

# Industrial High Speed Optical Transceiver

## IDL301T-220

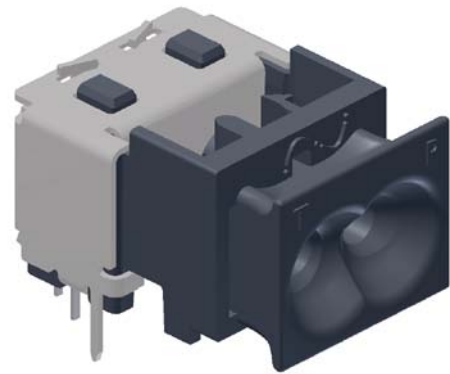
DATA SHEET

For High Speed Data Links Over  
Plastic Optic Fibre (POF); 650nm  
125 Mbps Fibre Optic Transceiver

Outstanding Immunity to  
Electromagnetic Interference

LVPECL Data Bus

  
**Firecomms™**



**FIGURE 1**  
OptoLock connector.

### FEATURES

- Visible high speed red light LED in the 650nm wavelength range
- LVPECL data bus
- Excellent ESD and EMI/EMC immunity
- Excellent pull force resistance
- Simple low-cost termination solution for 2.2mm jacketed POF cable
- Integrated optics to efficiently focus and direct light
- Eye safe light source
- Compatible with IEEE 802.3u Fast Ethernet data communications
- RoHS compliant

### APPLICATIONS

- Industrial vision systems
- Machine control
- Power systems control
- Wind-turbine control
- Solar-panel tracking control
- Robotics

### DESCRIPTION

Firecomms industrial transceiver combines both a transmit and a receive fibre optic component in a small form factor housing. OptoLock® allows bare fibre termination of standard 2.2mm jacketed Plastic Optic Fibre (POF) with a simple insert and lock system. This enables super fast installation and maintenance. The IDL301T transceiver offers performance over data rates from 10 Mbps to 125 Mbps, which covers diverse machine control applications up to full industrial 100Mb Ethernet.

The transmitter is a visible high speed LED known as a RCLD (Resonant Cavity LED) and is driven by a custom, fully integrated Firecomms driver IC. This provides high speed red light (650nm), which is ideal for communications over 1mm core POF.

The receiver is a digital bridge with photo-diode, Transimpedance amplifier and limiting amplifier, providing direct conversion from light to digital output on an LVPECL-compatible data bus. The receiver has high immunity to EMI/EMC and excellent ESD performance.

## SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS <sup>(1)</sup>				
Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	T <sub>stg</sub>	-40	+85	°C
Operating Temperature	T <sub>op</sub>	-20	+85	°C
Soldering Temperature <sup>(2)</sup>			+260	°C
Supply Voltage	V <sub>cc</sub>	-0.5	+4.5	V
Receiver Optical Overload	P <sub>OL</sub>		0	dBm

### Notes:

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

TRANSMITTER ELECTRICAL AND OPTICAL CHARACTERISTICS					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Voltage	V <sub>cc</sub>	3.00	3.30	3.60	V
Current Consumption	I <sub>cc</sub>	30.0	37.0	52.0	mA
Data Rate	BR	10		125	Mbps
Input Capacitance	C <sub>in</sub>			5.00	pF
Input Resistance	R <sub>in</sub>		5.00		kΩ
Input Common-Mode Voltage Range	V <sub>IB</sub>	GND+0.8		VCC-0.8	V
Differential Input Voltage Swing	V <sub>ID</sub>	100		1200	mV
Optical Power OFF Delay	T <sub>PD</sub>	0.02		20.00	μs
Optical Power ON Delay	T <sub>PU</sub>			5.00	μs
Peak Wavelength	λ <sub>peak</sub>	640	660	670	nm
Spectral Bandwidth (FWHM)	Δλ	18	24	27	nm
Average Output Power	P <sub>50</sub>	-10.0	-5.5	-1.5	dBm
Optical Rise Time (20%-80%)	T <sub>R</sub>	0.50	1.30	3.00	ns
Optical Fall Time (80%-20%)	T <sub>F</sub>	0.40	0.50	0.70	ns
Optical Modulation Amplitude	OMA	120	590	1250	μW
Open Eye Width	T <sub>eye</sub>	6.6	7.4	7.9	ns

