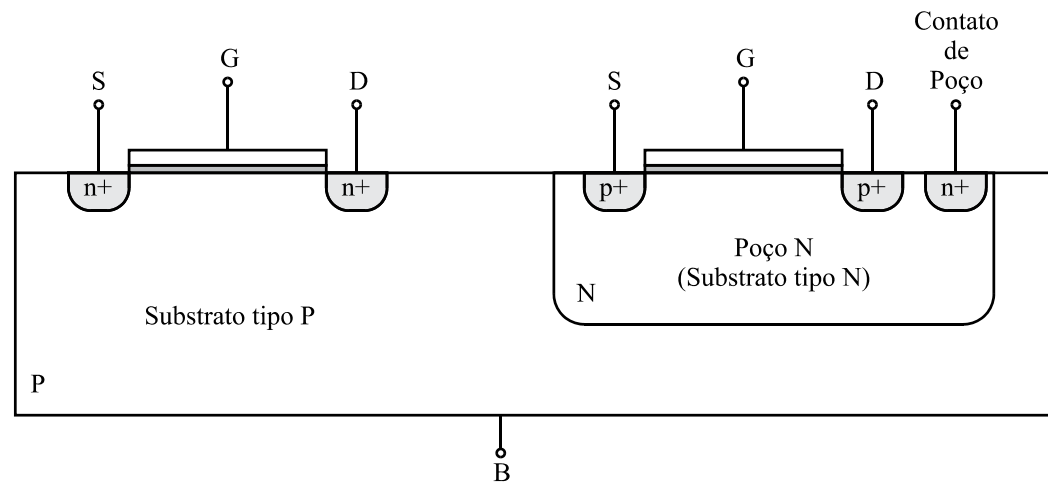


Tecnologia CMOS

A tecnologia CMOS (*Complementary Metal-Oxide-Semiconductor*) consiste basicamente na implementação dos transistores MOSFET tipo N (NMOS) e P (PMOS) em um mesmo substrato de silício. Tomando como exemplo um processo de fabricação tipo N, onde os transistores NMOS são implementados diretamente no substrato P, torna-se necessário a criação de um poço tipo N (substrato) para que seja possível implementar os transistores PMOS.

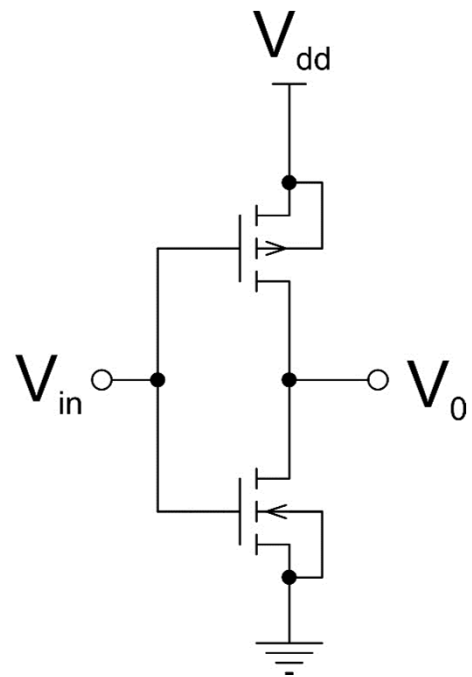
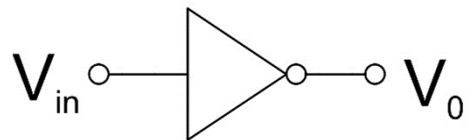


