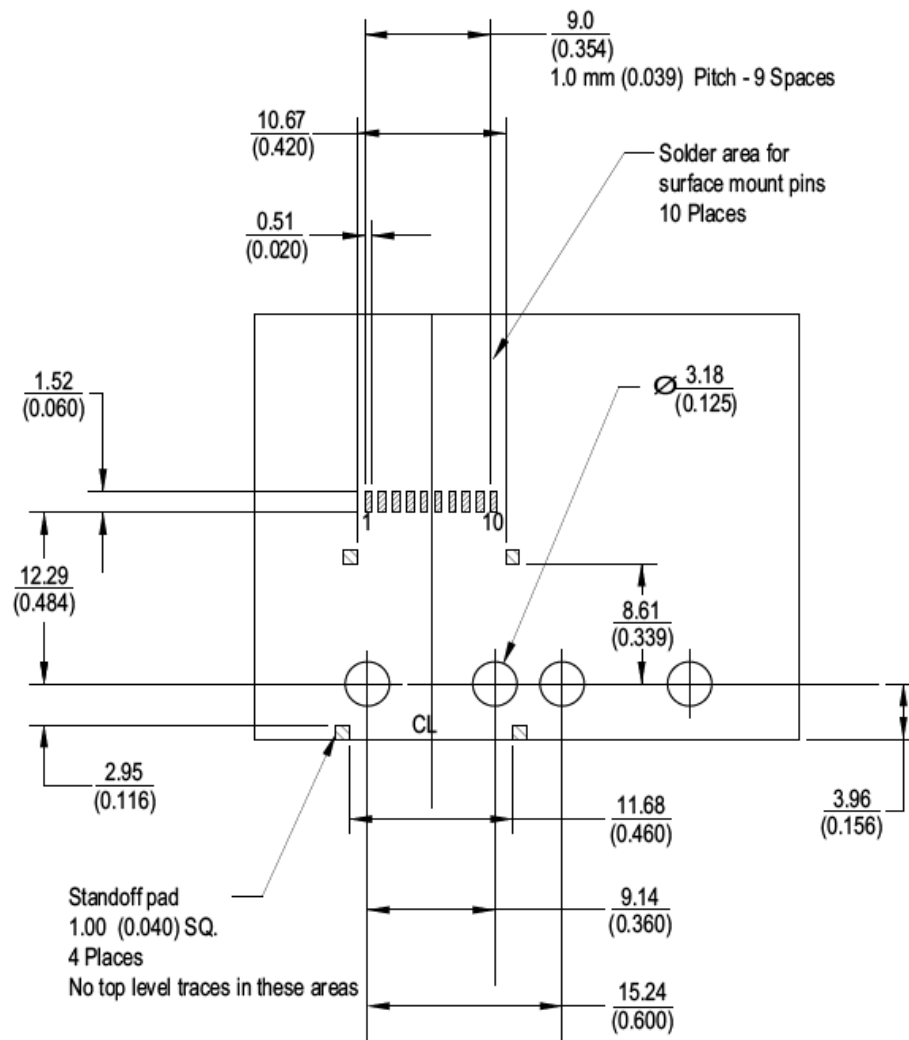
## LxF-LP11xx Low Profile Optical Transceiver

Connectivity for  
Business-Critical Continuity™

### Low Profile Optical Transceiver PCB Footprint

Dimensions are shown as:

