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lab3 PADs

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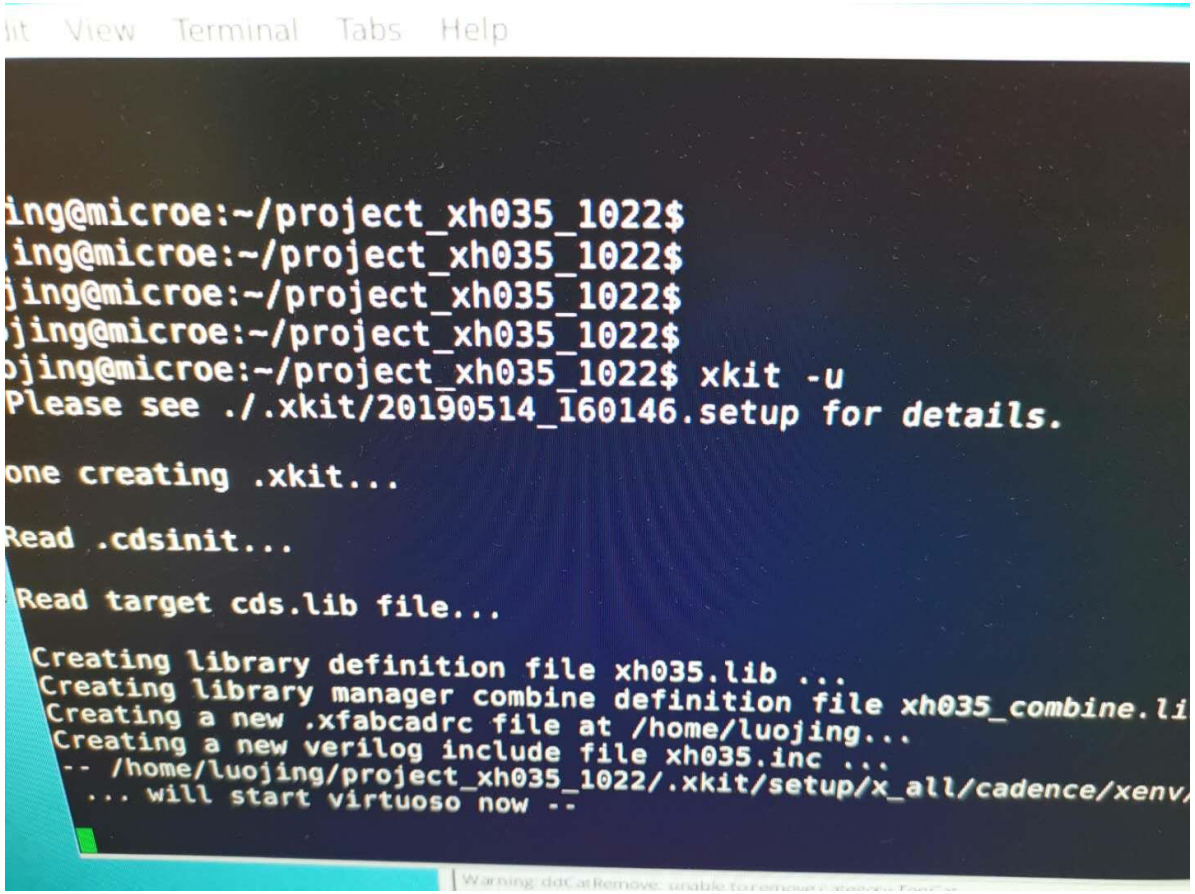
Outline

