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ANRITSU DEVICES
PRODUCT CATALOG Ver.2

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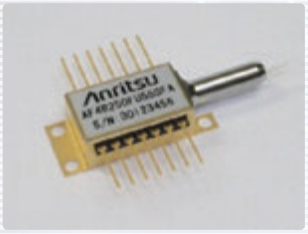
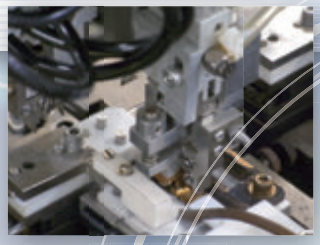
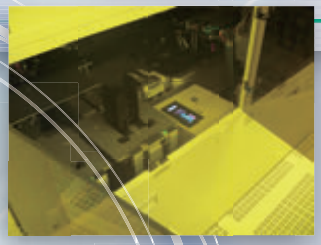
Optical Devices

■ Microfabrication ■ Device Design ■ Optical Coupling Technology ■ Crystal Growth

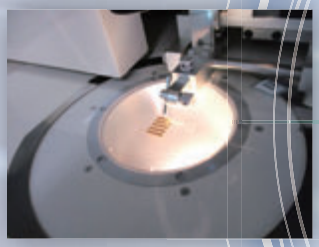
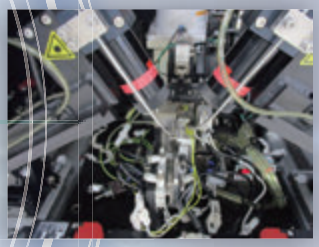


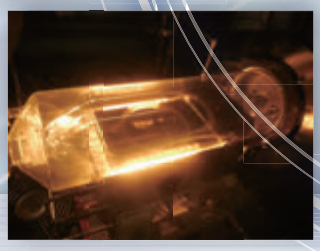



ANRITSU DEVICES

Core Technology

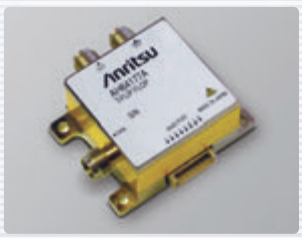
Crystal Growth~Mounting




Ultrafast Electron Devices

■ Microfabrication ■ Circuit Design ■ Mounting of High-frequency Module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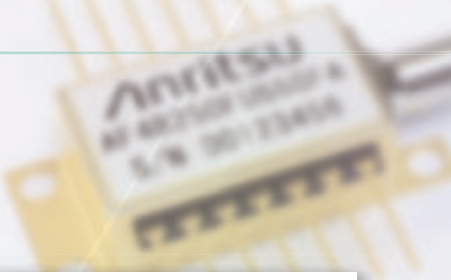


Telecommunication

Pump Laser for EDFA
1480nm FP-LD

Pump Laser for FRA
14xx nm FBG-LD

Gain Chip for Tunable Light Source
(C-band, L-band)

Semiconductor Optical Amplifier
1300nm SOA

Measurement

Light Source for Measurement Instruments
1310/1550/1625nm FP-LD
1650nm DFB-LD/SLD

Gain Chip for Tunable Light Source
(1300nm～1600nm)

Healthcare

OCT
830nm SLD
1310nm SLD
1550nm SLD

Eye Examination
830nm SLD

Blood Flow Sensor
1310nm DFB-LD

ANRITSU DEVICES

Core Technology

- Microfabrication
- Designing of Semiconductor Devices
- Optical Coupling Technology
- Crystal Growth

High Optical Output Power
Wide Bandwidth
For Various Wavelength

Precision

Probe Microscope
830nm SLD

FOG
830nm SLD

Displacement Meter
830nm SLD

Encoder
830nm SLD
1310nm DFB-LD

Industrial OCT
1310nm SLD

Industrial Use

Current Sensor
830nm SLD

LIDAR/Vehicle Detection
1480nm FP-LD

FBG Strain Sensor
1550nm SLD

Optical Powering
1550nm DFB-LD
1480nm FP-LD

Environment

Gas Sensing
1270nm～1800nm DFB-LD

Water Detection
1450nm FP-LD

Optical Devices: Selection Guide

List of Optical Devices Products

LD Module

Classification		Series/Model Number	Page No.	Optical Output Power	Laser Class (FDA)	Center Wavelength	Package
Pump Laser	1.48 μm FP-LD	AF4B Series type A	—	120 to 180 mW	Ⅲb	1475 nm	Butterfly
		AF4B Series type B	—	200 to 250 mW	Ⅲb		
		AF4B Series type C	—	300 to 400 mW	Ⅳ		
		AF4B Series type D	—	420 to 500 mW	Ⅳ		
		AF4B Seires type E	6	550 to 650 mW	Ⅳ		
	1.4xx μm FBG-LD	AF4B2 Series type GA	—	220 to 300 mW	Ⅲb	1420 to 1500 nm*	Butterfly
		AF4B2 Series type GB	—	310 to 400 mW	Ⅳ		
				410 to 500 mW	Ⅳ		
		AF4B2 Series type GC	—	410 to 500 mW	Ⅳ	1420 to 1485 nm*	
		AF4B2 Series type GD Low Power Consumption Version	—	410 to 500 mW	Ⅳ		
		AF4B Series type GE	8	550 to 650 mW	Ⅳ	1420 to 1470 nm*	
	1.48 μm FP-LD Uncooled type	AF4Y Series	14	80 mW	Ⅲb	Min: 1478 nm/Max: 1490 nm	Cylindrical
				150 mW	Ⅲb	Min: 1450 nm/Max: 1490 nm	
FP-LD		AF3B Series	—	100 mW	Ⅲb	1310 nm	Butterfly
			10	500 mW	Ⅳ	1320 nm	
		AF5B Series	—	100 mW	Ⅲb	1550 nm	
			12	450 mW	Ⅳ		

* 0.5 nm spacing is available. Other optical output power and center wavelength is also available, please contact our local office for further information.

SLD Module

Classification		Series/Model Number	Page No.	Optical Output Power	Laser Class (FDA)	Center Wavelength	Spectral Half Width	Package
SLD	0.8 μm SLD	AS8K215GY30M	16	5 mW	Ⅲb	830 nm	15	CAN
		AS8E210GP30M	17	1 mW	Ⅲb			Cylindrical
		AS8B112G230M	18	2 mW	Ⅲb		14	Butterfly
		AS8B115G230M		5 mW	Ⅲb			
		AS8B115L240M		5 mW	Ⅲb	840 nm	50	
	1.31 μm SLD	AS3E113HJ10M	15	3 mW	Ⅲb	1310±20 nm	53	Cylindrical
		AS3B119GM10M		15 mW	Ⅲb		55	Butterfly
	1.55 μm SLD	AS5B125EM50M		25 mW	Ⅲb	1550±20 nm	60	
	1.65 μm SLD	AS6B118GM50M		10 mW	Ⅲb	1650±20 nm	70	

DFB-LD Module

Classification		Series/Model Number	Page No.	Optical Output Power	Laser Class (FDA)	Center Wavelength	Package
1.65 μm DFB-LD	AB6B Series	AB6Bxxx	20	7 mW	Ⅲb	1651.1 nm	Butterfly
						1653.7 nm	

Gain Chip (for External Cavity)

Classification		Series/Model Number	Page No.	Center Wavelength	Laser Class (FDA)	ASE Spectral Width	Normal facet reflectance	Lateral Beam Exit Angle
Gain Chips	For C-L band without heater	AE5TxxxxBxx	21	1550 nm	Ⅲb	55 nm/100 mA	95 %	20 deg
	For C-L band with heater	AE5TxxxxJxx						

* Other center Wavelength (O,E,S and U-band) and facet reflectance is also available, please contact our local office for further information

SOA Module

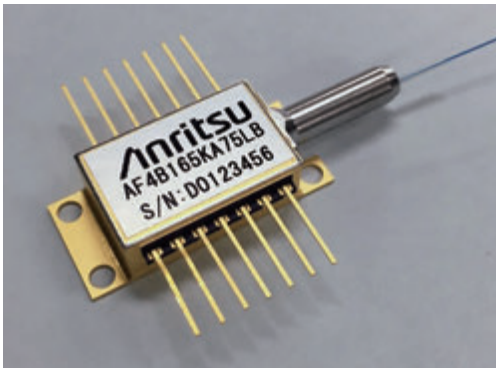
Classification		Series/Model Number	Page No.	Gain	Laser Class (FDA)	Polarizaiot Dependant Gain	Package
SOA	1.3 μm SOA Module	AA3F215CA	22	≥15 dB	Ⅲb	≤1.5 dB	6 pin Small PKG

Example of FP-LD ordering information

Model Number : A F 4 B 1 □ □ F □ □ □ □

- ◆ Center Wavelength Range
  CK: ±10 nm L: ±15 nm M: ±20 nm
- • Center Wavelength
  65: 1465 nm 70: 1470 nm
  75: 1475 nm 80: 1480 nm
- • Fiber and Connector
  A: SMF Ferrule D: PMF Ferrule
  G: SMF FC/PC K: PMF FC/PC
- • Optical Output Power
  42: 420 mW 46: 460 mW
  50: 500 mW

1.48 µm LD Module
AF4B Series type E



AF4B SERIES type E is 1.48 µm high power laser diode modules designed for Er doped fiber amplifier. The laser is packaged in a 14 pin butterfly package with optical isolator, monitor photodiode and thermo-electric cooler (TEC).

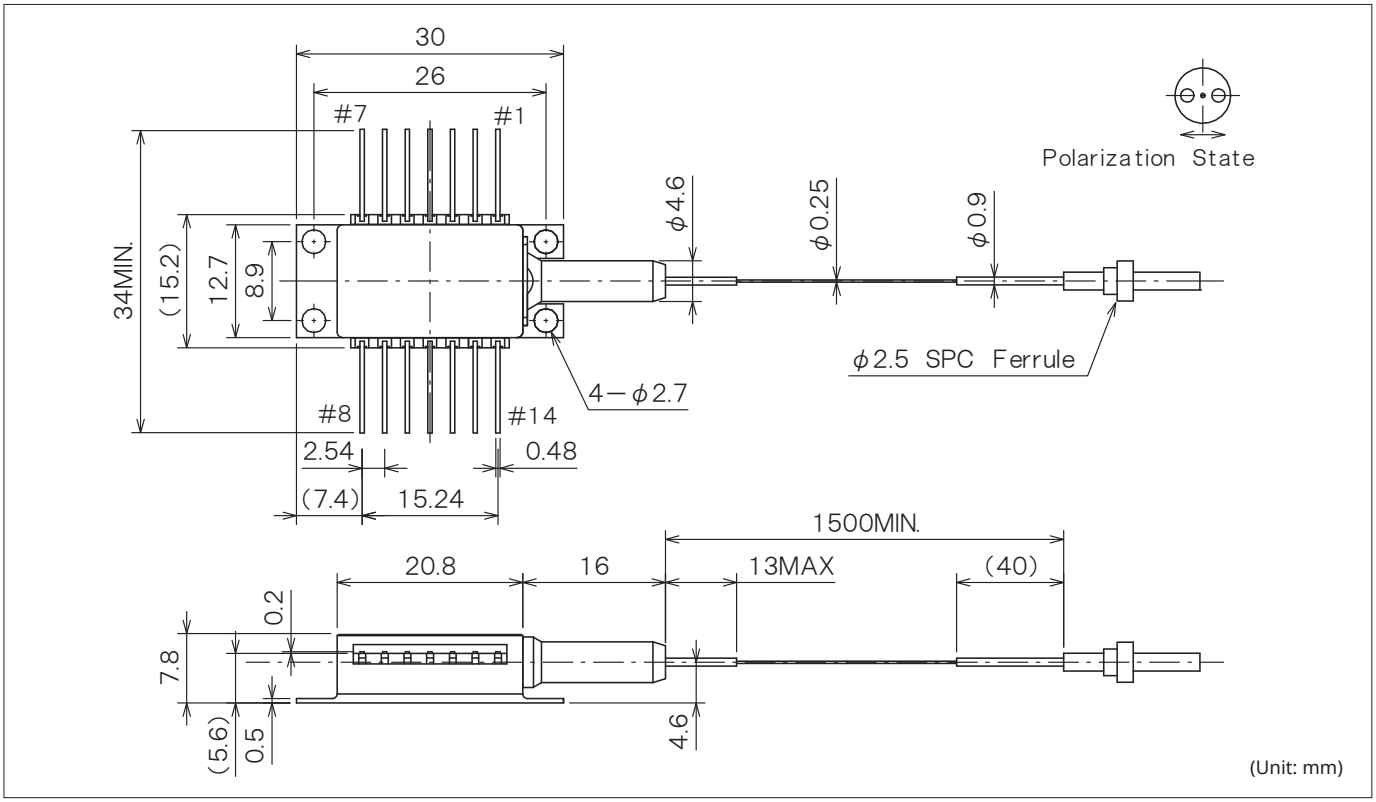
FEATURES

- Optical output power:
  AF4B155KA/KD75LB: 550mW
  AF4B160KA/KD75LB: 600mW
  AF4B165KA/KD75LB: 650mW
- Fiber
  • UV coating fiber: ø0.25mm
- 14 pin butterfly Package
- Built-in optical Isolator, Monitor photodiode and TEC
- LD operating temperature: 35°C

APPLICATION

- for Er doped Fiber Amplifier.

DIMENSIONS



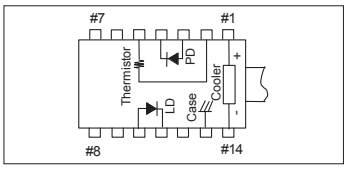
(Note) Polarization state of LD is aligned parallel to the slow axis.

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Ratings	Unit
LD Forward Current	I_F	2800	mA
LD Reverse Voltage	V_R	2	V
PD Forward Current	I_{FD}	10	mA
PD Reverse Voltage	V_{RD}	20	V
Operating Case temperature	T_C	−5 to +70	°C
Storage Temperature	T_{stg}	−40 to +85	°C
Cooler Current	I_C	5.8	A

* Excess over the absolute maximum ratings may cause device failure.

