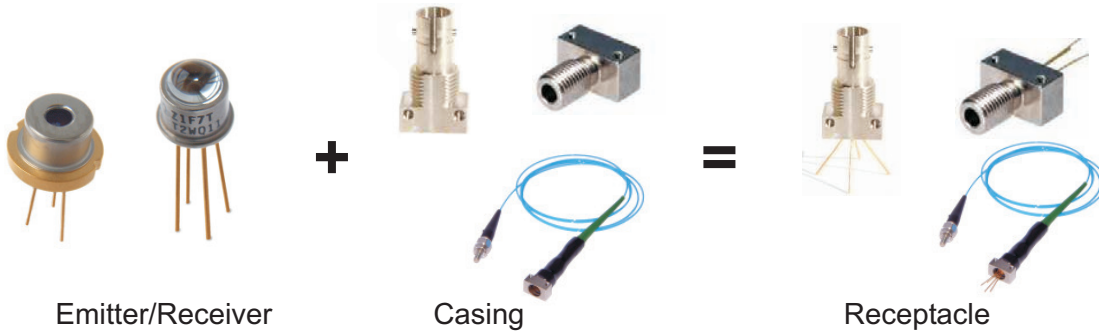


Fiber Optic Components





Emitter	Wavelength	Optical Output Power	Page
Singlemode - VCSEL	763 nm	100 µW	3
Singlemode - VCSEL	850 nm	500 µW	4
Singlemode - VCSEL	850 nm	200 µW	5
High Speed - VCSEL	850 nm	500 µW	6
High Speed - VCSEL	850 nm	1200 µW	7
Singlemode - VCSEL	1310 nm	900 µW	8
Singlemode - VCSEL	1550 nm	1500 µW	9
Singlemode - Laser Diode	635 nm	2500 µW	10
Singlemode - Laser Diode	650 nm	3000 µW	11
Laser Diode	1310 nm	3500 µW	12
Laser Diode	1550 nm	3500 µW	13
Laser Diode	1650 nm	55 mW (pulsed)	14
LED	850 nm	475 µW	15
LED	1310 nm	30 µW	16

Receiver	Detection Range	Bandwidth	Page
Silicon Photodetector 1.25 Gbps	850 nm	1 GHz	17
PIN-TIA Receiver 155 Gbps	1310 nm	140 MHz	18
PIN-TIA Receiver 622 Mbps	1310 nm	580 MHz	19
PIN-TIA Receiver 1.25 Gbps	1310 nm	920 MHz	20
PIN-TIA Receiver 2.5 Gbps	1310 nm	1.9 GHz	21
Silicon Photodiode 1.25 Gbps	850 nm	1.5 GHz	22
Silicon Photodiode 1.25 Gbps	850 nm	1 GHz	23
High-speed Photodiode	760 nm	1 GHz	24

Receptacles	Page
ST1, ST2, ST4, FIBERDIP, SC	25
SMA1, SMA2, FC/APC, FC1, FC2	26
P2, P2/APC, P3, P3/APC, LC	27
U2, U3 (only for visible Emitter), Duplex, Triplex	28

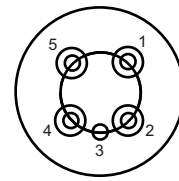
Fiber Combiner, Fiber Collimator, Inquiry	Page
Fiber Collimator	29
Ball Fiber Collimator	30
Inquiry	31

Singlemode - VCSEL 763 nm
(VCSEL = Vertical Cavity Surface Emitting Laser)



- Features of Diode:**
- Vertical Cavity Surface-Emitting Laser
 - internal TEC and Thermistor
 - Narrow linewidth
 - 2 nm tunability with TEC
 - ESD protection diode
 - optional without TEC and Thermistor
 - optional with ± 1 nm emission wavelength available

PINOUT



Bottom view

Absolute maximum ratings of VCSEL

Parameter	Min.	Max.
Storage temperature	-20 °C	85 °C
Operating temperature	-20 °C	80 °C
Laser continuous forward current		2 mA

Number	Function
1	TEC+
2	Thermistor+
3	VCSEL cathode, Thermistor-, case
4	VCSEL Anode
5	TEC-

Electrical-optical characteristics (T= 25 °C)

Parameter VCSEL	Test Condition	Min.	Typ.	Max.
Wavelength	T= 20 °C, I _{TEC} =0, P _{OP} =0.3 mW	760 nm	763 nm	766 nm
Threshold current	T= 20 °C		0.5 mA	
Threshold voltage			1.8 V	
Laser current	P _{opt} =0.3 mW			2 mA
Laser voltage	P _{opt} =0.3 mW		2.0 V	
Relative intensity noise	P _{opt} =0.3 mW @ 1 GHz		-130 dB/Hz	-120 dB/Hz
Wavelength tuning over current			0.60 nm/mA	
Wavelength tuning over temperature			0.06 nm/K	
Spectral bandwidth	P _{opt} =0.3 mW		100.0 MHz	
TEC current				500 mA
NTC thermistor resistance		9.5 kΩ	10 kΩ	11 kΩ
Wavelength tuning over TEC current	TEC current < 200 mA		0.008 nm/mA	
Parameter Receptacle		Min.	Typ.	Max.
Optical output power	Singlemode 4/125 μm fiber	0.05 mW	0.10 mW	
Possible receptacle	P2/APC, P3/APC, FC1, FC2, FC/APC			

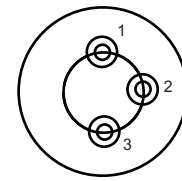
Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
Note: The above product specifications are subject to change without notice.

Singlemode - VCSEL 850 nm
(VCSEL = Vertical Cavity Surface Emitting Laser)



- Features of Diode:**
- Designed for drive currents between 1 and 5 mA
 - Optimized for low dependence of electrical properties over temperature
 - High speed ≥ 1 GHz
 - Two different laser/photodiode polarities
 - Attenuating coating also available
 - Packaged with a photodetector

PINOUT



Bottom view

Absolute maximum ratings of VCSEL

Parameter	Min.	Max.
Storage temperature	-20 °C	85 °C
Operating temperature	0 °C	50 °C
Laser continuous forward current, heat-sinked		4 mA
Laser reverse voltage ($I_R = 10 \mu A$)		5 V

Number	Function
1	VCSEL Cathode
2	VCSEL Anode, MD Cathode
3	MD Anode

Electrical-optical characteristics

Parameter VCSEL	Test Condition	Min.	Typ.	Max.
Wavelength	$I_F = 4 \text{ mA}$	835 nm		870 nm
Threshold current				1.5 mA
Laser forward voltage	$I_F = 4 \text{ mA}$		1.9 V	2.5 V
Rise and fall time	Prebias above Threshold, 20%-80%		150 ps	
Parameter Monitordiode	Test Condition	Min.	Typ.	Max.
Monitor current	$P_O = 1 \text{ mW}$		0.035 mA	
Dark current	$P_O = 0 \text{ mW}, V_R = 3 \text{ V}$			20 nA
PD reverse voltage	$P_O = 0 \text{ mW}, I_R = 10 \mu A$	30 V	115 V	
PD capacitance	$V_R = 3 \text{ V}, f = 1 \text{ MHz}$		40 pF	55 pF
Parameter Receptacle	Test Condition	Min.	Typ.	Max.
Optical output power	Singlemode 5/125 μm fiber	100 μW	150 μW	
	Multimode 50/125 μm fiber	300 μW	500 μW	
Possible receptacle	P2/APC, P3/APC, FC1, FC2, FC/APC			

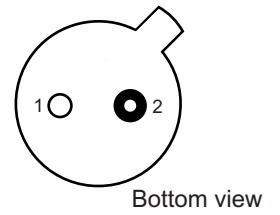
Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
Note: The above product specifications are subject to change without notice.

