

N3 PODE & CPODE

PDKD/TSMC

July 31, 2019



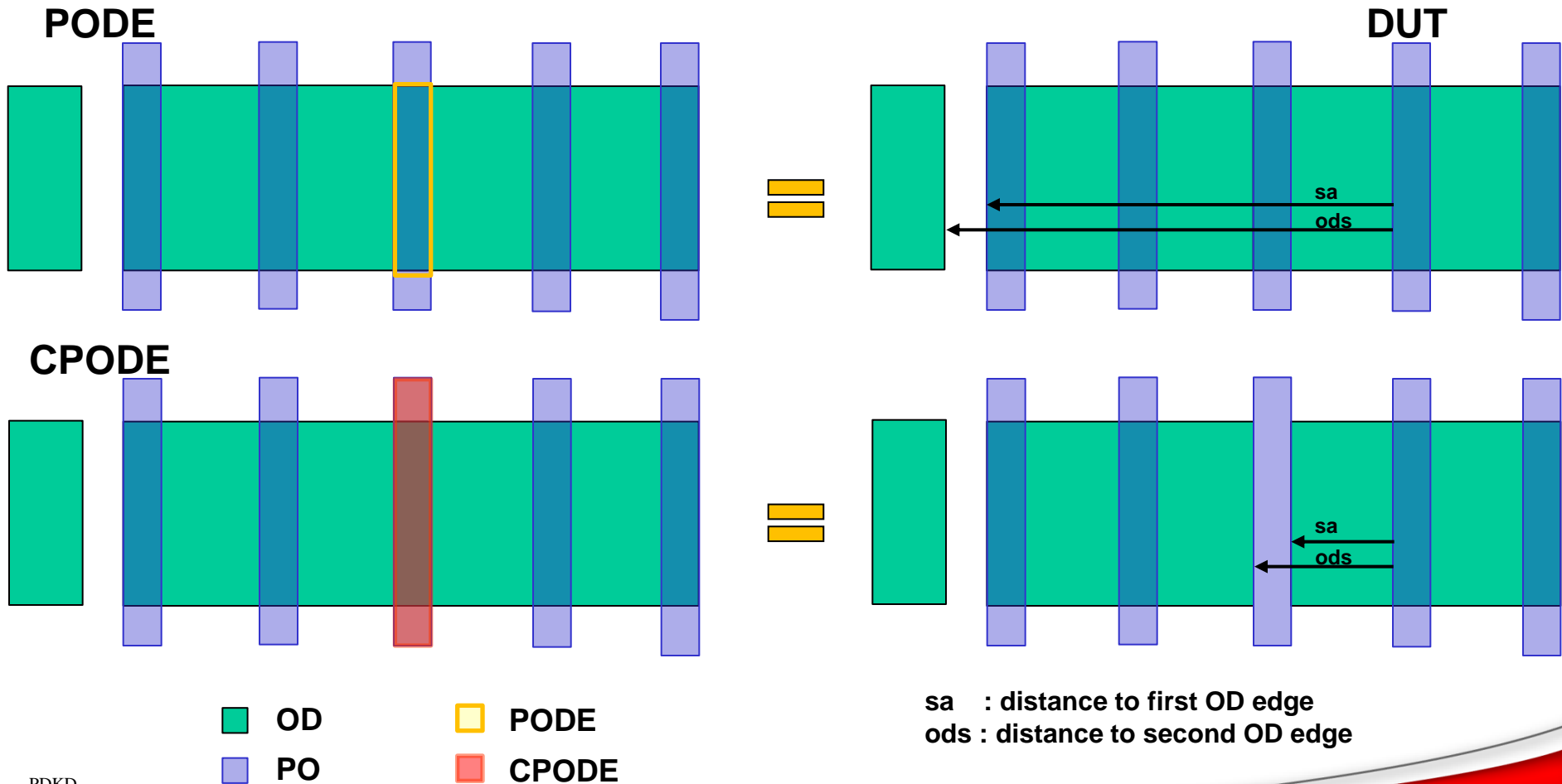
Security B
TSMC restricted

CPODE





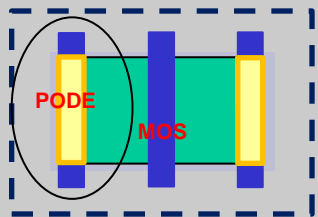
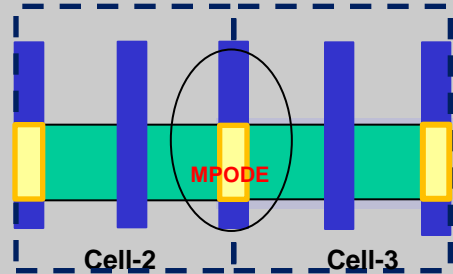
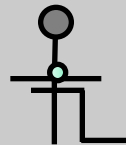
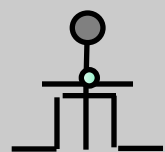
CPCODE – LDE Change

- OD under CPCODE will be cut off. And, it will change LDE (LOD/OSE) result.