TOP VIEW/PIN CONFIGURATION



No.	Function	No.	Function	No.	Function
1	Cooler Anode	6	NC	11	LD Cathode
2	Thermistor	7	NC	12	NC
3	PD Anode	8	NC	13	Case
4	PD Cathode	9	NC	14	Cooler Cathode
5	Thermistor	10	LD Anode		

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{LD} = 35 °C, T_C = 25 °C)

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Threshold Current	I_{th}	—	—	—	250	mA
Center Wavelength	λ_C	At Output Power, RMS (−20 dB)	1460	1475	1490	nm
Spectral width	$\Delta\lambda$	At Output Power −20 dB	—	5	10	nm
Monitor Current	I_m	At Output Power	300	—	3000	μA
PD Dark Current	I_d	V_{RD} = 5 V	—	—	0.1	μA
Tracking Error	ΔP_f	I_m = const, T_C = −5 to 70 °C	—	—	0.5	dB
Isolation	R_O	T_{LD} = 35 °C	—	30	—	dB
Extinction Ratio*	X_P	At Output Power	17	—	—	dB
Thermistor Resistance	R_{th}	T_{LD} = 35 °C	—	6.5	—	kΩ
		T_{LD} = 25 °C	—	10.0	—	

∗ PMF Only

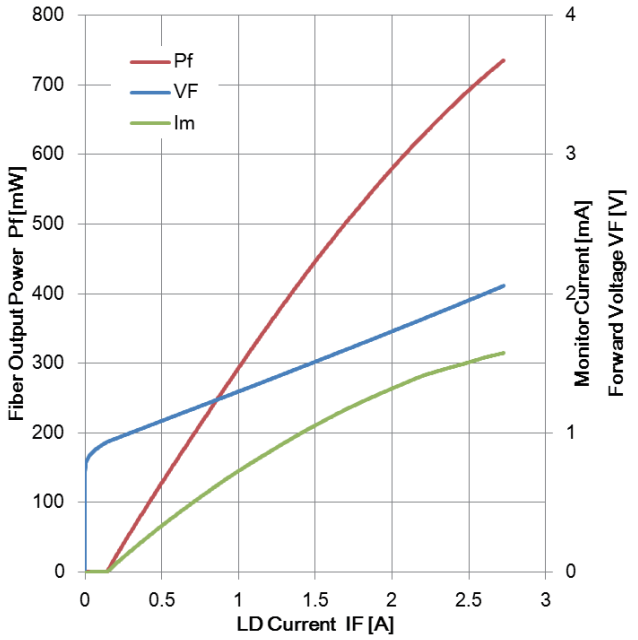
OPTICAL OUTPUT POWER/COOLER/CONSUPTION POWER

Item		Forward Current (Max.)	Forward Voltage (Max.)		Cooler Current (Max.)	Cooler Voltage (Max.)	Total Consumption Power (Max.)
Item		I_F	V_F		I_C	V_C	P_{total}
Test Condition		At Output Power			I_F = *EOL, T_C = 70 °C		
At Output Power	550 mW	1980	2.00	2.24	2.30	2.85	11.0
	600 mW	2170	2.05	2.30	2.60	3.15	13.0
	650 mW	2400	2.15	2.41	2.90	3.45	15.5
Unit		BOL [mA]	BOL [V]	EOL [V]	EOL [A]	EOL [V]	EOL [W]

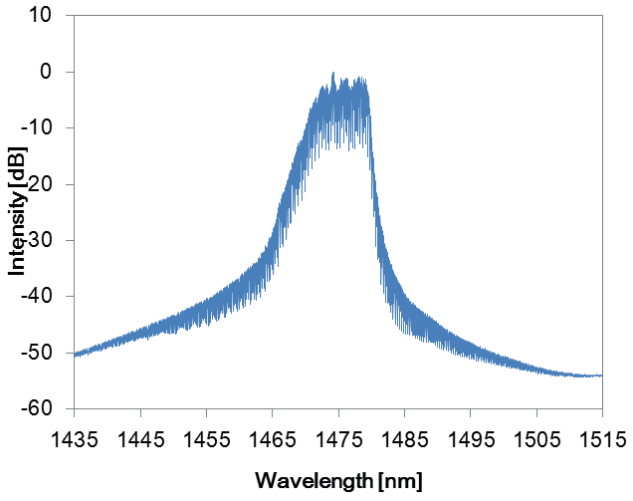
∗ EOL = BOL × 1.12

TYPICAL CHARACTERISTICS

◆ Output Power/Monitor Current/Forward Voltage [AF4B165KA75LB]

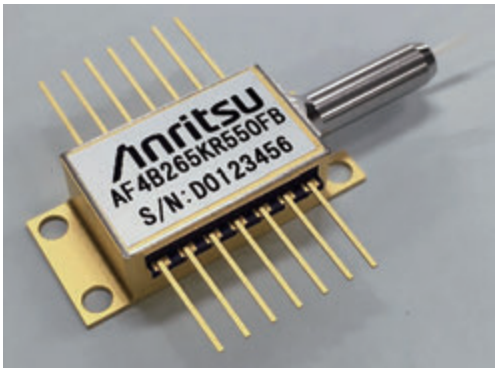


◆ Emission spectrum



1.4 µm FBG LD Module
AF4B2 Series type GE

The AF4B2 Series type GE is designed for Raman amplifier.



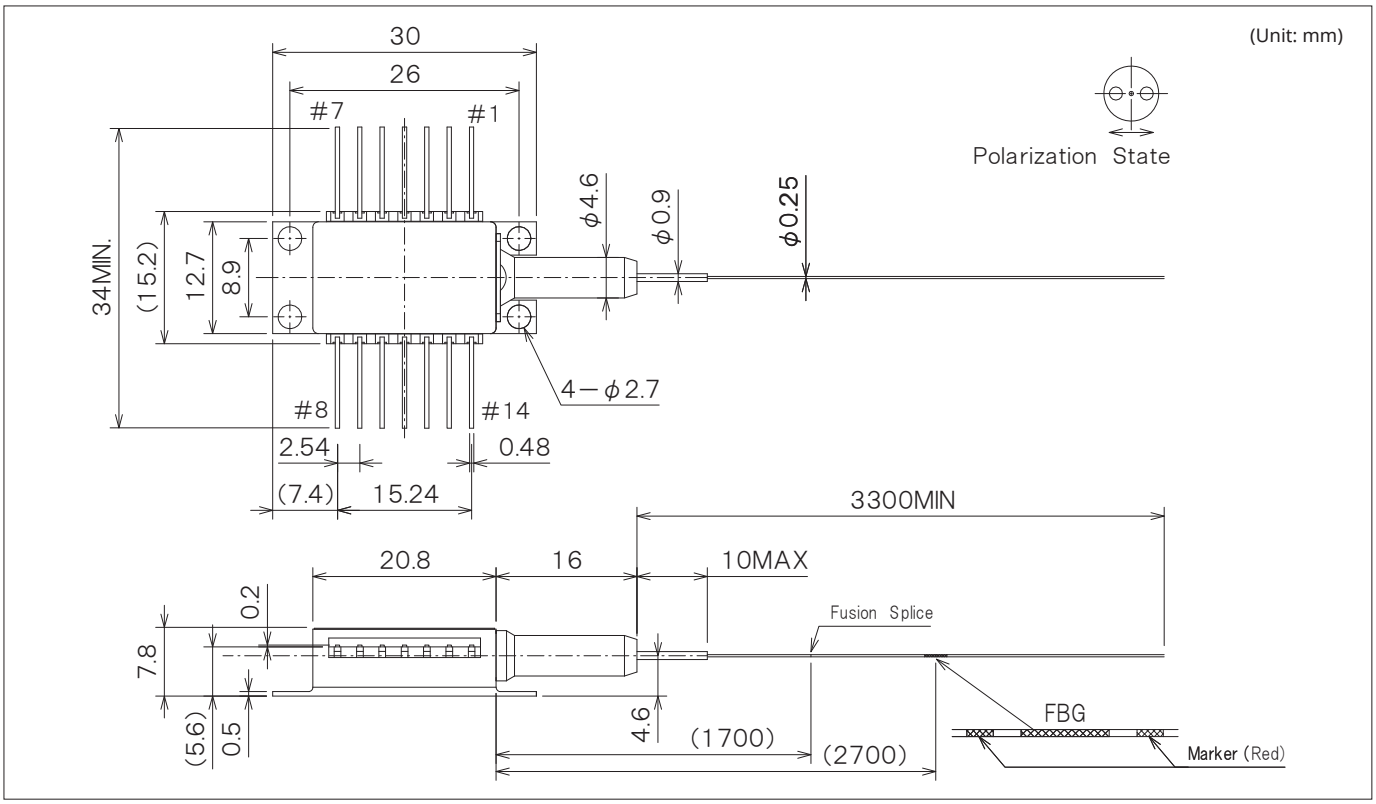
FEATURES

- Optical output power:
  AF4B255KRxxxFB: 550mW
  AF4B260KRxxxFB: 600mW
  AF4B265KRxxxFB: 650mW
- Range of Wavelength: 1420.0nm to 1470.0nm
  eg: xxx = 550 λ = 1455.0nm
  (0.5nm spacing is available)
- Fiber
  • PMF output (UV coating fiber: ø0.25mm)
- 14pin butterfly package, internal monitor PD and TEC.
- LD operating temperature: 35°C

APPLICATION

- Pump Laser for Raman Amplifier

DIMENSIONS



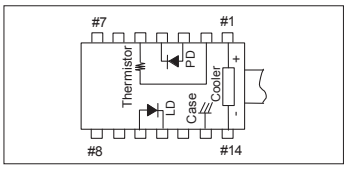
(Note) Polarization state of LD is Aligned parallel to the slow axis.

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Ratings	Unit
LD Forward Current	I_F	2800	mA
LD Reverse Voltage	V_R	2	V
PD Forward Current	I_{FD}	10	mA
PD Reverse Voltage	V_{RD}	20	V
Operating Case Temperature	T_C	−5 to +70	°C
Storage Temperature	T_{stg}	−40 to +85	°C
Cooler Current	I_C	5.8	A

∗ Excess over the absolute maximum ratings may cause device failure.

TOP VIEW/PIN CONFIGURATION



No.	Function	No.	Function	No.	Function
1	Cooler Anode	6	NC	11	LD Cathode
2	Thermistor	7	NC	12	NC
3	PD Anode	8	NC	13	Case
4	PD Cathode	9	NC	14	Cooler Cathode
5	Thermistor	10	LD Anode		

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{LD} = 35 °C, T_{FBG} = 25 °C, T_C = 25 °C)

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Threshold Current	I_{th}	—	—	—	250	mA
Center Wavelength	λ_C	At Output Power, RMS (−20 dB)	λ −10	λ	λ +1.0	nm
Spectral width	Δλ	At Output Power −10 dB	—	—	3.5	nm
Monitor Current	I_m	At Output Power	300	—	3000	μA
PD Dark Current	I_d	V_{RD} = 5 V	—	—	0.1	μA
Tracking Error	ΔP_f	I_m = const, T_C = −5 to 70 °C	—	—	0.5	dB
Extinction Ratio	X_P	At Output Power	17	—	—	dB
Thermistor Resistance	R_{th}	T_{LD} = 35 °C	—	6.5	—	kΩ
		T_{LD} = 25 °C	—	10.0	—	

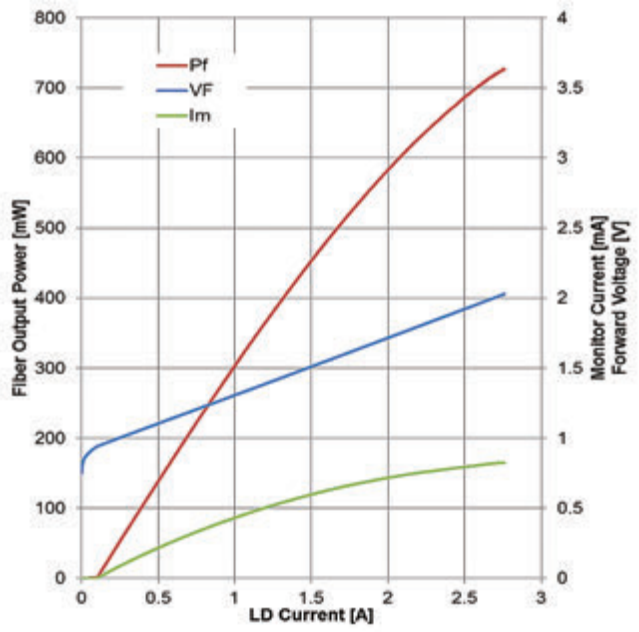
OPTICAL OUTPUT/TEC/POWER CONSUMPTION

Item		Forward Current (Max.)	Forward Voltage (Max.)		Cooler Current (Max.)	Cooler Voltage (Max.)	Total Consumption Power (Max.)
Symbol		I_F	V_F		I_C	V_C	P_{total}
Test Condition		At Output Power			I_F = *EOL, T_C = 70 °C		
Output Power	550 mW	1980	2.00	2.24	2.30	2.85	11.0
	600 mW	2170	2.05	2.30	2.60	3.15	13.0
	650 mW	2400	2.15	2.41	2.90	3.45	15.5
Unit		BOL [mA]	BOL [V]	EOL [V]	EOL [A]	EOL [V]	EOL [W]

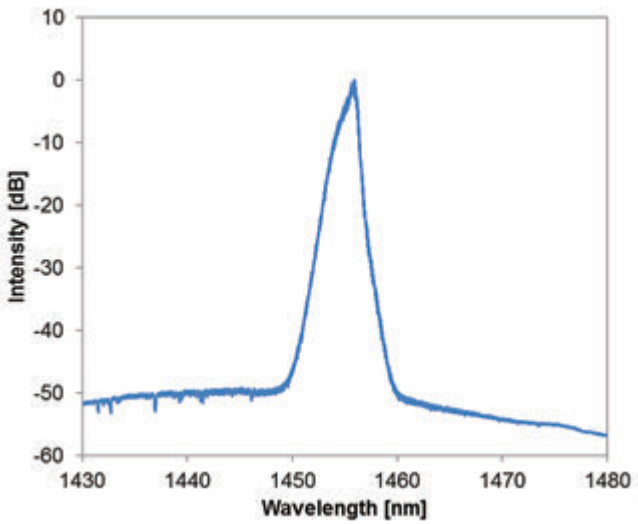
*EOL = BOL × 1.12

TYPICAL CHARACTERISTICS

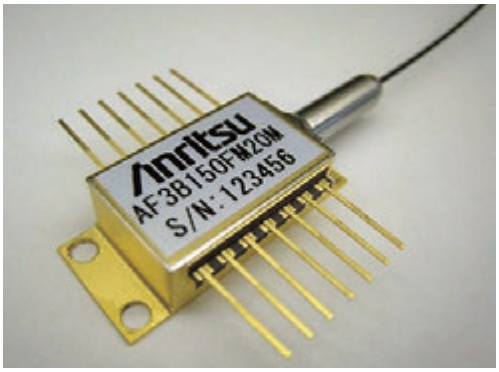
◆ Output Power/Monitor Current/Forward Voltage [AF4B265KR550FB]



◆ Emission Spectrum



1.3 µm LD Module
AF3B150FM20M
Optical output power 500 mW

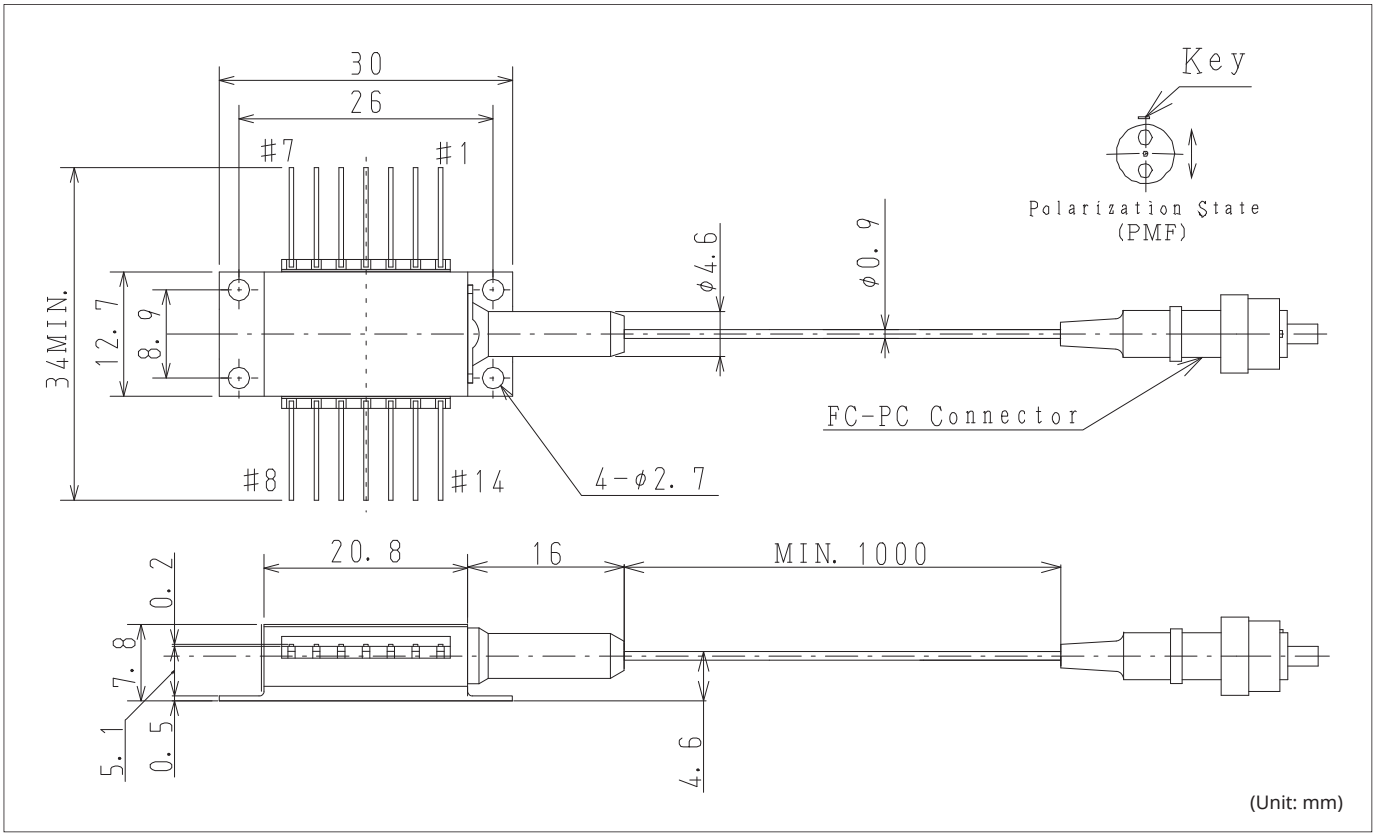


The AF3B150FM20M is 1.3 µm high power and low power consumption laser diode module designed for optical measurement and communication.

