SYSTEM Plus CONSULTING
9 rue Alfred Kastler - BP 10748 - 44307 Nantes Cedex 3 - France
Phone : +33 (0) 240 180 916 - email : info@systemplus.fr - website : www.systemplus.fr

Reverse Costing analysis

SemiSouth SJEP170R550
1700V 550mOhm
Vertical JFET

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Written by: Sylvain HALLEREAU

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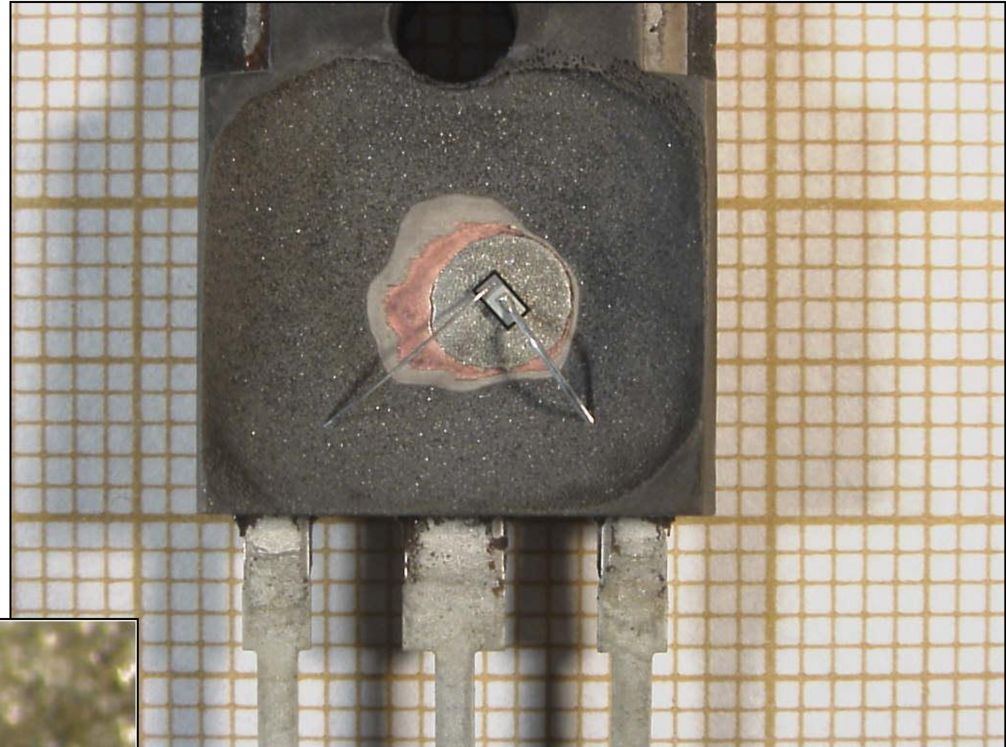
Die in the Package

Die in the TO247 after acid etching.

