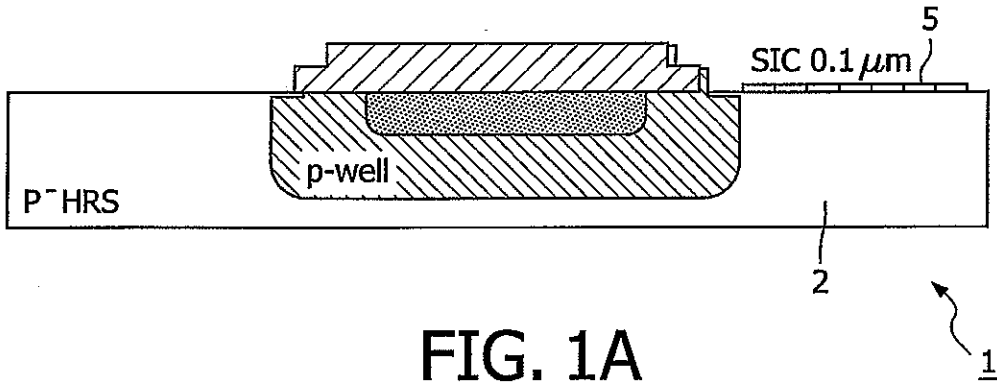

5
SIC 0.1 μm
p-well
P⁻HRS
2
10

FIG. 1A

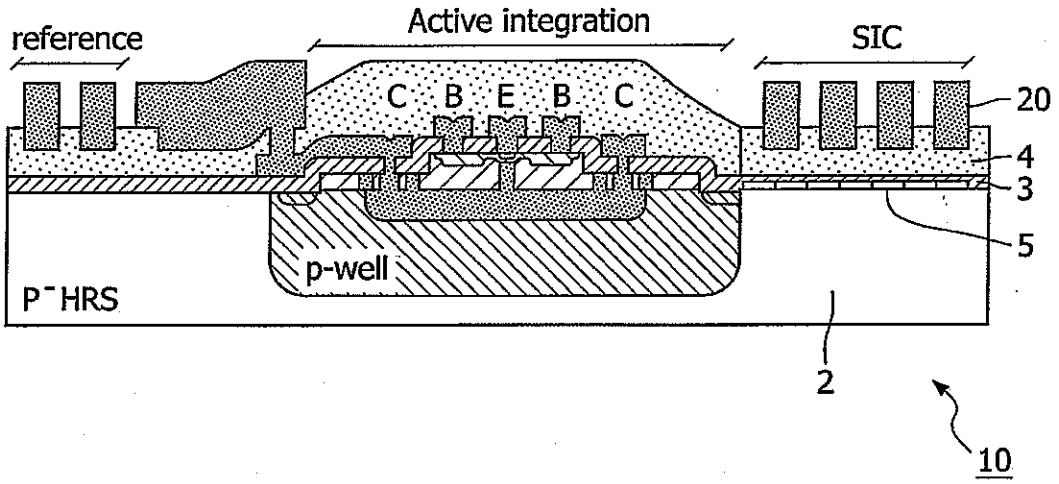

reference
Active integration
SIC
C B E B C
20
4
3
5
p-well
P⁻HRS
2
10

FIG. 1B

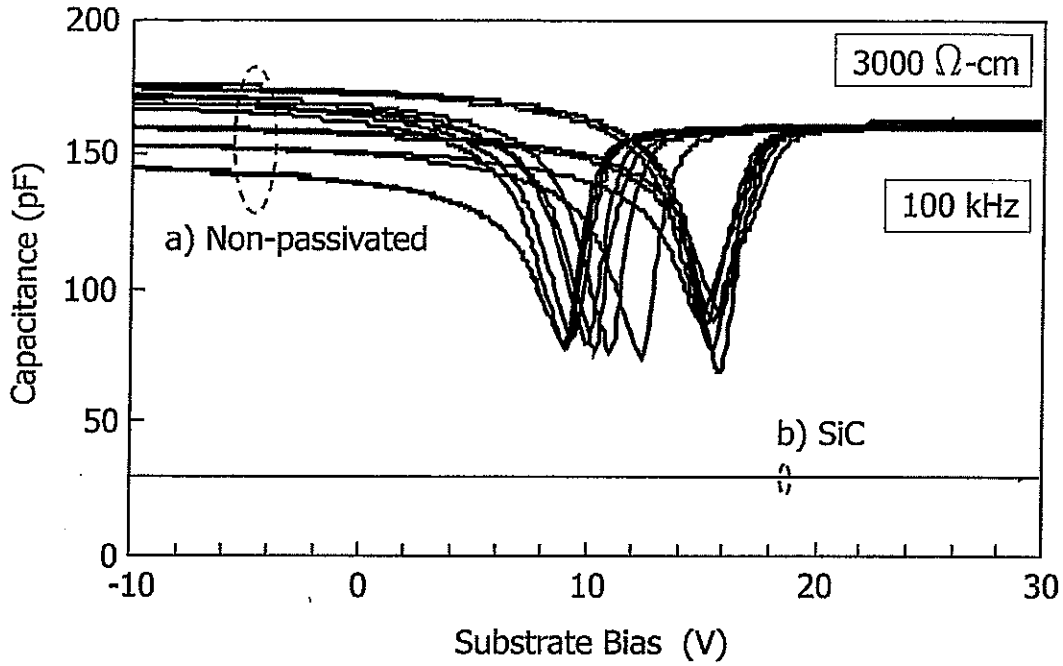

200
150
100
50
0
-10
0
10
20
30
Capacitance (pF)
Substrate Bias (V)
3000 Ω-cm
100 kHz
a) Non-passivated
b) SiC

