

Алматы (7273)495-231  
 Ангарск (3955)60-70-56  
 Архангельск (8182)63-90-72  
 Астрахань (8512)99-46-04  
 Барнаул (3852)73-04-60  
 Белгород (4722)40-23-64  
 Благовещенск (4162)22-76-07  
 Брянск (4832)59-03-52  
 Владивосток (423)249-28-31  
 Владикавказ (8672)28-90-48  
 Владимир (4922)49-43-18  
 Волгоград (844)278-03-48  
 Вологда (8172)26-41-59  
 Воронеж (473)204-51-73  
 Екатеринбург (343)384-55-89  
 Иваново (4932)77-34-06  
 Ижевск (3412)26-03-58  
 Иркутск (395)279-98-46  
 Казань (843)206-01-48

Калининград (4012)72-03-81  
 Калуга (4842)92-23-67  
 Кемерово (3842)65-04-62  
 Киров (8332)68-02-04  
 Коломна (4966)23-41-49  
 Кострома (4942)77-07-48  
 Краснодар (861)203-40-90  
 Красноярск (391)204-63-61  
 Курск (4712)77-13-04  
 Курган (3522)50-90-47  
 Липецк (4742)52-20-81  
 Магнитогорск (3519)55-03-13  
 Москва (495)268-04-70  
 Мурманск (8152)59-64-93  
 Набережные Челны (8552)20-53-41  
 Нижний Новгород (831)429-08-12  
 Новокузнецк (3843)20-46-81  
 Ноябрьск (3496)41-32-12  
 Новосибирск (383)227-86-73

Омск (3812)21-46-40  
 Орел (4862)44-53-42  
 Оренбург (3532)37-68-04  
 Пенза (8412)22-31-16  
 Петрозаводск (8142)55-98-37  
 Псков (8112)59-10-37  
 Пермь (342)205-81-47  
 Ростов-на-Дону (863)308-18-15  
 Рязань (4912)46-61-64  
 Самара (846)206-03-16  
 Саранск (8342)22-96-24  
 Санкт-Петербург (812)-309-46-40  
 Саратов (845)249-38-78  
 Севастополь (8692)22-31-93  
 Симферополь (3652)67-13-56  
 Смоленск (4812)29-41-54  
 Сочи (862)225-72-31  
 Ставрополь (8652)20-65-13  
 Сургут (3462)77-98-35

Сыктывкар (8212)25-95-17  
 Тамбов (4752)50-40-97  
 Тверь (4822)63-31-35  
 Тольятти (8482)63-91-07  
 Томск (3822)98-41-53  
 Тула (4872)33-79-87  
 Тюмень (3452)66-21-18  
 Ульяновск (8422)24-23-59  
 Улан-Удэ (3012)59-97-51  
 Уфа (347)229-48-12  
 Хабаровск (4212)92-98-04  
 Чебоксары (8352)28-53-07  
 Челябинск (351)202-03-61  
 Череповец (8202)49-02-64  
 Чита (3022)38-34-83  
 Якутск (4112)23-90-97  
 Ярославль (4852)69-52-93

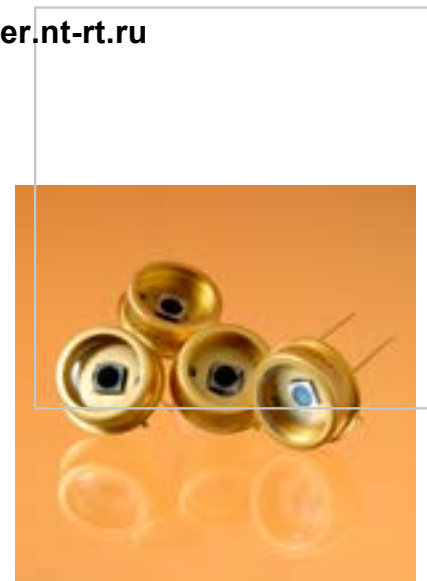
Россия +7(495)268-04-70

Казахстан +7(7172)727-132

Киргизия +996(312)96-26-47

Эл. почта: [sao@nt-rt.ru](mailto:sao@nt-rt.ru) || Сайт: <https://laser.nt-rt.ru>

## Silicon Avalanche Photodiode SAR1500x/SAR3000x



The SAR1500/3000x is based on a "reach-through" structure for excellent quantum efficiency and high speed. TO-5 and TO-8 package options are available.