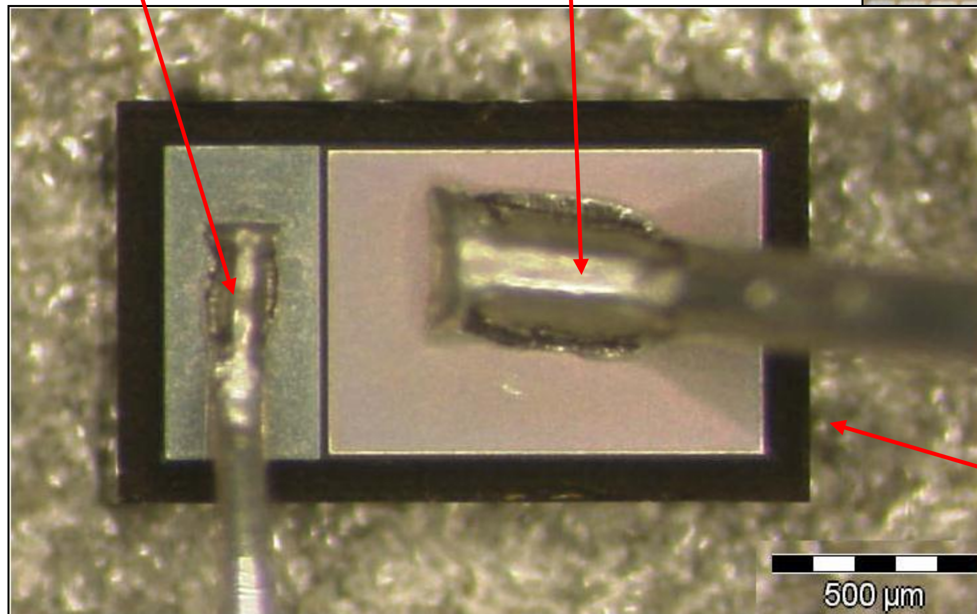


2 Aluminum wire bonds :

- **Gate bond : 6mm and 125µm of diameter.**
- **Source bond : 8mm and 250µm of diameter.**

Gate bond

Source bond



The Drain is directly soldered on the package leadframe with Sn solder.

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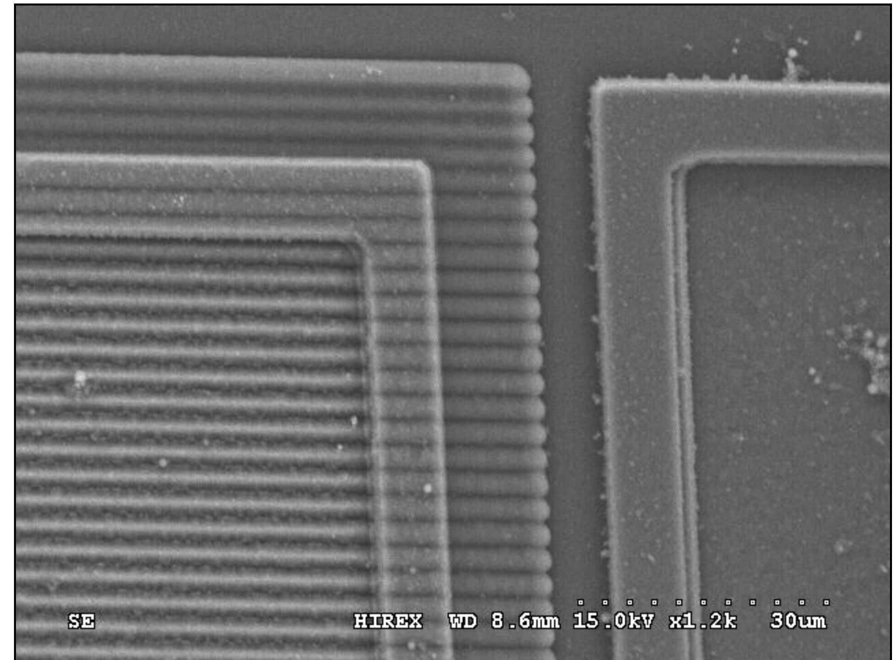
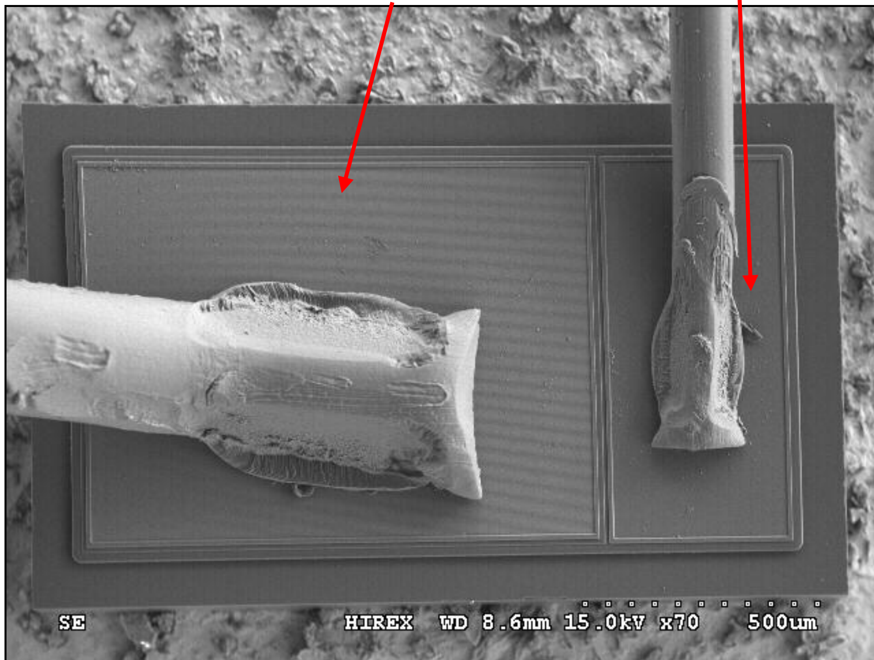
Die Overview



SEM picture : details.

