	Datasheet	No.	DS10-E009
		Initial Date	2010-07-29
OE	OEB6Cxx412	Written Team	R&D Dept.
			GH Zheng

## I Preview


PN	OEB6Cxx412
Description	SFP+ Bi-Di 1270nm/1310nm 20KMLCDDMI0~70 °C

## II Contents

1. Features
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## III Revision History

No.	Date	Items	Change Recording	Ver.	Rev.	Customer
1	2010-07-29	All	Initial registration	000	000	Standard
2						
3						
4						
5						
6						

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## 1. Features:

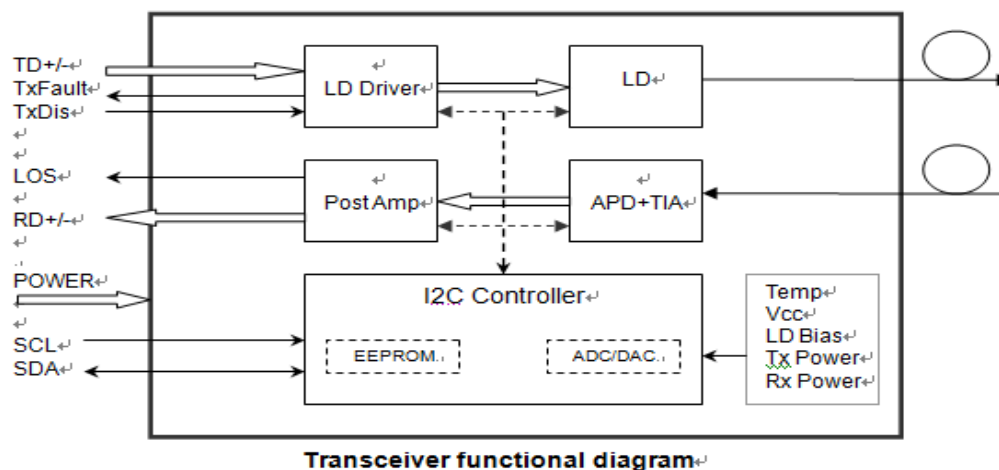
- ◆ Supports up to 10.7Gbps bit rates
- ◆ Hot-pluggable SFP+ footprint
- ◆ 1330/1270nm DFB laser and PIN photodiode, Up to 20km for SMF transmission
- ◆ Compliant with SFP+ MSA and SFF-8472 with duplex LC receptacle
- ◆ Compatible with RoHS
- ◆ Single +3.3V power supply
- ◆ Real Time Digital Diagnostic Monitoring
- ◆ Operating case temperature:
- ◆ Standard: 0 to +70°C
- ◆ Industrial: -40 to +85°C

## 2. Applications:


- ◆ 10Gbps Optical systems
- ◆ 10GBASE-LR at 10.3125Gbps
- ◆ 10GBASE-LW at 9.953Gbps
- ◆ LTE systems
- ◆ Other Optical links

## 3. Description:

OEB6Cxx412 is high performance, cost effective modules supporting data rate of 10Gbps and 20km transmission distance with SMF. The transceiver consists of three sections: a DFB laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements. The transceivers are compatible with SFP Multi-Source Agreement and SFF-8472 digital diagnostics functions.



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#### 4. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Temperature	T <sub>ST</sub>	-40	+85	°C
Supply Voltage	V <sub>CC3</sub>	0	+3.6	V
Relative Humidity	RH	5	95	%


#### 5. Operation Environment:

Parameter	Symbol	Min	Typ	Max	Unit
Date Rate			10.3125		Gb/s
Supply Voltage	V <sub>CC</sub>	+3.14	3.3	+3.47	V
Supply Current	I <sub>CC</sub>		380	450	mA
Power Dissipation	PD			2	W
Operating Temperature	T <sub>OP</sub>	0	25	+70	°C

