STRATOS
optical technologies

MIL-SxK-ST31M

Military SFF Optical Transceiver

Gigabit Ethernet / 1x Fibre Channel Applications 3.3 V, 850 nm VCSEL, Multimode, Up to 550 Meters

The MIL-SxK-ST31M multimode optical fiber transceivers provide low profile, cost effective solutions for Gigabit Ethernet and 1x Fibre channel multimode optical fiber data links with a duplex LC connector interface. These transceivers are fully compliant with the IEEE Gigabit Ethernet and 1x Fibre channel standards but can be used for any other data communications purpose within their operating parameters.

The transceiver consists of transmitter and receiver functions combined in a Small Form Factor (SFF) module. The optical transmitter is a high output 850nm VCSEL. The transmitter input lines are driven with differential LVPECL signals applied to the Transmit (TX+ and TX-) pins. These signals are internally converted to a suitable modulation current by a CMOS integrated circuit. A Transmit Disable (TDIS) function is provided to enable control of the VCSEL optical output. The optical receivers consist of PIN and Preamplifier assemblies and CMOS limiting post-amplifier integrated circuits. Outputs from the receivers consist of differential CML data signals on the Receive (RX+ and RX-) pins and a single ended LVTTL.

Features & Benefits

- Industry standard MSA 2x5 footprint
- IPC Class III assembly and construction
- Industrial Temp range -40°C to +85°C operational
- All metal construction for rugged environments
- Optional Parylene C conformal coating
- Optional AC coupled I/O for TD and RD signals
- TX Disable and RX Signal Detect pins
- Optional RX data squelch on Signal Detect deassert
- Separate +3.3 V power pins per TX/RX port
- Industry standard duplex multimode LC receptacle
- Full compliance to IEEE and ANSI requirements
- EN-60825/ IEC-825 / CDRH Class 1 Compliant

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Please read our datasheet & drawing disclaimer here.

Ordering Information

Part Number				
MIL-SNK-ST31M	1.25 Gbps 850 nm MM	Conformal Coat	I-Temp	Flat Shell
MIL-STK-ST31M	1.25 Gbps 850 nm MM	Conformal Coat	I-Temp	EMI Clip Shell

Absolute Maximum Ratings

Absolute maximum limits mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided each limiting parameter is in isolation and all other parameters have values within the performance specification. It should not be assumed that limiting values of more than one parameter can be applied to the product at the same time.

Parameter	Symbol	Min	Typical	Max	Unit
Storage Temperature	T_S	-55		+100	°C
Lead Soldering Temperature[1]	T_{SOLD}			+260	°C
Lead Soldering Time[1]	t_{SOLD}			10	Seconds
Supply Voltage	V_{CC}	-0.5		+4.5	V
Data Input Voltage	V_I	-0.5		V_{CC}	V
Differential Input Voltage (p-p)	V_D			2.0	V
Output Current	I_O			50	mA

[1] Recommended for hand solder or hot bar soldering only. Convection or IR reflow oven profiles may damage internal solder joints. Reference Low Rider Soldering Application Note.

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Temperature Limit	T_A	-40		+85	°C
Supply Voltage	V_{CC}	+3.135		+3.465	V
TX Common Mode Voltage	V_{CM}		2.0		V
TX Differential Input Voltage (p-p)	V_D	0.20		2.20	V
Transmit Disable Voltage	V_{TD}	2.0		V_{CC}	V
Transmit Enable Voltage	V_{TEN}	V_{EE}		0.8	V
RX Data Output Load	R_L		50		Ω

Transmitter[2]

Parameter[2]	Symbol	Min	Typical	Max	Unit
Optical Output Power[1]	P_O	-9.5		-4	dBm
Optical Output Wavelength	λ_{OUT}	830	850	860	nm
Spectral Width	$\Delta\lambda_{RMS}$			0.85	nm
Extinction Ratio	ER		10		dB
Supply Current	I_{CC}		55	75	mA
Optical Rise/Fall Time (20% - 80%)	$T_{R,F}$			0.26	nS
Relative Intensity Noise	RIN			-117	dB/Hz
Coupled Power Ratio	CPR	9			dB
Total Jitter	T_J		80	V_{CC}	pS

