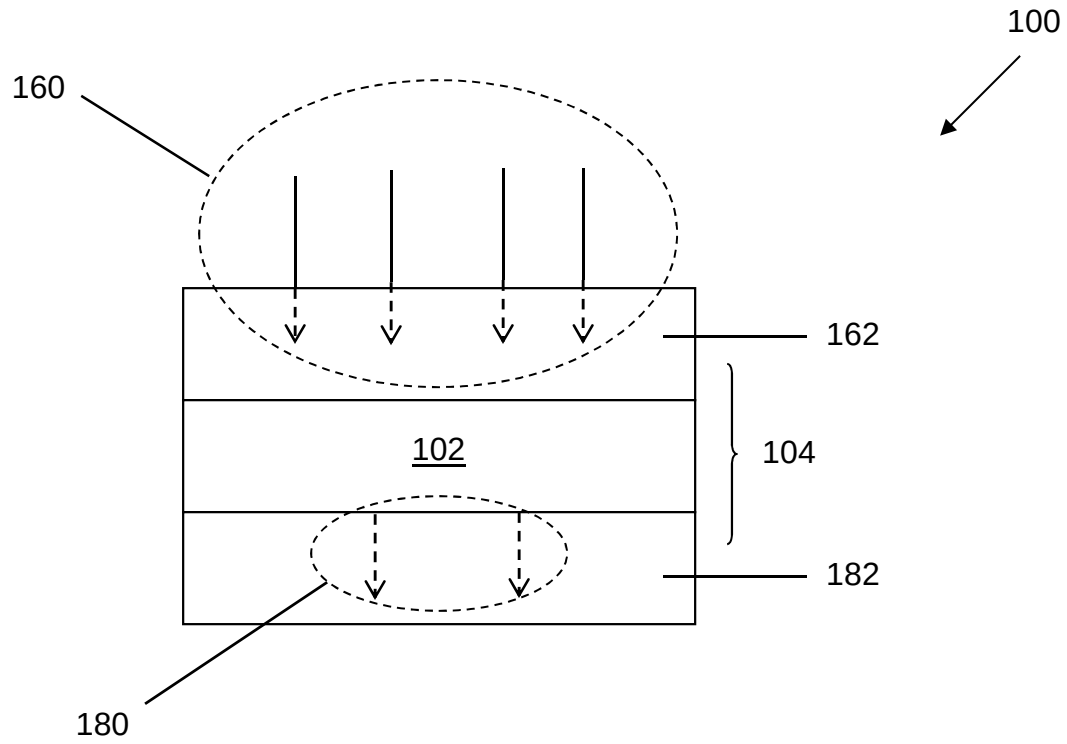


Figure 1

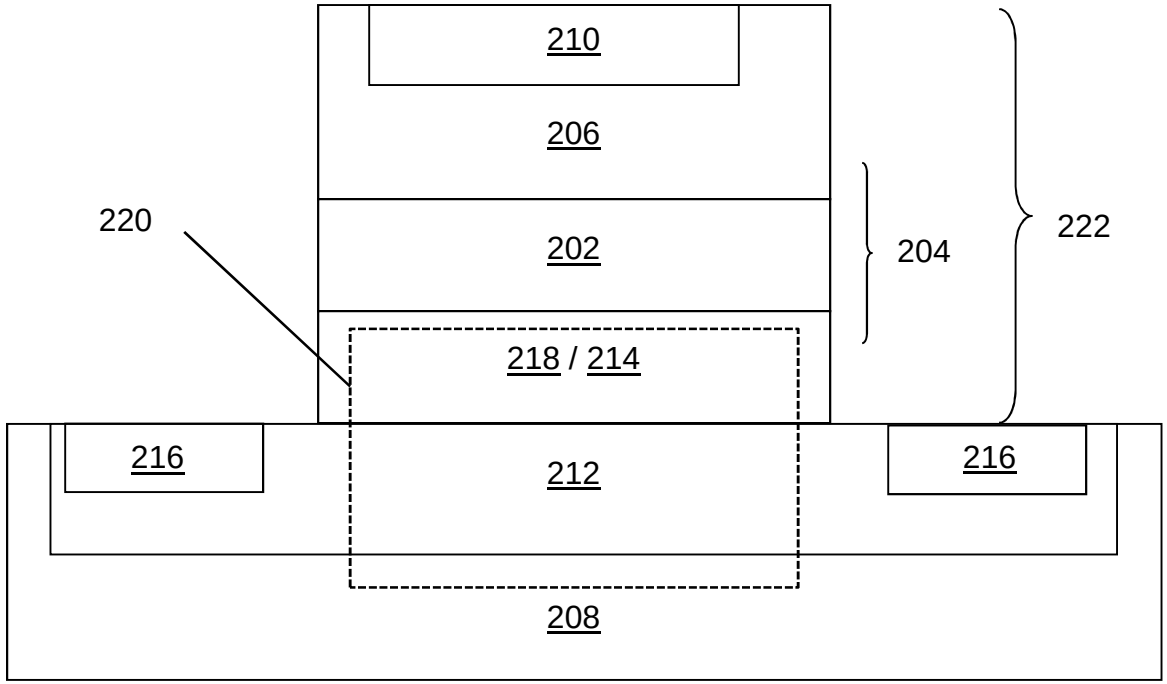


Figure 2

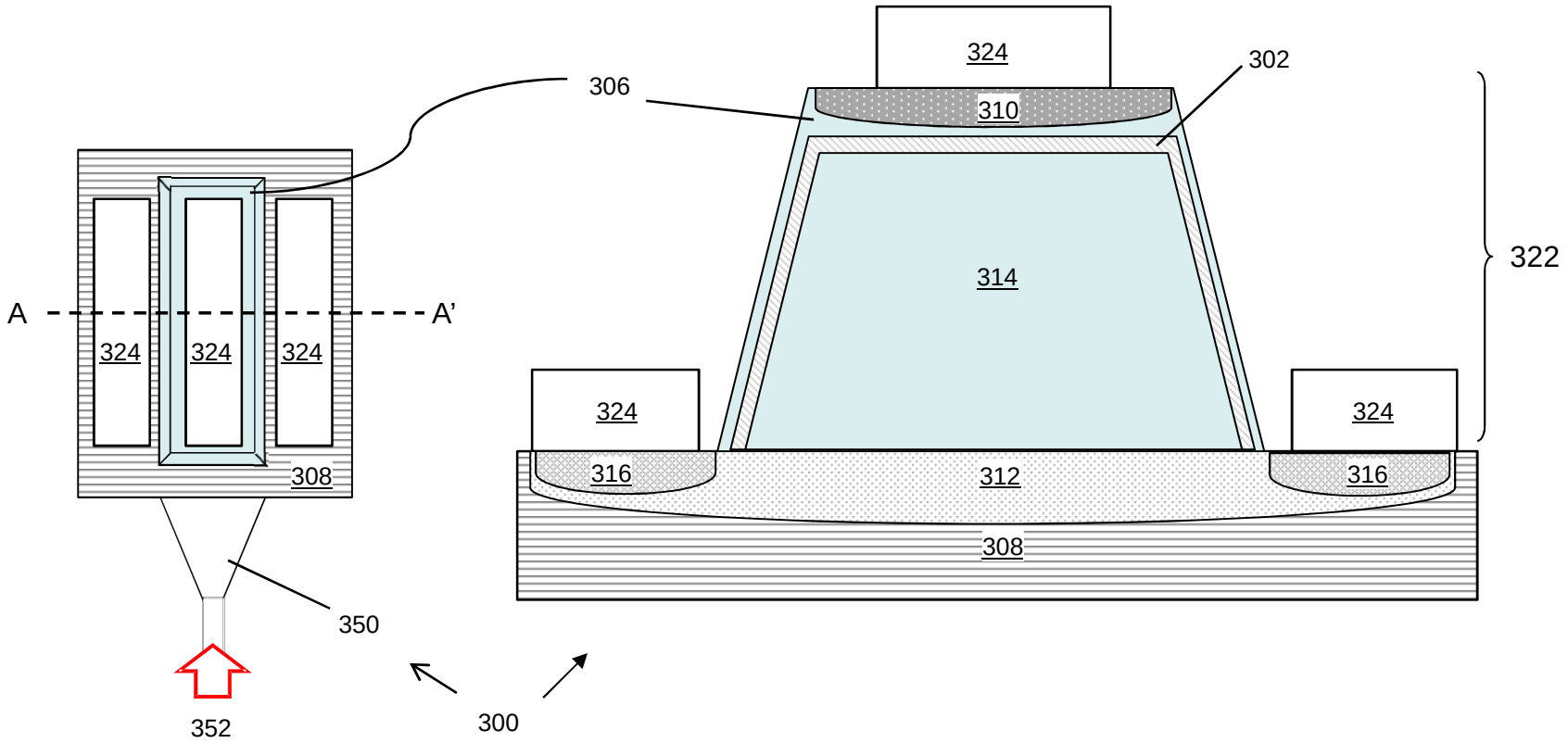


Figure 3A

Figure 3B

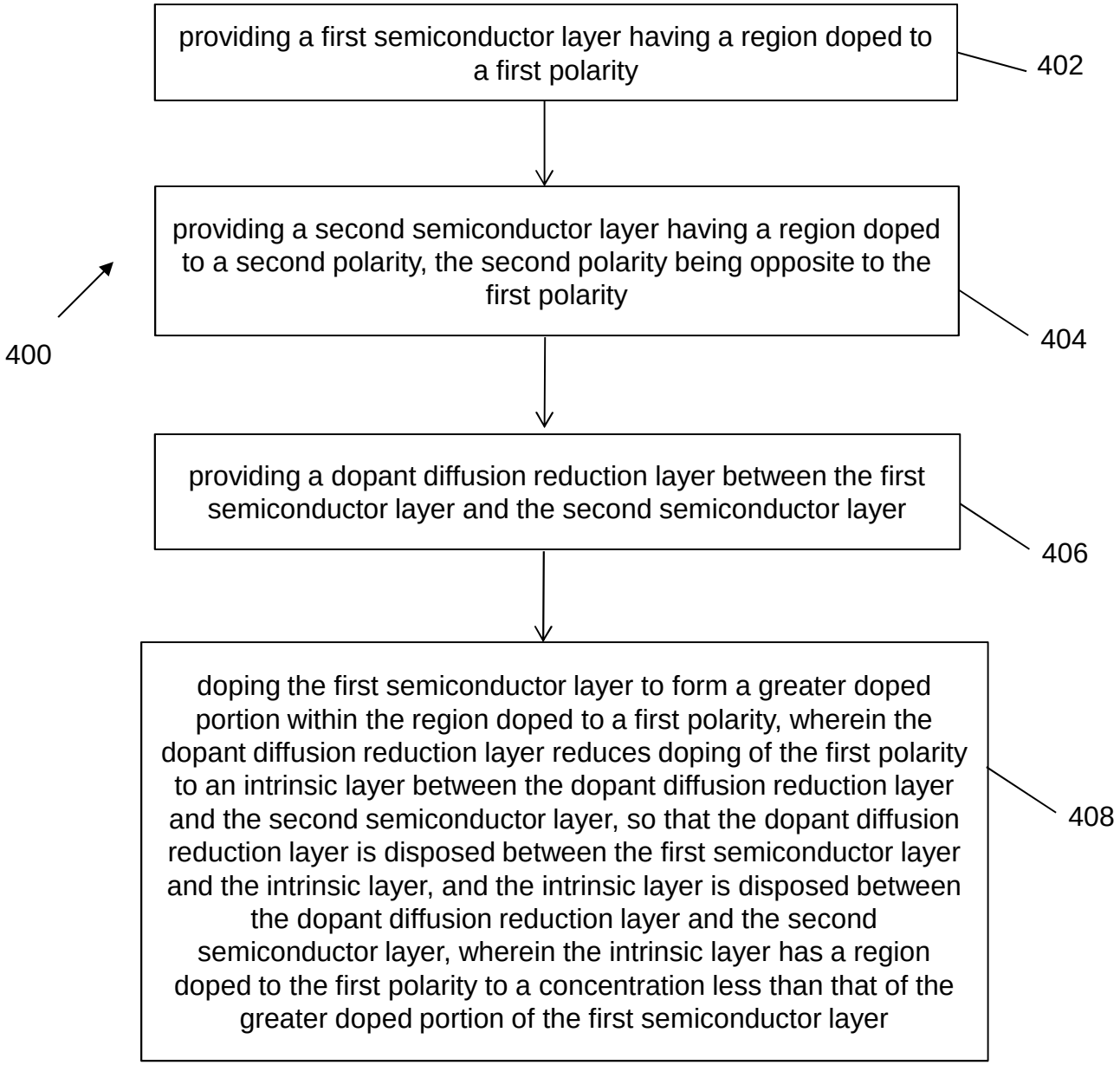

providing a first semiconductor layer having a region doped to a first polarity
402
providing a second semiconductor layer having a region doped to a second polarity, the second polarity being opposite to the first polarity
400
404
providing a dopant diffusion reduction layer between the first semiconductor layer and the second semiconductor layer
406
doping the first semiconductor layer to form a greater doped portion within the region doped to a first polarity, wherein the dopant diffusion reduction layer reduces doping of the first polarity to an intrinsic layer between the dopant diffusion reduction layer and the second semiconductor layer, so that the dopant diffusion reduction layer is disposed between the first semiconductor layer and the intrinsic layer, and the intrinsic layer is disposed between the dopant diffusion reduction layer and the second semiconductor layer, wherein the intrinsic layer has a region doped to the first polarity to a concentration less than that of the greater doped portion of the first semiconductor layer
408