#### 6. Optical and Electrical Characteristics

Parameter		Symbol	Min	Typical	Max	Unit	Notes
<b>Transmitter</b>							
Centre Wavelength		$\lambda_c$	1320/1260	1330/1270	1340/1280	nm	
Spectral Width (-20dB)		$\Delta\lambda$			1	nm	
Side-Mode Suppression Ratio		SMSR	30	-		dB	
Average Output Power		P <sub>out</sub>	-2		3	dBm	1
Extinction Ratio		ER	3.5			dB	
Data Input Swing Differential		V <sub>IN</sub>	180		850	mV	2
Input Differential Impedance		Z <sub>IN</sub>	90	100	110	$\Omega$	
TX Disable	Disable		2.0		V <sub>CC</sub>	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		V <sub>CC</sub>	V	
	Normal		0		0.8	V	
<b>Receiver</b>							
Centre Wavelength		$\lambda_c$	1260/1320	1270/1330	1280/1340	nm	
Receiver Sensitivity					-16	dBm	3
Receiver Overload			0.5			dBm	3
LOS De-Assert		LOS <sub>D</sub>			-15.5	dBm	
LOS Assert		LOS <sub>A</sub>	-26			dBm	

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LOS Hysteresis		0.5			dB	
Data Output Swing Differential	V <sub>out</sub>	300		900	mV	4
LOS	High	2.0		V <sub>cc</sub>	V	
	Low			0.8	V	

#### Notes:

1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2<sup>31</sup>-1 test pattern @10312Mbps, BER ≤ 1×10<sup>-12</sup>.
4. Internally AC-coupled.


### 7. Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t <sub>on</sub>			1	ms
Tx Disable Assert Time	t <sub>off</sub>			10	μs
Time To Initialize, including Reset of Tx Fault	t <sub>init</sub>			300	ms
Tx Fault Assert Time	t <sub>fault</sub>			100	μs
Tx Disable To Reset	t <sub>reset</sub>	10			μs
LOS Assert Time	t <sub>loss_on</sub>			100	μs
LOS De-assert Time	t <sub>loss_off</sub>			100	μs
Serial ID Clock Rate	f <sub>serial_clock</sub>		100	400	KHz
MOD_DEF (0:2)-High	V <sub>H</sub>	2		V <sub>cc</sub>	V
MOD_DEF (0:2)-Low	V <sub>L</sub>			0.8	V

### 8. Diagnostics

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal
Voltage	3.0 to 3.6	V	±3%	Internal
Bias Current	0 to 100	mA	±10%	Internal

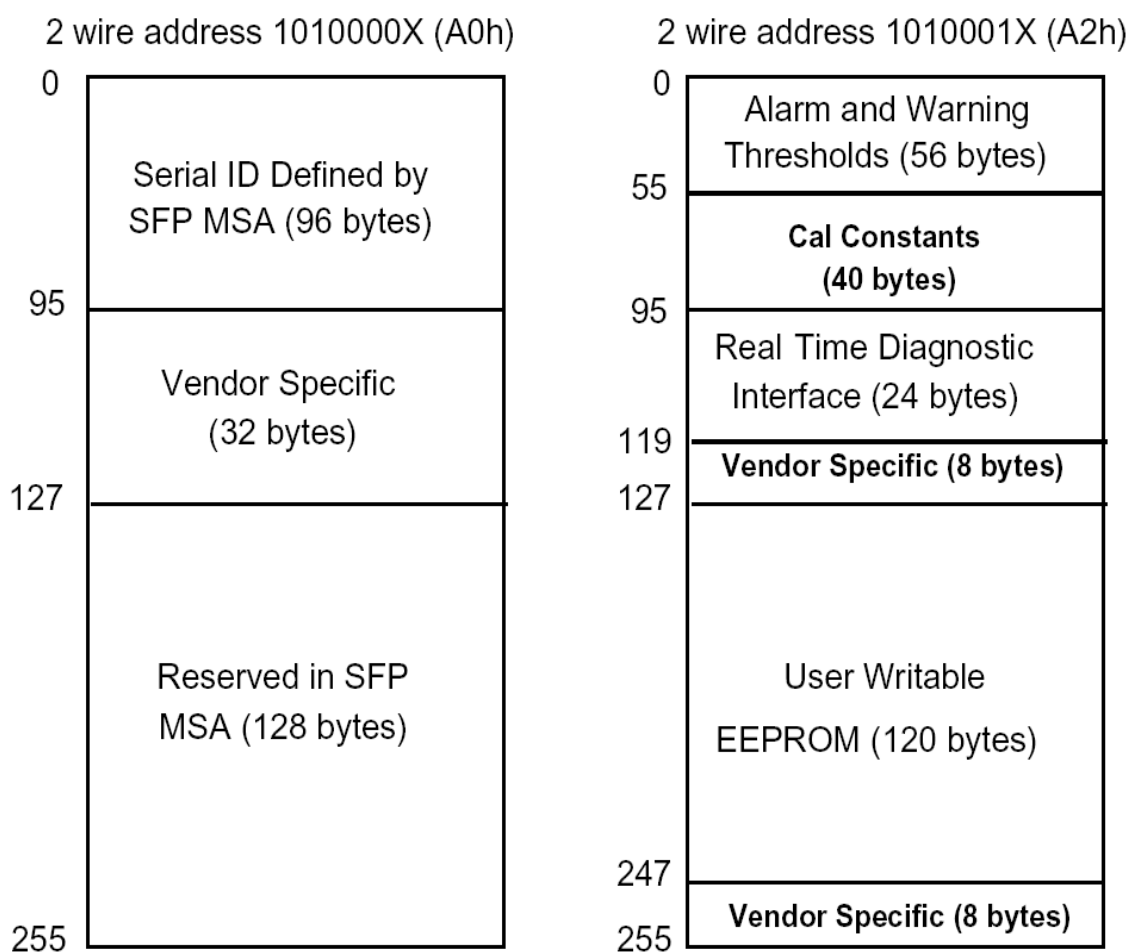
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TX Power	-5 to 0	dBm	±3dB	Internal
RX Power	-15 to 1	dBm	±3dB	Internal