- Loading library
- PADs choosing
- Connect PADs to core circuit
- An example

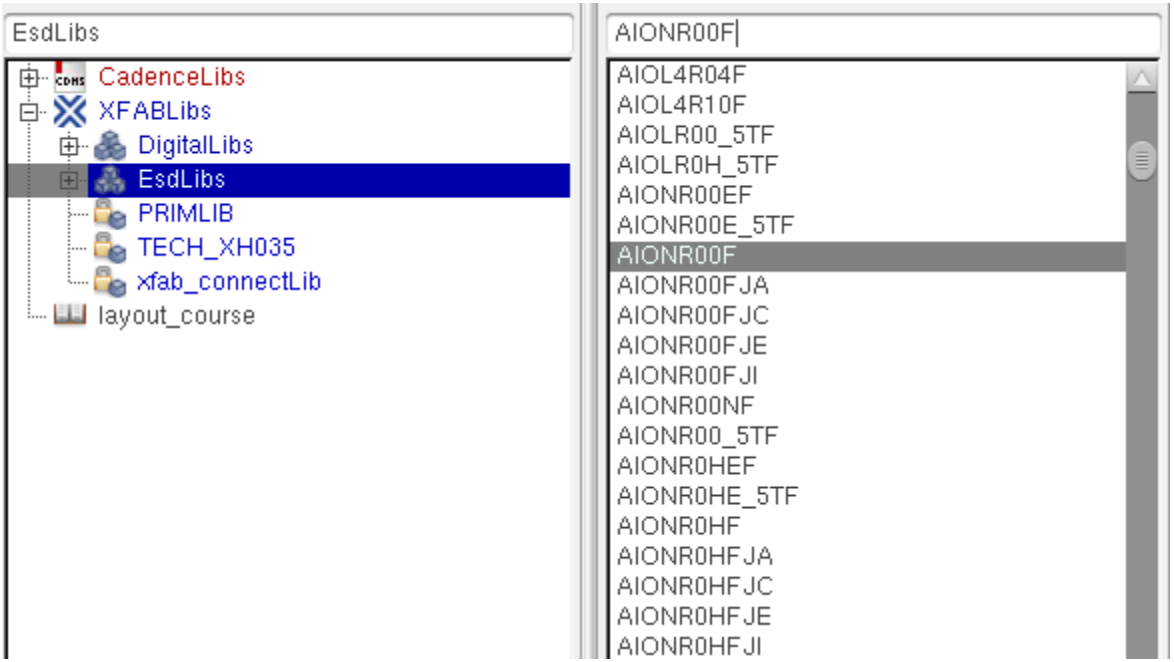
Loading library

- 用命令： xkit –u 来加载PAD库和数字库



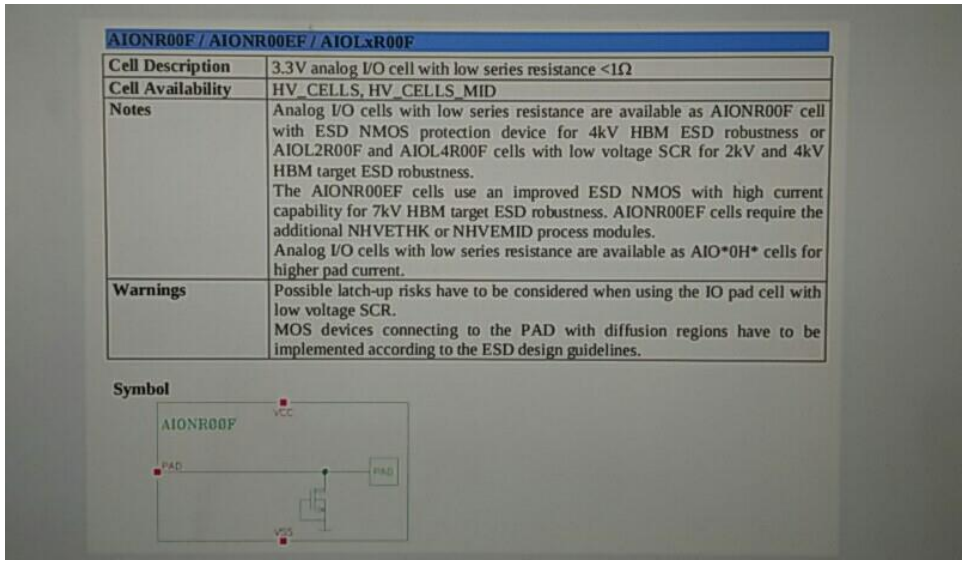
PADs choosing

- The OPA has 7 ports(vdd, gnd, Idc, Vip, Vin, Vop, Von)
- How to choose their PAD respectively?