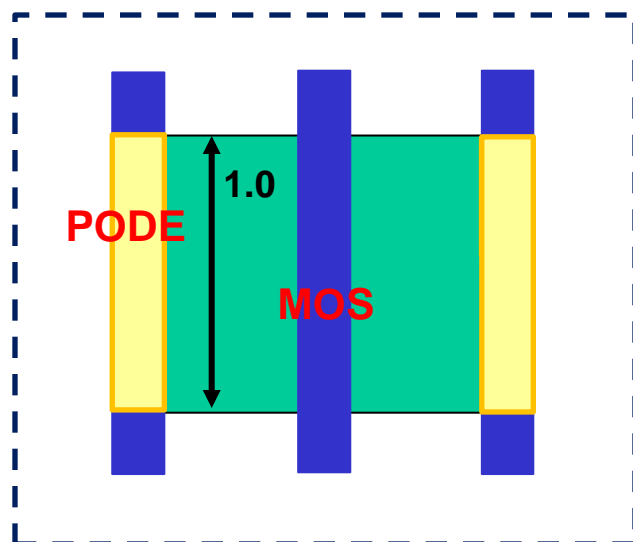


PODE (POLY on OD edge)

Device CAD Layer and Formation

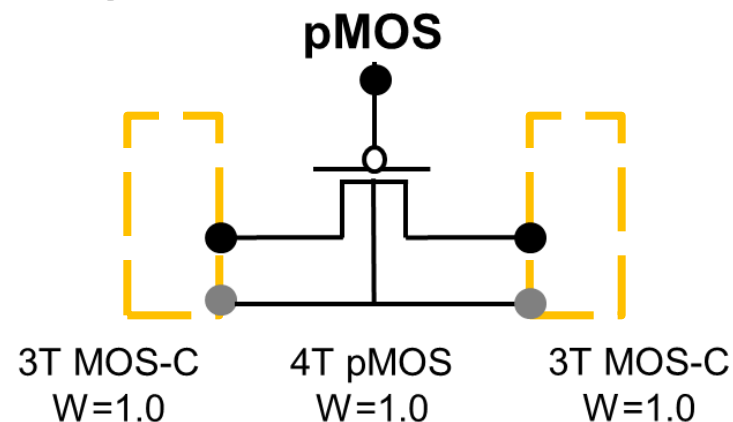
PODE Category	3T PODE	Cell abutted PODE
<p>Drawing</p>  <p>PODE_GATE (206:28)</p>  <p>PODE_TrGATE (206:29)</p>		
Device name	ppode_svt_mac (npode_svt_mac)	pch_mpodesvt_mac (nch_mpodesvt_mac)
PODE CAD layer PODE_Gate	Yes	Yes
Active MOS layer PODE_TrGate	No	No
Device Symbol or Schematics		