Emitter area

Gate pad



JFET die with the aluminum layer

JFET die cross section

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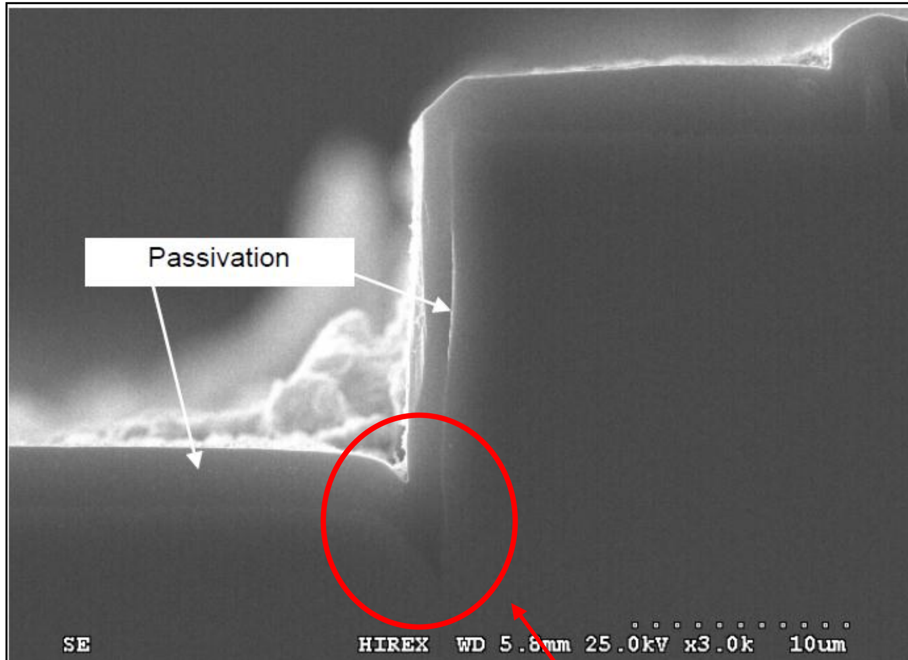
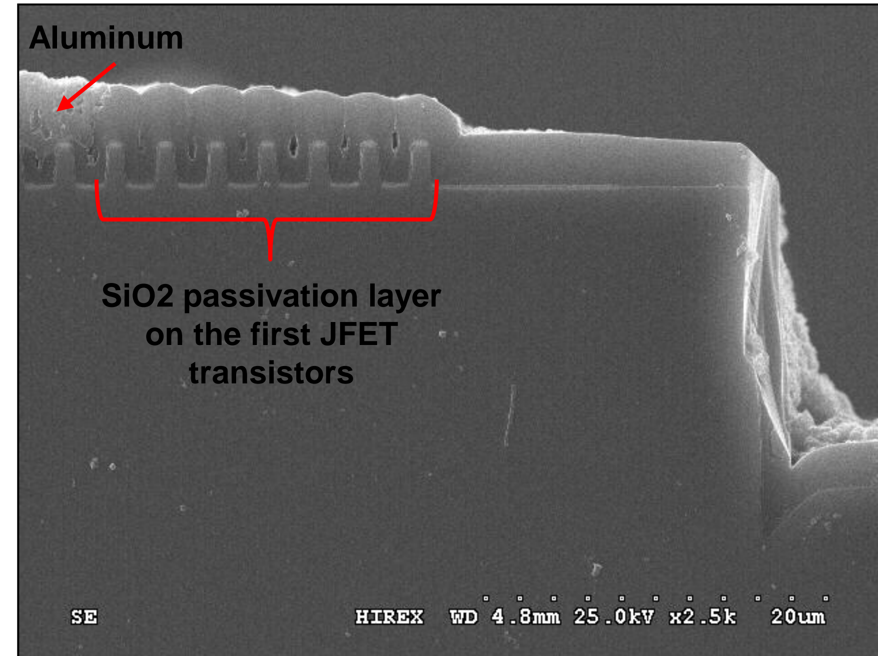
Passivation Details