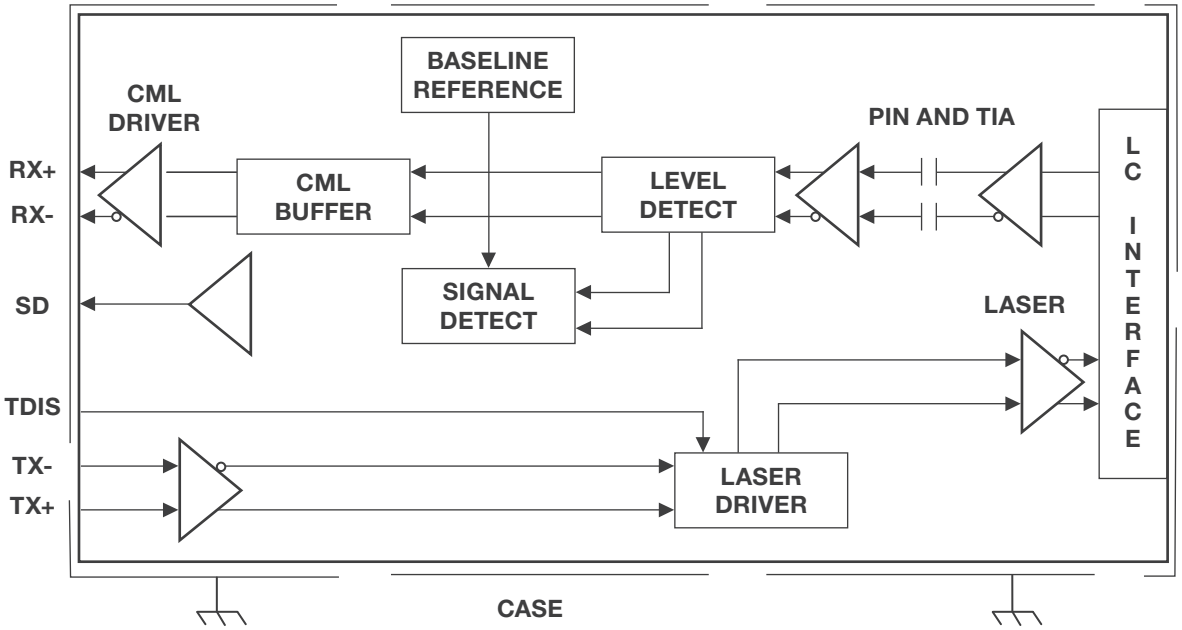
[1] V_{CC}TX = 3.135 V to 3.465 V, T_A = Operating Temperature Range
[2] BER = 10^{-10} @ 1.25 Gbps, PRBS 2^7-1, NRZ

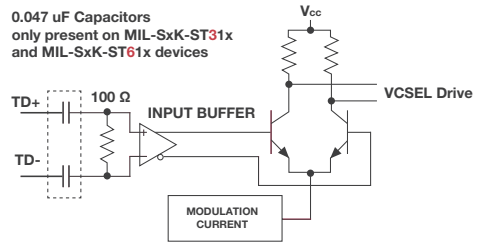
Receiver[2]

