

# Stratos 100G Transceivers

QSFP28 100G PSM4 500m Transceiver



## Features

- Hot-pluggable QSFP28 form factor
- Uncooled DFB laser (4 x1310 nm)
- PIN photo detector
- -5°C to +70°C case operating temperature range
- 500m transmission with SMF
- 3.3 V power supply
- Clock and data recovery (CDR)
- Power consumption < 3.5 W
- Compliant with QSFP28 MSA-SFF-8665
- Compliant with IEEE 802.3bm/100G PSM4 specification
- Digital diagnostic functions (Via I2C)
- RoHS compliant
- Compliant with UL & TUV



## Applications

- 100 Gigabit Ethernet, MPO, PSM4

## Part Numbers

Part Number	Form Factor	Data Rate	Media	Distance	Wavelength	TX Power	Voltage	Coupling	DDM	Temp
STA-100G-PSM4	QSFP28PSM4	100G	SMF	500m	1310 nm	-9.4 ~ 2dBm	3.3 V	AC/AC	Y	-5 ~ +70 C

## Absolute Maximum Ratings

Parameter	Symbol	Conditions	Min	Max	Unit
Storage temperature	$T_s$		-40	+85	°C
Supply relative humidity	RH	Non condensing	0	85	%
Supply voltage	$V_{cc}$		0	3.6	V

## Recommended Operating Conditions

Parameter	Symbol	Conditions	Min	Typical	Max	Unit
Case operating temperature	$T_c$		-5		70	°C
Supply voltage	$V_{cc}$		3.13	3.3	3.47	V
Supply voltage	$I_{cc}$		0		1000	mA
Data rate	DR			100		Gbps
Distance			2		500	m

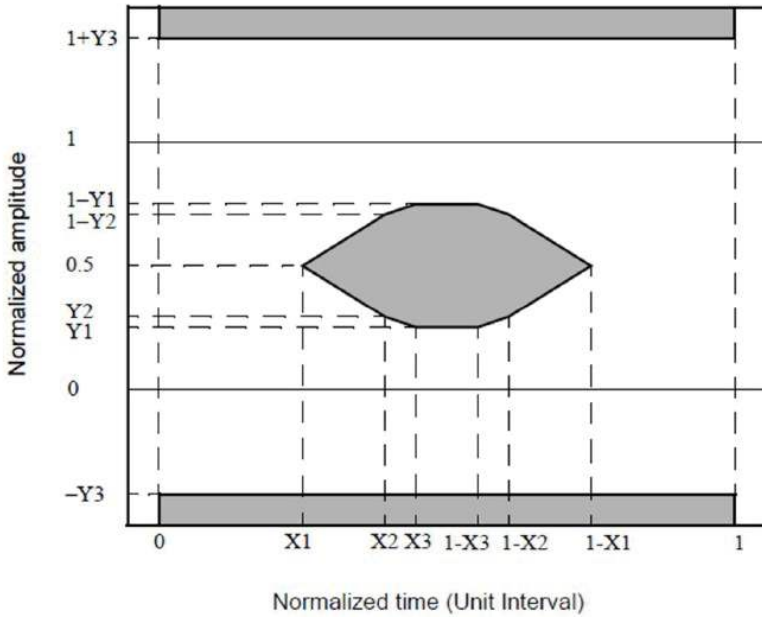
## Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typical	Max	Unit
<b>Transmitter</b>						
Differential input impedance	$R_{DI}$			100		Ohm
High speed differential input voltage (CML)	$V_{CML\_DI}$	AC-coupled, peak to peak	0.2		1.0	V
Low speed input voltage - low (LVCOMS)	$V_{LVCMOS\_IL}$		-0.3		$V_{cc} \cdot 0.3$	V
Low speed input voltage - high (LVCOMS)	$V_{LVCMOS\_IH}$			$V_{cc} \cdot 0.7$	$V_{cc} + 0.5$	V
Low speed input voltage - low (LVTTTL)	$V_{LVTTTL\_IL}$		-0.3		0.8	V
Low speed input voltage - high (LVTTTL)	$V_{LVTTTL\_IH}$		2		$V_{cc} + 0.3$	$V_{cc} + 0.3$
<b>Receiver</b>						
Differential output impedance	$R_{DO}$			100		Ohm
High speed differential output voltage (CML)	$V_{CML\_DO}$	AC-coupled, peak to peak	0.3		0.8	V
Low speed output voltage - low (LVCOMS)	$V_{LVCMOS\_OL}$		0		0.4	V
Low speed output voltage - high (LVCOMS)	$V_{LVCMOS\_OH}$		$V_{cc} - 0.5$		$V_{cc} + 0.3$	V
Low speed output voltage - low (LVTTTL)	$V_{LVTTTL\_OL}$		0		0.4	V
Low speed output voltage - high (LVTTTL)	$V_{LVTTTL\_OH}$		$V_{cc} - 0.5$		$V_{cc} + 0.3$	V