3T PODE LVS/LPE Views

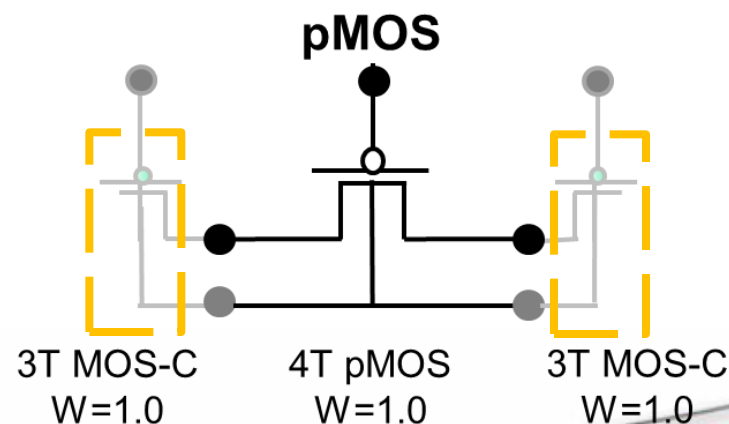


- OD
- PODE_GATE
- PO

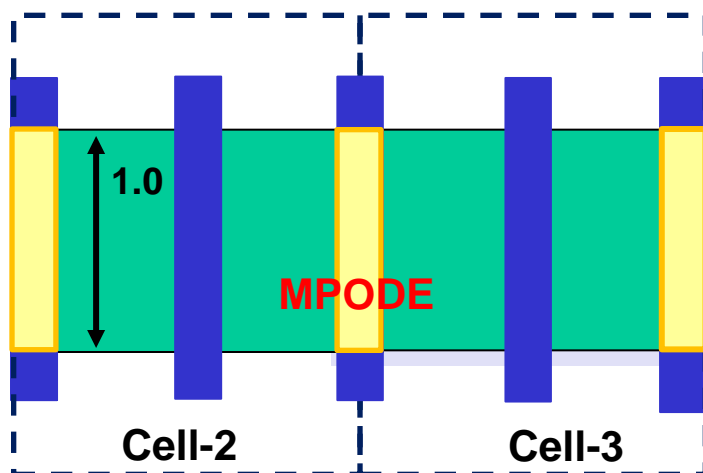
LVS



LPE

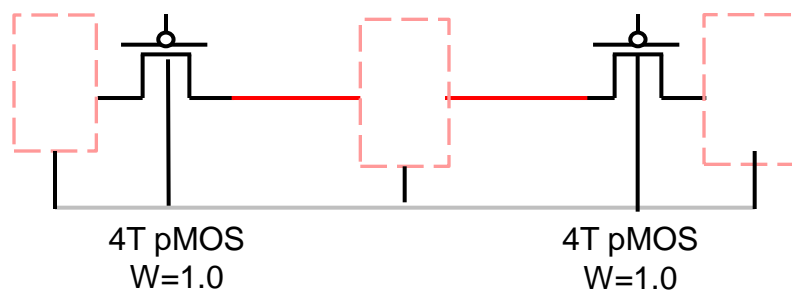


4T M-PODE LVS/LPE Views

