



# Product Specification

## 10Gbps XFP Transceiver

### TOXFP1510GZR

V20131010

### Product Features

- | 9.95Gbps to 11.1Gbps data links
- | 40km with 9/125μm SMF
- | 1550nm EML laser
- | Duplex LC Connector
- | Hot-pluggable XFP footprint
- | Single 3.3V power supply
- | Operating temperature: -5°C to 75°C
- | RoHS
- | Digital Diagnostic Monitor (DDM)
- | Power Consumption < 2W

### Applications

- √ 10GBase-ER/EW 10G Ethernet
- √ SONET OC-192 IR2/3
- √ SDH STM S-64.2b/64.3b
- √ 40km 10G Fiber Channel

## 1. Product Description

The TOXFP1510GZR is a 10Gbps enhanced small form factor pluggable XFP transceiver compatible with 10GBASE-ER/EW, SONET OC-192 IR2/3, SDH STM S-64.2b/64.3b . It is suitable for Single-mode fiber (SMF) communications in 10Gbps Ethernet/FC/SDH/SONET.

## 2. Regulatory Compliance

TINOUT transceivers are Class 1 Laser Products comply with FDA regulations. Meet Class 1 eye safety requirements of EN 60825 and the electrical safety requirements of EN 60950.



### 3. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage	V <sub>CC</sub>	-0.5	4	V
Storage Temperature	T <sub>s</sub>	-40	85	°C
Operating Case Temperature	T <sub>c</sub>	-5	75	°C

### 4. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T <sub>c</sub>	-5		75	°C
Power Supply Voltage	V <sub>CC</sub>	3.15	3.3	3.45	V
Power Supply Current	I <sub>CC3</sub>			400	mA
Data Rate			10		GBps
Max Link Length on 9/125μm SMF	L <sub>max</sub>			40	km

### 5. Optical Characteristics

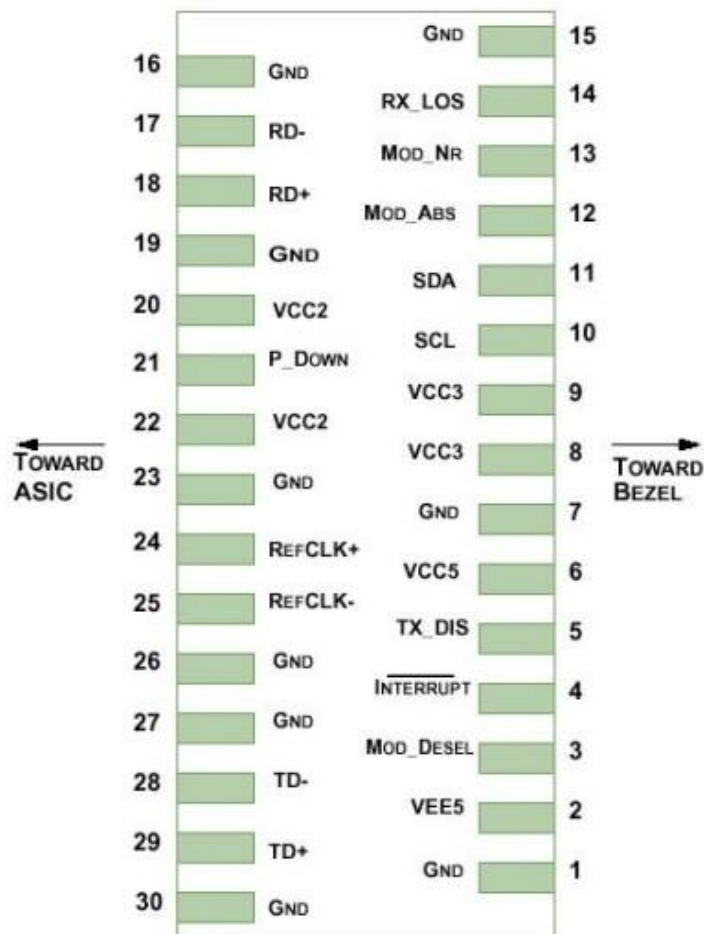
Parameter	Symbol	Min.	Typical	Max.	Unit
<b>Transmitter</b>					
Centre Wavelength	$\lambda_c$	1530	1550	1560	nm
Spectral Width (RMS)	$\sigma$			0.5	nm
Average Output Power	P <sub>out</sub>	-1		5	dBm
Extinction Ratio	ER	8			dB
Average Launch Power of Off Transmitter	P <sub>off</sub>			-30	dBm
<b>Receiver</b>					
Centre Wavelength	$\lambda_c$	1270		1600	nm
Receiver Sensitivity	P <sub>IN</sub>			-16	dBm
Receiver Overload	P <sub>max</sub>	3			dBm
LOS De-Assert	LOS <sub>D</sub>			-22	dBm
LOS Assert	LOS <sub>A</sub>	-28			dBm
LOS Hysteresis		0.5			dB