**SPECIFICATIONS (continued)**

RECEIVER ELECTRICAL AND OPTICAL CHARACTERISTICS					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Voltage	V <sub>CC</sub>	3.0	3.3	3.6	V
Current Consumption	I <sub>CC</sub>	40	65	100	mA
Data Rate <sup>[4]</sup>	BR	10		125	MBd
Output Common Mode Voltage	V <sub>OB</sub>		1.2		V
Output Differential Voltage Swing	V <sub>OD</sub>	1.0	1.4	1.8	V
Output Rise Time (10%-90%)	T <sub>R</sub>	0.0	1.2	2.5	ns
Output Fall Time (90%-10%)	T <sub>F</sub>	0.0	1.0	2.5	ns
Average Input Sensitivity	P <sub>in</sub>	-22	-24	-27	dBm
Open Eye Width	EW	5.0	6.0	8.0	ns
Signal Detect Assert/Deassert Time	T <sub>SD</sub>	0	0.3	1.5	μs
Signal Detect Optical Assert Level	P <sub>SD-AS</sub>	-37.0	-32.0	-29.0	dBm
Signal Detect Optical Deassert Level	P <sub>SD-DAS</sub>	-41.0	-35.0	-30.0	dBm
Signal Detect Voltage High <sup>[6]</sup> (V <sub>OH</sub> -V <sub>CC</sub> )	V <sub>SDH</sub>	V <sub>CC</sub> -0.9	V <sub>CC</sub> -0.7	V <sub>CC</sub> -0.6	V
Signal Detect Voltage Low <sup>[6]</sup> (V <sub>OL</sub> -V <sub>CC</sub> )	V <sub>SDL</sub>	V <sub>CC</sub> -1.9	V <sub>CC</sub> -1.7	V <sub>CC</sub> -1.4	V

## Notes:

- All tests were performed using an OptoLock connector for 2.2mm jacket coupled to 1m of standard 1mm core 0.5NA POF.
- Test data was run at the upper limit of 125 Mbps using a PRBS7 test pattern and 8B/10B encoding.
- Test data was validated over the full temperature range -20°C to +85°C and over the supply voltage range 2.97V to 3.63V.
- Signal Detect is a PECL type output where the logic level is referenced to V<sub>CC</sub>.



**MECHANICAL INFORMATION (continued)**

TRANSMITTER PIN DESCRIPTION		
Pin	Name	Symbol
TRANSMITTER		
1	EMI-GND	GND
2	Data Input (Negative)	TD-
3	Data Input (Positive)	TD+
4	Rex - Ground Pin <sup>[1]</sup>	GND
5	DC Power Input Pin	Vcc
6	Ground Pin <sup>[1]</sup>	GND
RECEIVER		
7	DC Power Input Pin	Vcc
8	Ground Pin <sup>[1]</sup>	GND
9	Signal Detect Output	SD
10	Data Output (Negative)	RD-
11	Data Output (Positive)	RD+
12	EMI-GND	GND

## Notes:

1. NB: Both ground pins must be connected to the ground plane on the PCB. These pins are not connected internally.

**ORDERING INFORMATION**

ORDERING INFORMATION		
Part Number	Name	Description
IDL301T-220	Industrial OptoLock LVPECL Transceiver, Black	650nm RCLED-Based Transceiver, Color Black, with Termination for Bare POF Cable 2.2mm Diameter

