	Datasheet	No.	DS10-E015
		Initial Date	2016-05-18
OE	OEFM841	Written Team	R&D Dept.
			GH Zheng

### I Preview


PN	OEFM841
Description	16G SFP+ SW 0.1KM0~70 °C

### II Contents

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### III Revision History

No.	Date	Items	Change Recording	Ver.	Rev.	Customer
1	2016-05-18	All	Initial registration	000	000	Standard
2						
3						
4						
5						
6						

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### 1. Features:

- ◆ Supports up to 14.025Gbps bit rates
- ◆ Hot-pluggable SFP+ footprint
- ◆ 850nm VCSEL laser and PIN photodiode, Up to 100m for OM3-MMF 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: 0 to +70°C

### 2. Applications

- ◆ 4.25/8.5/14.025G Fiber channel

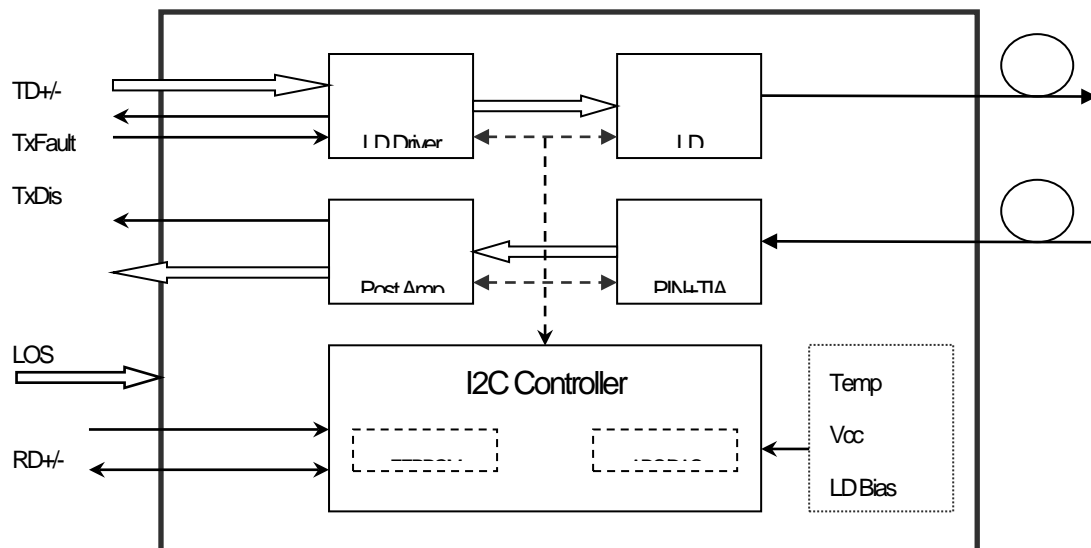
### 3. Description

The SFP+ transceivers are high performance, cost effective modules supporting data rate of 14.025 Gbps.


Fiber type	Data rate (Gbps)	Operating range (meters)
OM2	4.25	0.5~150
	8.5	0.5~50
	14.025	0.5~35
OM3	4.25	0.5~380
	8.5	0.5~150
	14.025	0.5~100

The transceiver consists of three sections: a VCSEL 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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### Transceiver functional diagram

#### 4. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V <sub>cc</sub>	-0.5	4.5	V
Storage Temperature	T <sub>s</sub>	-40	+85	°C
Operating Humidity	-	5	85	%


#### 5. Operating Environment

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	T <sub>c</sub>	0		+70	°C
Power Supply Voltage	V <sub>cc</sub>	3.135	3.30	3.465	V
Power Supply Current	I <sub>cc</sub>			300	mA
Data Rate			14.025		Gbps

