FIG. 1

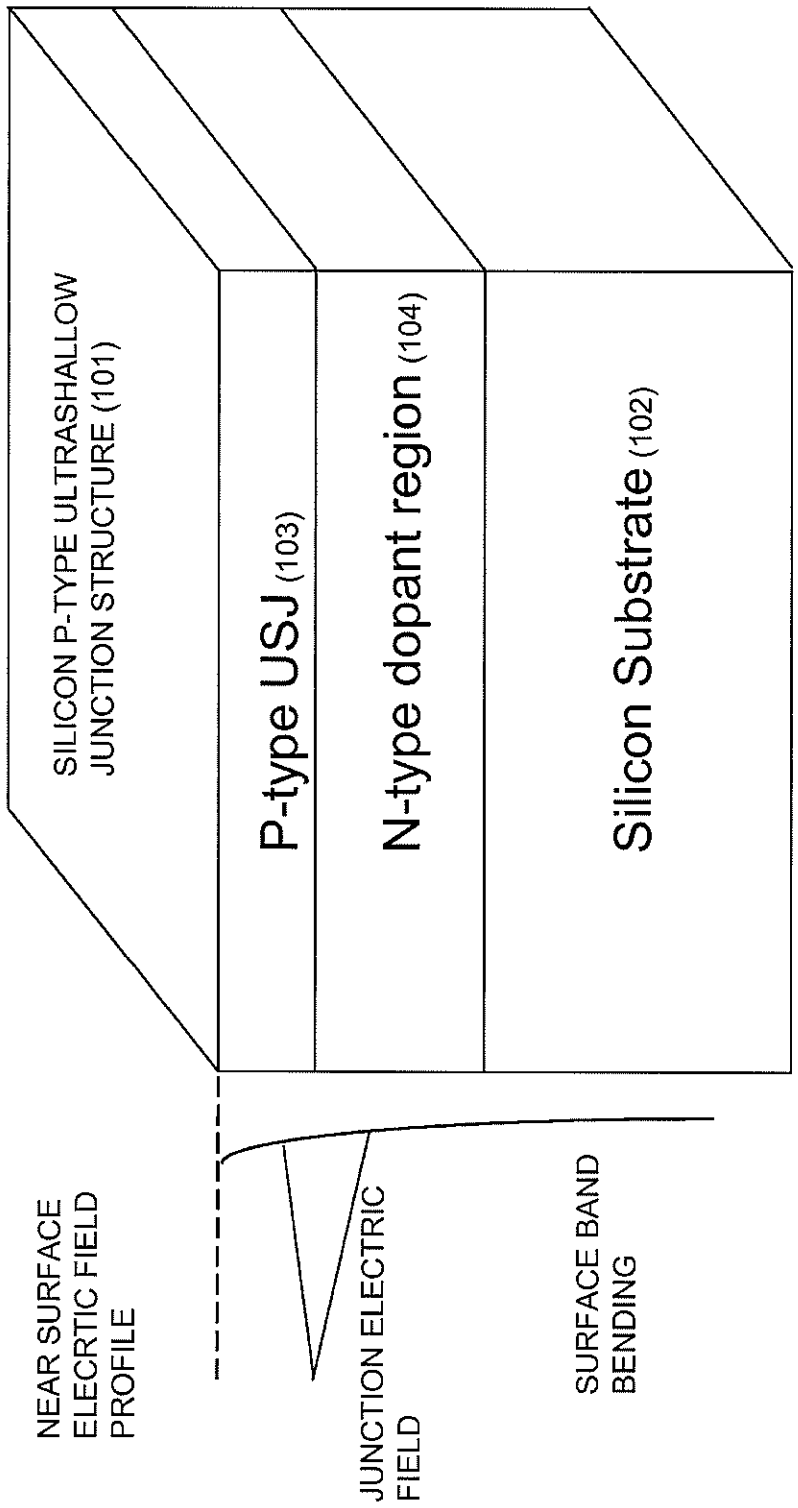

SILICON P-TYPE ULTRASHALLOW JUNCTION STRUCTURE (101)
P-type USJ (103)
N-type dopant region (104)
Silicon Substrate (102)
NEAR SURFACE ELECRTIC FIELD PROFILE
JUNCTION ELECTRIC FIELD
SURFACE BAND BENDING