FIG.2A

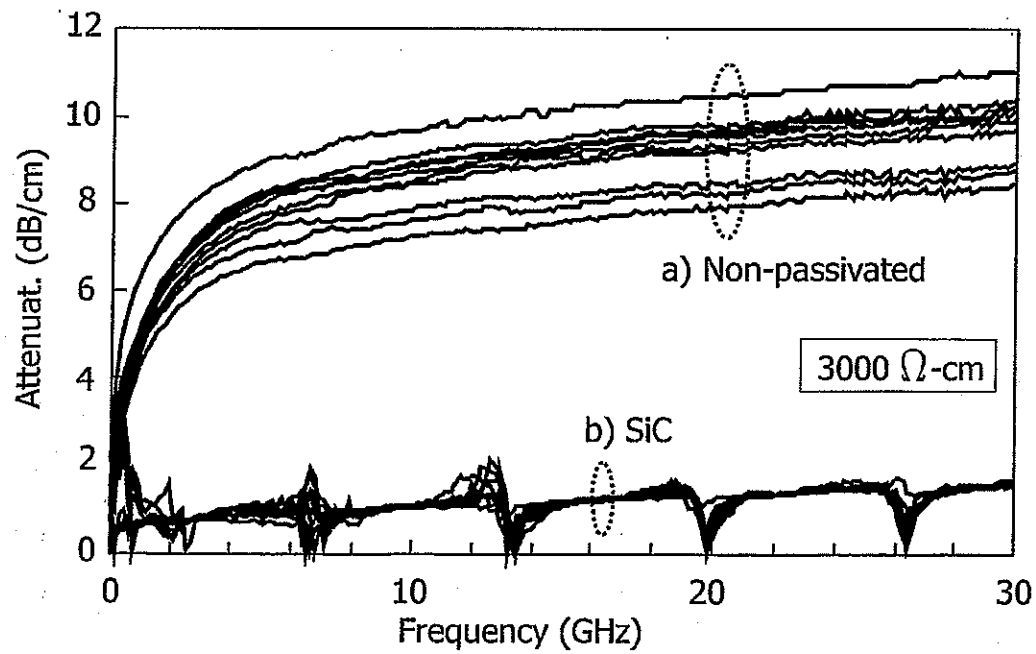

12
10
8
6
4
2
0
0
10
20
30
Attenuat. (dB/cm)
Frequency (GHz)
a) Non-passivated
3000 Ω-cm
b) SiC