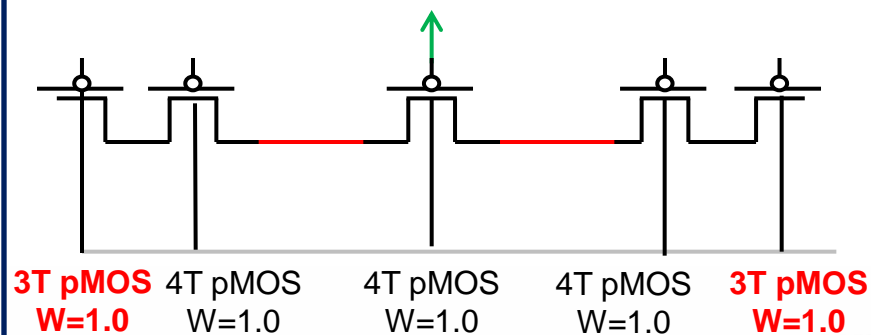


- OD
- PODE_GATE
- PO

LVS

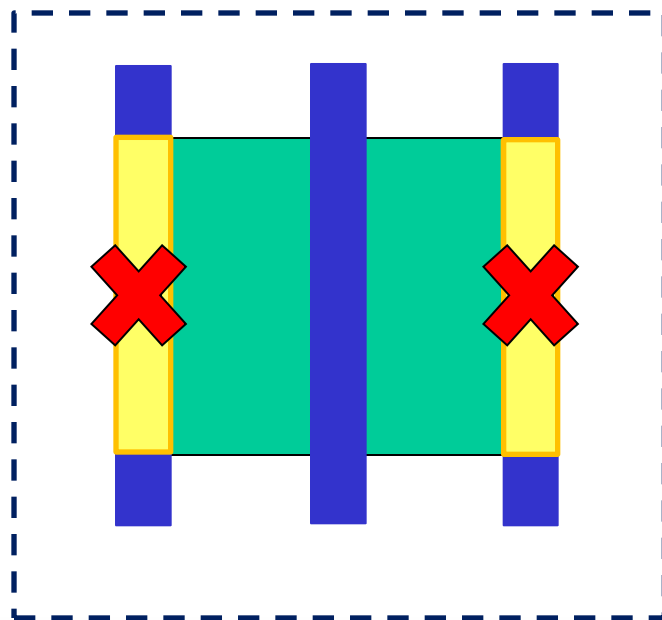


LPE



ERC Check on 3T PODE

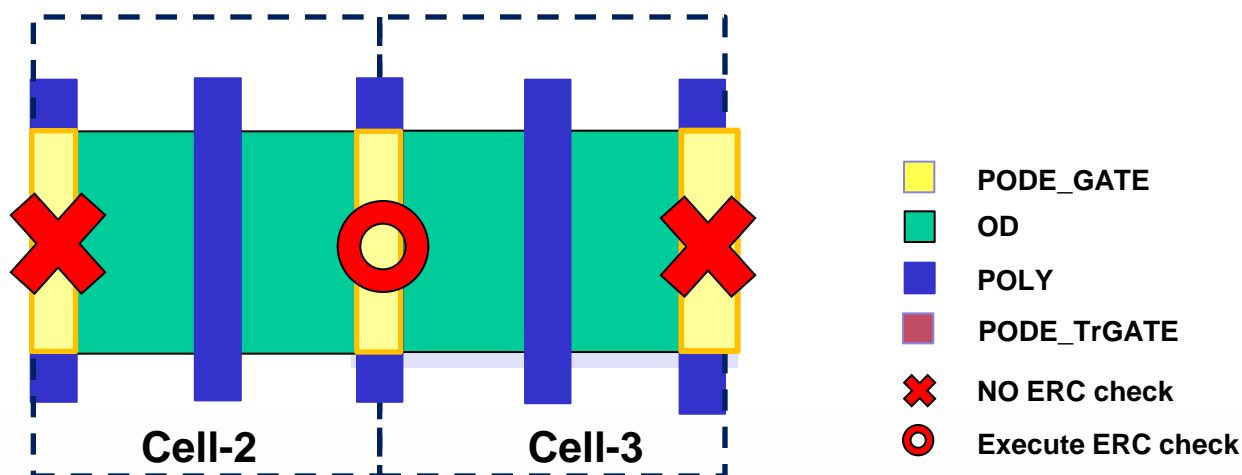
- 3T PODE device with single side OD is NOT required