Parameter	Symbol	Min	Typical	Max	Unit
Optical Sensitivity, FC (1.0625 Gbps)[1] **Optical Sensitivity, GE (1.25 Gbps)[1]**	P_I	-22 -21	-23 -22	0 0	dBm
Optical Input Wavelength	λ_{IN}	770		860	nm
Optical Return Loss	ORL	12			dB
Supply Current	I_{CC}			120	mA
Signal Detect Assert Time	t_{SDAS}		70	100	μS
Signal Detect Deassert Time	t_{SDDA}		<10	350	μS
Signal Detect Deassert Level	SD_{OFF}		<10		dBm
Signal Detect Assert Level	SD_{ON}			-21	dBm
Signal Detect Hysteresis	HYS	1.5	2.25	3.5	dB
RX Data Output – Low	V_{OL}-V_{CC}	-1.810		-1.475	V
RX Data Output – High	V_{OL}+V_{CC}	-1.165		-0.880	V

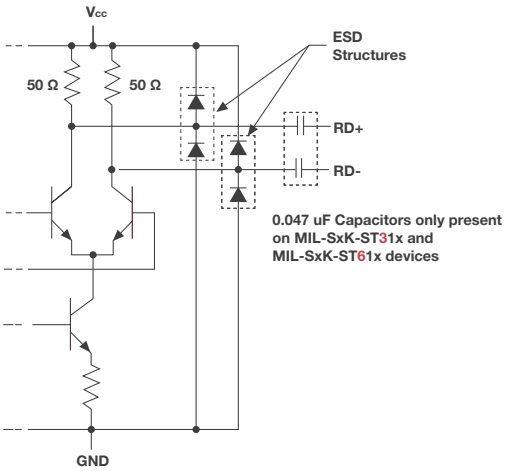
[1] BER=10^{-10} @ 1.25 Gbps, PRBS 2^7-1, NRZ, Compliant with ANSI X3.297 / FC-PH-2
[2] V_{CC}TX = 3.135 V to 3.465 V, TA = Operating Temperature Range

Block Diagram
Detail of Data I/O Stages





TD+/- LVPECL Input Stage



RD+/- CML Output Stage

Conformal Coating Option

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Parameter	Value
Specification	MIL-I-46058C, Type XY
Coating	Parylene type C
Deposition	Vacuum deposited
Film Thickness	1 MIL +/- 0.0002

Link Distance

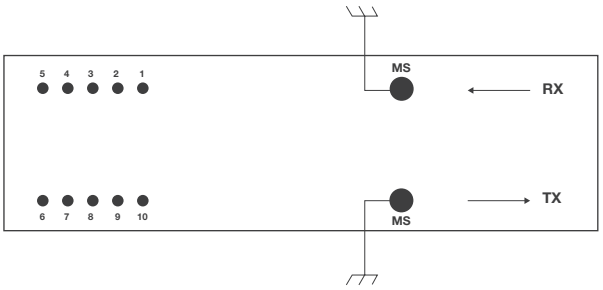
Application	Fibre Specification	Distance
Gigabit Ethernet – IEEE 802.3z	62.5/125 – 160 MHz*Km	150 M
	62.5/125 – 200 MHz*Km	150 M
	50/125 – 400 MHz*Km	150 M
	50/125 – 500 MHz*Km	300 M
Fibre Channel – ANSI X3.297	62.5/125 – 160 MHz*Km	300 M
	50/125 – 500 MHz*Km	500 M

Regulatory Compliance

Requirement	Feature	Condition	Notes
MIL-STD-883-3015.7	ESD	Class II	2200V
IEC-801-2	ESD	Human Body Model	25KV
IEC-801-3	EMI	Immunity	10V/M
FCC	EMI	Class B	>20dB
EN 55022 (CISPR 22A)	EMI	Class B	10V/M

