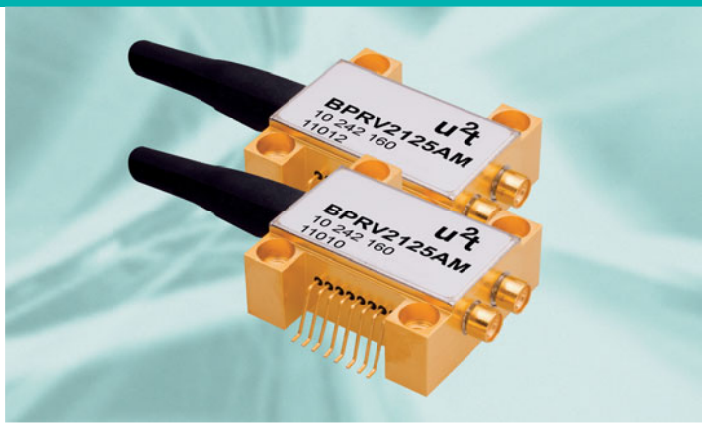
Datasheet

u2t photonics



43 Gbit/s DQPSK Balanced Photoreceiver Set

Product Code: BPRV2125AM

Product Description

The balanced photoreceiver set BPRV2125AM consists of two pieces BPRV2125A with matched fiber lengths. The balanced photoreceiver module BPRV2125A is a customized differential front-end for 43 Gbit/s DPSK-applications featuring high differential gain of typically 2800 V/W. The photoreceivers each contain two waveguide-integrated pin-photodiodes (PD) on a single chip and a limiting amplifier (LA) within one small form factor SMD-package. The limiting amplifier provides a differential output voltage swing of typ. 600 mV. The receivers are therefore well suited for OC-768/STM-256 system operation up to 43 Gbit/s but especially designed for DQPSK applications.

The DC output voltage can be monitored for OUTN and OUTP independently. For each amplifier path a threshold control at a linear amplification stage should be applied to ensure an optimized differential output signal.

An excellent electrical and optical phase propagation is achieved by a total skew of lower than 5 ps between the balanced signal paths of each device and 10 ps total skew for all fibers of the pair.

Features

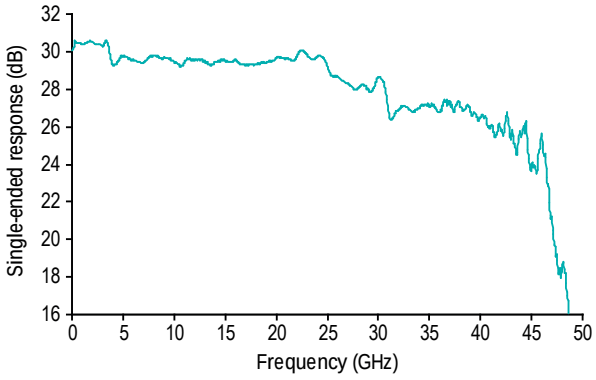
- Set contains 2 balanced PIN / LA photoreceiver modules
- All fiber lengths matched
- Very low skew
- Hermetically sealed SMD package with two GPPO™ connectors
- Dual optical input - differential rf output
- AC-coupled with threshold control option

Applications

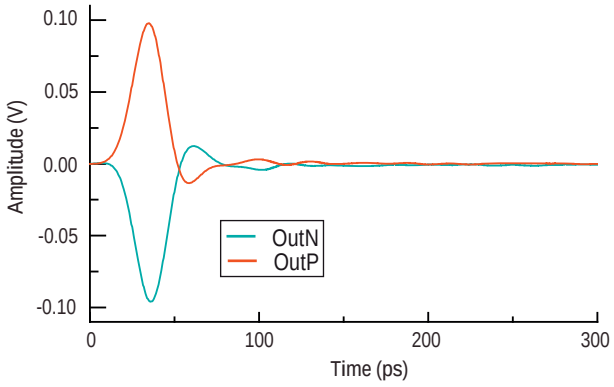
- 43 Gbit/s DQPSK communication systems
- Transponder and line card designs

Typical Performance

Frequency Response



Pulse Response



Absolute Maximum Ratings

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Storage temperature range	T_{stg}	Non condensing	-40		+85	°C
Photo diode bias voltage	$V_{PD1,2}$		0		+3.5	V
Amplifier supply voltage	V_{EE}		-5.5		+0.3	V
Amplifier adjustment voltage	V_{ADJ}		-5.5		+0.3	V
Amplifier threshold control voltage	$V_{THCP,N}$		-7.0		+7.0	V
Maximum average optical input power	P_{opt}	NRZ, per input port			9	dBm
Electro static discharge	V_{ESD}	C= 100 pF, R= 1.5 kΩ HBM	-500		500	V
Fiber bend radius			16			mm

