Detectors

Laser Diodes

Firecomms

LASER COMPONENTS

Industrial High Speed Optical Transceiver
IDL301T-220

DATA SHEET

Firecomms

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

Outstanding Immunity to Electromagnetic Interference

LVPECL Data Bus

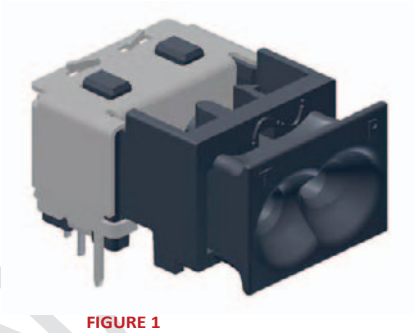

FIGURE 1
OptoLock connector.

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 RCLED (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.

IDL301T-220 (Preliminary) Revision P1

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SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS[1]				
Parameter	**Symbol**	**Minimum**	**Maximum**	**Unit**
Storage Temperature	Tstg	-40	+85	°C
Operating Temperature	Top	-20	+85	°C
Soldering Temperature[2]			+260	°C
Supply Voltage	Vcc	-0.5	+4.5	V
Receiver Optical Overload	P_{OL}		0	dBm

Notes:
1. These are absolute maximum ratings at or beyond which the FOT can be damaged.
2. 260ºC, 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	Vcc	3.00	3.30	3.60	V
Current Consumption	Icc	30.0	37.0	52.0	mA
Data Rate	BR	10		125	Mbps
Input Capacitance	C_{in}			5.00	pF
Input Resistance	R_{in}		5.00		kΩ
Input Common-Mode Voltage Range	V_{IB}	GND+0.8		VCC-0.8	V
Differential Input Voltage Swing	V_{ID}	100		1200	mV
Optical Power OFF Delay	T_{PD}	0.02		20.00	µs
Optical Power ON Delay	T_{PU}			5.00	µs
Peak Wavelength	λpeak	640	660	670	nm
Spectral Bandwidth (FWHM)	Δλ	18	24	27	nm
Average Output Power	P_{50}	-10.0	-5.5	-1.5	dBm
Optical Rise Time (20%-80%)	T_R	0.50	1.30	3.00	ns
Optical Rise Time (80%-20%)	T_F	0.40	0.50	0.70	ns
Optical Modulation Amplitude	OMA	120	590	1250	µW
Open Eye Width	T_{eye}	6.6	7.4	7.9	ns

SPECIFICATIONS (continued)

RECEIVER ELECTRICAL AND OPTICAL CHARACTERISTICS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Voltage	Vcc	3.0	3.3	3.6	V
Current Consumption	Icc	40	65	100	mA
Data Rate[4]	BR	10		125	MBd
Output Common Mode Voltage	V_{OB}		1.2		V
Output Differential Voltage Swing	V_{OD}	1.0	1.4	1.8	V
Output Rise Time (10%-90%)	T_R	0.0	1.2	2.5	ns
Output Fall Time (90%-10%)	T_F	0.0	1.0	2.5	ns
Average Input Sensitivity	P_{in}	-22	-24	-27	dBm
Open Eye Width	EW	5.0	6.0	8.0	ns
Signal Detect Assert/Deassert Time	T_{SD}	0	0.3	1.5	µs
Signal Detect Optical Assert Level	P_{SD-AS}	-37.0	-32.0	-29.0	dBm
Signal Detect Optical Deassert Level	P_{SD-DAS}	-41.0	-35.0	-30.0	dBm
Signal Detect Voltage High[6] (V_{OH}-Vcc)	V_{SDH}	Vcc-0.9	Vcc-0.7	Vcc-0.6	V
Signal Detect Voltage High[6] (V_{OL}-Vcc)	V_{SDL}	Vcc-1.9	Vcc-1.7	Vcc-1.4	V

Notes:
3. All tests were performed using an OptoLock connector for 2.2mm jacket coupled to 1m of standard 1mm core 0.5NA POF.
4. Test data was run at the upper limit of 125 Mbps using a PRBS7 test pattern and 8B/10B encoding.
5. 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.
6. Signal Detect is a PECL type output where the logic level is referenced to Vcc.

