SiPM model

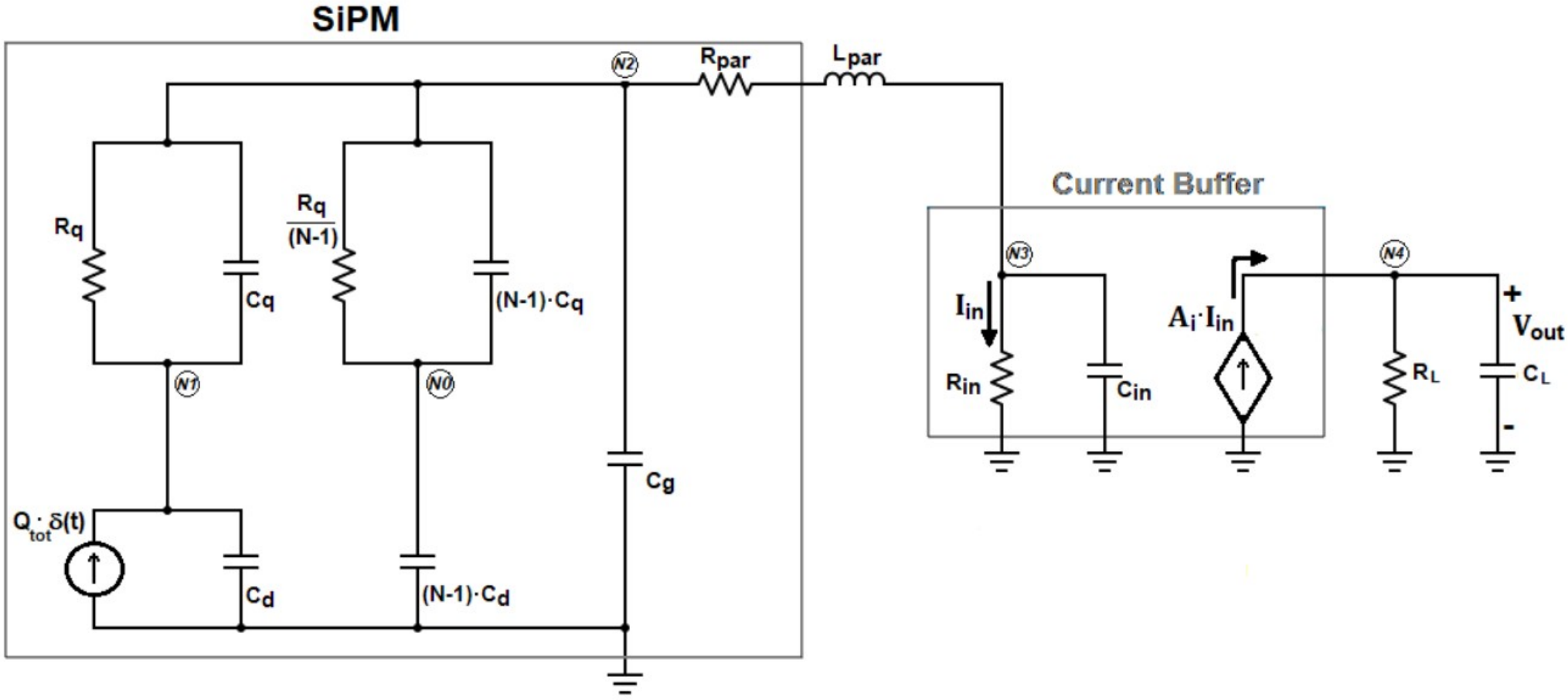


Figure 1. Equivalent electrical model of the silicon photomultiplier (SiPM) coupled to a current-mode front-end.

