

SFP+, 16Gbps, CDR, MM, 850nm, 100m

Особенности:

- передача данных до 14.025Gb/s
- 850nm VCSEL лазер
- передача на расстояние до 100m на OM3 MMF
- питание 3.3В
- дуплексный LC коннектор, горячее включение
- встроенная dual CDR
- соответствие MSA SFP+ спецификации SFF-8431
- Power Dissipation < 1.0W

Область применения:

- Tri-Rate 4.25/8.5/14.025 Gb/s Fibre Channel

Part No.	Data Rate	Laser	Fiber Type	Distance	Temp.	CDR	DDMI
SFP-16G-CDR-MM-0.1	Up to 14.025Gb/s	850nm VCSEL	OM3	100m	Standard	Yes	Yes

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T _s	-40	+85	°C
Supply Voltage	V _{cc}	-0.5	4.0	V

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T _A	0		70	°C
Power Supply Voltage	V _{cc}	3.15	3.3	3.45	V
Power Supply Current	I _{cc}			300	mA

Performance Specifications - Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
CML Inputs(Differential)	V _{in}	150		1200	mVpp	AC coupled inputs

Input Impedance (Differential)	Zin	90	100	110	ohms	Connected directly to TX pins
Tx_DISABLE Input Voltage – High		2		Vcc	V	
Tx_DISABLE Input Voltage – Low		0		0.8	V	
Receiver						
CML Outputs (Differential)	Vout	300		900	mVpp	AC coupled outputs
Rx_LOS Output Voltage – High		2		Vcc_Host	V	
Rx_LOS Output Voltage – Low		0		0.8	V	