FIG. 2

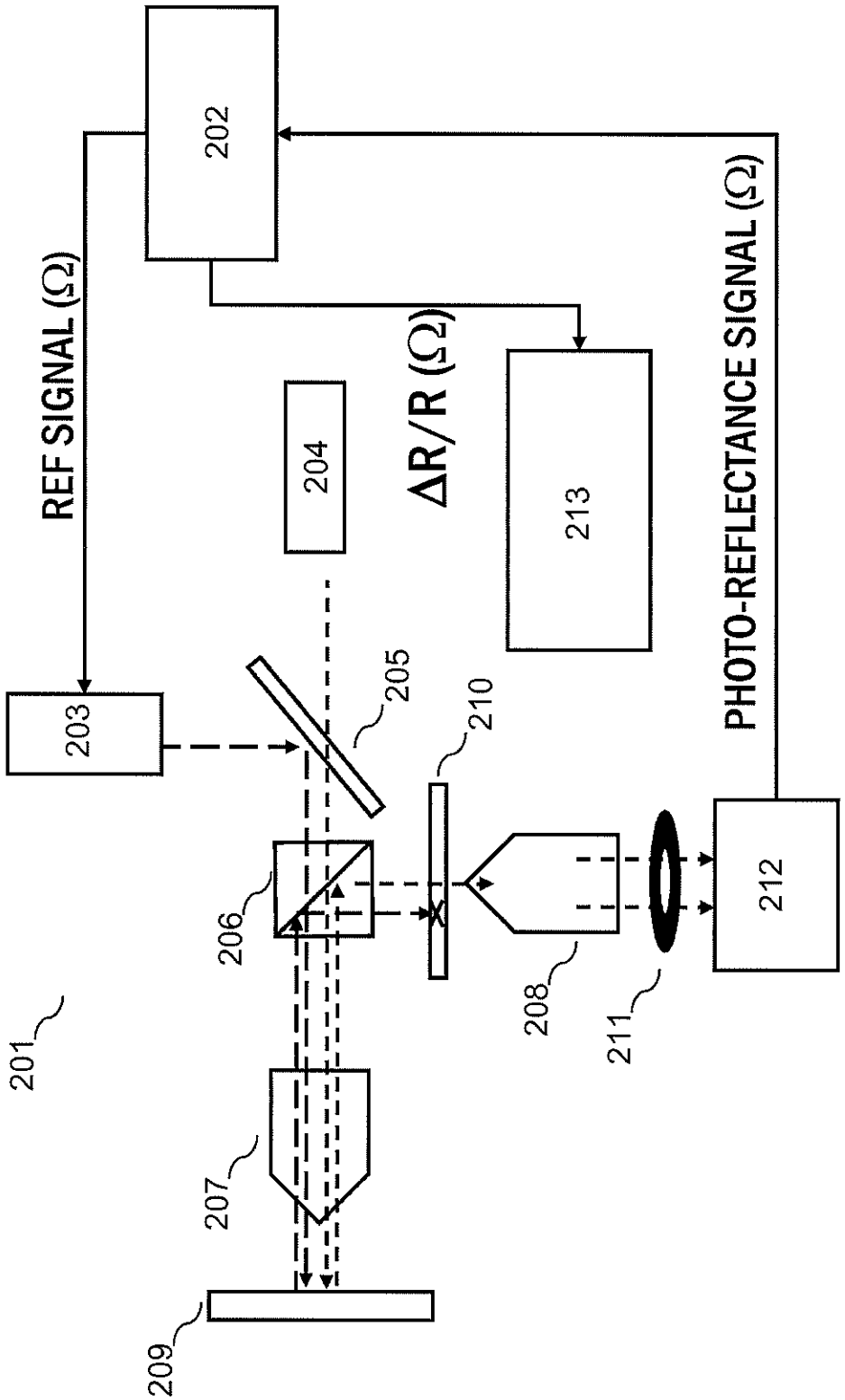

202
REF SIGNAL (Ω)
ΔR/R (Ω)
PHOTO-REFLECTANCE SIGNAL (Ω)
204
213
203
205
210
206
212
208
211
201
207
209

FIG. 3

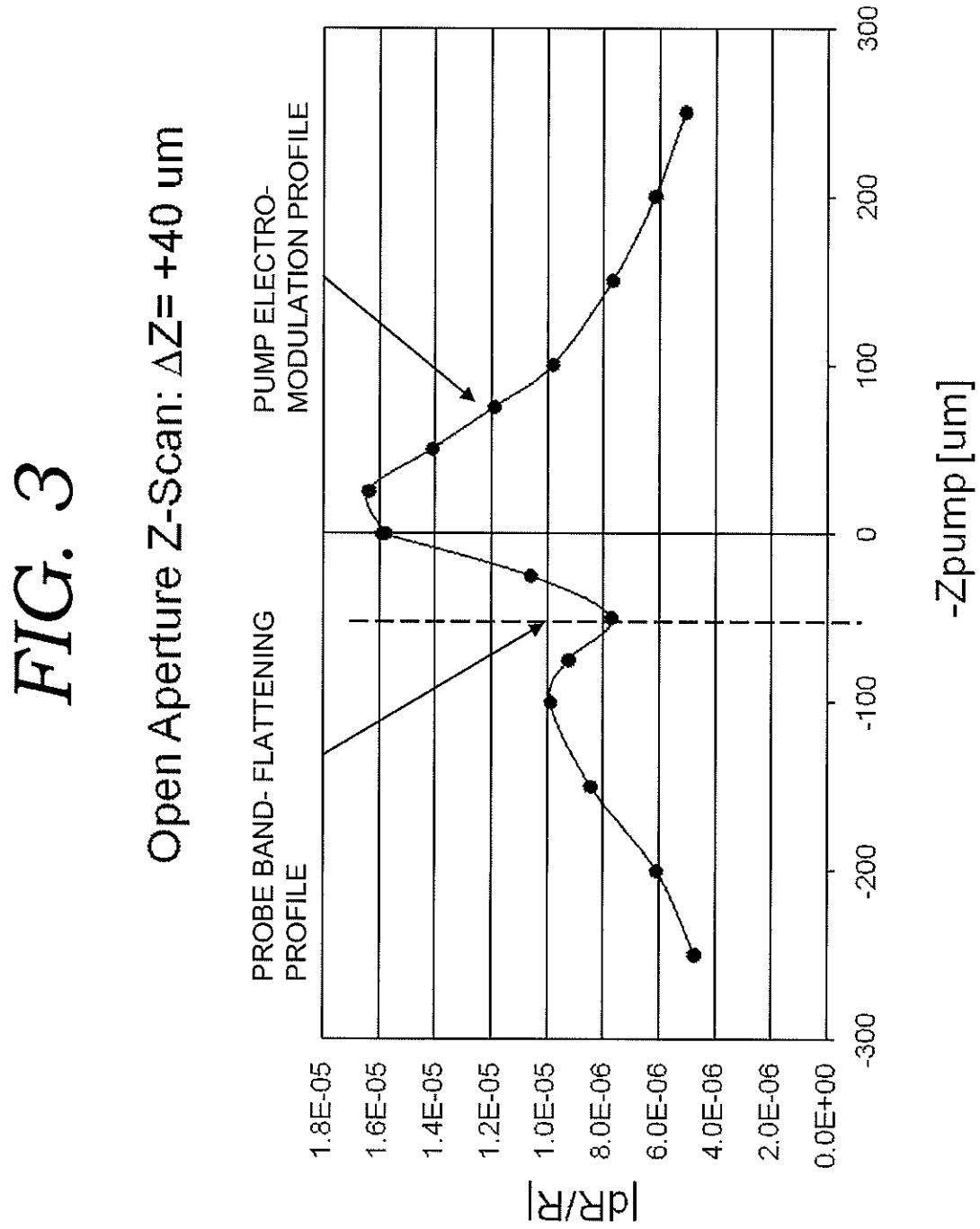

Open Aperture Z-Scan: ΔZ= +40 um
PROBE BAND- FLATTENING PROFILE
PUMP ELECTRO-MODULATION PROFILE
|dR/R|
1.8E-05
1.6E-05
1.4E-05
1.2E-05
1.0E-05
8.0E-06
6.0E-06
4.0E-06
2.0E-06
0.0E+00
-300
-200
-100
0
100
200
300
-Zpump [um]