Low cost Singlemode - VCSEL 850 nm
(VCSEL = Vertical Cavity Surface Emitting Laser)



- Features of Diode:**
- Ideal circular gaussian beam
 - Built-in ESD protection structure
 - High reliability, >10⁵ h @ 50°C, 2mA

PINOUT



Absolute maximum ratings

Parameter	Min.	Max.
Storage temperature	-20 °C	85 °C
Operating temperature	0 °C	50 °C
Laser continuous forward current		2.5 mA
Laser reverse voltage		8 V

Number	Function
1	VCSEL Cathode
2	VCSEL Anode

Electrical-optical characteristics (T= 25 °C)

Parameter VCSEL	Test Condition	Min.	Typ.	Max.
Wavelength	T=20 °C, P _{op} =1.0 mW	845 nm	855 nm	860 nm
Threshold current	T=20 °C	0.2 mA		1.0 mA
Laser current	P _{opt} =1.0 mW	1.2 mA		2.0 mA
Laser voltage	P _{opt} =1.0 mW			2.6 V
Side mode suppression ratio	P _{opt} =1.0 mW	10 dB		
Wavelength tuning over temperature			0.06 nm/K	
Parameter Receptacle	Test Condition	Min.	Typ.	Max.
Optical output power	I _{op} = 2.0 mW	0.1 mW	0.2 mW	
Possible receptacle	P2/APC, P3/APC, FC1, FC2, FC/APC			

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

High Speed - VCSEL 850 nm
(VCSEL = Vertical Cavity Surface Emitting Laser)

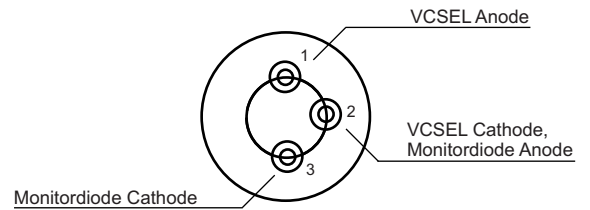


- Features of Diode:**
- 850 nm multi-mode oxide isolated VCSEL
 - Capable of modulation operation from DC to 2.5 Gbps
 - TO-46 flat window metal can component
 - Designed for drive currents between 3-15 mA average
 - Packaged with a back monitor
 - Attenuated can
 - Unattenuated versions also available

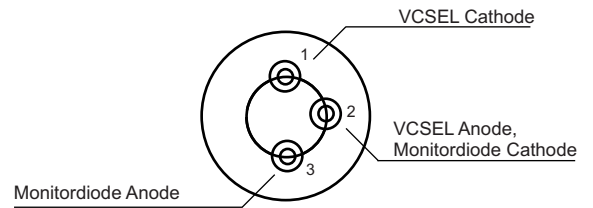
Absolute maximum ratings of VCSEL

Parameter	Min.	Max.
Storage temperature	-20 °C	85 °C
Operating temperature	-20 °C	85 °C
Laser continuous forward current		12 mA
Laser reverse voltage		5.0 V

PINOUT (Bottom View)



Type A



Type B

Electrical-optical characteristics (T= 25 °C)

Parameter VCSEL	Test Condition	Min.	Typ.	Max.
Wavelength	$I_F = 7 \text{ mA}$, $T_A = 0 \text{ °C to } 85 \text{ °C}$	830 nm	850 nm	860 nm
Threshold current		0.5 mA	1.8 mA	2.5 mA
Laser forward voltage	$I_F = 7 \text{ mA}$		1.8 V	2.0 V
Rise and fall time	$P_{avg} = 0.625 \text{ mW}$, extinct. Ratio=10			150 ps
Parameter Monitordiode	Test Condition	Min.	Typ.	Max.
Monitor current	$P_O = 0.625 \text{ mW}$, $T_A = 25 \text{ °C}$	0.100 mA		0.600 mA
Dark current	$P_O = 0 \text{ mW}$, $V_R = 3 \text{ V}$			20 nA
PD capacitance	$V_R = 3 \text{ V}$, $f = 1 \text{ MHz}$		40 pF	55 pF
Parameter Receptacle		Min.	Typ.	Max.
Optical output power	Multimode 50/125 μm fiber	250 μW	500 μW	
Possible receptacle	ST, Fiberdip, SMA ¹⁾ , FC, P			

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
Note: The above product specifications are subject to change without notice.

¹⁾ only multimode

High Speed - VCSEL 850 nm
(VCSEL = Vertical Cavity Surface Emitting Laser)

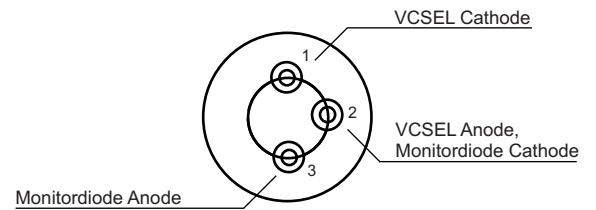


- Features of Diode:**
- 850 nm multi-mode oxide isolated VCSEL
 - Capable of modulation operation from DC to 2.5 Gbps
 - TO-46 flat window metal can component
 - Designed for drive currents between 3-15 mA average
 - Packaged with a back monitor
 - Unattenuated version

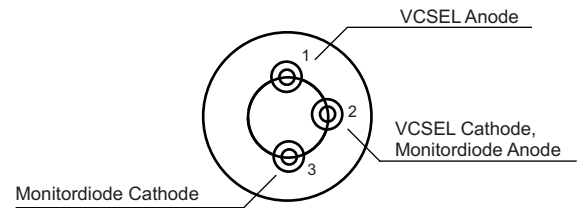
Absolute maximum ratings of VCSEL

Parameter	Min.	Max.
Storage temperature	-20 °C	85 °C
Operating temperature	-20 °C	85 °C
Laser continuous forward current		12 mA
Laser reverse voltage		5.0 V

PINOUT (Bottom View)



Type A



Type B

Electrical-optical characteristics

Parameter VCSEL	Test Condition	Min.	Typ.	Max.
Wavelength	$I_F = 7 \text{ mA}$, $T_A = 0 \text{ °C to } 85 \text{ °C}$	830 nm	850 nm	860 nm
Threshold current		0.5 mA	1.8 mA	2.5 mA
Laser forward voltage	$I_F = 7 \text{ mA}$		1.8 V	2.0 V
Rise and fall time	$P_{avg} = 2 \text{ mW}$, extinct. Ratio= 10			150 ps
Parameter Monitor diode	Test Condition	Min.	Typ.	Max.
Monitor current	$P_O = 2 \text{ mW}$, $T_A = 25 \text{ °C}$		0.025 mA	
Dark current	$P_O = 0 \text{ mW}$, $V_R = 3 \text{ V}$			20 nA
PD capacitance	$V_R = 3 \text{ V}$, $f = 1 \text{ MHz}$		40 pF	55 pF
Parameter Receptacle	Test Condition	Min.	Typ.	Max.
Optical output power	Multimode 50/125 μm fiber	0.8 mW	1.2 mW	
Possible receptacle	ST, Fiberdip, SMA ¹⁾ , FC, P			

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
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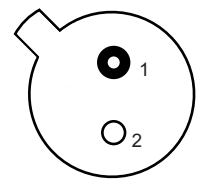
¹⁾ only multimode

Singlemode - VCSEL 1310 nm
(VCSEL = Vertical Cavity Surface Emitting Laser)



- Features of Diode:**
- 1310 nm single-mode VCSEL in TO-46
 - Optical output power: 1.8 mW
 - High data-rate modulation up to 10 Gbps available
 - Low power consumption
 - Low drive and threshold currents
 - Integrated monitoring diode optional
 - available with angled cap and anti-reflection window

PINOUT



Bottom view

Absolute maximum ratings of VCSEL

Parameter	Min.	Max.
Storage temperature	-20 °C	85 °C
Operating temperature	-20 °C	70 °C
Laser continuous forward current		20 mA
Laser reverse voltage		1.0 V

Number	Function
1	VCSEL Cathode
2	VCSEL Anode

Electrical-optical characteristics

Parameter VCSEL	Test Condition	Min.	Typ.	Max.
Wavelength	$T_o = 20\text{ °C}, @ P_{max/2}$	1300 nm	1330	1350 nm
Threshold current	$T_o = 20\text{ °C}$	0.5 mA	1.5 mA	2.5 mA
Laser forward voltage		1.1 V	1.3 V	2.0 V
Bandwidth			3.125 Gbps	
Operating current	$T_o = 20\text{ °C}$		16 mA	20 mA
Parameter Receptacle		Min.	Typ.	Max.
Optical output power	Singlemode 9/125 μm fiber	500 μW	700 μW	
	Multimode 50/125 μm fiber	600 μW	900 μW	
Possible receptacle	P2/APC, P3/APC, FC1, FC2, FC/APC			

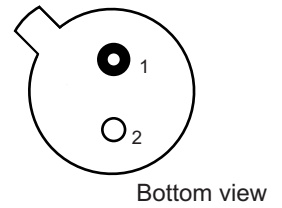
Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
Note: The above product specifications are subject to change without notice.