FIG.2B

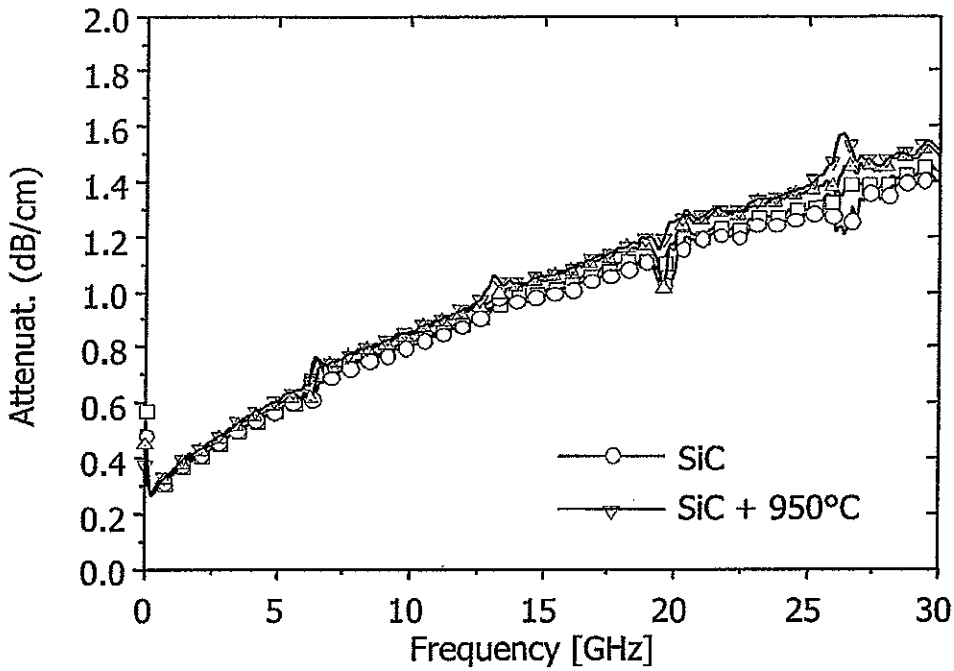

Attenuat. (dB/cm)
Frequency [GHz]
SiC
SiC + 950°C

FIG.3

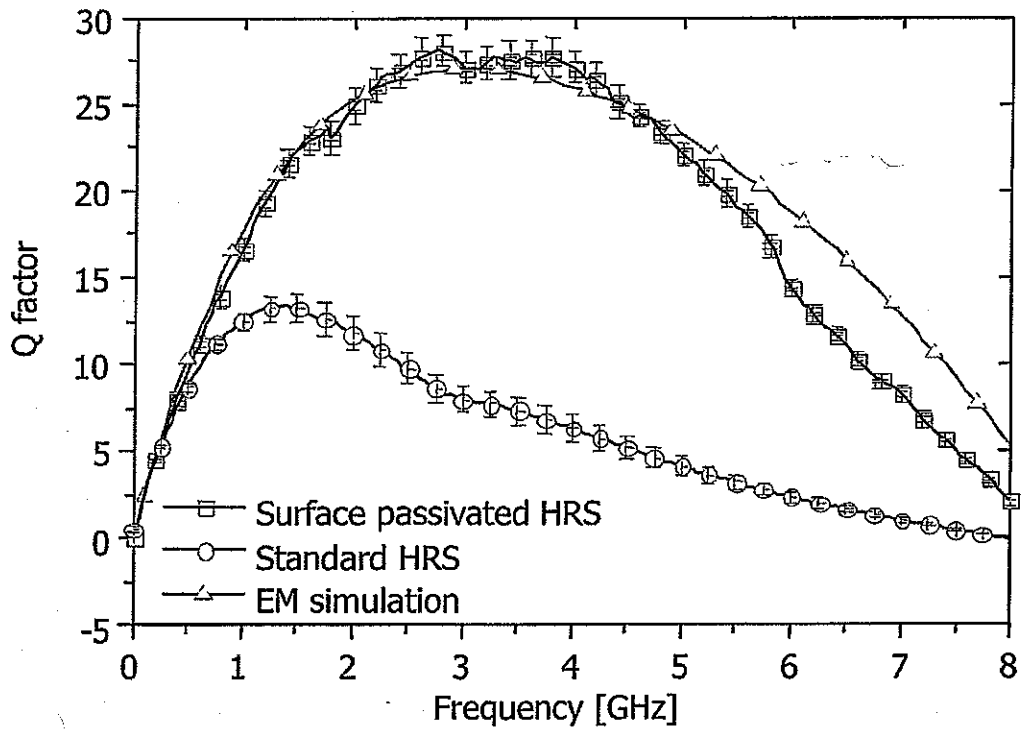

Q factor
Frequency [GHz]
Surface passivated HRS
Standard HRS
EM simulation

FIG.4

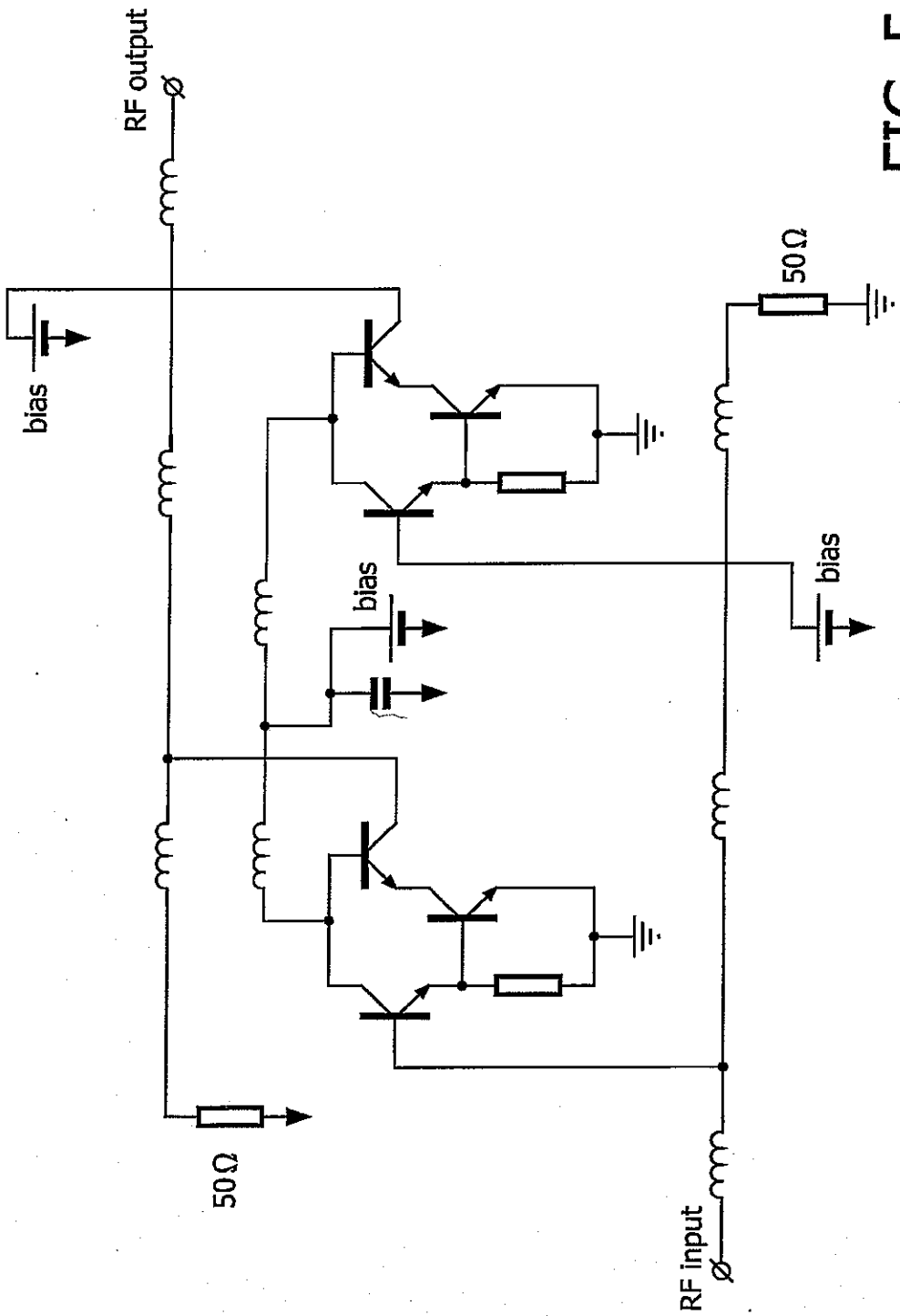