FEATURES

- Optical output power: 500 mW (I_F ≤ 1800 mA)
- Wavelength: 1320 ± 20 nm
- Fiber: Flame-retardant PMF (ø0.9 mm)
- FC-PC connector
- Built-in optical isolator
- Internal monitor PD and TEC
- Low power consumption
- 14 pin butterfly package

DIMENSIONS



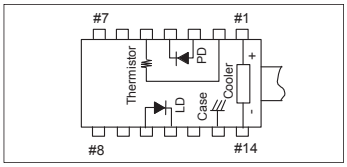
(Note) Polarization state of LD is aligned parallel to the slow axis.

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	unit
LD Forward Current	I_F	2200	mA
LD Reverse Voltage	V_R	2	V
PD Forward Current	I_{FD}	10	mA
PD Reverse Voltage	V_{RD}	20	V
Operating Case Temperature	T_C	−20 to +70	°C
Storage Temperature	T_{stg}	−40 to +85	°C
Cooler Current	I_C	5.8	A

∗ Excess over the absolute maximum ratings may cause device failure.

TOP VIEW/PIN CONFIGURATION



No.	Function	No.	Function	No.	Function
1	Cooler Anode	6	NC	11	LD Cathode
2	Thermistor	7	NC	12	NC
3	PD Anode	8	NC	13	Case
4	PD Cathode	9	NC	14	Cooler Cathode
5	Thermistor	10	LD Anode		

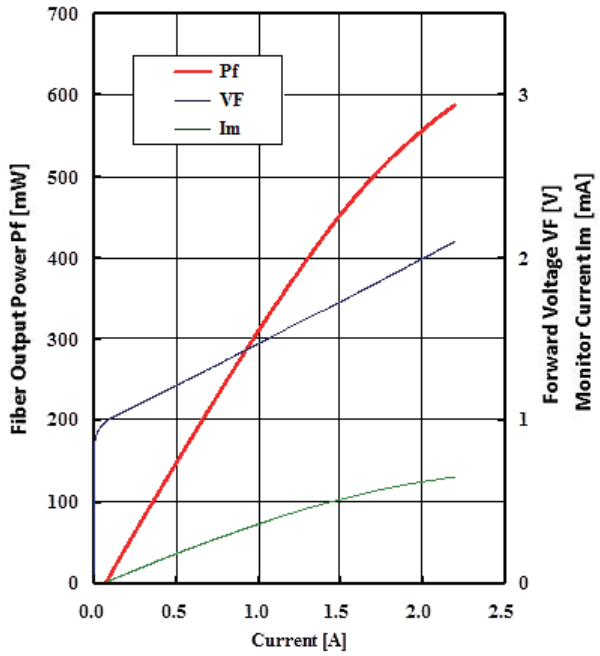
OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{LD} = 25 °C, T_C = 25 °C)

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	P_F = 500 mW	—	—	2.3	V
Threshold Current	I_{th}		—	—	180	mA
Forward Current (BOL)	I_F	P_F = 500 mW	—	—	1800	mA
Center Wavelength	λ_C	P_F = 500 mW, RMS (–20 dB)	1300	1320	1340	nm
Spectral Width	$\Delta\lambda$	P_F = 500 mW, RMS (–20 dB)	—	5	10	nm
Monitor Current	I_m	P_F = 500 mW, V_{RD} = 5 V	100	—	2000	μA
PD Dark Current	I_d	V_{RD} = 5 V	—	—	0.1	μA
Tracking Error	ΔP_f	I_m = const, T_C = –20 to 70 °C	—	—	0.5	dB
Cooler Voltage	V_C	I_F = *EOL, T_C = 70 °C	—	—	4	V
Cooler Current	I_C	I_F = *EOL, T_C = 70 °C	—	—	3.5	A
Thermistor Resistance	R_{th}	T_{LD} = 25 °C, B = 3900 ± 100 K	9.5	10	10.5	kΩ
Optical Isolation	R_O	T_{LD} = 25 °C	—	30	—	dB
Extinction Ratio	X_P	P_F = 500 mW	17	—	—	dB

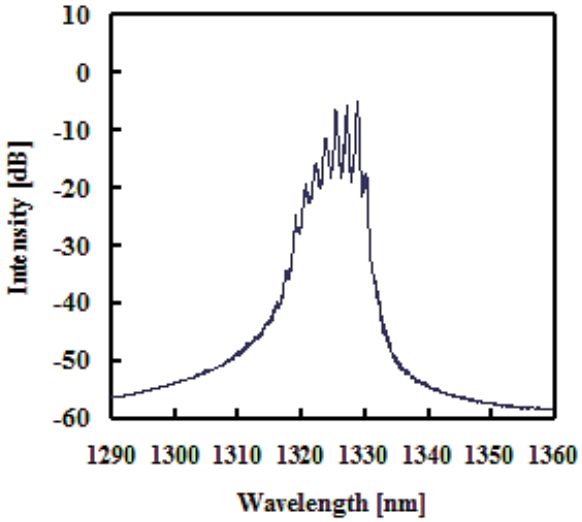
* EOL = BOL × 1.2

TYPICAL CHARACTERISTICS

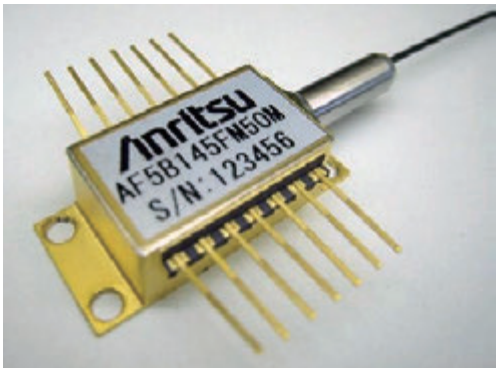
◆ Fiber output power/Monitor current/ Voltage-forward current characteristics



◆ Emission spectrum



1.55 µm LD Module
AF5B145FM50M
Optical output power 450 mW

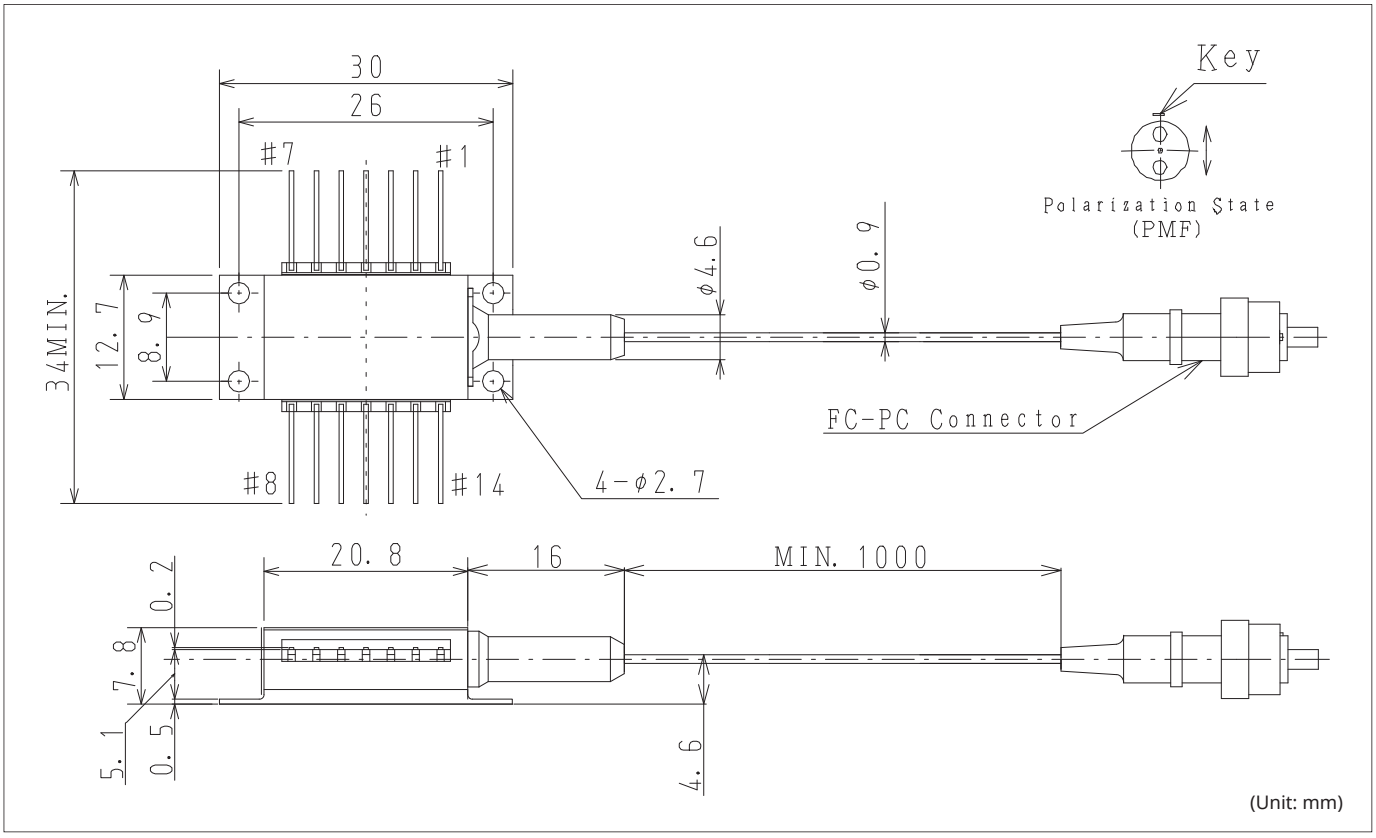


The AF5B145FM50M is 1.55 µm high optical output power and low power consumption laser diode module designed for optical measurement and communication.

FEATURES

- Optical output power: 450 mW ($I_F \leq 1800$ mA)
- Wavelength: 1550±20 nm
- Fiber: Flame-retardant PMF (ø0.9 mm)
- FC-PC connector
- Built-in optical isolator
- Internal monitor PD and TEC
- Low power consumption

DIMENSIONS



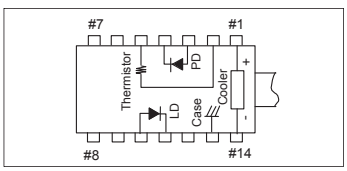
(Note) Polarization state of LD is aligned parallel to the slow axis.

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	unit
LD Forward Current	I_F	2200	mA
LD Reverse Voltage	V_R	2	V
PD Forward Current	I_{FD}	10	mA
PD Reverse Voltage	V_{RD}	20	V
Operating Case Temperature	T_C	−20 to +70	°C
Storage Temperature	T_{stg}	−40 to +85	°C
Cooler Current	I_C	5.8	A

∗ Excess over the absolute maximum ratings may cause device failure.

TOP VIEW/PIN CONFIGURATION



No.	Function	No.	Function	No.	Function
1	Cooler Anode	6	NC	11	LD Cathode
2	Thermistor	7	NC	12	NC
3	PD Anode	8	NC	13	Case
4	PD Cathode	9	NC	14	Cooler Cathode
5	Thermistor	10	LD Anode		

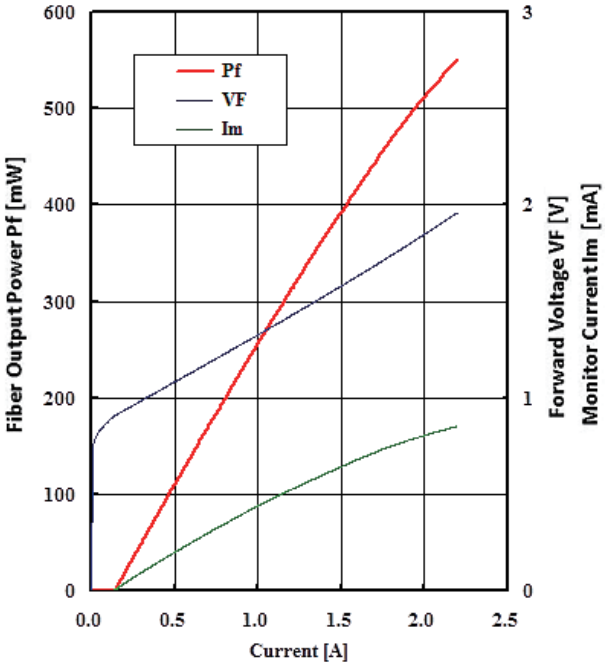
OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{LD} = 25 °C, T_C = 25 °C)

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	P_F = 450 mW	—	—	2.2	V
Threshold Current	I_{th}		—	—	180	mA
Forward Current (BOL)	I_F	P_F = 450 mW	—	—	1800	mA
Center Wavelength	λ_C	P_F = 450 mW, RMS (–20 dB)	1530	1550	1570	nm
Spectral Width	$\Delta\lambda$	P_F = 450 mW, RMS (–20 dB)	—	5	10	nm
Monitor Current	I_m	P_F = 450 mW, V_{RD} = 5 V	100	—	2000	μA
PD Dark Current	I_d	V_{RD} = 5 V	—	—	0.1	μA
Tracking Error	ΔP_f	I_m = const, T_C = –20 to 70 °C	—	—	0.5	dB
Cooler Voltage	V_C	I_F = *EOL, T_C = 70 °C	—	—	4	V
Cooler Current	I_C	I_F = *EOL, T_C = 70 °C	—	—	3.5	A
Thermistor Resistance	R_{th}	T_{LD} = 25 °C, B = 3900 ±100 K	9.5	10	10.5	kΩ
Optical Isolation	R_O	T_{LD} = 25 °C	—	30	—	dB
Extinction Ratio	X_P	P_F = 450 mW	17	—	—	dB

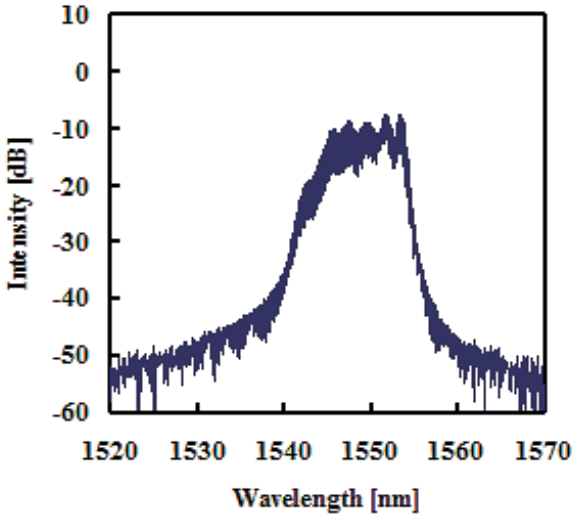
* EOL = BOL × 1.2

TYPICAL CHARACTERISTICS

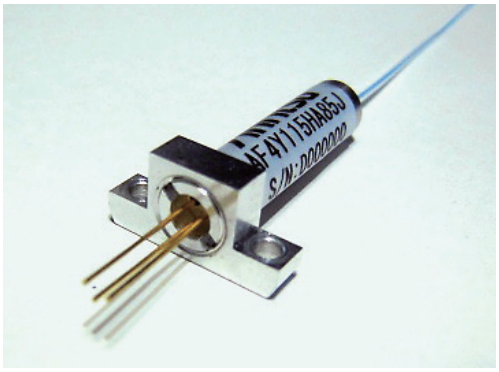
◆ Fiber output power/Monitor current/ Voltage-forward current characteristics



