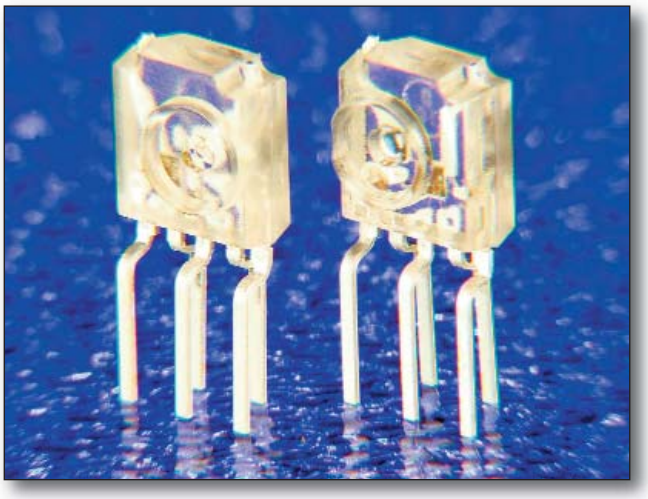
Fast Ethernet FOT Pair
EDL300E/EDL300D

LASER COMPONENTS

Firecomms™

650 nm 100 Mbps Fiber Optic Transceiver Solution

for Seamless Digital to Light/ Light to Digital Conversion



FEATURES

- Compatible with IEEE 802.3u Fast Ethernet data communications standard
- Logic interface compatible with both LVDS (Low-Voltage Differential Signaling) and CML (Current-Mode Logic)
- Integrated CMOS driver IC
- Resonant Cavity LED at red 650 nm with small emission aperture suitable for Plastic Optical Fiber (POF)
- Highly reliable transceiver solution with Mean Time to Failure exceeding 2M hours
- High sensitivity receiver IC and pin-diode for one-step light to digital conversion
- Integrated optics to efficiently focus light for fiber coupling
- Low power consumption
- Optimized for high-speed Fast Ethernet
- Compatible with standard step index 1mm POF with N.A. 0.5 (IEC60793-2-40 class A4a) and N.A. 0.3 (class A4d)

DESCRIPTION

Firecomms Ethernet Fiber Optic Transceivers (FOTs) are a RCLED-based 650 nm FOT solution designed to provide a Fast Ethernet communication link over plastic optic fiber (POF). These FOTs are compatible with low voltage differential signaling for seamless integration into Ethernet hubs.

Fully integrated transceivers, Firecomms Ethernet FOTs can operate at Fast Ethernet 100 Mbps for links between a PC or PC-controlled instrument and a server.

APPLICATIONS

Application	Standard	Distance	Speed
Industrial	Fast Ethernet	100 meters*	100 Mbps
Home/Office Network PC to Server	Fast Ethernet	100 meters*	100 Mbps

* Depending on installation conditions.

EDL300E/EDL300D Revision R3

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SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS[1]

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	T_{stg}	-40	100	°C
Operating Temperature	T_{op}	-20	70	°C
Soldering Temperature[2]			260	°C
Supply Voltage	Vcc	-0.5	4.5	V

NOTES:

1. These are absolute maximum ratings at or beyond which the FOT can be expected to be damaged.
2. 260°C, 5s 3 times, at least 2.2 mm away from lead root .

TRANSMITTER ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
DC Supply Voltage	V_{CC}	3.0	3.3	3.6	V
Current Consumption	I_{CC}		45	55	mA
Data Rate for an 8B/10B Encoded Data Bus	Data Rate	10	125		Mbps
Data Input Capacitance	C_{IN}			5	pF
Data Input Resistance (Single-Ended)	R_{IN}		5		kΩ
Input Common-Mode Range	$V_{IN-BIAS}$	GND+0.8		V_{DD}-0.8	V
Input Voltage Swing	$V_{IN-SWING}$	100		1200	mV
Optical Power OFF Delay	T_{PD}	0.02		20	µs
Optical Power ON Delay	T_{PU}			5	µs

TRANSMITTER PIN DESCRIPTION

Pin	Name	Symbol
1	Data Input (Negative)	TD-
2	Data Input (Positive)	TD+
3	Ground Pin	GND[1]
4	Input DC Power Pin	Vcc
5	Ground Pin	GND[1]

NOTE:

