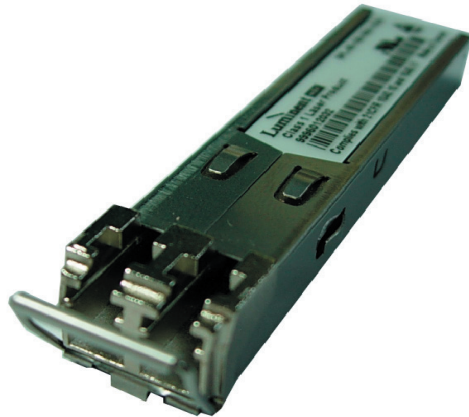


SP-MR-SR1-TDB-TS



Features

- Single 3.3 V supply
- 10 dB minimum link budget
- 2 km reach
- Industrial temperature available
- 1310nm FP laser
- Fibre Channel 100-SM-LC-L compliant
- Fibre Channel 200-SM-LC-L compliant
- Gigabit Ethernet 802.3ah 1000BASE-LX10 compliant
- SFP MSA SFF-8074i compliant
- GR 253/STM G.957 compliant
- Digital Diagnostic SFF-8472 Rev.9.3 compliant
- Telcordia GR-468 compliant
- Color coded bail latch tube : Grey
- RoHS compliant

General Operating

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V_{CC}	3.135	3.3	3.465	V
Total Current	I_{CC}	-	-	300	mA
Power Supply Noise Rejection ^a		100	-	-	mVp-p
Operating Temperature	T_{op}	-40	-	85	°C
Storage Temperature	T_{stg}	-40	-	85	°C
Data Rate	DR	100	-	2700	Mbps

a) 20Hz to 155MHz

Transmitter Specifications, Optical

Parameter	Symbol	Min	Typical	Max	Unit
Optical power	P_{op}	-10	-6	-3	dBm
Average Launch power of off Tx	P_{off}	-	-	-45	dBm
Extinction Ratio	ER	9	-	-	dB
Eye Mask		IEEE 802.3ah, SONET/SDH compliant			
Optical Jitter generation	J_{gen}	-	-	0.007	UI
Optical Rise time ^b	t_r	-	-	160	ps
Optical Fall time ^b	t_f	-	-	160	ps
Mean Wavelength	λ	1266	1310	1360	nm
Spectral width (RMS)	$\Delta\lambda$	-	-	4	nm
Relative Intensity Noise	RIN	-	-	-120	dB/Hz
Reflectance Tolerance ^c	rp	-24	-	-	dB

b) 20%-80% values

c) 1 dB degradation of receiver sensitivity

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Transmitter Specifications , Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Input Differential Impedence	R_{in}	80	100	120	Ω
PECL Single Ended data input swing	$V_{in, p-p}$	250	-	1200	mV
TxFault_Fault	V_{fault}	2	-	V_{cc}	V
TxFault_Normal	V_{normal}	V_{ee}	-	$V_{ee} + 0.5$	V
TxDisable_Disable	V_d	2	-	V_{cc}	V
TxDisable_Enable	V_{en}	V_{ee}	-	$V_{ee} + 0.8$	V

Receiver Specifications, Optical

Parameter	Symbol	Min	Typical	Max	Unit
Receiver Power Low ^d	$R_{sens, low}$	-	-22	-20	dBm
Receiver Power High ^d	$R_{sens, high}$	-3	-	-	dBm
Damage Threshold for Receiver	$P_{in, damage}$	4	-	-	dBm
Wavelength ^e	λ	1260	1310	1360	nm
Maximum Reflectance of Receiver	RX_r	-	-	-27	dB
LOS Assert	-	-30	-	-	dBm
LOS De-assert	-	-	-	-20	dBm
LOS hysteresis	-	0.5	-	-	dB

d) at 10^{-10} BER, PRBS 2²³-1 for SONET, 10^{-12} BER, PRBS 2⁷-1 for Gigabit ethernet

e) Operational over 1200-1625 nm range

Electrical Output

Parameter	Symbol	Min	Typical	Max	Unit
PECL Single ended data output swing	$V_{out, p-p}$	185	-	800	mV
Data output rise time	t_r	-	-	175	ps
Data output fall time	t_f	-	-	175	ps

Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate time	t_{on}	-	-	5	ms
Tx Disable assert time	t_{off}	-	-	10	μs
Time to initialize, including reset of Tx fault	t_{init}	-	-	300	ms
Tx fault Assert time	t_{fault}	-	-	100	μs
Tx Disable to reset	t_{reset}	10	-	-	μs
LOS Assert time	t_{loss_on}	-	-	100	μs
LOS De-assert time	t_{loss_off}	-	-	100	μs
Serial ID Clock Rate	f_{serial_clock}	-	-	100	KHz
RX_LOS Voltage (high)	Rx_LOS_H	2	-	-	V
RX_LOS Voltage (low)	Rx_LOS_L	-	-	0.8	V
LOS output voltage-Fault	V_{LOS_fault}	2	-	V_{cc}	V
LOS output voltage-Normal	V_{LOS_normal}	V_{ee}	-	$V_{ee} + 0.5$	V
MOD_DEF (0:2)-High	V_h	2	-	V_{cc}	V
MOD_DEF (0:2)-Low	V_l	V_{ee}	-	$V_{ee} + 0.5$	V

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Diagnostics

Parameter	Range	Accuracy	Unit	Calibration	Formula
Temperature	-40 to 85	±3	°C	Internal	$T_c(C) = T_{ad}(16 \text{ bit signed twos complement})/256$
Voltage	0 to Vcc	0.1	V	External	$V(\text{Volts}) = V_{slope} * V_{ad} (16 \text{ bit unsigned integer}) + V_{offset}$
Bias Current	0 to 120	5	mA	External	$I(\text{mA}) = I_{slope} * I_{ad}(16 \text{ bit unsigned integer}) + I_{offset}$
Tx Power	-10 to -3	±3dB	dBm	External	$Tx_PWR(\mu W) = Tx_PWR_{slope} * Tx_PWR_{ad}(16 \text{ bit unsigned integer}) + Tx_PWR_{offset}$
Rx Power	-20 to -3	±3dB	dBm	External	$Rx_PWR(\mu W) = A0 + A1 * x + A2 * x^2 + A3 * x^3 + A4 * x^4$

EEPROM Serial ID

Name of Field	Discription of Field	Address	Hex	ASCII
Vendor Name	SFPVendor name (ASCII)	20	4C	L
		21	55	U
		22	4D	M
		23	49	I
		24	4E	N
		25	45	E
		26	4E	N
		27	54	T
		28	4F	O
		29	49	I
		30	43	C
Vendor OUI	IEEE vendor OUI code for LuminentOIC Inc.	37	00	
		38	06	
		39	B5	
Vendor PN	Part number in ASCII, e.g. SP-MR-SR1-TDB-TS	40	53	S
		41	50	P
		42	4D	M
		43	52	R
		44	53	S
		45	52	R
		46	31	1
		47	54	T
		48	44	D
		49	42	B
		50	54	T
		51	53	S

SP-MR-SR1-TDB-TS

EEPROM Serial ID

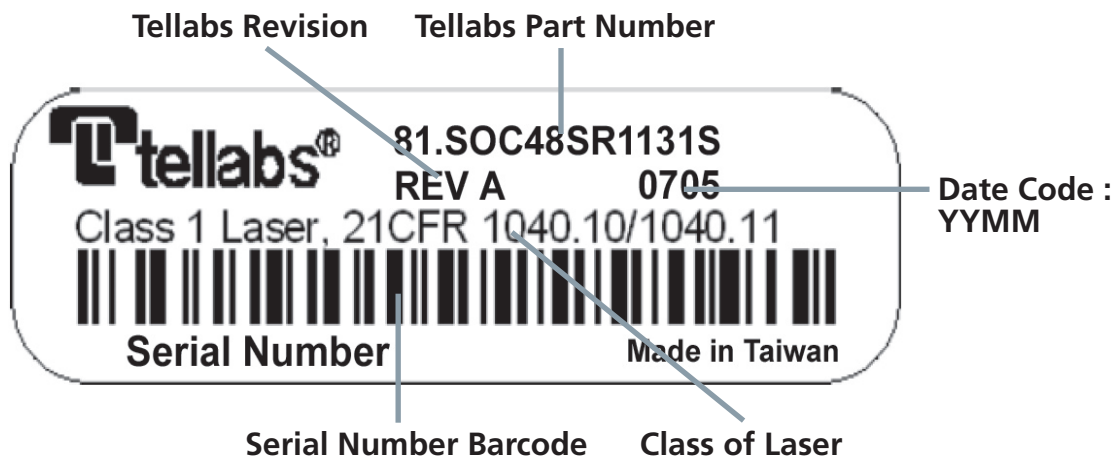
Name of Field	Discription of Field	Address	Hex	ASCII
Custom EEPROM Programming	Customization data	96	38	8
		97	31	1
		98	2E	.
		99	53	S
		100	4F	O
		101	43	C
		102	34	4
		103	38	8
		104	53	S
		105	52	R
		106	31	1
		107	31	1
		108	33	3
		109	31	1
		110	53	S
		111	20	
		112	20	
		113	20	
		114	41	A
		115	20	
		116	57	W
		117	4D	M
		118	4F	O
		119	54	T
		120	42	B
		121	32	2
		122	54	T
		123	43	C
		124	41	A
		125	41	A
		126	0A	
		127	45	