PADs choosing

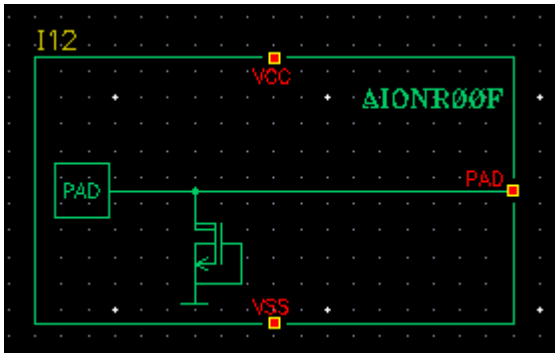
- Idc, Vip, Vin, Vop, Von

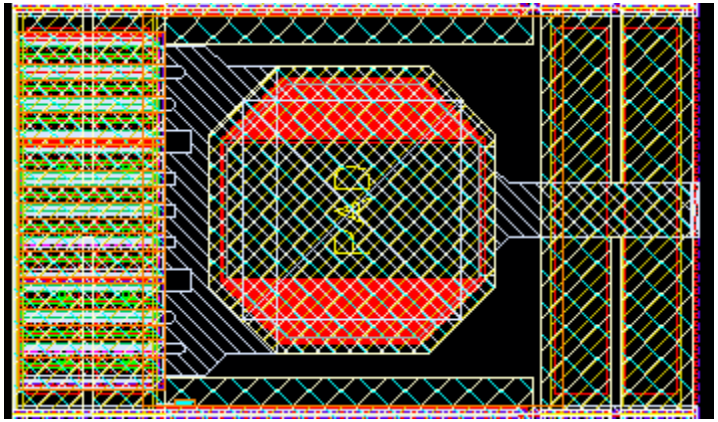


AIONR00F / AIONR00EF / AIOLxR00F

Cell Description	3.3V analog I/O cell with low series resistance <1Ω
Cell Availability	HV_CELLS, HV_CELLS_MID
Notes	Analog I/O cells with low series resistance are available as AIONR00F cell with ESD NMOS protection device for 4kV HBM ESD robustness or AIOL2R00F and AIOL4R00F cells with low voltage SCR for 2kV and 4kV HBM target ESD robustness. The AIONR00EF cells use an improved ESD NMOS with high current capability for 7kV HBM target ESD robustness. AIONR00EF cells require the additional NHVETHK or NHVEMID process modules. Analog I/O cells with low series resistance are available as AIO*0H* cells for higher pad current.
Warnings	Possible latch-up risks have to be considered when using the IO pad cell with low voltage SCR. MOS devices connecting to the PAD with diffusion regions have to be implemented according to the ESD design guidelines.