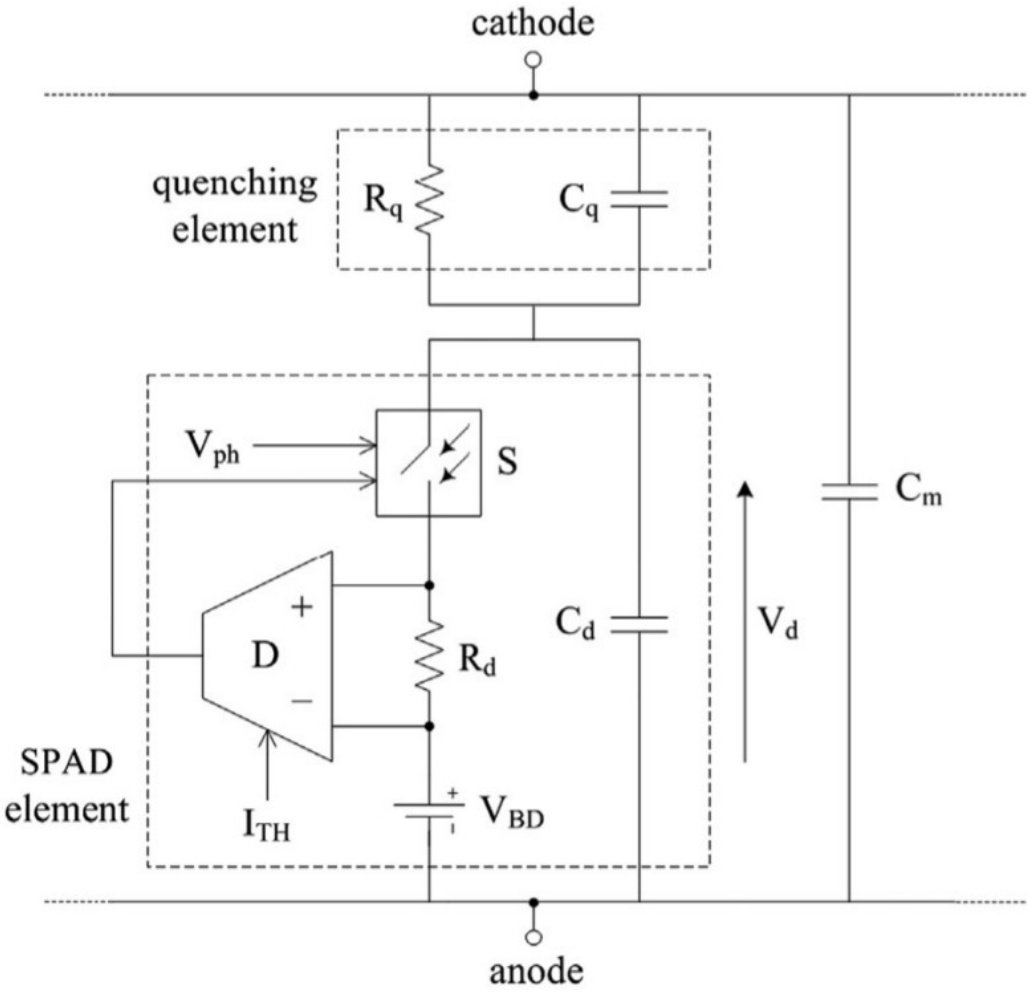