◆ Emission spectrum



1.48 µm Cylindrical Module
AF4Y108GA85J/AF4Y115HA85J

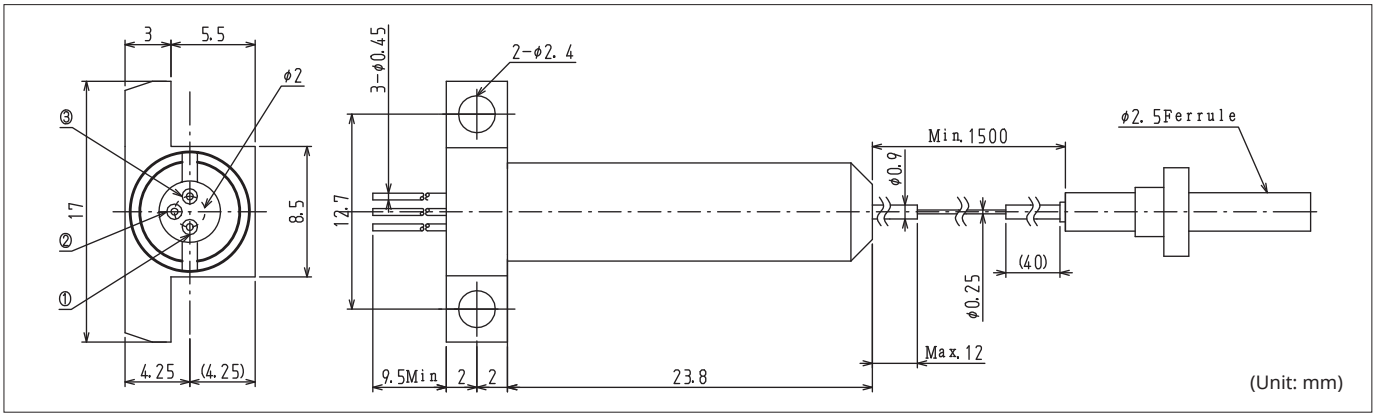


AF4Y108GA85J/AF4Y115HA85J is 1.48 µm high power laser diode module designed for Er doped fiber amplifier. The laser is packaged in a cylindrical package without isolator, monitor photodiode and thermoelectric cooler (TEC).

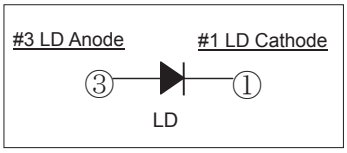
FEATURES

- SMF optical output power:
  AF4Y108GA85J: 80 mW (I_F <400 mA)
  AF4Y115HA85J: 150 mW (I_F <800 mA)
- Operating case temperature: −5 °C to +70 °C
- Coaxial module

DIMENSIONS



TOP VIEW/PIN CONFIGURATION



No.	Function
#1	LD Cathode
#2	NC (Case)
#3	LD Anode

ABSOLUTE MAXIMUM RATINGS*1

Item	Symbol	Rating		Unit
		AF4Y108GA85J	AF4Y115HA85J	
LD Forward Current	I_F	600	1000	mA
LD Reverse Voltage	V_R	2		V
Operating Case Temperature	T_C	−5*2 to +70		°C
Storage Temperature	T_{stg}	−40 to +85		°C

*1 Excess over the absolute maximum ratings may cause device failure.
*2 No Condensation.

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_C = 70 °C)

Item	Symbol	Test Condition	AF4Y108GA85J			AF4Y115HA85J			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Threshold Current	I_{th}	T_C = 70 °C	—	45	55	—	130	—	mA
Forward Current (BOL)	I_F	AF4Y108GA85J: P_F = 80 mW, T_C = 70 °C AF4Y115HA85J: P_f = 150 mW, T_C = 25 to 70 °C	—	350	400	—	—	800	mA
Center Wavelength*	λ_C	AF4Y108GA85J: P_f = 80 mW, T_C = 70 °C, RMS (−20 dB) AF4Y115HA85J: P_f = 150 mW, T_C = 25 to 70 °C, RMS (−20 dB)	1478	—	1490	1450	—	1490	nm
Forward Voltage	V_F	AF4Y108GA85J: P_F = 80 mW AF4Y115HA85J: P_f = 150 mW	—	1.4	1.8	—	—	2.0	V

* Center wavelength is measured under no reflected light condition

1.31 µm/1.55 µm/1.65 µm SLD Module
AS3B119GM10M/AS5B125EM50M/AS6B118GM50M

The AS3B119GM10M/AS5B125EM50M/AS6B118GM50M is SLD module developed as incoherent light sources for various optical measurements. The device emits incoherent light having wide spectral half width and high optical output power from PMF (Polarization-maintaining fiber).

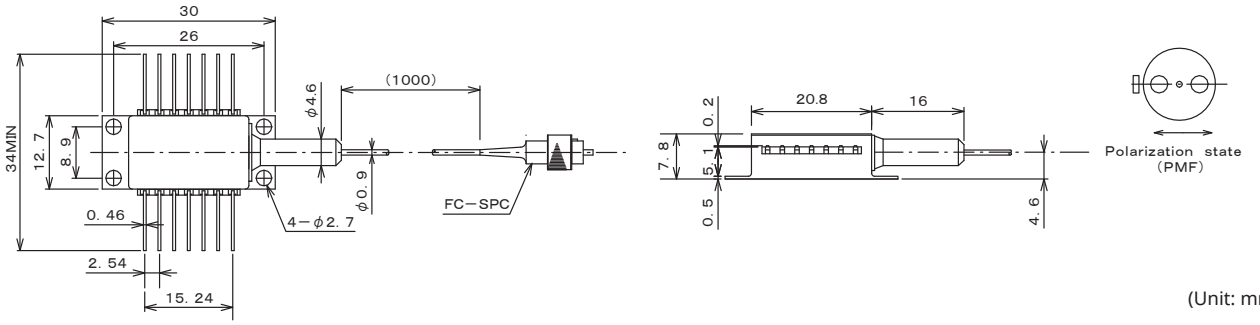
FEATURES

- Center Wavelength/Spectral half width/optical output power
  AS3B119GM10M: 1.31 µm/55 nm/15 mW
  AS5B125EM50M: 1.55 µm/60 nm/25 mW
  AS6B118GM50M: 1.65 µm/70 nm/10 mW
- Built-in optical isolator
- Internal monitor PD and TEC

APPLICATIONS

- Optical sensor
- Optical coherence tomography (OCT)
- Optical measurement

DIMENSIONS

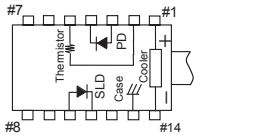


(Unit: mm)

ABSOLUTE MAXIMUM RATINGS (T_{SLD} = 25 °C)

Item	Symbol	Rating		Unit
SLD Forward current	I_F	AS3B119GM10M	480	mA
		AS5B125EM50M	600	
		AS6B118GM50M	420	
SLD Reverse Voltage	V_R	2.0		V
PD Forward current	I_{FD}	10		mA
PD Reverse Voltage	V_{RD}	10		V
Operating Case Temperature	T_C	−20 to +75		°C
Storage Temperature	T_{stg}	−40 to +85		°C
Cooler Current	I_C	2.0		A

TOP VIEW/PIN CONFIGURATION



No.	Function	No.	Function	No.	Function
1	Cooler Anode	6	NC	11	SLD Cathode
2	Thermistor	7	NC	12	NC
3	PD Anode	8	NC	13	Case
4	PD Cathode	9	NC	14	Cooler Cathode
5	Thermistor	10	SLD Anode		

OPTICAL CHARACTERISTICS (T_{SLD} = 25 °C, T_C = 25 °C)

Item	Symbol	AS3B119GM10M			AS5B125EM50M			AS6B118GM50M			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Forward Voltage	V_F	—	—	2.5	—	—	2.4	—	—	2.5	V
Forward Current	I_F	—	—	400	—	—	500	—	—	350	mA
Center Wavelength	λ_C	1290	1310	1330	1530	1550	1570	1630	1650	1670	nm
Spectral Width	$\Delta\lambda$	50	55	—	55	60	—	65	70	—	nm
Spectral Ripple	M	—	—	0.6	—	—	0.6	—	—	0.8	dB
Monitor Current	I_m	100	—	2000	400	—	2000	100	—	2000	µA

(Note) AS3B119GM10M: P_f = 15 mW, AS5B125EM50M: P_f = 25 mW, AS6B118GM50M: P_f = 10 mW
(Note) Test condition (Spectral Ripple: res = 0.1 nm, Monitor Current: V_{RD} = 5 V)

ELECTRICAL CHARACTERISTICS

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
PD Dark Current	I_d	V_{RD} = 5 V	—	—	0.1	µA
Tracking Error	ΔP_f	I_m = const, T_C = −20 to +75 °C	—	—	0.5	dB
Cooler Voltage	V_c	I_F = I_F (EOL), T_C = 75 °C	—	—	3.5	V
Cooler Current	I_c	I_F = I_F (EOL), T_C = 75 °C	—	—	1.2	A
Thermistor Resistance	R_{th}	T_{SLD} = 25 °C, B = 3900±100 K	9.5	10	10.5	kΩ
Optical Isoration	R_o	λ=λ_C, T_{SLD}=25 °C	—	30	—	dB

(Note) I_F (EOL) = I_F (BOL) × 1.2

0.8 µm SLD CAN
AS8K215GY30M
Optical output power 5 mW

The AS8K215GY30M is SLD (Super-Luminescent Diode) module developed as incoherent light sources for various optical measurements including Optical Coherence Tomography (OCT). The device emits wide spectral incoherent light. High intensity in a narrow radiation angle makes high efficient optical coupling to a single mode Fiber.

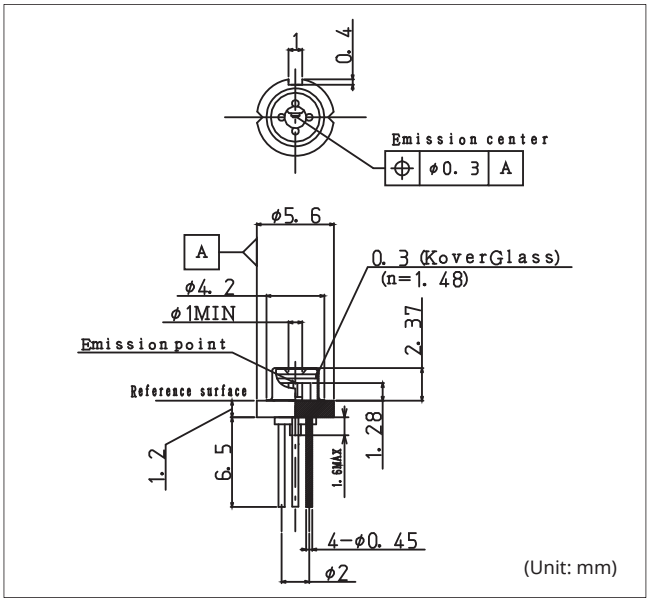
FEATURES

- ø5.6 CAN package
- High optical output power = 5 mW
- Wide spectral half width Δλ = 15 nm (Typ.)
- Built-in monitor photo diode

APPLICATIONS

- Optical sensor/optical encoder
- Optical Coherence Tomography (OCT)
- Optical measurement

DIMENSIONS

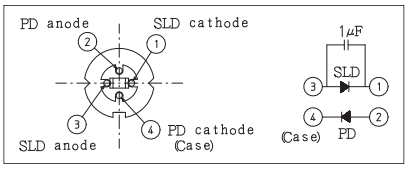


ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
SLD Reverse Voltage	V_R	2	V
Optical Output Power	P_O	6	mW
SLD Forward Current	I_F	120	mA
PD Reverse Voltage	V_{RD}	15	V
Operating Case Temperature	T_C	−20 to +70	°C
Storage Temperature	T_{stg}	−40 to +80	°C

∗ Excess over the absolute maximum ratings may cause device failure.

BOTTOM/PIN CONFIGURATION

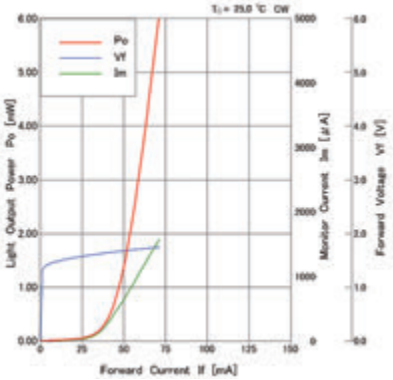


OPTICAL AND ELECTRICAL CHARACTERISTICS (T_C = 25 °C)

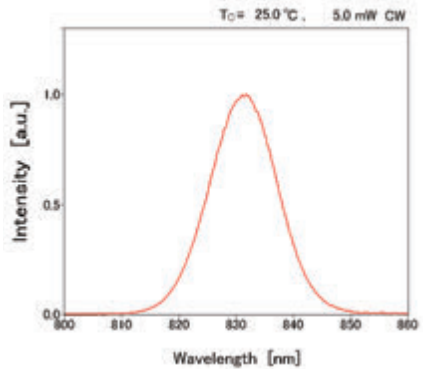
Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
SLD Forward Current	I_F	P_O = 5 mW	—	70	100	mA
SLD Forward Voltage	V_F	P_O = 5 mW	—	2	2.5	V
Center Wavelength	λ_C	P_O = 5 mW	810	830	850	nm
Spectral Half Width	Δλ	P_O = 5 mW	10	15	—	nm
Spectral Modulation	M_d	P_O = 5 mW	—	2	10	%
PD Monitor Current	I_m	P_O = 5 mW, V_{RD} = 5 V	0.2	1.5	2.2	mA
Parallel Beam Divergence	θ//	P_O = 5 mW	—	15	—	deg
Perpendicular Beam Divergence	θ⊥	P_O = 5 mW	—	45	—	deg

AS8K215GY30M TYPICAL CHARACTERISTICS

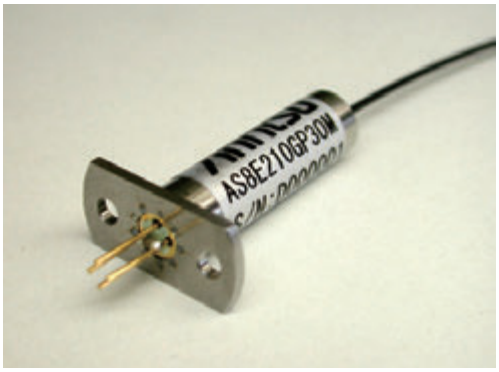
- Light output power/Monitor current/ Forward voltage – Forward current characteristics



- Emission spectrum



0.8 µm SLD MODULE
AS8E210GP30M
Optical output power 1 mW



The AS8E210GP30M is SLD (Super-Luminescent Diode) module developed as incoherent light sources for various optical measurements. The device emits incoherent light having wide spectral half width and high optical output power from PMF (polarization-maintaining fiber).

