



Security B –
TSMC restricted

N3 Standard Filter Cells LVS Implementation

LVSRCCE/TSMC

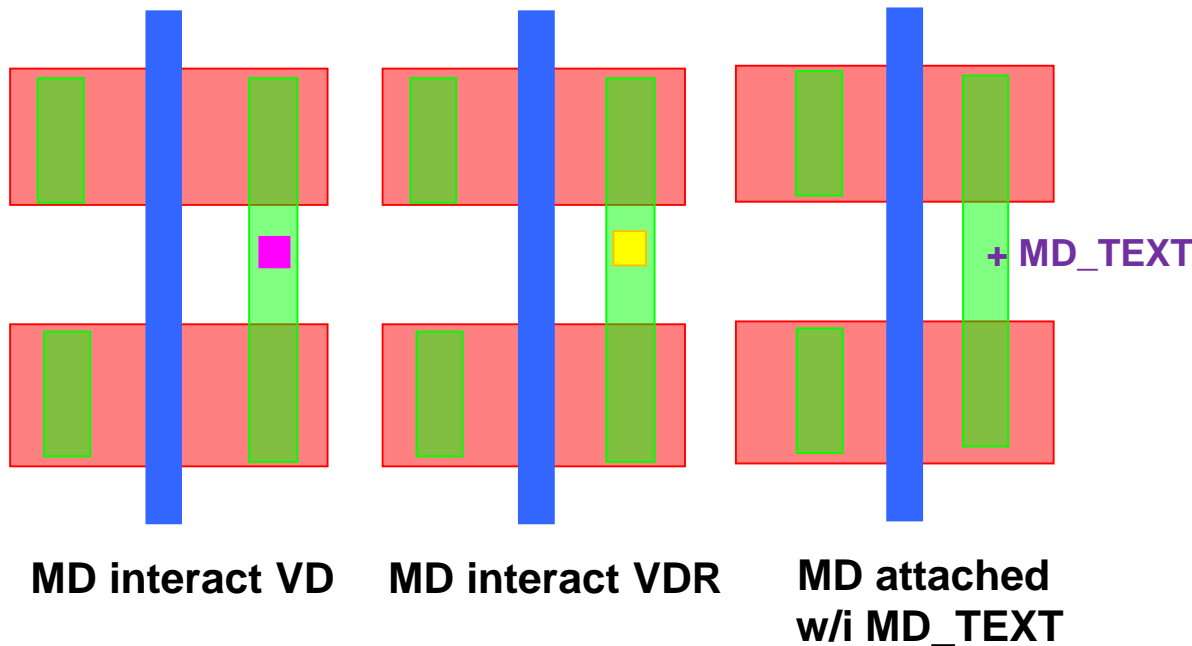
Sep. 4, 2020

Standard Filter Cell Conditions

Valid OD have 3 conditions

- ❖ 1st : When OD INTERACT { **MD INTERACT VD** }
- ❖ 2nd : When OD INTERACT { **MD INTERACT VD2** }
- ❖ 3th: When OD INTERACT { **MD INTERACT MD_TEXT** }
- ❖ Note: MD = MDi NOT CMDi

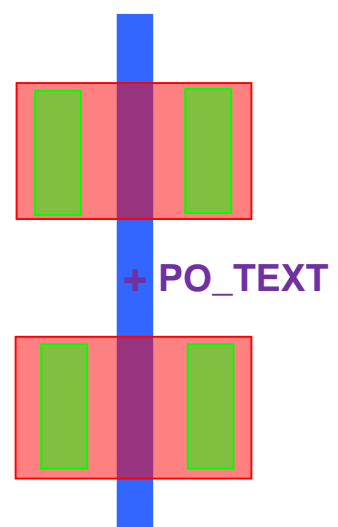
Layer	Number
MD	82;150
CMD	82;250
VG	178;150
VD	179;150
VD2	179;151
MD_TEXT	202;82



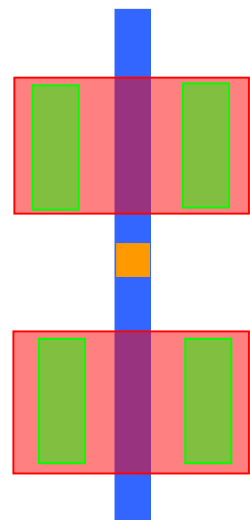
Standard Filter Cell Conditions(II)

- ❑ 4th condition is relative to poly
 - ❖ When OD INTERACT Valid_POLY
- ❑ Valid POLY conditions:
 - ❖ 1st: When POLY INTERACT POLY_TEXT
 - ❖ 2nd: When POLY INTERACT VG