FIG. 5

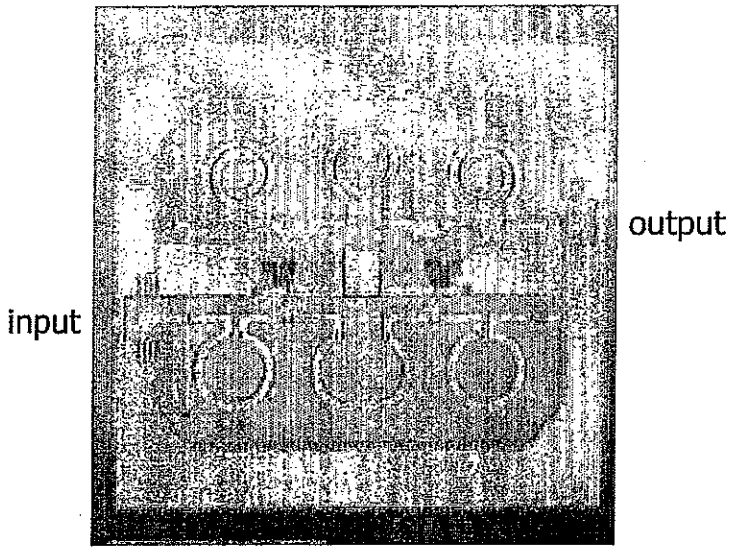

input
output

FIG.6

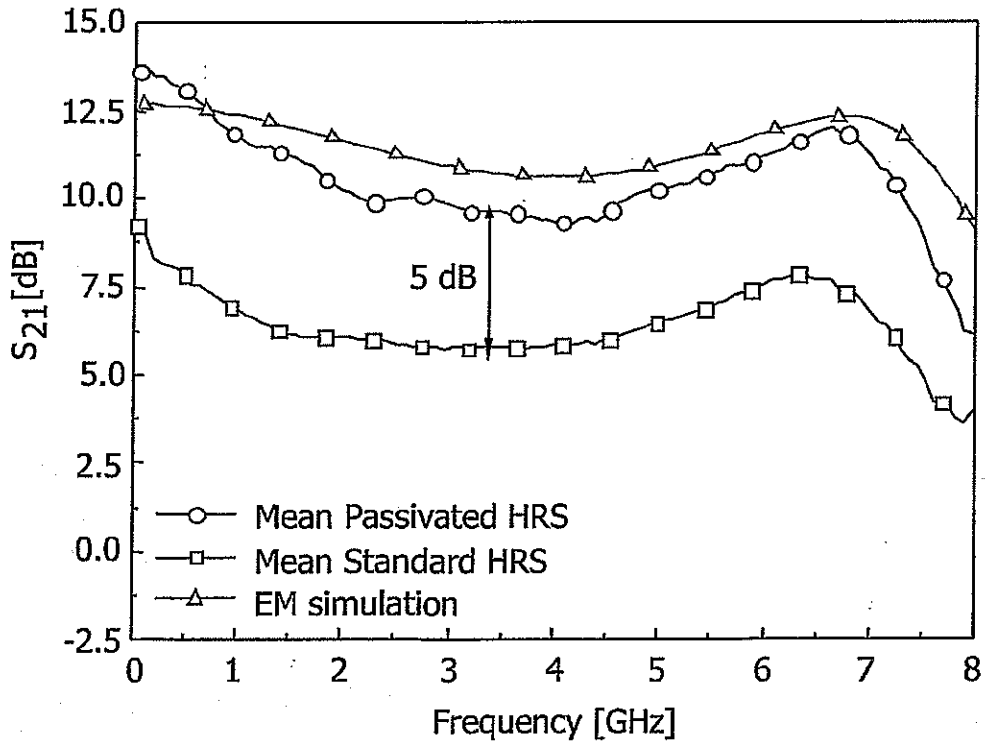

15.0
12.5
10.0
7.5
5.0
2.5
0.0
-2.5
S21[dB]
5 dB
Mean Passivated HRS
Mean Standard HRS
EM simulation
0
1
2
3
4
5
6
7
8
Frequency [GHz]