$\frac{\text{mm}}{\text{(inches)}}$



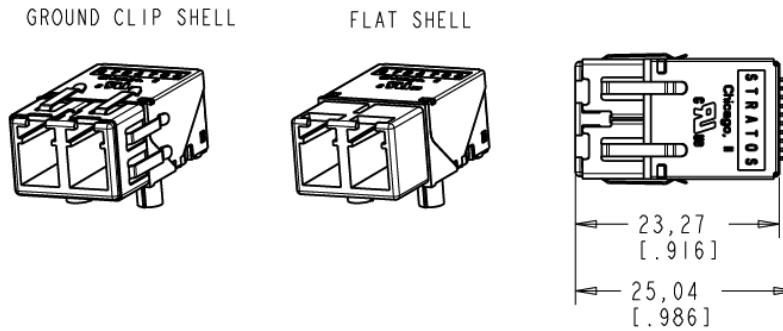
Top View Shown

# Stratos

## LxF-LP11xx Low Profile Optical Transceiver

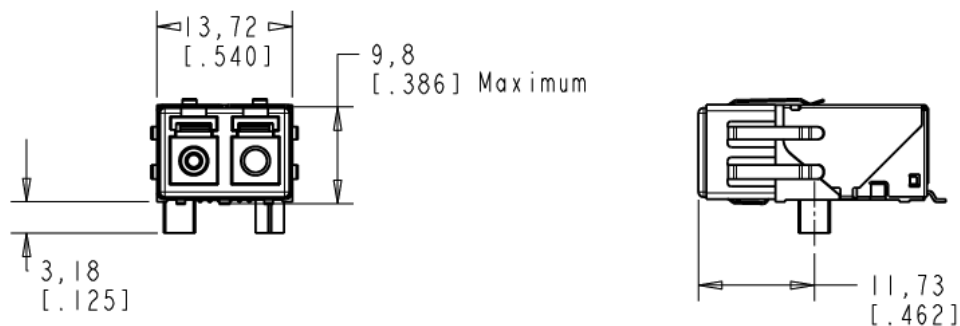
Connectivity for  
Business-Critical Continuity™

### Low Rider Mechanical Detail

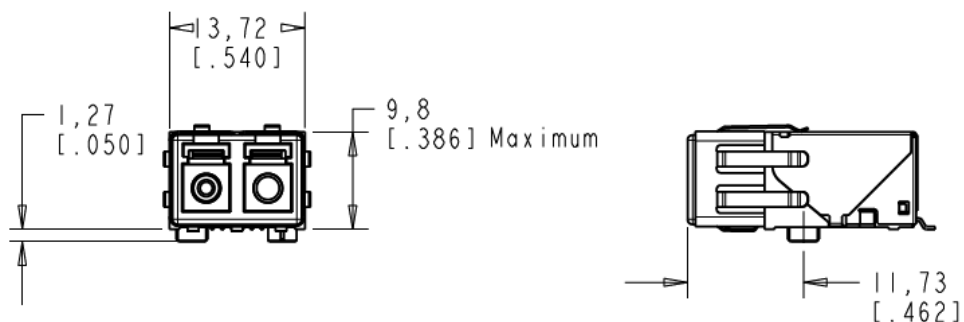


(Recommended panel cut-out for proper ground clip contact is 0.400 x 0.560 inches.)

### Solder Post Version



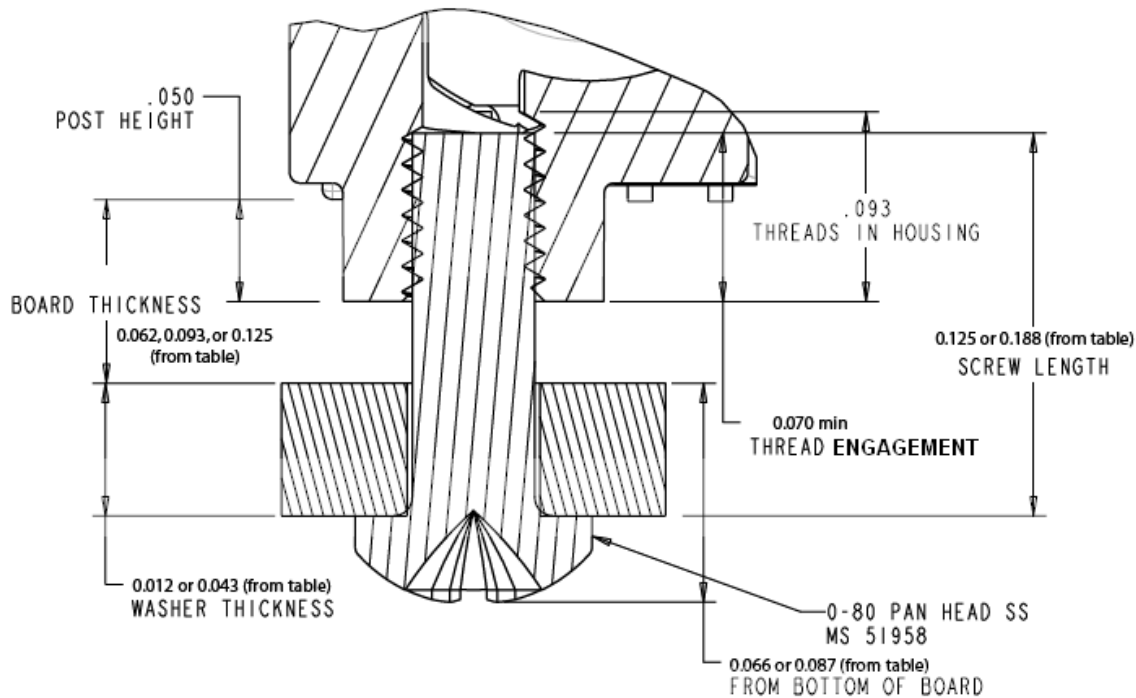
### Screw Post Version



# Stratos

## LxF-LP11xx Low Profile Optical Transceiver

Connectivity for  
Business-Critical Continuity™



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

### Notes:

- 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.
- 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.
- 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.