## 6. Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
<b>Transmitter</b>					
Input Differential Impedance	Zin	90	100	110	Ω
Data Input Swing Differential	Vin	200		700	mV
Tx-Dis Disable	Vd	2.0		Vcc	V
Tx-Dis Enable	Ven	0		0.8	V
<b>Receiver</b>					
Data Output Swing Differential	Vout	300		800	mV
Rx-Los Fault	Vlf	-0.5		VccHOST	V
Rx-Los Normal	Vln	0		0+0.8	V
Output rise and fall time	Tr, Tf			38	ps

## 7. Pin Descriptions





Pin	Symbol	Description	Ref.
1	GND	Module Ground	
2	VEE5	Optional Power Supply	
3	Mod-Desel		
4	Interrupt		
5	Tx-Dis	Transmitter Disable	
6	VCC5	+5V Power Supply	
7	GND	Module Ground	
8	VCC3	+3.3V Power Supply	
9	VCC3	+3.3V Power Supply	
10	SCL	Serial 2wire interface clock	
11	SDA	Serial 2wire interface data line	
12	Mod-Abs	Module Absent	
13	Mod-NR	Module Not Ready	
14	Rx-Los	Receiver Loss of Signal indicator	
15	GND	Module Ground	
16	GND	Module Ground	
17	RD-	Receiver Inverted data output	
18	RD+	Receiver non-Inverted data output	
19	GND	Module Ground	
20	VCC2	+1.8V Power Supply	
21	P-Down/RST		
22	VCC2	+1.8V Power Supply	
23	GND	Module Ground	
24	Ref CLK+		
25	Ref CLK-		
26	GND	Module Ground	
27	GND	Module Ground	
28	TD-	Transmitter Inverted data input	
29	TD+	Transmitter non-Inverted data input	
30	GND	Module Ground	

## 8. EEPROM & DDM THRESHOLD

### 8.1 EEPROM

TABLE (00h)

Reserved for diagnostics functions
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TABLE (01h) EEPROM Serial ID Memory Contents



Addr.	Size (Bytes)	Name of Field	Hex	Description
<b>BASE ID FIELDS</b>				
128	1	Identifier	06	XFP
129	1	Ext. Identifier	50	TX Ref Clock Input Not Required; Power Consumption Max 2.5W
130	1	Connector	07	LC
131-138	8	Transceiver	22 20 00 00 00 20 00 00	Transmitter Code
139	1	Encoding	F0	64B/66B, 8B/10B, SONET, NRZ
140	1	BR, Min	63	9.9Gbps
141	1	BR, Min	6F	11.1Gbps
142	1	Length (9um) km	28	40km
143	1	Length (E-50um) m	00	
144	1	Length (50um) m	00	
145	1	Length (62.5um) m	00	
146	1	Length (Copper)	00	
147	1	Device Tech	74	cooled 1550nm EML
148-163	16	Vendor Name	43 2D 4C 49 47 48 54 20 20 20 20 20 20 20 20 20	TINOUT * OEM available
164	1	CDR Support	F8	9.9~11.1Gbps
165-167	3	Vendor OUI	00 00 00	* OEM available
168-183	16	Vendor PN	xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	* OEM available
184-185	2	Vendor Rev	30 31	01
186-187	2	Wavelength	79 18	1550nm
188-189	2	Wavelength Tolerance	0D AC	17.5nm
190	1	Max Case Temp	4B	75°C
191	1	CC-BASE		
<b>EXTENDED ID FIELDS</b>				
192-195	4	Power Supply	64	Max Power Consumption 2W
			78	Max Power Consumption in Power Down Mode is 1.2W
			04	Max Current by 3.3V is 400mA
			00	
196-211	16	Vendor SN	43 4C xx xx xx xx xx xx	SN of Transceiver (ASCII).