MECHANICAL INFORMATION

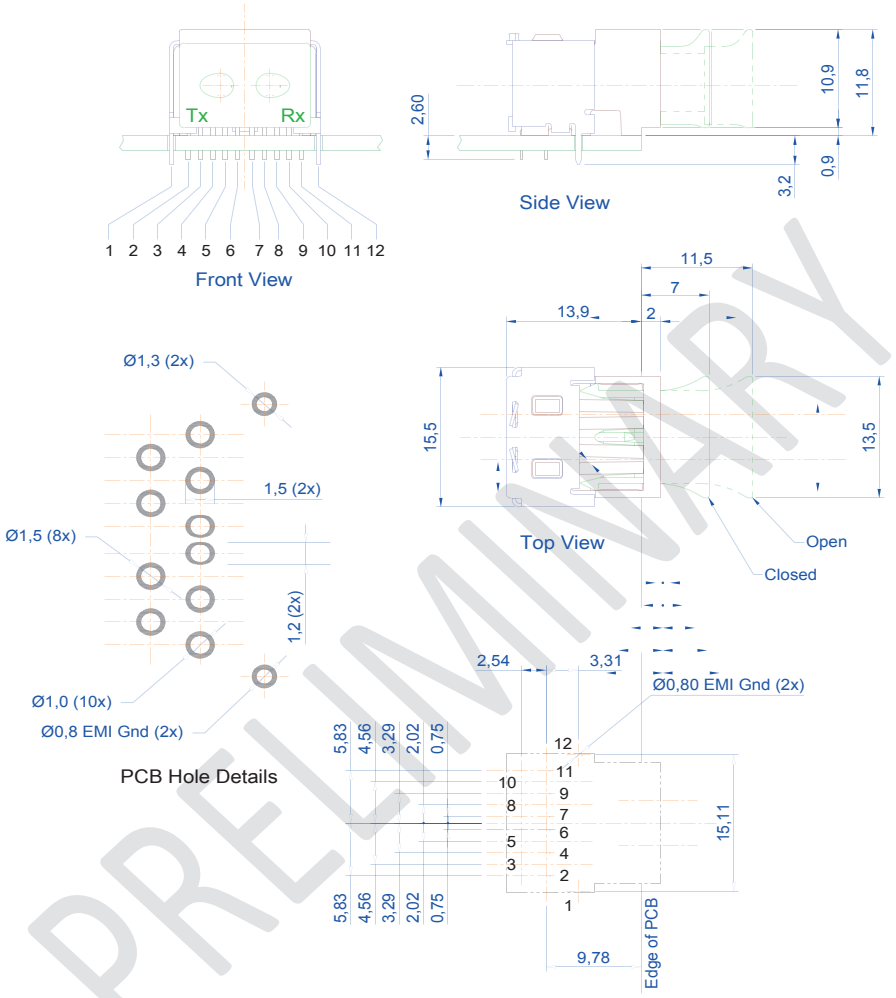

FIGURE 2
PCB layout footprint for IDL301T-220

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[1]	GND
5	DC Power Input Pin	Vcc
6	Ground Pin[1]	GND
	RECEIVER	
7	DC Power Input Pin	Vcc
8	Ground Pin[1]	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

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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

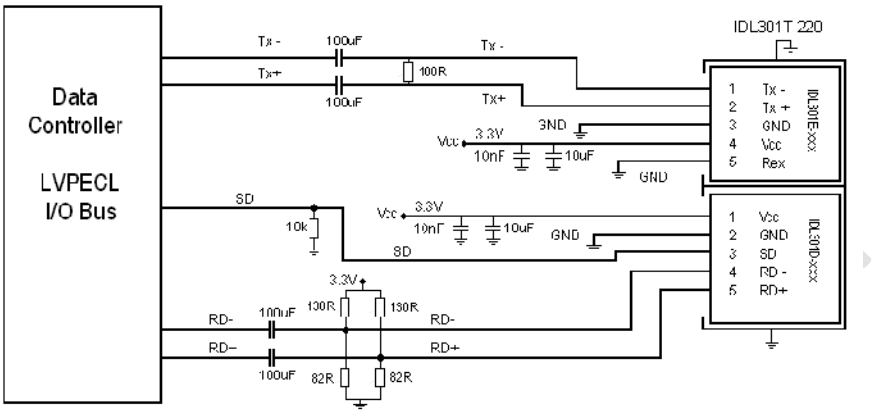

FIGURE 3
Schematic layout for an AC coupled IDL301T-220.

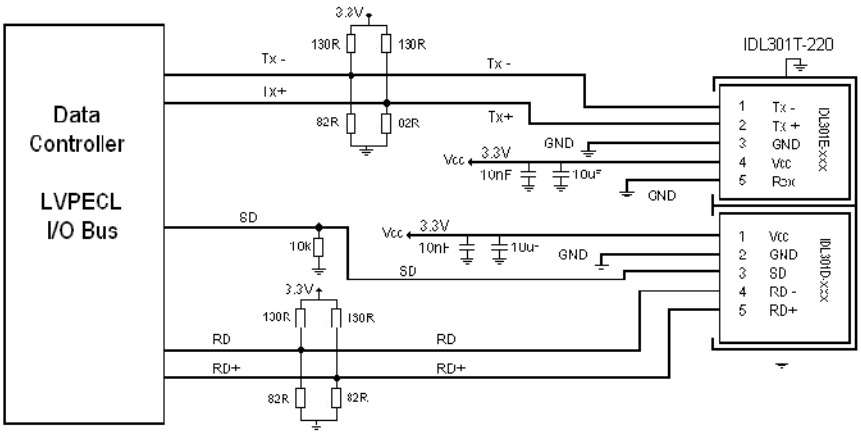

FIGURE 4
Schematic layout for an DC coupled IDL301T-220.

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

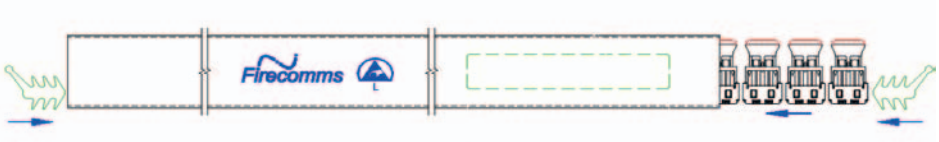

FIGURE 5
Packing tube for the Firecomms transceiver IDL301T-220.

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