NMOS → Substrato sempre conectado ao terra









PMOS → Substrato suspenso

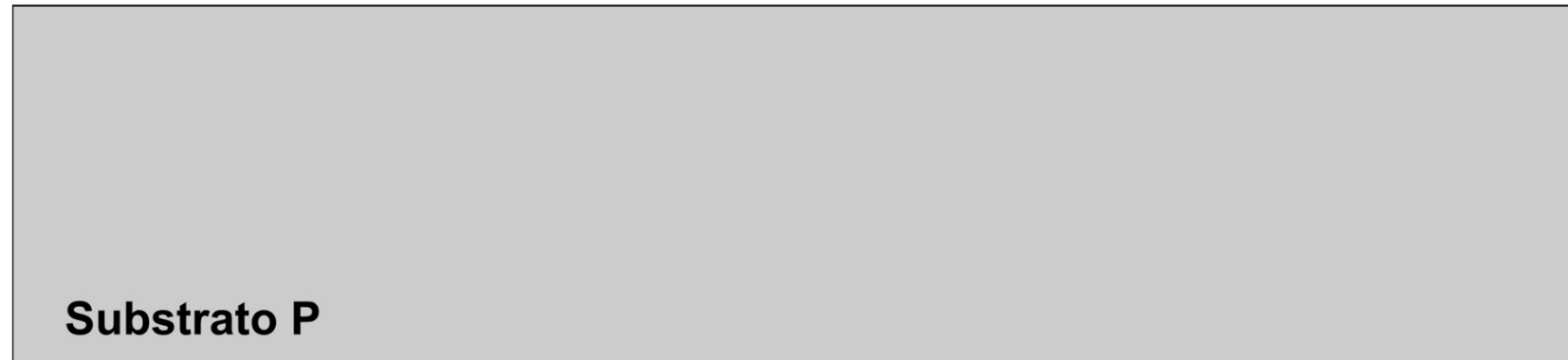
Processo de Fabricação CMOS

Inversor CMOS











Passo 1 - Substrato tipo P limpo

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