Singlemode - VCSEL 1550 nm
(VCSEL = Vertical Cavity Surface Emitting Laser)



- Features of Diode:**
- 1550 nm single-mode VCSEL in TO-46
 - Optical output power: 3.5 mW
 - High data-rate modulation up to 10 Gbps available
 - Low power consumption
 - Low drive and threshold currents
 - Integrated monitoring diode optional
 - available with angled cap and anti-reflection window

PINOUT



Absolute maximum ratings of VCSEL

Parameter	Min.	Max.
Storage temperature	-20 °C	85 °C
Operating temperature	-20 °C	70 °C
Laser continuous forward current		20 mA
Laser reverse voltage		1.0 V

Number	Function
1	VCSEL Cathode
2	VCSEL Anode

Electrical-optical characteristics

Parameter VCSEL	Test Condition	Min.	Typ.	Max.
Wavelength	$T_o = 20\text{ °C}, @ P_{max/2}$	1540 nm	1550	1560 nm
Threshold current	$T_o = 20\text{ °C}$	0.5 mA	1.5 mA	2.5 mA
Laser forward voltage		1.1 V	1.3 V	2.0 V
Bandwidth			3.125 Gbps	
Operating current	$T_o = 20\text{ °C}$		16 mA	20 mA
Parameter Receptacle		Min.	Typ.	Max.
Optical output power	Singlemode 9/125 μm fiber	500 μW	1000 μW	
	Multimode 50/125 μm fiber	600 μW	1500 μW	
Possible receptacle	P2/APC, P3/APC, FC1, FC2, FC/APC			

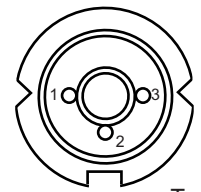
Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
Note: The above product specifications are subject to change without notice.

Singlemode - Laser Diode 635 nm



- Features of Diode:**
- 635 nm single-mode Laser Diode
 - Designed for drive currents between 30 and 45 mA
 - TO-18 flat window metal can component
 - Packaged with a photodetector

PINOUT



Top view

Absolute maximum ratings of laser diode

Parameter	Min.	Max.
Storage temperature	-20 °C	85 °C
Operating temperature	-10 °C	40 °C
Laser continuous forward current		45 mA
Laser reverse voltage		2.0 V
PD reverse voltage		30 V

Number	Function
1	LD Cathode
2	LD Anode, MD Cathode
3	MD Anode

Electrical-optical characteristics

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Wavelength	P _o = 5mW		635 nm	640 nm
Threshold current	CW		20 mA	35 mA
Laser forward voltage	P _o = 5mW		2.2 V	2.4 V
Parameter Monordiode	Test Condition	Min.	Typ.	Max.
Monitor current	P _o = 5mW	0.08 mA	0.2 mA	0.5 mA
Parameter Receptacle		Min.	Typ.	Max.
Optical output power	Singlemode 4/125 μm fiber		1000 μW	
	Multimode 50/125 μm fiber		2500 μW	
Optical output power (U2, U3)	Multimode 9/125 μm fiber		750 μW	
	Multimode 50/125 μm fiber		800 μW	
Possible receptacle	ST, Fiberdip, SMA ¹⁾ , FC, P, U			

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

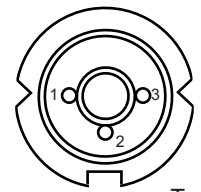
¹⁾ only multimode

Singlemode - Laser Diode 650 nm



- Features of Diode:**
- 650 nm single-mode Laser Diode
 - Designed for drive currents between 30 and 45 mA
 - TO-18 flat window metal can component
 - Packaged with a photodetector

PINOUT



Top view

Absolute maximum ratings of laser diode

Parameter	Min.	Max.
Storage temperature	-20 °C	85 °C
Operating temperature	-10 °C	70 °C
Laser continuous forward current		45 mA
Laser reverse voltage		2.0 V
PD reverse voltage		30 V

Number	Function
1	LD Cathode
2	LD Anode, MD Cathode
3	MD Anode

Electrical-optical characteristics

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Wavelength	$P_o = 5mW$	645 nm	650 nm	660 nm
Threshold current	CW		20 mA	35 mA
Laser forward voltage	$P_o = 5mW$		2.3 V	2.6 V
Parameter Monordiode	Test Condition	Min.	Typ.	Max.
Monitor current	$P_o = 5mW$	0.08 mA	0.2 mA	0.4 mA
Parameter Receptacle		Min.	Typ.	Max.
Optical output power	Singlemode 4/125 μm fiber		1200 μW	
	Multimode 50/125 μm fiber		3000 μW	
Optical output power (U2, U3)	Multimode 9/125 μm fiber		900 μW	
	Multimode 50/125 μm fiber		1000 μW	
Possible receptacle	ST, Fiberdip, SMA ¹⁾ , FC, P, U			

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

¹⁾ only multimode

FP- Laser Diode 1310 nm

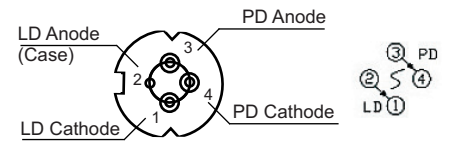


- Features of Diode:**
- Uncooled laser diode with MQW structure
 - 5 mW CW operation at -40 to 85 °C
 - High temperature operation without active cooling
 - Hermetically sealed active component
 - Built-in InGaAs monitor photodiode
 - Complies with Telcordia (Bellcore) GR-468-CORE
 - TO-18 packaging with a flat window cap or ball lens cap

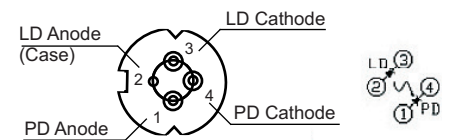
Absolute maximum ratings of laser diode

Parameter	Min.	Max.
Storage temperature	-20 °C	85 °C
Operating temperature	-20 °C	85 °C
Laser continuous forward current		150 mA
Laser reverse voltage		2.0 V
PD reverse voltage		10 V

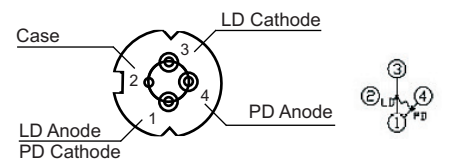
PINOUT (Bottom View)



Type A



Type B



Type D

Electrical-optical characteristics

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Wavelength		1290 nm	1310 nm	1330 nm
Threshold current	CW, P _o = 5 mW		10 mA	15 mA
Laser forward voltage	CW, P _o = 5 mW		1.2 V	1.5 V
Rise and fall time	10% - 90%			0.5 ns
Parameter Monitordiode	Test Condition	Min.	Typ.	Max.
Monitor current	CW, P _o = 5 mW, V _{RPD} = 2 V	100 μA		
Dark current	V _{RPD} = 5 V			0.1 μA
PD capacitance	V _{RPD} = 5 V, f = 1MHz		6 pF	15 pF
Parameter Receptacle		Min.	Typ.	Max.
Optical output power	Singlemode 9/125 μm fiber	1000 μW	1700 μW	
	Multimode 50/125 μm fiber	2500 μW	3500 μW	
Possible receptacle	ST, Fiberdip, SMA ¹⁾ , FC, P			

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

¹⁾ only multimode

FP- Laser Diode 1550 nm

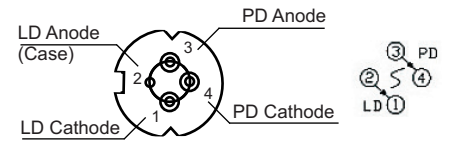


- Features of Diode:**
- Uncooled laser diode with MQW structure
 - 5 mW CW operation at -40 to 85 °C
 - High temperature operation without active cooling
 - Hermetically sealed active component
 - Built-in InGaAs monitor photodiode
 - Complies with Telcordia (Bellcore) GR-468-CORE
 - TO-18 packaging with a flat window cap or ball lens cap

