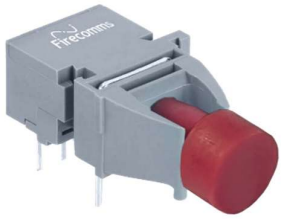
FT1M2HAR

650 nm DC-125 MBd RedLink® Fiber Optic Transmitter

Datasheet



DESCRIPTION

Firecomms DC to 125 MBd RedLink® transmitter is based on the highly reliable Firecomms designed Resonant Cavity Light Emitting Diode (RCLED) technology.

It is housed in a non-conducting plastic RedLink® connector. The transmitter is grey in colour. The housings are compatible with the Versatile Link style fiber plug and are optimised for use with Plastic Optic Fiber (POF) and Plastic Clad Silica (PCS).

The transmitter can be driven from TTL type logic drivers. It operates over the industrial temperature range of -40 °C to +85 °C, supporting many industrial applications where reliable command and control response is required in electrically harsh environments. The transmitter uses a large aperture red (650 nm) eye-safe RCLED based on InGaP/InGaAlP/GaAs technology. It operates over a wide range of drive current that can be adjusted using a serial resistor to minimise current consumption for a given link distance.

FEATURES

- Ideal for use with POF and PCS
- Optimised for data rates from DC to 125 MBd
- Industrial temperature range -40 °C to +85 °C
- Flame retardant (UL 94 V-0) connector housings
- RCLED transmitter with visible red light (650 nm wavelength)
- Low pulse width distortion
- The form factor of the RedLink® family is compatible with the Versatile Link range of connectors and cables

AVAILABLE OPTIONS

Table 1
ORDERING INFORMATION / PART NUMBERS

DC-125 MBd Horizontal Package Non-Inverting, TTL	FT1M2HAR

APPLICATIONS

Table 2
APPLICATIONS

Application	Automation and Industrial Control, Robotic Links, Fast Ethernet Communications, Voltage Isolation
Standard	Serial RS232, RS485, CAN Bus, Modbus, PROFIBUS, SERCOS
Distance	50 meters Step Index (SI) POF [1] 100 meters with 200 µm PCS fiber [1]
Speed	DC to 125 MBd [2]

Notes:
1. *Depending on the installation condition*
2. *When used with special drive circuit*

SPECIFICATIONS

Table 3
TRANSMITTER PIN DESCRIPTION

Pin	Name	Symbol
1	RCLED ANODE	TD+
2	RCLED CATHODE	TD-
3	NOT CONNECTED	NC
4	NOT CONNECTED	NC
5	RETAINING PIN [(a)]	GND (Chassis)
8	RETAINING PIN [(a)]	GND (Chassis)

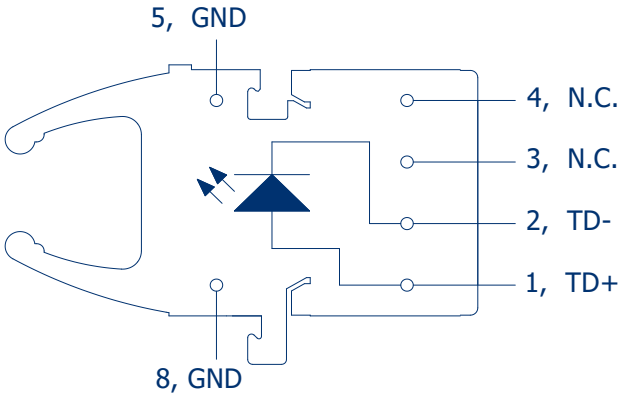


FIGURE 1
Transmitter pin-out, top view

NOTE: *(a) Pins 5 and 8 are used only for mounting and retention purposes. For general applications connect to chassis ground. If chassis ground is unavailable connect to general ground. For applications using high magnetic fields (e.g. MRI) or extremely high voltage, pins 5 and 8 should be left unconnected to ground to avoid eddy currents or uncontrolled static discharge.*