## 9. Digital Diagnostic Memory Map

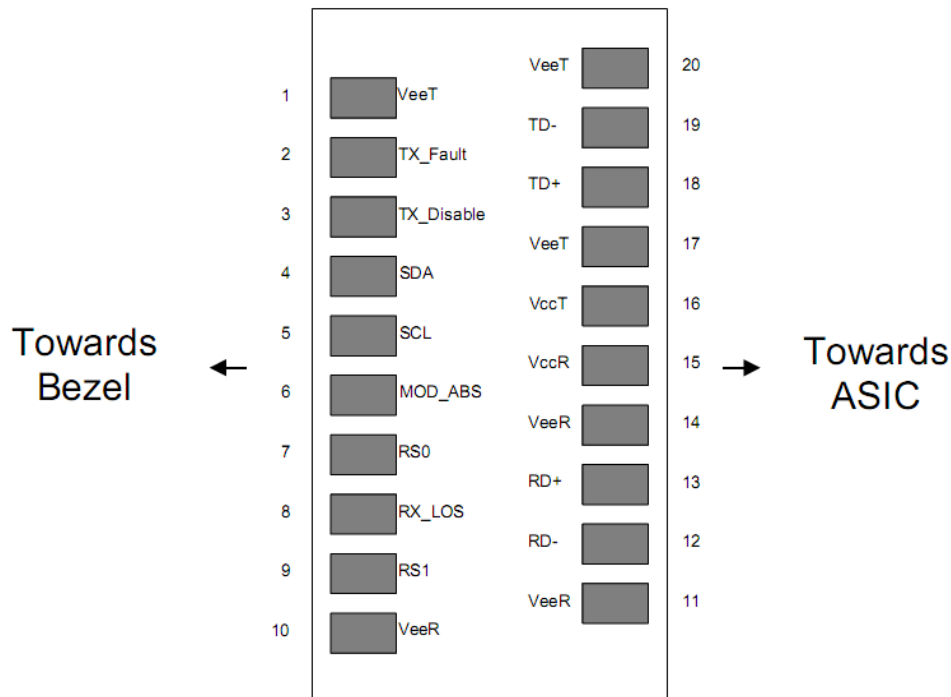
The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA). The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring. The digital diagnostic memory map specific data field defines as following.