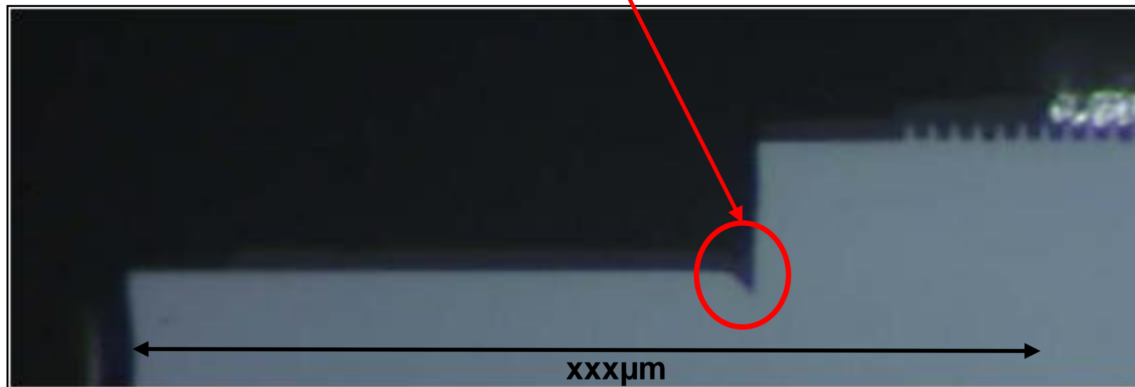
SEM view : Passivation details



SEM view : Passivation details



The fast plasma etching technique used to manufacture the MESA generates a hole at the base of the MESA



The protective area on the edges of the die is of XXXµm.

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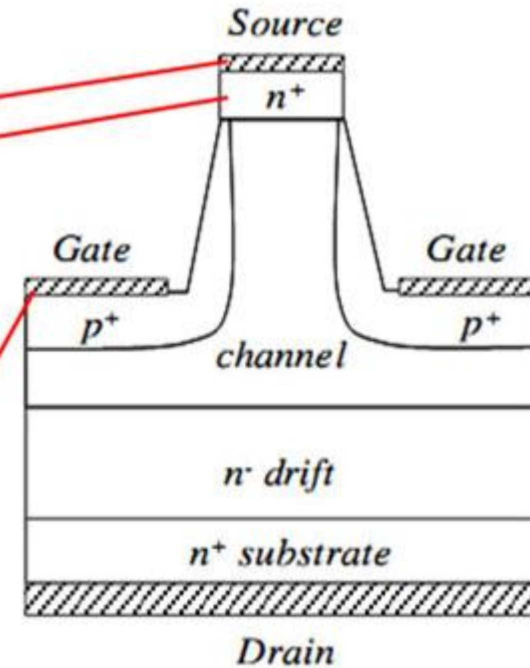
JFET Transistor Dimensions

TiN
Ni
Ti
Si
Ni
SE



SEM view : JFET transistor

The standard revealed junction technique don' t work on the SiC. Therefore we can not identify doping areas and the epitaxy thicknesses. We estimate the channel layer thickness at 2.25µm.