#### 6. Optical and Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
<b>Transmitter</b>						
Centre Wavelength	$\lambda_c$	840	850	860	nm	
Spectral Width (RMS)	$\Delta\lambda$			0.59	nm	
Side-Mode Suppression Ratio	SMSR	-	-	-	dB	
Average Output Power	P <sub>out</sub>	-7.8		-0.5	dBm	1
Extinction Ratio	ER	3.0			dB	
Data Input Swing Differential	V <sub>IN</sub>	180		950	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	$\lambda_c$	840	850	860	nm	
Receiver Sensitivity				-10.5	dBm	3
Receiver Overload		0			dBm	3
LOS De-Assert	LOS <sub>D</sub>			-12	dBm	
LOS Assert	LOS <sub>A</sub>	-22			dBm	

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LOS Hysteresis		0.5		4	dB	
Data Output Swing Differential	$V_{out}$	500	700	900	mV	4
LOS	High	2.0		$V_{cc}$	V	
	Low			0.8	V	

**Notes:**

1. The optical power is launched into MMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS  $2^{31}-1$  test pattern @14025Mbps, BER  $\leq 1 \times 10^{-12}$ .
4. Internally AC-coupled.


**7. Timing and Electrical**

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	$t_{on}$			1	ms
Tx Disable Assert Time	$t_{off}$			10	$\mu s$
Time To Initialize, including Reset of Tx Fault	$t_{init}$			300	ms
Tx Fault Assert Time	$t_{fault}$			100	$\mu s$
Tx Disable To Reset	$t_{reset}$	10			$\mu s$
LOS Assert Time	$t_{loss\_on}$			100	$\mu s$
LOS De-assert Time	$t_{loss\_off}$			100	$\mu s$
Serial ID Clock Rate	$f_{serial\_clock}$		100	400	KHz
MOD_DEF (0:2)-High	$V_H$	2		$V_{cc}$	V
MOD_DEF (0:2)-Low	$V_L$			0.8	V

**8. Diagnostics**

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	$^{\circ}C$	$\pm 3^{\circ}C$	Internal
Voltage	3.0 to 3.6	V	$\pm 3\%$	Internal
Bias Current	0 to 15	mA	$\pm 10\%$	Internal
TX Power	-7.8 to -0.5	dBm	$\pm 3dB$	Internal

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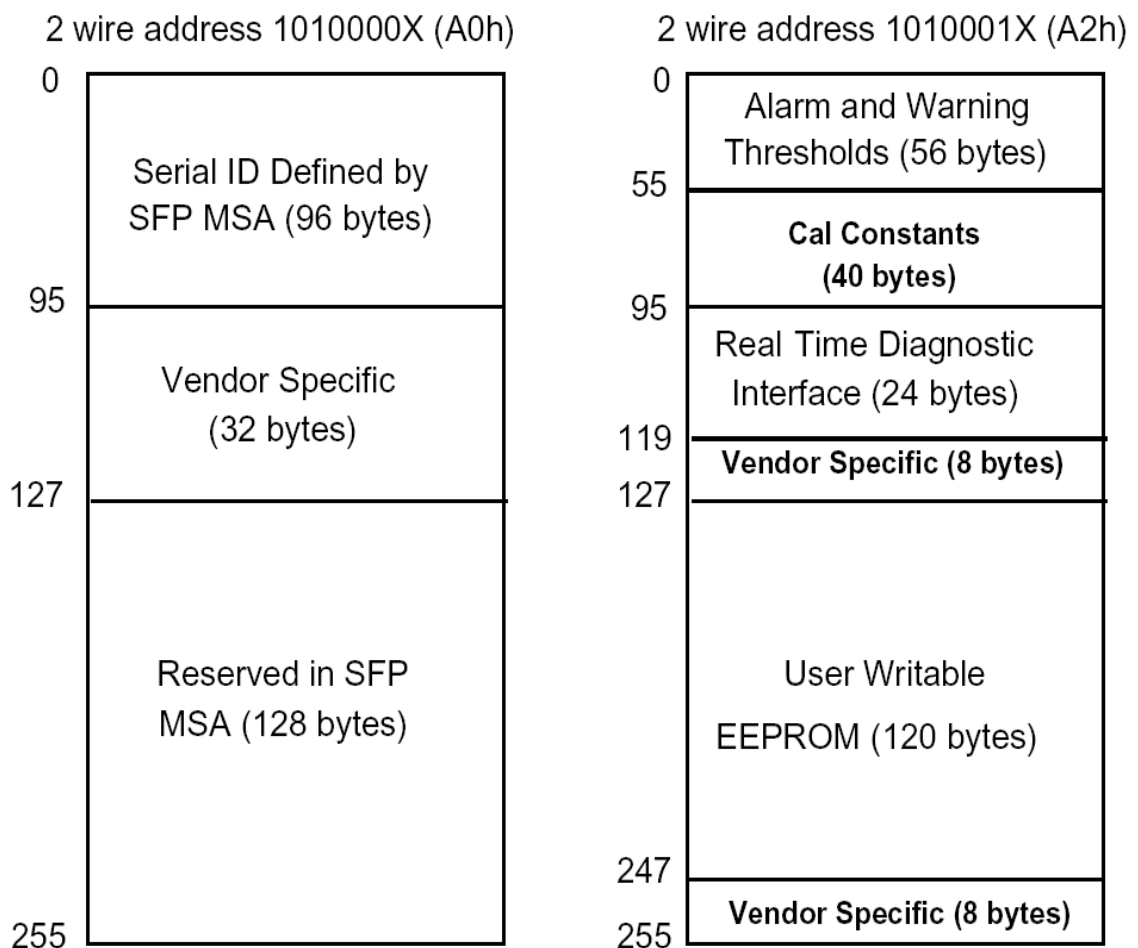
RX Power	-16 to -1	dBm	±3dB	Internal
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## 9. Digital Diagnostic Memory Map

