


25GE/eCPRI SFP28 CSR

GSS-MPO250-CSRTA

Features

- ✓ Hot-pluggable SFP28 form factor transceiver module
- ✓ Data rate up to 24.33Gbps or 25.78125Gbps
- ✓ Compliant with SFP28 MSA, CPRI/eCPRI and IEEE 802.3by 25GBASE-SR
- ✓ 850nm VCSEL laser and PIN photo-detector
- ✓ Internal CDR on both transmitter and receiver channels
- ✓ Reach up to 200m/300m over OM3/OM4 MMF with FEC
- ✓ Duplex LC receptacles
- ✓ Power consumption < 1W
- ✓ Digital diagnostics functions available via the I²C interface
- ✓ Industrial operating case temperature range: -40°C to +85°C
- ✓ Single 3.3V power supply
- ✓ RoHS-6 compliant (lead free) 



Applications

- ✓ 5G Fronthaul eCPRI/CPRI
- ✓ 25GBASE-SR Ethernet

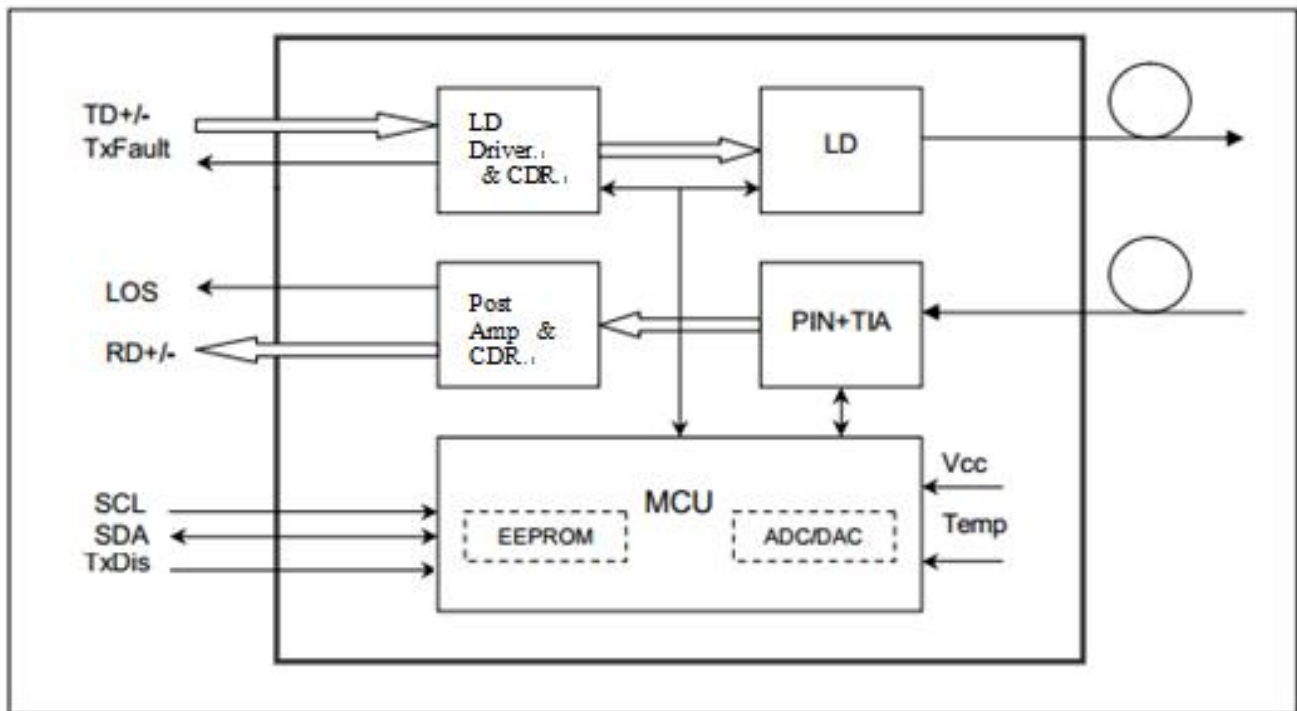
Description

GIGALIGHT's 25GE/eCPRI SFP28 CSR is a pluggable transceiver module designed for 25G Ethernet and eCPRI/CPRI links reach up to 200m/300m over OM3/OM4 MMF with FEC, operating at 24.33Gbps or 25.78125Gbps and using a nominal wavelength of 850nm. The electrical interface uses a 20-contact edge type connector. The optical interface uses duplex LC receptacles. This module incorporates GIGALIGHT's proven circuit and VCSEL technology to provide reliable long life, high performance, and consistent service.