- PODE_GATE
- OD
- POLY
- PODE_TrGATE
- ✗ NO ERC check
- Execute ERC check

ERC Check on 3T PODE and 4T M-PODE

- 4T M-PODE device (with source/drain) is required
 - PMOS M-PODE tied to VDD
 - NMOS M-PODE tied to VSS
- 3T PODE device with single side OD is NOT required





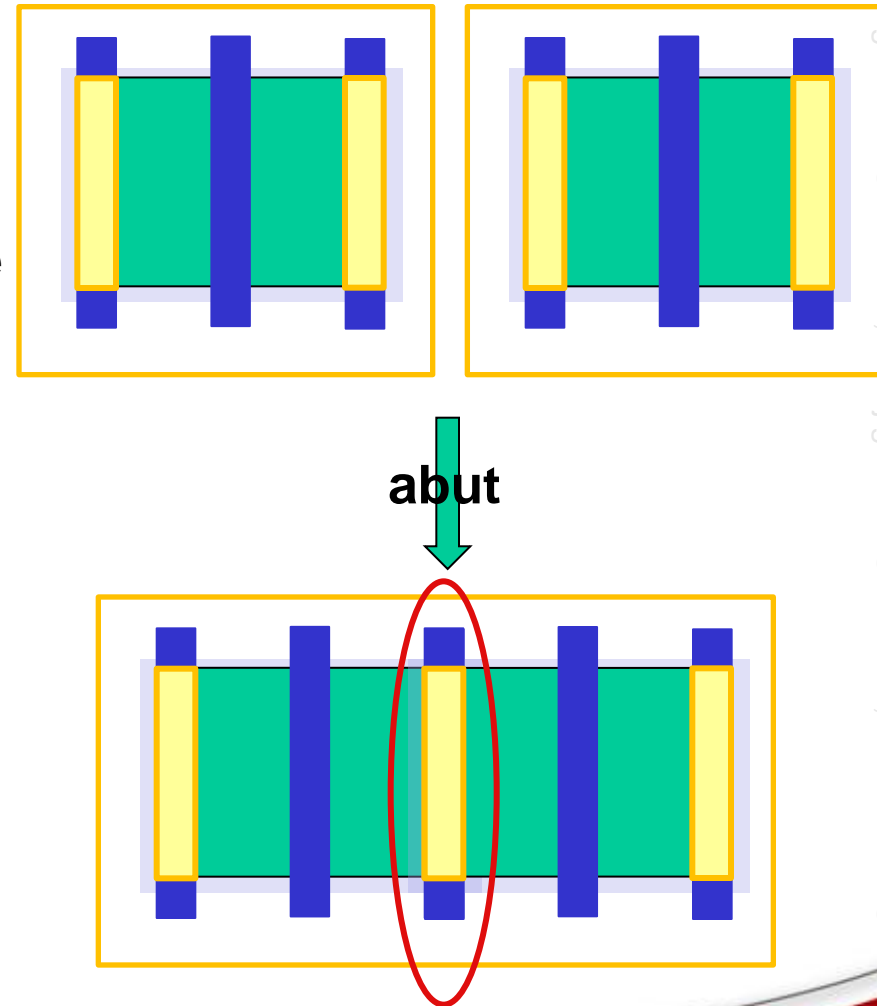
Security B –
TSMC Restricted
Secret

ERC check for MPODE

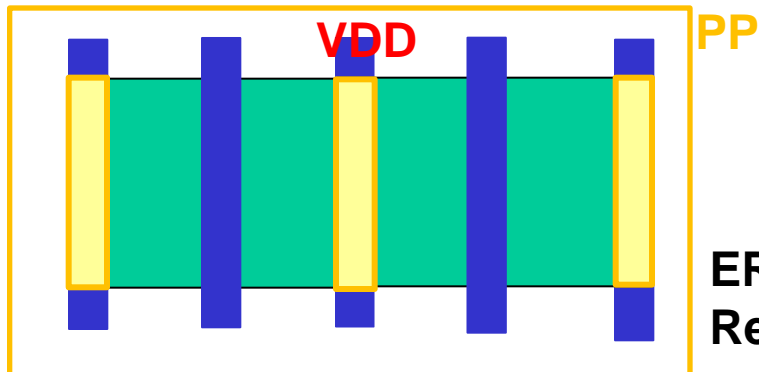
PODE Connect to POWER / GROUND

LAYOUT

- Requirement: Two abutted 3T p-type PODE should be tied to POWER. Two abutted 3T n-type PODE should be tied to GROUND.
