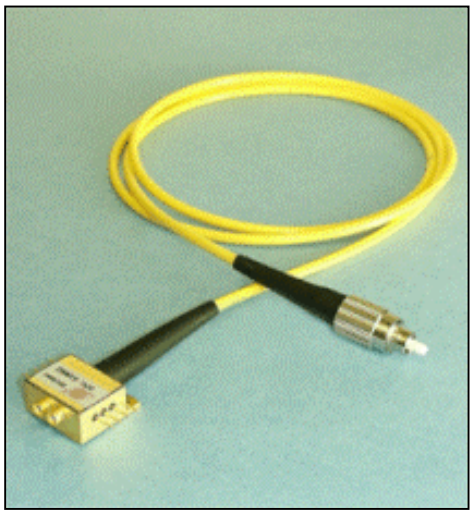
Discovery Semiconductors, Inc.
An ISO 9001:2000 Certified Company

Data Sheet
February 2002

DSC-R601, R602: Digital 2-R Optical Receivers

Description:



Using the 2-R functions **receive** and **regenerate** in a pigtailed 8-pin butterfly package, this low-noise module saves system designers board space while improving performance and reliability. Our DSC-R601 model provides a type K coaxial RF output and has a single-ended limiting amplifier providing a constant ~300 mV_{pp} to following stages with optical input powers from -20 to +0 dBm. Our DSC-R602 model provides dual sub-miniature coaxial outputs and has a differential limiting amplifier providing a constant ~600 mV_{pp} to following stages with optical input powers from -20 to +0 dBm. The InGaAs/InP Infrared Photodiode is ideal for 850, 1330 and 1550 nm systems.

Features:

- High Sensitivity: -19 dBm typical @ 9.9 Gb
- 8-pin butterfly package with type K coaxial RF output for R601 model and push-on GPPO/SSMP compatible RF outputs for R602 model
- Differential output for common mode rejection (only available in model R602)
- User selectable decision point (V_{adj})
- Small footprint package
- Hermetically sealed

Applications:

- 10 Gigabits per second digital receiver for telecom and datacom
- Short, intermediate and long haul systems
- DWDM systems
- SONET/SDH systems
- Datacom systems
- Test & measurement analyzers

Optical / Electrical Specifications:

Parameter	Min.	Typ.	Max.	Units
Sensitivity (9.9 Gb PRBS: 2^{31}-1 BER 10^{-12}	-18	-19		dBm
Overload		+0		dBm
Noise (Equivalent current density)		10	13	pA/rt(Hz)
Responsivity @1550 nm	0.7	0.8		A/W
AC output swing (single-ended)		300		mV
AC output swing (differential) only available with R602 model		600		mV
Preamp conversion gain	1500	1800	2100	ohms
TIA bandwidth (3 dB electrical)	8	9		GHz
Lower frequency limit		50	100	KHz
PIN bias (V_{bd})		5		V
Preamp bias (V_{dd2})		+3.3		V
Limiting amp bias (V_{dd1})		+1.8		V
Threshold bias adjust (V_{adj})	0		1.8	V
Power dissipation		0.45		W
RF output return loss (<8 GHz)			-10	dB
Optical return loss	30	35		dB