INTERFACE CIRCUIT

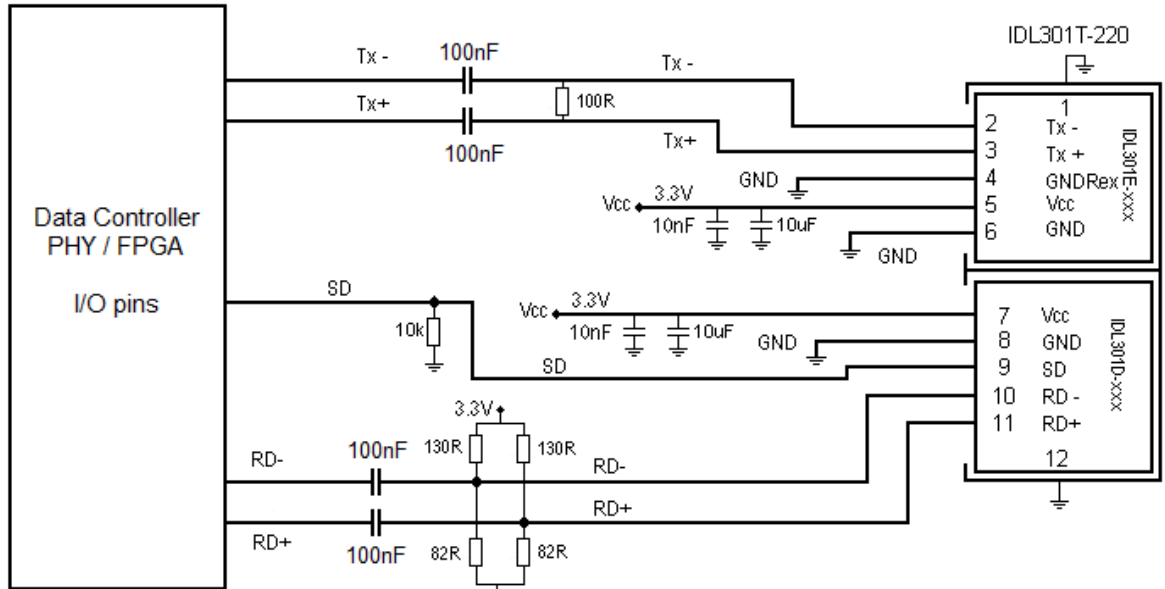


FIGURE 3  
Schematic layout for an AC coupled IDL301T-220.

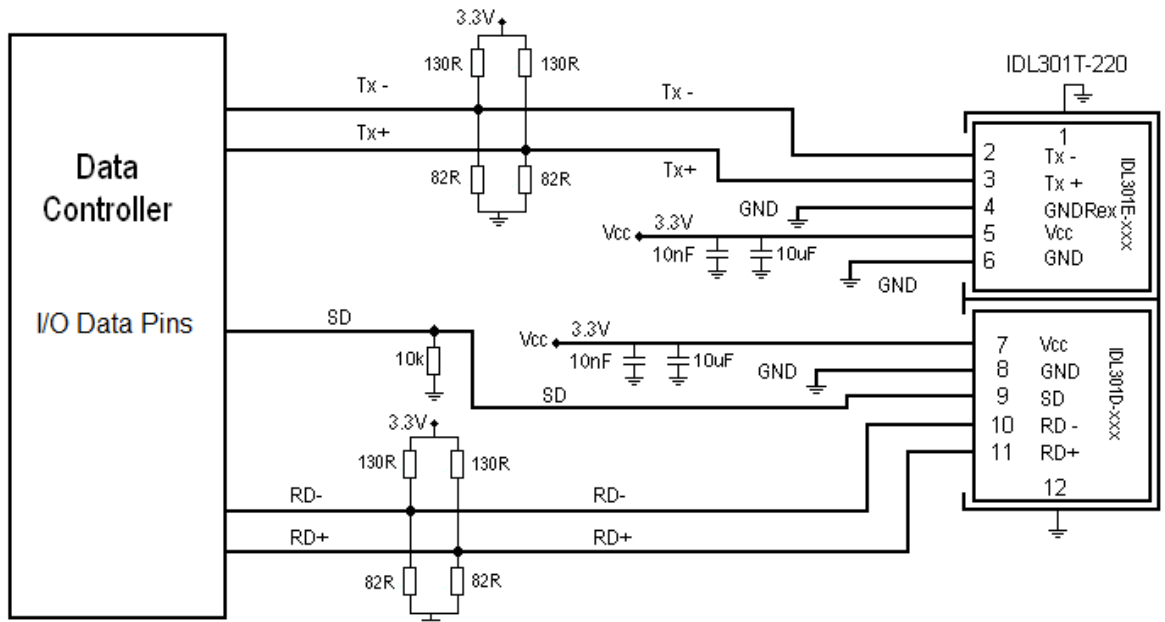
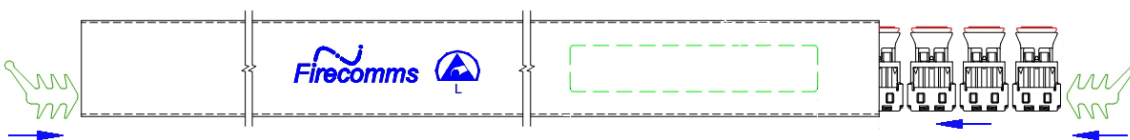


FIGURE 4  
Schematic layout for a DC coupled IDL301T-220.

**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		25
	Tube Length	440 mm
	Tube Height	20 mm
	Tube Depth	31 mm
Tubes per Bag		10
Bags per Inner Carton		1
	Tube Length	590 mm
	Tube Height	85 mm
	Tube Depth	145 mm
Weight per Inner Carton, Complete		1.8 Kg
Components per Inner Carton		250
Inner Cartons per Outer Carton		4
	Outer Carton Length	600-640 mm
	Outer Carton Height	300 mm
	Outer Carton Depth	200-285 mm
Weight per Outer Carton, Complete		8.6 Kg
Components per Outer Carton		1,000



**FIGURE 5**  
Packing tube for the Firecomms transceiver IDL301T-220.

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