Optical and Electrical Characteristics

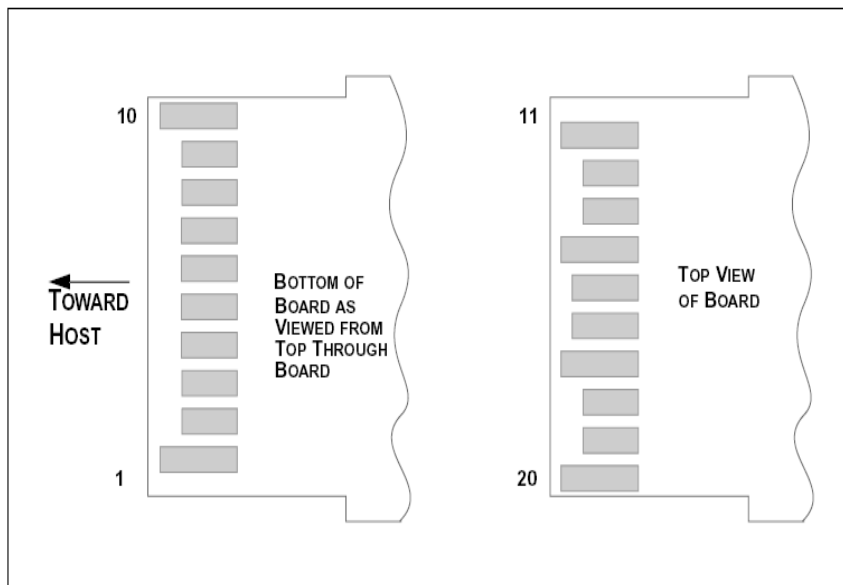
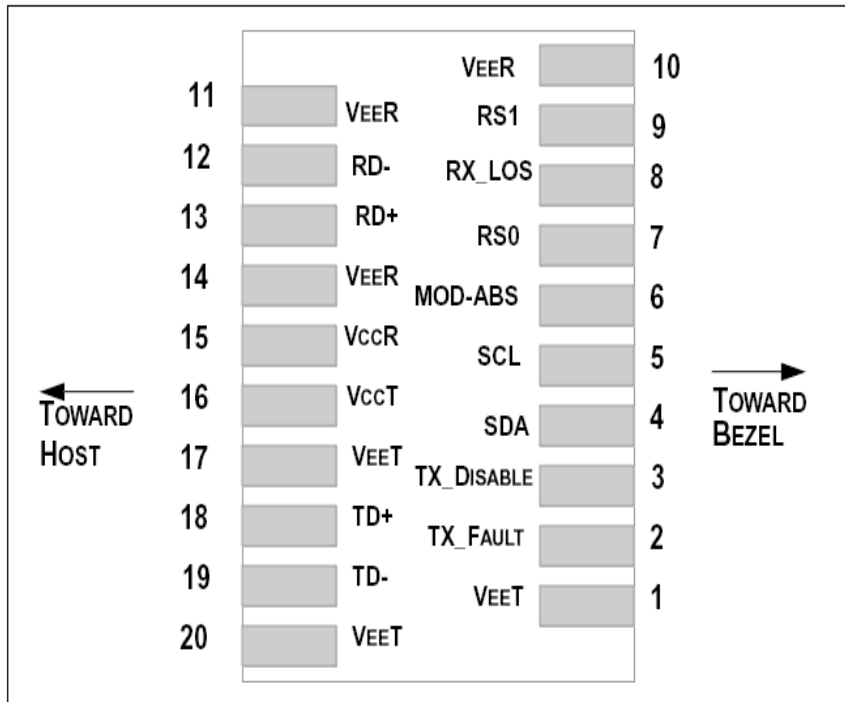
Parameter	Symbol	Min.	Typical	Max.	Unit
50 / 125 um MMF OM3		2		100	m
Data Rate				14.0	Gbps
Transmitter					
Centre Wavelength	λ_c	840	850	860	nm
Receiver Sensitivity @14.025G*Note3	$\Delta\lambda$			0.5	nm
Average Output Power: 50 MMF	P _{out}	-7.8			dBm
Extinction Ratio	ER	3	5		dB
Receiver					
Centre Wavelength	λ_c	840	850	860	nm
Receiver Sensitivity @14.025G*Note3	P _{min}			-10.5	dBm
Receiver Sensitivity @8.5G*Note4	P _{min}			-11.0	dBm
Receiver Sensitivity @4.25G*Note5	P _{min}			-12.0	dBm
Receiver Overload	P _{max}	0			dBm
Optical Return Loss	ORL			-12	dB
LOS De-Assert	LOS _D			-12.5	dBm
LOS Assert	LOS _A	-25			dBm
LOS Hysteresis		0.5			dB