Table 4
REGULATORY COMPLIANCE

Parameter	Symbol	Standard	Level
Electrostatic Discharge, Human Body Model	HBM	Mil-STD-883	Level 2 (4 kV)
Storage Compliance	MSL	J-STD-020	3 (1-week floor life)
Eye Safety		IEC 60825-1	LED Class 1
Restriction of Hazardous Substances Directive	RoHS	Directive 2011/65/EU Incl. Amendment 2015/863	Certified Compliant
Radiated Emissions Immunity	EMC	IEC 61000-4-3	15 Vm^{-1}

EXEMPLAR APPLICATION CIRCUIT

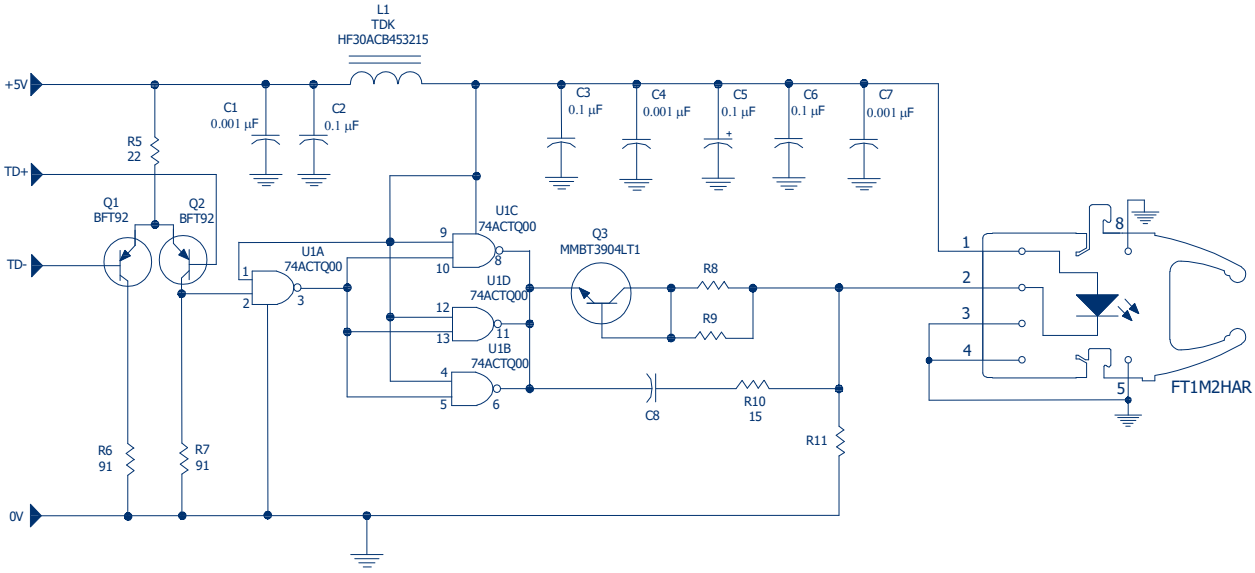


FIGURE 2
Exemplar transmitter application circuit.
Customers should contact Firecomms for circuit design guidelines.

NOTE:

a) All capacitor values are in µF with 10% tolerance (unless otherwise stated).
b) All resistor values are in Ohms with 5% tolerance (unless otherwise stated).
c) The values of R8, R9, R11 and C8 are different for POF and PCS/HCS drive circuits.