Symbol



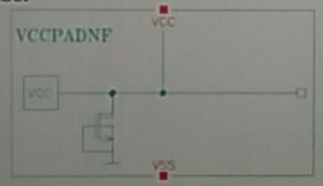


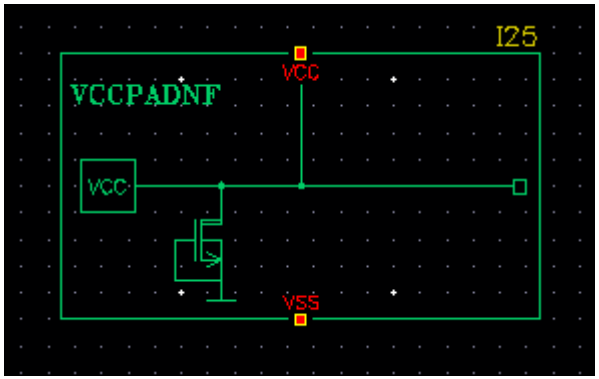
PADs choosing

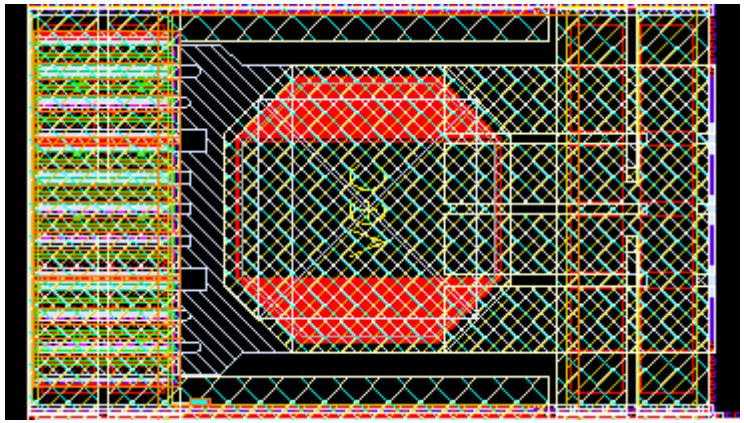
- Vdd

VCCPADNF / VCCPADNEF	
Cell Description	VCC power supply pad
Cell Availability	HV_CELLS, HV_CELLS_MID
Notes	The VCCPADNF power supply pad cell contains an ESD NMOS protection device for 4kV HBM target ESD robustness. The VCCPADNEF cell contains an improved ESD NMOS with high current capability for 7kV HBM target ESD robustness. The VCCPADNEF cell requires the additional NHVETHK or NHVEMID process modules.
Warnings	