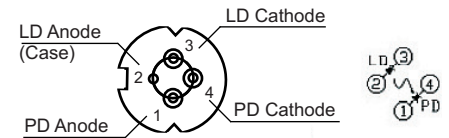
Absolute maximum ratings of laser diode

Parameter	Min.	Max.
Storage temperature	-20 °C	85 °C
Operating temperature	-20 °C	85 °C
Laser continuous forward current		150 mA
Laser reverse voltage		2.0 V
PD reverse voltage		10 V

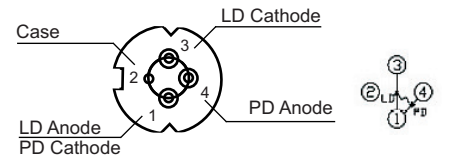
PINOUT (Bottom View)



Type A



Type B



Type D

Electrical-optical characteristics

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Wavelength		1530 nm	1550 nm	1570 nm
Threshold current	CW, P _o = 5 mW		10 mA	15 mA
Laser forward voltage	CW, P _o = 5 mW		1.2 V	1.5 V
Rise and fall time	10-90%			0.5 ns
Parameter Monitordiode	Test Condition	Min.	Typ.	Max.
Monitor current	CW, P _o = 5 mW, V _{RPD} = 2 V	100 µA		
Dark current	V _{RPD} = 5 V			0.1 µA
PD capacitance	V _{RPD} = 5 V, f = 1MHz		6 pF	15 pF
Parameter Receptacle		Min.	Typ.	Max.
Optical output power	Singlemode 9/125 µm fiber	1000 µW	1700 µW	
	Multimode 50/125 µm fiber	2500 µW	3500 µW	
Possible receptacle	ST, Fiberdip, SMA ¹⁾ , FC, P			

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

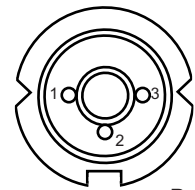
¹⁾ only multimode

FP- Laser Diode 1650 nm



- Features of Diode:**
- TO56 package with window cap
 - Designs for optical test equipment applications where high peak pulsed power is desired
 - Includes a monitor diode for feedback control

PINOUT



Bottom view

Absolute maximum ratings of laser diode

Parameter	Min.	Max.
Storage temperature	-20 °C	85 °C
Operating temperature	-20 °C	70 °C
Laser continuous forward current		1000 mA

Number	Function
1	LD Cathode
2	LD Anode, MD Cathode/ Ground
3	Monitordiode Anode

Electrical-optical characteristics

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Wavelength	$I_f=1000\text{ mA}$, $P_w=10\text{ us}$, $D/C=1\%$	1640 nm	1650 nm	1660 nm
Threshold current	$P_w=10\text{ us}$, $D/C=1\%$		45 mA	60 mA
Forward voltage	$I_f=1000\text{ mA}$, $P_w=10\text{ us}$, $D/C=1\%$		2 V	4 V
Spectral width (RMS)	$I_f=1000\text{ mA}$, $P_w=10\text{ us}$, $D/C=1\%$		7 nm	12 nm
Parameter Monitordiode	Test Condition	Min.	Typ.	Max.
Monitor current	Ex-facet, $P_o= 5\text{ mW CW}$	30 μA		
Parameter Receptacle		Min.	Typ.	Max.
Optical output power	$I_f=1000\text{ mA}$, $P_w=10\text{ }\mu\text{s}$, $D/C=1\%$ Singlemode 9/125 μm fiber	40 mW	55 mW	
Possible receptacle	P2, P2/APC, P3, P3/APC, FC1, FC2, FC/APC			

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)

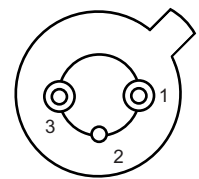
Note: The above product specifications are subject to change without notice.

Infrared LED 850 nm
(Light Emitting Diode)



- Features of Diode:**
- High-speed response: 100 MHz typ.
 - High radiant output power: for fiber optic applications
 - Electrically isolated from case

PINOUT



Bottom view

Absolute maximum ratings of LED

Parameter	Min.	Max.
Storage temperature	-40 °C	150 °C
Operating temperature	-40 °C	125 °C
Laser continuous forward current		100 mA
Laser reverse voltage		1.0 V

Number	Function
1	LED Anode
2	LED Cathode
3	Case GND

Electrical-optical characteristics

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Wavelength	$I_F = 50 \text{ mA}$	820 nm	850 nm	880 nm
Spectral bandwidth (FWHM)	$I_F = 50 \text{ mA}$		35 nm	
Forward voltage	$I_F = 100 \text{ mA}$		1.8 V	2.0 V
Rise and fall time	$I_F = 100 \text{ mA}, 10\% - 90\%$		3.5 ns	4.5 ns
Parameter Receptacle		Min.	Typ.	Max.
Optical output power	Multimode 62.5/125 μm fiber, NA= 0.28		45 μW	
	Multimode 100/140 μm fiber, NA= 0.29		125 μW	
	Multimode 200/230 μm fiber, NA= 0.41		475 μW	
Possible receptacle	ST, Fiberdip, SMA ¹⁾ , FC, P			

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

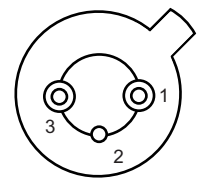
¹⁾ only multimode

LED 1310 nm
(Light Emitting Diode)



- Features of Diode:**
- High efficiency
 - -40 to 85 °C operating temperature
 - Hermetically sealed active component
 - TO-46 packaging with integrated ball lens cap
 - Optical data communication transmitter application
 - E-O converters application
 - LANS application
 - FDDI networks application
 - FITL application

PINOUT



Bottom view

Absolute maximum ratings

Parameter	Min.	Max.
Storage temperature	-40 °C	85 °C
Operating temperature	-40 °C	85 °C
Laser continuous forward current		150 mA
Laser reverse voltage		2.0 V

Number	Function
1	LED Anode
2	LED Cathode
3	Case GND

Electrical-optical characteristics

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Wavelength		1280 nm	1310 nm	1350 nm
Spectral width				170 nm
Forward voltage			1.2 V	1.7 V
Bandwidth		115 MHz		
Rise and fall time	10 - 90%		3.5 ns	
Parameter Receptacle		Min.	Typ.	Max.
Optical output power	Multimode 62.5/125 µm fiber	30 µW		
Possible receptacle	ST, Fiberdip, SMA ¹⁾ , FC, P			

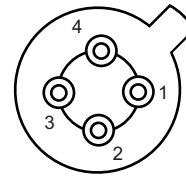
¹⁾ only multimode

Silicon Photodetector 1.25 Gbps with TIA and AGC

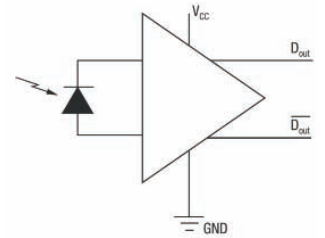


- Features of Diode:**
- Silicon Photodetector / Low Noise Transimpedance Amplifier
 - Large Active Area of 250 μm
 - High Bandwidth/ Wide Dynamic Range
 - Automatic Gain Control (AGC)
 - Hermetically Sealed TO-46 Can
 - Single 3.3 V to 5 V Power Supply
 - Differential Output

PINOUT



Bottom view



Functional Schematic

Absolute maximum ratings

Parameter	Min.	Max.
Storage temperature	-40 °C	125 °C
Operating temperature	-40 °C	75 °C
Supply voltage	0 V	6 V
Input optical power		5 dBm

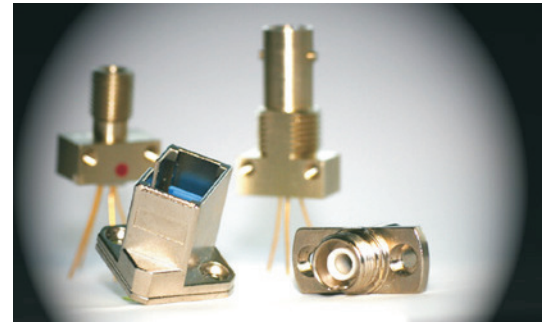
Number	Function
1	D _{out}
2	V _{CC}
3	D _{out} ^{bar}
4	GND

Electrical-optical characteristics (T_A = 23 °C, V_{CC} = 5.0 V, 850 nm)

