FR00AxAR

RedLink® Fiber Optic Analogue Receiver

Datasheet

DESCRIPTION

Firecomms Analogue Receiver is based on a highly reliable photodiode which generates a current proportional to the fiber coupled incident light. It is encapsulated in a clear plastic over-mold which forms a lens suitable for coupling to 1mm Plastic Optic Fiber (POF). The receiver is housed in a blue plastic housing which is UL rated flame retardant (UL 94 V-0).

The housing is compatible with the Versatile Link style fiber plug, and is ideal for use with POF.

The receiver operates over the industrial temperature range of -40 °C to +85 °C supporting many industrial applications where reliable command, control and sensing response is required in electrically harsh environments.
The receiver can be used as a simple light sensing device or as part of a communications link by combining the output with an external transimpedance amplifier. The frequency response allows it to be used in application from DC to 250 Mbps (125 MHz, Min UI 4 ns).

FEATURES

- Silicon Photodiode
- Industrial temperature range -40 °C to +85 °C
- RoHS compliant and flame retardant (UL 94 V-0) connector housings
- Detects DC to 250 Mbps
- Horizontal, Vertical and 30° Tilted options available
- Compatible with Versatile Link cables and connectors

AVAILABLE OPTIONS

Table 1
ORDERING INFORMATION / PART NUMBERS

RedLink® Analogue Receiver, Horizontal Package	FR00AHAR
RedLink® Analogue Receiver, Vertical Package	FR00AVAR
RedLink® Analogue Receiver, Tilted Package	FR00AWAR

APPLICATIONS

Table 2
APPLICATIONS

Application	Motor Control, Voltage Isolation, Drives, Inverters, Industrial Control, Gaming, Medical Sensing
Standard	Low-speed serial RS232, RS485, CAN Bus, Modbus, PROFIBUS
Distance	Application specific, contact Firecomms technical support for link design consultation
Speed	DC to 250 MBd (NRZ)

SPECIFICATIONS

Table 3
RECEIVER PIN DESCRIPTION

Pin	Name	Symbol
1	NOT CONNECTED INTERNALLY / GND	GND
2	PD CATHODE	RD -
3	PD ANODE	RD +
4	NOT CONNECTED INTERNALLY / GND	GND
5	RETAINING PIN	GND
8	RETAINING PIN	GND

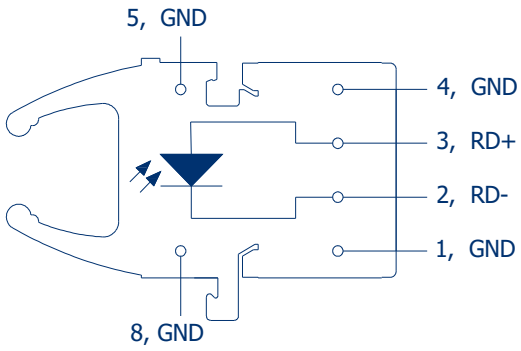

FIGURE 1
Receiver pin-out, top view

NOTE: *Pins 5 and 8 are used for mounting and retention purposes. It is recommended that pins 5 and 8 be connected to ground.*

Table 4
REGULATORY COMPLIANCE

Parameter	Symbol	Standard	Level
Electrostatic Discharge, Human Body Model (contact ESD)	HBM	Mil-STD-883	Level 2 (4 kV)
UL Certification	UL	60950-1	File No. E362227
Storage Compliance	MSL	J-STD-020	2a (4-week floor life)
Restriction of Hazardous Substances Directive	RoHS	Directive 2011/65/EU Incl. Amendment 2015/863	Certified compliant

SPECIFICATIONS

Table 5
ABSOLUTE MAXIMUM RATINGS

These are the absolute maximum ratings at or beyond which the FOT can be expected to be damaged
Notes:
1. *260 °C for 10 seconds, one time only, at least 2.2 mm away from lead root*