Symbol

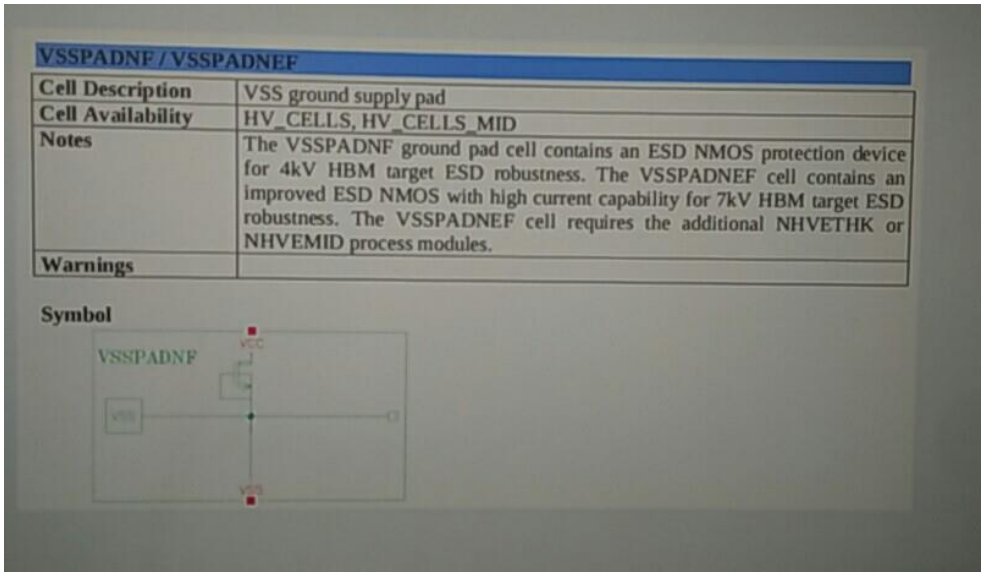






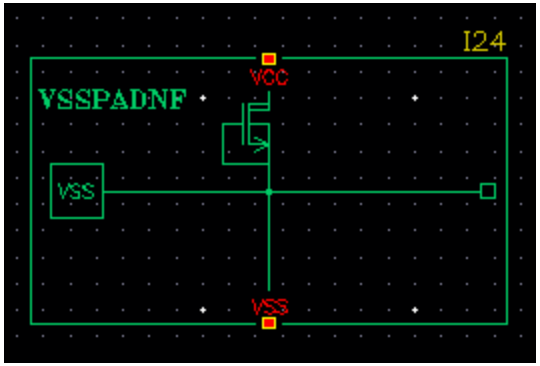
PADs choosing

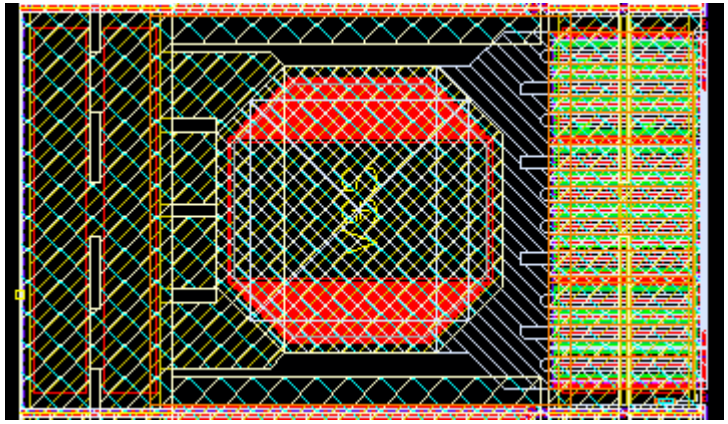
- gnd



VSSPADNF / VSSPADNEF	
Cell Description	VSS ground supply pad
Cell Availability	HV_CELLS, HV_CELLS_MID
Notes	The VSSPADNF ground pad cell contains an ESD NMOS protection device for 4kV HBM target ESD robustness. The VSSPADNEF cell contains an improved ESD NMOS with high current capability for 7kV HBM target ESD robustness. The VSSPADNEF cell requires the additional NHVETHK or NHVEMID process modules.
Warnings	