Figure 4A

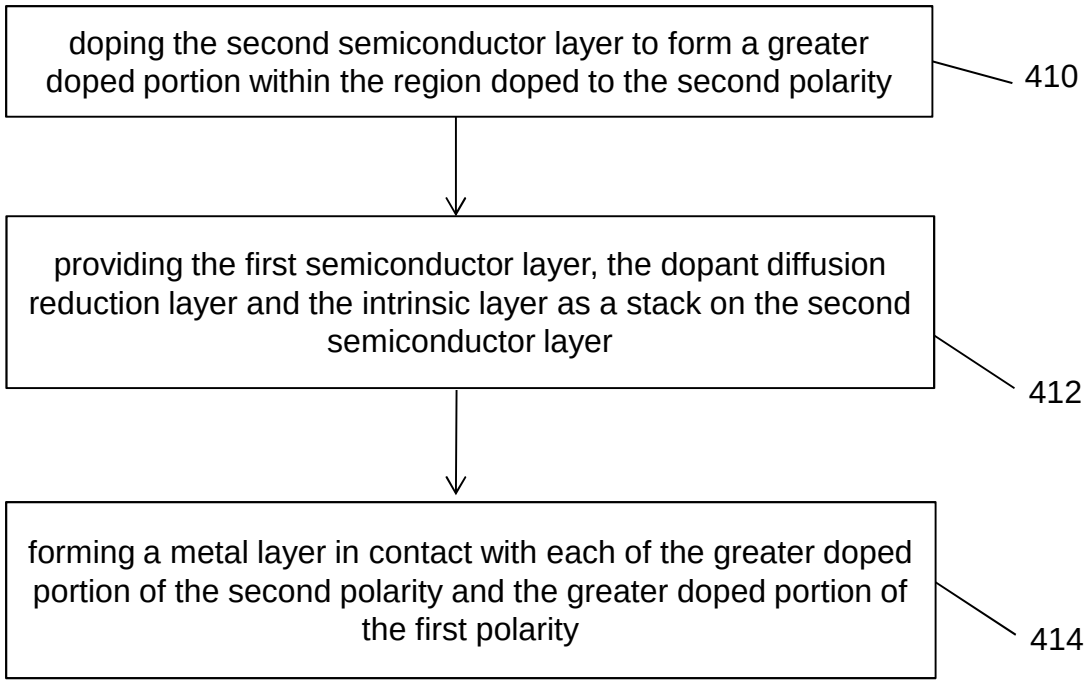

doping the second semiconductor layer to form a greater doped portion within the region doped to the second polarity
410
providing the first semiconductor layer, the dopant diffusion reduction layer and the intrinsic layer as a stack on the second semiconductor layer
412
forming a metal layer in contact with each of the greater doped portion of the second polarity and the greater doped portion of the first polarity
414