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Power supply		3.0 V		5.5 V
Differential output voltage			200 mV _{p-p}	
Supply current			38 mA	50 mA
Detection range			850 nm	
Responsivity	-19 dBm, differential		3000 V/W	
Bandwidth	- 3 dB, small signal	800 MHz	1000 MHz	
Saturation power		-3 dBm	0 dBm	
Sensitivity	BER= 10 ⁻¹⁰ , PRBS2 ⁷ -1	-20 dBm	-23 dBm	
Output resistance		40 Ω	50 Ω	62 Ω
Possible receptacle	ST, Fiberdip, SC, SMA, FC, P, LC			

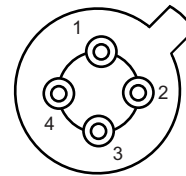
Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

PIN-TIA Receiver 155 Gbps with AGC

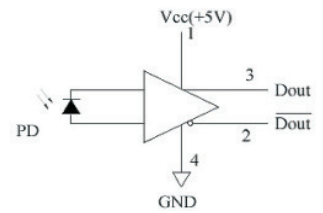


- Features of Diode:**
- InGaAs/InP PIN Photodiode with Transimpedance Amplifier
 - High sensitivity with AGC
 - Differential ended output
 - Single 3.3 V operation
 - -40 to 85 °C operating temperature
 - Integrated 4-pin TO-46 ball lens cap package
 - SDH/SONET/ATM application
 - Fast Ethernet application
 - ESCON application

PINOUT



Bottom view



Functional Schematic

Absolute maximum ratings

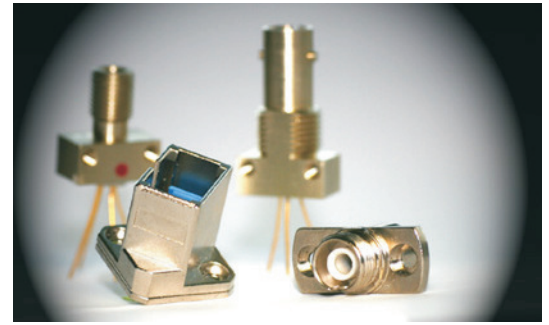
Parameter	Min.	Max.
Storage temperature	-40 °C	85 °C
Operating temperature	-40 °C	85 °C
Supply voltage		4.5 V

Number	Function
1	V _{CC}
2	D _{out}
3	D _{out}
4	GND

Electrical-optical characteristics (T_c= 25 °C)

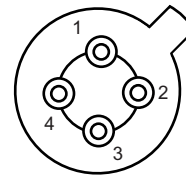
Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Power supply		3.0 V	3.3 V	3.6 V
Differential output voltage				1 V
Supply current				35 mA
Detection range ¹⁾		1100 nm	1310 nm	1650 nm
Gain @ 10 Mbps Differential ¹⁾	λ= 1310 nm	52 V/mW		70 V/mW
Bandwidth ¹⁾		120 MHz	140 MHz	
Saturation power ¹⁾	λ= 1310 nm	-3 dBm	0 dBm	
Sensitivity ¹⁾	BER= 10 ⁻¹⁰ @ 155 Mbps		-38 dBm	-35 dBm
Output resistance ¹⁾			50 Ω	65 Ω
Possible receptacle	ST, Fiberdip, SC, SMA, FC, P, LC			

PIN-TIA Receiver 622 Mbps with AGC

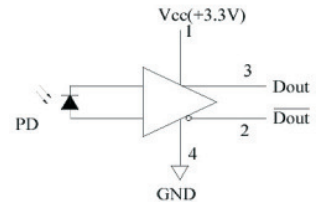


- Features of Diode:**
- InGaAs/InP PIN Photodiode with Transimpedance Amplifier
 - High sensitivity with AGC
 - Differential ended output
 - Single supply voltage 3.3 V
 - -40 to 85 °C operating temperature
 - Integrated 4-pin TO-46 ball lens cap package
 - 622 Mbps SONET/SDH/ATM receivers
 - Bi-Directional optical module/transceiver

PINOUT



Bottom view



Functional Schematic

Absolute maximum ratings

Parameter	Min.	Max.
Storage temperature	-40 °C	85 °C
Operating temperature	-40 °C	85 °C
Supply voltage		4 V

Number	Function
1	V _{CC}
2	D _{out}
3	D _{out}
4	GND

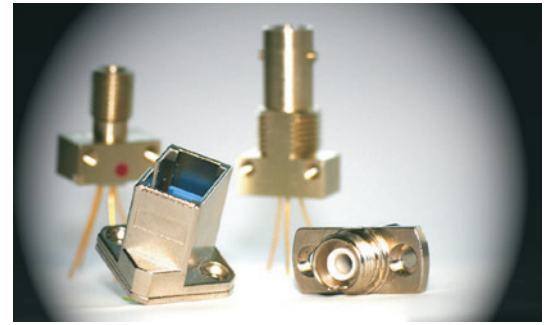
Electrical-optical characteristics (T_c= 25 °C)

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Power supply		3.0 V	3.3 V	3.6 V
Differential output voltage				0.4 V
Supply current			20 mA	26 mA
Detection range ¹⁾		1100 nm	1310 nm	1650 nm
Gain @ 10 Mbps Differential ¹⁾	Measure diff. AC coupled, R _L =50 Ω	13 V/mW	16.5 V/mW	21 V/mW
Bandwidth ¹⁾	T _c = 25 °C	435 MHz	580 MHz	
Saturation power ¹⁾	BER < 10 ⁻¹⁰ @ 622 Mbps, Er= 10 dB	-3 dBm	0 dBm	
Sensitivity ¹⁾	BER < 10 ⁻¹⁰ @ 622 Mbps, Er= 10 dB		-32 dBm	-29 dBm
Output resistance ¹⁾		60 Ω	75 Ω	90 Ω
Possible receptacle	ST, Fiberdip, SC, SMA, FC, P, LC			

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
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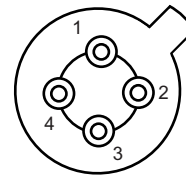
¹⁾ V_{CC} = 3.3 V, 9/125 μm SM fiber

PIN-TIA Receiver 1.25 Gbps

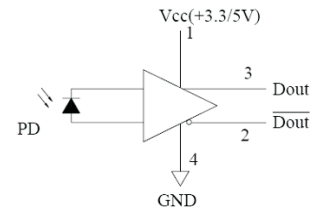


- Features of Diode:**
- InGaAs/InP PIN Photodiode with Transimpedance Amplifier
 - High sensitivity with AGC
 - Differential ended output
 - Single 3.3 V/5 V operation
 - -40 to 85 °C operating temperature
 - Add the pin to monitor PD chip
 - Integrated 4-pin TO-46 ball lens cap package
 - 1.25 Gbps SDH/SONET/ATM receiver application

PINOUT



Bottom view



Functional Schematic

Absolute maximum ratings

Parameter	Min.	Max.
Storage temperature	-40 °C	85 °C
Operating temperature	-40 °C	85 °C
Supply voltage		6 V

Number	Function
1	V _{CC}
2	D _{out}
3	D _{out}
4	GND

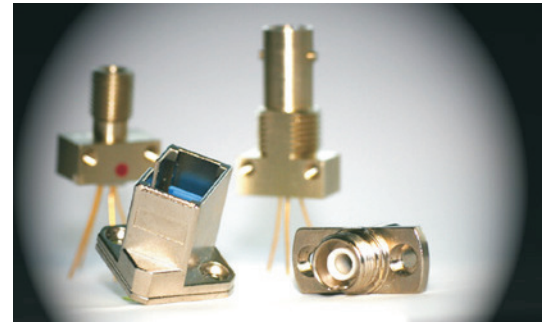
Electrical-optical characteristics (T_c= 25 °C)

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Power supply		3.0 V		5.5 V
Differential output voltage		185 mV _{p-p}	250 mV _{p-p}	415 mV _{p-p}
Supply current			26 mA	50 mA
Detection range ¹⁾		1100 nm	1310 nm	1650 nm
Gain @ 10 Mbps Differential ¹⁾	Measure diff. with 30 μA _{p-p} signal	1.92 V/mW	2.5 V/mW	3.4 V/mW
Bandwidth ¹⁾		700 MHz	920 MHz	1100 MHz
Saturation power ¹⁾	BER < 10 ⁻¹⁰ @ 1.25 Gbps, Er=10 dB	-3 dBm	0 dBm	
Sensitivity ¹⁾	BER < 10 ⁻¹⁰ @ 1.25 Gbps, Er=10 dB		-26 dBm	-24 dBm
Output resistance ¹⁾		48 Ω	50 Ω	62 Ω
Possible receptacle	ST, Fiberdip, SC, SMA, FC, P, LC			