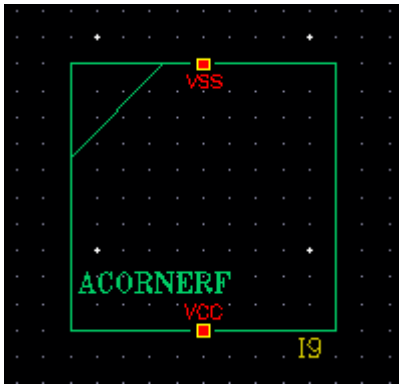
Symbol

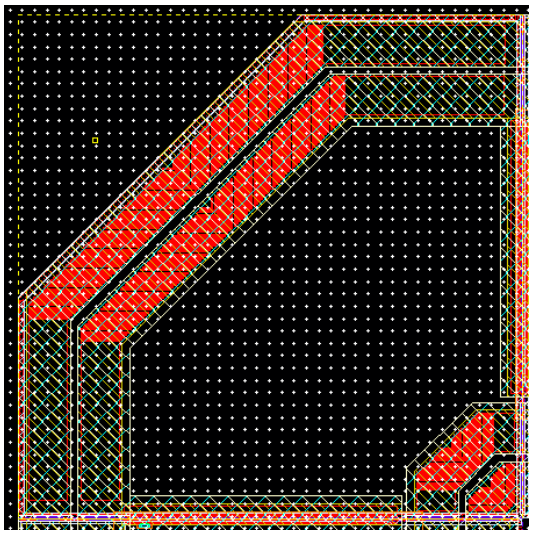




PADs choosing

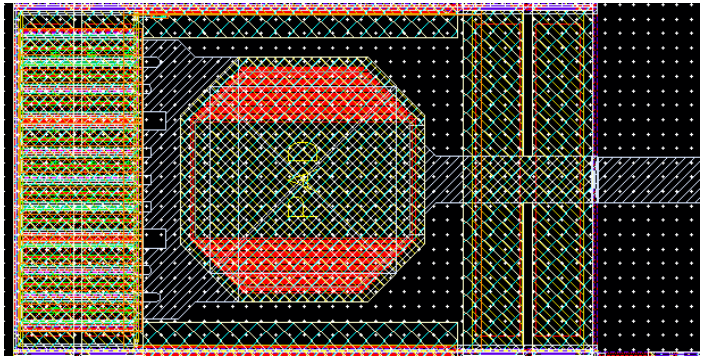
- Corner

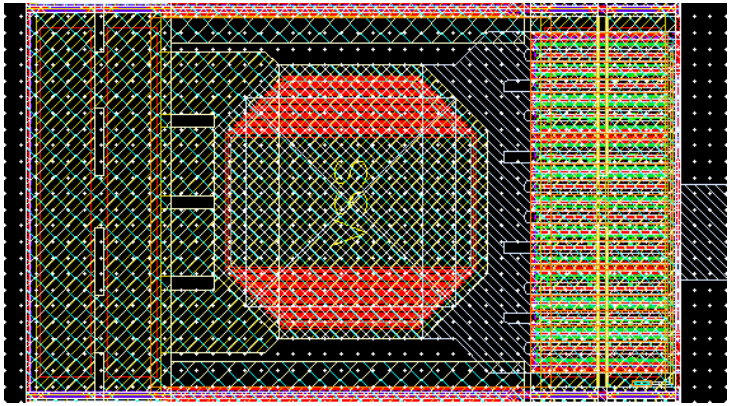


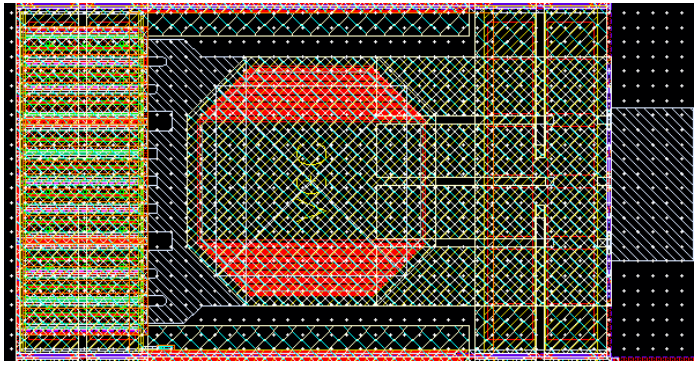


Connect PADs to core circuit

- You can use metal1 to connect PADS to your core

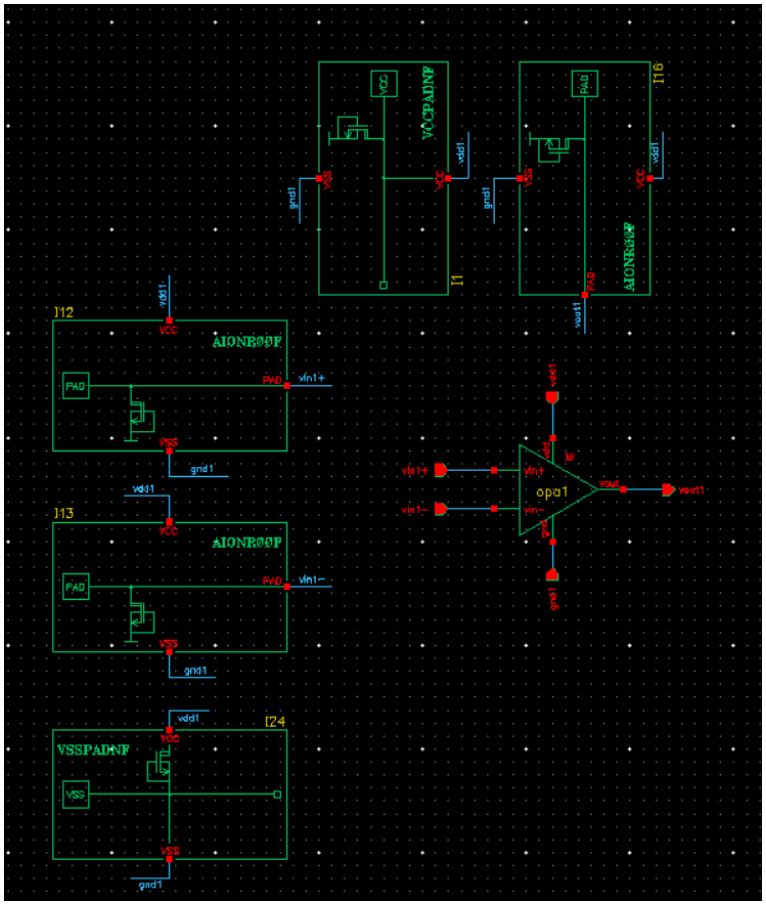


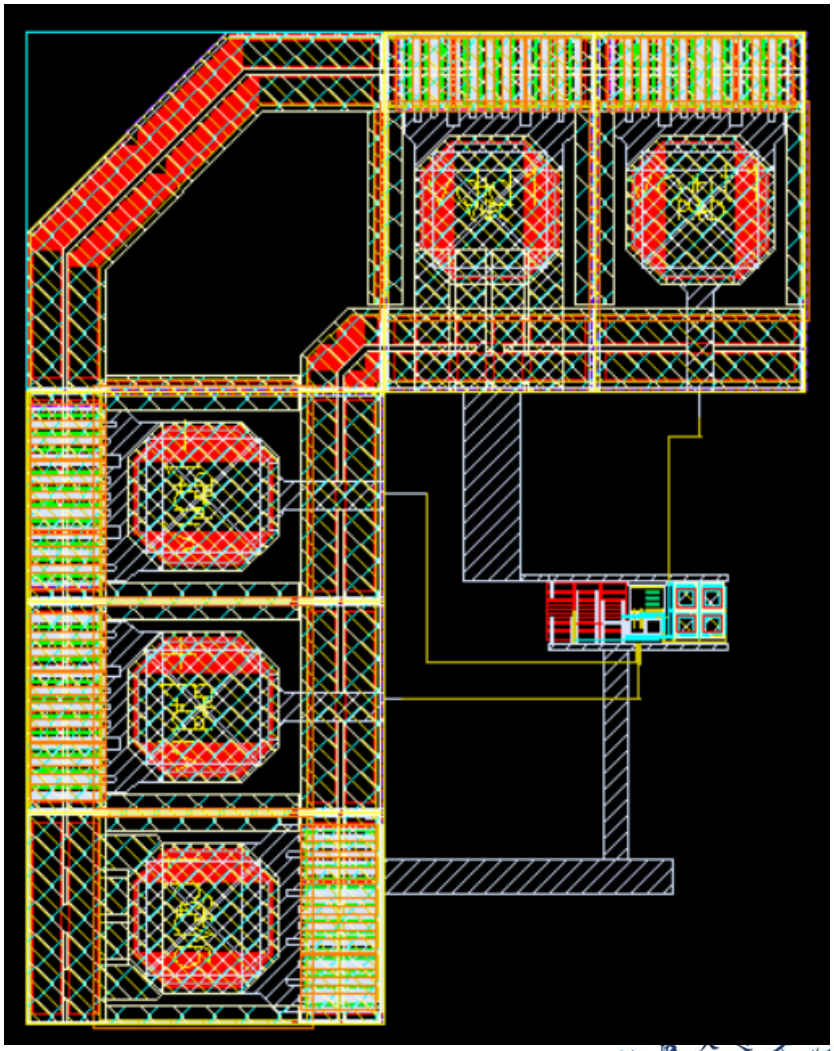




An example

- Single-ended OPA





Datasheets of some kinds of PADs

3.1. 3.3V Analog I/O Cells

Pad Cell	Description
AIONR00F	Analog I/O cell with low series resistance <1Ω; ESD NMOS protection device for 4kV HBM ESD robustness
AIONR00EF	Analog I/O cell with low series resistance <1Ω; ESD improved NMOS protection device for 7kV HBM ESD robustness
AIOL2R00F	Analog I/O cell with low series resistance <1Ω, Low Voltage SCR protection device for 2kV HBM ESD robustness
AIOL4R00F	Analog I/O cell with low series resistance <1Ω, Low Voltage SCR protection device for 4kV HBM ESD robustness
AIONR0HF	Analog I/O cell with low series resistance <1Ω, high current, ESD NMOS protection device for 4kV HBM ESD robustness
AIONR0HEF	Analog I/O cell with low series resistance <1Ω, high current, ESD improved NMOS protection device for 7kV HBM ESD robustness