 - ERC can check if the pode gate layer connects to POWER NET / GROUND NET.
 - Users need to add POWER NET and GROUND NET by themselves.
 - Limitation: **ERC does not have voltage information.**
- Several cases are listed in the next few pages.



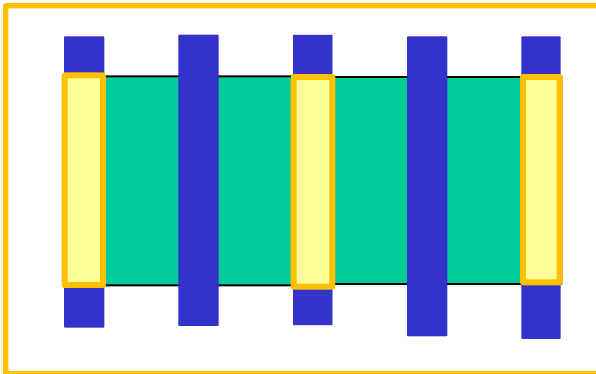
P-type PODE (I)



ERC: Pass
Reason: ppode ties to POWER

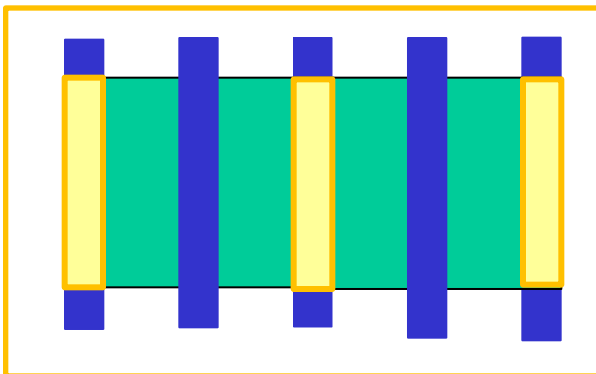
P-type PODE (II)

VDD



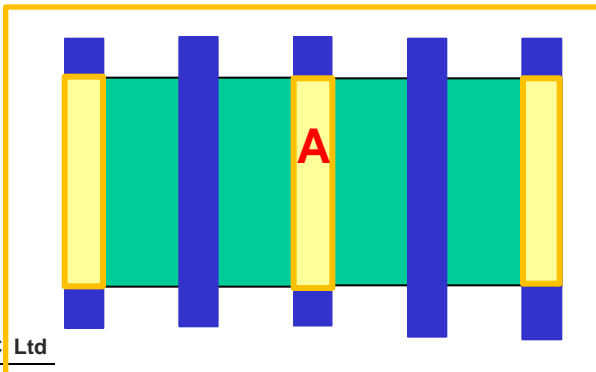
PP

ERC result: Error
Reason: pnode does not connect to PWR



PP

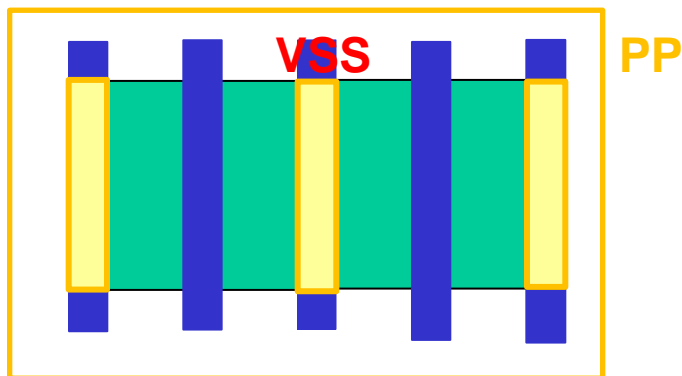
ERC result: Error
Reason: pnode is floating



