Discovery Semiconductors, Inc.
An ISO 9001:2000 Certified Company

Data Sheet
February 2002

DSC-R402: Low-Noise High-Gain 12.3 Gb/s Optical Receiver

Description:

A low noise, low group delay 20 dB gain photoreceiver with over 10 GHz bandwidth for NRZ data with 10.8 or 12.3 Gb/s FEC. Wide spectral response enables use for 850 nm as well as 1310 nm, S, C and L telecommunications wavelength bands. Compact pigtailed microwave package consisting of an InGaAs/InP photodiode and a transimpedance amplifier with low electrical return loss for improved link performance.

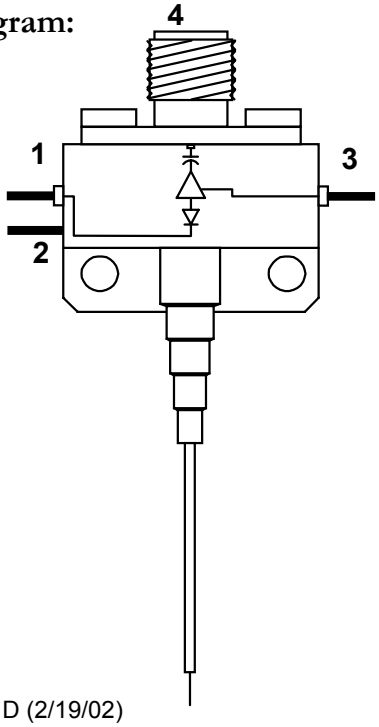
Features:

- High Responsivity of 0.8 A/W @ 1310 & 1550 nm
- Responsivity of 0.25 A/W @ 850 nm
- Low-Noise, High-Gain
- Low Group Delays
- Low PDL
- Single-mode or multi-mode fiber pigtails
- Available DC or AC coupled
- Hermetically Sealed and Built to GR-468 Standards

Applications:

- Digital Optical Receiver for OC-192/SDH-64 telecom and 10 Gbits/s Ethernet datacom
- Analog RF for microwave C, S and X band applications

Block Diagram:



Pin Connections:

1.	Bias Voltage Photodiode V_{bd} = +10 V
2.	Case Ground *
3.	Bias Voltage Amplifier V_{dd} = +8 V
4.	RF Signal Out (std: AC coupled, opt: DC coupled)

* Observe Polarities
ALWAYS connect ground FIRST, either at case or by RF connection, and ALWAYS disconnect ground LAST.

Electrical / Optical Specifications:

