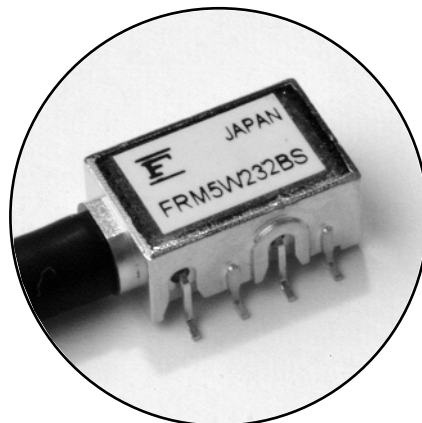


InGaAs-APD/Preamp Receiver *FRM5W232BS/BS-A*

FEATURES

- 2.7Gb/s APD Receiver module in an industry standard mini-DIL package is available in gull-wing or through-hole configuration
- High Sensitivity: -34 dBm (typ.)
- Differential Electrical Output
- Integral Thermistor and GaAs IC Preamp
- Wide operating temperature range: -40 to +85°C



APPLICATIONS

This APD detector preamp is intended to function as an optical receiver in long haul SONET, SDH, and DWDM systems operating up to 2.7Gb/s. The device operates in both the 1,310 and 1,550nm wavelength windows. The nominal 10K Ω integral thermistor allows accurate monitoring of the APD temperature and facilitates the design of the APD bias control circuits. The detector preamplifier has a differential electrical output.

DESCRIPTION

The FRM5W232BS incorporates a 30 micron InGaAs Avalanche Photodiode (APD) detector, a GaAs IC transimpedance preamplifier, and a thermistor in a mini-DIL type package. The APD is processed with modern MOVPE techniques resulting in reliable performance over a wide range of operating conditions. The lens coupling system and the single mode fiber are assembled using Nd: YAG welding techniques. The BS package is designed for a surface mount PC board assembly, and the BS-A is designed for through-hole mount assembly.

ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Storage Temperature	T _{stg}	-40 to +85	°C
Operating Case Temperature	T _{op}	-40 to +85	°C
Supply Voltage	V _{DD}	0 to +4.5	V
APD Reverse Voltage	V _R	0 to V _B (Note)	V
APD Reverse Current	I _R (peak)	3.0	mA

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

FRM5W232BS/BS-A InGaAs-APD/Preamp Receiver

OPTICAL & ELECTRICAL CHARACTERISTICS

(T_C=25°C, λ=1,550nm, V_{DD}=+3.3V unless otherwise specified)

Parameter	Symbol	Test Conditions		Limits		Unit	
			Min.	Typ.	Max.		
APD Responsivity	R13	$\lambda = 1,310\text{nm}$, M=1	0.75	0.80	-	A/W	
	R15	$\lambda = 1,550\text{nm}$, M=1	0.80	0.85	-		
	R16	$\lambda = 1,610\text{nm}$, M=1	-	0.70	-		
APD Breakdown Voltage	VB	ID=10 μ A	40	50	65	V	
Temperature Coefficient of VB	γ	Note (1)	0.08	0.12	0.15	V/°C	
AC Transimpedance	Z _t	Pin=-30dBm, f=100MHz, Single-end	1800	2200	2600	Ω	
Bandwidth	BW	Pin=-30dBm, M=10, -3dB from 1MHz	2.2	2.4	-	GHz	
Lower Cut-Off Frequency	f _{cl}		-	50	75	kHz	
Peaking	d _{pk}	Pin=-30dBm, M=10, from 1MHz	-	-	+2	dB	
Group Delay Deviation	GD	Pin=-30dBm, M=10, from 500MHz to 1.75GHz	-	100	-	psec	
Output Return Loss	S22	up to 1.75GHz	10	-	-	dB	
		up to 2.5GHz	5	-	-		
Equivalent Input Noise Current Density	i _n	Average within 2.2GHz	-	9.5	11	pA $\sqrt{\text{Hz}}$	
Minimum Sensitivity	P _r	Note (4)	Ta=25°C, R _{ext} =14dB	-	-34.0	-33.0	dBm
			Ta=-40°C ~ 85°C, R _{ext} =14dB	-	-33.0	-31.0	
			Ta=25°C, R _{ext} =10dB	-	-33.0	-	
Maximum Overload	P _{max}	2.488Gb/s, NRZ, PRBS=2 ²³ -1, BER=10 ⁻¹⁰ , M=3	-5	-	-	dBm	
		M=3, Note (3)	-7	-	-		
Maximum Output Voltage Swing	V _{clip}	Saturated Output Voltage	450	550	800	mV	
Optical Return Loss	ORL	-	30	-	-	dB	
Power Supply Current	I _{DD}	-	-	45	70	mA	
Power Supply Voltage	V _{DD}	-	3.15	3.30	3.45	V	
Thermistor Resistance	R _{th}	T _c =25°C	9.5	10.0	10.5	k Ω	
Thermistor B Constant	B	-	3800	3900	4000	K	