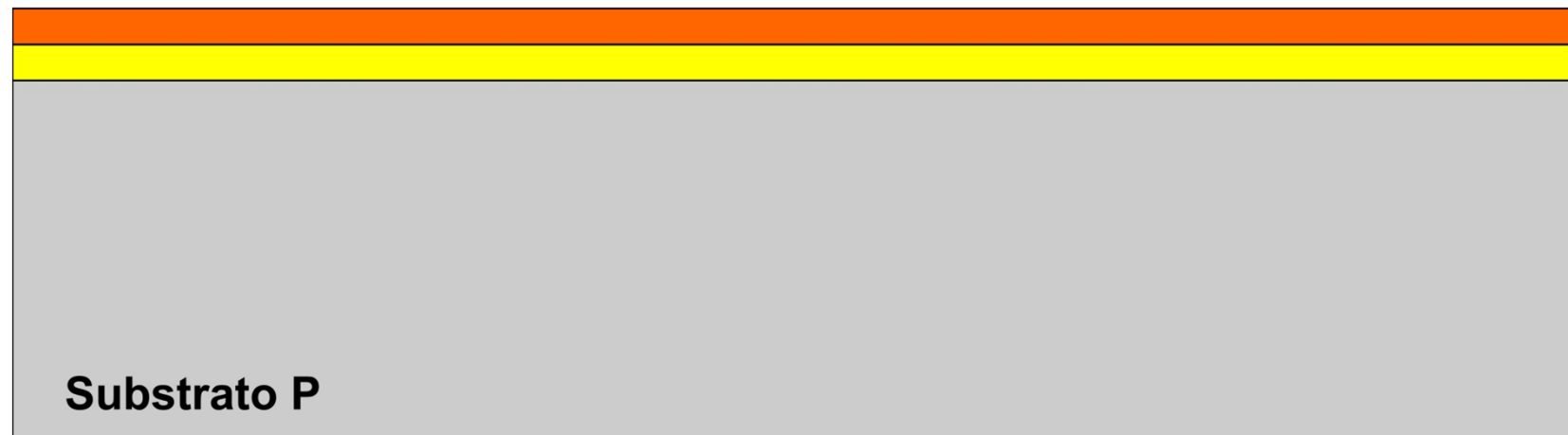
Passo 2 - Oxidação

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











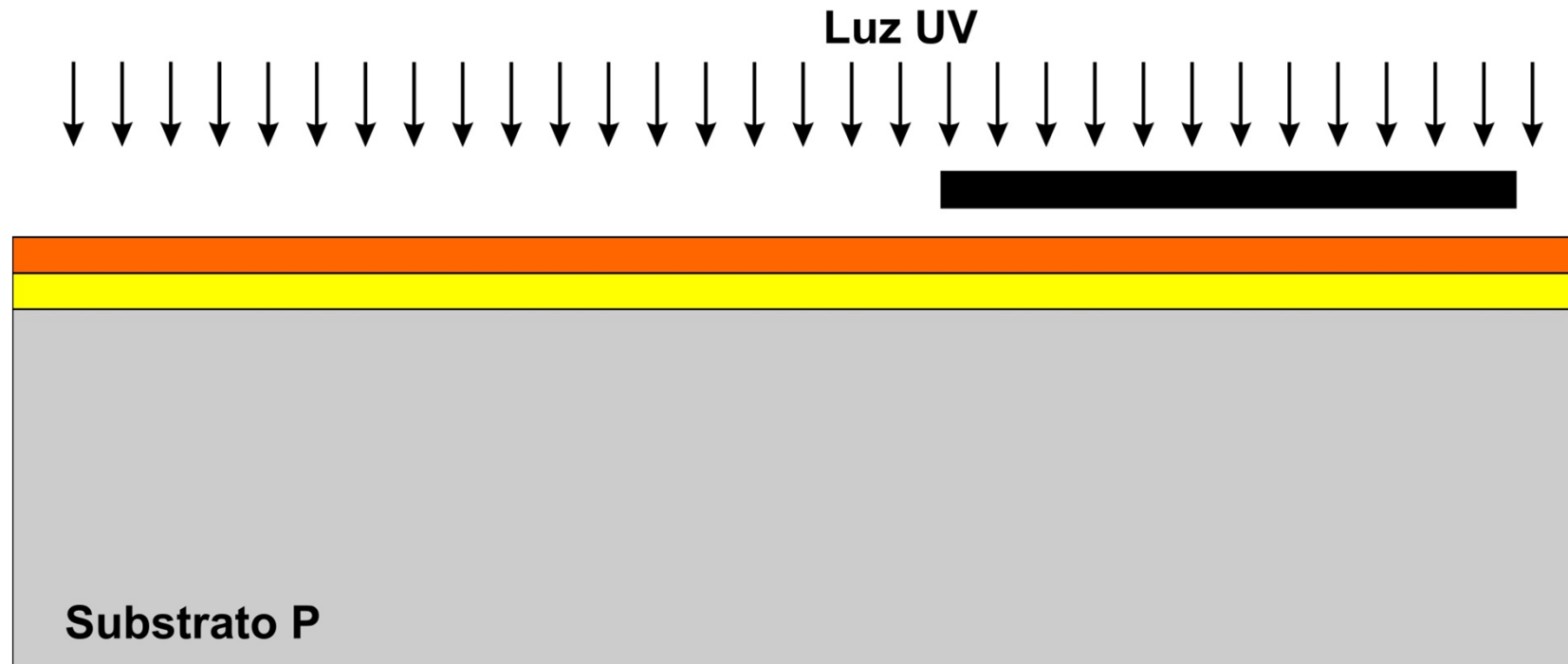
Passo 3 - Photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