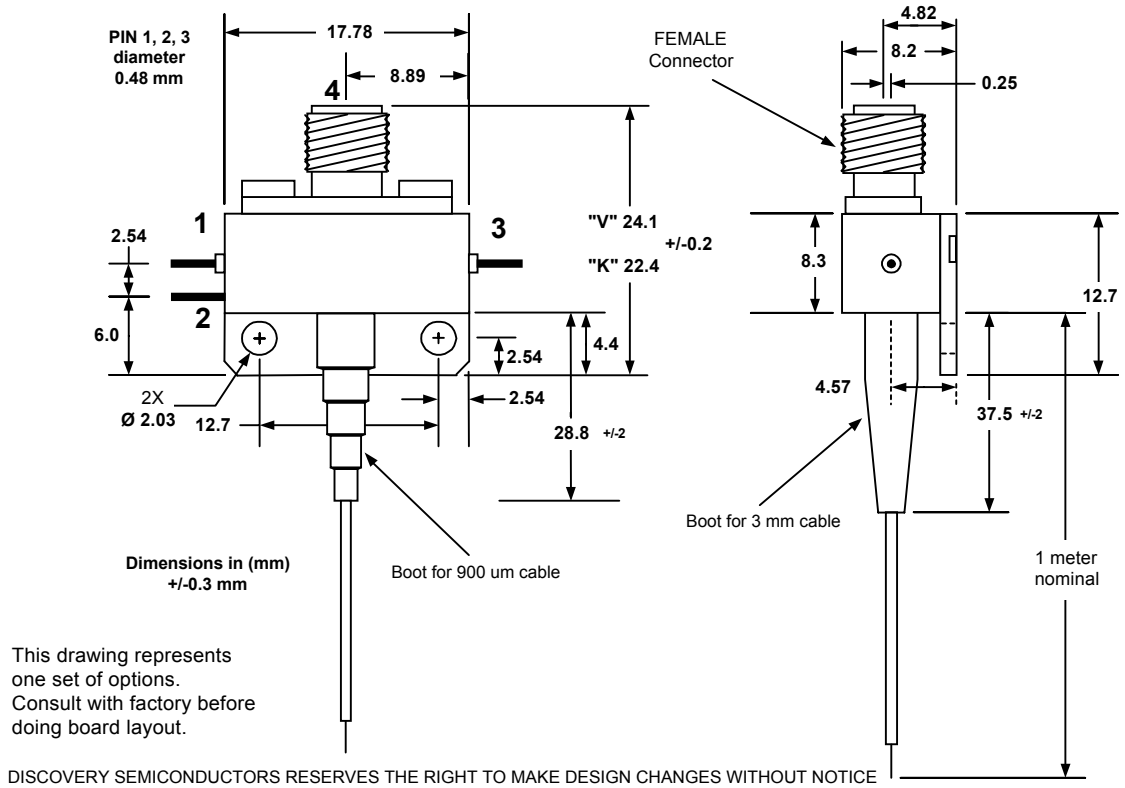
Parameter		Min	Typical	Max	Units
Responsivity	@ 1550 nm	0.7	0.8	-	A / W
	@ 1310 nm	0.7	0.8	-	A / W
	@ 850 nm	0.2	0.25		A / W
Power Gain of Amp.		15	20		dB
Transimpedance		400	500	650	Ω
Gain Flatness @ 1550 nm (1)		-	± 0.75	-	dB
Logic Sense		-	Non-inverting	-	-
Group Delay (2,4)		-	± 10	± 15	ps
Bandwidth @ 1550 nm		9.5	10	-	GHz
Low Frequency Cutoff (AC coupled)		-	30	-	KHz
Noise		-	-	16	pA / √Hz
Noise Figure			3		dB
Power Dissipation		710	800	925	mW
Electrical Return Loss		-10	-15	-	dB
Optical Return Loss @ 1550 nm		-30	-35	-	dB
Wavelength Response		800	-	1650	nm
V_{bd} Bias Diode		7	10	12	V+
V_{dd} Bias Amp.		7.5	8	8.4	V+
Optical Overload (BER < 10^{-9}) (4)		-	3	-	dBm
Sensitivity 10^{-10} BER; 2^{23}-1 PRBS (4)		-18	-19	-	dBm
Optical PDL @ 1550 nm (5)			0.06	0.12	dB

Absolute Maximum Ratings:

Operating Temperature Range (6)	0 to 70	°C
Storage Temperature Range	-40 to 85	°C
Max PIN Bias V_{bd}	+16	V
Max Amp Bias V_{dd}	+8.5	V
Optical Input Power Damage Threshold (3)	+9	dBm
Lead Soldering Temperature (10 s)	250	°C

(1) Flatness – relative to mean from DC to 70% of the 3 dB bandwidth
(2) Group Delay – over range of 500 MHz to –3 dB bandwidth
(3) DC coupled option goes to 0 Hz.
(4) Assumes NRZ format with 50% duty cycle and 1550 nm source
(5) Optical PDL measured with the Agilent measurement system
(6) Heat sink is required

Dimensioned Outline Drawing:



Optical Input:

Connector	Polish	Fiber	Buffer	Length
FC	UPC / APC	SMF28	3 mm (std) or 900 um tight buffer	1 meter or Option
SC				
others by request		50 mm Graded Index	3 mm	1 meter

Electrical Output:

Model	Coupling	Standard	Option
DSC-R402	AC	"K" [+] type female coaxial	"KM" [+] type male coaxial
DSC-R402DC	DC	"K" [+] type female coaxial	"KM" [+] type male coaxial