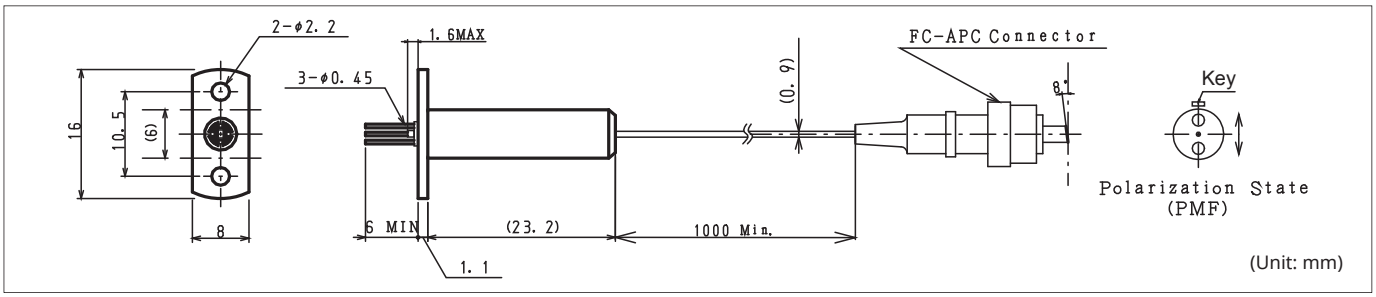
FEATURES

- PMF output coolerless coaxial module
- High optical output power Pf = 1 mW
- Wide spectral half width Δλ = 15 nm (typ.)
- Built-in monitor photo diode

APPLICATIONS

- Optical sensor/optical encoder
- Optical Coherence Tomography (OCT)
- Optical measurement

DIMENSIONS

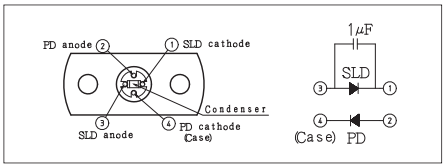


ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Optical Output Power	P_f	1.2	mW
SLD Forward Current	I_F	120	mA
SLD Reverse Voltage	V_R	2	V
PD Reverse Voltage	V_{RD}	15	V
Operating Case Temperature	T_C	−20 to +70	°C
Storage Temperature	T_{stg}	−40 to +80	°C

∗ Excess over the absolute maximum ratings may cause device failure.

BOTTOM/PIN CONFIGURATION

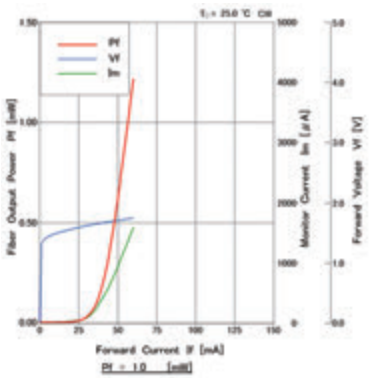


OPTICAL AND ELECTRICAL CHARACTERISTICS (T_C = 25 °C)

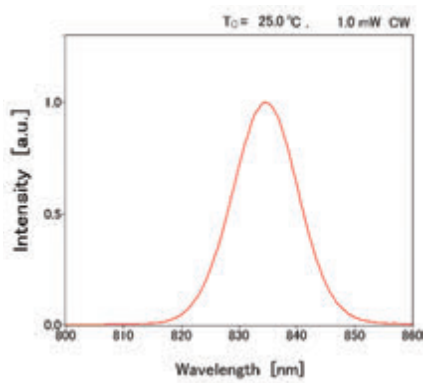
Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
SLD Forward Current	I_F	P_f = 1 mW	—	70	100	mA
SLD Forward Voltage	V_F	P_f = 1 mW	—	2	2.5	V
Center Wavelength	λ_C	P_f = 1 mW	810	830	850	nm
Spectral Half Width	Δλ	P_f = 1 mW	10	15	—	nm
Spectral Modulation	M_d	P_f = 1 mW	—	2	10	%
PD Monitor Current	I_m	P_f = 1 mW, V_{RD} = 5 V	0.2	1.5	—	mA
Tracking Error	ΔP_f	I_m = Const, TC = −20 to +70 °C	−2	—	2	dB

AS8E210GP30M TYPICAL CHARACTERISTICS

- Fiber output power/Monitor current/ Forward voltage – Forward current characteristics

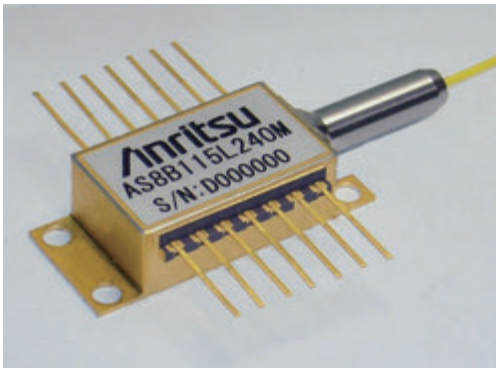


- Emission spectrum



0.8 µm SLD Module

AS8B112G230M/AS8B115G230M/AS8B115L240M

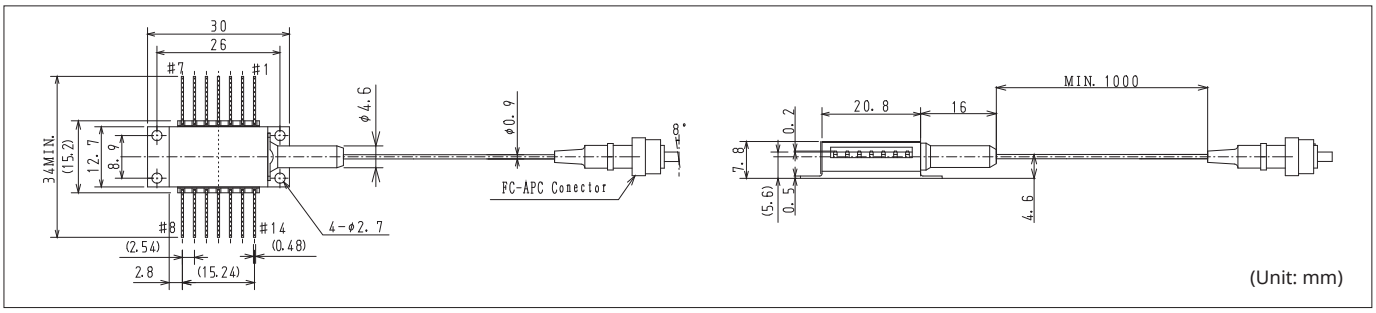


This SLD (Super-Luminescent Diode) module is developed as incoherent light sources for various optical measurements including Optical Coherent Tomography (OCT).

FEATURES

- Spectral half width/optical output power:
  AS8B112G230M: 14nm/2mW
  AS8B115G230M: 14nm/5mW
  AS8B115L240M : 50nm/5mW
- Internal monitor PD and TEC
- FC-APC connector

DIMENSIONS

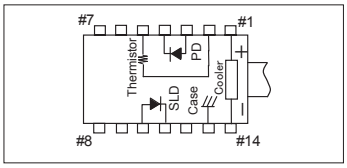


(Unit: mm)

ABSOLUTE MAXIMUM RATINGS (T_{SLD} = 25 °C)

Item	Symbol	Rating			Unit
		AS8B112G230M	AS8B115G230M	AS8B115L240M	
Optical Output Power	P_f	2.5	6.0	7.0	mW
SLD Forward Current	I_F	180	220	220	mA
SLD Reverse Voltage	V_R	2.0			V
PD Reverse Voltage	V_R	20			V
Operating Case Temperature	T_C	−20 to +75			°C
Storage Temperature	T_{stg}	−40 to +85			°C
Cooler Current	I_C	2.0			A

TOP VIEW/PIN CONFIGURATION



No.	FUNCTION	No.	FUNCTION	No.	FUNCTION
1	Cooler Anode	6	NC	11	SLD Cathode
2	Thermistor	7	NC	12	NC
3	PD Anode	8	NC	13	Case
4	PD Cathode	9	NC	14	Cooler Cathode
5	Thermistor	10	SLD Anode		

OPTICAL CHARACTERISTICS (T_{SLD} = 25 °C, T_C = 25 °C)

Item	Symbol	AS8B112G230M			AS8B115G230M			AS8B115L240M			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Optical Output Power	P_f	2.0	—	—	5.0	—	—	5.0	—	—	mW
Forward Voltage	V_F	—	2.0	2.5	—	2.0	2.5	—	2.0	2.5	V
Forward Current (BOL)	I_F	—	—	120	—	—	150	—	150	180	mA
Center Wavelength	λ_C	810	830	850	810	830	850	820	840	860	nm
Spectral Half Width	$\Delta\lambda$	10	14	—	10	14	—	45	50	—	nm
Monitor Current	I_m	0.2	—	—	0.2	—	—	0.05	—	2.0	mA

(Note) Test condition (Monitor current: V_R = 5V)

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{SLD} = 25 °C, T_C = 25 °C)

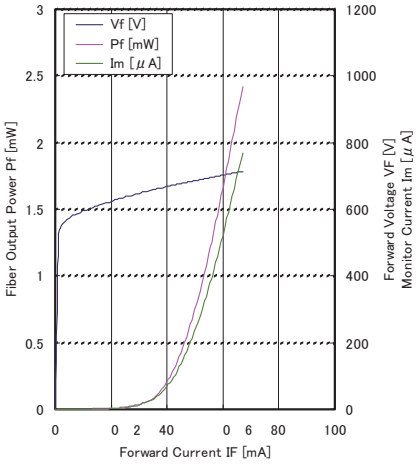
Cooler Cathode	Symbol	Test Condition	Min.	Typ.	Max.	Unit
PD Dark Current	I_d	V_R = 5 V	—	—	0.1	mA
Tracking Error	ΔP_f	I_m = const, T_C = −20 to 75 °C	—	—	1.0	dB
Cooler Voltage	V_C	I_F =EOL, T_C = 75 °C	—	—	2.5	V
Cooler Current	I_C	I_F =EOL, T_C = 75 °C	—	—	1.0	A
Thermistor Resistane	R_{th}	T_{SLD} = 25 °C, B = 3900±100 K	9.5	10	10.5	kΩ

∗ EOL = BOL × 1.2

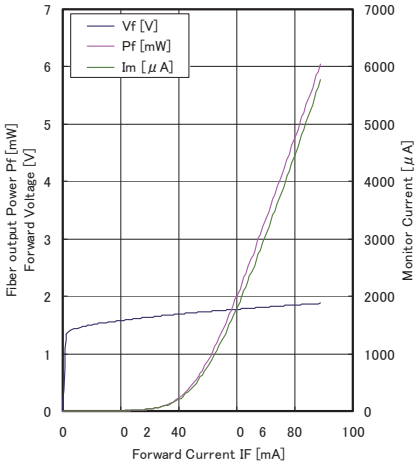
TYPICAL CHARACTERISTICS

◆ Optical Output power / Forward Voltage / Monitor Current

[AS8B112G230M]



[AS8B115G230M]



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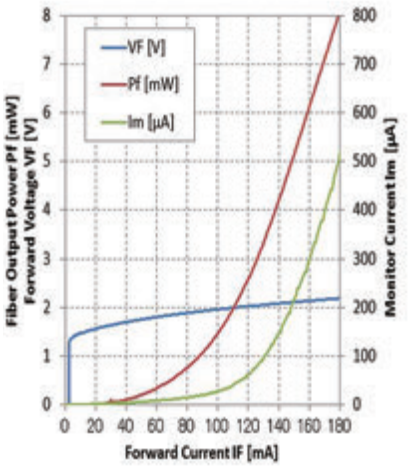
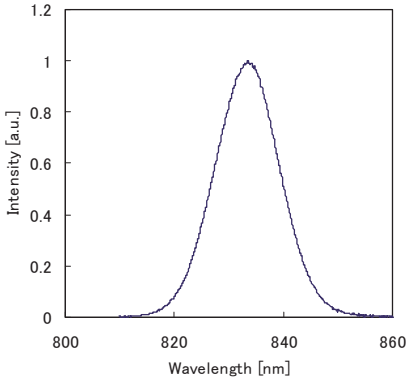


◆ Emission Spectrum

[AS8B112G230M]



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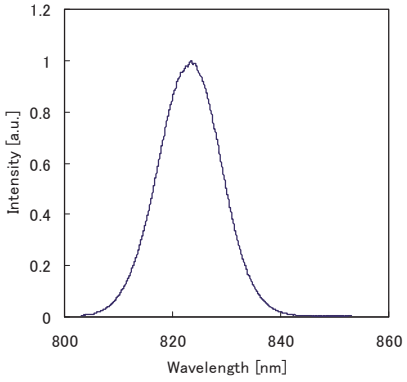

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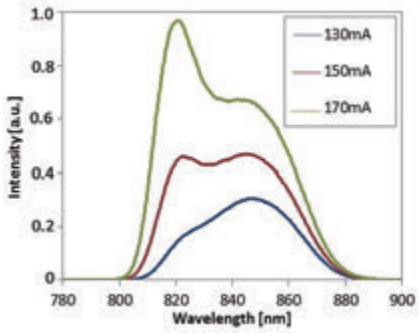


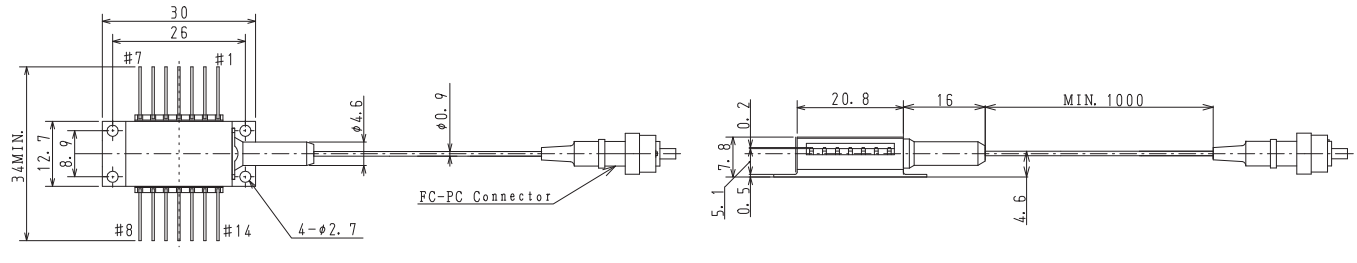
1.65 µm DFB LD MODULE
AB6B407BJ537F

The AB6B407BJ537F is 1.65 µm InGaAsP/InP distributed feedback (DFB) laser diode module developed as a light source for methane sensing.

FEATURES

- Optical output power: typ. 10 mW
- Built-in optical isolator (30 dB)
- Internal monitor PD and TEC
- SMF pigtail type (FC/PC connector)

DIMENSIONS



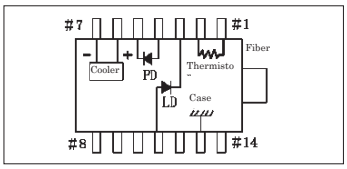
(Unit: mm)

ABSOLUTE MAXIMUM RATINGS (T_{LD} = 25 °C)

Item	Symbol	Rating	Unit
LD Forward Current	I_F	150	mA
LD Reverse Voltage	V_R	2	V
PD Forward Current	I_{FD}	10	mA
PD Reverse Voltage	V_{RD}	10	V
Operating Case Temperature	T_C	−20 to +70	°C
Storage Temperature	T_{stg}	−40 to +85	°C
Cooler Current	I_C	2	A

* Excess over the absolute maximum ratings may cause device failure.