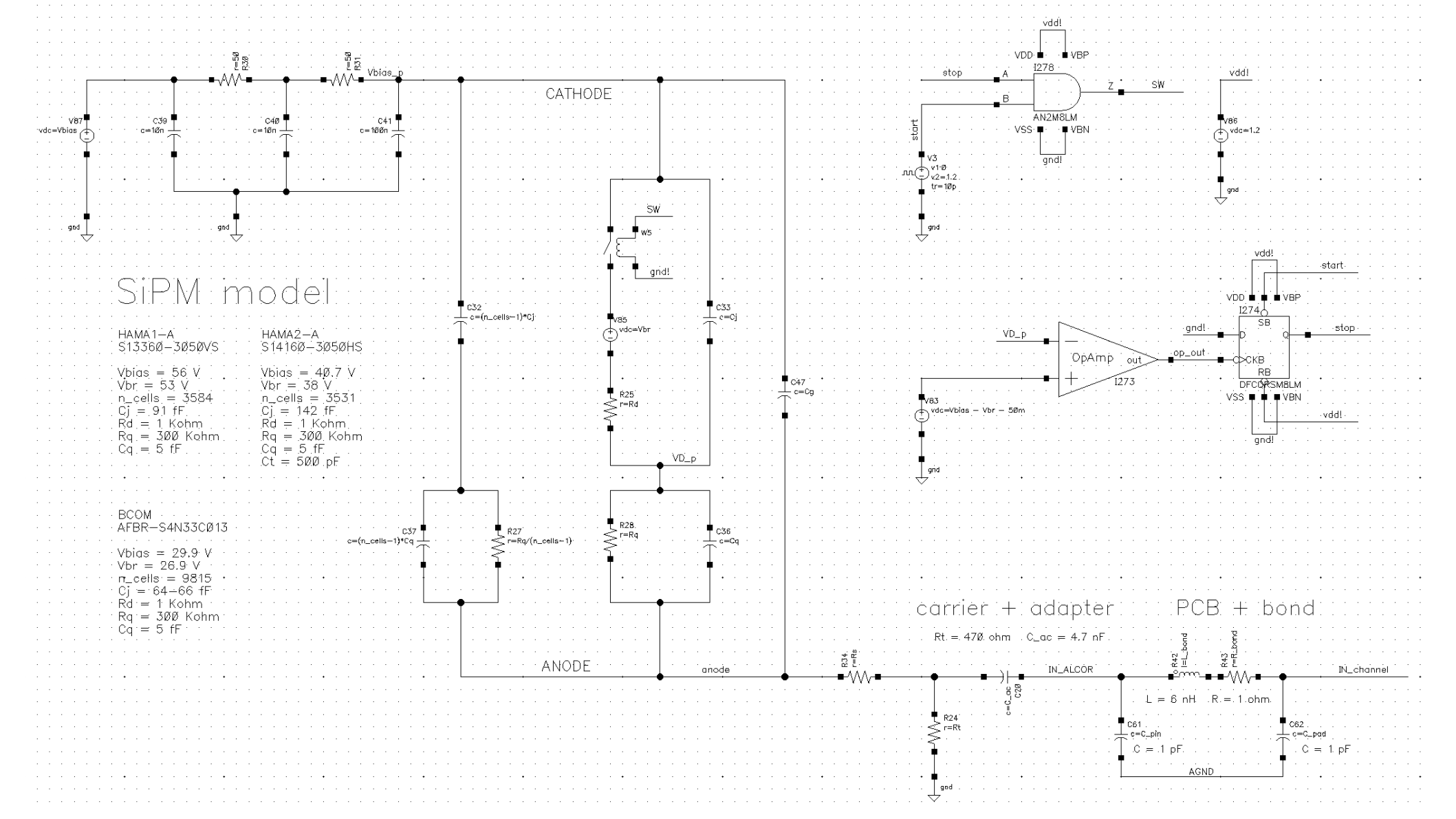


