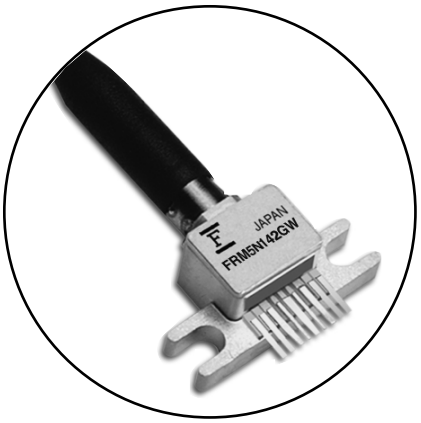
InGaAs-APD/Preamp Receiver

FRM5N142GW

FEATURES

- Small Form Factor Package(GW): 9 pins coplanar
- Integrated Design Optimizes Performance at Bit Rates up to 10.7Gb/s
- High Gain: 4kΩ(Single-ended), 8kΩ(Differential)
- High Sensitivity: -27dBm (typ.)
- Electrical Differential Output
- Wide Bandwidth: 8.5GHz (typ.)
- Operates in both C and L wavelength bands
- Wide Operating Temperature Range: -5°C to +75°C



APPLICATIONS

This APD with HBT preamplifier is intended to function as an optical receiver at 1,310nm or 1,530-1,610nm in SONET, SDH, DWDM or other optical fiber systems operating up to 10.7Gb/s. The typical transimpedance (Zt) value of 4,000Ω optimizes the total bandwidth for 10Gb/s application. The detector preamplifier is DC coupled and has an electrical differential output.

DESCRIPTION

The FRM5N142GW incorporates a high bandwidth InGaAs APD photo diode, a GaAs HBT IC amplifier in a hermetically sealed Small Form Factor package (SFF). The APD is processed with modern MOVPE techniques resulting in a reliable performance over a wide range of operating conditions. The lens coupling system and the single mode fiber are assembled using Nd YAG welding.

ABSOLUTE MAXIMUM RATINGS (T_C=25°C)

Parameter	Symbol	Ratings	Unit
Storage Temperature	T_{stg}	-40 to +85	°C
Operating Temperature	T_{op}	-5 to +75	°C
Supply Voltage	V_{ss}	-6 to 0	V
PIN Reverse Voltage	V_R	0 to VB(Note)	V
PIN Reverse Current	$I_{R(peak)}$	5	mA

Note: Since VB may vary from device-to-device, VB data is attached to each device for reference.

Edition 1.1
October 2003

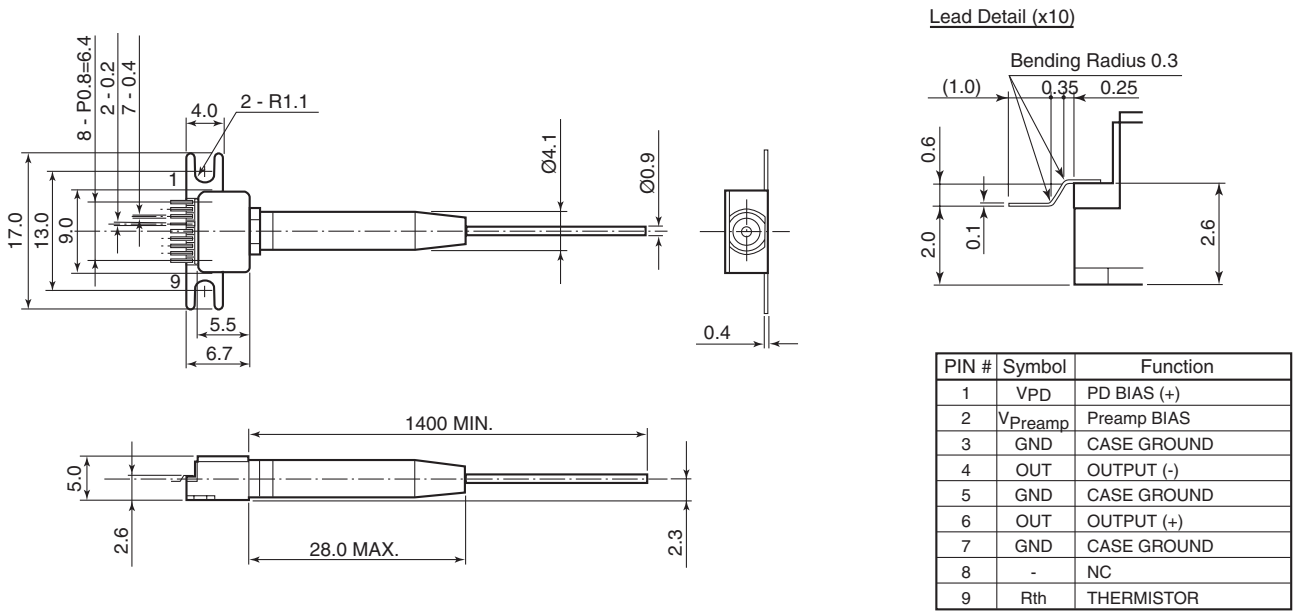
OPTICAL & ELECTRICAL CHARACTERISTICS
(T_C=25°C, λ=1,550nm, V_{SS}=-5.2V, unless otherwise specified)