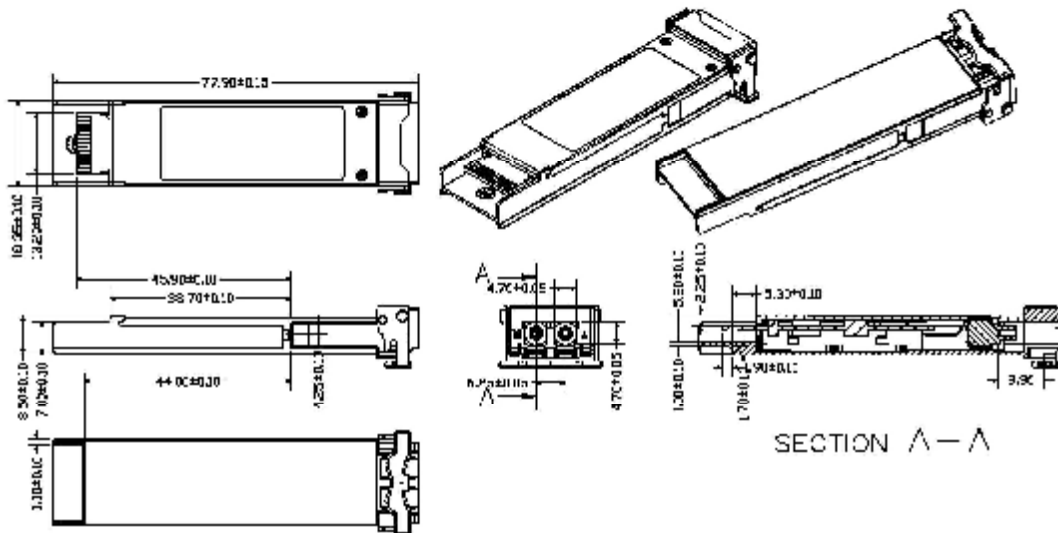


			xx xx xx 20 20 20 20 20	Exp. "TOXXXXXXXXXX"
212-219	8	Date Code	xx xx xx xx xx xx 20 20	YY/MM/DD Exp. 120727
220	1	Diagnostic Monitoring	08	Average Power
221	1	Enhanced Options	40	Optional Soft TX_DISABLE implemented;
222	1	Aux Monitoring	00	
223	1	CC_EXT	checksum	Checksum for Extended ID
<b>VENDOR SPECIFIC ID FIELDS</b>				
224-255	32	Vendor Specific	FF FF FF.....	Depends on Customer Info

### 8.1 DDM THRESHOLD

	Low Alarm	Low Warn	High Warn	High Alarm
Temperature	-5°C	0°C	70°C	75°C
Voltage	2.9V	3V	3.6V	3.7V
Tx Bias	15mA	20mA	90mA	100mA
Tx Power	-3dBm	-2dBm	5dBm	7dBm
Rx Power	-20dBm	-16dBm	-1dBm	1.9dBm

## 9. Mechanical Specifications



## 10. LABEL



TINOUT offers label OEM design and print.  
Label barcode supports code128 and 2D barcode  
SIZE: 38mm\*15mm

## Ordering Information

Part No.	Data Rate	DDM	Wave	Fiber Type	Dist.	Temp.	Optical Interface
TOXFP1510GZR	9.95Gbps ~11.1Gbps	yes	1550nm	SMF	40km	-5~75°C	LC

## VERSION UPDATE:

VERSION NO.	DATE	UPDATED INFORMATION
V20131010	20131010	<ol style="list-style-type: none"> <li>EEPROM&amp; DDM Threshold updated</li> <li>"LABEL" added</li> <li>Ordering information updated</li> <li>Product picture updated</li> </ol>

## NOTICE:

TINOUT reserves the right to make changes to this product in this specification without notice, in order to improve product performance.

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