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.

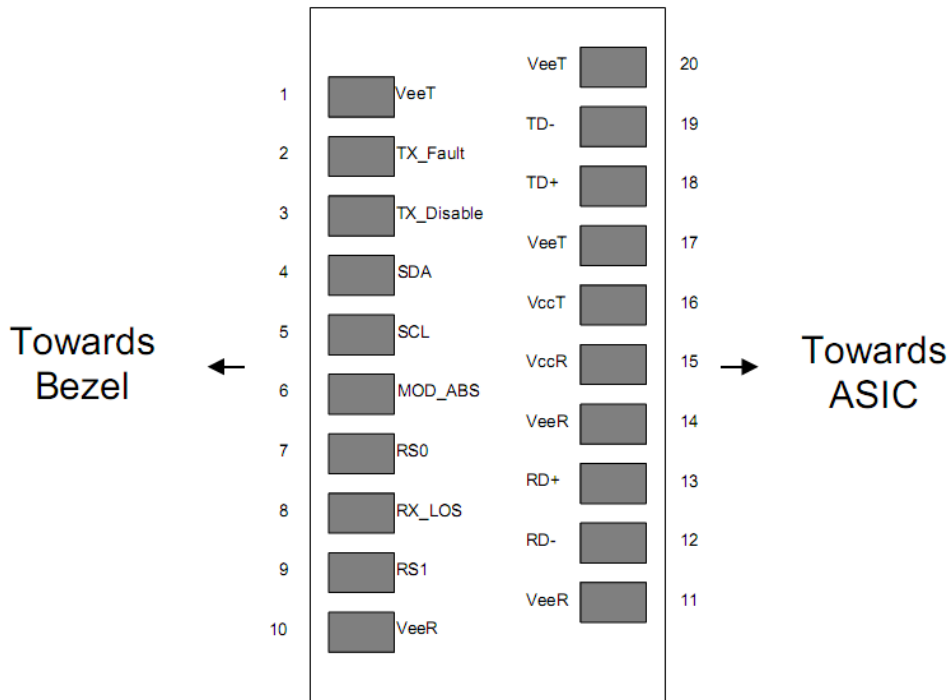
The digital diagnostic memory map specific data field defines as following.