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	T_{stg}	-40	+85	°C
Operating Temperature	T_{op}	-40	+85	°C
Soldering Temperature [1]	T_{sld}		+260 [1]	°C
Storage Compliance	MSL		2a	J-STD-020
Reverse Voltage	V_R		+25	V
Electrical Power Dissipation	P_{tot}		100	mW

Table 6
RECEIVER ELECTRICAL AND OPTICAL CHARACTERISTICS

Test Conditions:
1. *Test data was validated over the full temperature range of -40 °C to +85 °C, unless otherwise noted. Typical data are at +25 °C*
2. *Input power levels are for peak (not average) optical input levels. For 50 % duty cycle data, peak optical power is twice the average optical power. Optical power for POF is measured when coupled into 0.5 m of a 1 mm diameter 0.5 NA POF and a large area detector*
3. *Responsivity R = Photocurrent/POF emitted optical power (A/W)*

Parameter	Symbol	Min	Typical	Max	Unit	Test Condition
Responsivity Spectral Range	λ	400	650	1000	nm	Responsivity (R) > 10 % of R_{MAX}
Responsivity	R		0.3	0.42	A/W	λ = 650 nm
Dark Current	IR			0.2	nA	Testing at 5 V at 25 °C
Noise Spectral Density			6		fA/√Hz	
Rise time (20 % - 80 %)	t_r		1	4	ns	V_r = 3.5V to 5V, 25 °C, R_L = 50 Ω
Fall time (80 % - 20 %)	t_f		1		ns	V_r = 3.5V to 5V, 25 °C, R_L = 50 Ω
Capacitance	C_0		2		pF	