## Optical Characteristics

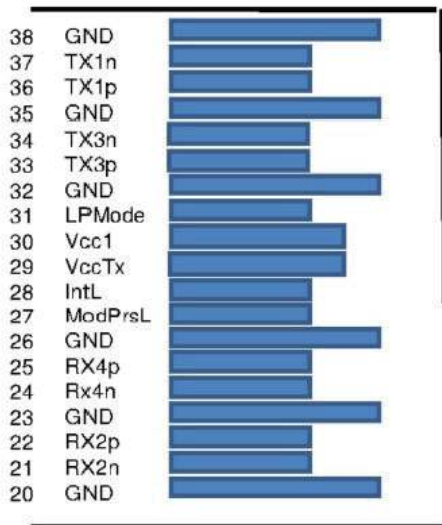
Parameter	Symbol	Conditions	Min	Typical	Max	Unit
<b>Transmitter</b>						
Lane wavelengths			1295	1310	1325	nm
Side mode suppression ratio	SMSR		30			dB
Average launch power, each lane			-9.4		2	dBm
Transmitter and dispersion penalty (TDP), each lane	TDP				2.9	dB
Average launch power of OFF transmitter, each lane	Poff		-12.66		-30	dBm
Extinction ratio	ER		3.5			dB
Eye mask definition					Compliance IEEE802.3bm	
<b>Receiver</b>						
Center wavelength - lane 0- 3			1295	1310	1325	nm
Damage threshold	$\lambda_{CO}$		3.0			dBm
Receiver power (OMA), each lane					2.2	dBm
Receiver reflectance					-12	dB
Average receive power, each lane			-12.66		2.0	dBm
Receiver sensitivity (OMA), each lane	Rsens	Assured with PRBS 2 <sup>31</sup> -1 at 5*10 <sup>-5</sup> BER, NRZ			-11.35	dBm
Stress receiver sensitivity (OMA), each lane					100G-PSM4 as being defined by 100G PSM4 specification	dBm

## Eye Mask Definition



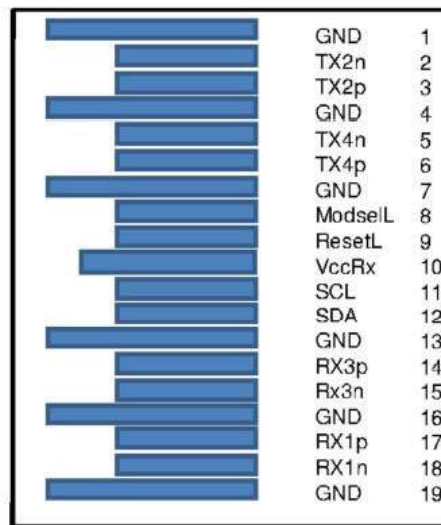
X1	0.31	Y1	0.34
X2	0.40	Y2	0.38
X3	0.45	Y3	0.40

## Pin Description



Top Side  
Viewed From Top

Module Card Edge



Bottom Side  
Viewed From Bottom

## Pin Function Definitions

Pin	Logic	Symbol	Description	Notes
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter inverted data input	
3	CML-I	Tx2p	Transmitter non-inverted data input	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter inverted data input	
6	CML-I	Tx4p	Transmitter non-inverted data input	
7		GND	Ground	1
8	LVTTL-I	ModSelL	Module select	
9	LVTTL-I	ResetL	Module reset	
10		Vcc Rx	+3.3 V power supply receiver	2
11	LVC MOS I / O	SCL	2-wire serial interface clock	
12	LVC MOS I / O	SDA	2-wire serial interface data	
13		GND	Ground	1
14	CML-O	Rx3p	Receiver non-inverted data output	
15	CML-O	Rx3n	Receiver inverted data output	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver non-inverted data output	
18	CML-O	Rx1n	Receiver inverted data output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver inverted data output	
22	CML-O	Rx2p	Receiver non-inverted data output	
23		GND	Ground	1
24	CML-O	Rx4n	Receiver inverted data output	
25	CML-O	Rx4p	Receiver non-inverted data output	
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module present	
28	LVTTL-O	IntL	Interrupt	
29		Vcc Tx	+3.3 V power supply transmitter	2
30		Vcc1	+3.3 V power supply	2
31	LVTTL-I	LPMODE	Low power mode	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter non-inverted data input	
34	CML-I	Tx3n	Transmitter inverted data input	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter non-inverted data input	
37	CML-I	Tx1n	Transmitter inverted data input	
38		GND	Ground	1

1. ND is the symbol for signal and supply (power) common for the QSFP+ module. All are common within the QSFP+ module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.