FIG.7

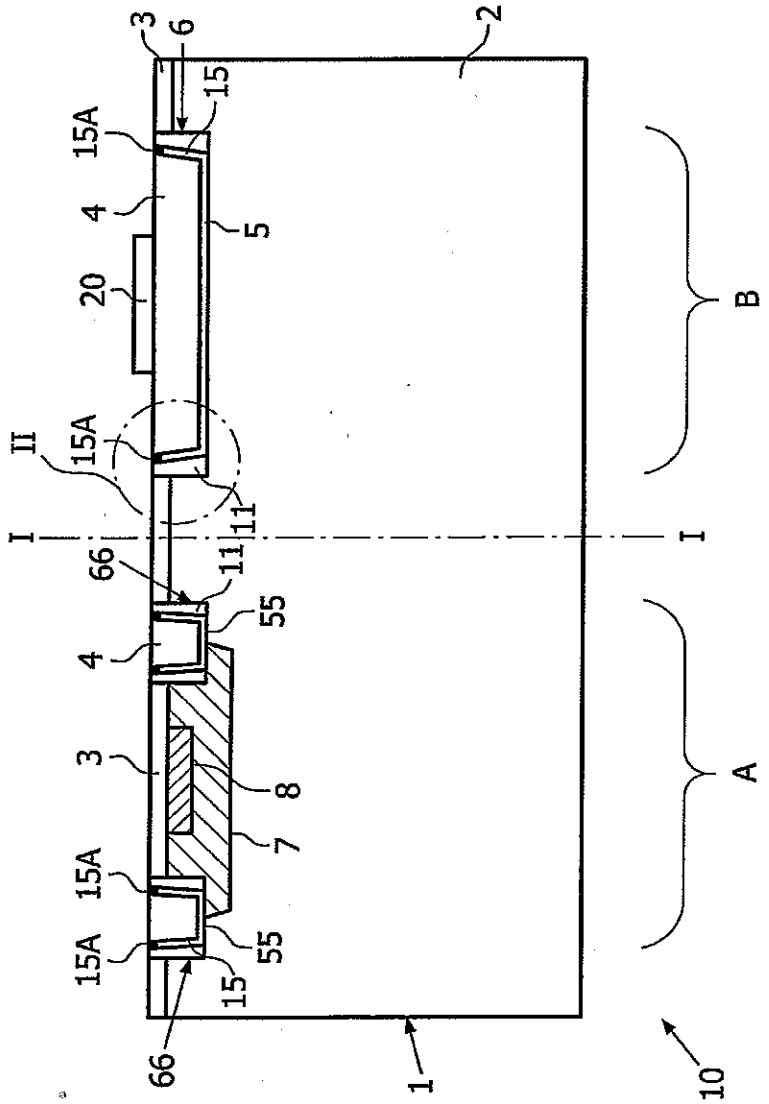


FIG. 8

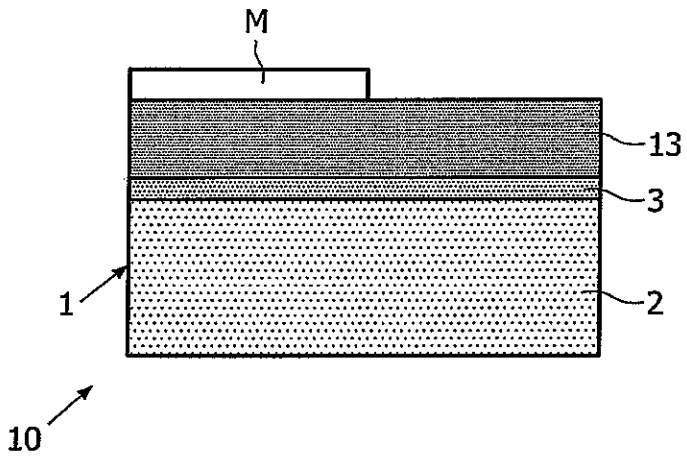


FIG. 9

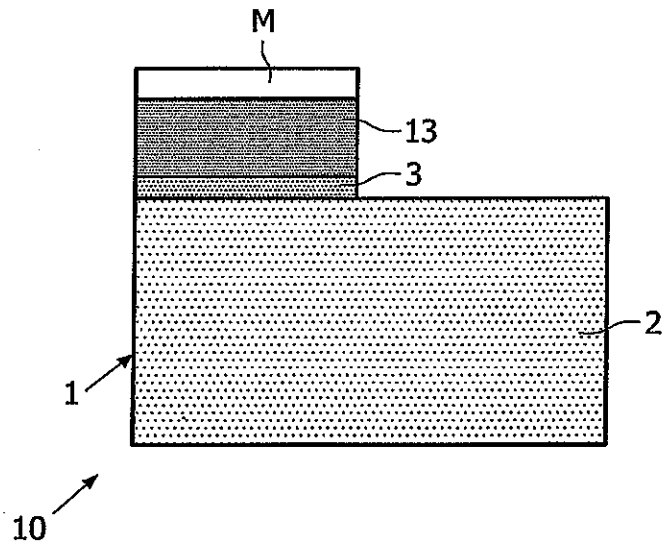


FIG. 10

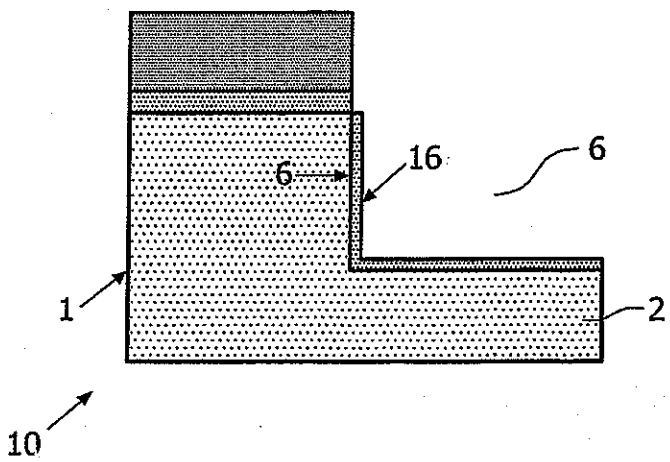


FIG. 11

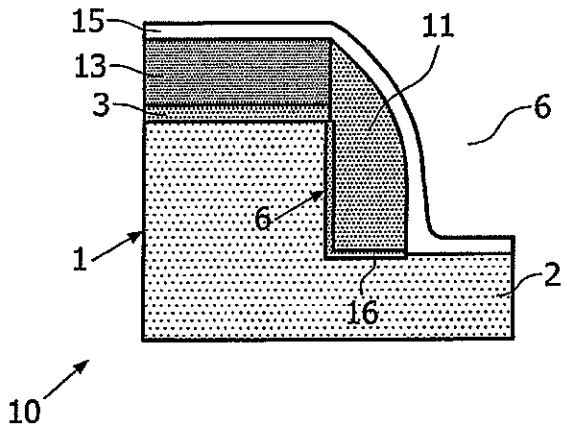


FIG. 12

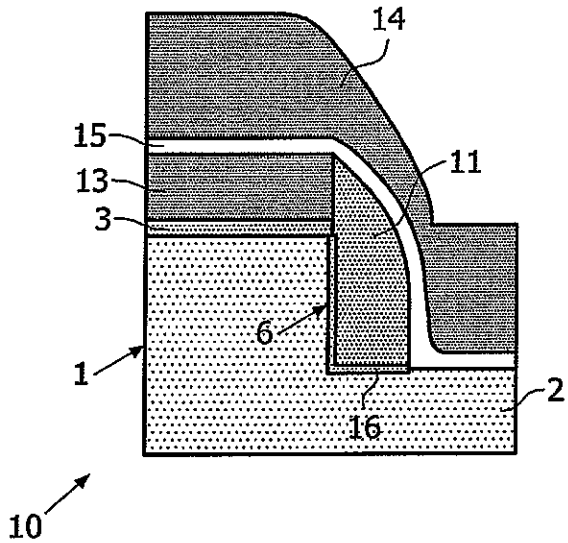


FIG. 13

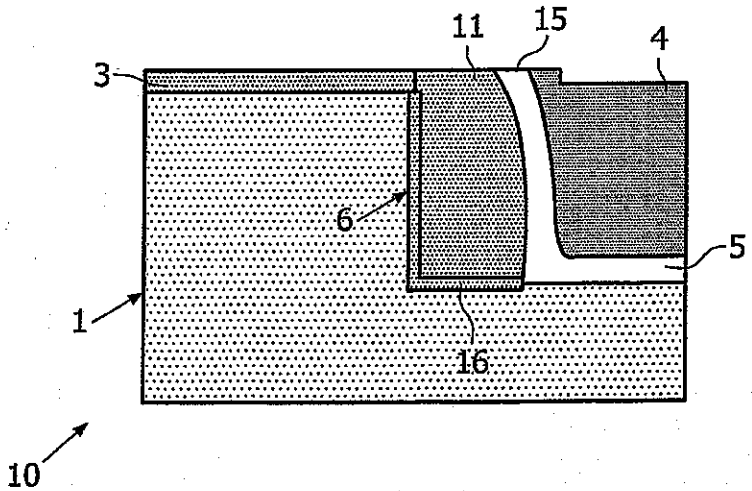


FIG. 14

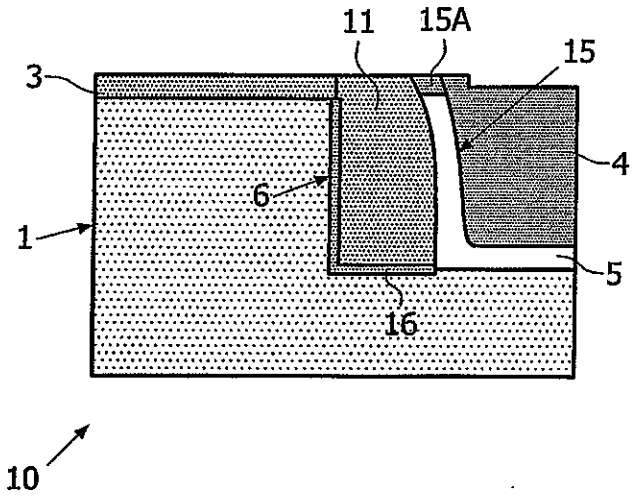

11
15A
15
3
4
6
1
5
16
10

FIG. 15

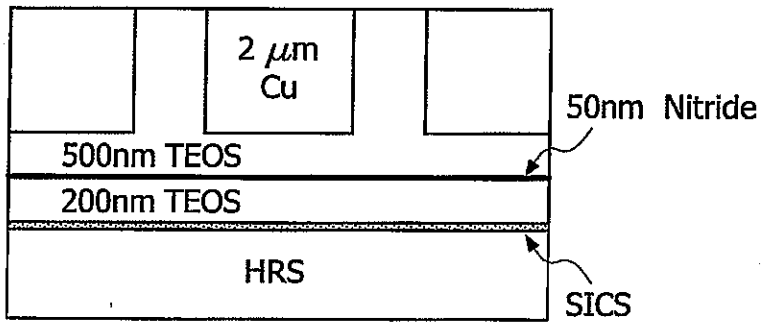

2 μm
Cu
50nm Nitride