FIG. 4

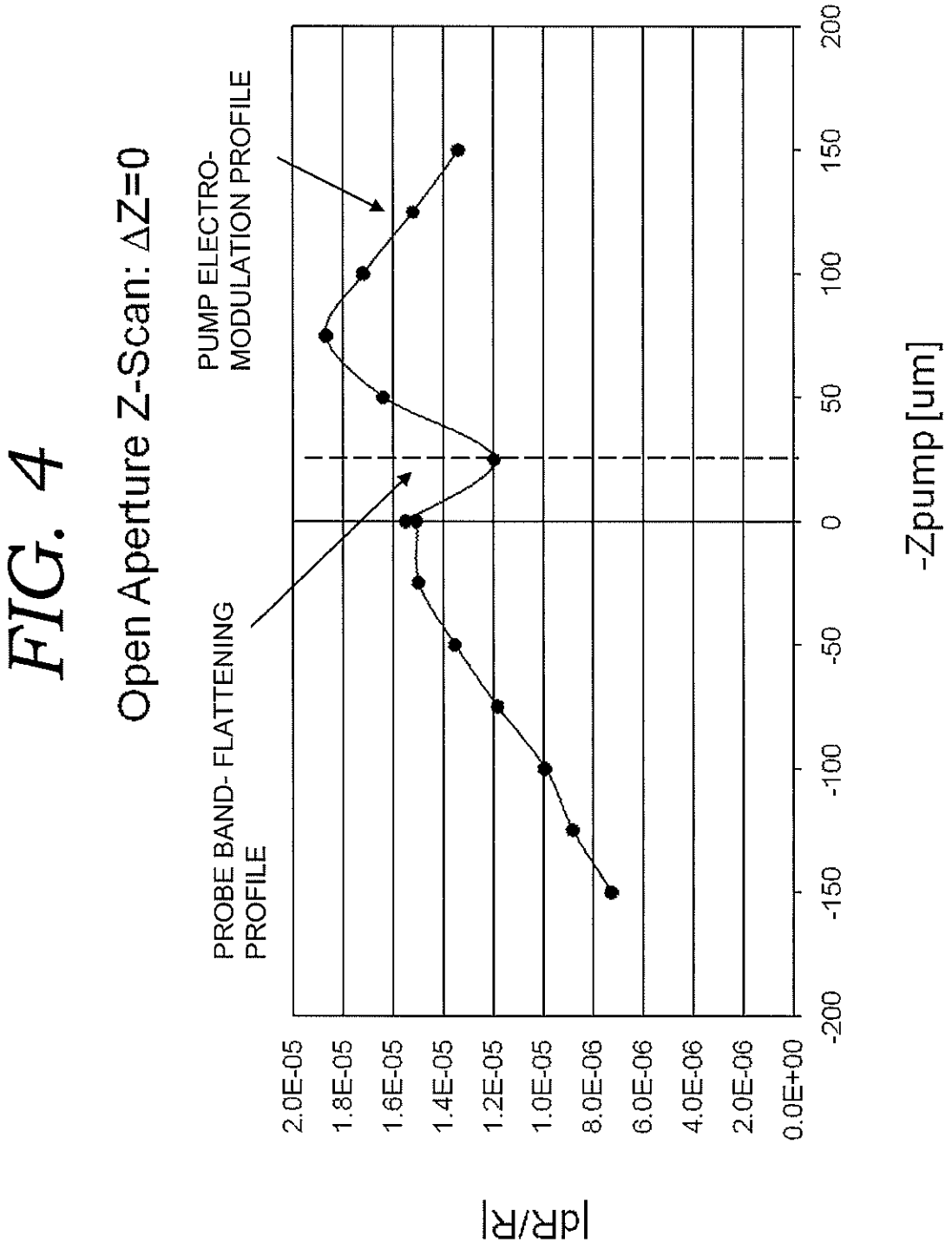

Open Aperture Z-Scan: ΔZ=0
PUMP ELECTRO-MODULATION PROFILE
PROBE BAND- FLATTENING PROFILE
|dR/R|
-Zpump [um]
2.0E-05
1.8E-05
1.6E-05
1.4E-05
1.2E-05
1.0E-05
8.0E-06
6.0E-06
4.0E-06
2.0E-06
0.0E+00
-200
-150
-100
-50
0
50
100
150
200

FIG. 5

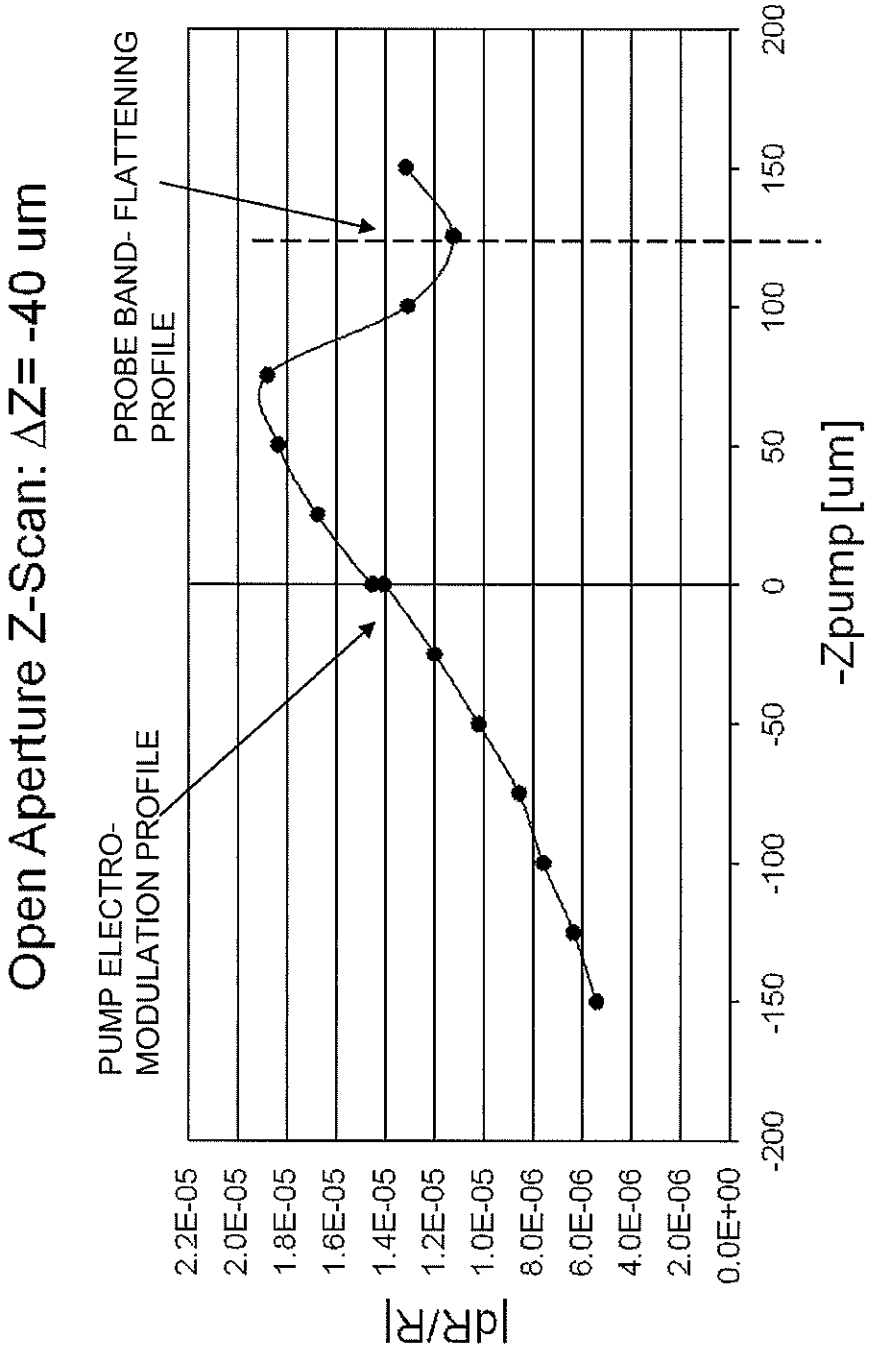

Open Aperture Z-Scan: ΔZ= -40 um
PROBE BAND- FLATTENING PROFILE
PUMP ELECTRO-MODULATION PROFILE
|dR/R|
-Zpump [um]
2.2E-05
2.0E-05
1.8E-05
1.6E-05
1.4E-05
1.2E-05
1.0E-05
8.0E-06
6.0E-06
4.0E-06
2.0E-06
0.0E+00
-200
-150
-100
-50
0
50
100
150
200