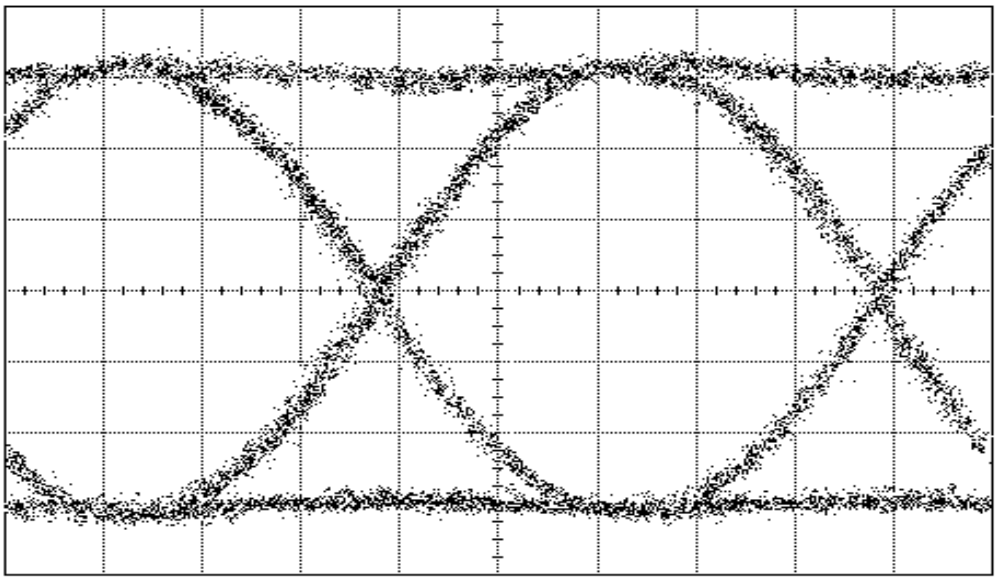
[+] K type RF connector is a trademark of Anritsu Company with barrel diameter of 2.92 mm RF (compatible with 3.5 mm SMA).

Ordering information:

Parts should be ordered as DSC-R402(DC)-YT-ZZ/UUU-W where the code characters:

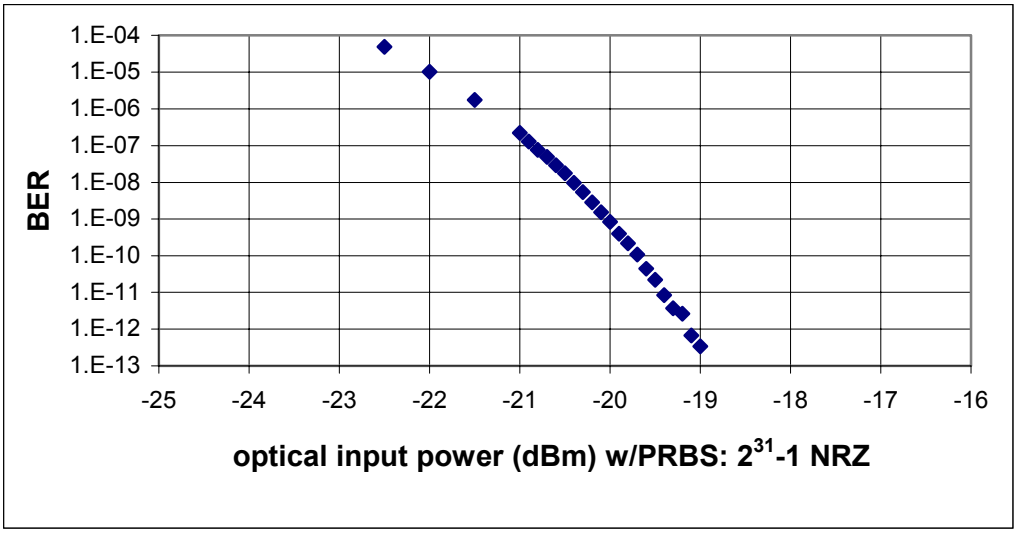
- Y is '3' for standard optical return loss, '5' for >45dB (extra cost), '6' for 50mm multimode fiber, proximity focused (extra cost), '7' for 62.5 mm multi-mode fiber (extra cost)
- T is '3' for 3mm (standard) and is '9' for 0.9mm diameter buffer,
- ZZ specifies the fiber optic connector (FC, SC, LC),
- UUU specifies the ferrule finish diameter (APC, UPC).
- W specifies the K connector, which is the only output connector available.

Typical Eye Diagram:



Input: 0 dBm p-p @ 10 GB/s, 1550 nm & 50% duty cycle
Scale: 16.7 ps/div & 140 mV/div

Typical 10 Gb/s Sensitivity Curve:



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