500nm TEOS
200nm TEOS
HRS
SICS

FIG. 16

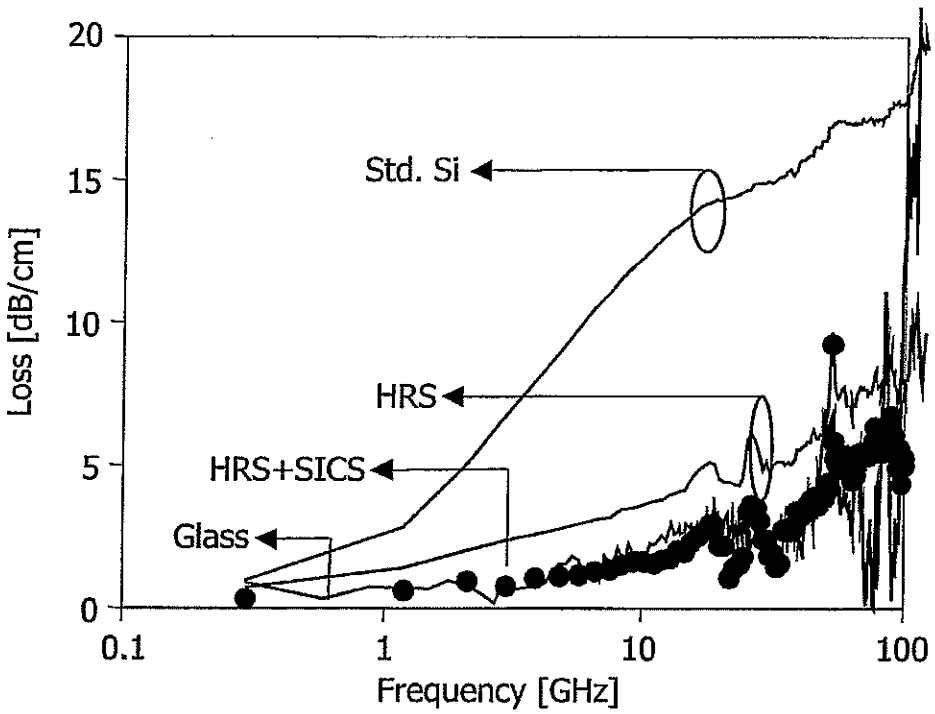

20
15
10
5
0
Loss [dB/cm]
Std. Si
HRS
HRS+SICS
Glass
0.1
1
10
100
Frequency [GHz]

FIG.17

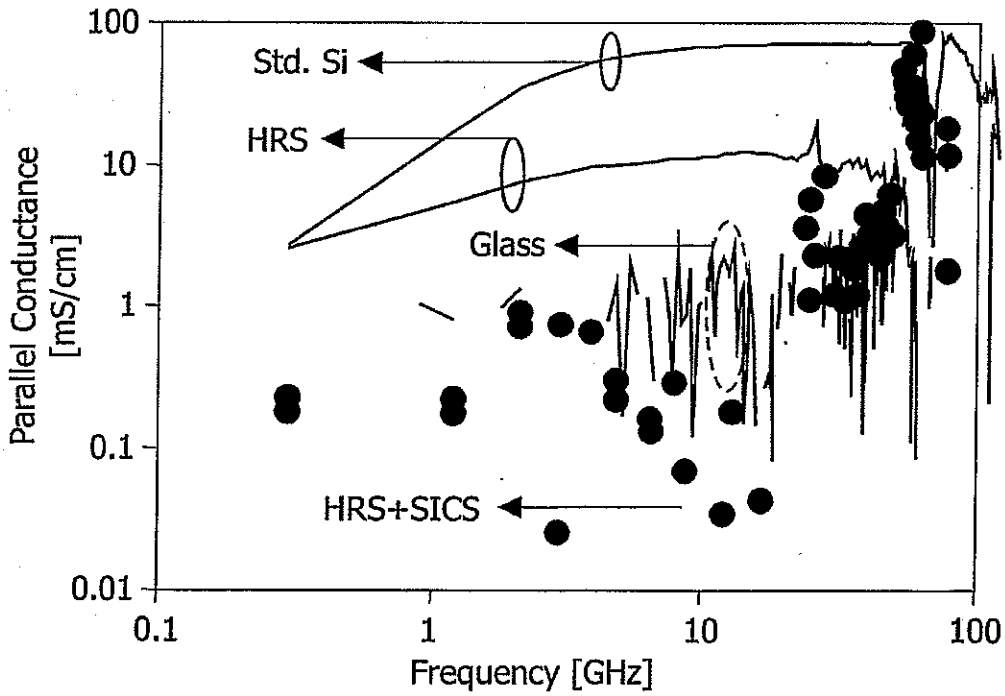

100
10
1
0.1
0.01
Parallel Conductance [mS/cm]
Std. Si
HRS
Glass
HRS+SICS
0.1
1
10
100
Frequency [GHz]

FIG.18

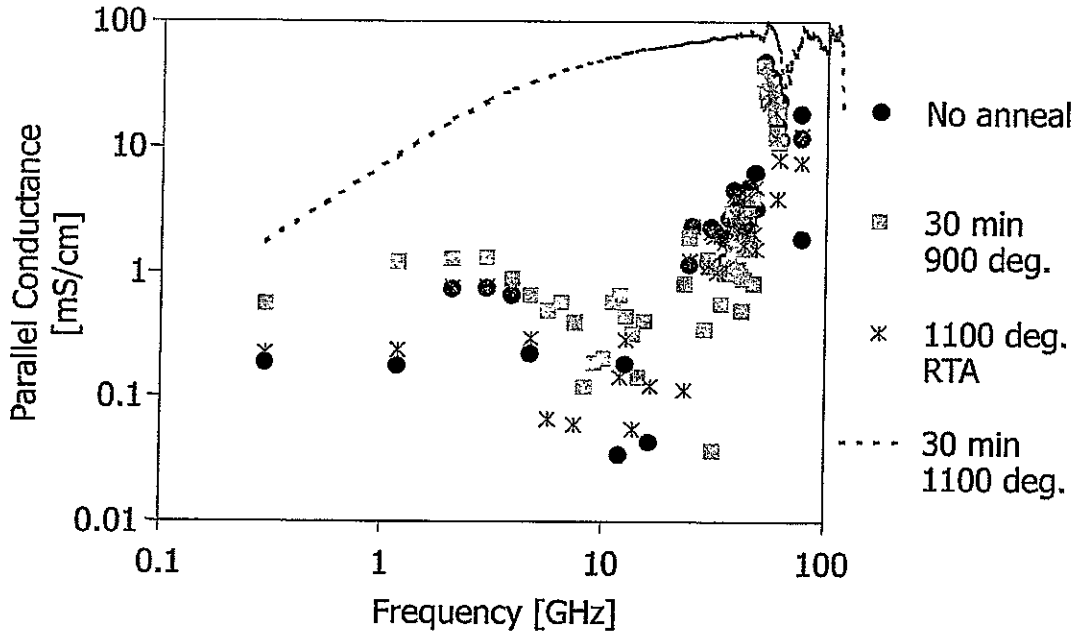

100
10
1
0.1
0.01
0.1
1
10
100
Parallel Conductance [mS/cm]
Frequency [GHz]
No anneal
30 min 900 deg.
1100 deg. RTA
30 min 1100 deg.