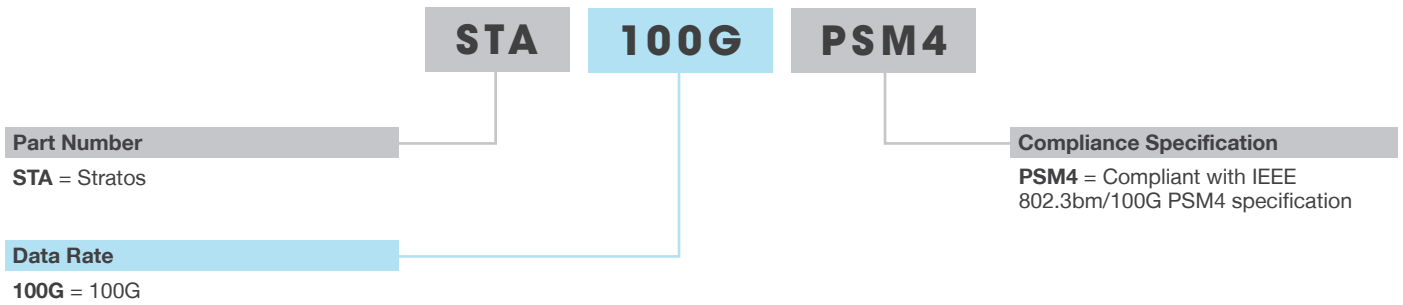
2. Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently.

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## Product Label

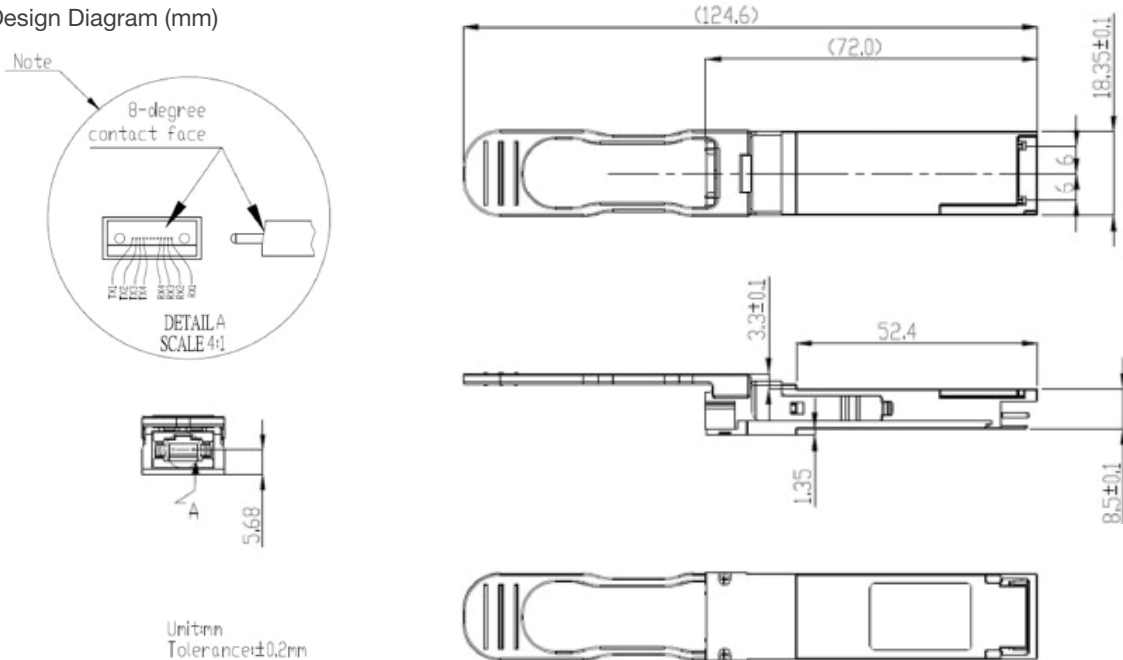


## Ordering Information



## Part Drawings

Mechanical Design Diagram (mm)



## Regulatory Compliance

Item	Standard
Electromagnetic interference (EMI)	FCC art 15 Class B CE EN55032+EN55035 VCCI CISPR32
ESD (Module case)	Contact discharge EN61000-4-2 criterion B
ESD (Module case)	Air discharge EN61000-4-2 criterion B
ESD (Electrical connector)	ANSI/ESDA/JEDEC JS-001
RoHS	2011/65/EU
Laser eye safety	FDA 21CFR 1040.10 and 1040.11
Component recognition	UL and TUV

## Laser Safety Information

All versions of this laser are Class 1 laser products per IEC/EN 60825-1. Users should observe safety precautions such as those recommended by ANSI<sup>3</sup> Z136.1, ANSI Z36.2 and IEC 60825-1.

This product conforms to FDA (CDRH) 21 CFR 1040.10 and 1040.11 except for deviations of laser safety class designation pursuant to '[Laser Notice No.50](#)'

Product labeling:  
Class 1 Laser Product  
Compliance with 21 CFR  
1040.10 and 1040.11

If labeling is not affixed to the module due to size constraints; then rather, labeling is placed on the outside of the shipping box. This product is not shipped with a power supply.

Caution: use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

## Certifications

UL: 62368-1  
TUV: EN62368-1, EN 60825-1, EN 60825-2  
Documentation is available upon request.

(1) IEC is a registered trademark of the International Electrotechnical Commission

(2) Within Europe the IEC standard has been adopted as a European Normative standard known as EN 60825, and each European country will have its own version of this standard, for example, the British Standards version known as BS EN 60825. There can be small differences between the different countries versions of EN 60825, and these are in part caused by the process of translating the standard into the native language of that country.

(3) ANSI is a registered trademark of the American National Standards Institute