	POF	***PCS/HCS***	***Tolerance***
R8	*300*	*82*	*1%*
R9	*300*	*82*	*1%*
R11	*1K*	*470*	*1%*
C8	*43 pF*	*120 pF*	*1%*

SPECIFICATIONS

Table 5
ABSOLUTE MAXIMUM RATINGS

These are the absolute maximum ratings at or beyond which the part 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*
2. *When peak forward current exceeds 60 mA then the duty cycle must maintain a pulse width (PW) less than 1 µs and average forward current less than or equal to 60 mA. [60 mA ≤ I_{FPK} ≤ 90 mA ↔ I_{FAVG}≤ 60 mA AND PW ≤ 1 µs]*

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
Tx Reverse Input Voltage	V_{BR}		-10	V
Tx Forward Input Current [2]	I_{FDC}		80	mA
Tx Peak Forward Input Current [2]	I_{FPK}		1000	mA
Average Forward Input Current [2]	I_{FAVG}		60	mA

SPECIFICATIONS

Table 6
TRANSMITTER ELECTRICAL AND OPTICAL CHARACTERISTICS

Test Conditions:

1. *Test data was validated over the full temperature range of -40 °C to +85 °C, and over the full drive current range*
2. *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. *Optical power for PCS is measured when coupled into 0.5 m of a 200 µm diameter PCS and a large area detector*
4. *Emission Wavelength (centroid) λc = ΣiPi. λi/ ΣiPi. (Ref: EIA/TIA std. FOTP-127/6.1, 1991)*
5. *Spectral Width Root Mean Squared (RMS) λRMS = (Σi Pi(λc – λi)2/ ΣiPi)1/2 (ref: EIA/TIA std. FOTP-127/6.3, 1991)*
6. *Pins 5 and 8 are only used for mounting and retention purposes. Connect to ground*

Parameter	Symbol	Min	Typical	Max	Unit	Test Condition
Output Optical Power	P_o	-7.5	-3.5	+1.3	dBm	1 mm POF I_{FDC} = 60 mA
		-16.8	-9.0	-0.7	dBm	1 mm POF I_{FDC} = 20 mA
		-17.3	-12.5	-7.2	dBm	200 µm PCS I_{FDC} = 60 mA
Emission Wavelength (centroid) [4]	λ_c	635	650	665	nm	I_{FDC} = 30 mA
Spectral Width (RMS) [6]	λ_{RMS}		11	16	nm	I_{FDC} = 30 mA
Forward Voltage	V_F	1.8	2.1	2.65	V	I_{FDC} = 60 mA
Forward Voltage Temperature Coefficient	$\Delta V_F/\Delta T$		-3.3		mV/°C	I_{FDC} = 60 mA
Reverse Input Breakdown Voltage	V_{BR}	10			V	I_{FDC} = -1 µA
Diode Capacitance	C_o		11		pF	V = 0 V
Tx Numerical Aperture	NA		0.5			I_{FDC} = 60 mA
Data Rate		DC		125	MBd	Drive circuit dependent
Optical Rise Time (20 % - 80 %)	t_r		10		ns	I_{FAVG} = 30 mA [4] Fig 3
Optical Fall Time (80 % - 20 %)	t_f		11		ns	I_{FAVG} = 30 mA [4] Fig 3