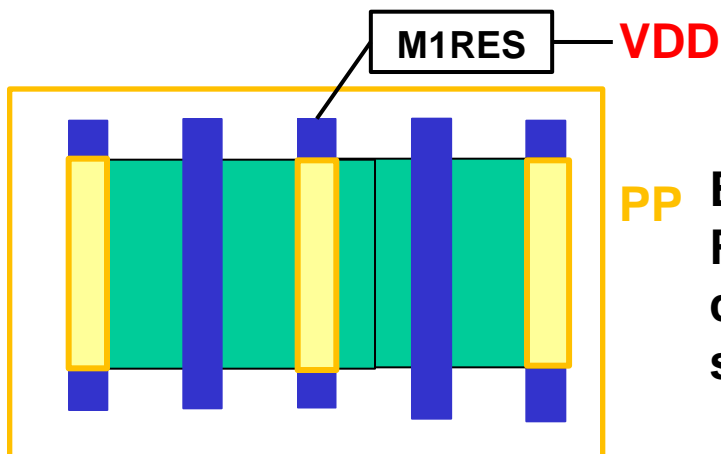
PP

ERC result: Error
Reason: pnode does not connect to PWR

P-type PODE (III)

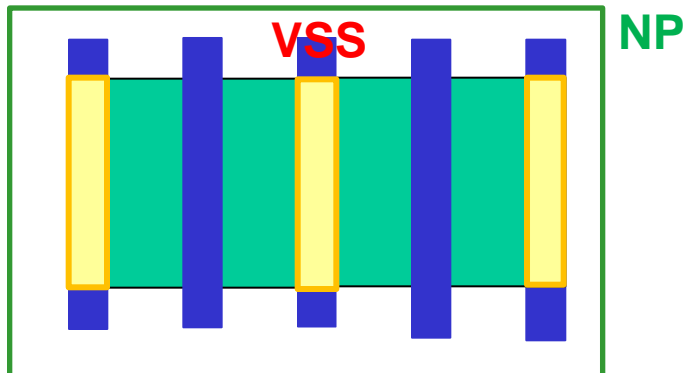


ERC result: Error
Reason: pnode does not connect to PWR



ERC result: Error
Reason: pnode should directly connect to PWR (device will cut the signal)

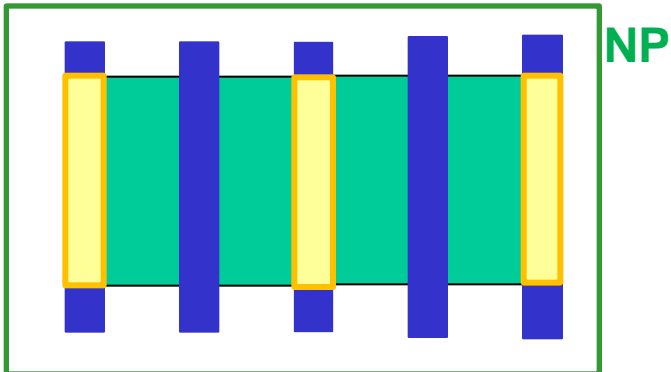
N-type PODE (I)