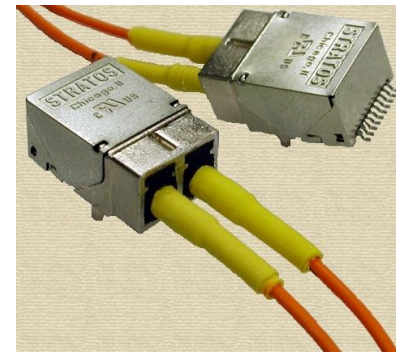
# Stratos

## LxF-LP11xx Low Profile Optical Transceiver

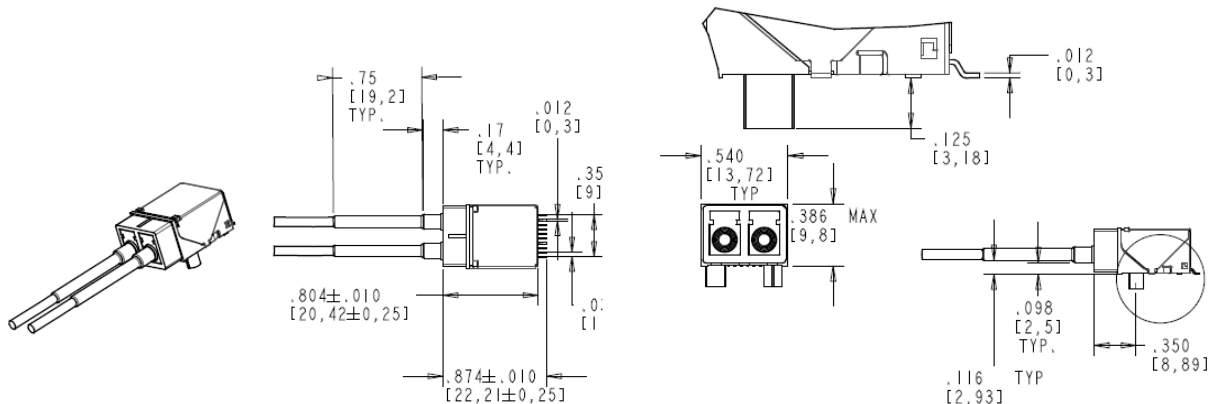
Connectivity for  
Business-Critical Continuity™

### Pigtail Options

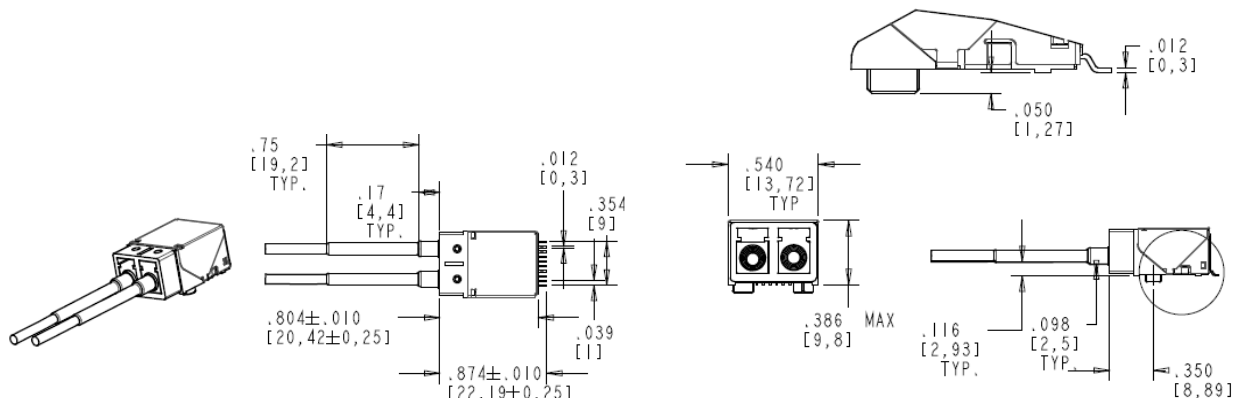
The Low Profile RJ optical transceiver can be ordered with permanently attached fiber pigtails. The fiber pigtails are customized to the customer's application and can vary in length from as short as 3 inches to as long as 50 inches, possibly longer dependent upon the application. The fiber pigtail optical connector may be selected from a wide variety of industry supported optical termini. Almost any combination is possible, as long as the termini components are available and supported by the OEM. Common termini components selected by customers include industry standard LC, SC, FC, ST, M29504, PHD, and others. Reference the Roughrider Worksheet portion of this datasheet as a guide to capture your custom requirements.