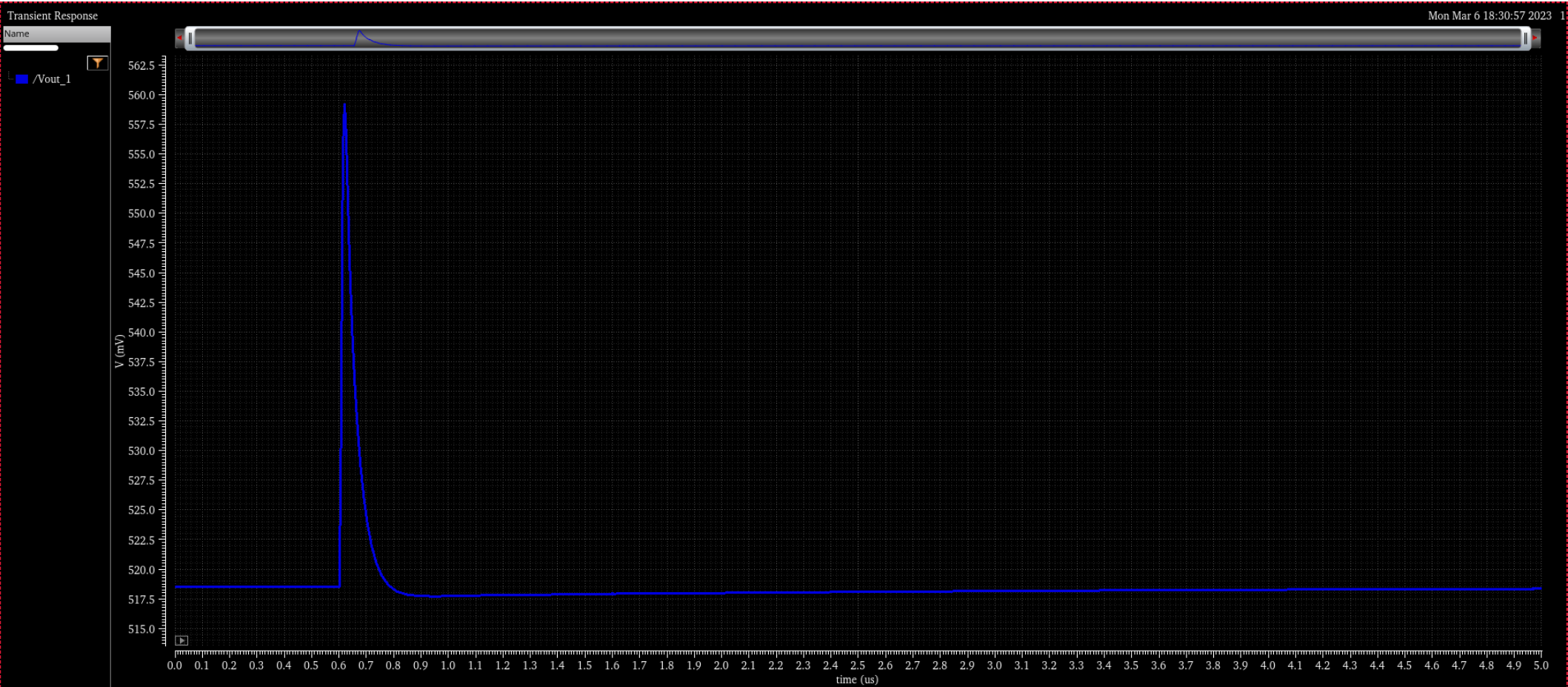
Fig. 3. Simplified block diagram of the improved equivalent electrical model of a single SPAD microcell.