FIG.19

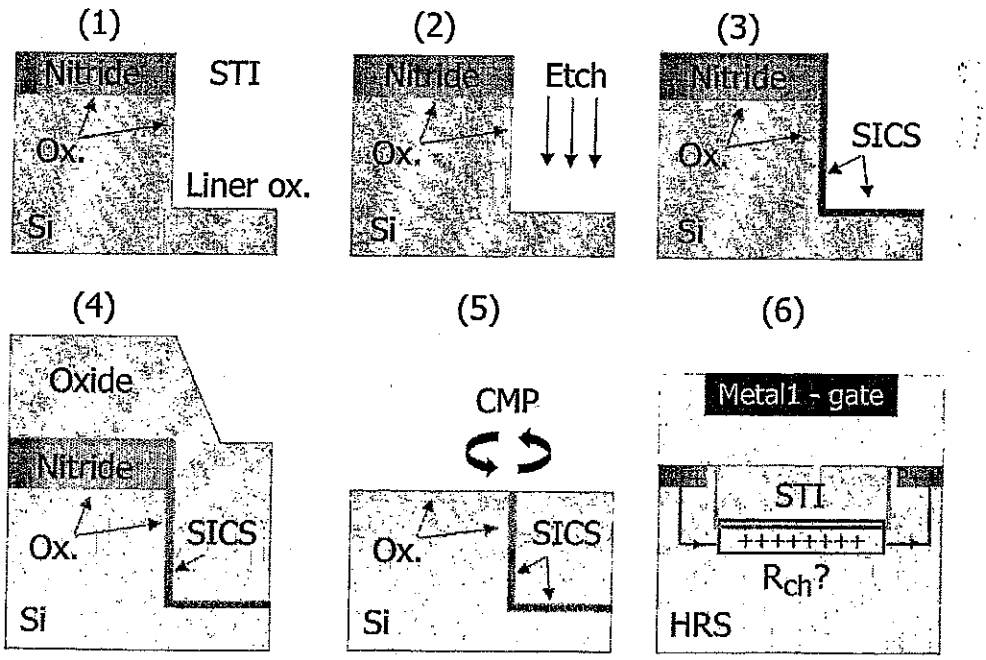

(1)
Nitride
STI
Ox.
Liner ox.
Si
(2)
Nitride
Etch
Ox.
Si
(3)
Nitride
Ox.
SICS
Si
(4)
Oxide
Nitride
Ox.
SICS
Si
(5)
CMP
Ox.
SICS
Si
(6)
Metal1 - gate
STI
Rch?
HRS

