



# BPR-23-SQ

## DEVICE

## 23 GHz Linear Balanced Photo Receiver

## INFO

The Optilab BPR-23-SQ is a linear balanced photoreceiver with a **configurable bandwidth** up to 23 GHz. It is carefully designed, manufactured and tested to meet space application requirements. Compared to its commercial grade counter part, BPR-23-SQ is more shock and vibration tolerant, withstands larger temperature range and shows an overall better reliability. BPR-23-Q comes with **space grade MINI-AVIM connectors**.

## FEATURES

- MGC and AGC modes
- Adjustable bandwidth to 23 GHz
- Low skew, near ideal matching response
- Linear TIA with integrate VGA
- 14 pin mini-DIL package
- Dual GPPO for differential RF output

## USE IN

- $\leq 23$  GHz RFoF Link Systems
- Line card designs
- 48 Gbit/s DQPSK systems
- Transponder designs
- Low-noise analog heterodyne detection
- Satellite Communication

## TESTS (partial)

- Stabilization Bake
- Thermal Cycling
- Constant Acceleration
- PIND
- Burn-in Screening
- Electro-Optical Measurement
- Radiographic Inspection
- Fine and Gross Seal Tests
- SAM
- SEM
- Bond Pull Test
- Die Shear Attache Strength
- Vibration Test
- Life Test
- Humidity Test
- ESD (HBM) Test
- Temperature Step-Stress Test
- Proton Displacement Damage

## STANDARDS (partial)

- ECSS\_Q-ST-60-5C
- ESCC (various)
- MIL-STD-883
- IEC 60749-29
- MIL-PRF-38534
- FOTP-13





# BPR-23-SQ

## SPECIFICATIONS

Optimized Operating Wavelength	950 nm to 1650 nm
Optical Input Level	+4 dBm max.
S21 3 dB Bandwidth	23 GHz typ.
Dark Current @ 25° C, 3.3V	5 nA typ.
Conversion Gain	1500 V/W typ., 1300 V/W min
Imbalance of Conversion Gain	0.3 dB typ.
Optical Return Loss	30 dB typ.
Optical PDL @1550 nm	0.25 dB max.
PD Reverse Bias Voltage	3.3 V $\pm$ 0.2V
TIA Supply Voltage	3.3 V $\pm$ 0.2V
Output Return Loss	8 dB @ 20 GHz
Differential Output Voltage	Up to 1200 mVpp
Impedance	50 $\Omega$
Output Coupling	DC (external AC coupling required)
Impulse Response	22 ps typ.
Skew	5 ps typ. , 20 ps max.
Noise Equivalent Power Density	70 pW/ $\sqrt$ Hz max.

## GENERAL

Operating Temperature	-15 °C to +75 °C
Storage Temperature	-40 °C to +85 °C
Operating Humidity	85% max
Supply Current	77 mA typ., 93 mA max.
Housing Dimension	18 mm x 22 mm x 8.5 mm
Fiber Connector	Diamond MINI-AVIM
Optical Fiber	SMF-28
Package Type	14 pin butterfly min-DIL
RF Connector	Dual GPPD

## MECHANICAL

PD Reverse Bias Voltage	4.5 V
Input Optical Power	6 mW
Maxium Current	93 mA
Continuous Input Current	-1.5 mA to 5 mA
ESD, Input and Output Pins	1000 V min.
ESD, All Other Pins	2000 V min.
Latch up	JESD78 Class 2
Humidity	85%

## MAX RATINGS



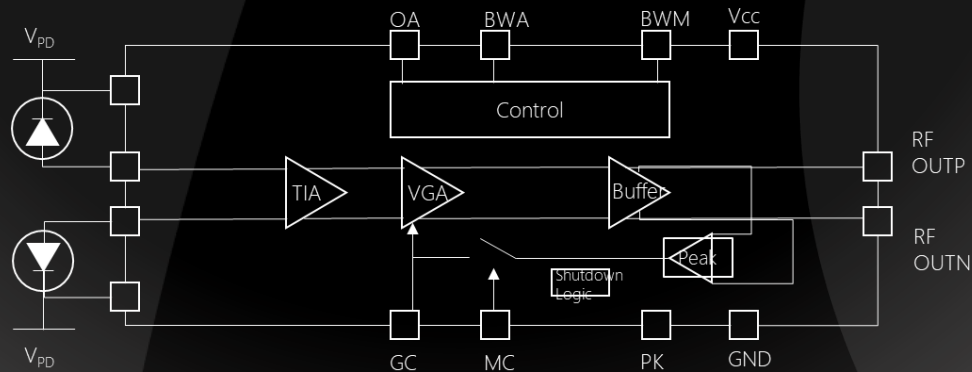


# BPR-23-SQ

## PIN-OUT

PIN 1, 5, 10, 14	Vcc	2.8 to 3.3 V, abs max current is 93 mA
PIN 2	BWM	Bandwidth Adjust, Sign.
PIN 3	BWA	Bandwidth Adjust, Magnitude
PIN 4	OA	Output Amplitude Adjust. 0-3.3 VDC adjustment for AGC mode.
PIN 6, 9	GND	Ground
PIN 7	VPD1	PD1 Cathode Connection
PIN 8	VPD2	PD2 Cathode Connection
PIN 11	GC	Gain Control. 0-3.3 VDC adjustment for MGC mode. Set to FLT in AGC mode.
PIN 12	MC	Mode Control. GND: MGC mode; FLT: AGC mode; Vcc: Shutdown.
PIN 13	PKD	Peak Detector Output
	OUTP	Positive RF Output, DC coupled out
	OUTN	Negative RF Output, DC coupled out

## FUNCTION DIAGRAM





# BPR-23-D ADDITIONS

DEVICE

## Evaluation Board (BPR-23-EVAL)

INFO

Evaluation board for the BPR is designed for **ease of testing**. It provides convenient access to all 14 pins and the data output ports. Utilizing a **zero-insertion force** configuration, the BPR can be mounted without the need for soldering. Different settings can be easily configured with the provided jumpers. The evaluation board can be powered up with a single +3.3V power with the provided power cable.

SETTINGS

BWM (PIN 2)	BWA (PIN 3)	Min. Bandwidth (GHz)
GND	Vcc	13
GND	FLT	15
GND	GND	16
FLT	FLT	18
Vcc	GND	20
Vcc	FLT	20.5

Operation Mode	MC Setting (PIN 12)	Amplitude/Gain Adjustment
Manual Gain Control	GND	GC (PIN 11), 0~3.3V
Auto Gain Control	Floating	OA (PIN 4), 0~3.3V
Shit Down	Vcc	N.A.

DEVICE

## Integrated Module (BPR-23-M)

INFO

For ease of installation, a fully integrate module BPR-23-M is available for ordering. Here are the features of BPR-23-M:

- Power and controlled via USB
- Integrated input power monitoring
- Integrated DC blocks
- MGC/AGC selection