SP-MR-SR1-TDB-TS

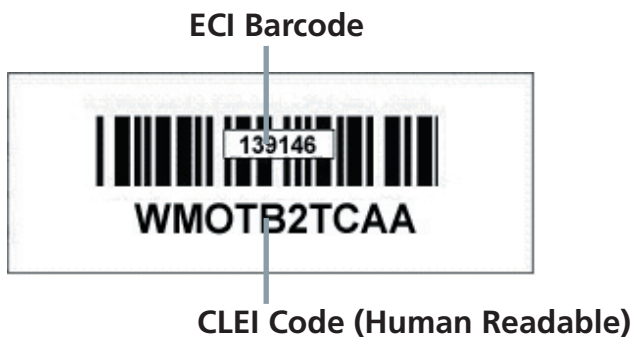
Pinout Definitions

Pin	Function	Notes
1	V _{ee} T	TX GND
2	TX_FAULT	Open Collector
3	TX_DISABLE	Internally Pulled High
4	MOD_DEF2	Serial Data Input
5	MOD_DEF1	Serial Clock Input
6	MOD_DEF0	Internally Grounded
7	NC	Not Connected
8	LOS	Open Collector
9	V _{ee} R	RX Ground
10	V _{ee} R	RX Ground
11	V _{ee} R	RX Ground
12	RXD-	RX Data Negative
13	RXD+	RX Data Positive
14	V _{ee} R	RX GND
15	V _{CC} R	RX Power
16	V _{CC} T	TX Power
17	V _{ee} T	TX GND
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	V _{ee} T	TX GND

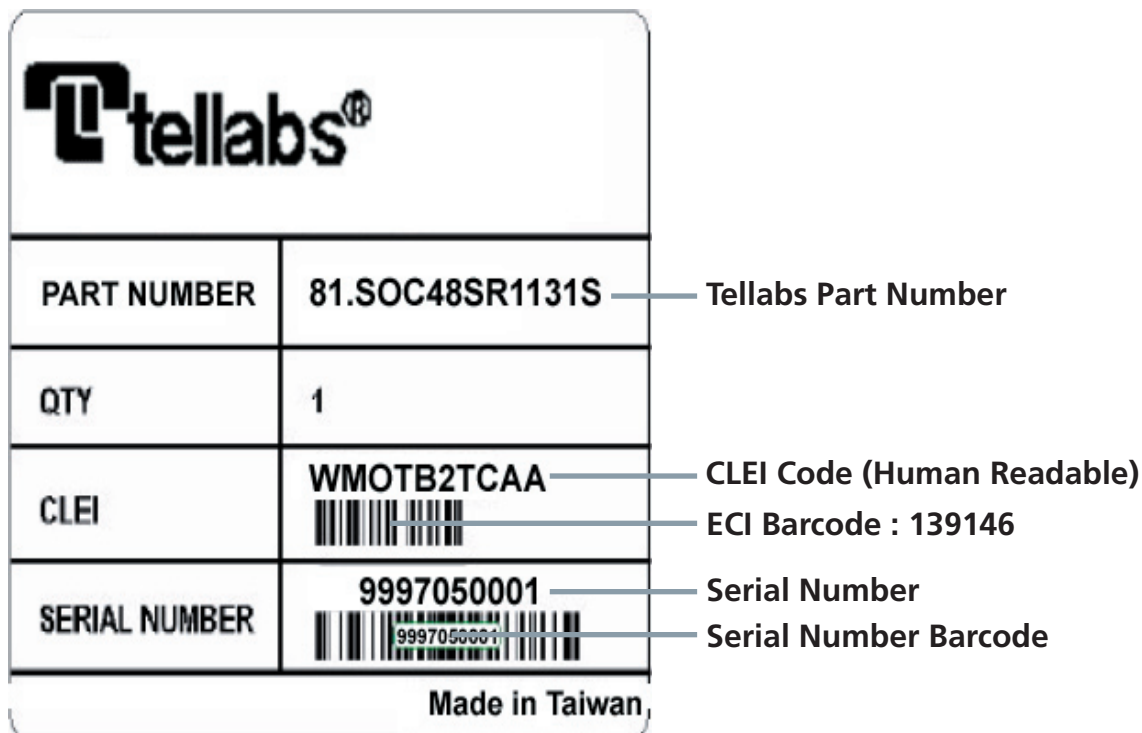
Device Label (Top Label)



