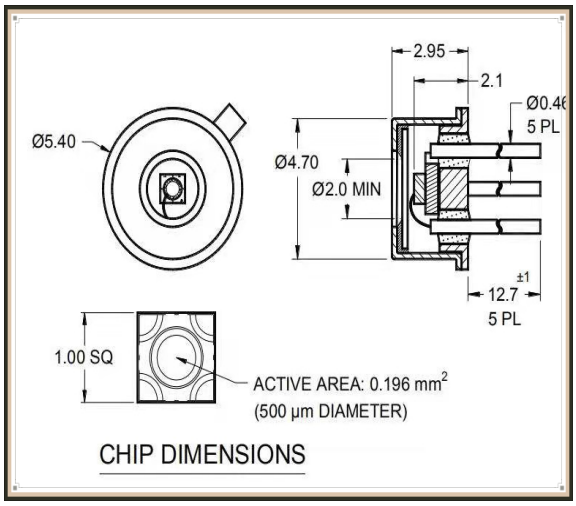
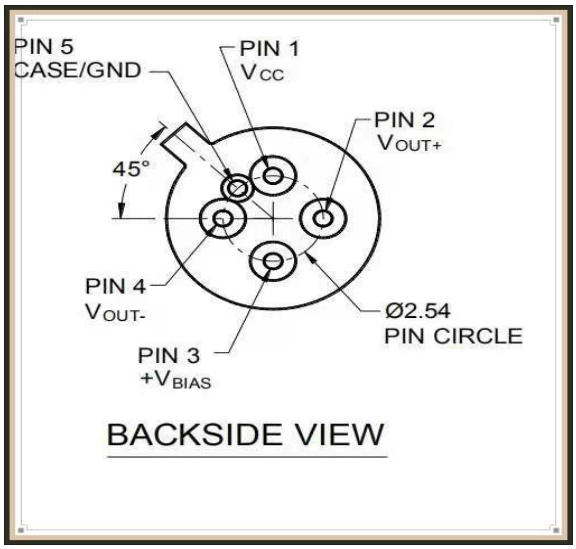
Hybrid APD



The APD500-9-8015T is an Avalanche Photodiode Amplifier Hybrid containing a 0.196mm^2 active area APD chip integrated With an internal transimpedance amplifier. Hermetically Packaged in a TO-52 with a flat borosilicate glass window cap.

Application

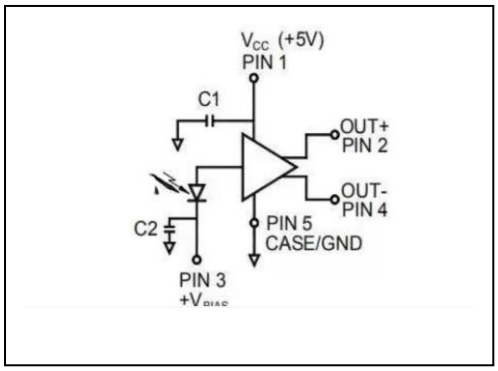
- ◆Precision photometry
- ◆Analytical instruments
- ◆Low light sensor
- ◆Medical equipment



Absolute Maximum Rating

Symbol	Parameter	Min.	Max.	Units
T_{STG}	Storage Temp.	-55	+125	℃
T_{OP}	Operating Temp	-40	+80	℃
Tsoldering	Soldering Temp.	-	+240	℃
P	Power Dissipation	-	360	mW
Vcc	Single Supply Voltage	+4.5	+11	V
Icc	Supply Current	-	26	mA

Schematic



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Optoelectronic Characteristics @23℃

Symbol	Parameter	Test Conditions	Min.	Typ.	Max	Units
Id	Dark Current	M=100 (see note 1)	--	0.60	5.0	nA
C	Capacitance	M=100 (see note 1)	--	1.0	--	pF
Vbr	Breakdown Voltage	Id= 2uA	160	190	200	V
	Temperature Coefficient of Vbr		--	1.1	--	V/℃
	Responsivity	M = 100; = 0 V; λ = 905 nm	45	50	--	A/W
f_{3dB}	Bandwidth**	-3dB	--	0.5	--	GHz
Tr	Rise Time	M=100	--	500	--	ps
	Optimum Gain		50	60	--	
	"Excess Noise" factor	M=100	--	2.6	--	
	"Excess Noise" index	M=100	--	0.35	--	
	Noise Current	M=100	--	1.2	--	$pA/Hz^{1/2}$
	Max Gain		200	--	--	
NEP	Noise Equivalent Power	M=100, λ=905nm	-	$2.3*10^{-14}$	--	$W/Hz^{1/2}$

Note 1: Measurement conditions: Setup of photo current 1nA @M=1 and irradiated by a 880nm, 80nm bandwidth LED. Increase the photo current up to 100nA (M=100) by internal multiplication due to an increasing bias voltage.