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## 10. Pin Descriptions



Pin	Signal Name	Description	Plug Seq.	Notes
1	V <sub>EET</sub>	Transmitter Ground	1	
2	TXFAULT	Transmitter Fault Indication	3	Note 1
3	TXDISABLE	Transmitter Disable	3	Note 2
4	SDA	SDA Serial Data Signal	3	
5	SCL	SCL Serial Clock Signal	3	
6	MOD_ABS	Module Absent. Grounded within the module	3	
7	RS0	Not Connected	3	
8	LOS	Loss of Signal	3	Note 3
9	RS1	Not Connected	3	
10	V <sub>EER</sub>	Receiver ground	1	
11	V <sub>EER</sub>	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 4
13	RD+	Received Data Out	3	Note 4
14	V <sub>EER</sub>	Receiver ground	1	
15	V <sub>CCR</sub>	Receiver Power Supply	2	
16	V <sub>CCT</sub>	Transmitter Power Supply	2	
17	V <sub>EET</sub>	Transmitter Ground	1	

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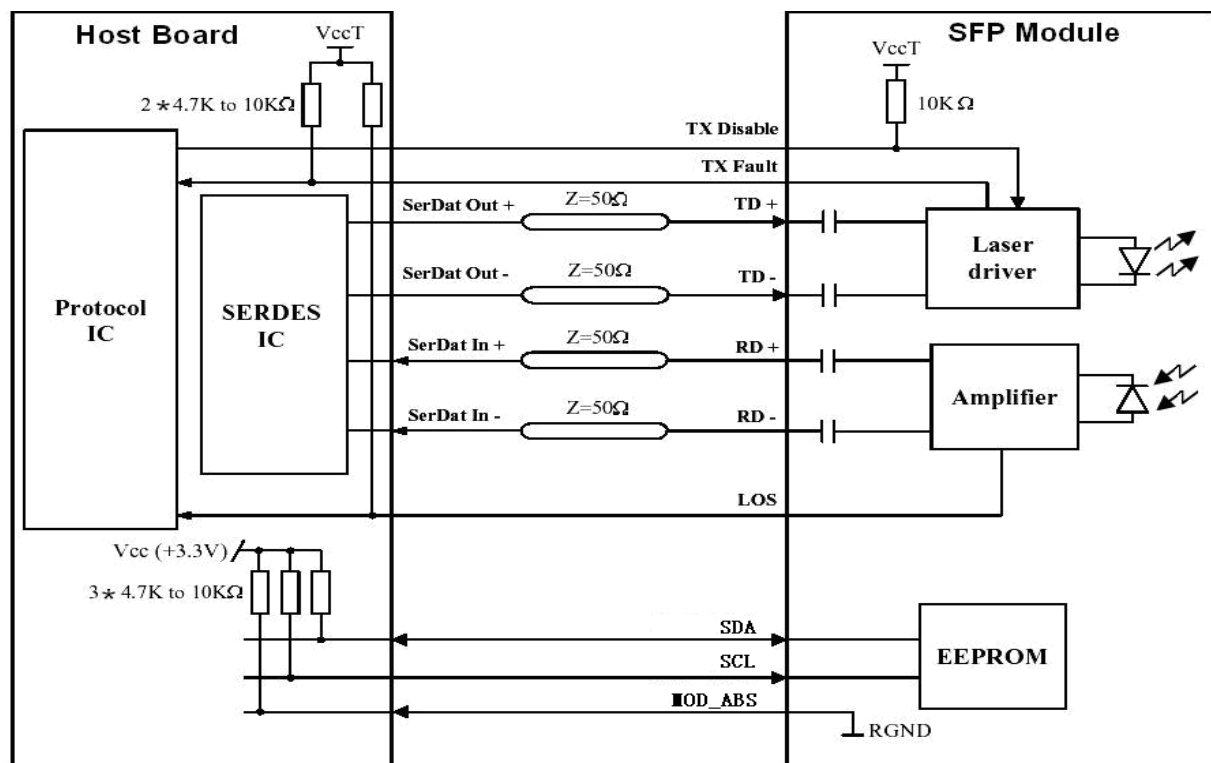
18	TD+	Transmit Data In	3	Note 5
19	TD-	Inv. Transmit Data In	3	Note 5
20	V <sub>EET</sub>	Transmitter Ground	1	

Notes:


Plug Seq.: Pin engagement sequence during hot plugging.