Operation Conditions

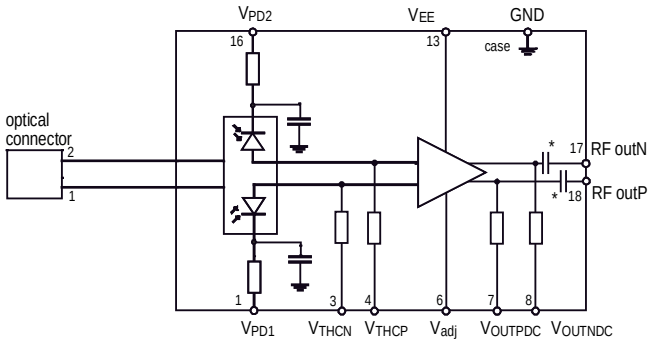
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating case temperature range	T_{case}		0		+75	°C
Relative humidity range	RH	non condensing	5		85	%
Operating wavelength range	λ		1530		1620	nm
Average optical input power range	P_{opt}		-10		4	dBm
Photodiode bias voltage	V_{PD}		2.0	2.25	2.75	V
Amplifier supply voltage	V_{EE}		-5.3	-5.2	-4.8	V

Optical and Electrical Specifications [1)]

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Differential conversion gain	CG	2), 3)	2000	2800		V/W
Photodiode DC responsivity	R	optimum polarization	0.5	0.6	0.75	A/W
Polarization dependent loss	PDL			0.4	0.6	dB
Optical return loss	ORL		27	30		dB
Bit rate		NRZ DQPSK		43		Gbit/s
3dB cut-off frequency	f_{3dB}	3)	27	31		GHz
Lower frequency cut off	f_{3dB_L}				100	kHz
Electrical output reflexion coefficient	S_{22}	f = 0.5 to 15 3) f = 15 to 50 GHz 3)			-10 0	dB
Differential output voltage swing	V_{out_diff}	P_{opt} ≥ 0dBm 2)		600		mV
$Skew_{Rx}$				1	5	ps
$Skew_{Set}$		total skew for all fibers			10	ps
Equivalent input noise density	i_{noise}				80	pA/√Hz
Sensitivity	Sens	2), 4)		-10	-5	dBm
Amplifier supply current	I_{EE}	per receiver		85	100	mA
Photodiode dark current	I_{dark}	per PD		5	300	nA
Power consumption	P_{con}			0.45	0.6	W

Notes: 1) $V_{PD1} = V_{PD2} = +2.25$ V, $V_{EE} = -5.2$ V; $V_{adj} = -2.4$ V, λ = 1550nm, T=25°C
2) Measurements performed in single ended conditions
3) Measured using Agilent 860330A 50 GHz Lightwave component analyzer
4) Evaluated from NRZ eye diagram and BER measurement at 40 Gbit/s (BER 10^{-12}, PRBS 2^{31}-1, back to back)