MECHANICAL DATA, HORIZONTAL

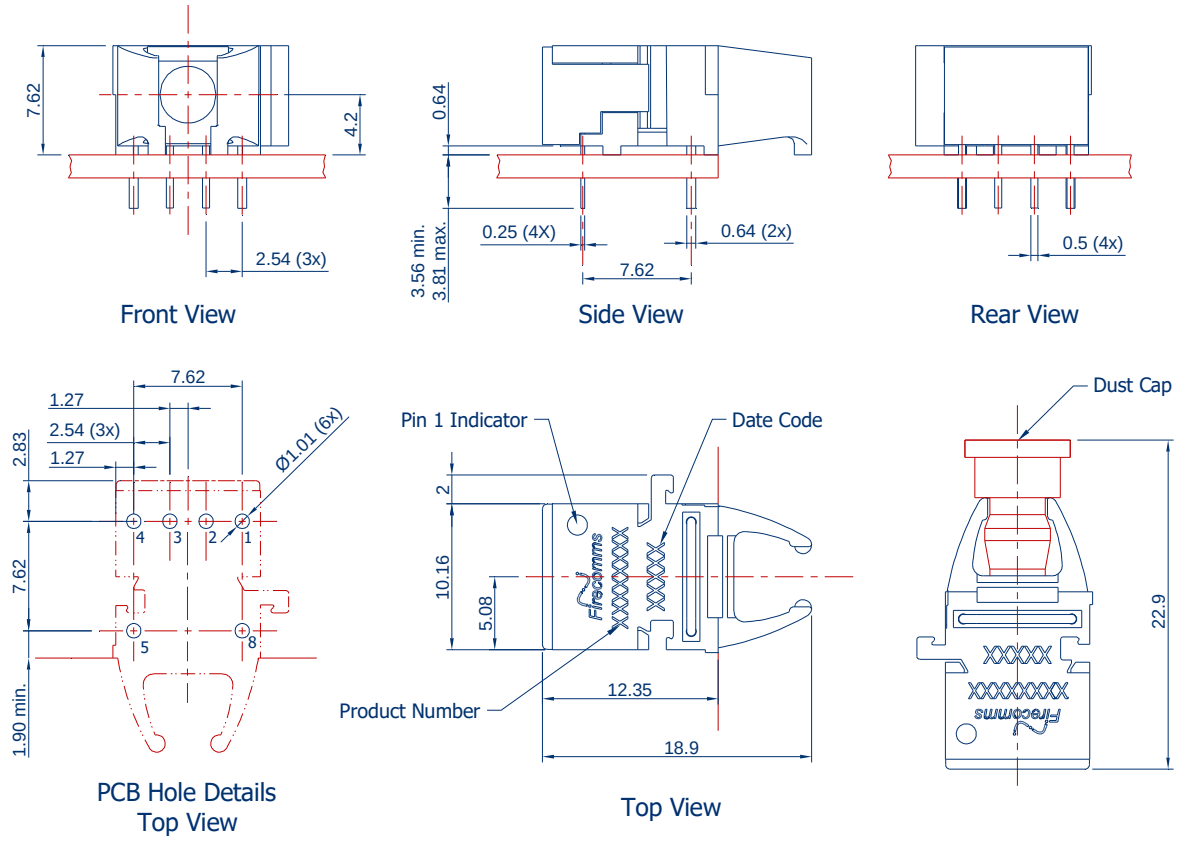

FIGURE 2
Mechanical dimensions of RedLink® horizontal connectors and PCB footprint, which is a top view
General dimensional tolerance is ± 0.2 mm