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

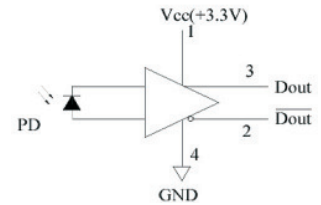
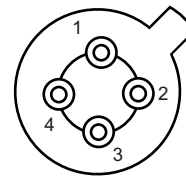
¹⁾ V_{CC} = 3.3 V, 9/125 μm SM fiber

PIN-TIA Receiver 2.5 Gbps with AGC



- Features of Diode:**
- InGaAs/InP PIN Photodiode with Transimpedance Amplifier
 - High sensitivity with AGC
 - Differential ended output
 - Single 3.3 V operation
 - -40 to 85 °C operating temperature
 - Integrated 4-pin TO-46 ball lens cap package
 - 2.5 Gbps SDH/SONET/ATM receiver application

PINOUT



Bottom view

Absolute maximum ratings

Parameter	Min.	Max.
Storage temperature	-40 °C	85 °C
Operating temperature	-40 °C	85 °C
Supply voltage		3.8 V

Number	Function
1	V _{CC}
2	D _{out}
3	D _{out}
4	GND

Electrical-optical characteristics (T_c= 25 °C)

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Power supply		3.0 V	3.3 V	3.6 V
Differential output voltage			0.6 V	
Supply current			26 mA	38 mA
Detection range ¹⁾		1100 nm	1310 nm	1650 nm
Gain @ 10 Mbps Differential ¹⁾			27 V/mW	
Bandwidth ¹⁾		1.7 GHz	1.9 GHz	
Saturation power ¹⁾		-3 dBm	0 dBm	
Sensitivity ¹⁾	BER= 10 ⁻¹⁰ @2.5 Gbps, PRBS 2 ²³ -1		-21 dBm	-18 dBm
Output resistance ¹⁾		40 Ω	53 Ω	65 Ω
Possible receptacle	ST, Fiberdip, SC, SMA, FC, P, LC			

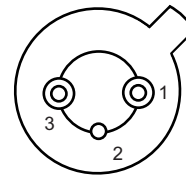
¹⁾ V_{CC}= 3.3 V, λ=1310 nm, 9/125 μm SM fiber

Silicon Photodiode 1.25 Gbps

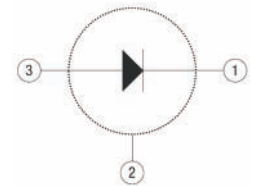


- Features of Diode:**
- Silicon Photodiodes
 - High Responsivity
 - Large Diameter Sensing Area
 - Low Capacitance @ 3.3 V

PINOUT



Bottom view



Functional Schematic

Absolute maximum ratings

Parameter	Min.	Max.
Storage temperature	-55 °C	125 °C
Operating temperature	-40 °C	75 °C
Reverse voltage		20 V

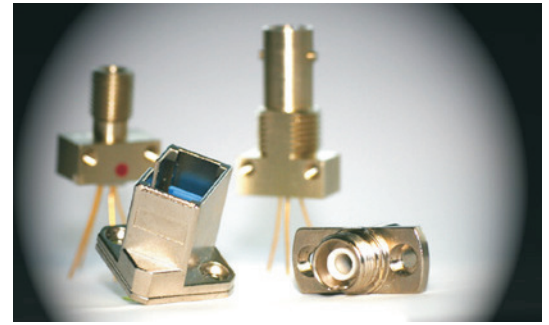
Number	Function
1	Cathode
2	Case
3	Anode

Electrical-optical characteristics (T_A = 23°C)

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Active area diameter			150 µm	
Responsivity	λ = 850 nm		0.36 A/W	
Dark current	V _R = 3.3 V		20 pA	500 pA
Detection range			850 nm	
Rise time	20-80 %, R _L = 53 Ω, λ = 850 nm, V _R = 3.3 V		38 ps	
Fall time	80-20 %, R _L = 53 Ω, λ = 850 nm, V _R = 3.3 V		313 ps	
NEP in W/Hz ^{1/2}			8.60x10 ⁻¹⁵	
Possible receptacle	ST, Fiberdip, SC, SMA, FC, P, LC			

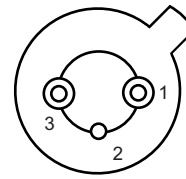
Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

Silicon Photodiode 1.25 Gbps

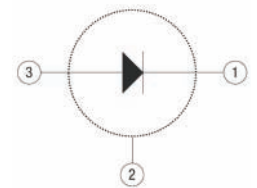


- Features of Diode:**
- Silicon Photodiodes
 - High Responsivity
 - Large Diameter Sensing Area
 - Low Capacitance @ 3.3 V

PINOUT



Bottom view



Functional Schematic

Absolute maximum ratings

Parameter	Min.	Max.
Storage temperature	-55 °C	125 °C
Operating temperature	-40 °C	75 °C
Reverse voltage		20 V

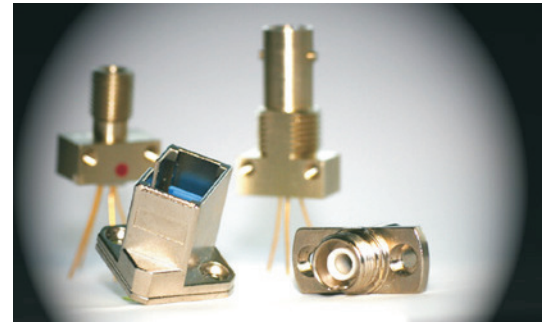
Number	Function
1	Cathode
2	Case
3	Anode

Electrical-optical characteristics (T_A = 23°C)

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Active area diameter			250 µm	
Responsivity	λ = 850 nm		0.36 A/W	
Dark current	V _R = 3.3 V		25 pA	500 pA
Detection range			850 nm	
Rise time	20-80 %, R _L = 53 Ω, λ = 850 nm, V _R = 3.3 V		50 ps	
Fall time	80-20 %, R _L = 53 Ω, λ = 850 nm, V _R = 3.3 V		429 ps	
NEP in W/Hz ^{1/2}			9.29x10 ⁻¹⁵	
Possible receptacle	ST, Fiberdip, SC, SMA, FC, P, LC			

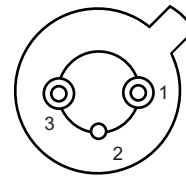
Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

High-speed photodiode

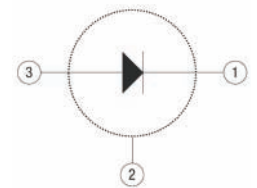


- Features of Diode:**
- SI PIN photodiode
 - High speed response: 1 GHz ($V_R=3.3$ V)
 - High sensitivity
 - High reliability

PINOUT



Bottom view



Functional Schematic

Absolute maximum ratings

Parameter	Min.	Max.
Storage temperature	-55 °C	125 °C
Operating temperature	-40 °C	100 °C
Reverse voltage		20 V