1. Both ground pins must be connected to the PCB ground plane as they are not connected internally..

TRANSMITTER OPTICAL CHARACTERISTICS[1]

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Peak Wavelength	λ_{peak}	640	660	670	nm
Spectral Bandwidth (FWHM)	$\Delta\lambda$		23	30	nm
Average Output Power	P	-8.5		-2.0	dBm
Optical Rise/Fall Time (20% - 80%)	t_r/t_f		2.0	3.0	ns
Extinction Ratio	R_E	12.0	16.0		dB
Data Dependent Jitter	DDJ			0.69	ns
Random Jitter	RJ			0.60	ns

NOTE:

1. Operating temperature = -20°C to 70°C. Parameter measurement taken after 1m class A4a POF at 125 Mbps data rate.

RECEIVER CHARACTERISTICS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
DC Supply Voltage	V_{CC}	3.0	3.3	3.6	V
Current Consumption	I_{CC}		37	45	mA
Output Impedance Between D and $\underline{D}$			100		Ohm
Offset Common Mode Voltage	V_{ocm}		1.2		V
Output Differential Voltage Swing		500		600	mV
Rise/Fall Time (10% - 90%)[1]	t_{er}/t_{ef}		2	3	ns
Maximum Allowed Optical Power	P_{MAX}			0	dBm
Signal Detect Assert/Deassert Time		0.5	5	100	µs
Signal Detect High		2.4		V_{CC}	V
Signal Detect Low		0		0.4	V
Signal Detect Asserted	P_{AS}	-28	-27	-24	dBm
Signal Detect Deasserted	P_{DAS}	-32	-29	-24.5	dBm
Signal Detect Hysteresis	HYS	0.5	1	3	dB

NOTE:

1. Measured at 125 Mbps with class A4a POF. Input optical power = -26 dBm.

RECEIVER PIN DESCRIPTION

Pin	Name	Symbol
1	Input DC Power Pin	V_{CC}
2	Ground Pin	GND
3	Output Signal Detect	SD
4	Data Input (Negative)	RD-
5	Data Input (Positive)	RD+