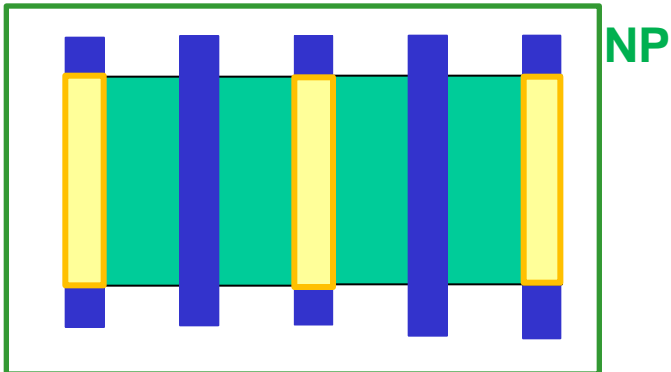
ERC: Pass
Reason: npode ties to GROUND

N-type PODE (II)

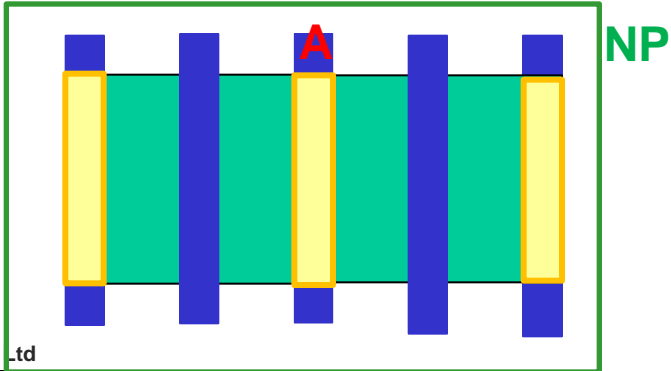
VSS



ERC result: Error
Reason: npode does not connect to GROUND

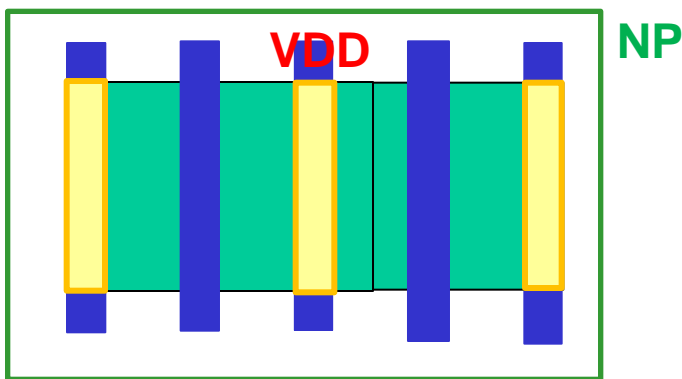


ERC result: Error
Reason: npode is floating

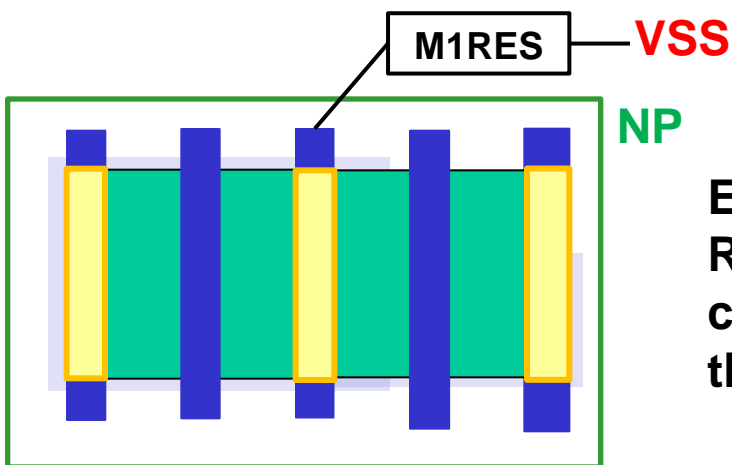


ERC result: Error
Reason: npode does not connect to GROUND

N-type PODE (III)



ERC result: Error
Reason: npode does not connect to GROUND



ERC result: Error
Reason: npode should directly connect to GROUND (device will cut the signal)