SPECIFICATIONS

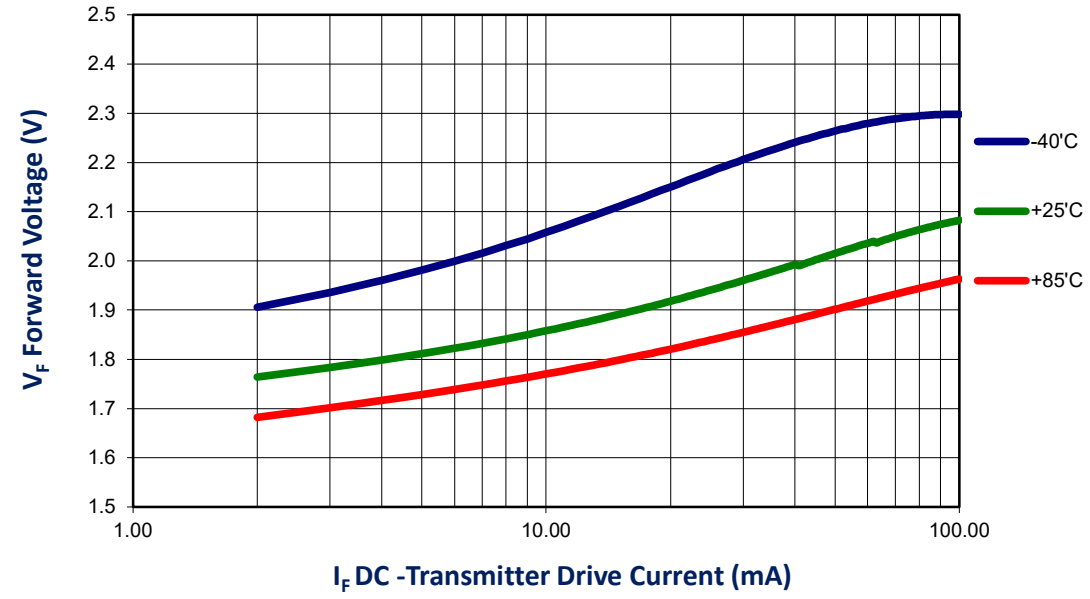


FIGURE 3
Typical forward voltage (V_F) vs. drive current ($I_{F,DC}$)

