



Dear customers,

**About the change in the name such as "Oki Electric Industry Co. Ltd." and "OKI" in documents to OKI Semiconductor Co., Ltd.**

The semiconductor business of Oki Electric Industry Co., Ltd. was succeeded to OKI Semiconductor Co., Ltd. on October 1, 2008. Therefore, please accept that although the terms and marks of "Oki Electric Industry Co., Ltd.", "Oki Electric", and "OKI" remain in the documents, they all have been changed to "OKI Semiconductor Co., Ltd.". It is a change of the company name, the company trademark, and the logo, etc. , and NOT a content change in documents.

October 1, 2008  
OKI Semiconductor Co., Ltd.

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# Optical Components

Rev. 8 [4. 2009]

## OD8647R

**10Gbps PIN-PD with High Gain TIA receiver optical sub-assembly (ROSA)**

### 1. DESCRIPTION

OD8647R is a high sensitivity PIN-TIA receiver optical sub-assembly (ROSA). It includes a high speed PIN-photodiode with a high gain trans-impedance amplifier (TIA) in a hermetically sealed coaxial package. It incorporates LC/SC receptacle and a flexible printed circuit (FPC). The signal GND and a receptacle are electrically isolated in this ROSA.

### 2. FEATURES

Data rate up to 11.3Gbps  
Power supply (TIA): 3.3V  
High sensitivity: -20.0dBm Typ.  
Differential transimpedance: 12k $\Omega$  Typ.  
Low power consumption: 0.1W Typ.  
Electrical isolation between signal GND and a receptacle  
Adjustable DC offset (Eye cross-point control)  
PKG outline compatible with XMD-MSA



### 3. APPLICATION

IEEE802.3ae 10GBASE-L, 10GBASE-E  
SONET/SDH

### 4. ABSOLUTE MAXIMUM RATING

(Tc = +25 °C, unless otherwise specified)

Parameter	Symbol	Rating	Unit
PD Supply Voltage	VR	+15	V
Supply Voltage	Vcc	0 to +3.7	V
DC Offset Adjustment Voltage	Vth	Vcc-1.0 to Vcc+0.5*1)	V
PD Reverse Current (cw)	IR	2	mA
Input Optical Power	Pin	+4	dBm
Operating Case Temperature	Tc	-40 to 90	°C
Storage Temperature	Tstg	-40 to 85	°C
Soldering Temperature	- -	260 (10s)	°C

\*1) at all times including power up/down.

**OD8647R****5.OPTICAL AND ELECTRICAL CHARACTERISTICS**

(Tc = +25°C, λ=1550nm, VCC=+3.3V, VPD=5.0V, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Wavelength	λ	--	1260		1610	nm
PD Responsivity	RPD	λ=1310nm	0.80	0.85		A/W
		λ=1550nm	0.80	0.85		
PD Dark Current	ID	VR=+5V	--	--	5	nA
Transimpedance	Zt	Pin=-17dBm, Differential	10	12	--	kΩ
Bandwidth	BW	Pin=-17dBm f3dB, RL=50Ω	7.5	8.5	--	GHz
Low Frequency Cutoff	fc_low		--	45	100	kHz
Maximum Output Swing	Vout	Differential	--	450	650	mVpp
Electrical Return Loss	ERL	130MHz-BW GHz Differential Calculation Method <sup>1)</sup>	--	-10	-8	dB
Group Delay Deviation	GD	1-8GHz	--	±30	±60	ps
Sensitivity <sup>2)</sup>	Pmin	Rext.=12dB	--	-20.0	-19.0	dBm
		Rext.=10dB	--	-19.5	-18.0	
Overload <sup>2)</sup>	Pmax	Rext.=12dB	+1.0	+2.0	--	dBm
Optical Return Loss	ORL	λ=1310nm, 1550nm	--	--	-27	dB
Power Supply	VCC	--	+3.1	+3.3	+3.5	V
Voltage	VPD	--	+4.5	+5.0	+12	V
Vth input current	Ith	--	-30	--	30	uA
Supply Current	Icc	Pin=0W	--	32	--	mA

Notes:

1) ERL=1/2(S11-S21+S22-S12)

2) 10Gbps, NRZ, BER=10<sup>-12</sup>, PRBS2<sup>31</sup>-1**6. CONNECTOR AND FIBER SPECIFICATIONS****OD8647R-LC-x (LC receptacle)**