### Roughrider Mechanical Detail (Solder Post Version)



### Roughrider Mechanical Detail (Screw Post Version)



All dimensions are +/- .005 unless otherwise noted. All dimensions are inch/mm.

### Part Number Summary and Options

Low Rider Part Number	Roughrider Part Number <sup>1</sup>	Flat Shell	Clip Shell	Conf Coat	Solder Posts	Screw Posts
LNF-LP11H	RRF-LP11H-Sxxx	X			X	
LNF-LP11M	RRF-LP11M-Sxxx	X		X	X	
LNF-LP11HB	RRF-LP11HB-Sxxx	X				X
LNF-LP11MB	RRF-LP11MB-Sxxx	X		X		X
LTF-LP11H			X		X	
LTF-LP11M			X	X	X	
LTF-LP11HB			X			X
LTF-LP11MB			X	X		X

1. For Roughrider options, consult the factory to determine your custom part number (-Sxxx suffix) dependent upon fiber type, termination type, and other Roughrider worksheet options. Worksheet located in product detail sheet

# Stratos

## LxF-LP11xx Low Profile Optical Transceiver

Connectivity for  
Business-Critical Continuity™

### Emerson Connectivity Solutions – Stratos Products Roughrider Worksheet

(Please use this worksheet to specify your order for Roughrider parts)

Customer, Program:

Low Rider or MIL SFF Part  
Number: (if known)

Data Rate:

Wavelength:

☐ 850

☐ 1310

Mode:

☐ Singlemode

☐ Multimode

Conformal Coat:

☐ Yes

☐ No

Post:

☐ Screw Post

☐ Solder Post

Fiber Type:

☐ 62.5/125  $\mu$ m Multimode: OCC A01-020V-WST/900-MIL

☐ 50/125  $\mu$ m Multimode: OCC A01-020C-AST/900-MIL

☐ 9/125  $\mu$ m Singlemode: OCC A01-020G-SLS/900-HS

☐ Other: \_\_\_\_\_

RX Termini:

TX Termini:

RX Pigtail Length: (+/- 0.5 inches is default)

TX Pigtail Length: (+/- 0.5 inches is default)

Special Notes: (Boot color, heatshrink, labels,  
special testing, shipping, etc.)

Part Number:

(Assigned by Emerson Connectivity Solutions)

Assigned By:

(Emerson)

Date:

--	--	--

#### IMPORTANT NOTICE

Stratos International, Inc. reserves the right to make changes to or discontinue any optical link product or service identified in this publication, without notice. Stratos International, Inc. recommends that its customers obtain the latest version of the publications to verify, before placing orders, that the information being relied on is current. Stratos International, Inc. warrants performance of its optical link products to current specifications in accordance with the Stratos International, Inc. standard warranty. Testing and other quality control techniques are utilized to the extent that Stratos International, Inc. has determined it to be necessary to support this warranty. Specific testing of all parameters of each optical link product is not necessarily performed on all optical link products. Stratos International, Inc. products are not designed for use in life support appliances, devices, or systems where malfunction of a Stratos International, Inc. product can reasonably be expected to result in a personal injury. Stratos International, Inc. customers using or selling optical link products for use in such applications do so at their own risk and agree to fully indemnify Stratos International, Inc. for any damages resulting from such improper use or sale. Stratos International, Inc. assumes no liability for Stratos International, Inc. applications assistance, customer product design, software performance, or infringement of patents or services described here in. Nor does Stratos International, Inc. warrant or represent that a license, either expressed or implied is granted under any patent right, copyright, or intellectual property right, and makes no representations or warranties that these products are free from patent, copyright, or intellectual property rights. Applications that are described herein for any of the optical link products are for illustrative purposes only. Stratos International, Inc. makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.