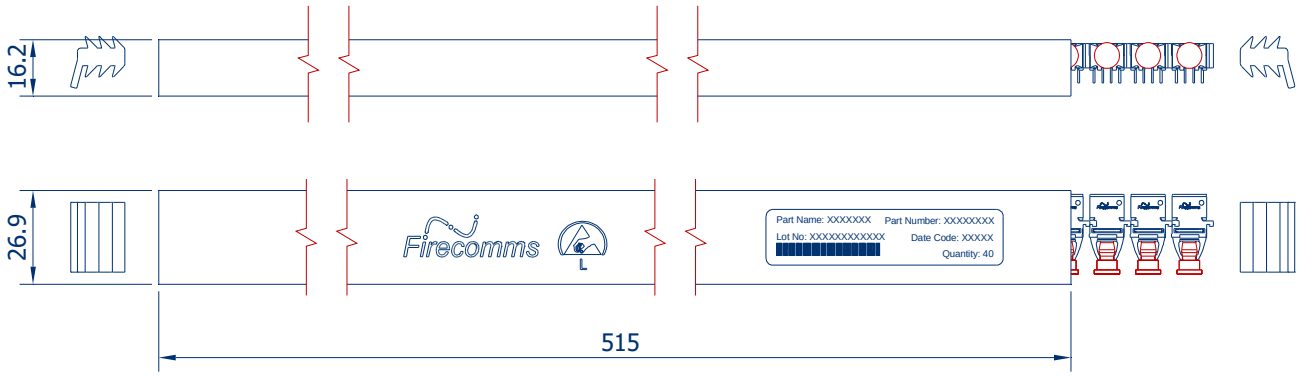

FIGURE 3
Packing tube for Firecomms RedLink® horizontal connectors

MECHANICAL DATA, VERTICAL

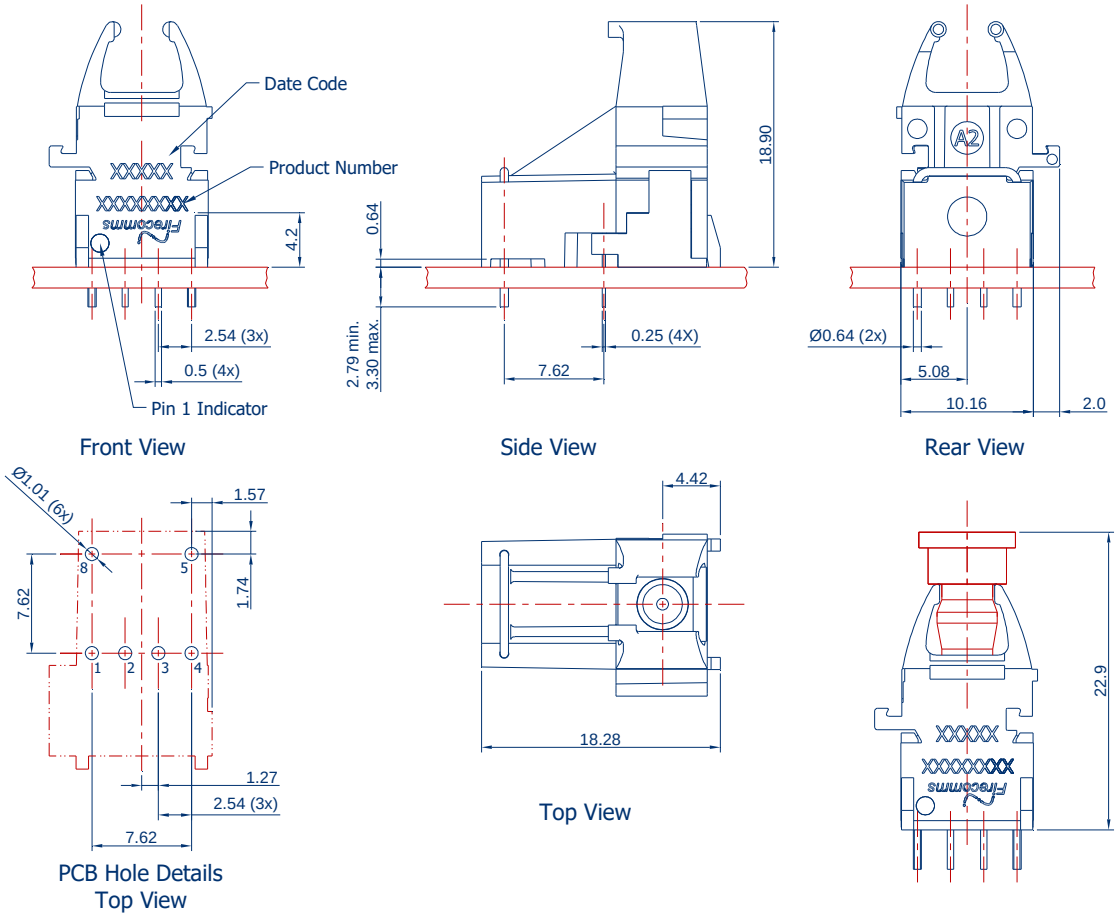

FIGURE 4
Mechanical dimensions of RedLink® vertical connectors and PCB footprint, which is a top view
General dimensional tolerance is ± 0.2 mm