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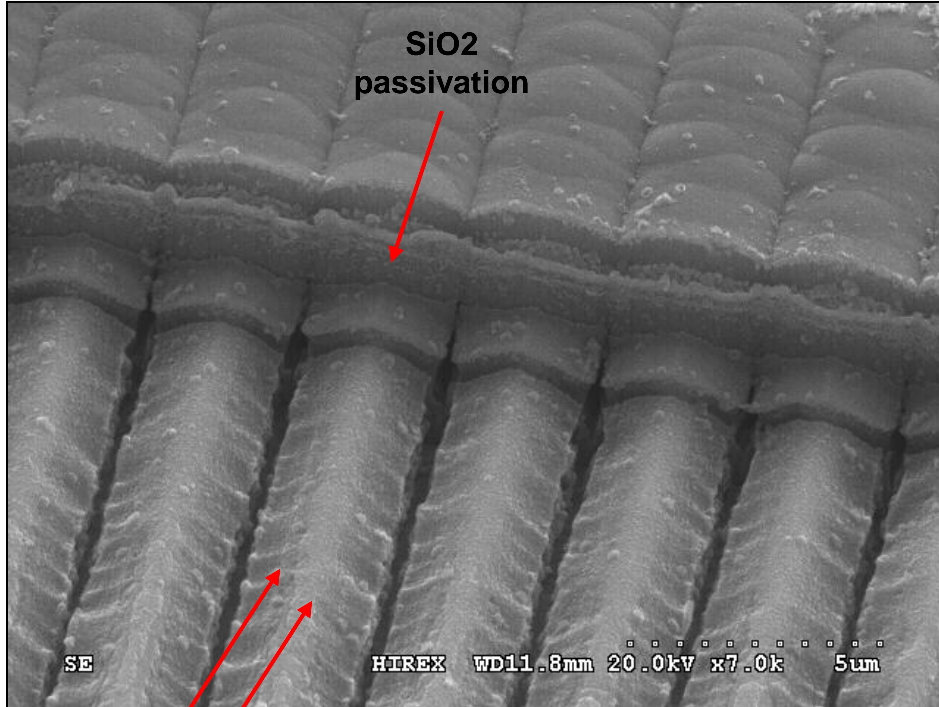
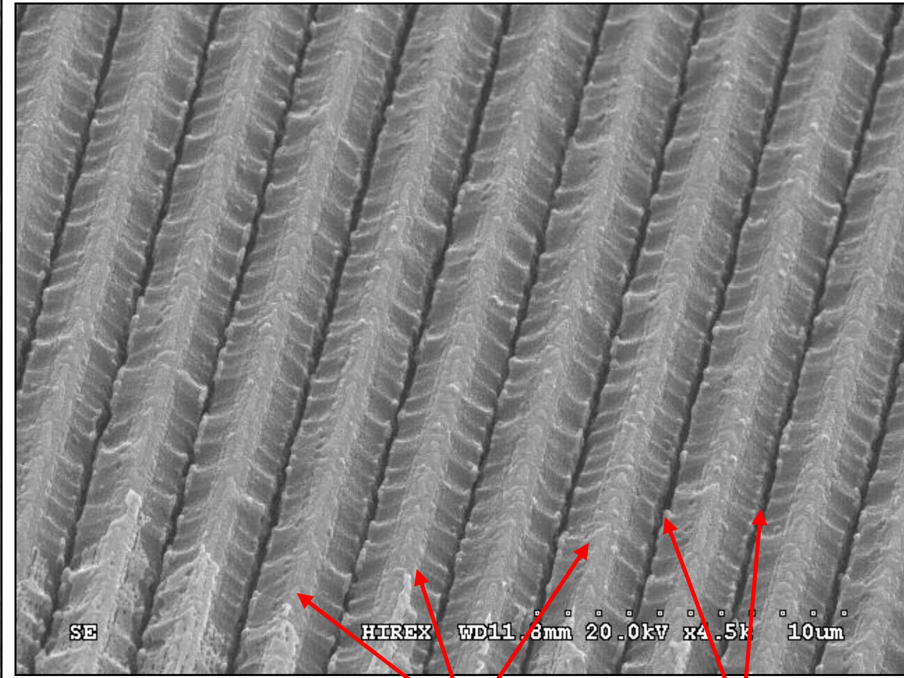
Delayering

SEM view : JFET die without aluminum





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Process Flow Front side (1/2)