TOP VIEW/PIN CONFIGURATION



No.	Function	No.	Function	No.	Function
1	Thermistor	6	Cooler Anode	11	LD Anode
2	Thermistor	7	Cooler Cathode	12	NC
3	LD Cathode	8	Case	13	Case
4	PD Anode	9	NC	14	NC
5	PD Cathode	10	NC		

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{LD} = 25 °C, T_C = 25 °C)

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	I_F = 100 mA	—	—	2.5	V
Threshold Current	I_{th}		—	10	25	mA
Optical Output Power	P_f	I_F = 100 mA	7	10	—	mW
Peak Wavelength	λ_p	I_F = 100 mA	1652.7	1653.7	1654.7	nm
Side Mode Suppression Ratio	SMSR	I_F = 100 mA	33	40	—	dB
Spectral Linewidth	Δf	I_F = 100 mA	—	3	15	MHz
PD Dark Current	I_d	V_{RD} = 5 V	—	—	0.1	µA
Tracking Error	ΔP_f	I_m = const, T_C = −20 to 70 °C	—	—	0.5	dB
Cooler Voltage	V_C	I_F = 100 mA, T_C = 70 °C	—	—	2.5	V
Cooler Current	I_C	I_F = 100 mA, T_C = 70 °C	—	—	1	A
Thermistor Resistance	R_{th}	T_{LD} = 25 °C, B = 3900 ±100 K	9.5	10	10.5	kΩ
Optical Isolation	R_O	λ = 1650 nm	—	30	—	dB
Current Dependency of Peak Wavelength	dλ/dI	I_F = 100 mA	—	0.009	—	nm/mA
Temperature Dependency of Peak Wavelength	dλ/dT	I_F = 100 mA	—	0.09	—	nm/deg

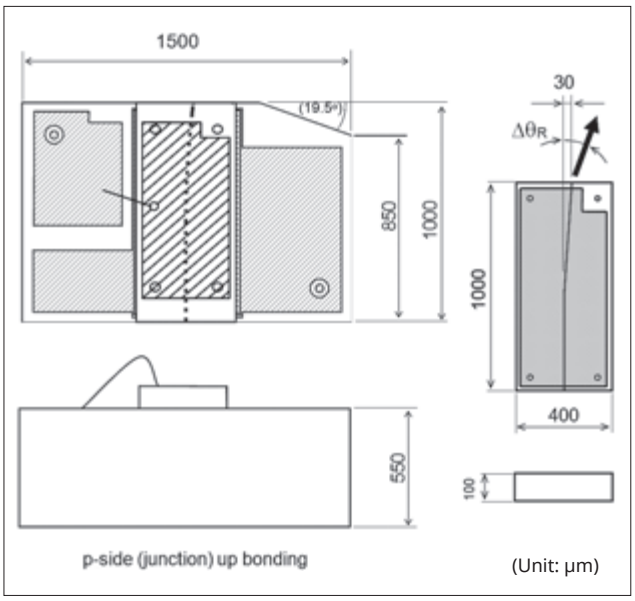
1.5 µm Gain Chip (chip on submount) for External Cavity Laser
AE5T315BY20P, AE5T310BY10P

The AE5T315BY20P/AE5T310BY10P is 1.5 µm InGaAsP/InP Gain Chip for External Cavity Laser developed as a light source for optical fiber communication and optical sensing.

FEATURES

- Broad band: >100 nm tuning range
- High optical output power: >40 mW with external cavity
- Low spectral ripple
- Bare chip shipment is also available
- Normal facet reflectance: AE5T315BY20P: HR (95%) AE5T310BY10P: LR (6%)

DIMENSIONS



ABSOLUTE MAXIMUM RATINGS (T_{LD} = 25 °C)

Item	Symbol	Rating	Unit
Forward Current	I_F	500	mA
LD Reverse Voltage (T_{LD} = 25 °C)	V_R	2	V
Operating Case Temperature	T_C	15 to +45	°C
Storage Temperature	T_{stg}	−40 to +85	°C
Process/Soldering Temp. vs Time Maximum Duration 20 s Maximum Duration 2 hour Maximum Duration 100 hour	—	 300 200 120	°C
ESD (Human Body Model)	ESD	500	V

∗ Excess over the absolute maximum ratings may cause device failure.

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{LD} = 25 °C, T_C = 25 °C)
UPPER: AE5T315BY20P, LOWER: AE5T310BY10P

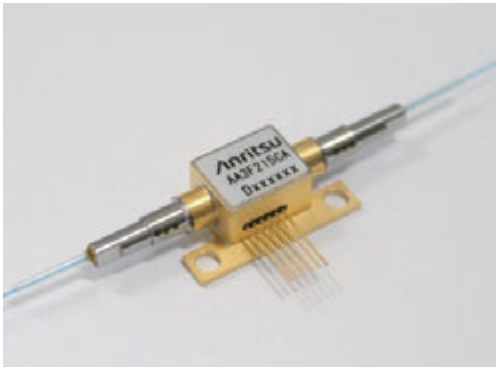
Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	I_F = 200 mA Pulsed (tw = 50 µs)	—	1.4	2	V
ASE Output Power	P_{ASE}	I_F = 200 mA Pulsed (tw = 50 µs)	5	10	—	mW
			1	5	—	
Center Wavelength	λ_C	I_F = 100 mA Pulsed (tw = 50 µs)	1490	—	1550	nm
			1480	—	1540	
ASE Ripple	M	I_F = 100 mA CW at λ = 1550 nm	—	—	3.5	dB
			—	—	2	
Beam Exit Angle	$\Delta\theta_R$	I_F = 200 mA CW	19	20	21	deg.
Beam Divergence Angle (FAHM) Transverse (Perpendicular), Normal Facet	Θ_t^{NOR}	I_F = 200 mA CW, FAHM	15	20	25	deg.
Beam Divergence Angle (FAHM) Lateral (Parallel), Normal Facet	Θ_p^{NOR}	I_F = 200 mA CW, FAHM	17	20	23	deg.
Beam Divergence Angle (FAHM) Transverse (Perpendicular), Angled Facet	Θ_t^{ANG}	I_F = 200 mA CW, FAHM	26	29	32	deg.
Beam Divergence Angle (FAHM) Lateral (Parallel), Angled Facet	Θ_p^{ANG}	I_F = 200 mA CW, FAHM	15	18	21	deg.

TECHNICAL SPECIFICATIONS

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Angled Facet Reflectance	R^{ANG}	C-band	—	5×10^{-5}	10^{-4}	—
Normal Facet Reflectance	R^{NOR}	C-band, Upper: AE5T315BY20P,	90	95	—	%
		Lower: AE5T310BY10P	5	6	7	
Chip Length	Length		0.98	1	1.02	mm
Chip Width	Width		0.38	0.40	0.42	mm
Chip Height	Height		0.09	0.10	0.11	mm

1.3 µm SOA Module
AA3F215CA

AA3F215CA is 1.3 µm high gain and low polarization dependent gain SOA (Semiconductor Optical Amplifier) module with optical isolator and thermo-electric cooler (TEC).



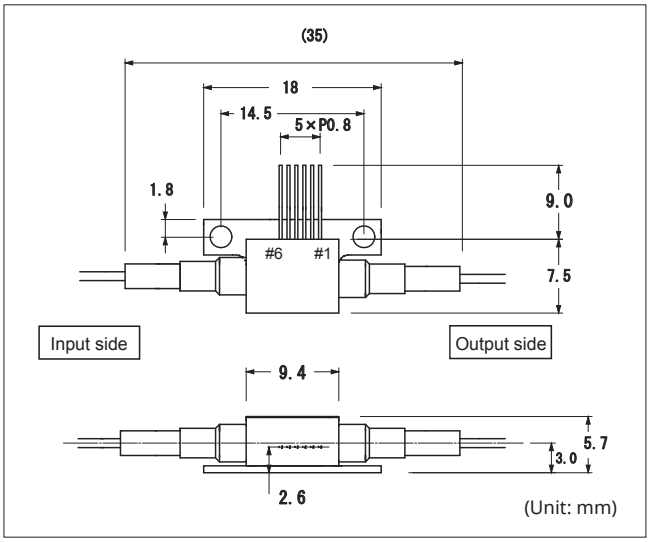
FEATURES

- Gain: ≥15dB
- Polarization Dependent Gain (PDG) : ≤15dB
- Built-in optical isolator (input side)
- Low power consumption: 1.0W typ. (T_C = 75°C)

APPLICATIONS

- 100GBASE-ER4 CFP/CFP2 transceiver
- Preamplifier

DIMENSIONS



ABSOLUTE MAXIMUM RATINGS (T_{SOA} = 25°C)

Item	Symbol	Rating	Unit
SOA Forward Current	I_F	150	mA
SOA Reverse Voltage	V_R	2	V
Operating Case Temperature	T_C	−5 to +75	°C
Storage Temperature	T_{stg}	−40 to +85	°C
Cooler Current	I_C	1.0	A
Cooler Voltage	V_C	2.5	V

∗ Excess over the absolute maximum ratings may lead to damage.

PIN CONFIGURATION

No.	FUNCTION
1	Cooler Cathode
2	Cooler Anode
3	Thermistor
4	Thermistor
5	SOA Cathode
6	SOA Anode

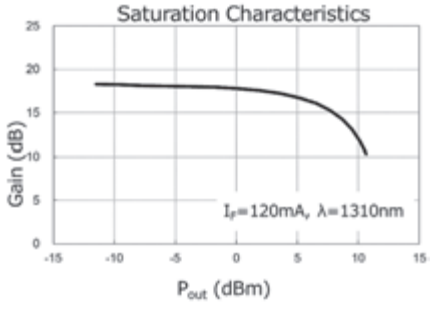
Fiber Characteristics	
Fiber type	SMF
Diameter of Fiber	ø0.25
Minimum Fiber bend radius	7.5mm
Fiber length (both sides)	1,000mm
Connectors (both sides)	LC Connector

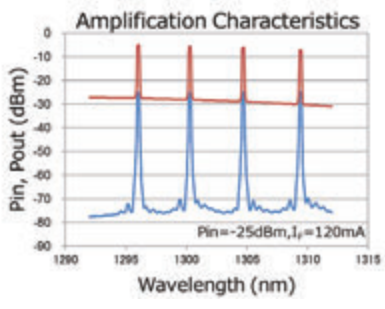
OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{SOA} = 25°C, T_C = 25°C)

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
Optical Gain	G	I_F = 120mA*1, *2, *3	15	—	—	dB
Polarization Dependent Gain	PDG	I_F = 120mA*1, *2, *3	—	—	1.5	dB
Forward Current	I_F	—	100	—	150	mA
Forward Voltage	V_F	I_F = 120mA	—	—	2.0	V
Wavelength Range	λ	I_F = 120mA	1294	—	1311	nm
Saturation Power	P_S	I_F = 120mA*4	—	7	—	dBm
Noise Figure	NF	I_F = 120mA*1, *2, *3, *5	—	7	—	dB
Cooler Current	I_C	G = (BOL), T_C = 75°C	—	—	0.6	A
Cooler Voltage	V_C	G = (BOL), T_C = 75°C	—	—	2.2	V
Thermistor Resistance	R_{th}	T_{SOA} = 25°C, B = 3435±105K	9.5	10	10.5	kΩ

∗1: Optical input signal condition: Continuous Wave(CW)
∗2: Optical input signals are 4 ranges of wavelength listed below. Characteristics are measured for each wavelength range.
Wavelength range of optical input signals are as follows
λ 0: 1294.5 to 1296.6nm λ 1: 1299.0 to 1301.1nm λ 2: 1303.5 to 1305.7nm λ 3: 1308.0 to 1310.2nm
∗3: Optical Input signal Power (Pin) = −25dBm
∗4: Saturation power is measured by using single wavelength (λ=1310nm).
∗5: Without polarization adjustment.

TYPICAL CHARACTERISTICS





Ultrafast Electron Devices

Electronic Devices for
Ultra-high speed
communication networks

ANRITSU DEVICES

Core Technology

MMIC

- Chip
- Package

- Circuit Design
- Micro Fabrication
- Mounting of High-frequency Module

Module

- Metal Package

Electronic Devices for
Measurement Instruments

Ultrafast Electron Devices: Selection Guide

List of Ultrafast Electron Devices products

MMIC

Product Name	Series/Model Number	Operating Range	Features
28 Gbaud Quad Linear EA Driver	AG2P65P	28 Gbaud	Output Voltage: 1.1 Vp-p, typ/ch, differential input, single end output.

Functional Module

Product Name	Series/Model Number	Operating Range	Features
2:1 Multiplexer	AH64175A	DC to 64 Gbit/s	Half-rate clock input, Differential output
1:2 Demultiplexer	AH64176A	DC to 64 Gbit/s	Half-rate clock input, Single-ended data/clock input, Data input sensitivity :<50 mVp-p
T-type Flip-Flop	AH64177A	DC to 60 GHz	Single-ended input, differential output
Differential Branch Amplifier	AH54172A	30 k to 40 GHz	Low power consumption: 0.60 Wtyp., Built-in DC block capacitor

Power Divider

Product Name	Series/Model Number	Operating Range	Features
4 Way Power divider	AN44187A	DC to 40 GHz	Insertion loss: 12 dB typ., skew: 3 ps typ

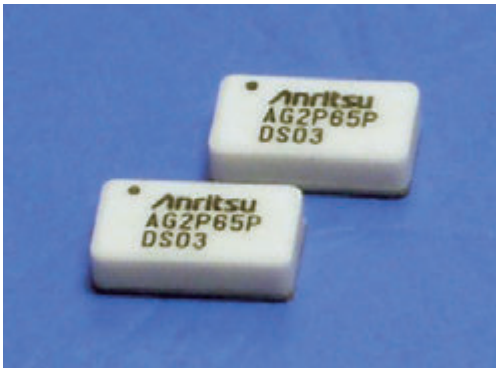
Amplifier

Product Name	Series/Model Number	Operating Range	Features
10 G Low Noise Amplifier	AH14149A	50 k to 10 GHz	NF: 4 dB typ., Small package with K-connector

Bessel Filter

Product Name	Series/Model Number	Operating Range	Features
Low Reflection Bessel Filter	AN14165A/B/C	f0: 1.6 GHz	Low reflection, Low group delay deviation, Metal PKG with K-connectors
Low Reflection Bessel Filter	AN14166A/B/C	f0: 3.2 GHz	Low reflection, Low group delay deviation, Metal PKG with K-connectors
Low Reflection Bessel Filter	AN14167A/B/C	f0: 7.5 GHz	Low reflection, Low group delay deviation, Metal PKG with K-connectors
Low Reflection Bessel Filter	AN44168A/B/C	f0: 30 GHz	Low reflection, Low group delay deviation, Metal PKG with V-connectors
Low Reflection Bessel Filter	AN44169A/B/C	f0: 35 GHz	Low reflection, Low group delay deviation, Metal PKG with V-connectors
Low Reflection Bessel Filter	AN44170A/B/C	f0: 40 GHz	Low reflection, Low group delay deviation, Metal PKG with V-connectors

28 Gbaud Quad Linear EA Driver
AG2P65P



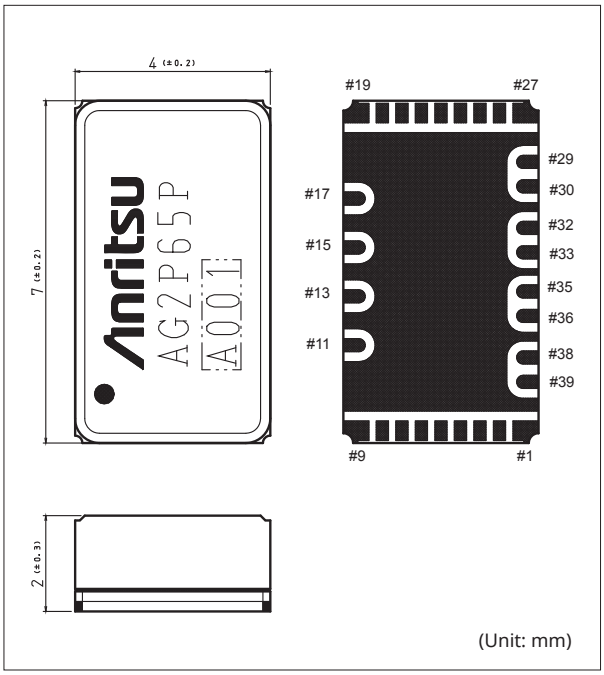
FEATURES

- Circuit number: 4 circuits
- Output voltage: 1.1 Vp-p typ./ch
- Power consumption: 0.28 W typ./ch
- Input interface: Differential
- Output interface: Single-end
- 40 pin QFN package: 7×4×2 mm
- Output Bias-T included

APPLICATIONS

- Driver for 400 GbE (PAM4) EA modulators

DIMENSIONS



(Unit: mm)

ABSOLUTE MAXIMUM RATINGS

Items	Symbol	Ratings		Units	Note
		Min.	Max.		
Input signal voltage*	V_{in}	—	1.0	Vp-p	AC coupled
Supply voltage	V_{CC}	−0.5	3.6	V	
Output amplitude control voltage	V_{amp}	−1.0	3.0	V	
Storage temperature	T_{Stg}	−40	90	°C	

*The value is amplitude into each port (IN / IN).