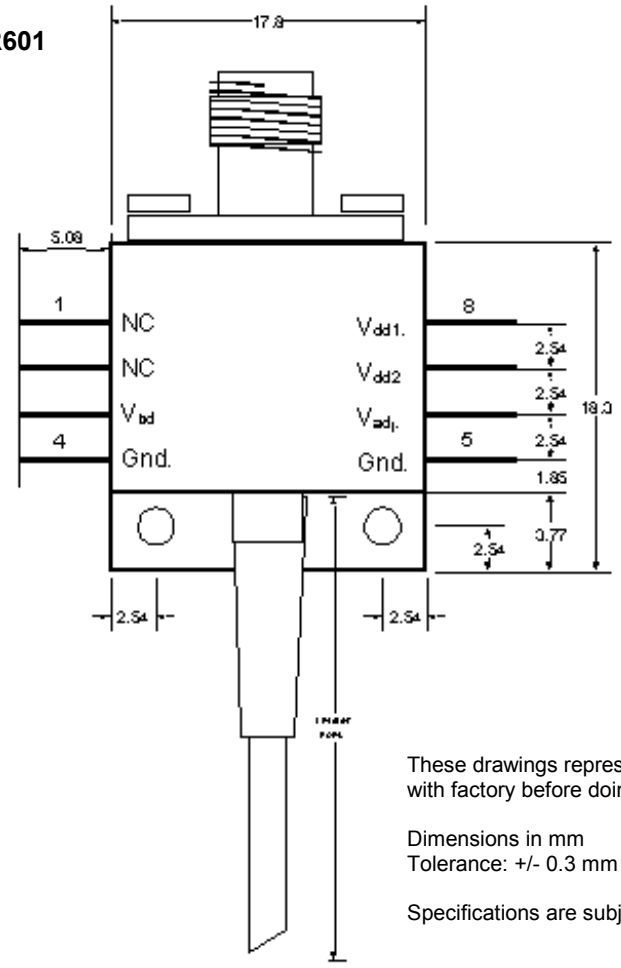
Absolute Maximum Ratings:

Parameter	R601	R602	Units
Operating Temperature Range [2]	0 to +70		°C
Storage Temperature Range	- 40 to +85		°C
Amplifier Bias V_{dd1}	3		V
Amplifier Bias V_{dd2}	VIN < 0.8 V: 3.6 VIN ≥ 0.8 V: 4.3		V
Photodiode Bias V_{bd}	20		V
Optical Input Power Damage Threshold [3]	7		dBm Peak
Lead Soldering Temp (10 sec)	250		°C

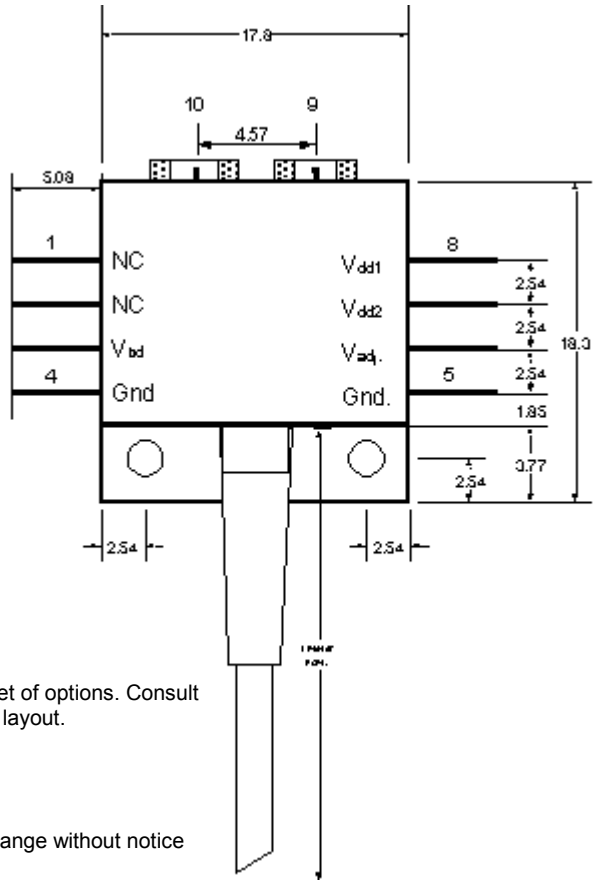
[1] Optical PDL measured with the Agilent measurement system
[2] Heat sink is required
[3] Assumes 50% duty cycle

Dimensioned Outline Drawing:

R601



R602



These drawings represent on set of options. Consult with factory before doing board layout.