FIG. 6

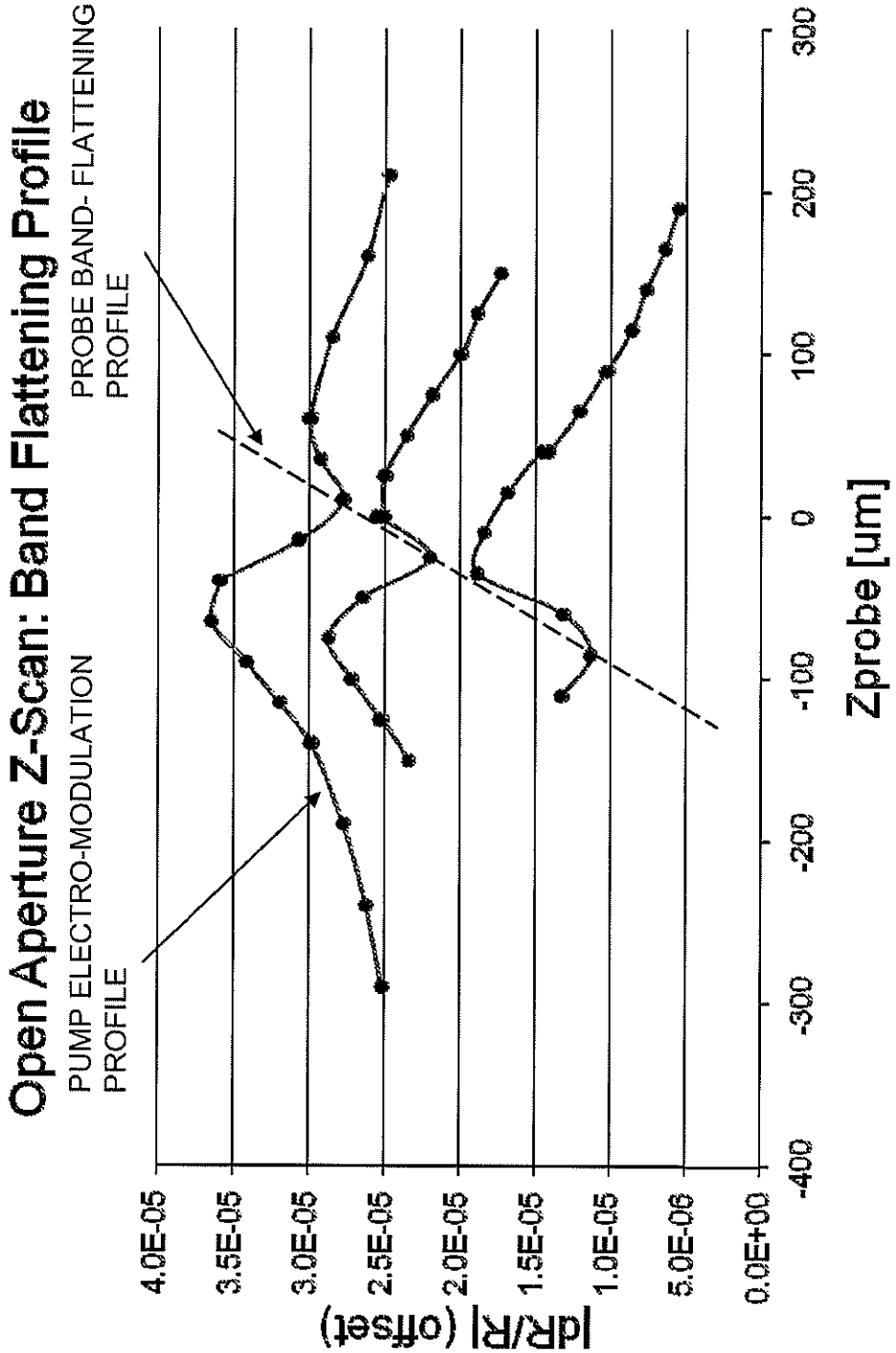

Open Aperture Z-Scan: Band Flattening Profile
PUMP ELECTRO-MODULATION PROFILE
PROBE BAND- FLATTENING PROFILE
|dR/R| (offset)
4.0E-05
3.5E-05
3.0E-05
2.5E-05
2.0E-05
1.5E-05
1.0E-05
5.0E-06
0.0E+00
-400
-300
-200
-100
0
100
200
300
Zprobe [um]

FIG. 7

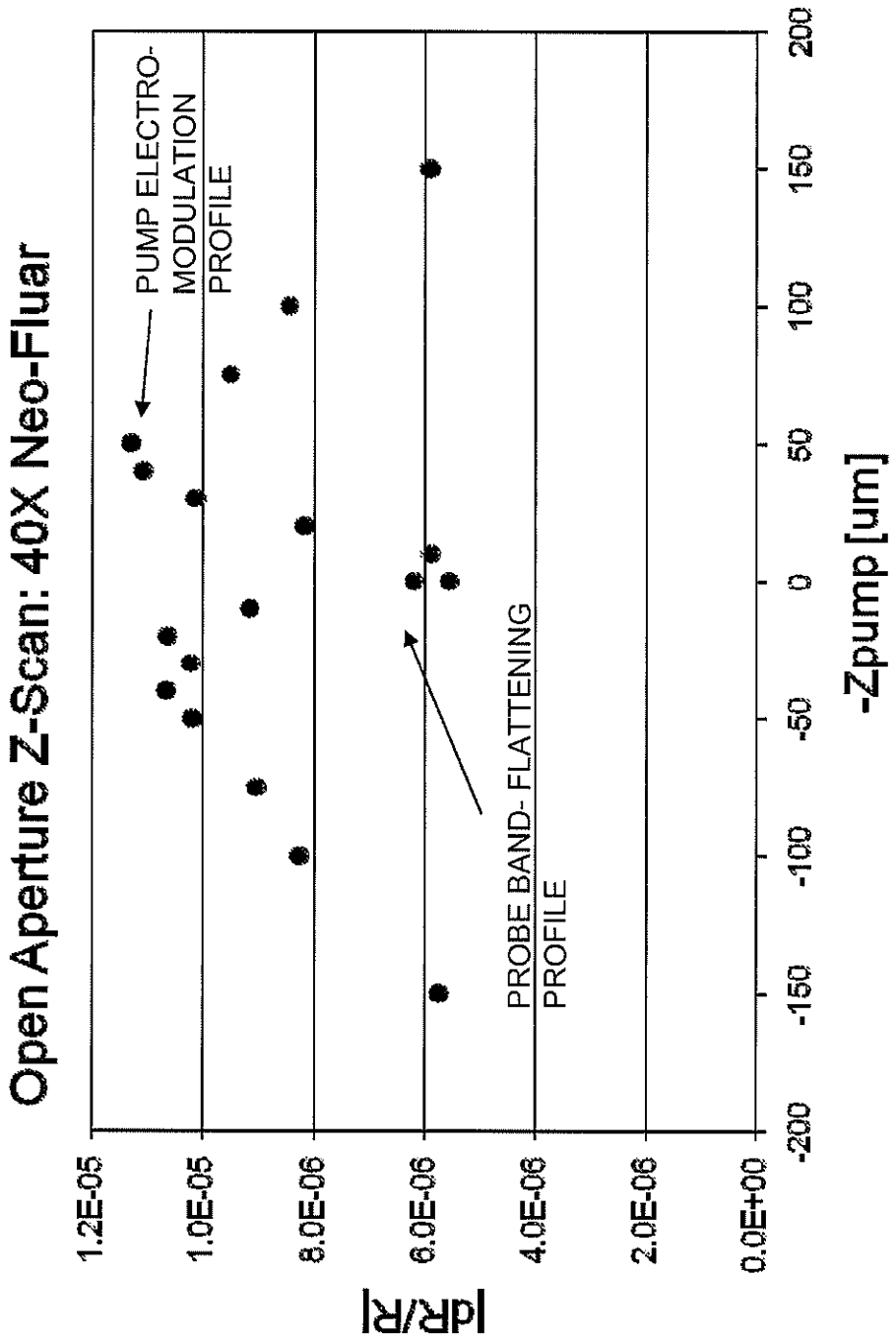

Open Aperture Z-Scan: 40X Neo-Fluar
PUMP ELECTRO-MODULATION PROFILE
PROBE BAND- FLATTENING PROFILE
|dR/R|
-Zpump [um]
1.2E-05
1.0E-05
8.0E-06
6.0E-06
4.0E-06
2.0E-06
0.0E+00
-200
-150
-100
-50
0
50
100
150
200