RECOMMENDED OPERATING CONDITIONS

Items	Symbol	Specifications			Units	Note
		Min.	Typ.	Max.		
Supply voltage	V_{CC}	2.6	—	2.8	V	
Driver choke bias	V_{DRV}	2.6	—	2.8	V	
Output amplitude control voltage	V_{amp}	1.8	—	2.4	V	
EAM bias current	I_{EAM}	—	—	100	mA	
Case temperature backside	T_C	−5	—	85	°C	

ELECTRICAL CHARACTERISTICS (T_C = 25 °C, V_{CC} = 2.6 V, V_{DRV} = 2.6 V, V_{amp} = 2.4 V, Z_{in} = 50 Ω, Z_{out} = 50 Ω)

Items	Conditions	Specifications			Units
		Min.	Typ.	Max.	
Baud rate	—	—	28	—	Gbaud
Input signal voltage	AC coupled*1 each-port	0.2	—	0.45	Vp-p
Max. Output voltage	V_{in} = 0.45 Vp-p*2	—	1.1	—	Vp-p
Output polarity	OUT1, OUT2 port	inverted			—
	OUT3, OUT4 port	Non-inverted			—
Input return loss	40 M to 20 GHz	—	10	—	dB
Output return loss	40 M to 20 GHz	—	10	—	dB

*1 External blocking capacitor is required
*2 Adjusted by supplied voltage to V_{amp}

POWER SUPPLIES (V_{CC} = 2.6 V to 2.8 V, V_{DRV} = 2.6 V to 2.8 V, V_{amp} = 2.4 V)

Items	Conditions	Specifications			Units
		Min.	Typ.	Max.	
Current consumption	I_{CC}	—	68	86	mA
	I_{DRV}	—	32	42	mA
	I_{amp}	—	6.5	10	mA
Power consumption	/ch	—	0.28	—	W

LOW REFLECTION 4-WAY POWER DIVIDER
AN44187A

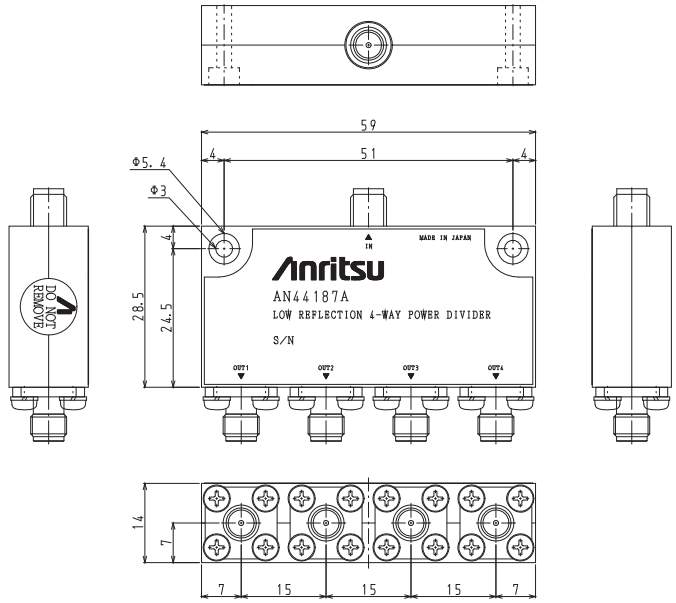
Multi-channel system and ratio measurement where signals are accurately divided

SPECIFICATIONS (T_a = 25°C, Z_{in} = 50 ohms, Z_{out} = 50 ohms)

Model Number			AN44187A		
External Appearance					
Items	Conditions	Units	Specifications		
			Min.	Typ.	Max.
Frequency Range		GHz	DC	—	40
Insertion Loss	@DC	dB	—	12	14
	@40GHz		—	13	15
Input Return Loss	DC to 20GHz	dB	15	20	—
	20G to 40GHz		10	15	—
Output Return Loss	DC to 20GHz	dB	15	20	—
	20G to 40GHz		10	15	—
Group Delay	DC to 40GHz	ps	—	±50	—
Isolation	Out1(3) to Out2(4)	dB	—	6	—
	Others		—	18	—
Skew		ps	—	3	—

DIMENSIONS

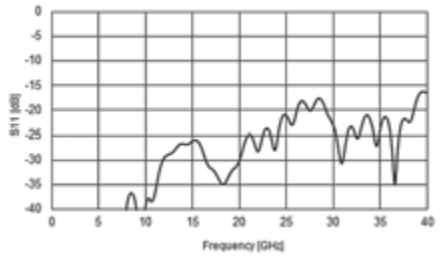
AN44187A

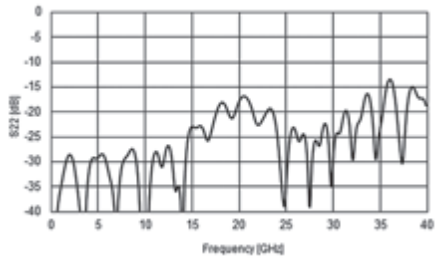


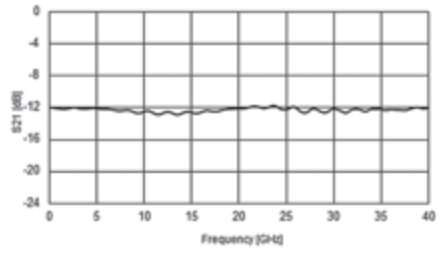
Connector type: K (Unit: mm)

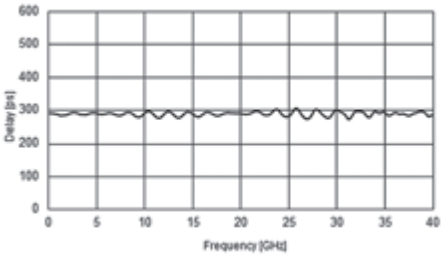
No.	Symbols	Functions	Remarks
1	IN	Signal input	K-Female
2	OUT1	Signal output-1	K-Female
3	OUT2	Signal output-2	K-Female
4	OUT3	Signal output-3	K-Female
5	OUT4	Signal output-4	K-Female

S-PARAMETER





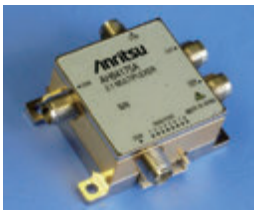




FUNCTIONAL MODULE SERIES
AH64175A 2:1 Multiplexer, AH64176A 1:2 Demultiplexer, AH64177A T-Flip Flop, AH54172A Differential Branch Amplifier

Functional Modules are digital function modules over 40 Gbit/s. The interfaces are coaxial connectors which are easy to use. Designed for R&D of optical communication and evaluation of high speed devices.

SPECIFICATIONS (T_a = 25 °C, V_{EE} = 3.5 V, Z_{in} = 50 Ω, Z_{out} = 50 Ω)

Model Number			AH64175A			AH64176A		
External Appearance								
Items	Conditions	Units	Specifications			Specifications		
			Min.	Typ.	Max.	Min.	Typ.	Max.
Bit Rate		Gbit/s	DC	—	64	DC	—	64
Data Input Voltage	D1, D2	Vp-p	0.2	0.5	0.7			
	D0					0.05	—	0.7
Clock Input Voltage	CK	Vp-p	0.2	0.5	0.7	—	0.5	—
Output Voltage	V_{in} = 0.5 Vp-p@64 Gbit/s	Vp-p	0.3	0.5	—	0.25	0.35	—
Jitter*		fs rms	—	350	—	—	300	—
Rise Time/Fall Time*	20 — 80 %	ps	—	7	—	—	6	—
Supply Current	V_{EE} = −3.5 V	mA	—	350	450	—	430	500
Power Consumption		W	—	1.2	—	—	1.5	—

* The specifications are based on the measurement using the Keysight 86118A 70 GHz Remote sampling head and 86107A Precision time base.

Model Number			AH64177A		
External Appearance					
Items	Conditions	Units	Specifications		
			Min.	Typ.	Max.
Frequency	Input	GHz	DC	—	60
	Output		DC	—	30
Clock Input Voltage	CKin	Vp-p	0.2	0.5	—
Output Voltage	V_{in} = 0.5 Vp-p @60 GHz	Vp-p	0.3	0.5	—
			—	—	—
Jitter*		fs rms	—	250	—
Supply Current	V_{EE} = −3.5 V	mA	—	250	350
Power Consumption		W	—	0.9	—

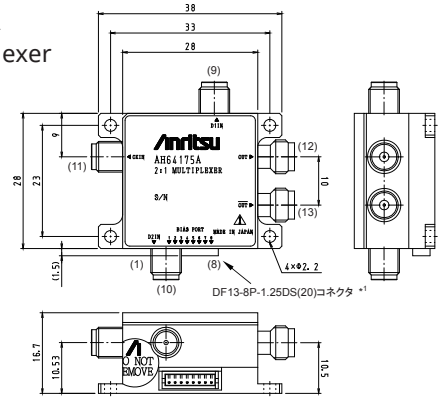
* The specifications are based on the measurement using the Keysight 86118A 70 GHz Remote sampling head and 86107A Precision time base.

Model Number			AH54172A		
External Appearance					
Items	Conditions	Units	Specifications		
			Min.	Typ.	Max.
Small Signal Bandwidth	Low End	kHz	—	30	100
	High End	GHz	—	40	—
Input Voltage	Single-End	Vp-p	0.2	0.5	0.7
	Differential		0.1	0.25	0.35
Output Voltage	V_{in} = 0.5 Vp-p @30 GHz	Vp-p	0.5	0.8	—
Jitter*		fs rms	—	300	—
Rise Time/Fall Time*	20 — 80 %	ps	—	6	—
Input Return Loss	40 M to 30 GHz	dB	—	10	—
Output Return Loss	40 M to 30 GHz	dB	—	10	—
Supply Current	V_{EE} = −3.5 V	mA	—	170	250
Power Consumption		W	—	0.6	—

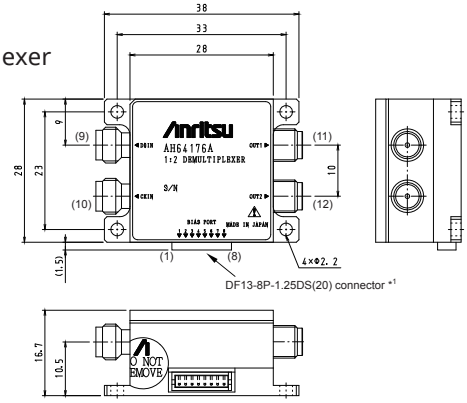
* The specifications are based on the measurement using the Keysight 86118A 70 GHz Remote sampling head and 86107A Precision time base.