- 1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and V<sub>cc</sub>+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- 2) Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
- 3) LOS is open collector output. Should be pulled up with 4.7k~10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
- 4) RD-/+ : These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
- 5) TD-/+ : These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

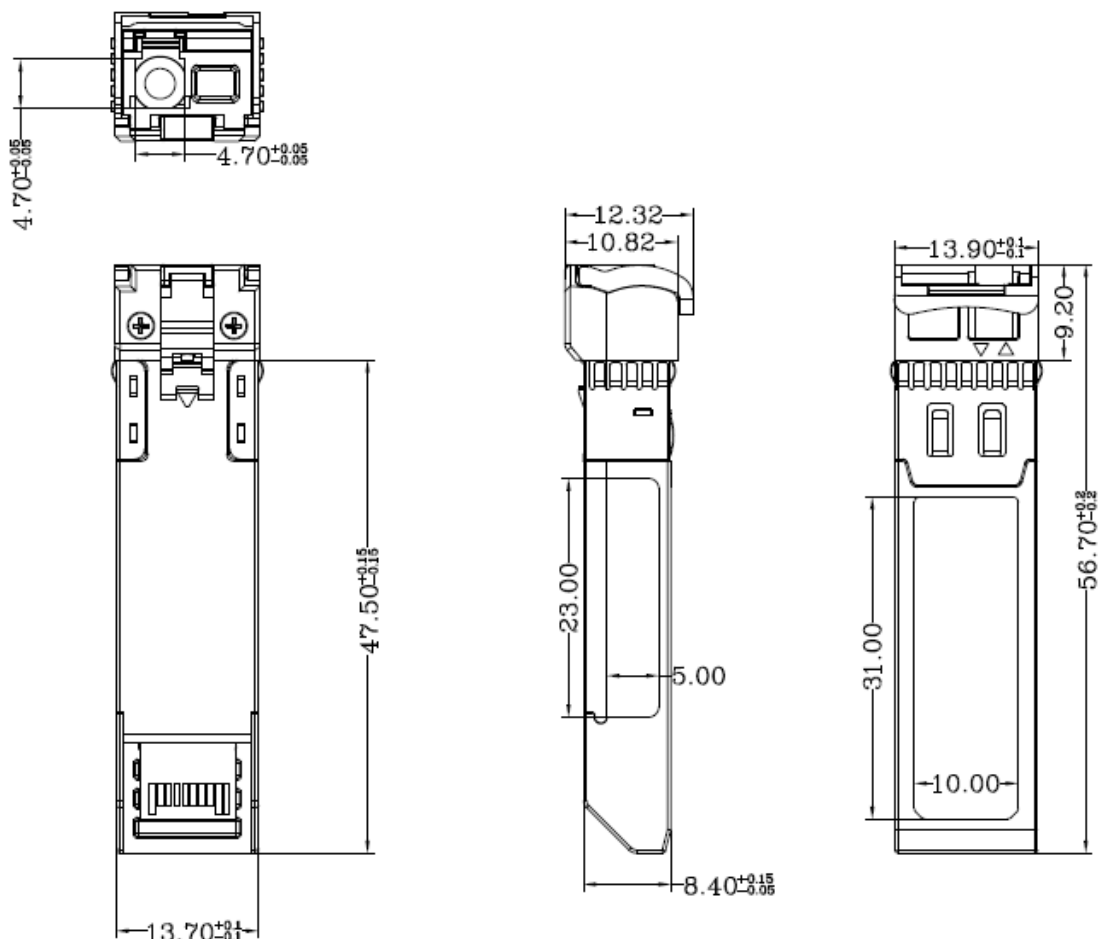
## 11. Recommended Interface Circuit



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## 12. Mechanical Dimensions



## 13. Model Ordering Information

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OEB6C03412	SFP+ Bi-Di Tx1270nm/Rx1310nm 20KMLC DDMI 0~70 °C
OEB6C30412	SFP+ Bi-Di Tx1330nm/Rx1270nm 20KMLC DDMI 0~70 °C
OEB6C03422	SFP+ Bi-Di Tx1270nm/Rx1310nm 20KMLC DDMI -40~85 °C
OEB6C30422	SFP+ Bi-Di Tx1330nm/Rx1270nm 20KMLC DDMI -40~85 °C

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