GENERAL APPLICATION CIRCUIT

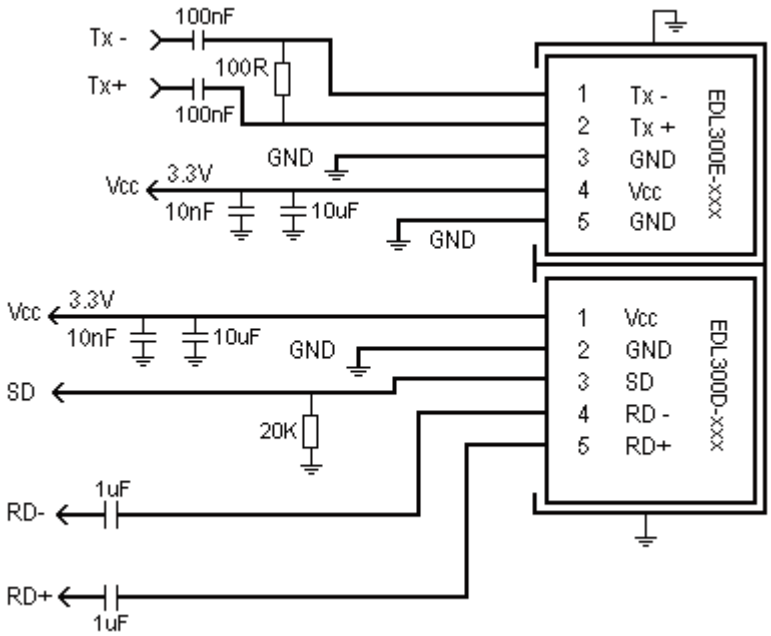
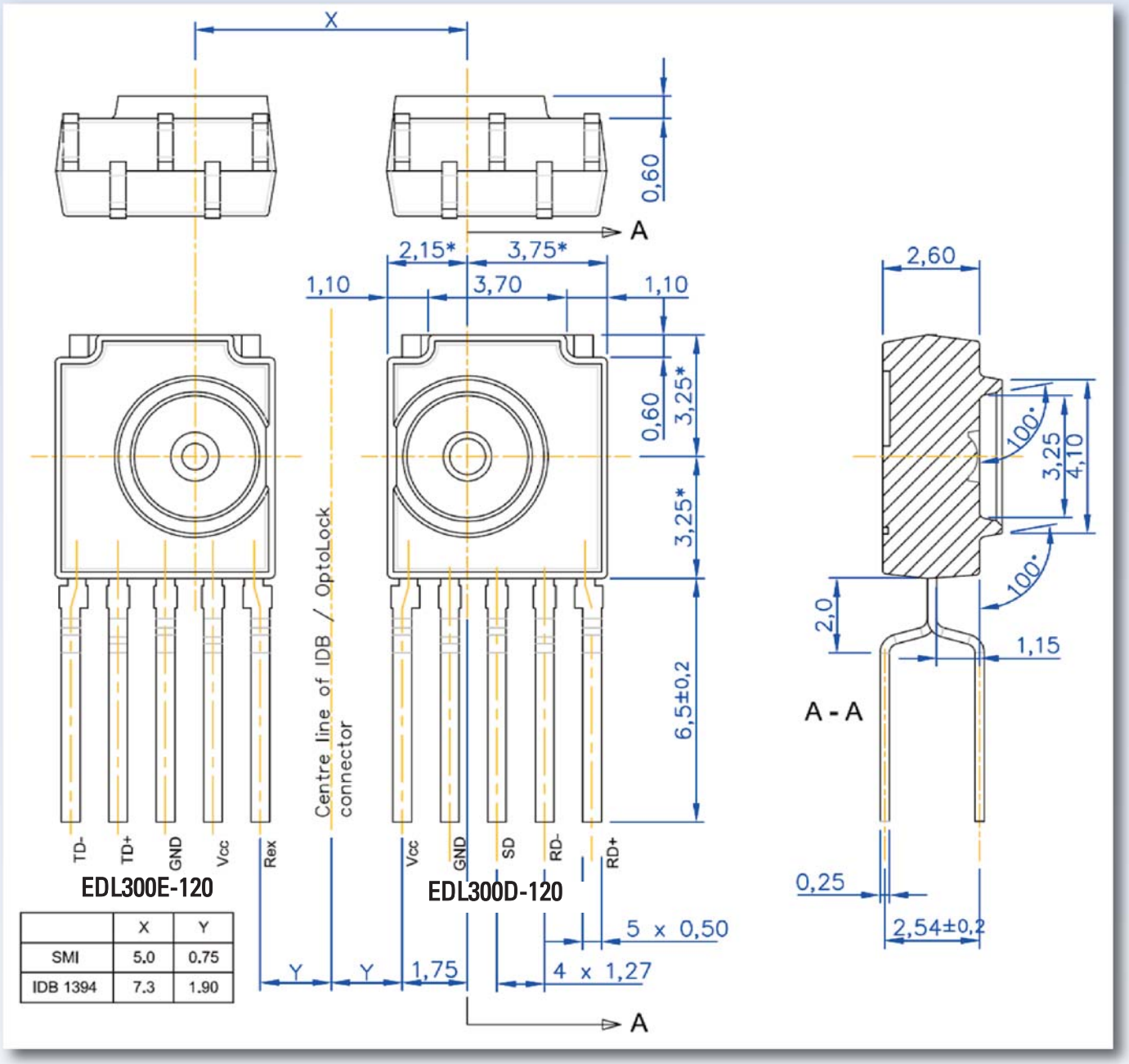


FIGURE 1
General application circuit.

Notes:

1. The Tx and Rx FOTs must be electrically shielded from each other to prevent crosstalk. This shield must be grounded. Please see the application note for recommendations on connector options and the PCB layout for standard connectors, such as SMI and OptoLock.
2. Power line capacitors should be located as close to the FOT's DC power PINs as possible.
3. The data lines are impedance-matched differential pairs. The PCB layout for these tracks must comply to high-speed data standards for impedance matching.
4. Ethernet PHY interface circuits are available in the application note for the Ethernet FOT devices.

MECHANICAL DATA



	X	Y
SMI	5.0	0.75
IDB 1394	7.3	1.90

FIGURE 2
Mechanical data for the integrated transmitter EDL300E and integrated receiver EDL300D.

Notes:

1. The metal projections at the top corners of the package are internally connected and should not come into electrical contact with any metal surface, ground plane, or circuit board.
2. The alignment ring (diameter 3.25/4.10) is the primary mechanical reference for alignment of the fiber.