CLEI code Label (Side Label)

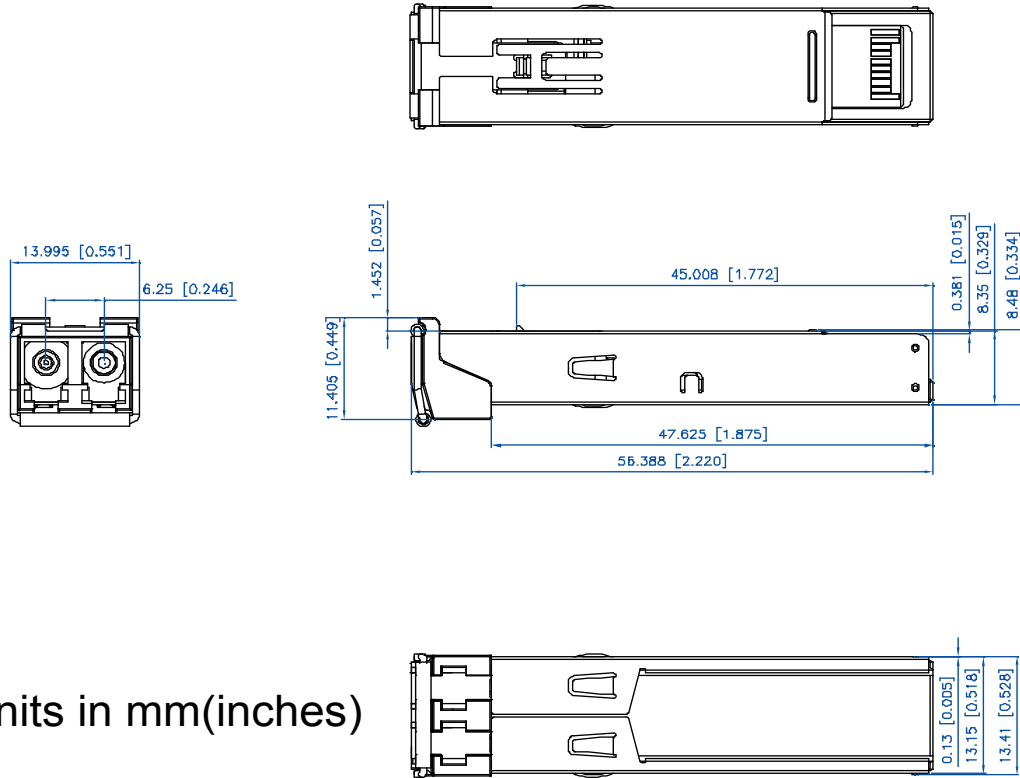


Box Label



SP-MR-SR1-TDB-TS

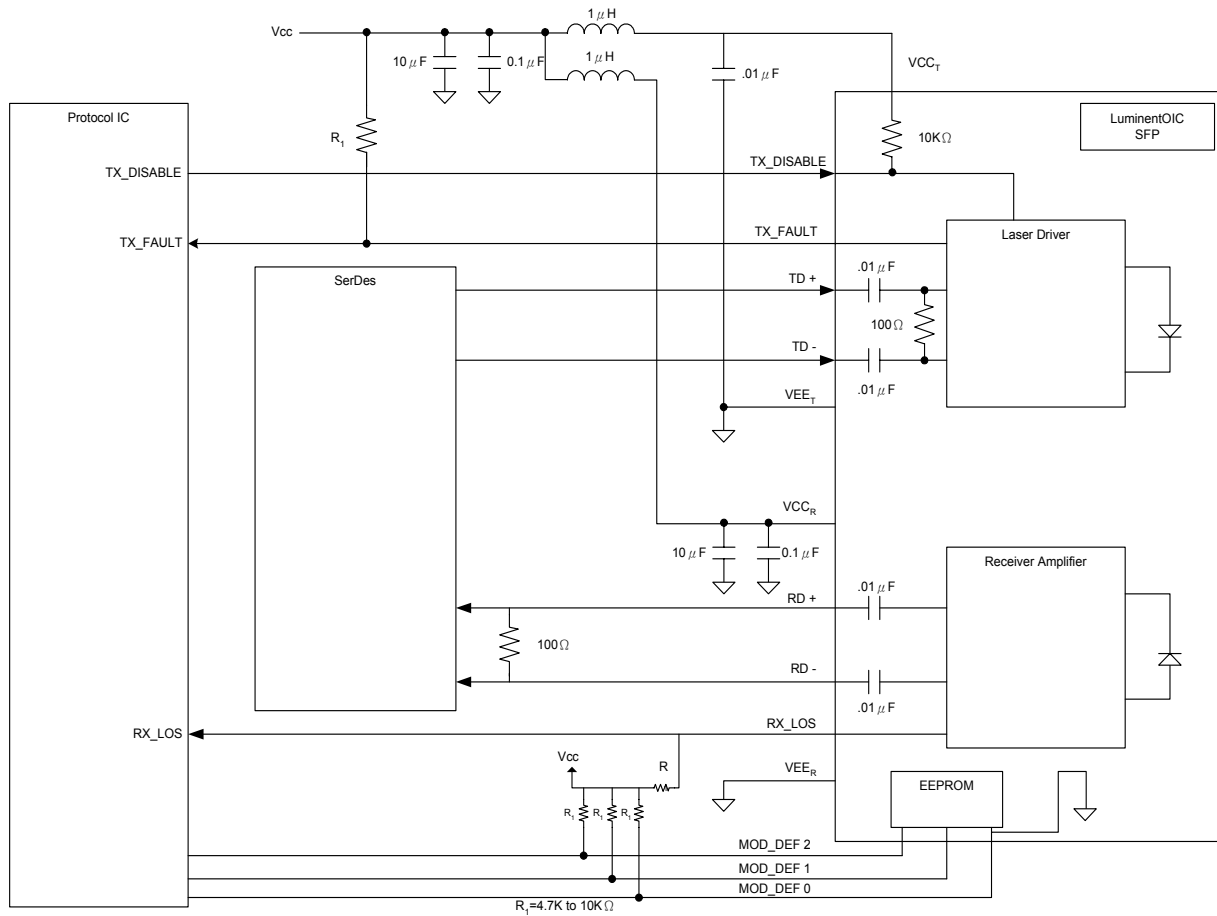
Outline Drawing



Units in mm(inches)

SP-MR-SR1-TDB-TS

Suggested Transceiver Interface

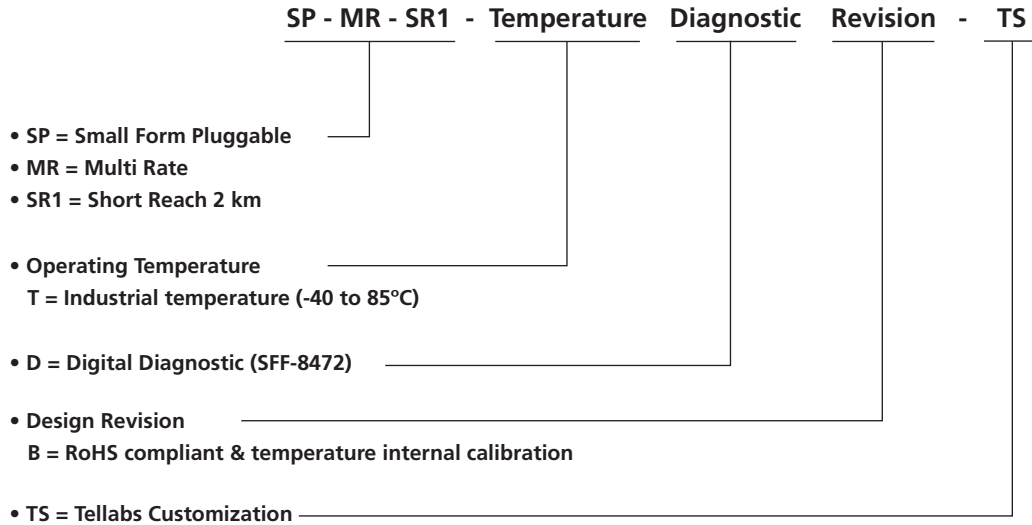


SP-MR-SR1-TDB-TS

Ordering Information

Available Options: SP-MR-SR1-TDB-TS

Part numbering Definition:



Warnings:

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Legal Notes:

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