FIG. 8

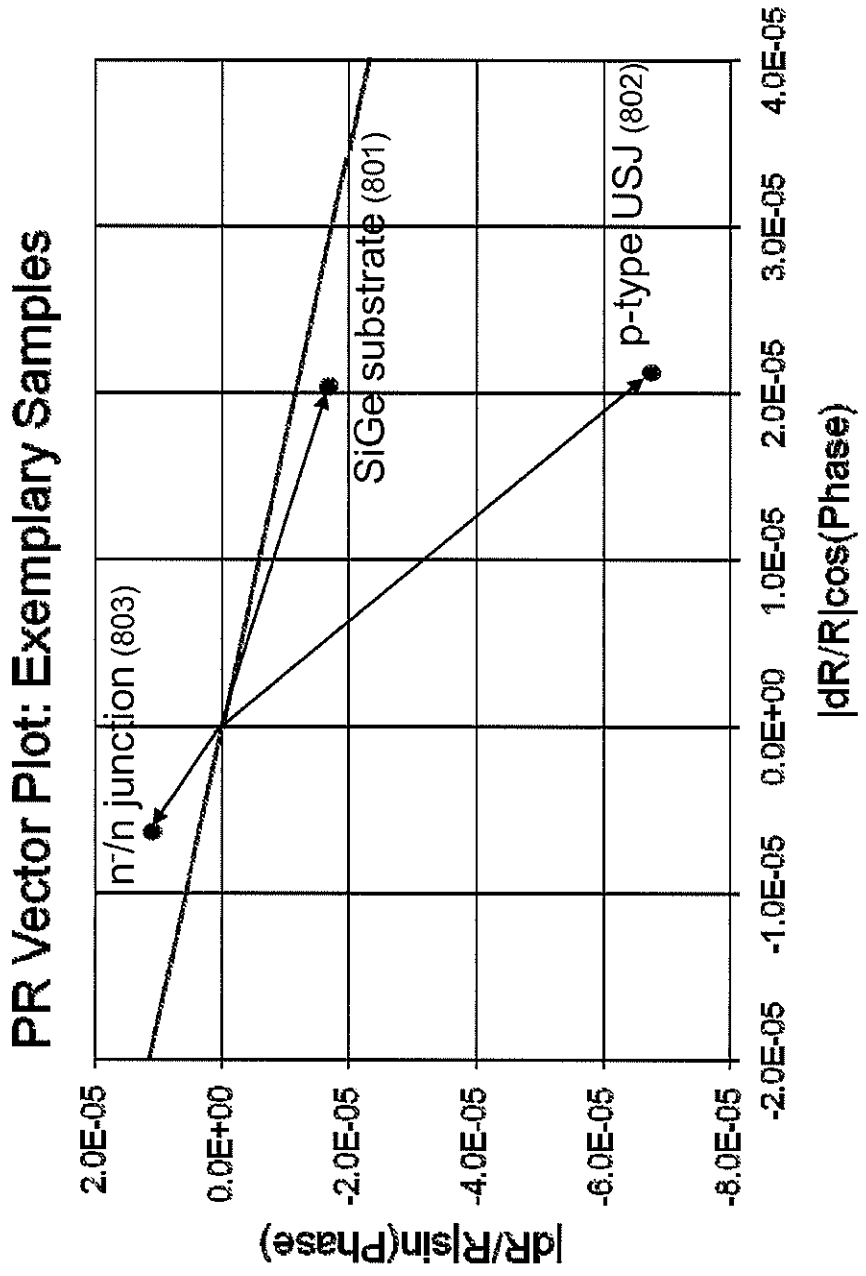

PR Vector Plot: Exemplary Samples
n-/n junction (803)
SiGe substrate (801)
p-type USJ (802)
2.0E-05
0.0E+00
-2.0E-05
-4.0E-05
-6.0E-05
-8.0E-05
-2.0E-05
-1.0E-05
0.0E+00
1.0E-05
2.0E-05
3.0E-05
4.0E-05
|dR/R|sin(Phase)
|dR/R|cos(Phase)