AIOL2R0HF	Analog I/O cell with low series resistance <1Ω, high current, Low Voltage SCR protection device for 2kV HBM ESD robustness
AIOL4R0HF	Analog I/O cell with low series resistance <1Ω, high current, Low Voltage SCR protection device for 4kV HBM ESD robustness
AIONR01F	Analog I/O cell with 100Ω series resistance ESD NMOS protection device for 4kV HBM ESD robustness
AIONR01EF	Analog I/O cell with 100Ω series resistance ESD improved NMOS protection device for 7kV HBM ESD robustness
AIOL2R01F	Analog I/O cell with 100Ω series resistance, Low Voltage SCR protection device for 2kV HBM ESD robustness
AIOL4R01F	Analog I/O cell with 100Ω series resistance, Low Voltage SCR protection device for 4kV HBM ESD robustness
AIONR04F	Analog I/O cell with 400Ω series resistance ESD NMOS protection device for 4kV HBM ESD robustness
AIONR04EF	Analog I/O cell with 400Ω series resistance ESD improved NMOS protection device for 7kV HBM ESD robustness
AIOL2R04F	Analog I/O cell with 400Ω series resistance, Low Voltage SCR protection device for 2kV HBM ESD robustness
AIOL4R04F	Analog I/O cell with 400Ω series resistance, Low Voltage SCR protection device for 4kV HBM ESD robustness