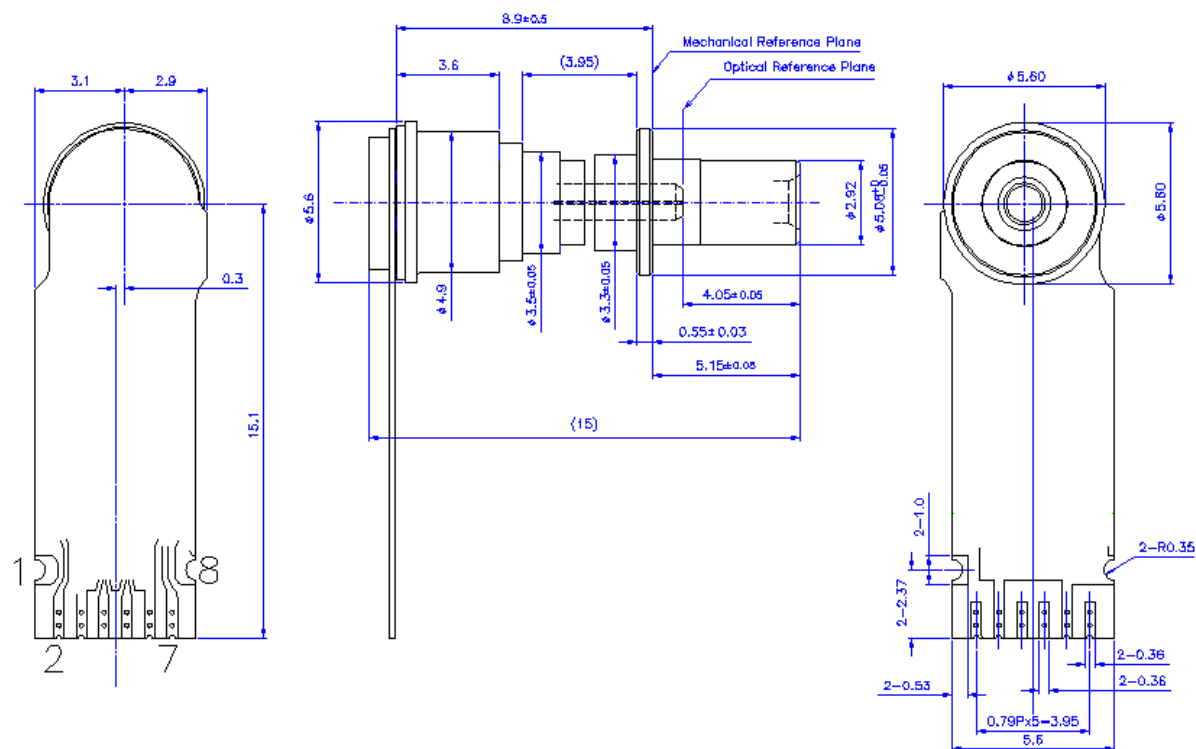
Parameter	Specifications	Unit
Applicable Optical Fiber	C-SMF	--
Core Diameter	9.5	um
Cladding Diameter	125	um
Ferrule Diameter	1.25	mm