Transimpedance amplifier data @25℃

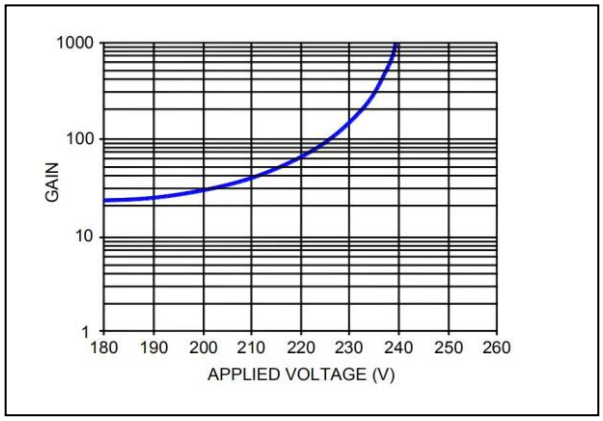
(Vcc=+4.5V to 11V, TA=0~+70C, 50Ω load between OUT+ and OUT-. Typical values are at TA=25C, Vcc=+5V)

Parameter	Test Conditions	Min.	Typ.	Max	Units
Supply Voltage		+4.5	+5	+11	V
Supply Current		--	25	26	mA
Transimpedance	Differential, measured with 40uA p-p signal	16	20	24	KΩ
Output impedance	Single ended per side	40	50	60	Ω
Maximum Differential Output Voltage	**Input = 2 mA p-p with 50 Ω differential termination**	--	650	--	mVp-p
Input Referred RMS Noise	TO-46 package, see note 3	--	26.5	--	nA
Input Referred Noise Density	See note 3	--	3.0	--	$pA/Hz^{1/2}$
Small Signal bandwidth	Source capacitance=1.2Pf, see note 2	180	240	--	MHz
Low Frequency Cutoff	-3dB, input<20uA DC	--	5	--	kHz
Transimpedance Linear Range	Peak to peak 0.95 < linearity < 1.05	±25	±30	--	uAp-p
Power Supply Rejection Ratio (PSRR)		--	40	--	dB

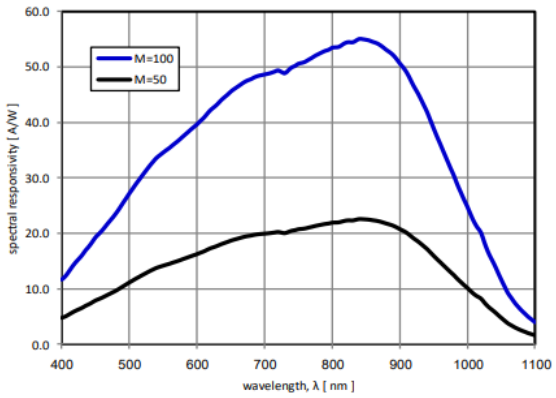
Note 2: Source capacitance for APD500-9-8015T is the capacitance of APD

Note 3: Input referred noise is calculated as RMS output noise/ (gain at f = 100 Mhz). Noise density is (input referred noise)/√bandwidth.

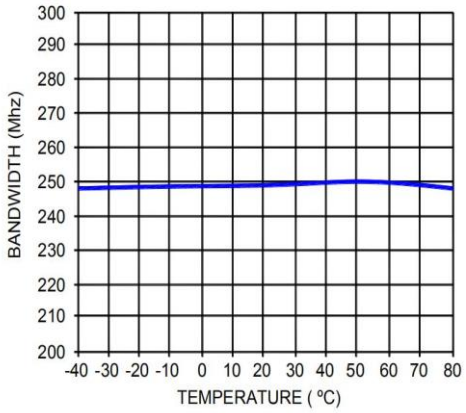
■ APD gain vs bias voltage



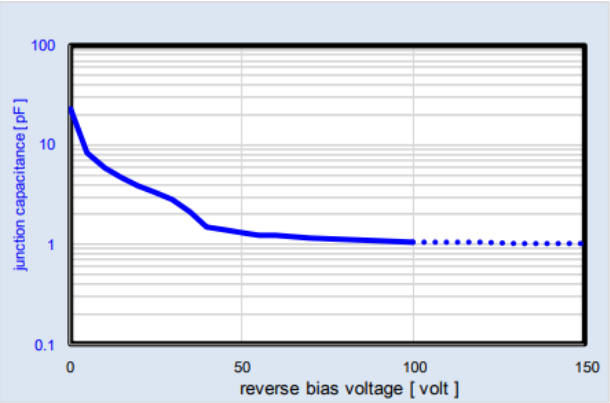
■ APD Spectral response (M = 1)



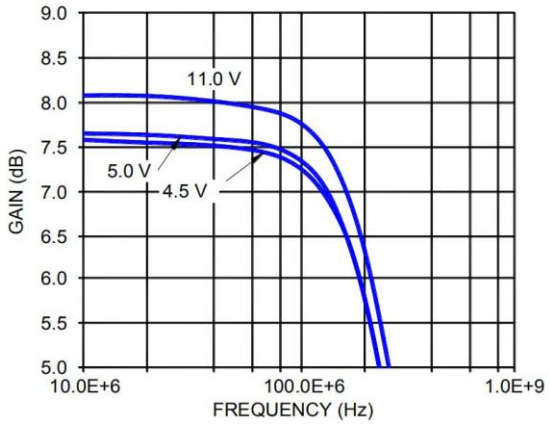
■ Amplifier bandwith vs temperature



■ APD Capacitance vs voltage



■ Differential gain vs. Supply



■ Amplifier gain vs. frequency