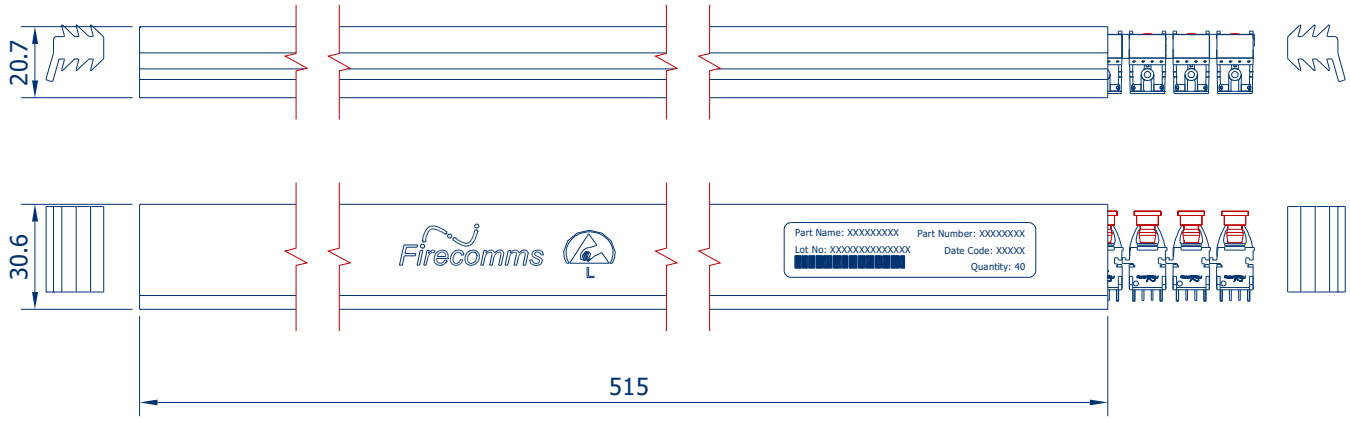

FIGURE 5
Packing tube for Firecomms RedLink® vertical connectors

MECHANICAL DATA, 30° TILTED

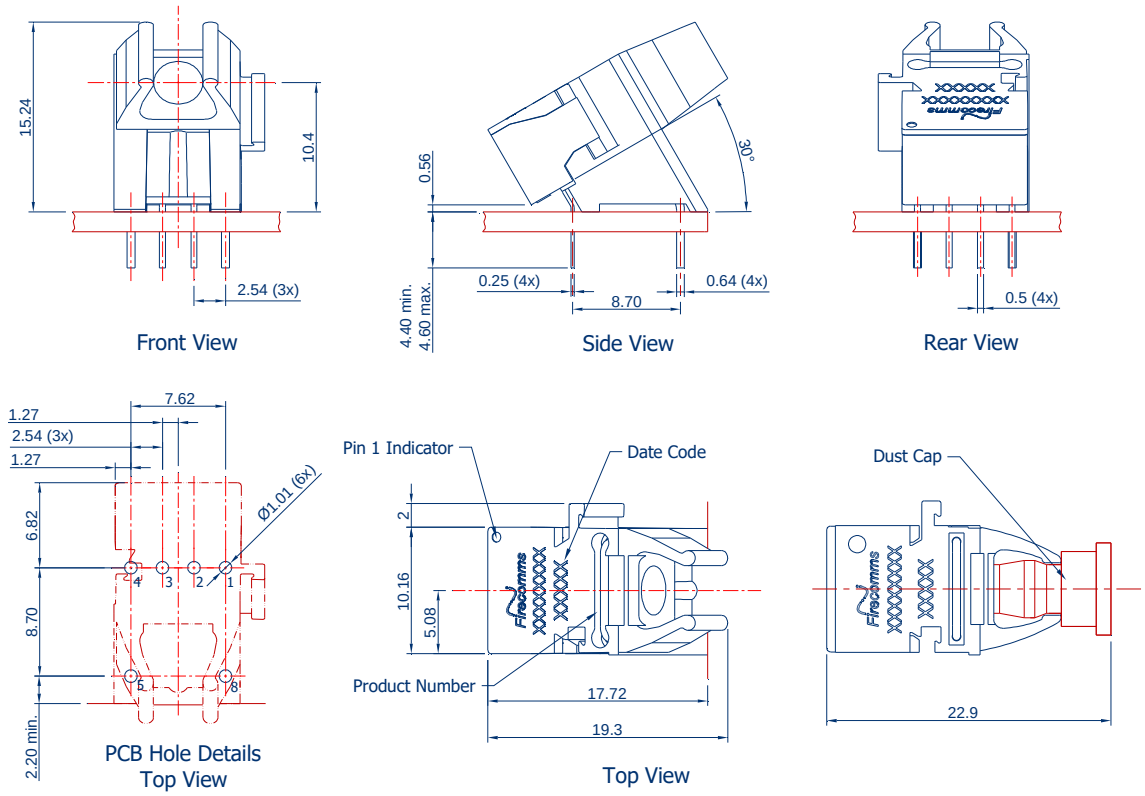

FIGURE 6
Mechanical dimensions of RedLink® tilted connectors and PCB footprint, which is a top view
General dimensional tolerance is ± 0.2 mm