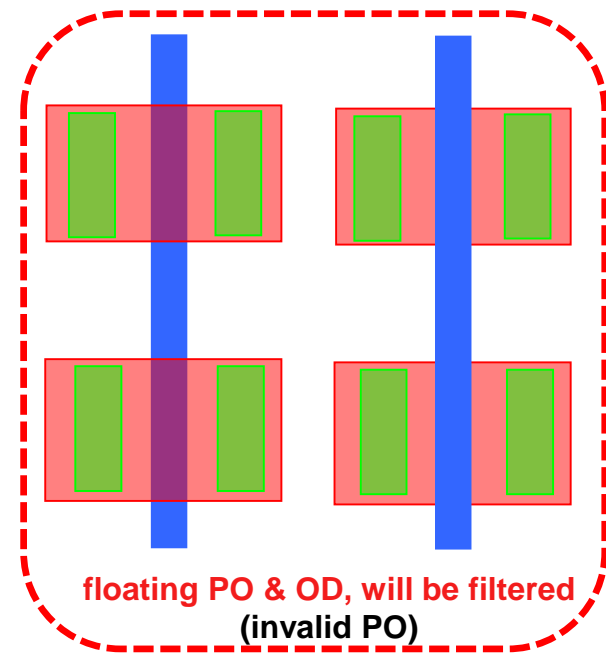
Layer	Number
VG	178;150
PO_TEXT	202;17



PO interact Text
OD interact Valid_PO



PO interact VG
OD interact VG



floating PO & OD, will be filtered
(invalid PO)

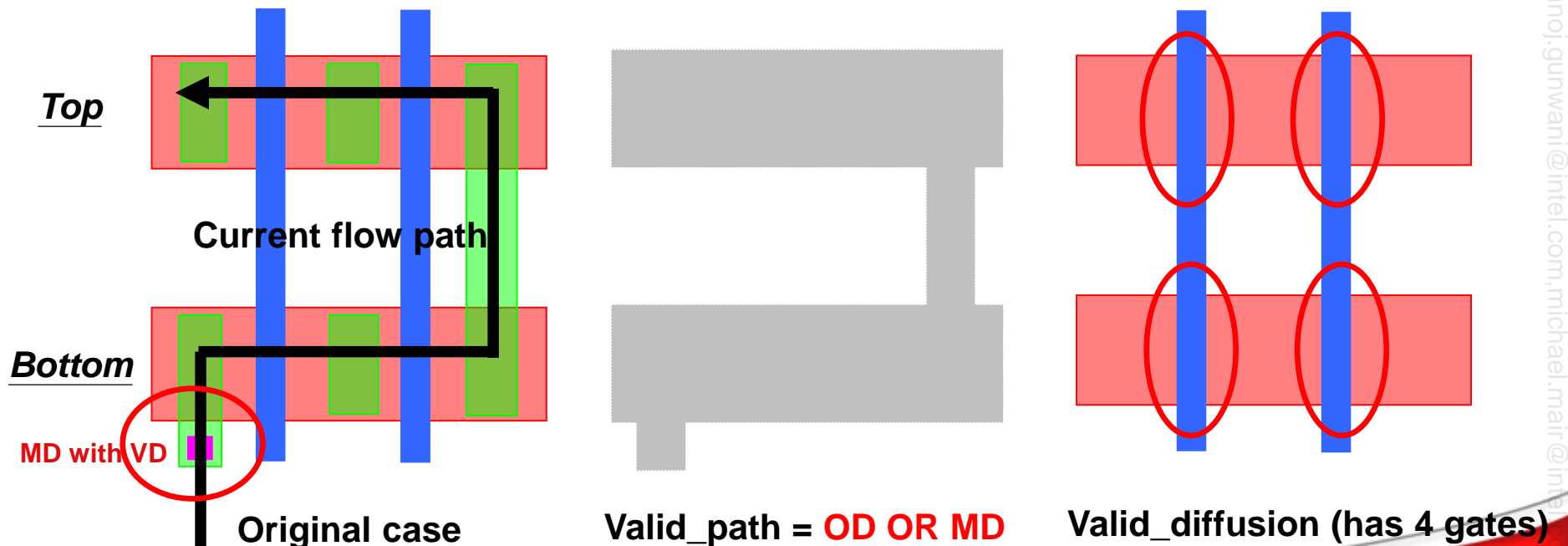
- VG
- OD
- POLY
- MD
- + PO_TEXT

LVS Filter Implementation

- ❑ Collect all OD || MD regions first, then choose ones which satisfy 4 conditions:
 - ❖ OD_a = OD INTERACT MDi
 - ❖ Cond1 = MD INTERACT VD
 - ❖ Cond2 = MD INTERACT VD2
 - ❖ Cond3 = MD WITH TEXT “?” MD_text
- ❑ Define valid path for these 3 conditions
 - ❖ Valid_path = (OD_a OR MD) INTERACT (Cond1 OR Cond2 or Cond3)
- ❑ Choose diffusion polygons in valid_path
 - ❖ Diffusion1 = OD AND Valid_path
- ❑ Choose OD with 5th condition:
 - ❖ Cond5 = OD INTERACT valid_PO
 - ❖ Valid_PO1 = PO WITH TEXT “?” poly_text
 - ❖ Valid_PO2 = PO INTERACT VG
 - ❖ Diffusion2 = (OD NOT Diffusion1) INTERACT (Valid_PO1 OR Valid_PO2)
- ❑ Final valid diffusion polygons with consideration for both OD and PO
 - ❖ Diffusion = Diffusion1 OR Diffusion2

Example 1

- ❑ Extract devices which in valid path
 - ❖ Bottom OD would be valid OD (MD interact VD)
 - ❖ Top OD connect with Bottom OD by MD
 - ❖ Whole { OD + MD } path is valid
 - ❖ LVS will treat “Top” and “Bottom” OD as valid ODs



Example 2

- ❑ Extract devices which in valid path
 - ❖ Top OD would be valid OD (OD interact valid_PO)
 - ❖ Bottom OD connect with Top OD by MD
 - ❖ Only Top OD is valid, Bottom OD/PO would be filtered and extract no devices