FIG.20

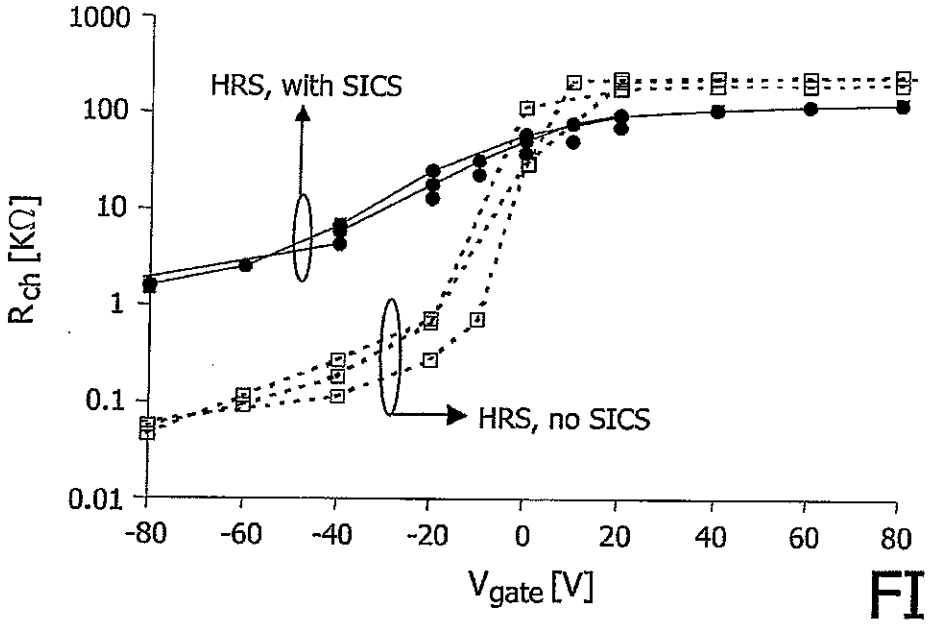


FIG.21

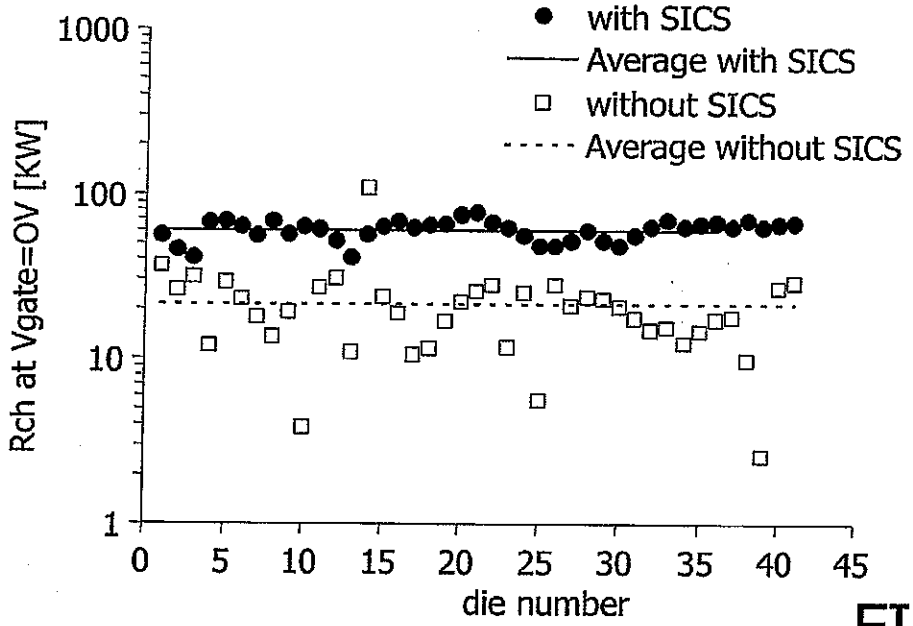


FIG.22

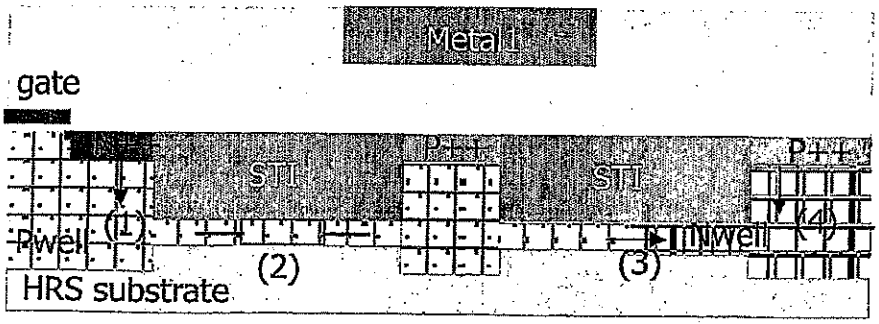


FIG.23

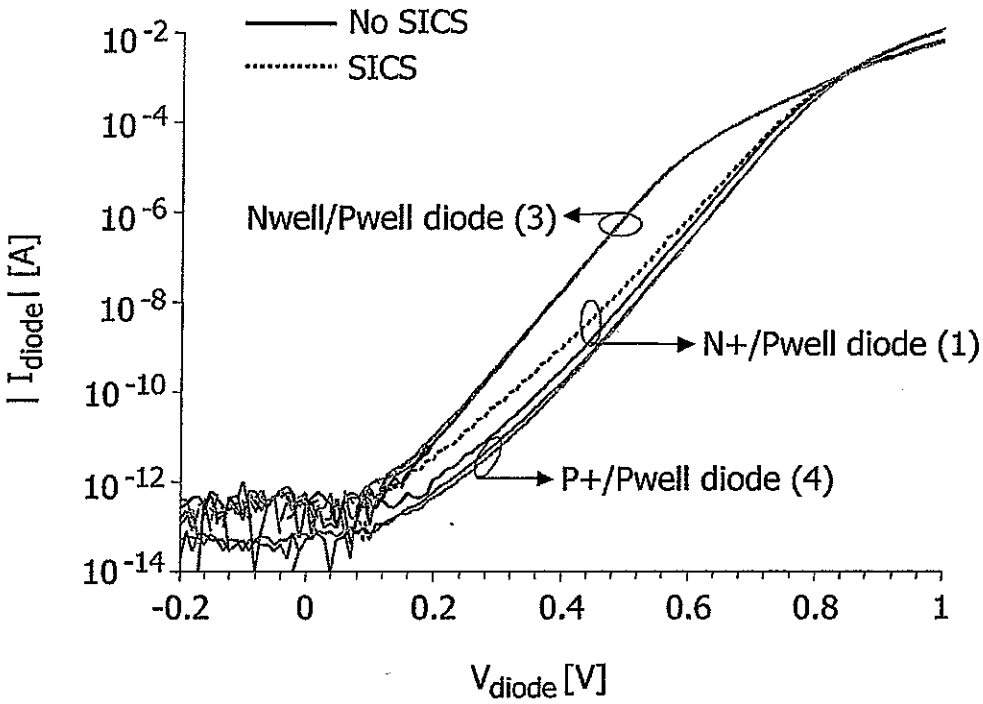

No SICS
SICS
Nwell/Pwell diode (3)
N+/Pwell diode (1)
P+/Pwell diode (4)
10^{-2}
10^{-4}
10^{-6}
10^{-8}
10^{-10}
10^{-12}
10^{-14}
$|I_{diode}|$ [A]
-0.2
0
0.2
0.4
0.6
0.8
1
V_{diode} [V]

FIG.24

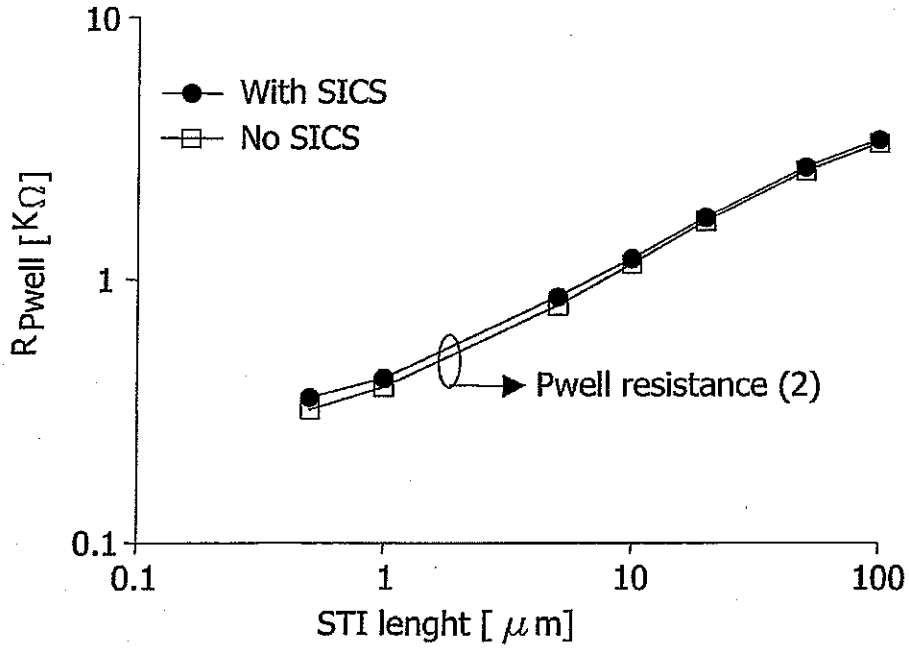

With SICS
No SICS
Pwell resistance (2)
10
1
0.1
R_{Pwell} [$K\Omega$]
0.1
1
10
100
STI lenght [μm]

FIG.25