Preliminary

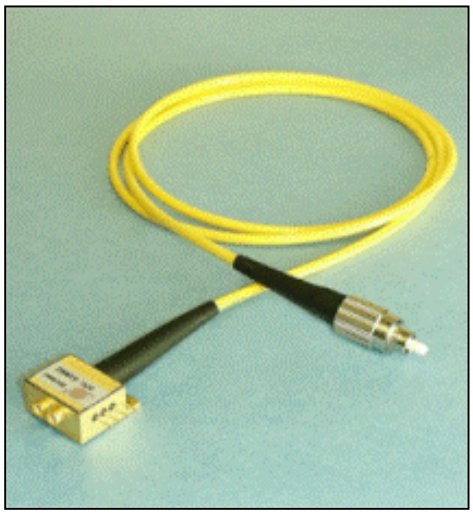
Discovery Semiconductors, Inc.

An ISO 9001:2000 Certified Company

Data Sheet
March 2002

DSC-R601APD, R602APD: Digital 2-R Optical Receivers

Description:



These modules add the extra sensitivity of an APD to the 2-R functions **receive** and **regenerate** mounted in a pigtailed 8-pin butterfly package, the modules save system designers board space while improving performance and reliability. Our DSC-R601APD 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 -22 to -6 dBm. Our DSC-R602APD model provides dual sub-miniature coaxial outputs and has a differential limiting amplifier providing a constant ~600 mV_{pp} to the following stages. The InGaAs Infrared APD is ideal for 1330 and 1550 nm systems.

Features:

- High Sensitivity: -22 dBm @ 10^{-12}, PRBS 2^{31} -1
- Same small footprint and pinout for PIN and APD versions of the 2-R receivers
- 8-pin butterfly package with type K coaxial RF output for R601APD model and push-on GPPO/SSMP compatible RF outputs for R602APD model
- Differential output for common mode rejection (only available in model R602APD)
- User selectable decision point (V_{adj})
- 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} M = 7	-	-22	-	dBm
Optical Overload (BER < 10^{-12}) at M = 3	-	- 7	-	dBm
Responsivity @1550 nm, M = 1	-	0.7	-	A/W
AC output swing (single-ended)	-	300	-	mV
AC output swing (differential) only available with R602APD model	-	600	-	mV
Preamp conversion gain	1500	1800	2100	ohms
Lower frequency limit	-	30	-	KHz
APD Breakdown Voltage (V_{bd}) at 10µA	-	37	-	V
APD Breakdown Voltage Temp Coefficient	-	0.15%/° C	-	V/°C
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
Optical return loss	30	35		dB

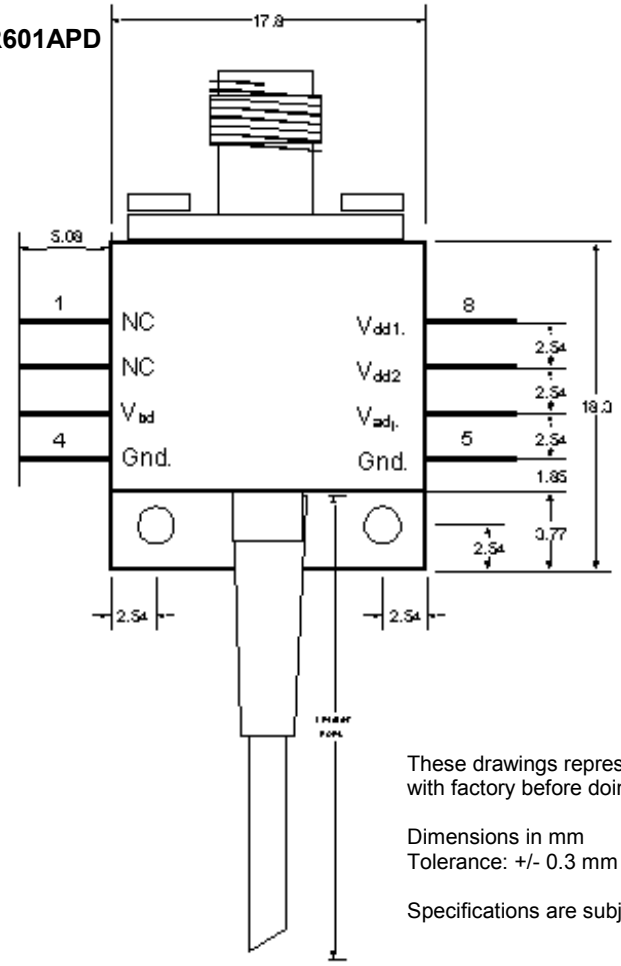
Absolute Maximum Ratings:

Parameter	R601APD	R602APD	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
Max APD Breakdown Voltage at 10µA	+ 40		V
Optical Input Power Damage Threshold, M = 3 (3)	- 1.5		dBm Peak
Lead Soldering Temp (10 sec)	250		°C

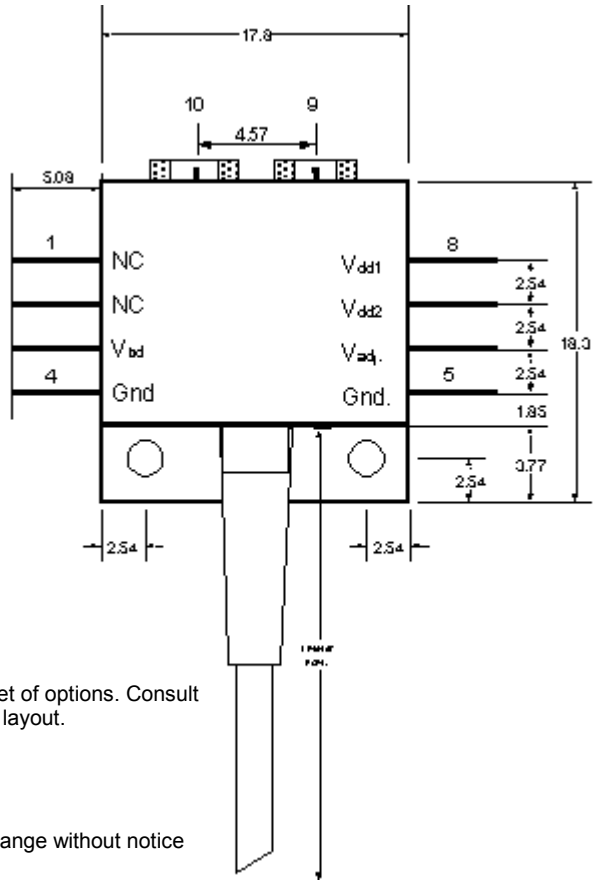
(1) Optical PDL measured with the Agilent measurement system
(2) Heat sink and forced air cooling is required
(3) Assumes 50% duty cycle, NRZ format, 1550 nm source and M = 7 unless otherwise noted

Dimensioned Outline Drawing:

R601APD



R602APD



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} APD 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-R601APD	"K" + type female coaxial - standard	"KM" + type male coaxial
DSC-R602APD	Dual GPPO/SSMP coaxial – standard	no options

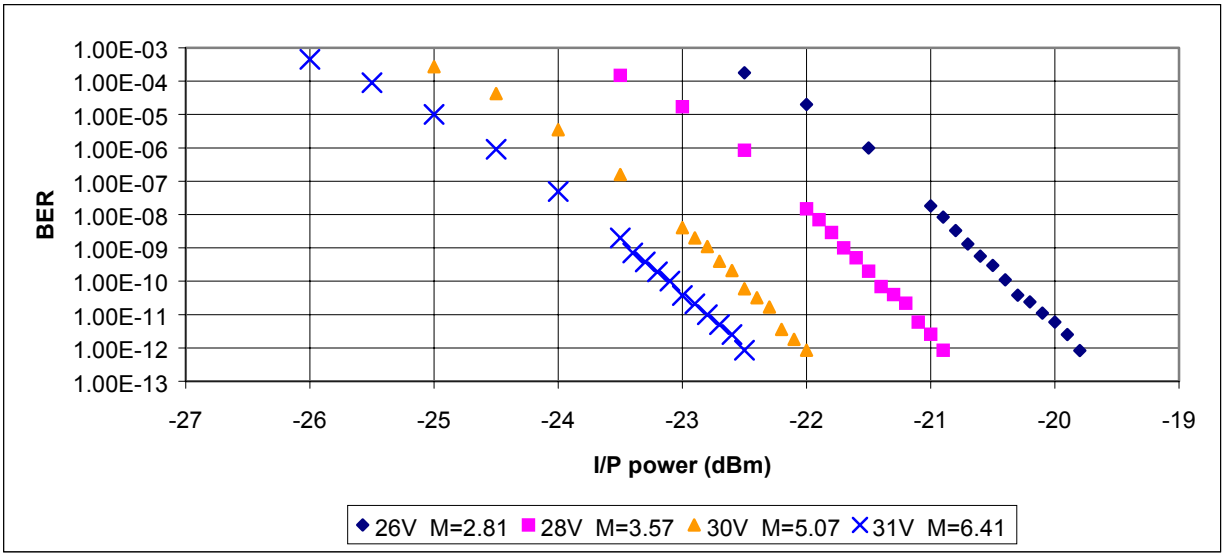
+ K type RF connector is a trademark of Anritsu Company with barrel diameter of 2.92 mm RF (compatible with 3.5 mm SMA).

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:



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