Figure 4B

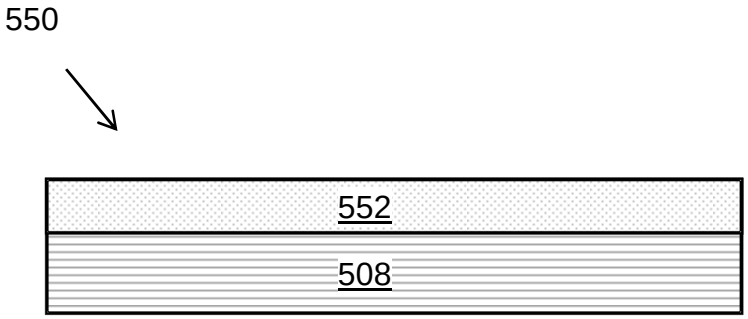


Figure 5A

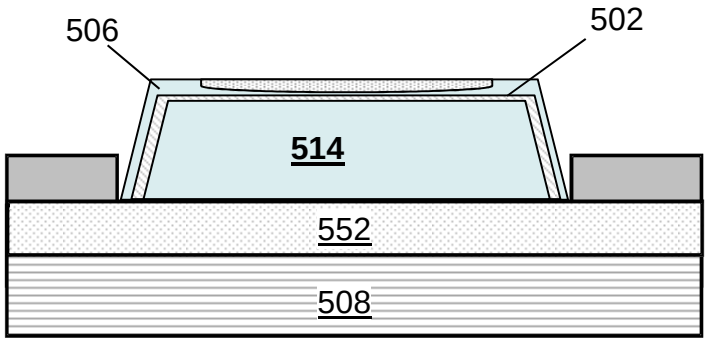


Figure 5C

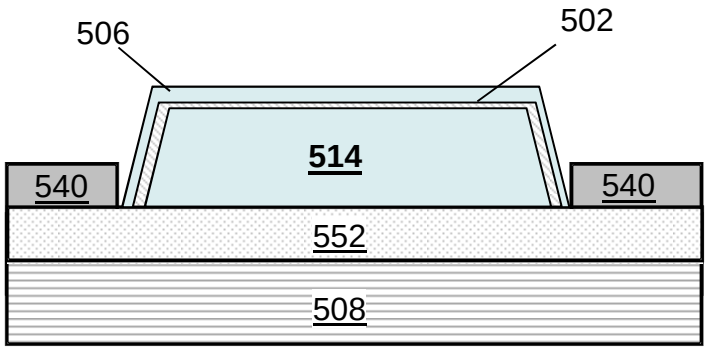


Figure 5B

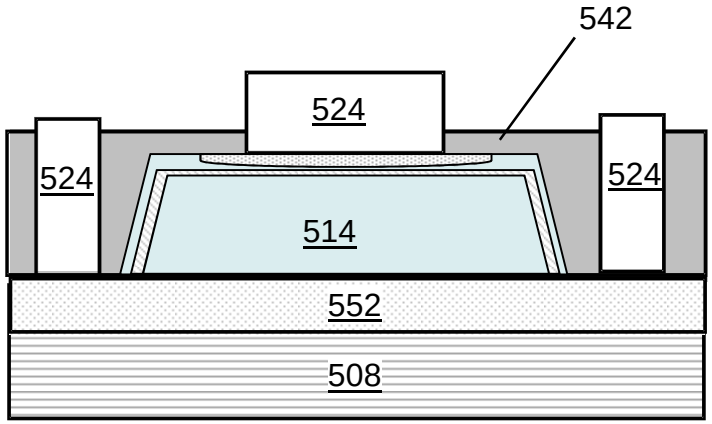


Figure 5D