Number	Function
1	Cathode
2	Case
3	Anode

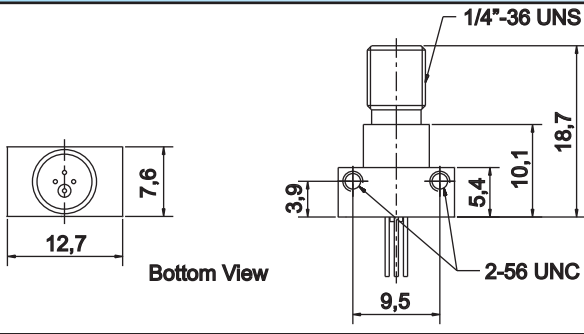
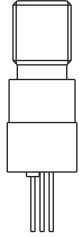
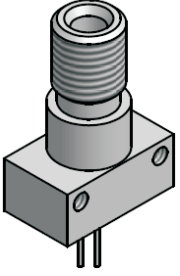
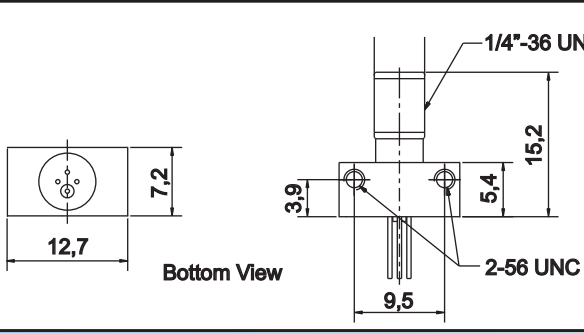
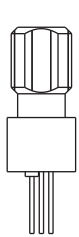
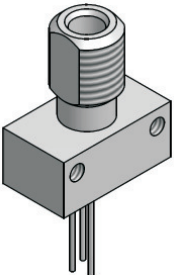
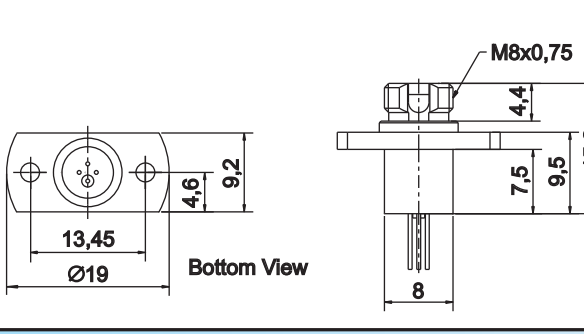
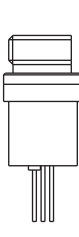
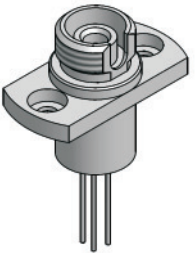
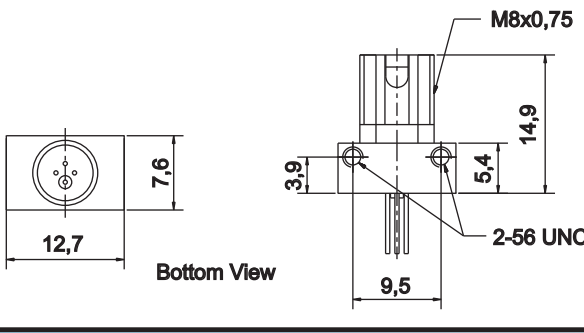
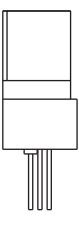
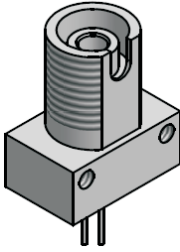
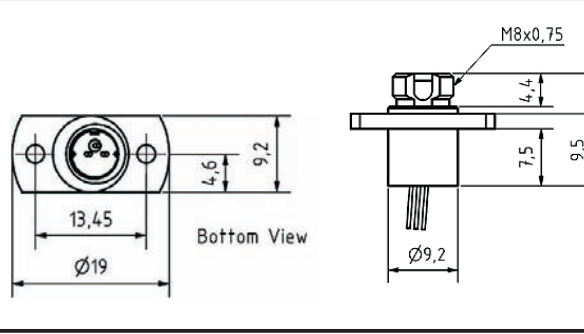

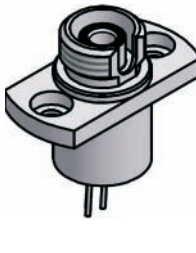
Electrical-optical characteristics

Parameter Laser Diode	Test Condition	Min.	Typ.	Max.
Active area diameter			0.4 mm	
Sensitivity	$\lambda = 780$ nm		0.51 A/W	
Dark current	$V_R = 3.3$ V		0.001 nA	0.1 nA
Detection range		320nm	760 nm	1000 nm
Rise time			0.25 ns	
Fall time			0.8 ns	
NEP in $W/Hz^{1/2}$	$V_R = 3.3$ V		1.1×10^{-15}	
Possible receptacle	ST, Fiberdip, SC, SMA, FC, P, LC			

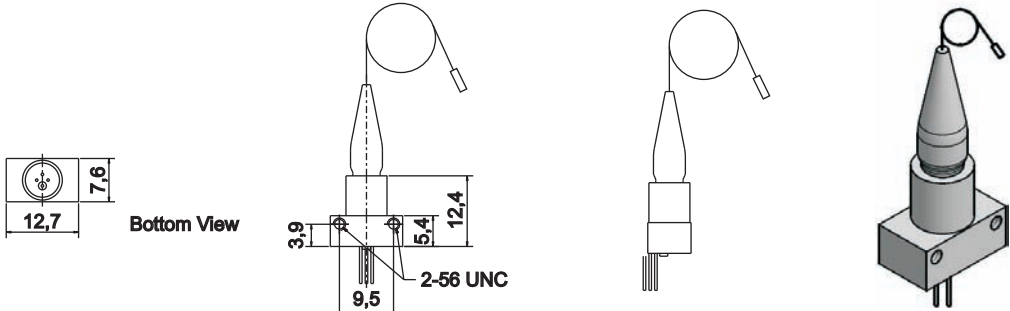
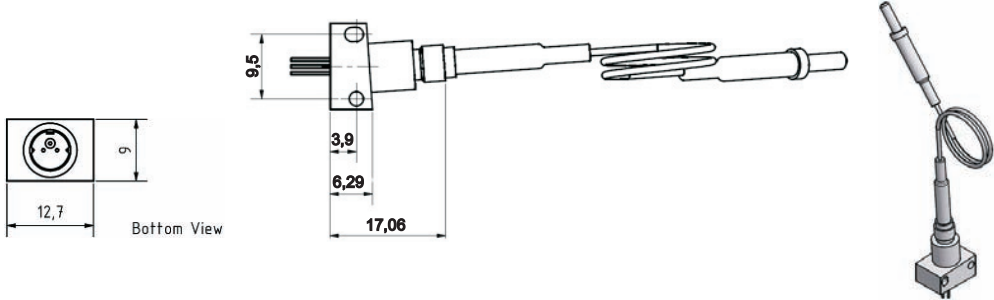
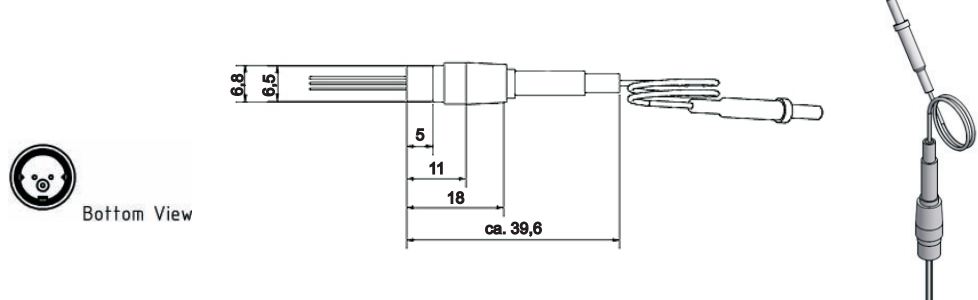
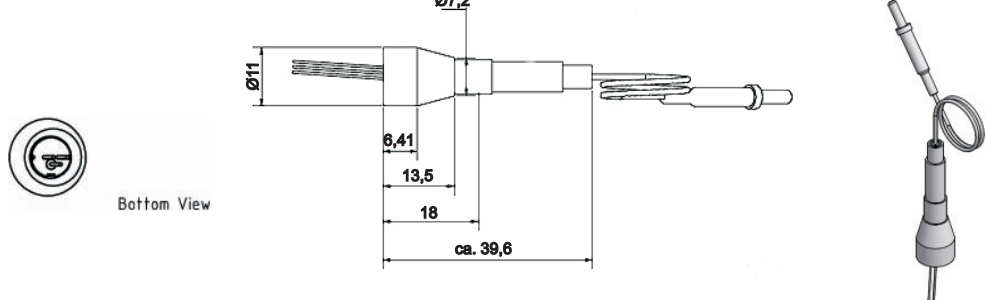
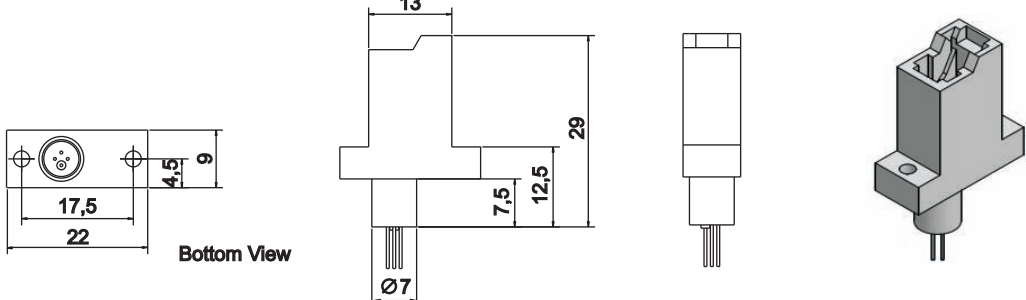
Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