Dimensions in mm
Tolerance: +/- 0.3 mm

Specifications are subject to change without notice

Pinout	Function
Pin 1	NC - Do not use
Pin 2	NC - Do not use
Pin 3	V_{bd} PIN bias
Pin 4	Ground
Pin 5	Ground
Pin 6	Crossover adjustment
Pin 7	V_{dd2} Preamp bias
Pin 8	V_{dd1} Lim Amp bias
Pin 9 (only in R602)	Output (non-inverting)
Pin 10 (only in R602)	Output (inverting)

Optical Input:

Connector	Polish	Fiber	Buffer	Length
FC, SC or LC	UPC or APC	SMF28	3mm loose buffer (std)	1 meter
others by request	UPC or APC		900 um tight buffer (opt)	option

Electrical Output:

Model	Standard	Option
DSC-R601	"K" + type female coaxial - standard	"KM" + type male coaxial
DSC-R602	Dual GPPO/SSMP coaxial – standard	no options

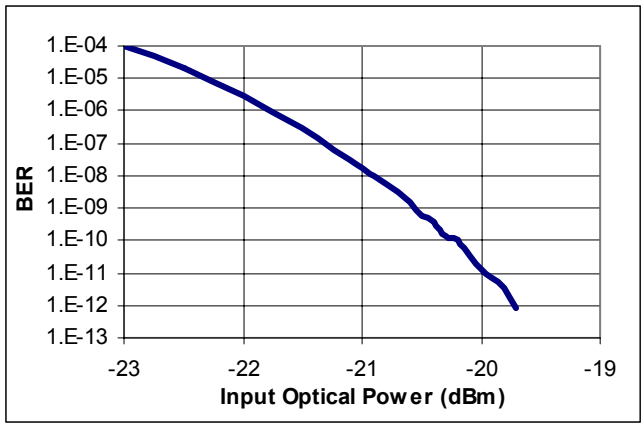
+ K type RF connector is a trademark of Anritsu Company with barrel diameter of 2.92 mm RF (compatible with 3.5 mm SMA).

Ordering Information:

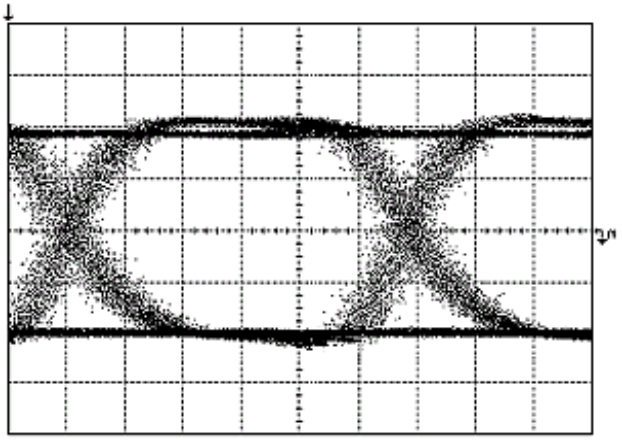
Parts should be ordered as DSC-R40X-YT-ZZ/UUU-W(M) where the code characters:

- X is replaced by the desired model digit, e.g. 1 for model R601.
- Y is 3 for 25 dB (1550 nm) optical return loss; no options
- T is 3 for 3 mm loose buffer diameter standard, 9 for 0.9 mm tight option
- ZZ specifies the fiber optic connector (FC, SC, LC)
- UUU specifies polish type (APC, UPC)
- WW specifies the RF connector (type 8K or 8G) where 8K = 8-pin butterfly package with type K coaxial RF output connector and 8G = 8-pin butterfly package with Dual GPPO/SSMP coaxial connectors

Single-Ended 10 Gb BER Sensitivity Curve:



Differential Eye Diagram for R602:



x: 16.9 ps/div y: 200 mv/div

For additional information, please contact the following:

INTERNET: www.chipsat.com
E-MAIL: sales@chipsat.com
ADDRESS: Discovery Semiconductors, Inc.,
119 Silvia Street, Ewing, NJ 08628, USA
Tel: (609) 434-1311
Fax: (609) 434-1317