These APDs are also available in a hermetically sealed TO-37 with thermoelectrical cooler. This enables the APD to be used in a variety of demanding applications including fluorescence detection, LIDAR and medical applications.

### Features

- Very high quantum efficiency
- Low noise, high speed
- Multiplication gain,  $M > 100$  available
- 1.5 mm / 3.0 mm diameter active area
- Gradual multiplication curve
- Wide operating temperature range

### Applications

- Medical
- Fluorescence detection
- LIDAR
- Analytical

### Generic Characteristics at $T_a = 25\text{ }^\circ\text{C}$

	SAR1500x			SAR3000x			Units
	Min	Typ	Max	Min	Typ	Max	
Wavelength range	400		1000	400		1000	nm
Peak sensitivity		890			890		nm
Diameter		1500			3000		$\mu\text{m}$

# Silicon Avalanche Photodiode SAR1500x/SAR3000x

## Absolute Maximum Ratings

	SAR1500x/SAR3000x		Units
	Min	Max	
Storage temperature	-55	100	°C
Operating temperature	-40	85	°C
Reverse current Peak value (CW operation)		200	μA
Reverse current Peak value (1 sec duration)		1	mA
Forward current $I_F$ at 25 °C, average value (CW operation)		5	mA
Forward current $I_F$ at 25 °C, peak value (1 sec duration)		50	mA
Max. total power dissipation		60	mW
Soldering (for 15 sec.)		260	°C

## Electrical Characteristics, $T_a = 25\text{ °C}$ , $M = 100$

	SAR1500x			SAR3000x			Units
	Min	Typ	Max	Min	Typ	Max	
Breakdown voltage @ $I_d = 10\text{ μA}$	150	270	400	150	270	400	Volt
Responsivity @ 905 nm		50			50		A/W
$V_{br}$ temperature coefficient		1	3.2		1	3.2	V/°C
Dark current		1	5		3	10	nA
Noise current		2.5			5		pA/sqrt Hz
Capacitance		4			7		pF
Rise time		500			800		psec