FIG. 9

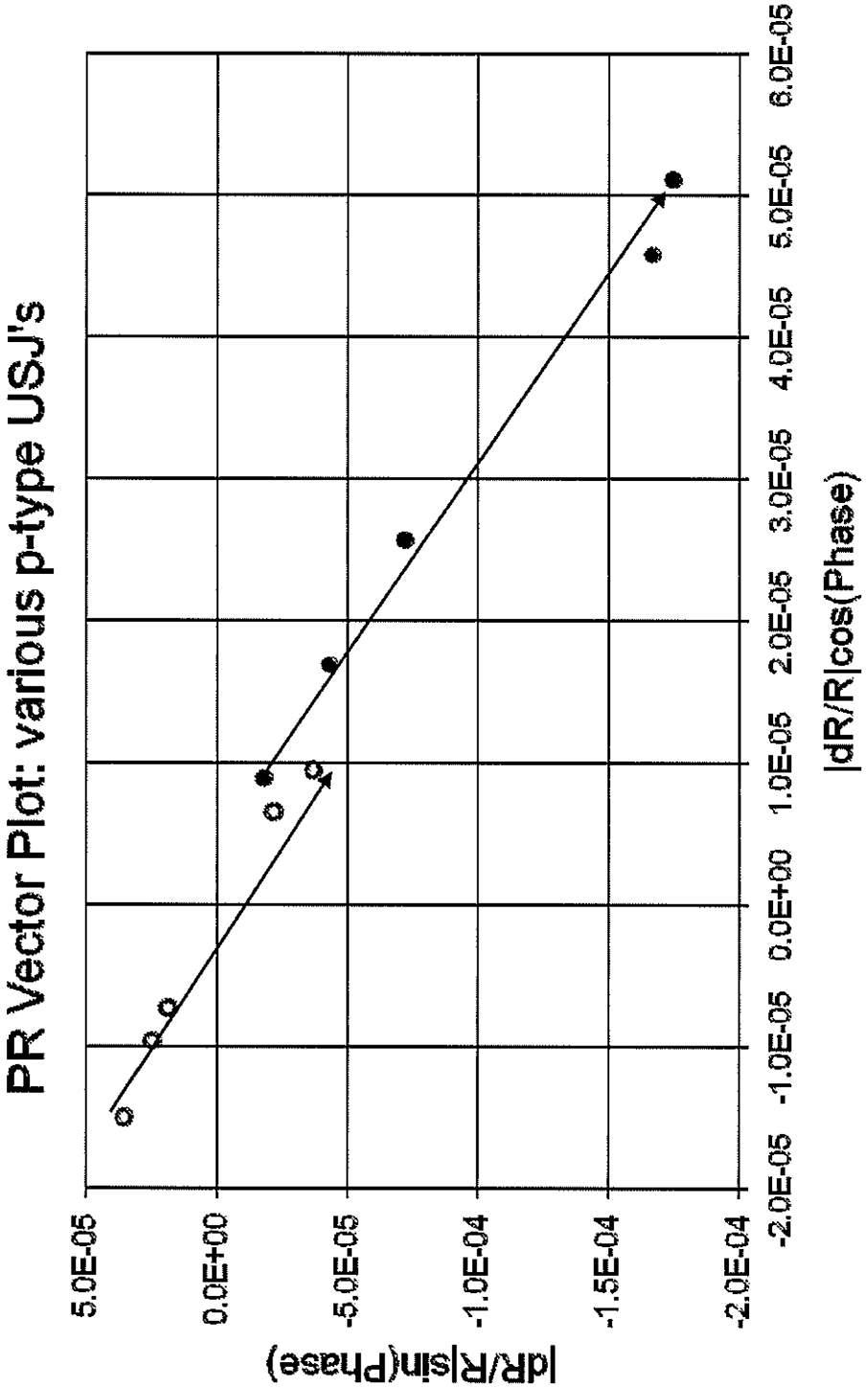

PR Vector Plot: various p-type USJ's
|dR/R|sin(Phase)
|dR/R|cos(Phase)
5.0E-05
0.0E+00
-5.0E-05
-1.0E-04
-1.5E-04
-2.0E-04
-2.0E-05
-1.0E-05
0.0E+00
1.0E-05
2.0E-05
3.0E-05
4.0E-05
5.0E-05
6.0E-05

FIG. 10

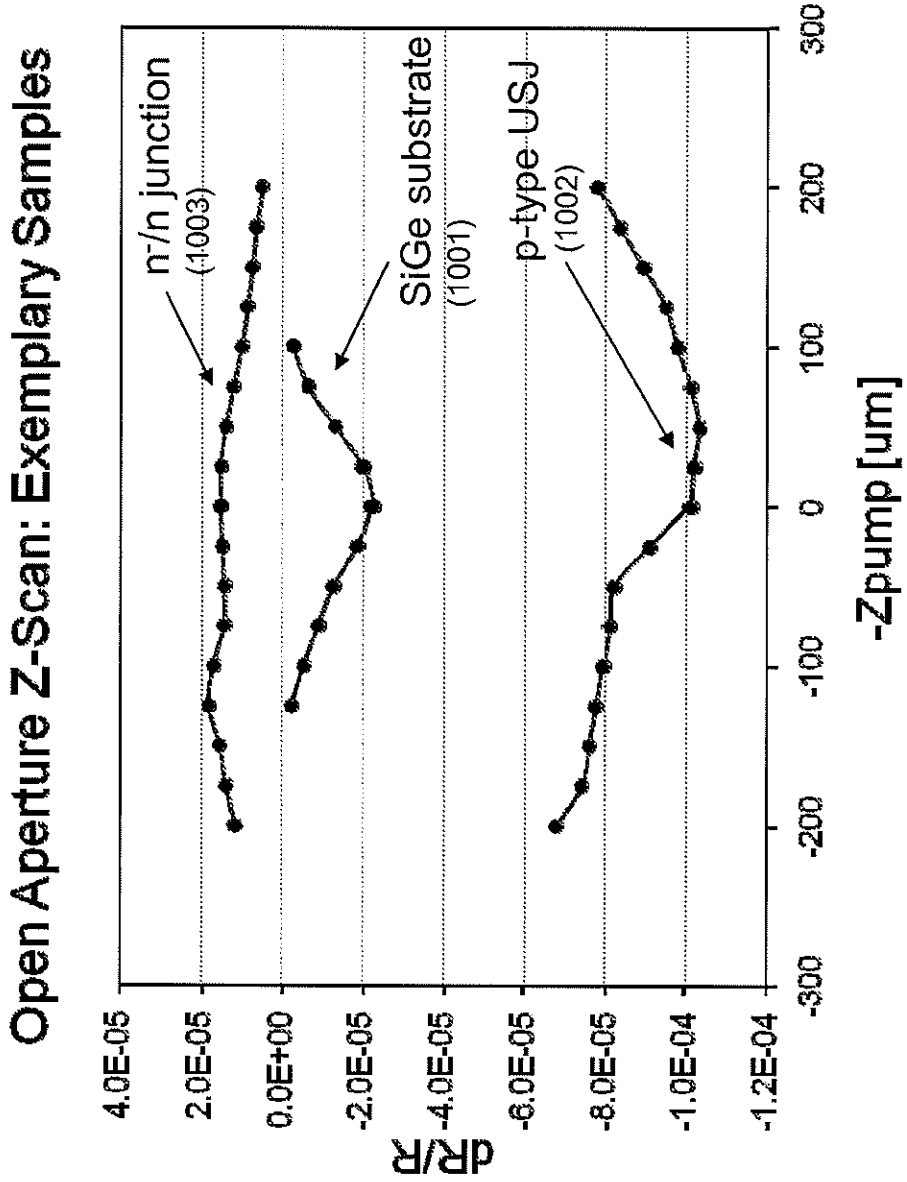

Open Aperture Z-Scan: Exemplary Samples
n⁻/n junction
(1003)
SiGe substrate
(1001)
p-type USJ
(1002)
dR/R
4.0E-05
2.0E-05
0.0E+00
-2.0E-05
-4.0E-05
-6.0E-05
-8.0E-05
-1.0E-04
-1.2E-04
-300
-200
-100
0
100
200
300
-Zpump [um]