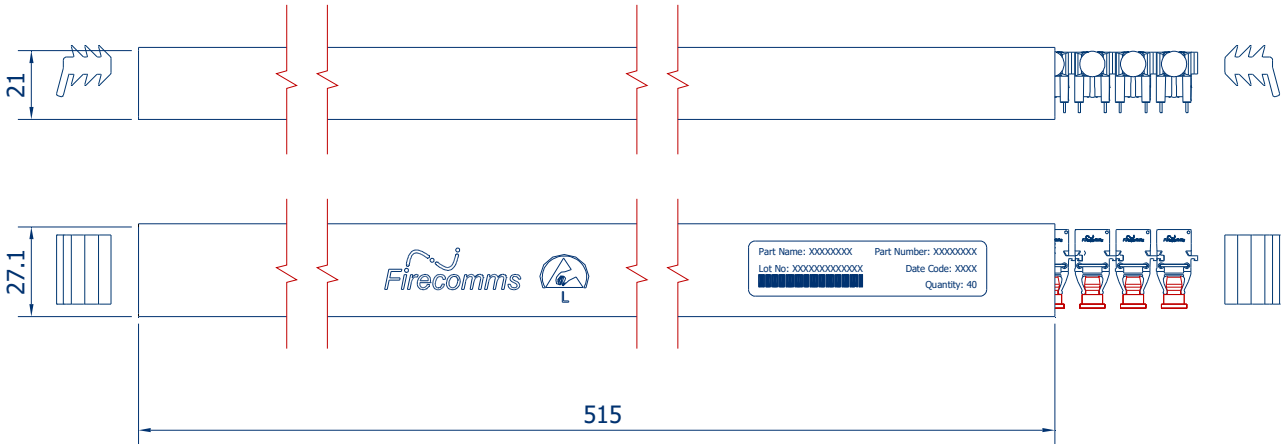

FIGURE 7
Packing tube for Firecomms RedLink® tilted connectors

PART HANDLING

Firecomms RedLink® connectors are auto-insertable and tested for handling in static-controlled assembly processes (Human Body Model - HBM). Cleaning, degreasing and post solder washing should be carried out using standard solutions compatible with both plastics and the environment. For example, recommended solutions for degreasing are alcohols (methyl, isopropyl and isobutyl). Acetone, ethyl acetate, phenol or similar solution-based products are not permitted.

In the soldering process, non-halogenated water-soluble fluxes are recommended. RedLink® connectors are not suitable for use in reflow solder processes (infrared/vapor-phase reflow). The dust plug should remain in place during soldering, washing and drying processes to avoid contamination of the active optical area of each part.

The Moisture Sensitivity Level (MSL) classification of this device is 2a according to JEDEC J-STD-020.
The shelf life of an unopened MBB (Moisture Barrier Bag) is 24 months at < 40 °C and < 90 % R.H.
Once the Moisture Barrier Bag is opened, the devices can be either;

a) Stored in normal factory conditions < 30 °C and < 60 % R.H. for a maximum of 672 hours (4 Weeks) prior to soldering
b) Stored at < 10 % R.H. (Dry Cabinet)

PACKING INFORMATION

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

Table 7
PACKING INFORMATION

		Horizontal	Vertical	Tilted
Components per Tube		40	40	40
	Tube Length	515 mm	515 mm	515 mm
	Tube Height	16.2 mm	20.7 mm	21 mm
	Tube Depth	26.9 mm	30.6 mm	27.1 mm
Tubes per Bag		5	5	5
Bags per Inner Carton		1	1	1
	Inner Carton Length	630 mm	630 mm	630 mm
	Inner Carton Width	70 mm	70 mm	70 mm
	Inner Carton Height	105 mm	105 mm	105 mm
Weight per Inner Carton, Complete		0.77 kg	0.92 kg	0.92 kg
Components per Inner Carton		200	200	200
Inner Cartons per Outer Carton		10	10	10
	Outer Carton Length	650 mm	650 mm	650 mm
	Outer Carton Width	235 mm	235 mm	235 mm
	Outer Carton Height	376 mm	376 mm	376 mm
Weight per Outer Carton, Complete		8.13 kg	9.60 kg	9.60 kg
Components per Outer Carton		2,000	2,000	2,000