AMLCD TFT Pixel Parasitic RC Extraction

Clever Full Descriptions TFT Pixel Simulation
The original GDS2 layout is loaded into MaskViews and single pixel is selected for 3D simulation.

For multiple pixels user can select critical nets or reduced pixels for 3D simulation.

In TFT-LCD application single pixel is sufficient for pixel simulation.
• Extracted Active TFT device and Back-annotated layout
• The 3D structure is built using process simulation
• The structure is then field solved inside the conductors for resistance extraction and within insulators for capacitance extraction
• All parasitics are then automatically back annotated onto the original extracted SPICE netlist
• Easy-to-Use Interface for running process simulation and parasitic extraction
• Final netlist is sorted and reported
go Clever

# glass substrate - 1um thick

init layout="gentft.lay" depth=5 oxide
#Netbuild Map="gentft.map"
#Save Layout="gettft_1.lay" Spice="gentft.net"

# Cr gate
deposit uniform material("Chromium") thickness=0.8
deposit resist thickness=0.3

mask "SCAN"
etch material("Chromium")
strip resist
electrodes "SCAN" material("Chromium")

deposit uniform nitride thickness=0.3

# a-Si layer
deposit uniform silicon thick=0.6
deposit resist thickness=0.3

mask "AA"
etch silicon
strip resist

# source-drain
# Cr source/drain metal line
deposit uniform aluminum thickness=0.8
deposit resist thickness=0.3
mask "DATA"
etch aluminum
etch silicon thick=0.2
strip resist
electrodes "DATA" aluminum

# contact cut for connection to ITO
deposit uniform nitride thick=0.6
deposit resist thick=0.3

mask "CONT" reverse
etch nitride
strip resist

# ITO layer
deposit uniform material("ITO") thick=0.6
deposit resist thick=0.3

mask "ITO"
etch material("ITO")
strip resist
electrodes "ITO" material("ITO")

# liquid crystal layer
deposit uniform material("LiquidCrystal") thickness=1

# ITO layer
#deposit aluminum thick=0.8

# set parameters
save structure="gentft.str"
material material("Chromium") conductivity=47619.05
material material("LiquidCrystal") perm=8.5
#material material("LiquidCrystal") perm=3.27
material material("ITO") conductivity=4550
material aluminum conductivity=74074.07
#
interconnect capacitance adapt=0.05

#
save structure="gentft_pixel.str" \
    layout="gentft_pixel_odin.lay" \
    spice="gentft_pixel.spice"
quit
; Define regions
And SCAN AA GATE
And SCAN CONT CITO
And DATA CONT SCNT

; Define device name, gate, source/drain, substrate and connection
ELEMENT MOS[nTFT] GATE DATA “” SCNT

; Export new masks
Export GATE
Export CITO
Export SD
Export SCNT

; Define connectivity
Connect CITO ITO
Connect SCNT ITO
M1 int1 int2 int0  nTFT w=49u l=38.5714u As=1274p Ad=2439p Ps=150u Pd=610u Nrs=0 Nrd=0 geo=0

C1  substrate gate  7.0546831e-14
C2  substrate source  1.8129127e-14
C3  substrate data  2.0716453e-14
C4  substrate drain  1.4305911e-13
C5  gate source  1.1740464e-13
C6  gate data  4.771088e-14
C7  gate drain  4.652125e-13
C8  source drain  4.5148594e-15
C9  data drain  8.3458712e-15

After pixel netlist extraction, TFT-LCD charging and holding simulation can be directly done with SmartSpice and see the effects of parasitic RC delay