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Block Diagram



Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V _{CC}	0	3.6	V
Storage Temperature	T _s	-40	+85	°C
Operating Humidity	-	5	85	%

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Recommended Operating Conditions

Table 2 - Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	T_c	-40		85	°C
Power Supply Voltage	V_{cc}	3.13	3.3	3.47	V
Power Supply Current	I_{cc}			300	mA
Fiber Length on 50/125 μ m high-bandwidth (OM3) MMF with FEC				200	m
Fiber Length on 50/125 μ m high-bandwidth (OM4) MMF with FEC				300	m

Optical and Electrical Characteristics

Table 3 - Optical and Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Data Rate	BR		24.33	25.78125	Gbps	
Center Wavelength	λ_c	840	850	860	nm	
Spectral Width (-20dB)	σ			0.6	nm	
Average Output Power	P_{avg}	-8.4		3.4	dBm	
Optical Power OMA	P_{OMA}	-6.4		3	dBm	



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Extinction Ratio		ER	2			dB	
Differential Data Input Swing		$V_{IN,PP}$	40		1000	mV	
Input Differential Impedance		Z_{IN}	90	100	110	Ω	
TX Disable	Disable		2.0		V_{CC}	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		V_{CC}	V	
	Normal		0		0.8	V	
Receiver							
Data Rate	BR		24.33	25.78125		Gbps	
Center Wavelength	λ_c	840	850	860		nm	
Receiver Sensitivity (OMA)	P_{sens}	-	-	-10		dBm	1
Stressed Sensitivity (OMA)		-	-	-5.2		dBm	
Receiver Power (OMA)				3		dBm	
LOS De-Assert	LOS_D			-13		dBm	
LOS Assert	LOS_A	-30				dBm	
LOS Hysteresis		0.5				dB	
Differential Data Output Swing	$V_{out,PP}$	300			850	mV	
LOS	High	2.0			V_{CC}	V	

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	Low			0.8	V	
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Notes:

1. Receive Sensitivity measured with a PRBS31 pattern @25.78125Gb/s, BER 1E-5;

Timing and Electrical

Table 4 - Timing and Electrical

Parameter	Symbol	Min.	Max.	Unit	Conditions
Tx_Disable assert time	t_off		100	μs	Rising edge of Tx_Disable to fall of output signal below 10% of nominal
Tx_Disable negate time	t_on		2	ms	Falling edge of Tx_Disable to rise of output signal above 90% of nominal. This only applies in normal operation, not during start up or fault recovery.
Time to initialize 2-wire interface	t_2w_start_up		300	ms	From power on or hot plug after the supply meeting Table 8.
Time to initialize	t_start_up		300	ms	From power supplies meeting Table 8 or hot plug or Tx disable negated during power up, or Tx_Fault recovery, until non-cooled power level I part (or non-cooled power level II part already enabled at power level II for Tx_Fault recovery) is fully operational.
Time to initialize cooled module and time to power up a cooled module to Power Level II	t_start_up_cooled		90	s	From power supplies meeting Table 8 or hot plug, or Tx disable negated during power up or Tx_Fault recovery, until cooled power level I part (or cooled power level II part during fault recovery) is fully operational. Also, from stop bit low-to-high SDA transition enabling Power Level II until cooled module is fully operational
Time to Power Up to Level II	t_power_level2		300	ms	From stop bit low-to-high SDA transition enabling power level II until non-cooled module is fully operational
Time to Power Down from Level II	t_power_down		300	ms	From stop bit low-to-high SDA transition disabling power level II until module is within power level I requirements
Tx_Fault assert	Tx_Fault_on		1	ms	From occurrence of fault to assertion of Tx_Fault
Tx_Fault assert for cooled module	Tx_Fault_on_cooled		50	ms	From occurrence of fault to assertion of Tx_Fault
Tx_Fault Reset	t_reset	10		μs	Time Tx_Disable must be held high to reset Tx_Fault
RS0, RS1 rate select timing for FC	t_RS0_FC, t_RS1_FC		500	μs	From assertion till stable output
RS0, RS1 rate select timing non FC	t_RS0, t_RS1		24	ms	From assertion till stable output
Rx_LOS assert delay	t_los_on		100	μs	From occurrence of loss of signal to assertion of Rx_LOS
Rx_LOS negate delay	t_los_off		100	μs	From occurrence of presence of signal to negation of Rx_LOS

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Diagnostics

Table 5 – Diagnostics Specification

Parameter	Range	Unit	Accuracy	Calibration
Temperature	-40 to +85	°C	±3°C	Internal / External
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	0 to 20	mA	±10%	Internal / External
TX Power	-8 to 3	dBm	±3dB	Internal / External
RX Power	-14 to 0	dBm	±3dB	Internal / External