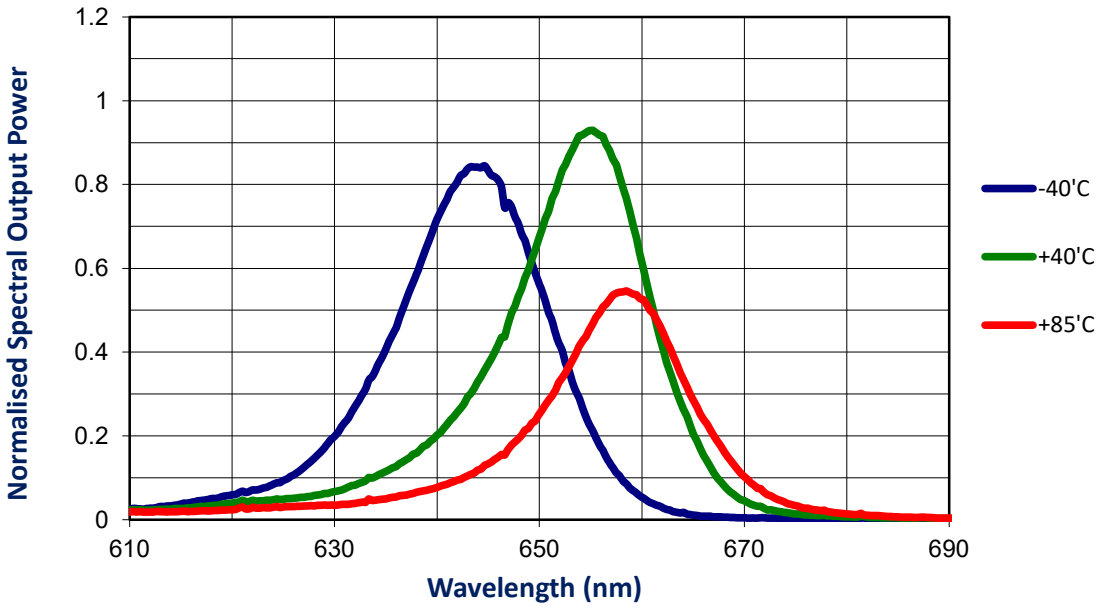


FIGURE 4
Typical normalized optical spectra

SPECIFICATIONS

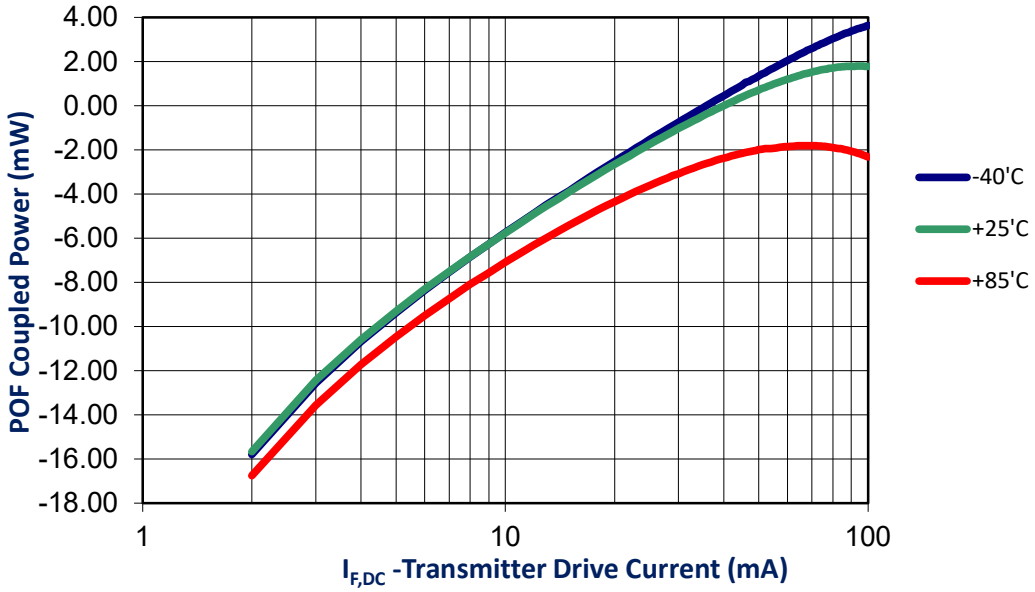


FIGURE 5
Typical POF coupled optical power vs. drive current

MECHANICAL DATA, HORIZONTAL

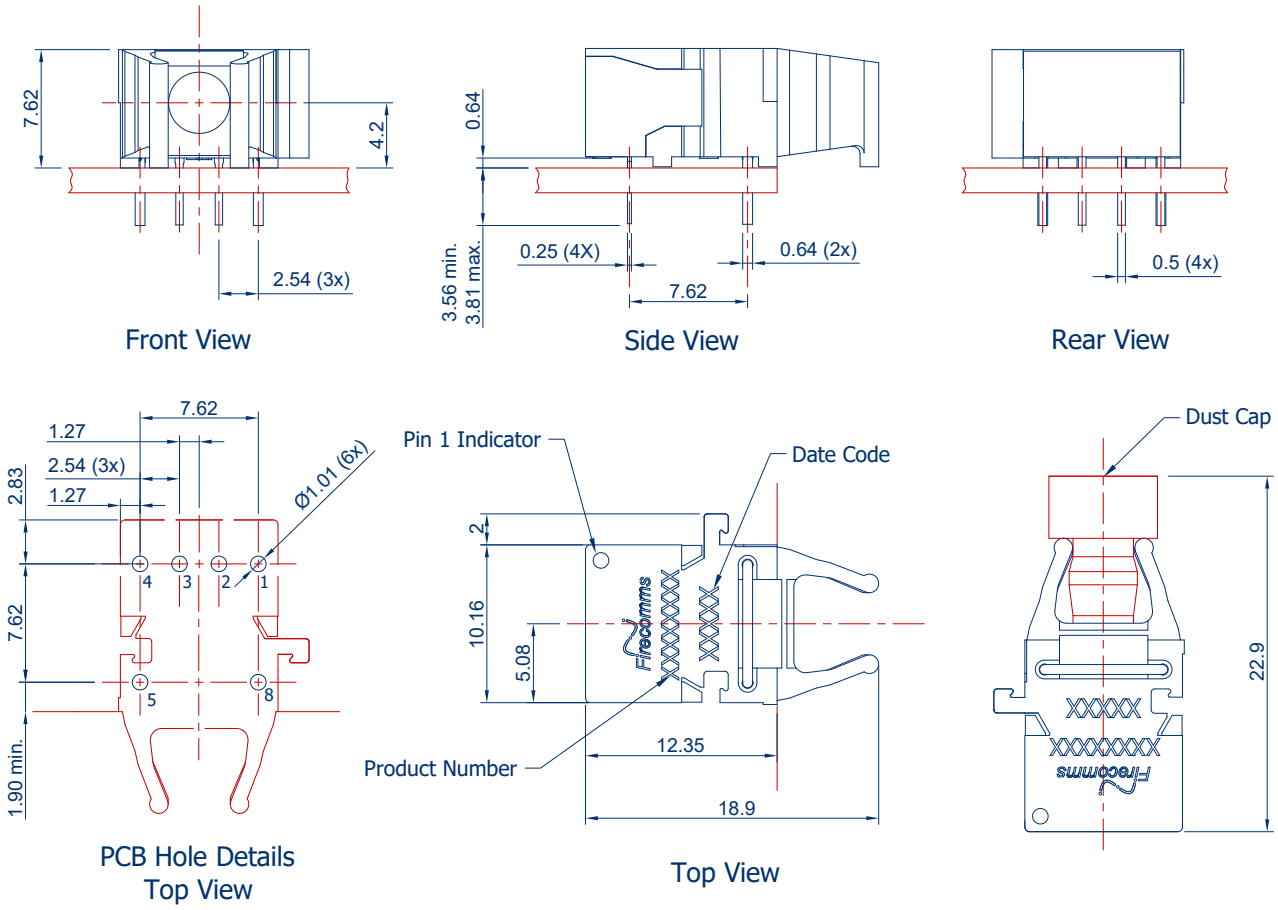


FIGURE 6
Mechanical dimensions of RedLink® horizontal connectors and PCB footprint, which is a top view
General dimensional tolerance is ± 0.2 mm