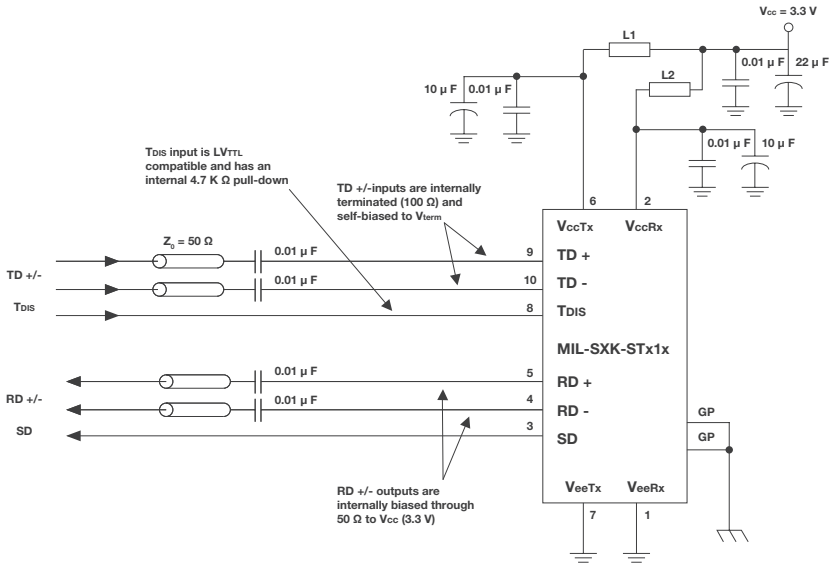
Pin Functions

Top View Shown



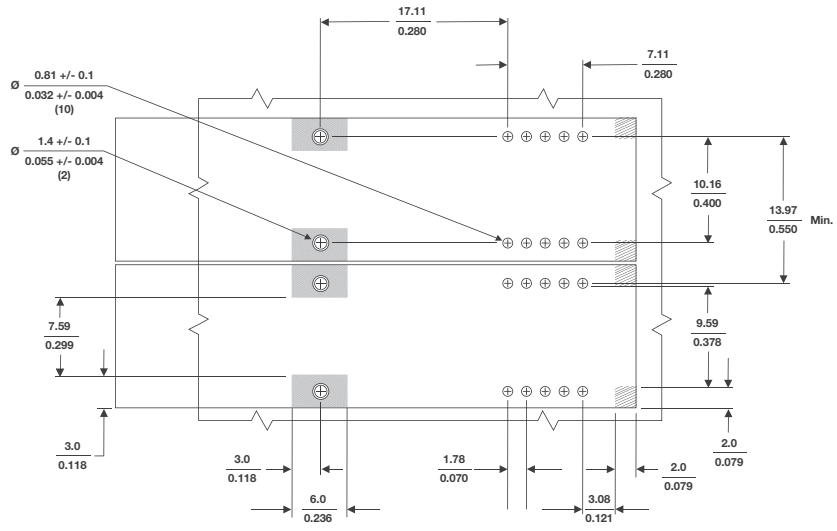
Pin #	Symbol	Description	Logic Family
MS	MS	Mounting Studs Connect to chassis ground	N/A
1	V_{EE}RX	Receiver Signal Ground	N/A
2	V_{CC}RX	Receiver Power Supply	N/A
3	SD	Signal Detect (1=detect, 0=no signal)	LVTTL
4	RD-	Receive Data Out -	CML
5	RD+	Receive Data Out +	CML
6	V_{CC}TX	Transmit Power Supply	N/A
7	V_{EE}TX	Transmit signal Ground	N/A
8	T_{DIS}	Transmit Disbale (1 = disable, 0 = enable) Internal 20KΩ pull-down (enable)	LVTTL
9	TD+	Transmit Data In +	CML
10	TD-	Transmit Data In -	CML