Block Diagram

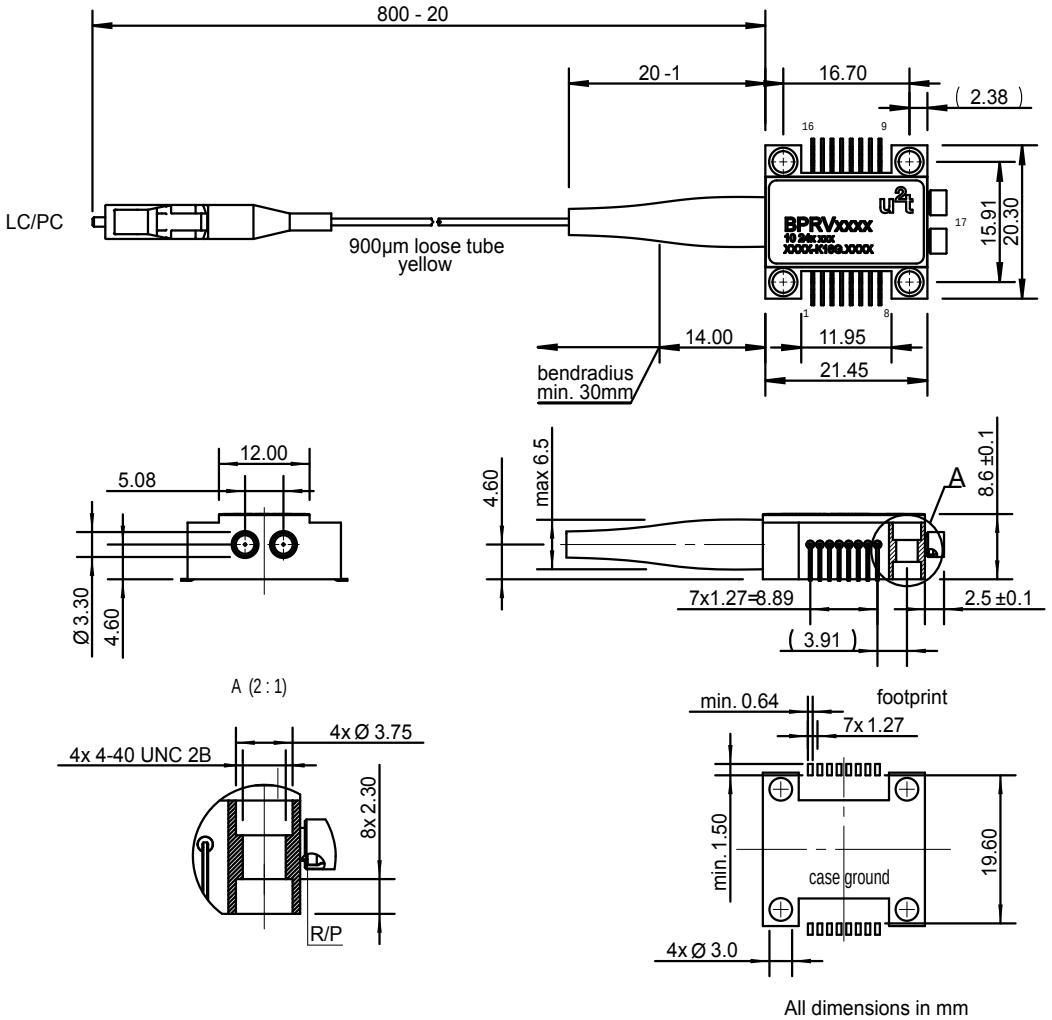


* optional blocking capacitor

Pin Description

Pin#	Symbol	Description
1	V_{PD1}	Photodiode 1 supply
3	V_{THCN}	Amplifier threshold control negative
4	V_{THCP}	Amplifier threshold control positive
6	V_{adj}	Amplifier adjustment control
7	V_{OUTPDC}	DC voltage monitor on OUTP
8	V_{OUTNDC}	DC voltage monitor on OUTN
16	V_{PD2}	Photodiode 2 supply
17	outN	Rf-output negative – GPPO connector
18	outP	Rf-output positive – GPPO connector
9, 10, 11, 12	N/C	Not connected
13	V_{EE}	Amplifier supply voltage
2, 5, 14, 15	GND	Ground

Mechanical Dimensions

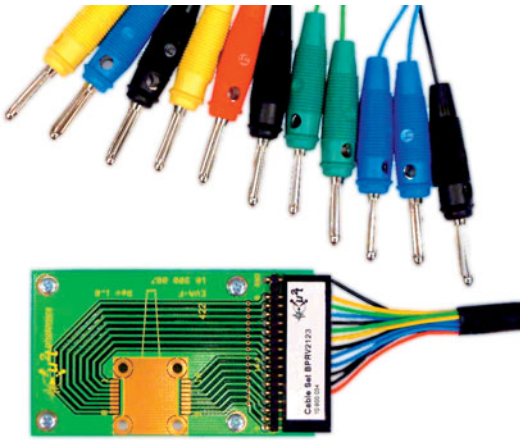


All dimensions in mm

GPPO™ Connector is a registered trademark of Corning Gilbert Inc.

Accessories

The u2t Evaluation Kit EVA-BPRV serves as easy-to-use utility to characterize a single u2t photoreceiver BPRV2125A under laboratory conditions. The kit consists of a PCB (printed circuit board), a DC cable set and 4 socket head screws 4-40 UNC (see picture).



Ordering Information

Please use the following table to select your required configuration of the balanced photoreceiver set.

BPRV2125 A [M] – [GM] – [LPH]

specifies optical connector
LPH = LP/PC connector

specifies rf connector
GM = male GPPO™ connector (standard)

specifies set
M = Set containing 2 Balanced Photoreceivers, all fiber lengths matched
blank = single Balanced Photoreceiver (standard)

For the Evaluation kit please use the following code.

EVA – [BPRV]

specifies matching photodetector / photoreceiver type

GPPO™ is a registered trademark of Corning Gilbert Inc.

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