FIG. 11

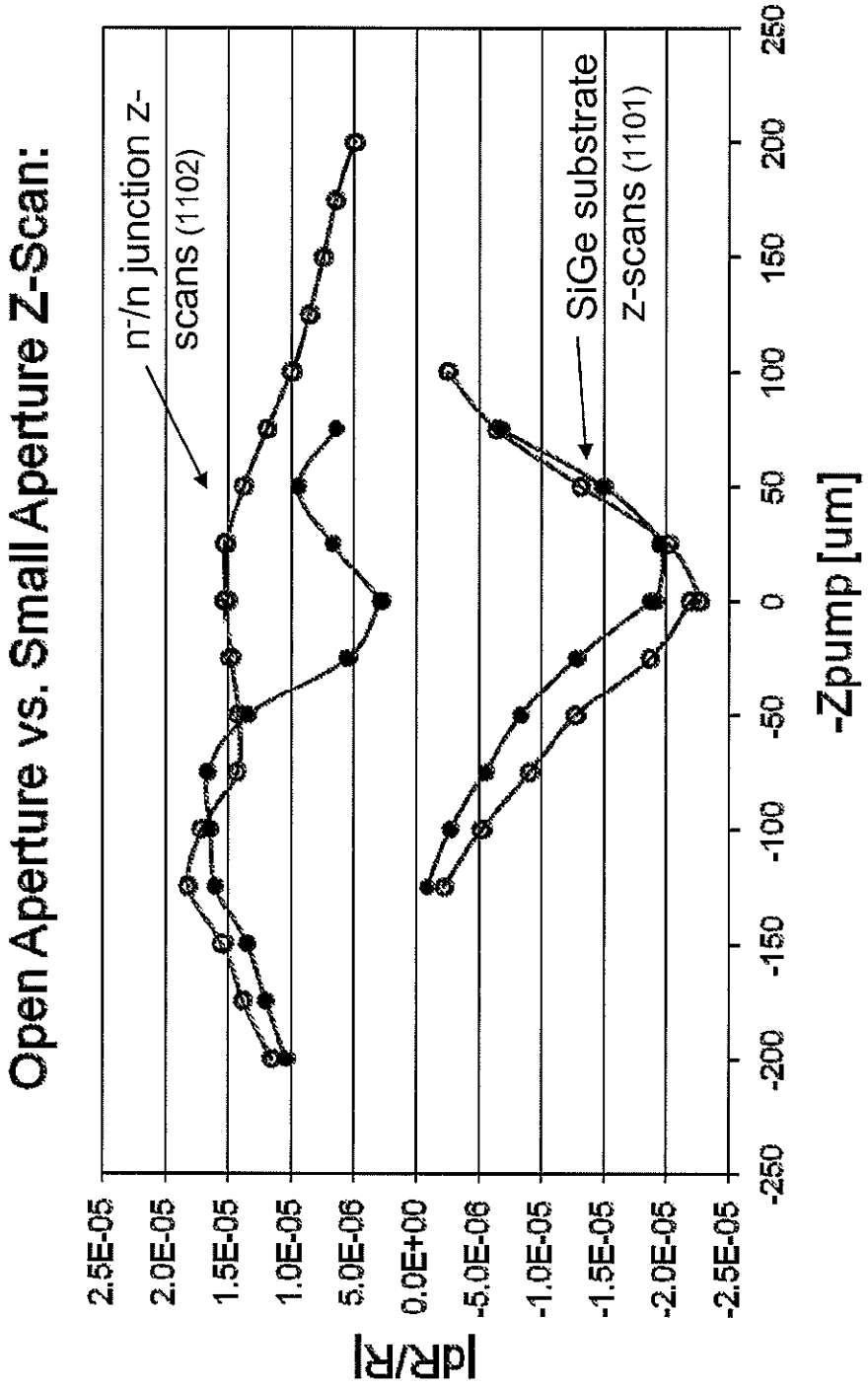

Open Aperture vs. Small Aperture Z-Scan:
n-/n junction z-scans (1102)
SiGe substrate z-scans (1101)
|dR/R|
-Zpump [um]
2.5E-05
2.0E-05
1.5E-05
1.0E-05
5.0E-06
0.0E+00
-5.0E-06
-1.0E-05
-1.5E-05
-2.0E-05
-2.5E-05
250
200
150
100
50
0
-50
-100
-150
-200
-250

FIG. 12

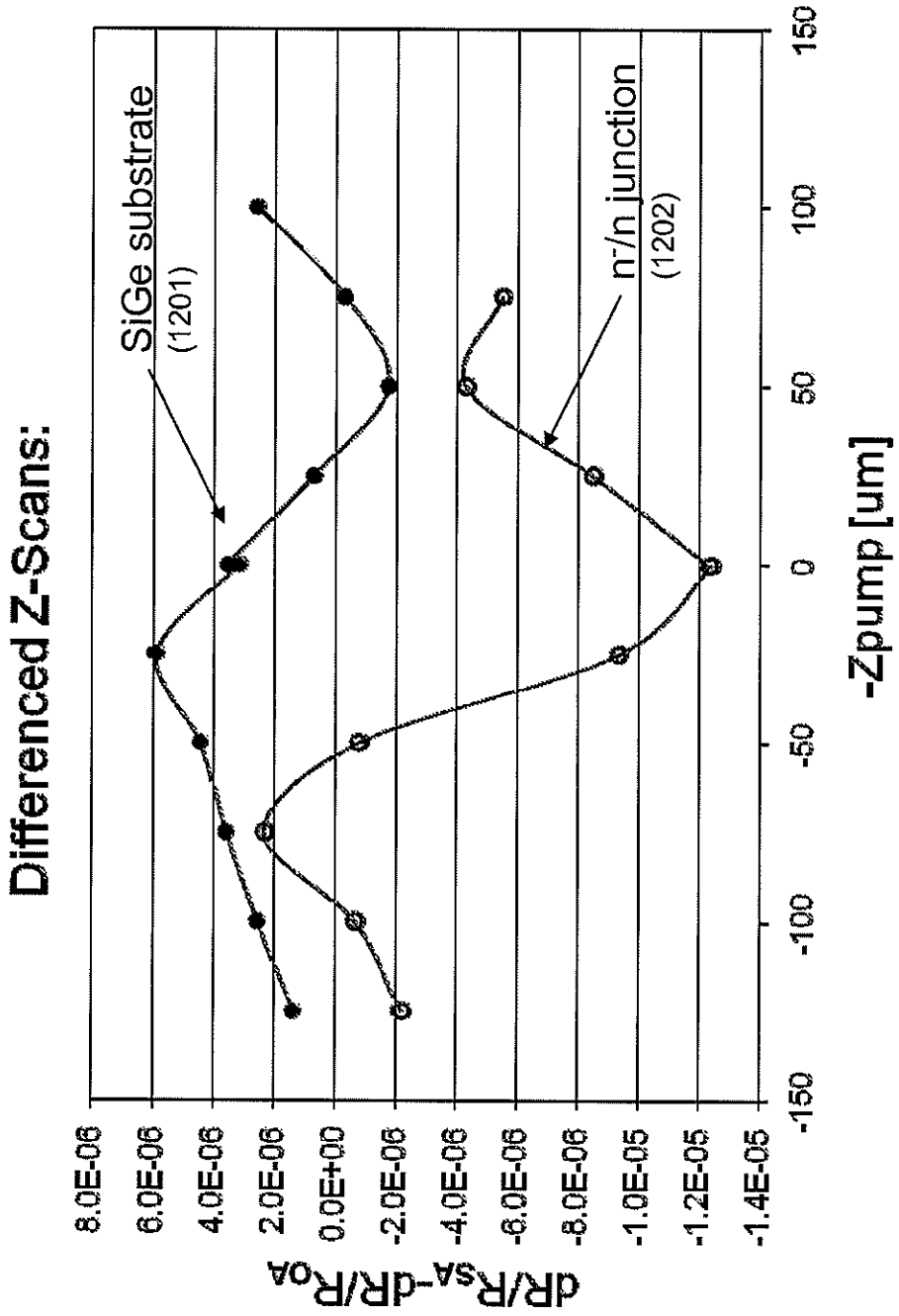

Differenced Z-Scans:
SiGe substrate
(1201)
n-/n junction
(1202)
dR/R_SA-dR/R_OA
-Zpump [um]
8.0E-06
6.0E-06
4.0E-06
2.0E-06
0.0E+00
-2.0E-06
-4.0E-06
-6.0E-06
-8.0E-06
-1.0E-05
-1.2E-05
-1.4E-05
150
100
50
0
-50
-100
-150