## 10. Pin Descriptions


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Pin	Signal Name	Description	Plug Seq.	Notes
1	V <sub>EET</sub>	Transmitter Ground	1	
2	TX FAULT	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	
18	TD+	Transmit Data In	3	Note 5
19	TD-	Inv. Transmit Data In	3	Note 5

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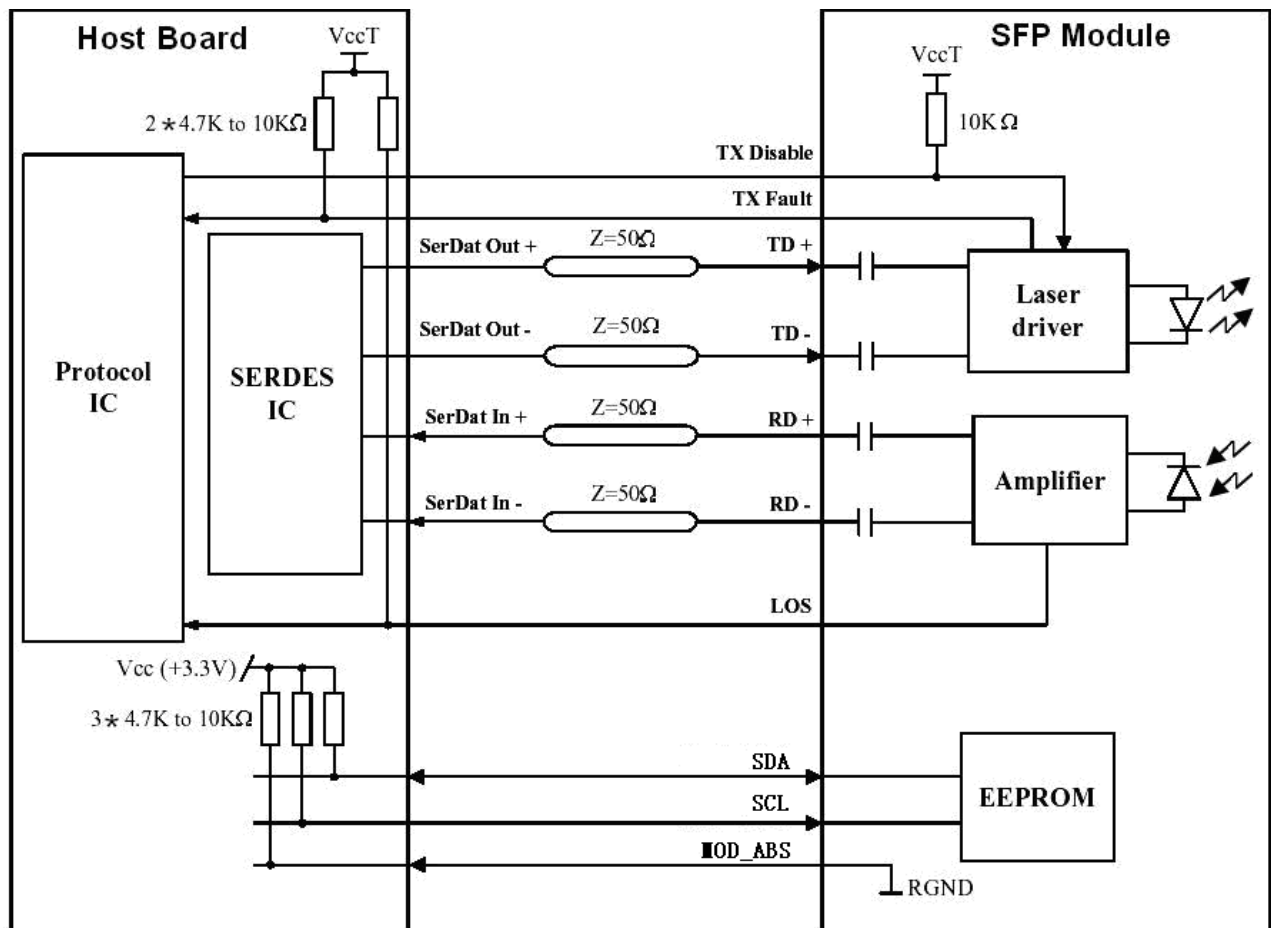
20	V <sub>EET</sub>	Transmitter Ground	1	
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Notes:


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.