**OD8647R-SC-x (SC receptacle)**

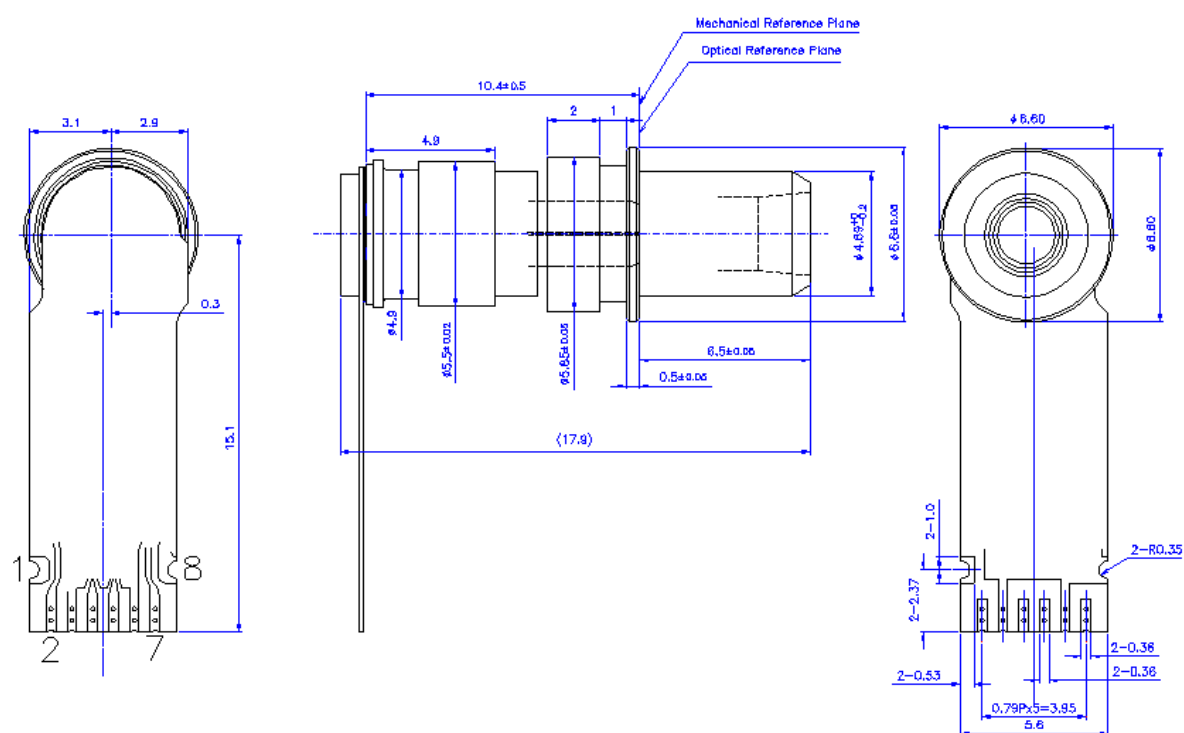
Parameter	Specifications	Unit
Applicable Optical Fiber	C-SMF	--
Core Diameter	9.5	um
Cladding Diameter	125	um
Ferrule Diameter	2.5	mm

**OD8647R**

**7. OUTLINE DRAWING** All dimensions in millimeters(Unit: mm)  
**OD8647R-LC-x (LC receptacle)**



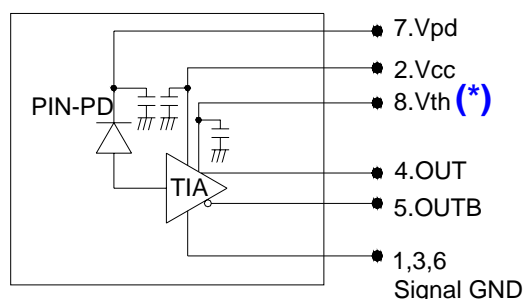
**OD8647R-SC-x (SC receptacle)**



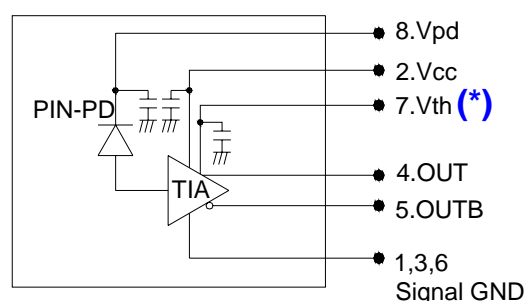
## OD8647R

### 8. BLOCK DIAGRAM

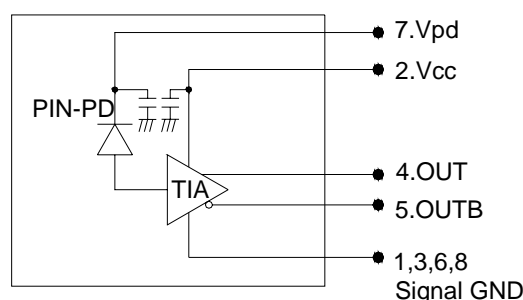
#### OD8647R-xx-A



#### OD8647R-xx-B



#### OD8647R-xx-C (Compliant with XMD, w/o Vth)



#### Note (\*)

When using without DC offset control, Vth terminal should be **NO CONNECTION**. And also, please make sure Vth voltage NOT to go to GND level during power-on or power-off transitions and after power on.

### 9. ORDERING INFORMATION

OD8647R - \_ \_ - \_

Rectangle Type

Assignment of Vth terminal

LC : LC

#8 : A

SC : SC

#7 : B

Not assigned : C

#### Safety and handling Information on this product

<b>Caution</b> GaAs Product	The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled, ingested or swallowed. Do not destroy or burn the product. Do not crush or chemically dissolve the product. Do not put the product in the mouth. Observe related laws and company regulations when discarding this product. The product should be excluded from general industrial waste or household garbage.
<b>Caution</b> Optical Fiber	A glass-fiber is attached on the product. Handle with care. When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.
<b>Attention</b> ESD sensitive	Appropriate precautions must be taken to avoid exposure to ESD and EOS during handling the product.

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