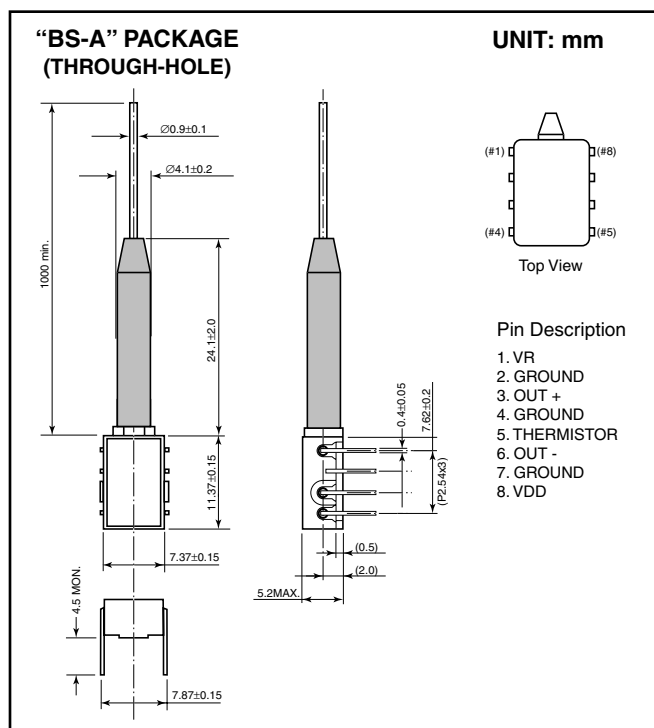
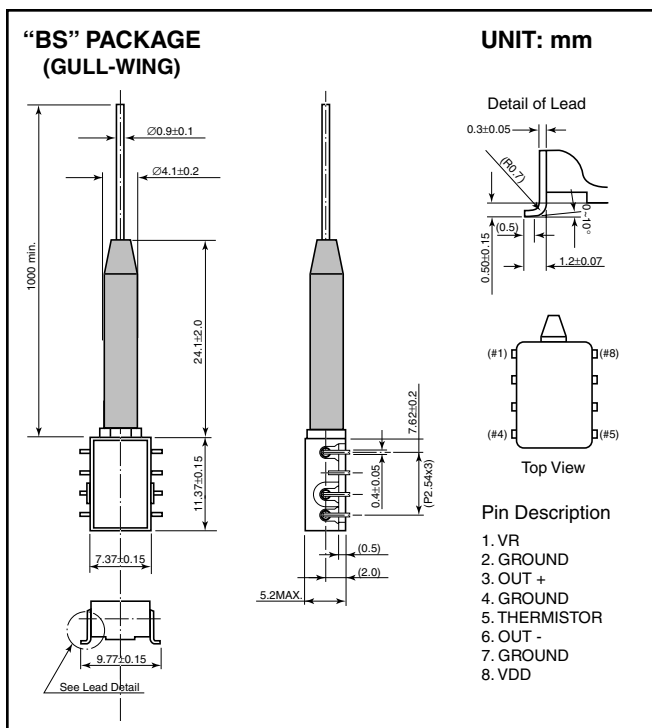
Note: (1) γ=ΔVB/ΔT_C

Note: (2) All the parameters are measured with 50Ω AC-coupled.

Note: (3) Defined by 10% distortion of wave form.

Note: (4) Test condition is 2.488Gb/s, NRZ, PRBS=2²³-1, B.E.R.=10⁻¹⁰, VR=Optimum with fc=1866MHz Bessel.

Notes



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