

## High gain, low noise 1550 nm GaAsSb/AlGaAsSb avalanche photodiodes: supplement

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Supplement DOI: <https://doi.org/10.6084/m9.figshare.21713888>

Parent Article DOI: <https://doi.org/10.1364/OPTICA.476963>

## Supplementary Information

### High Gain, Low Noise, Room Temperature 1550 nm GaAsSb/AlGaAsSb Avalanche Photodiodes

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S1. Table S1. Stack information on p-i-n samples

Types	Material	Doping (cm <sup>-3</sup> )	Thickness (nm)
PIN1	GaAsSb	p <sup>++</sup> : 1×10 <sup>19</sup>	20
	AllnAs	p <sup>+</sup> : 2×10 <sup>18</sup>	150
	GaAsSb	UID	1000
	GaAsSb	n <sup>+</sup> : 2×10 <sup>18</sup>	100
	AllnAs	n <sup>++</sup> : 1×10 <sup>19</sup>	500
	Semi-insulating InP substrate		
PIN2	InGaAs	p <sup>++</sup> : 1×10 <sup>19</sup>	20
	AllnAs	p <sup>+</sup> : 2×10 <sup>18</sup>	150
	GaAsSb	UID	1800
	GaAsSb	n <sup>+</sup> : 2×10 <sup>18</sup>	100
	AllnAs	n <sup>++</sup> : 1×10 <sup>19</sup>	500
	Semi-insulating InP substrate		
PIN3	InGaAs	p <sup>++</sup> : 1×10 <sup>19</sup>	20
	AlGaAsSb	p <sup>+</sup> : 2×10 <sup>18</sup>	300
	AlGaAsSb	UID	390
	AlGaAsSb	n <sup>+</sup> : 2×10 <sup>18</sup>	100
	AllnAs	n <sup>++</sup> : 1×10 <sup>19</sup>	500
	Semi-insulating InP substrate		
PIN4	InGaAs	p <sup>++</sup> : 1×10 <sup>19</sup>	20
	AlGaAsSb	p <sup>+</sup> : 2×10 <sup>18</sup>	300
	AlGaAsSb	UID	590
	AlGaAsSb	n <sup>+</sup> : 2×10 <sup>18</sup>	100
	AllnAs	n <sup>++</sup> : 1×10 <sup>19</sup>	500
	Semi-insulating InP substrate		
PIN5	InGaAs	p <sup>++</sup> : 1×10 <sup>19</sup>	20
	AlGaAsSb	p <sup>+</sup> : 2×10 <sup>18</sup>	300
	AlGaAsSb	UID	1020
	AlGaAsSb	n <sup>+</sup> : 2×10 <sup>18</sup>	100
	InGaAs	n <sup>++</sup> : 1×10 <sup>19</sup>	500
	Semi-insulating InP substrate		

\*All grown layers are nearly lattice-matched to InP substrates.

\* In<sub>0.53</sub>Ga<sub>0.47</sub>As (InGaAs), Al<sub>0.48</sub>In<sub>0.52</sub>As (AllnAs), GaAs<sub>0.51</sub>Sb<sub>0.49</sub> (GaAsSb), Al<sub>0.85</sub>Ga<sub>0.15</sub>AsSb (AlGaAsSb)