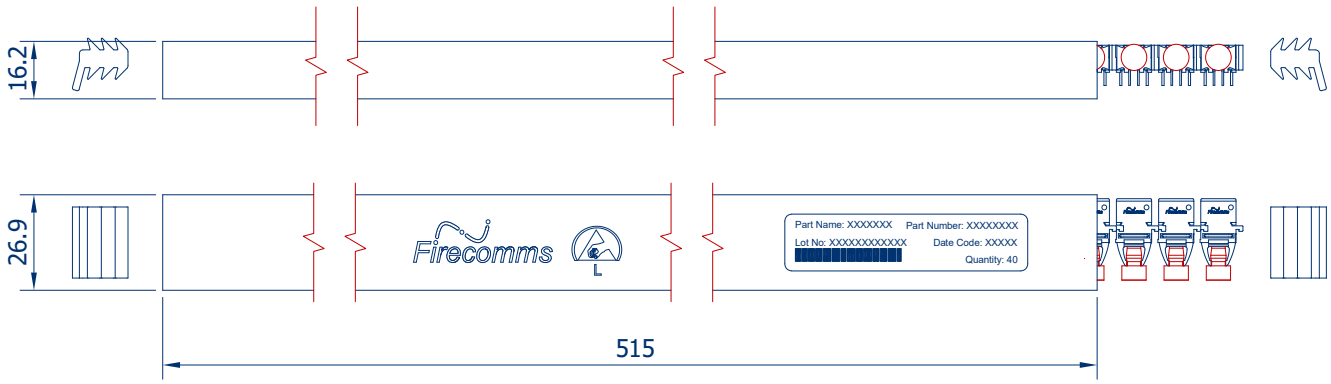


FIGURE 7
Packing tube for Firecomms RedLink® horizontal connectors

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 3 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 168 hours (1 Week) 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.

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

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