<p>St1</p>	<p>ST Slot</p> <p>Bottom View</p> <p>5/16"-32 UNEF</p>		
<p>St2</p>	<p>ST Slot</p> <p>Bottom View</p> <p>3/8"-32 UNEF</p> <p>2-56 UNC</p>		
<p>St4</p>	<p>ST Slot</p> <p>Bottom View</p> <p>3/8"-32 UNEF</p> <p>2-56 UNC</p>		
<p>FIBERDIP</p>	<p>ST Slot</p> <p>Bottom View</p> <p>3/8"-32 UNEF</p>		
<p>SC</p>	<p>Bottom View</p>		

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

<p>SMA1</p>			
<p>SMA2</p>			
<p>FC1</p>			
<p>FC2</p>			
<p>FC/APC</p>			

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

<p>P2</p>	<p>Length 1m with: 1,25 mm Ferule; 2,50 mm Ferule; DIN; E2000; FC; SC; ST; SMA</p> 
<p>P2/APC</p>	
<p>P3</p>	
<p>P3/APC</p>	
<p>LC</p>	

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
Note: The above product specifications are subject to change without notice.

U2

Bottom View

U3

Bottom View

Duplex

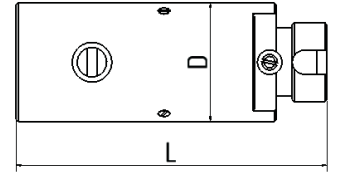
Triplex

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
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Fiber Collimator with FC-Connector



- Information:**
- LWL connection for FC/PC connectors (0° polish)
 - Coating of lense: $R_{AVG} < 0,5\%$ from 400-700nm



Dimensions according to DIN ISO 2768 f if not specified otherwise. Drawing not in scale

D (mm)	12 H7
L (mm)	31.50

Parameter @ $T_c = 25\text{ °C}$, 4/125 μm fiber	Min.	Typ.	Max.
Focal length f'		20 mm	
Numerical aperture N.A.		0.18	
Clear aperture			7.4 mm
Collimated beam diameter @ $1/e^2$		3.4 mm	
Beam divergence			0.3 mrad
Focused beam diameter @ $1/e^2$			
- at distance 0.5 m		0.2 mm	
- at distance 1.0 m		0.35 mm	
- at distance 5.0 m		1.40 mm	



Fiber Colli with Pigtail



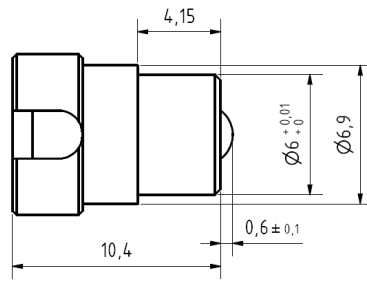
Fiber Colli with Pigtail

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

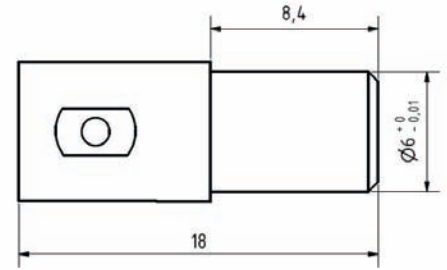
BFC3ST / BFC3FC



Information: - Ball Fiber Collimator with ST or FC Connector

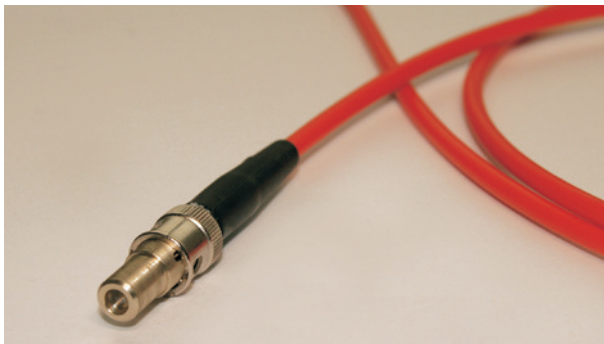


BFC3FC¹⁾

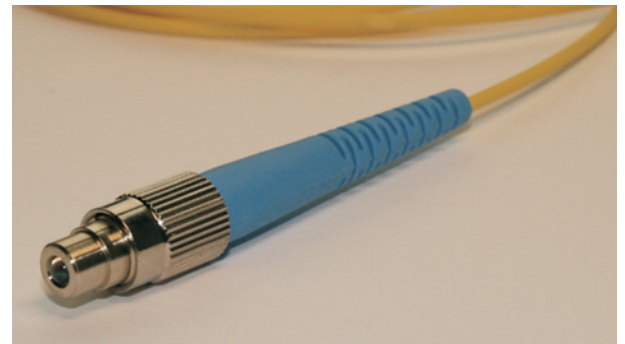


BFC3ST¹⁾

Parameter @ T _c = 25 °C, 4/125 μm, N.A. 0.11	Min.	Typ.	Max.
Focal length f'		18 mm	
Clear aperture			3.0 mm
Collimated beam diameter @ 1/e ²		0.75 mm	
Beam divergence			1 mrad
Focused beam diameter @ 1/e ²			
- at distance 0.5 m		1.75 mm	
- at distance 1.0 m		2.75 mm	
- at distance 5.0 m		10.75 mm	



BFC3ST with Fiber



BFC3FC with Fiber

Compliant with RoHS-requirements (2002/95/EG vom 27.01.2003)
 Note: The above product specifications are subject to change without notice.

¹⁾ Dimensions according to DIN ISO 2768 f if not specified otherwise.
 Drawing not in scale.

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 Also an inquiry form you will find on our website **www.imm-photonics.de**.
 Please write in **block letters**.

Company information	
Company	
Street	
Zip-Code / City	
Country	
Phone	
Fax	
E-mail	

Emitter			
<input type="checkbox"/> Standard Emitter	Side:	Name:	
<input type="checkbox"/> Singlemode	<input type="checkbox"/> Multimode	Casing type:	
Custom designed			
<input type="checkbox"/> VCSEL	<input type="checkbox"/> Laser diode	<input type="checkbox"/> LED	<input type="checkbox"/> Other:
<input type="checkbox"/> Singlemode	<input type="checkbox"/> Multimode	Fiber type:	
Wavelength (nm)		Data rate (Gbps)	
Optical output power (µW)		Operating current (mA)	
PINOUT type		Operating voltage (V)	
Receptacle type		Operating temperature (°C)	

Receiver			
<input type="checkbox"/> Standard Receiver	Side:	Name:	
Casing type:			
Custom designed			
Detection range	<input type="checkbox"/> 850 nm	<input type="checkbox"/> 1310 nm	<input type="checkbox"/> Other: Fiber type:
Bandwidth (MHz)		Operating current (mA)	
NEP in W/Hz ^{1/2}		Operating voltage (V)	
Receptacle type		Operating temperature (°C)	

Pigtail (Only fill in if you chose Receptacle P)			
Core diameter (µm)		Ferule cutting housing side (°C)	
Cladding diameter (µm)		Ferule cutting connector side	
Coating diameter (µm)			
Pigtail length (m)			

Notice

If you have your own specification. Do not hesitate to fax us.

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Unser Produktangebot reicht von der einzelnen Komponente (Laserdiode, Optik, Optoelektronik) über Subsysteme (Kollimatoren und Module) bis hin zu kompletten Geräten wie z.B. den FIBERPOINT®. Bei der Entwicklung kundenspezifischer Lösungen greifen wir auf die Erfahrung von 12 Ingenieurinnen und Ingenieuren zurück. Dies bildet die Basis für unser hohes technisches Know-how und die hervorragende Qualität unserer Produkte.

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Company Philosophy

Our aim is to find specific solutions together with you – for you.

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