Datasheets of some kinds of PADs

Pad Cell	Description
AIONR10F	Analog I/O cell with 1000Ω series resistance ESD NMOS protection device for 4kV HBM ESD robustness
AIONR10EF	Analog I/O cell with 1000Ω series resistance ESD improved NMOS protection device for 7kV HBM ESD robustness
AIOL2R10F	Analog I/O cell with 1000Ω series resistance, Low Voltage SCR protection device for 2kV HBM ESD robustness
AIOL4R10F	Analog I/O cell with 1000Ω series resistance, Low Voltage SCR protection device for 4kV HBM ESD robustness
AIONR00NF	3.3V analog I/O cell for positive and negative pad voltage with low series resistance <1Ω and ESD NMOS protection device for 4kV HBM ESD robustness
AIONR0HNF	3.3V analog I/O cell for positive and negative pad voltage with low series resistance <1Ω, high current and ESD NMOS protection device for 4kV HBM ESD robustness
AIONR01NF	3.3V analog I/O cell for positive and negative pad voltage with 100Ω series resistance and ESD NMOS protection device for 4kV HBM ESD robustness
AIONR04NF	3.3V analog I/O cell for positive and negative pad voltage with 400Ω series resistance, ESD NMOS protection device for 4kV HBM ESD robustness
AIONR10NF	3.3V analog I/O cell for positive and negative pad voltage with 1000Ω series resistance and ESD NMOS protection device for 4kV HBM ESD robustness
AIOQR00F	5V tolerant analog I/O cell with low series resistance <1Ω and ESD NMOS protection device for 4kV HBM ESD robustness
AIOQR0HF	5V tolerant analog I/O cell with low series resistance <1Ω, high current and ESD NMOS protection device for 4kV HBM ESD robustness
AIOQR01F	5V tolerant analog I/O cell with 100Ω series resistance and ESD NMOS protection device for 4kV HBM ESD robustness
AIOQR04F	5V tolerant analog I/O cell with 400Ω series resistance and ESD NMOS protection device for 4kV HBM ESD robustness
AIOQR10F	5V tolerant analog I/O cell with 1000Ω series resistance and ESD NMOS protection device for 4kV HBM ESD robustness

Datasheets of some kinds of PADs

3.7. 3.3V Power Supply Cells

Pad Cell	Description
VCCPADNF	VCC power supply pad, ESD NMOS supply clamp device
VCCPADNEF	VCC power supply pad, ESD improved NMOS supply clamp device
VCCIPADNF	VCCI isolated core power supply pad, ESD NMOS supply clamp device
VCCIPADNEF	VCCI isolated core power supply pad, ESD improved NMOS supply clamp device
VSSPADNF	VSS ground supply pad, ESD NMOS supply clamp device
VSSPADNEF	VSS ground supply pad, ESD improved NMOS supply clamp device
VSSIPADNF	VSSI isolated core ground pad, ESD NMOS supply clamp device
VSSIPADNEF	VSSI isolated core ground pad, ESD improved NMOS supply clamp device

Thanks!