# Silicon Avalanche Photodiode SAR1500x/SAR3000x

## Curves

Fig. 1: Spectral Response @ M = 100

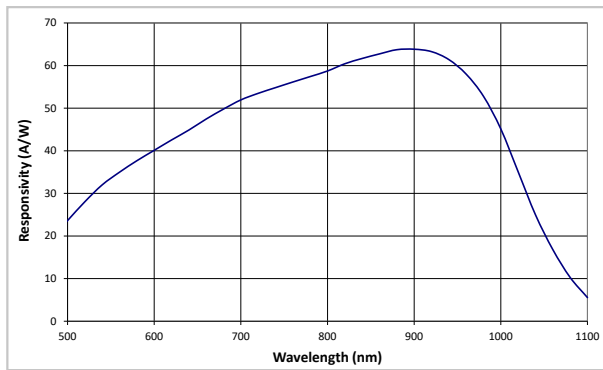


Fig. 2: Quantum Efficiency vs. Wavelength

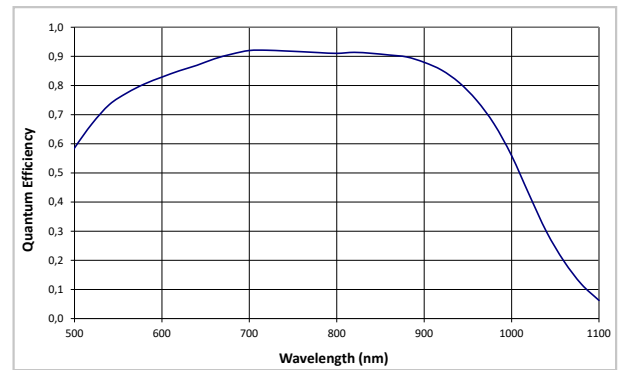


Fig. 3: Typical Dark Current Characteristics

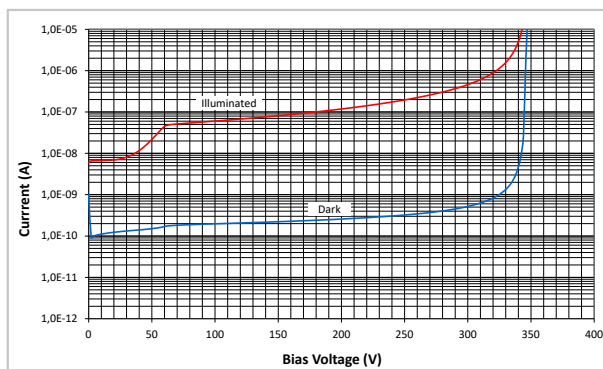


Fig. 4: Gain - Voltage Characteristics @ 905 nm

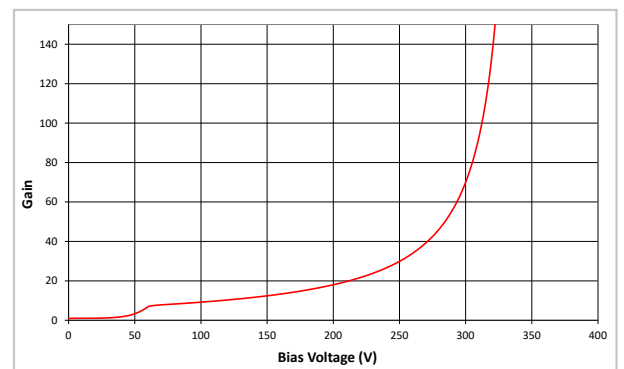


Fig. 5: Capacitance vs. Reverse Voltage

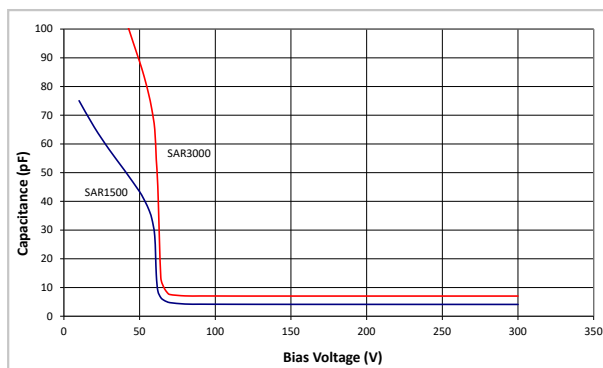
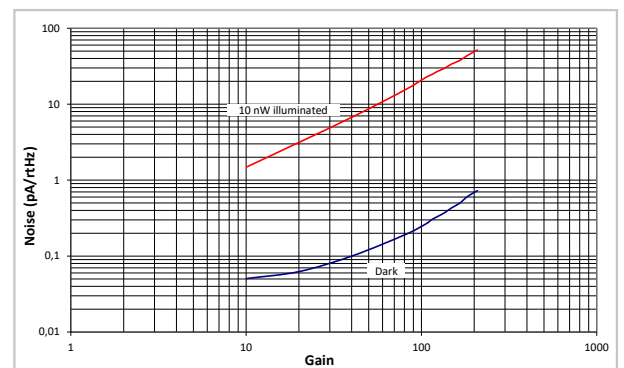
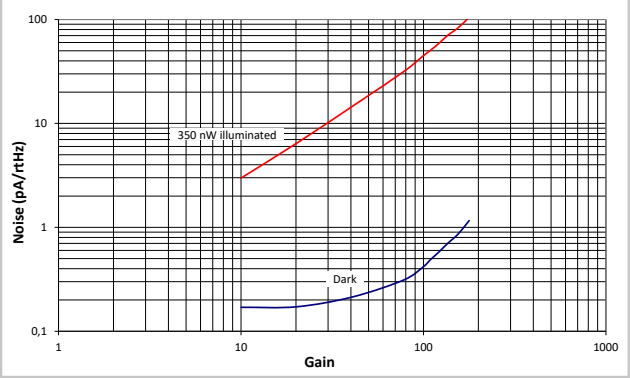