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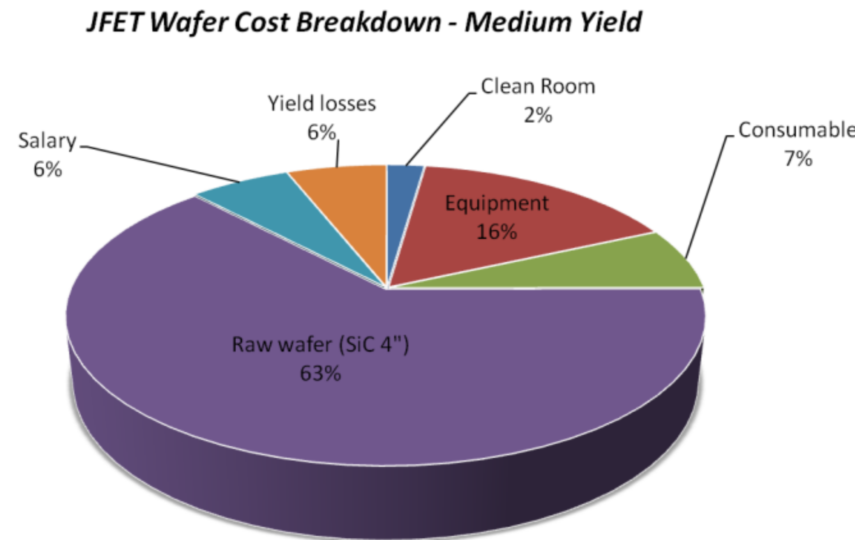
JFET Unprobed Wafer Cost

	Low Yield		Medium Yield		High Yield	
	Cost	Breakdown	Cost	Breakdown	Cost	Breakdown
Clean Room	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Equipment	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Consumable	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Raw wafer (SiC 4")	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Salary	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Yield losses	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL	[illegible]		[illegible]		[illegible]	
Fab Yield	[illegible]		[illegible]		[illegible]	

- The main part of the wafer cost is due to the raw wafer (XX%).
- The manufacturing yield is around XX% in 2010.

Details of the cost per step are given in the Excel Spreadsheet



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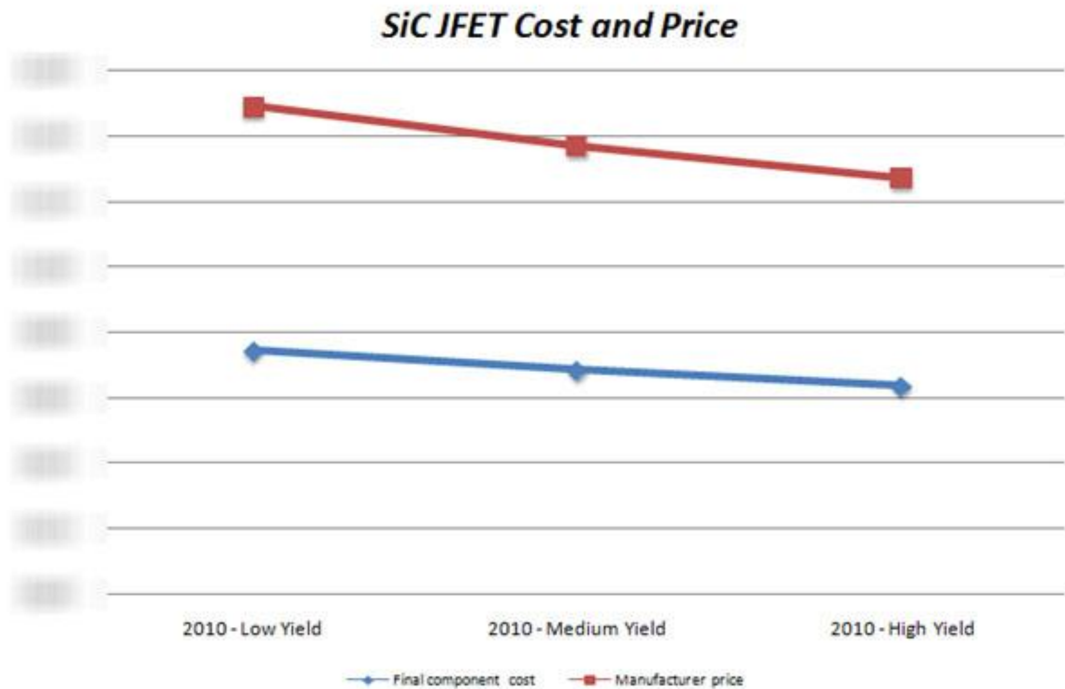
Selling Price

	Final component cost	Floor price	Manufacturer price
2010 - Low Yield	[illegible]	[illegible]	[illegible]
2010 - Medium Yield	[illegible]	[illegible]	[illegible]
2010 - High Yield	[illegible]	[illegible]	[illegible]

Note: These calculated selling prices are for large quantities purchased directly from SemiSouth.



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