SiPM model
HAMA1–A
S13360–3050VS
Vbias = 56 V
Vbr = 53 V
n_cells = 3584
Cj = 91 fF
Rd = 1 Kohm
Rq = 300 Kohm
Cq = 5 fF
HAMA2–A
S14160–3050HS
Vbias = 40.7 V
Vbr = 38 V
n_cells = 3531
Cj = 142 fF
Rd = 1 Kohm
Rq = 300 Kohm
Cq = 5 fF
Ct = 500 pF
BCOM
AFBR–S4N33C013
Vbias = 29.9 V
Vbr = 26.9 V
n_cells = 9815
Cj = 64–66 fF
Rd = 1 Kohm
Rq = 300 Kohm
Cq = 5 fF
CATHODE
ANODE
V87
vdc=Vbias
C39
c=10n
C40
c=10n
C41
c=100n
R30
r=50
R31
r=50
Vbias_p
gnd
C32
c=(n_cells-1)*Cj
C33
c=Cj
SW
W5
gnd!
V85
vdc=Vbr
R25
r=Rd
VD_p
C47
c=Cg
C37
c=(n_cells-1)*Cq
R27
r=Rq/(n_cells-1)
R28
r=Rq
C36
c=Cq
anode
R34
r=Rs
R24
r=Rt
c=C_ac
C29
IN_ALCOR
R42
r=L_bond
R43
r=R_bond
IN_channel
L = 6 nH
R = 1 ohm
C61
c=C_pin
C = 1 pF
C62
c=C_pad
C = 1 pF
AGND
carrier + adapter
PCB + bond
Rt = 470 ohm
C_ac = 4.7 nF
vdd!
VDD
VBP
I278
stop
A
B
AN2M8LM
Z
SW
VSS
VBN
start
V3
v1=0
v2=1.2
tr=10p
V86
vdc=1.2
VD_p
OpAmp
out
I273
op_out
V83
vdc=Vbias - Vbr - 50m
I274
SB
D
Q
CKB
RB
DFCQRSM8LM