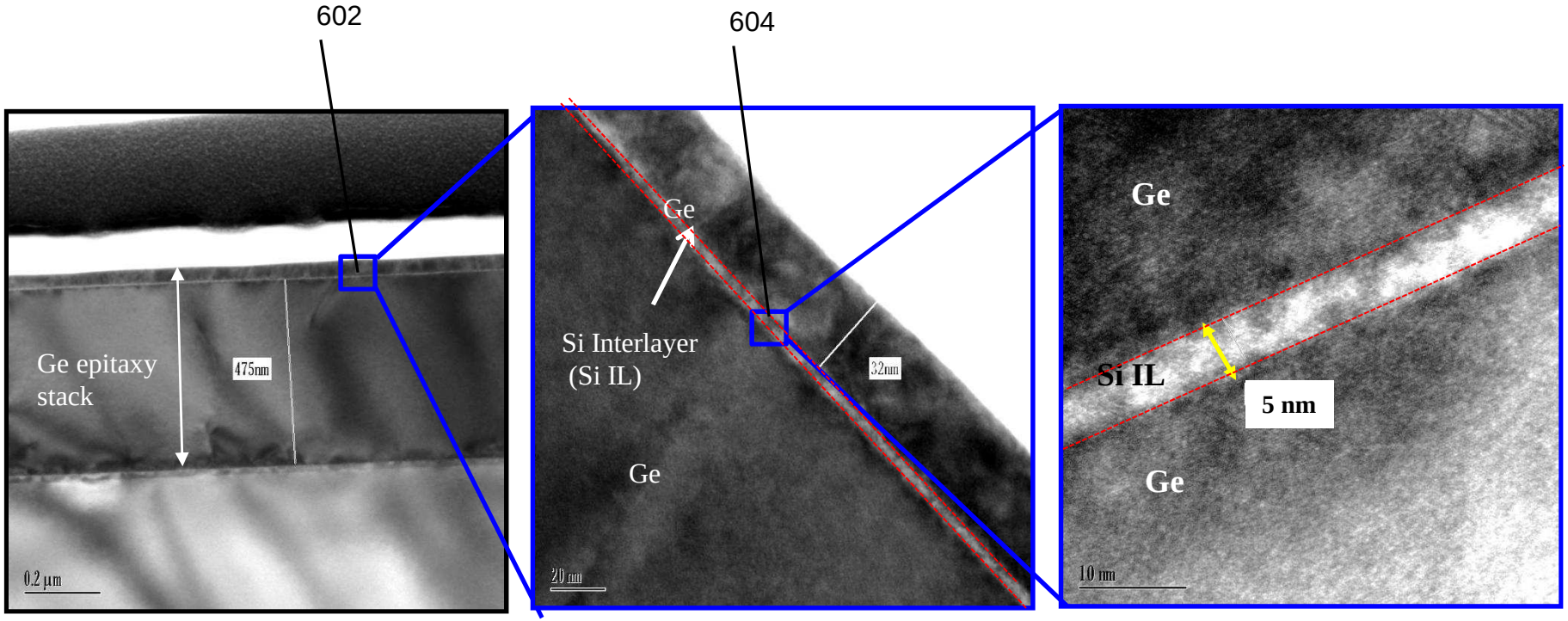


Figure 6A

Figure 6B

Figure 6C

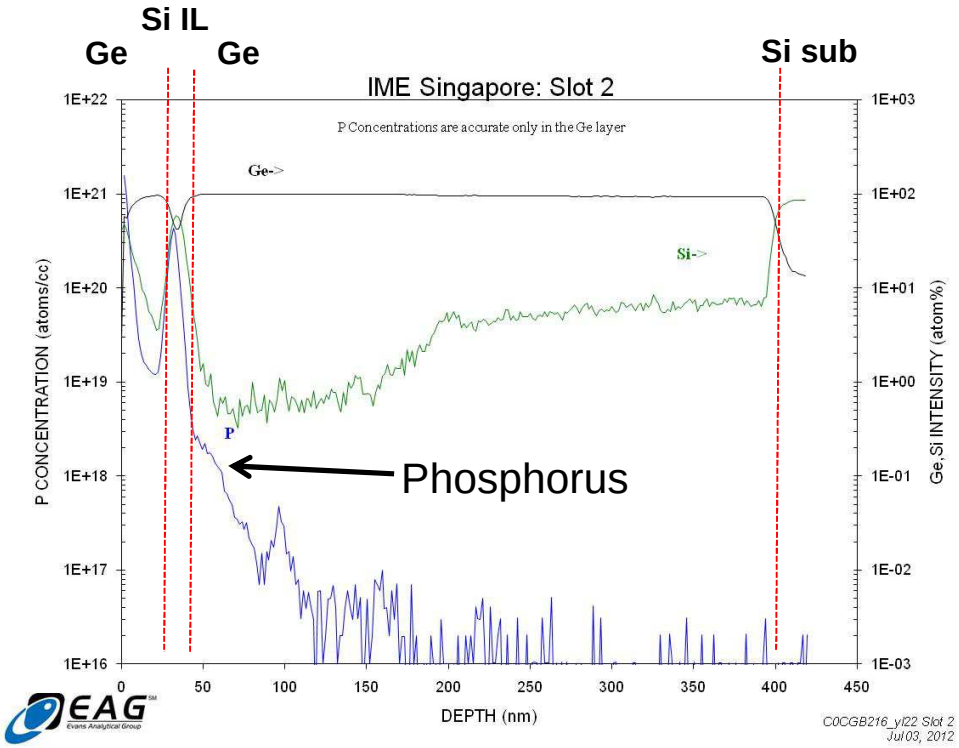

Si IL
Ge
Ge
Si sub
IME Singapore: Slot 2
P Concentrations are accurate only in the Ge layer
Ge->
Si->
P
Phosphorus
P CONCENTRATION (atoms/cc)
Ge,Si INTENSITY (atom%)
DEPTH (nm)
1E+22
1E+21
1E+20
1E+19
1E+18
1E+17
1E+16
1E+03
1E+02
1E+01
1E+00
1E-01
1E-02
1E-03
0
50
100
150
200
250
300
350
400
450
EAG
Evans Analytical Group
C0CGB216_yl22 Slot 2
Jul 03, 2012