Note 3: Measured with a PRBS 231 -1 test pattern @ 14.025Gbps, BER≤10-12

Note 4: Measured with a PRBS 27 -1 test pattern @ 8.5Gbps, BER≤10-12

Note 5: Measured with a PRBS 27 -1 test pattern @ 4.25Gbps, BER≤10-12

SFP28 Transceiver Electrical Pad Layout



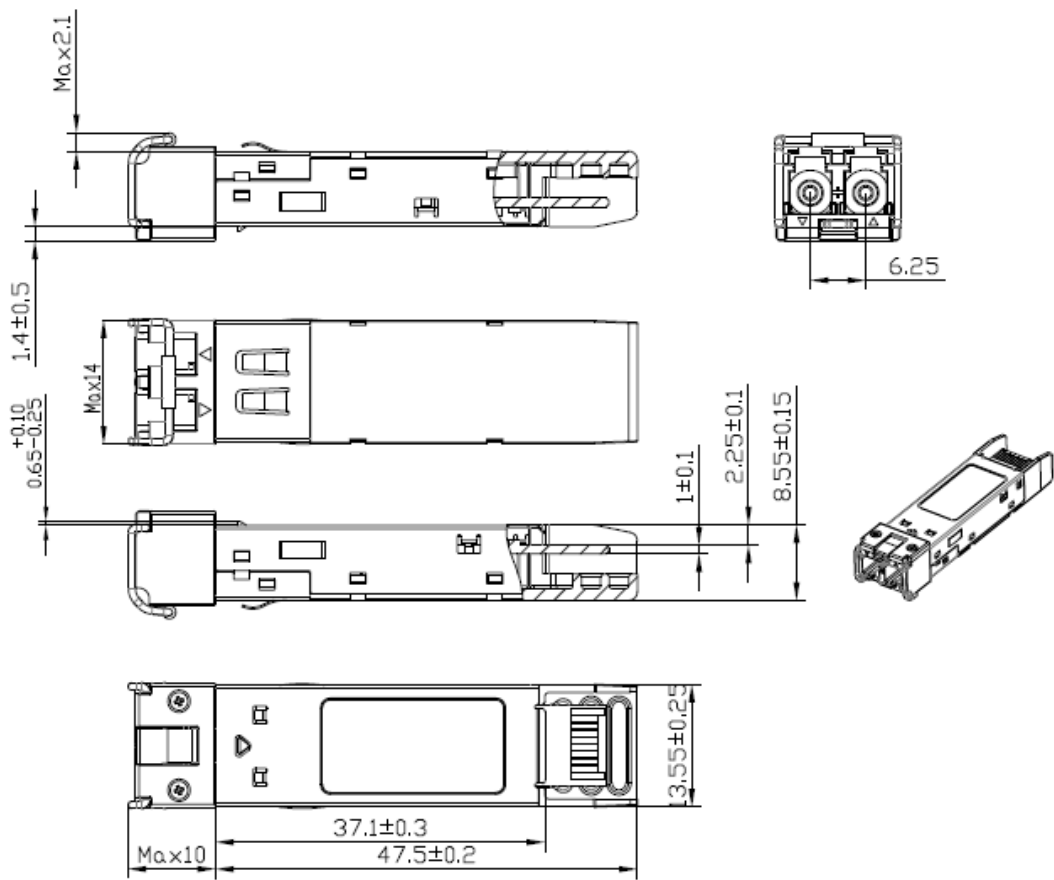
Pin Function Definitions

Pin Num.	Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	SDA	Module Definition 2	3	Data line for Serial ID.
5	SCL	Module Definition 1	3	Clock line for Serial ID.
6	MOD-ABS	Module Definition 0	3	Note 3
7	RS0	RX Rate Select (LVTTTL).	3	Rate Select 0, optionally controls SFP28 module receiver. This pin is pulled low to VeeT with a >30K resistor..
8	LOS	Loss of Signal	3	Note 4
9	RS1	TX Rate Select (LVTTTL).	1	Rate Select 1, optionally controls SFP28 module transmitter. This pin is pulled low to VeeT with a >30K resistor.
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 6
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3V ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3V ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

Notes:

- 1) TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10K Ω resistor on the host board. Pull up voltage between 2.0V and $V_{ccT/R}+0.3V$. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
- 2) TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7K~10 K Ω resistor. Its states are:
Low (0 – 0.8V): Transmitter on (>0.8, < 2.0V): Undefined
High (2.0 – 3.465V): Transmitter Disabled Open: Transmitter Disabled
- 3) Module Absent, connected to VeeT or VeeR in the module.
- 4) LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10K Ω resistor. Pull up voltage between 2.0V and V_{cc_Host} . When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
- 5) VeeR and VeeT may be internally connected within the SFP28 module.
- 6) RD-/+: These are the differential receiver outputs. They are AC coupled 100 Ω differential lines which should be terminated with 100 Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 185 and 425 mV differential (92.5 –212.5 mV single ended) when properly terminated.
- 7) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V \pm 5% at the SFP+ connector pin. Maximum supply current is 340mA. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP28 input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP28 transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP28 transceiver module.
- 8) TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 90 – 800 mV (45 – 400 mV single-ended), though it is recommended that values between 90 and 800 mV differential (45 – 400 mV single-ended) be used for best EMI performance.

Mechanical Specifications



Unremarked tolerances $\pm 0.2\text{mm}$