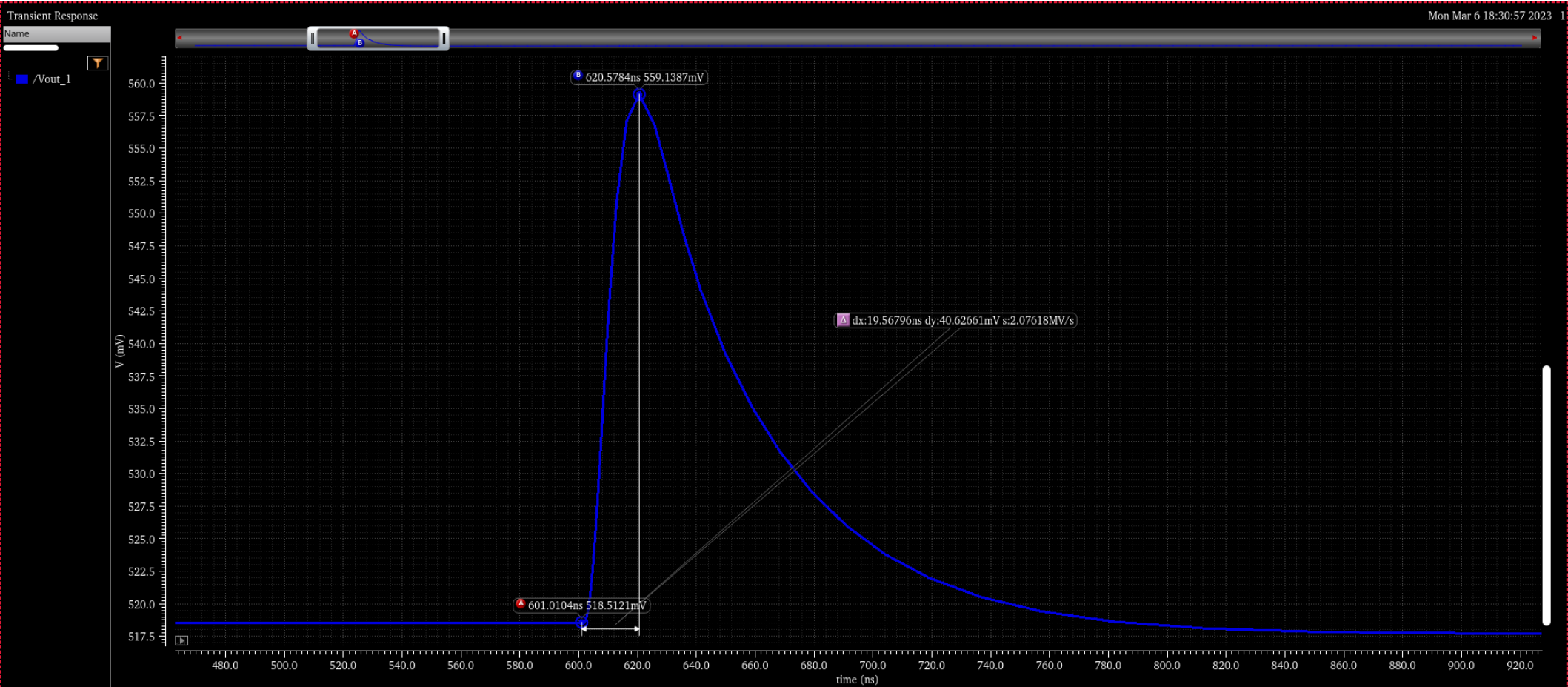
Vbias = 4V, Vbr = 1V, OV = 3V

ALCOR v1 sim

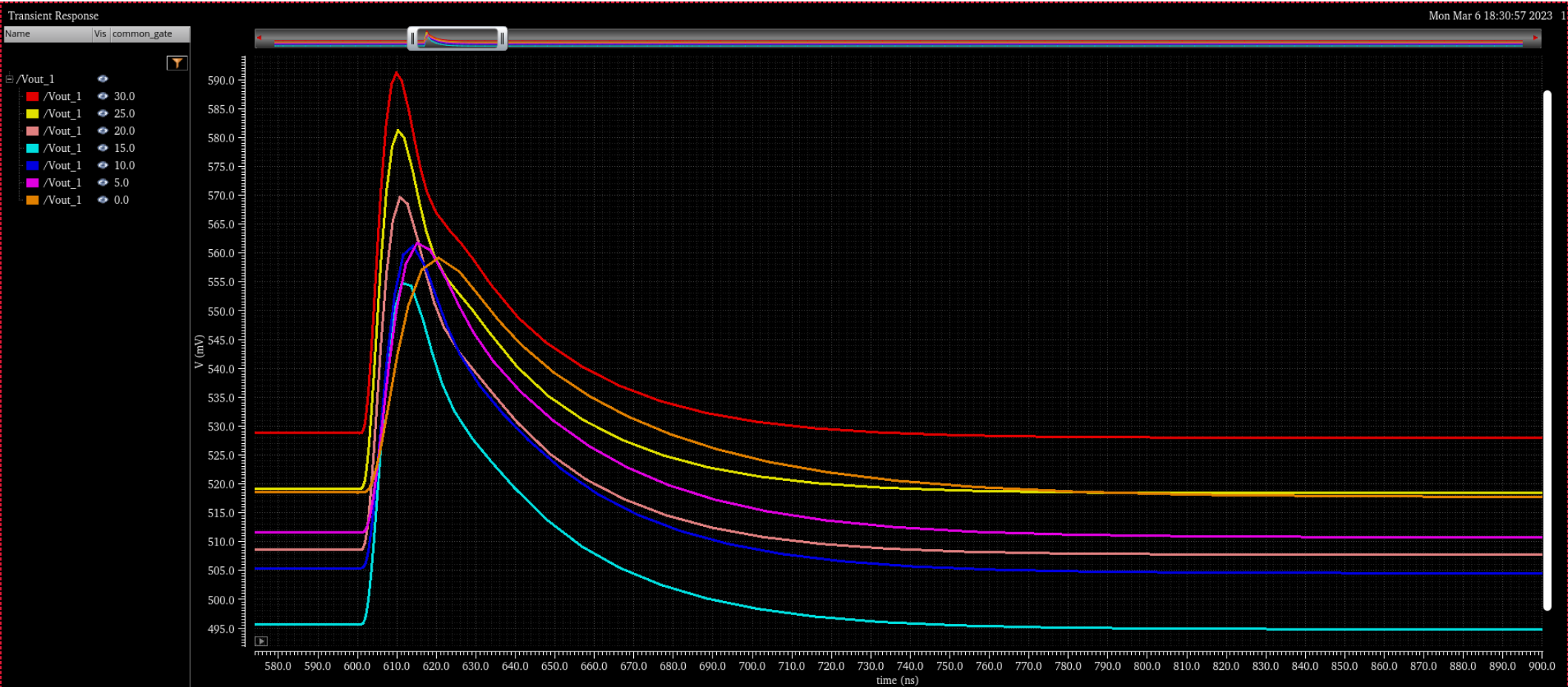
Common gate = 0, boost = 0



Common gate = 0, boost = 0



Common gate scan (0-30)



Common gate scan (0-30)