Figure 7A

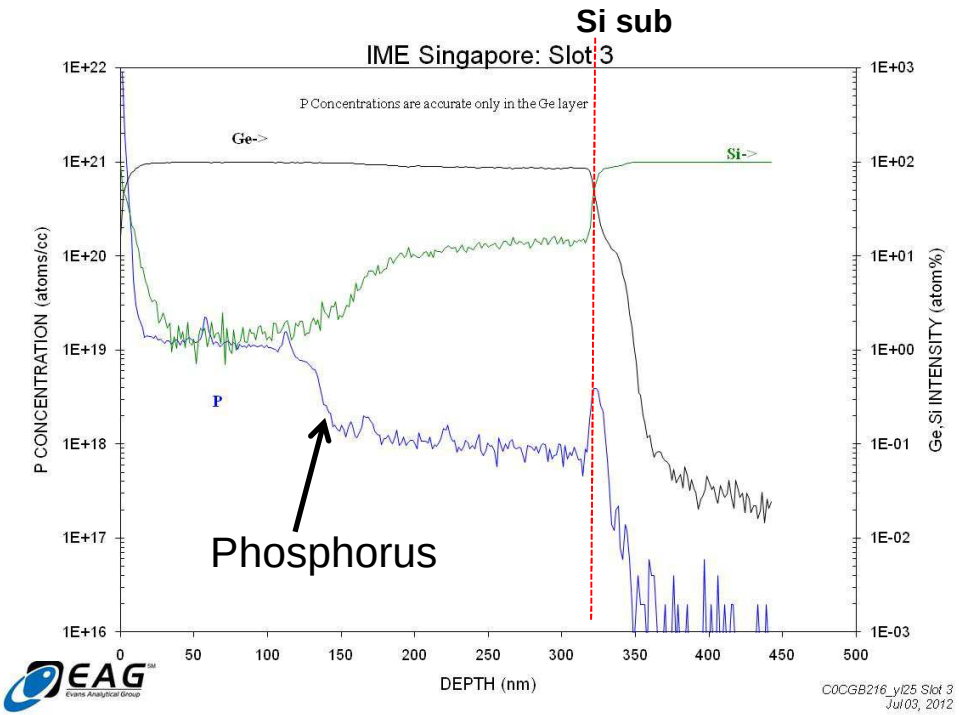

Si sub
IME Singapore: Slot 3
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P CONCENTRATION (atoms/cc)
Ge,Si INTENSITY (atom%)
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1E+22
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1E+20
1E+19
1E+18
1E+17
1E+16
1E+03
1E+02
1E+01
1E+00
1E-01
1E-02
1E-03
0
50
100
150
200
250
300
350
400
450
500
EAG
Evans Analytical Group
C0CGB216_yl25 Slot 3
Jul 03, 2012

Figure 7B

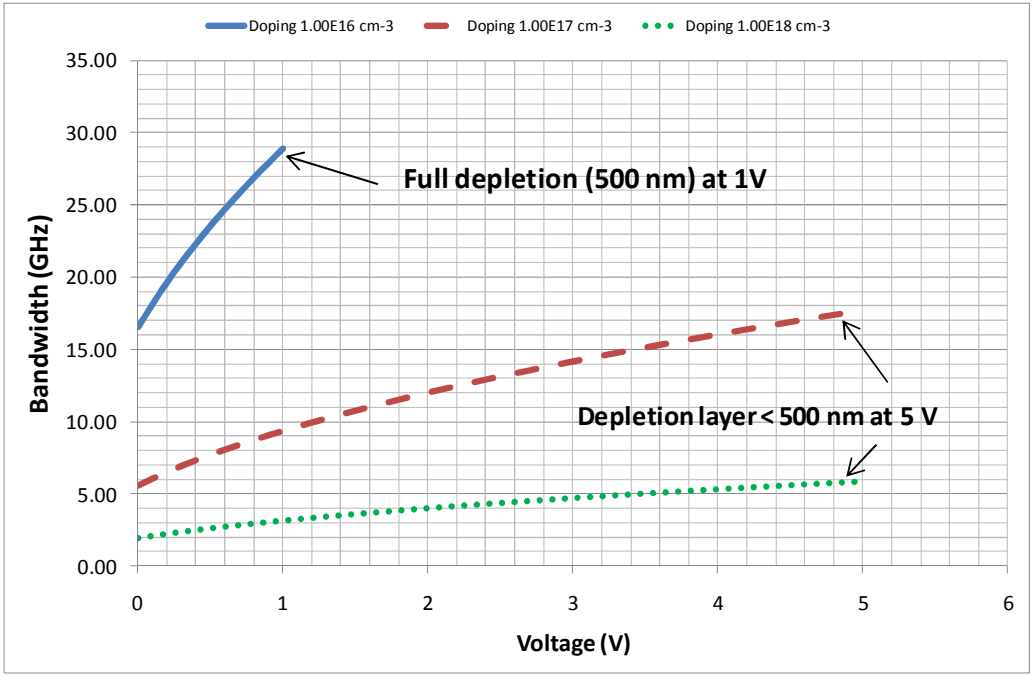

Doping 1.00E16 cm-3
Doping 1.00E17 cm-3
Doping 1.00E18 cm-3
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Bandwidth (GHz)
0
1
2
3
4
5
6
Voltage (V)
Full depletion (500 nm) at 1V
Depletion layer < 500 nm at 5 V

Figure 8