



Gallium Arsenide GaAs :

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Gallium arsenide GaAs has some better electronic characteristics than Si, such as high saturation electron velocity and high electron mobility, making GaAs can be used in occasions higher than 250 GHz. GaAs will have less noise if the equivalent GaAs and Si components are both operating at high frequencies. Also because GaAs has a higher breakdown voltage, GaAs is more suitable for high-power operation than the same Si device. Because of these characteristics, GaAs circuits can be used in mobile phones, satellite communications, microwave point-to-point connections, radar systems, etc.

GaAs has been used to make Gunn diodes (Gane diodes or microwave diodes, Gunn diodes) to emit microwaves.

Another advantage of GaAs: it is a direct energy gap material, so it can be used to emit light. Si is a material with an indirect energy gap and can only emit very weak light. (However, recent technologies can already use Si to make LEDs and use them in lasers.)

Material properties:

single	doping	conductivity	Carrier	Dislocation	growth	standard substrate
GaAs	none	Si	/	5×10^5	LEC	D3"×0.5 D2"×0.5
	Si	N	>math>5 \times 10^{17}</math>			
	Cr	Si	/		HB	
	Fe	N	~math>2 \times 10^{18}</math>			
	Zn	P	>math>5 \times 10^{17}</math>			
Dimensions (mm)		25×25×0.5mm, 10×10×0.5mm, 10×5×0.5mm, 5×5×0.5mm or customized				
Surface roughness		Ra <math>< 1\text{nm}</math>				
polishing		single or double sided				
Package		Class 100 clean bag, Class 1000 ultra-clean room				