Parameter	Symbol	Test Conditions		Limits Min.	Limits Typ.	Limits Max.	Unit
APD Responsivity	R13	λ = 1,310nm, M=1		0.70	0.85	-	A/W
	R15	λ = 1,550nm, M=1		0.70	0.90	-	
	R16	λ = 1,610nm, M=1		-	0.80	-	
APD Breakdown Voltage	VB	ID = 10μA		20.0	25.0	30.0	V
Temperature Coefficient of VB	γ	Note (1)		0.03	0.05	0.07	V/°C
AC Transimpedance	Z_t	f = 750MHz, Single-end		3500	4000	-	Ω
Maximum Output Voltage Swing	V_{clip}	Saturated Output Voltage, Single-ended		250	350	450	mV
Bandwidth	BW	-3dB from 750MHz, Pin=-24dBm	M=9	7.5	8.5	-	GHz
			M=3	7.5	8.5	-	
Lower Cut-off Frequency	fcl	-3dB from 750MHz, Pin=-24dBm		-	40	100	kHz
Peaking	dpk	130MHz to BW, Pin=-24dBm,M=9		-	1.5	2.0	dB
Group Delay Deviation	GD	1GHz to 6GHz, Pin=-24dBm, M=9		-	30	-	ps_{p-p}
		1GHz to 8GHz, Pin=-24dBm, M=9		-	60	-	
Output Return Loss	S22	130MHz to 6GHz		-	10	-	dB
		130MHz to 8GHz		-	7	-	
Minimum Sensitivity	P_r	10Gb/s, NRZ, PRBS=2^{31}-1, B.E.R.=10^{-12}, VR=Optimum	25°C, Rext=13dB	-	-27.0	-25.0	dBm
			25°C, Rext=10dB	-	-26.0	-	
			25°C, Rext=8.2dB	-	-25.0	-	
			75°C, Rext=13dB	-	-26.0	-24.0	
Maximum Overload	P_o	10Gb/s, NRZ, PRBS=2^{31}-1, B.E.R.=10^{-12}, Rext=13dB, M=3		-4	-2	-	dBm
Optical Return Loss	ORL	λ = 1,550nm		27	-	-	dB
		λ = 1,310nm		27	-	-	
Power Supply Current	I_{ss}	-		-	80	130	mA
Power Supply Voltage	V_{ss}	-		-5.46	-5.20	-4.94	V
Thermistor Resistance	R_{th}	-		9.5	10.0	10.5	kΩ
Thermistor B Constant	B	-		3800	3900	4000	K

Note 1: γ=ΔVB/ΔTc
Note: All the parameters are measured with 50Ω, AC-coupled.

Notes

"GW" PACKAGE **UNIT: mm**



PIN #	Symbol	Function
1	V_{PD}	PD BIAS (+)
2	V_{Preamp}	Preamp BIAS
3	GND	CASE GROUND
4	OUT	OUTPUT (-)
5	GND	CASE GROUND
6	OUT	OUTPUT (+)
7	GND	CASE GROUND
8	-	NC
9	Rth	THERMISTOR

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Fujitsu Compound Semiconductor Products contain **gallium arsenide (GaAs)** which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- **Do not put this product into the mouth.**
- **Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.**
- **Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.**

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