Fig. 6: Typical APD Noise Density as a Function of Gain for SAR1500x

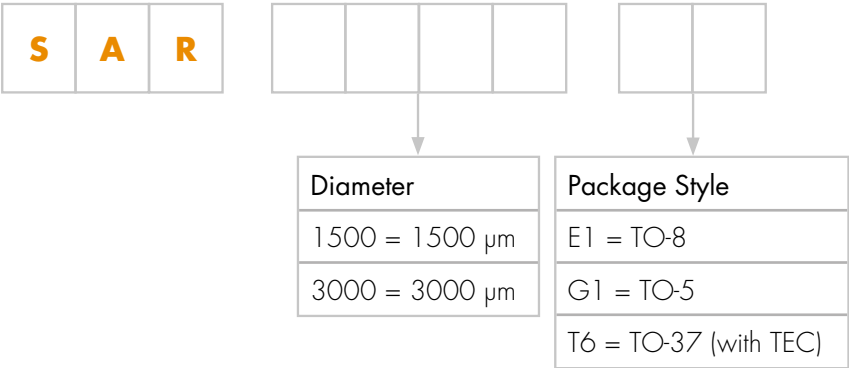


# Silicon Avalanche Photodiode SAR1500x/SAR3000x

Fig. 7: Typical APD Noise Density as a Function of Gain for SAR3000x



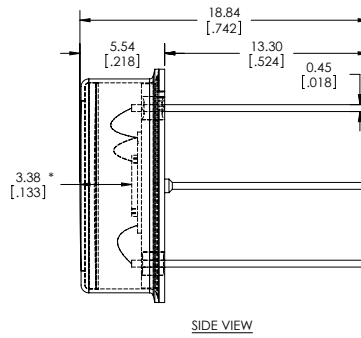
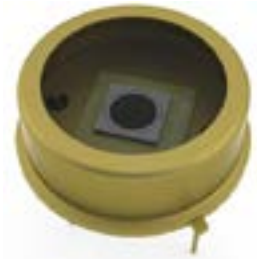
## Product Number Designations



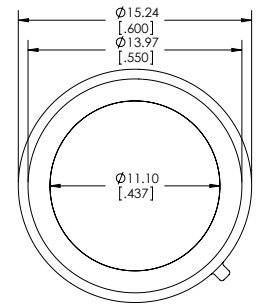
# Silicon Avalanche Photodiode SAR1500x/SAR3000x

## Package Drawings

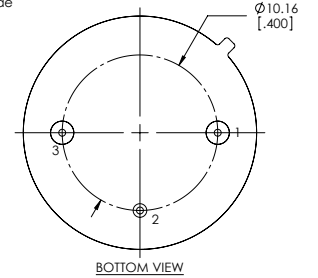
### Package E1 TO-8



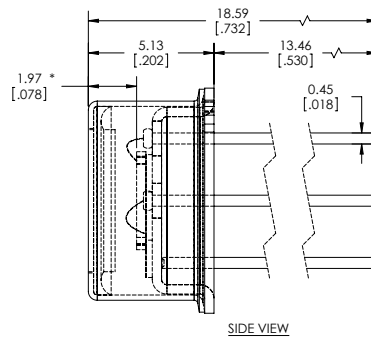
\* DISTANCE FROM TOP OF DEVICE TO TOP OF DETECTOR



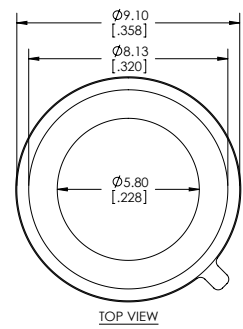
PIN #1: Cathode  
PIN #2: Ground/Case  
PIN #3: Anode



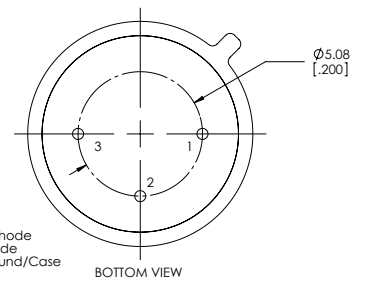
### Package G1 TO-5



\* DISTANCE FROM TOP OF DEVICE TO TOP OF DETECTOR

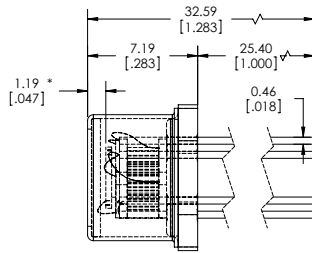


PIN #1: Cathode  
PIN #2: Anode  
PIN #3: Ground/Case

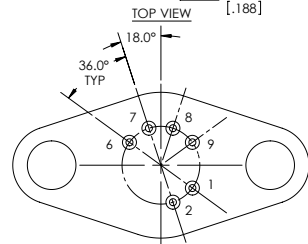
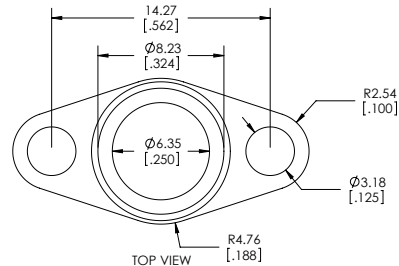