FIG. 13

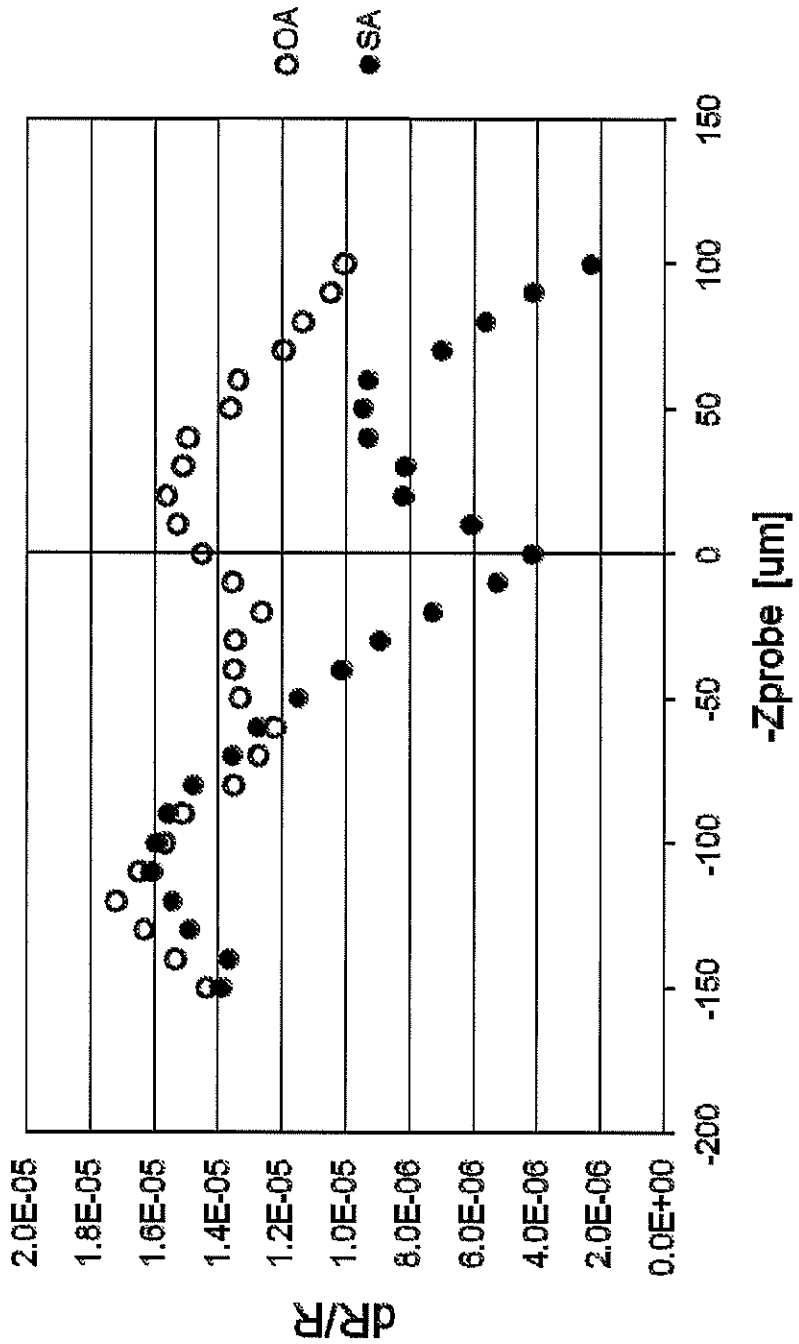
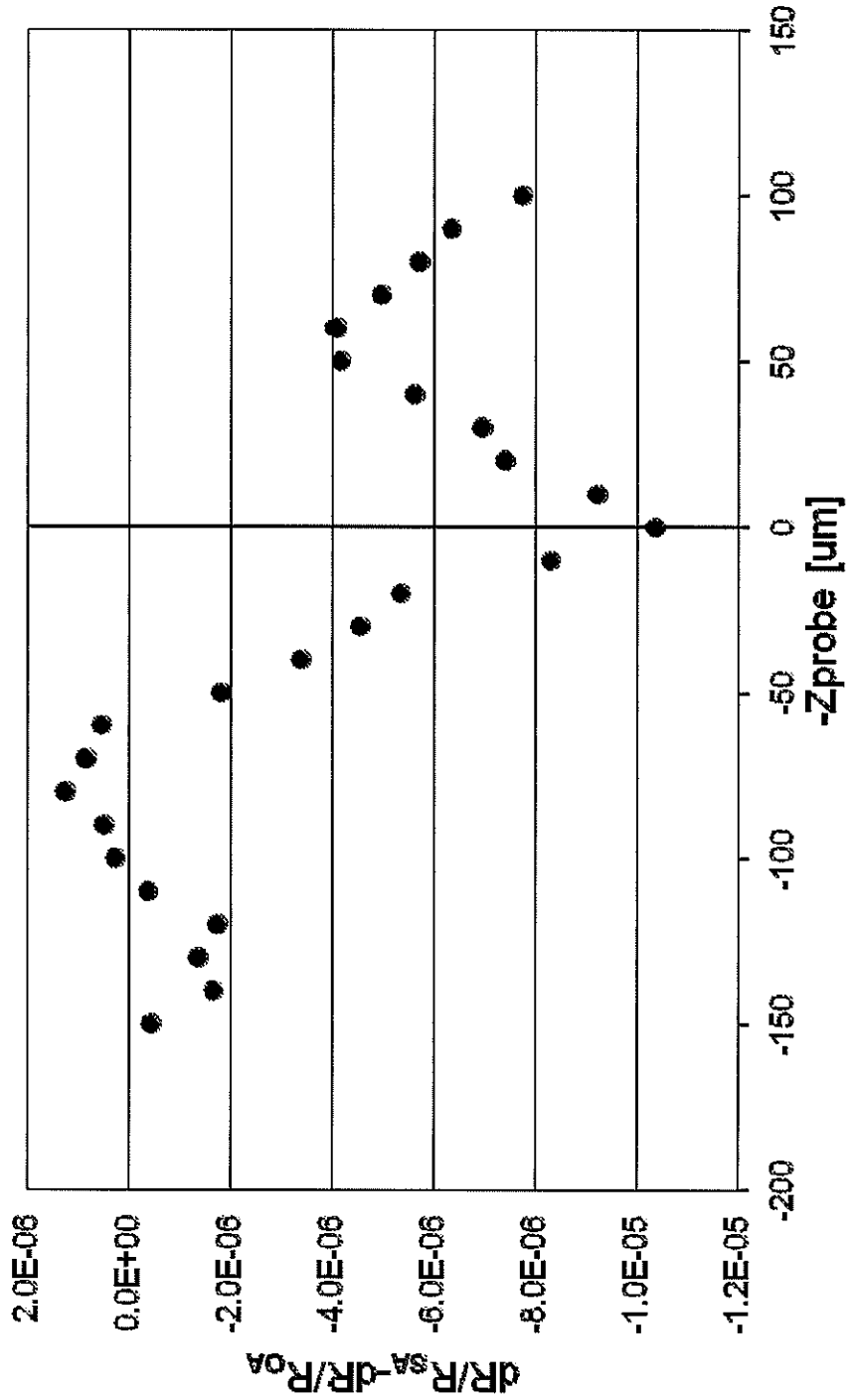

Open Aperture & Small Aperture Z-Scan: n'/n junction
OA
SA
dR/R
2.0E-05
1.8E-05
1.6E-05
1.4E-05
1.2E-05
1.0E-05
8.0E-06
6.0E-06
4.0E-06
2.0E-06
0.0E+00
-200
-150
-100
-50
0
50
100
150
-Zprobe [um]

FIG. 14


Differenced Z-Scan Photo-Reflectance: n'/n junction
dR/R_SA-dR/R_OA
2.0E-06
0.0E+00
-2.0E-06
-4.0E-06
-6.0E-06
-8.0E-06
-1.0E-05
-1.2E-05
-200
-150
-100
-50
0
50
100
150
-Zprobe [um]