Digital Diagnostic Memory Map

PIN	Logic	Symbol	Name / Description	Notes
1		VeeT	Module Transmitter Ground	1
2	LVTTTL-O	TX_Fault	Module Transmitter Fault	2
3	LVTTTL-I	TX_Dis	Transmitter Disable; Turns off transmitter laser output	
4	LVTTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
5	LVTTTL-I	SCL	2-Wire Serial Interface Clock	2
6		MOD_ABS	Module Definition, Grounded in the module	
7	LVTTTL-I	RS0	Receiver Rate Select	
8	LVTTTL-O	RX_LOS	Receiver Loss of Signal Indication Active LOW	
9	LVTTTL-I	RS1	Transmitter Rate Select (not used)	



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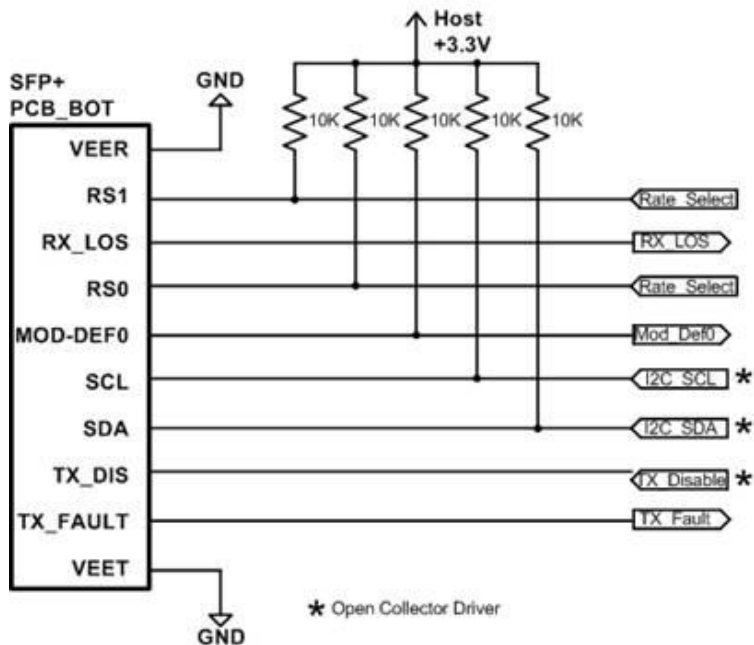
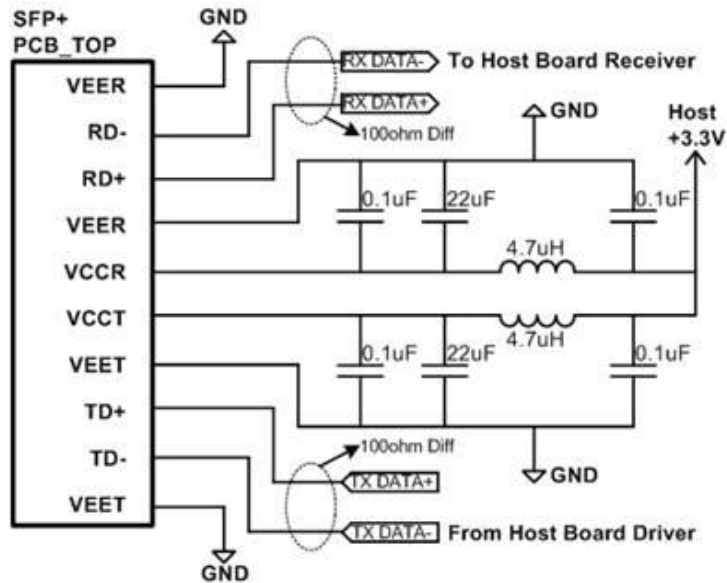
10		VeeR	Module Receiver Ground	1
11		VeeR	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Data Output	
14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3 V Supply	
16		VccT	Module Receiver 3.3 V Supply	
17		VeeT	Module Transmitter Ground	1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeeT	Module Transmitter Ground	1

Notes:

1. Module ground pins GND are isolated from the module case.
2. Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

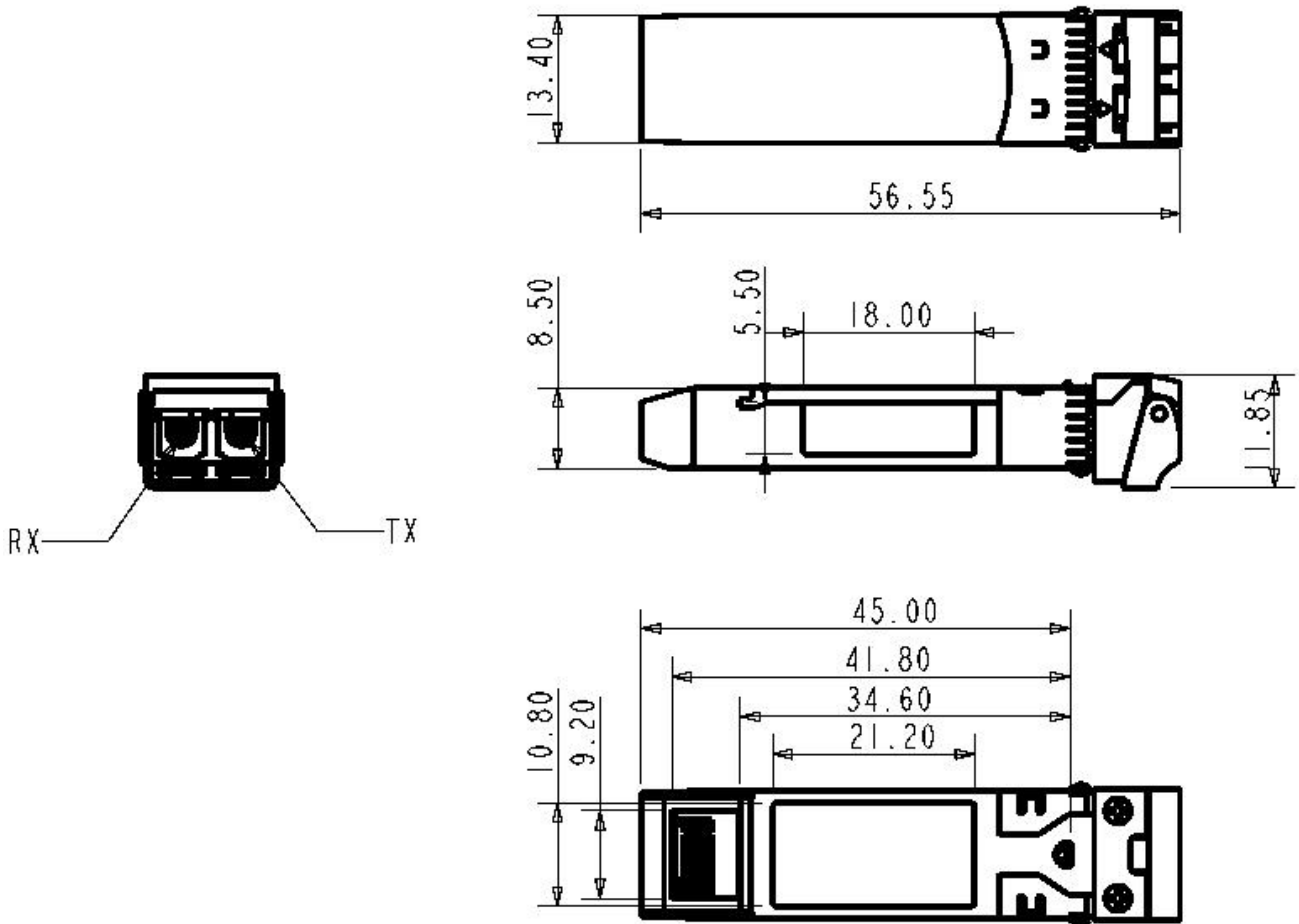
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Recommended Interface Circuit



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Mechanical Dimensions





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Regulatory Compliance

GIGALIGHT's transceivers are Class 1 Laser Products. They are certified per the following standards:

Feature	Agency	Standard
Laser Eye Safety	FDA/CDRH	CDRH 21 CFR 1040 and Laser Notice 50
Laser Eye Safety	TÜV	IEC 60825-1:2014 EN 60825-1:2014 EN 60825-2:2004+A1+A2
Electrical Safety	TÜV	EN 60950-1:2006+A11+A1+A12+A2
Electrical Safety	UL/CSA	UL 60950-1 & CAN/CSA C22.2 No.60950-1 CLASS 3862.07 CLASS 3862.87
EMC	FCC	47 CFR FCC Part 15 Subpart B
EMC	CE-EMC	EN 55032:2015 EN 55024:2010+A1:2015 EN 61000-3-2:2014 EN 61000-3-3:2013

Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

References

1. SFP28 MSA
2. CPRI/eCPRI specifications
3. Directive 2011/65/EU of the European Parliament and of the Council, "on the restriction of the use of certain hazardous substances in electrical and electronic equipment," July 1, 2011.



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⚠ CAUTION:

Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Ordering Information

Part Number	Product Description
GSS-MPO250-CSRTA	25GE/eCPRI SFP28 CSR, 850nm, 300m, MMF, Dual LC, I-Temp

Important Notice

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Revision History

Revision	Date	Description
V0	July-19- 2019	Advance Release.
V1	Oct-23- 2020	Revise the distance spec of OM3 70m to be OM3 200m with FEC