DIMENSIONS

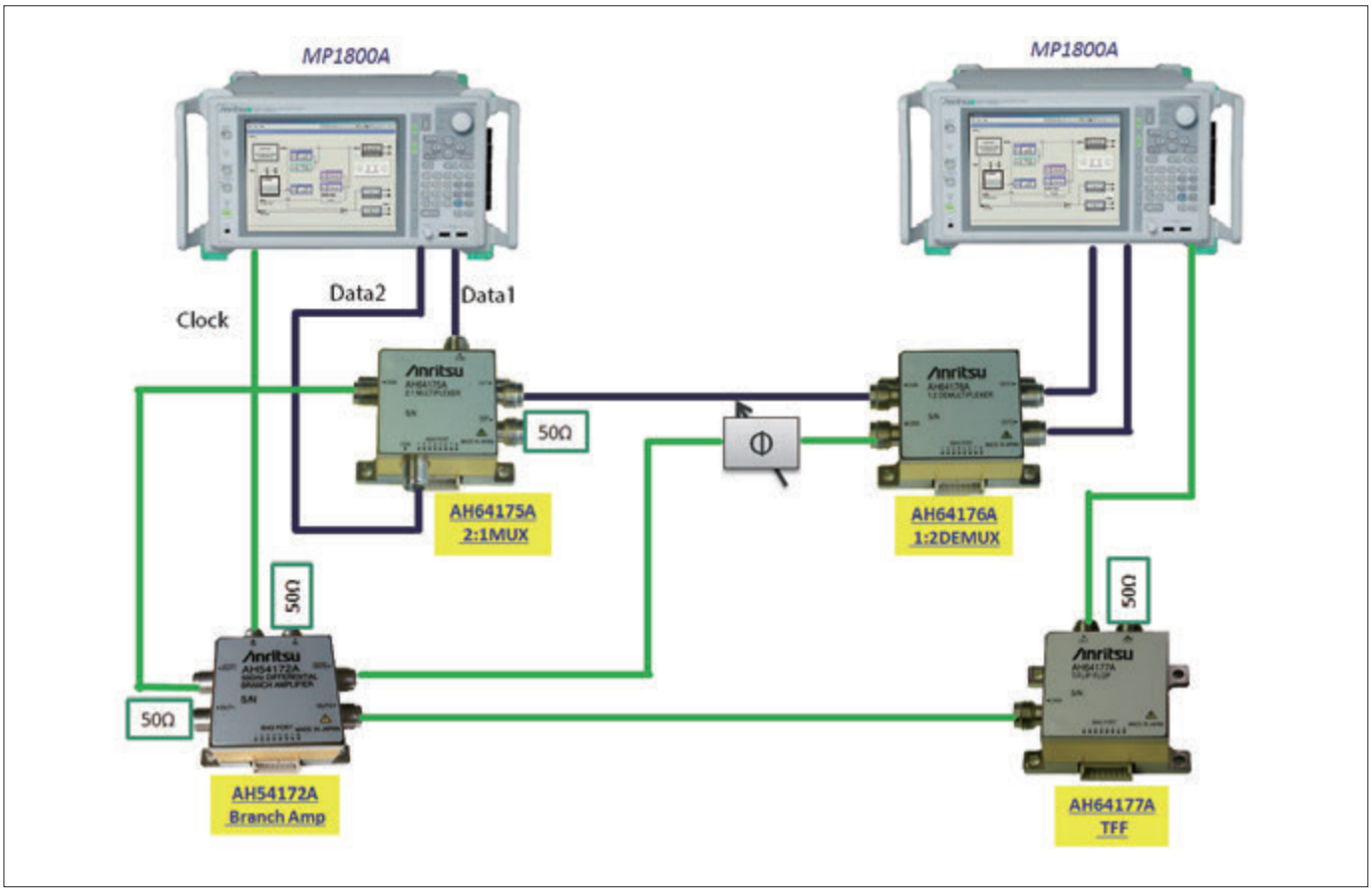
AH64175A
2:1 Multiplexer



AH64176A
1:2 Demultiplexer



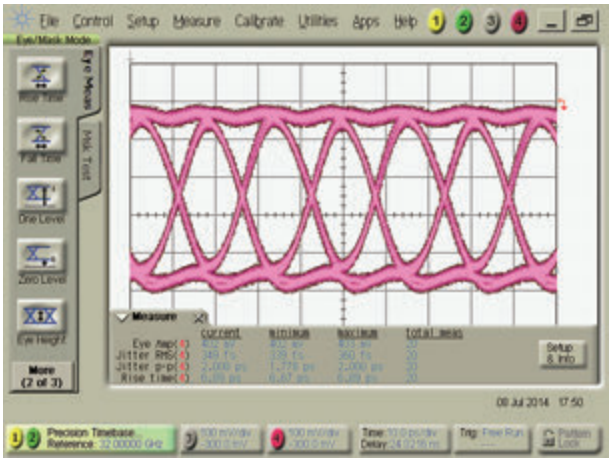
EXAMPLE OF APPLICATION



ELECTRICAL CHARACTERISTICS

◆ AH64175A

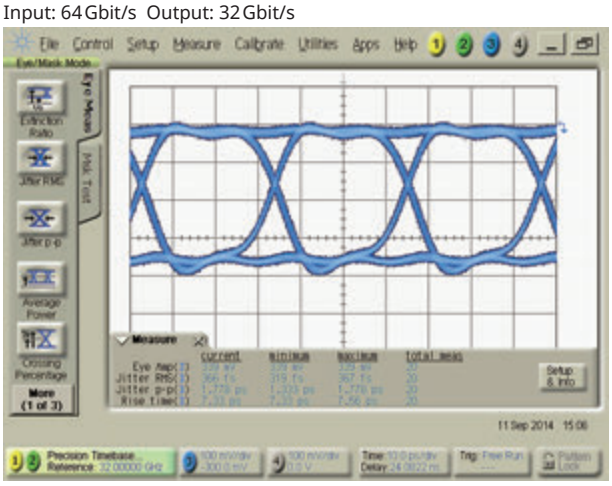
@64Gbit/s



V: 0.1V/div H: 10ps/div

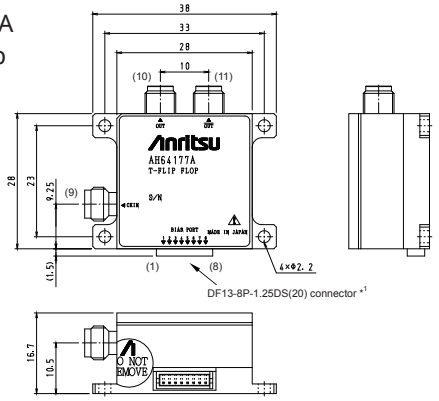
◆ AH64176A

Input: 64Gbit/s Output: 32Gbit/s

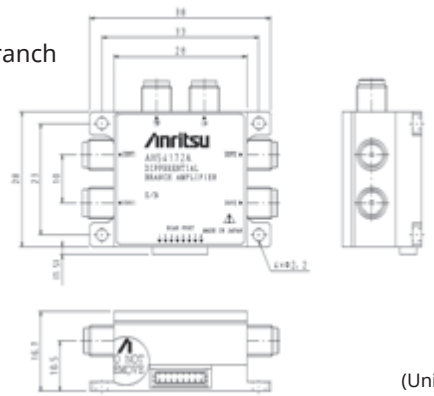


V: 0.1V/div H: 10ps/div

AH64177A
T-Flip Flop



AH54172A
Differential Branch
Amplifier



(Unit: mm)

BESSEL FILTER
AN14series/AN44series

These filters are low reflection vessel low pass filters which have superior characteristics for group delay deviation. The frequency ranges from 1.6GHz to 40GHz are available.

SPECIFICATIONS (T_a = 25°C, Z_{in} = 50Ω, Z_{out} = 50Ω)

Model Number			AN14165□			AN14166□			AN14167□		
External Appearance											
Items	Conditions	Units	Specifications			Specifications			Specifications		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Cutoff Frequency f0		GHz	—	1.6	—	—	3.2	—	—	7.5	—
Bit Rate		Gbit/s	—	2.125	—	—	4.25	—	—	10	—
Return Loss (S11/S22)	DC to fo	dB	15	—	—	15	—	—	15	—	—
	To 3fo		8	—	—	8	—	—	8	—	—
Insertion Loss	100MHz	dB	—	1.0	1.5	—	0.7	1.2	—	0.5	1.0
Insertion Loss*1	0.2fo	dB	–0.4	0.1	0.6	–0.4	0.1	0.6	–0.4	0.1	0.6
	0.4fo		–0.1	0.4	0.9	–0.1	0.4	0.9	–0.1	0.4	0.9
	0.6fo		0.5	1.0	1.5	0.5	1.0	1.5	0.5	1.0	1.5
	0.8fo		1.4	1.9	2.4	1.4	1.9	2.4	1.4	1.9	2.4
	1.0fo		2.5	3.0	3.5	2.5	3.0	3.5	2.5	3.0	3.5
	1.2fo		3.34	4.5	5.66	3.34	4.5	5.66	3.34	4.5	5.66
	1.33fo		4.16	5.7	7.24	4.16	5.7	7.24	4.16	5.7	7.24
	1.4fo		4.69	6.4	8.11	4.69	6.4	8.11	4.69	6.4	8.11
	1.6fo		6.3	8.5	10.7	6.3	8.5	10.7	6.3	8.5	10.7
	1.8fo		8.28	10.9	13.52	8.28	10.9	13.52	8.28	10.9	13.52
	2.0fo		10.4	13.4	16.4	10.4	13.4	16.4	10.4	13.4	16.4
Group Delay	DC to fo	mUI*2	—	—	Δ100	—	—	Δ100	—	—	Δ100

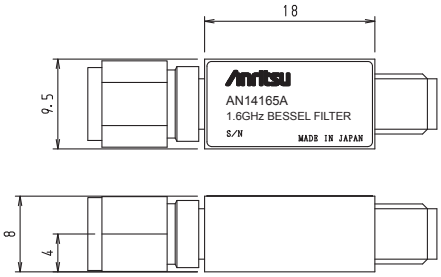
*1 Reference insertion loss: 100MHz
*2 UI's reference frequency: Bit rate

Model Number			AN44168□			AN44169□			AN44170□		
External Appearance											
Items	Conditions	Units	Specifications			Specifications			Specifications		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Cutoff Frequency fo	–3dB	GHz	—	30	—	—	35	—	—	40	—
Return Loss (S11/S22)	DC to fo	dB	10	15	—	10	15	—	10	15	—
	To 65GHz		5	10	—	5	10	—	5	10	—
Insertion Loss1	@100MHz	dB	—	0.2	0.7	—	0.2	0.7	—	0.2	0.7
Insertion Loss2	0.2fo	dB	–0.6	0.1	0.8	–0.6	0.1	0.8	–0.6	0.1	0.8
	0.4fo		–0.2	0.5	1.2	–0.2	0.5	1.2	–0.2	0.5	1.2
	0.6fo		0.3	1.0	1.7	0.3	1.0	1.7	0.3	1.0	1.7
	0.8fo		1.2	1.9	2.6	1.2	1.9	2.6	1.2	1.9	2.6
	1.0fo		2.3	3.0	3.7	2.3	3.0	3.7	2.3	3.0	3.7
	1.2fo		3.4	4.5	5.7	3.4	4.5	5.7	3.4	4.5	5.7
	1.3fo		4.3	5.7	7.1	4.3	5.7	7.1	4.3	5.7	7.1
	1.4fo		4.9	6.4	7.9	4.9	6.4	7.9	4.9	6.4	7.9
	1.6fo		6.7	8.6	10.5	6.7	8.6	10.5	6.7	8.6	10.5
	(1.8fo)		8.8	10.9	13.0	8.8	10.9	13.0	8.8	10.9	13.0
	(2.0fo)		11.0	13.4	15.8	11.0	13.4	15.8	11.0	13.4	15.8
Group Delay*1	DC to fo	mUI	—	—	Δ300	—	—	Δ300	—	—	Δ300

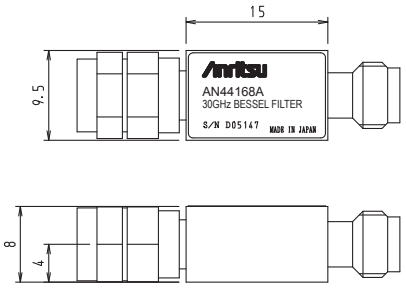
*1 UI's reference frequency: 1.3fo

DIMENSIONS

AN14165 to 14167□



AN44168 to 44170□



(Unit: mm)

MODEL NUMBER

AN14165□

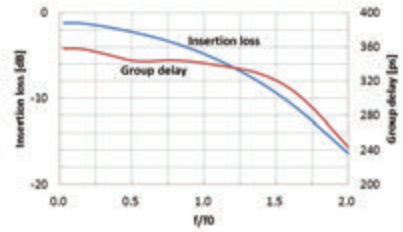
Connector type example: AN14165A

Connector Type	In/Out
A	M-F
B	F-F
C	M-M

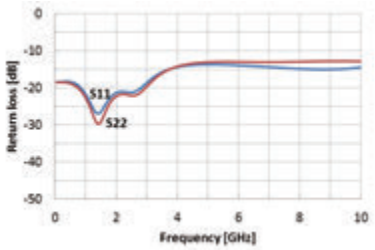
ELECTRICAL CHARACTERISTICS

◆ AH14165A

Transmission characteristics

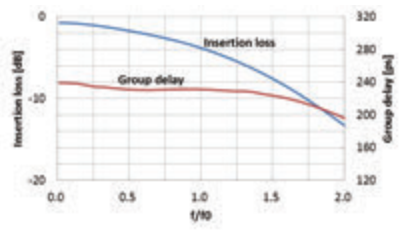


Reflection characteristics

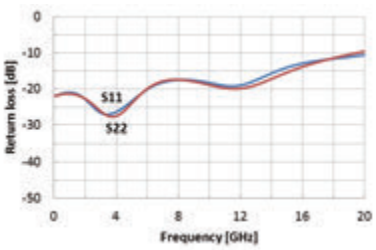


◆ AH14166A

Transmission characteristics

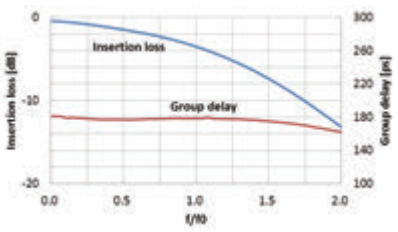


Reflection characteristics

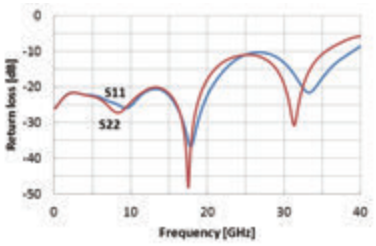


◆ AH14167A

Transmission characteristics

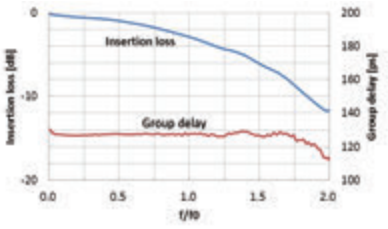


Reflection characteristics

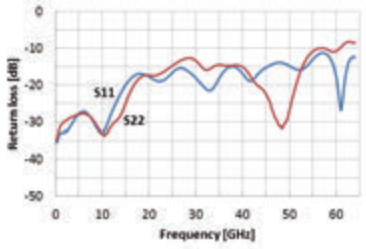


◆ AH44168A

Transmission characteristics

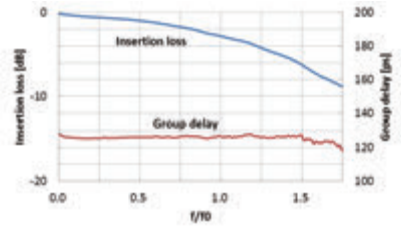


Reflection characteristics

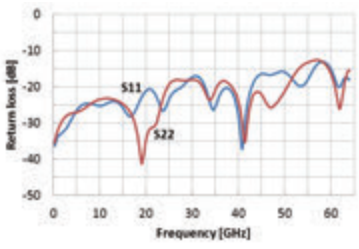


◆ AH44169A

Transmission characteristics

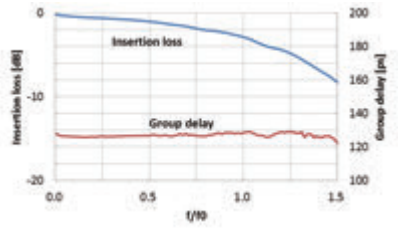


Reflection characteristics

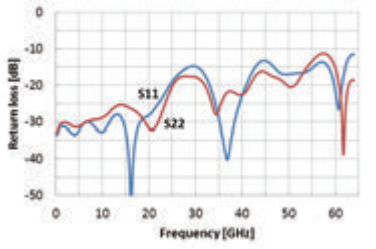


◆ AH44170A

Transmission characteristics

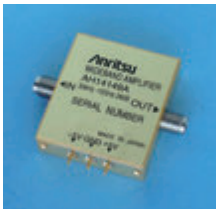


Reflection characteristics



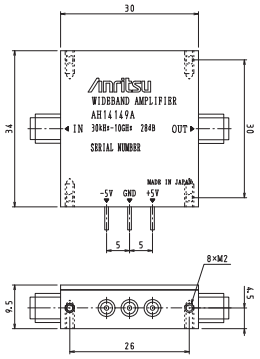
10G Low Noise Amplifier
AH14149A

SPECIFICATIONS (T_a = 25°C, V+ = +5 V, V– = –5 V, Z_{in} = 50Ω, Z_{out} = 50Ω)

Model Number			AH14149A		
External Appearance					
Items	Conditions	Units	Specifications		
			Min.	Typ.	Max.
Bandwidth	–3dB@1GHz	kHz	—	50	100
	Ref.	GHz	9	10	—
Voltage Gain	@1GHz	dB	25	28	—
Gain Flatness	1MHz to 7.5GHz	dB	—	—	±1.5
Noise Figure	1GHz to 10GHz	dB	—	4	5
Group Delay	45MHz to 10GHz	ps	—	—	±150
Rise Time/Fall Time	10% — 90%	ps	—	35	—
Overshoot		%	—	—	10
Output Voltage	100mVp-p Input	Vp-p	1.2	1.5	—
Input Return Loss	To 10GHz	dB	6	—	—
Output Return Loss	To 10GHz	dB	10	—	—
Supply Current	+5V	mA	—	90	100
	–5V	mA	—	5	10
Output Polarity			Invert		

DIMENSIONS

AH14149A

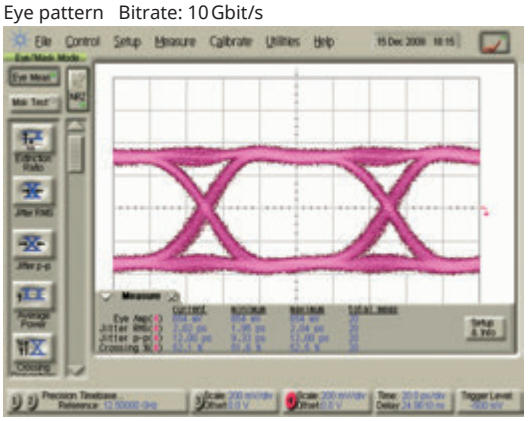


(Unit: mm)

ELECTRICAL CHARACTERISTICS

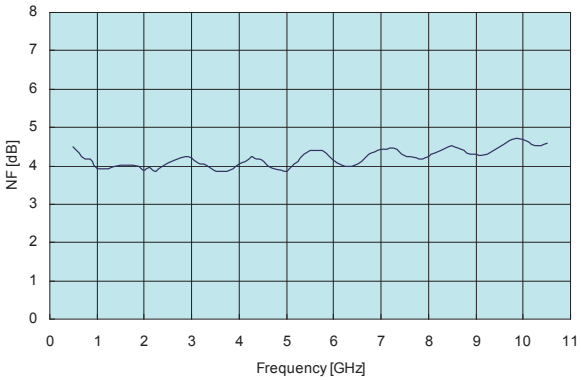
◆ AH14149A

Eye pattern Bitrate: 10Gbit/s



V: 800mV/div H: 10ps/div

Noise figure



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