EVALUATION BOARDS

Firecomms offers a Transceiver Evaluation Kit, F01281-101, for the Firecomms Ethernet FOT. Each kit includes two evaluation boards, two power supplies, and one POF cable. Each board contains SMA-type electrical connectors to interface Data I/O, SD, and Rex. The EDL300K-220 is mounted on the boards in SMI sockets and the 10 metre POF cable (Eska Mega 0.3NA) is fitted with matching SMI plugs. A separate data sheet is available for this developer kit.

PACKING INFORMATION

Components are packed in PVC anti-static tubes in moisture barrier bags. Bags should be opened only in static-controlled locations, and standard procedures should be followed for handling moisture-sensitive components.

PACKING INFORMATION

Components per Tube		50
	Tube Length	316 mm
	Tube Height	5 mm
	Tube Depth	20 mm
Tubes per Bag		20
Bags Per Inner Carton		1
	Inner Carton Length	450 mm
	Inner Carton Height	100 mm
	Inner Carton Depth	120 mm
Weight per Inner Carton, Complete		0.7 Kg
Components per Inner Carton		1,000
Inner Cartons per Outer Carton		4
	Outer Carton Length	465 mm
	Outer Carton Height	260 mm
	Outer Carton Depth	220 mm
Weight per Outer Carton, Complete		3.2 Kg
Components per Outer Carton		4,000

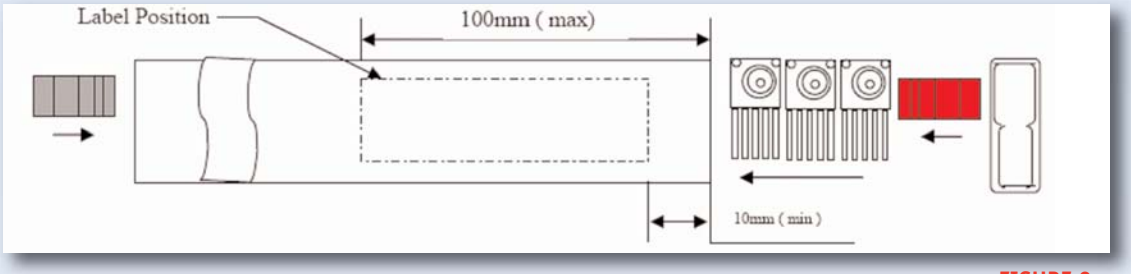


FIGURE 3
EDL300 Rx components inside tube.

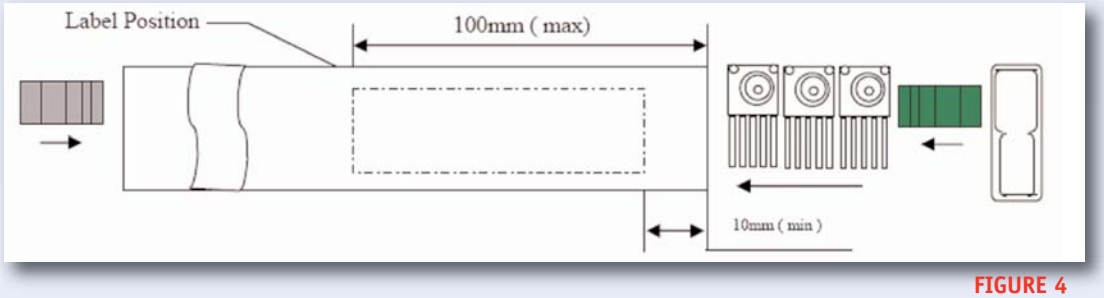


FIGURE 4
EDL300 Tx components inside tube.

ORDERING INFORMATION

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EDL300E/EDL300D PRODUCTS

Part Number	Name	Description
EDL300E-120	650 nm RCLED TOSA	Ethernet transmitter (TX), 6.5 nm formed leads
EDL300D-120	ROSA	Ethernet receiver (RX), 6.5 nm formed leads
EDL300K-120	Kit	Pair, including EDL300D-120 and EDL300E-120

RELATED PRODUCTS

Part Number	Name	Description
EDL300T	OptoLock® Connector Fitted with EDL300E and EDL300D	See EDL300T data sheet
EDK300	Transeiver Evaluation Kit	See EDK300 data sheet
MDK300	Media Development Kit	See MDK300E/F data sheet

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