# Silicon Avalanche Photodiode SAR1500x/SAR3000x

Package T6 TO-37 (with TEC)



SIDE VIEW  
\* DISTANCE FROM TOP OF  
DEVICE TO TOP OF DETECTOR



PIN #1: Thermistor  
PIN #2: Thermistor  
PIN #6: Anode  
PIN #7: Cathode  
PIN #8: TEC -  
PIN #9: TEC +

## Product Changes

LASER COMPONENTS reserves the right to make changes to the product(s) or information contained herein without notice.

No liability is assumed as a result of their use or application.

## Ordering Information

Products can be ordered directly from LASER COMPONENTS or its representatives. For a complete listing of representatives, visit our website at

Custom designed products are available on request.

## По вопросам продаж и продукции обращайтесь:

Алматы (7273)495-231  
Ангарск (3955)60-70-56  
Архангельск (8182)63-90-72  
Астрахань (8512)99-46-04  
Барнаул (3852)73-04-60  
Белгород (4722)40-23-64  
Благовещенск (4162)22-76-07  
Брянск (4832)59-03-52  
Владивосток (423)249-28-31  
Владикавказ (8672)28-90-48  
Владимир (4922)49-43-18  
Волгоград (844)278-03-48  
Вологда (8172)26-41-59  
Воронеж (473)204-51-73  
Екатеринбург (343)384-55-89  
Иваново (4932)77-34-06  
Ижевск (3412)26-03-58  
Иркутск (395)279-98-46  
Казань (843)206-01-48

Калининград (4012)72-03-81  
Калуга (4842)92-23-67  
Кемерово (3842)65-04-62  
Киров (8332)68-02-04  
Коломна (4966)23-41-49  
Кострома (4942)77-07-48  
Краснодар (861)203-40-90  
Красноярск (391)204-63-61  
Курск (4712)77-13-04  
Курган (3522)50-90-47  
Липецк (4742)52-20-81  
Магнитогорск (3519)55-03-13  
Москва (495)268-04-70  
Мурманск (8152)59-64-93  
Набережные Челны (8552)20-53-41  
Нижний Новгород (831)429-08-12  
Новокузнецк (3843)20-46-81  
Ноябрьск (3496)41-32-12  
Новосибирск (383)227-86-73

Омск (3812)21-46-40  
Орел (4862)44-53-42  
Оренбург (3532)37-68-04  
Пенза (8412)22-31-16  
Петрозаводск (8142)55-98-37  
Псков (8112)59-10-37  
Пермь (342)205-81-47  
Ростов-на-Дону (863)308-18-15  
Рязань (4912)46-61-64  
Самара (846)206-03-16  
Саранск (8342)22-96-24  
Санкт-Петербург (812)-309-46-40  
Саратов (845)249-38-78  
Севастополь (8692)22-31-93  
Симферополь (3652)67-13-56  
Смоленск (4812)29-41-54  
Сочи (862)225-72-31  
Ставрополь (8652)20-65-13  
Сургут (3462)77-98-35

Сыктывкар (8212)25-95-17  
Тамбов (4752)50-40-97  
Тверь (4822)63-31-35  
Тольятти (8482)63-91-07  
Томск (3822)98-41-53  
Тула (4872)33-79-87  
Тюмень (3452)66-21-18  
Ульяновск (8422)24-23-59  
Улан-Удэ (3012)59-97-51  
Уфа (347)229-48-12  
Хабаровск (4212)92-98-04  
Чебоксары (8352)28-53-07  
Челябинск (351)202-03-61  
Череповец (8202)49-02-64  
Чита (3022)38-34-83  
Якутск (4112)23-90-97  
Ярославль (4852)69-52-93

Россия +7(495)268-04-70

Казахстан +7(7172)727-132

Киргизия +996(312)96-26-47

Эл. почта: [sao@nt-rt.ru](mailto:sao@nt-rt.ru) || Сайт: <https://laser.nt-rt.ru>