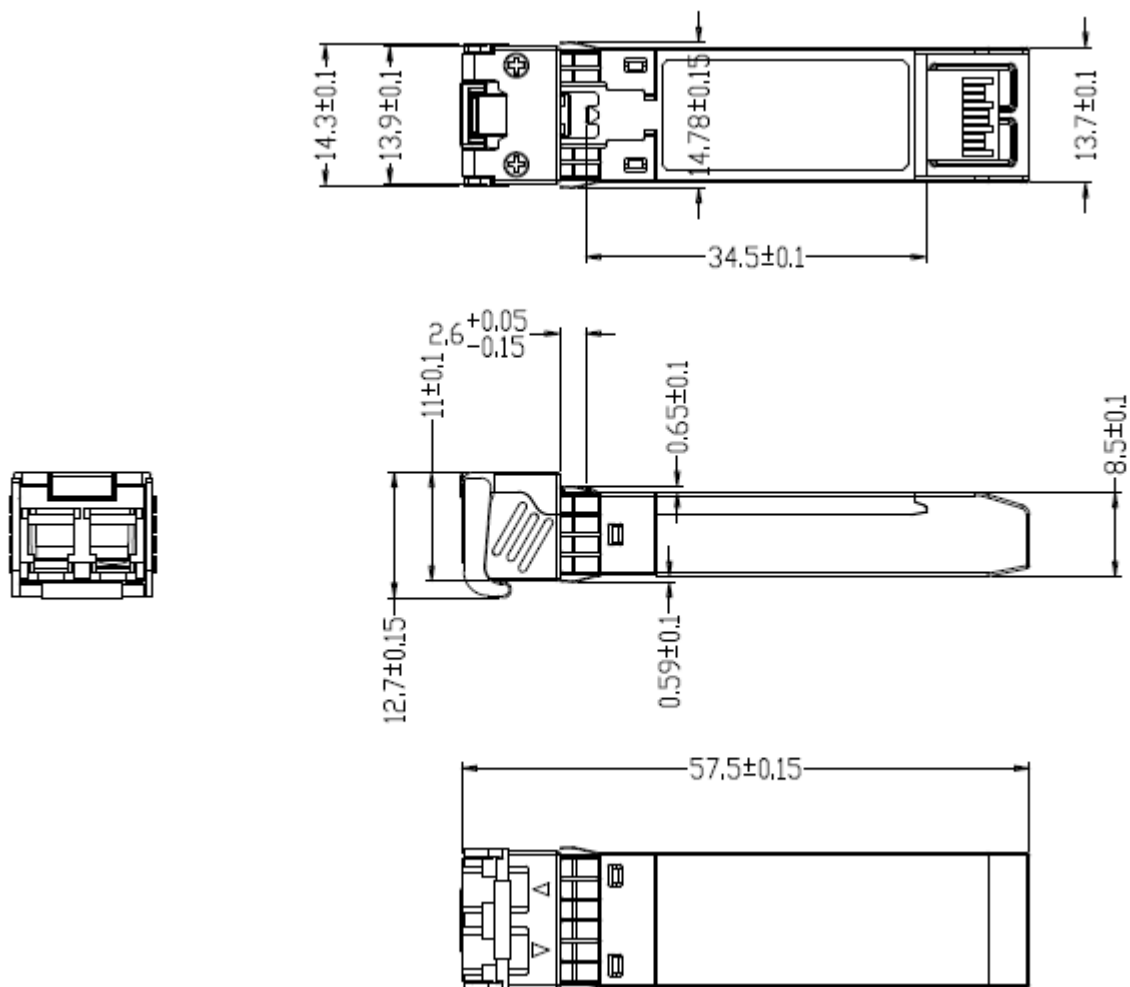
### 11. Recommended Interface Circuit



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## 12. Mechanical Dimensions



## 13. Module Ordering information

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