Application Schematic

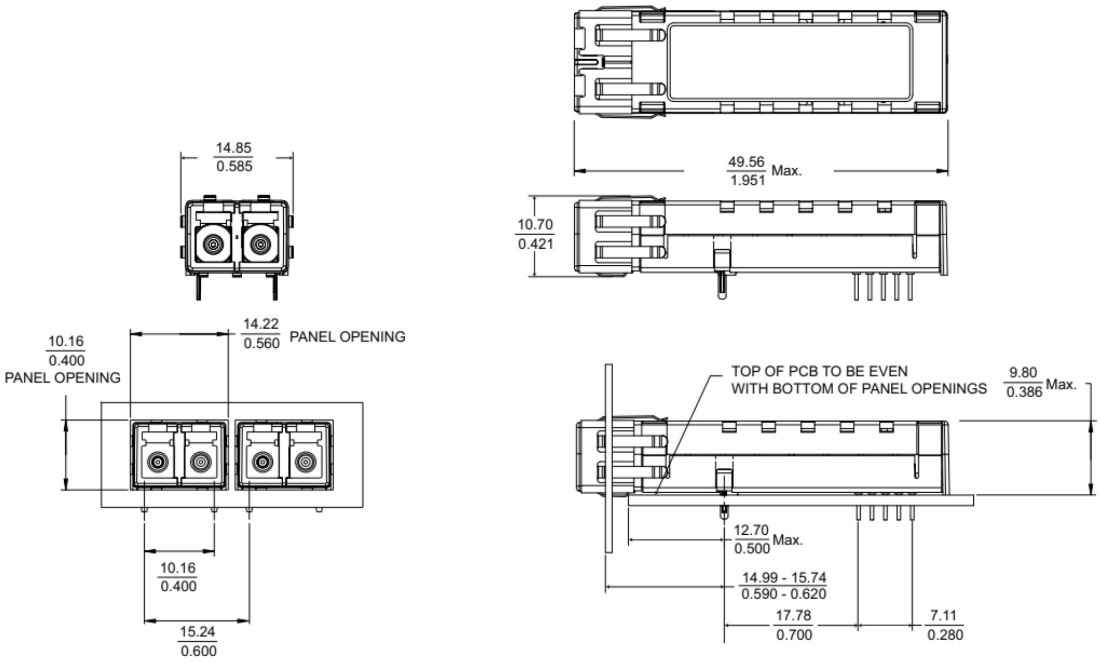


PCB Footprint

Top View Shown
Dimensions are shown as mm
(inches)



Mechanical Detail, EMI Clip option
PN MIL-STK-ST31M



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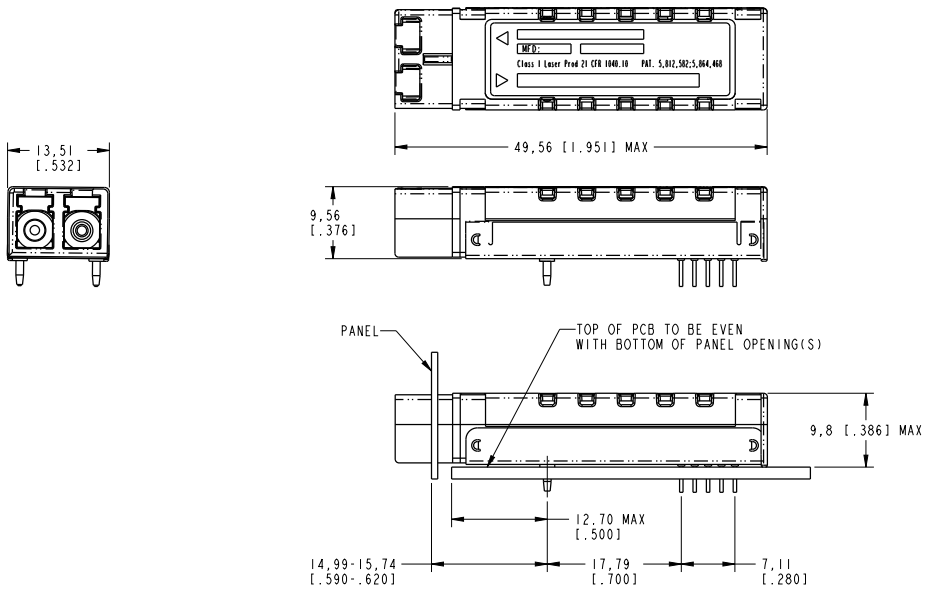

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