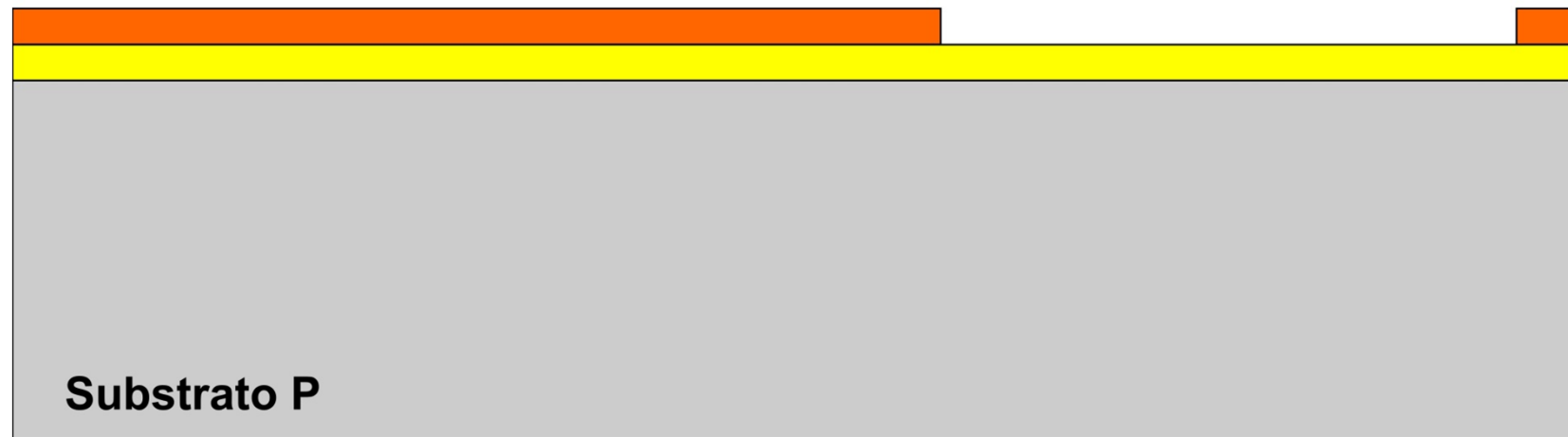
Passo 4 - Máscara do poço N

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











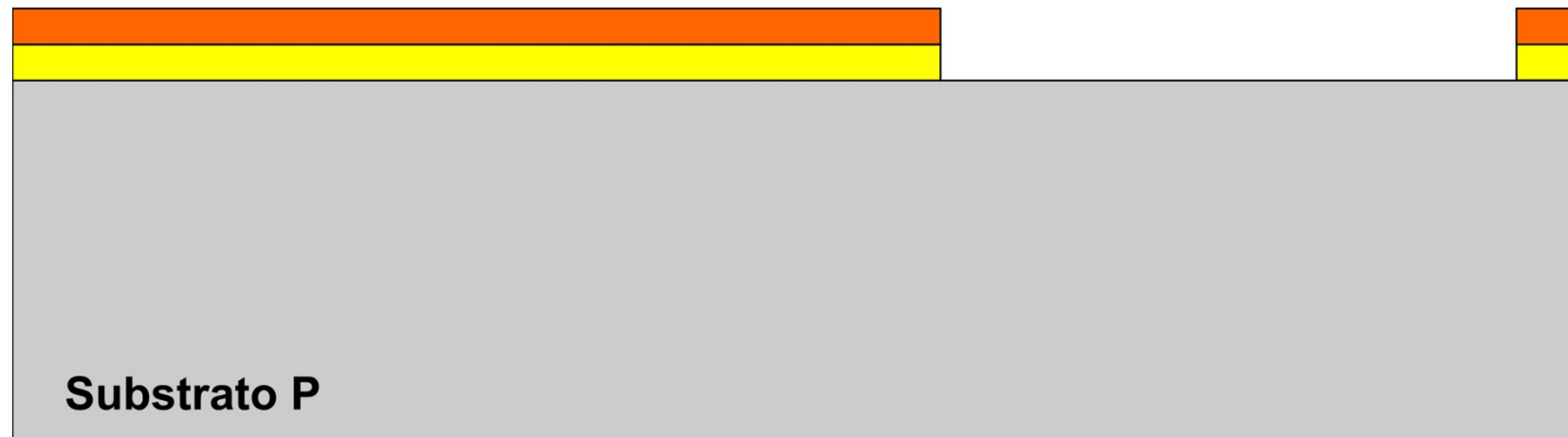
Passo 5 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











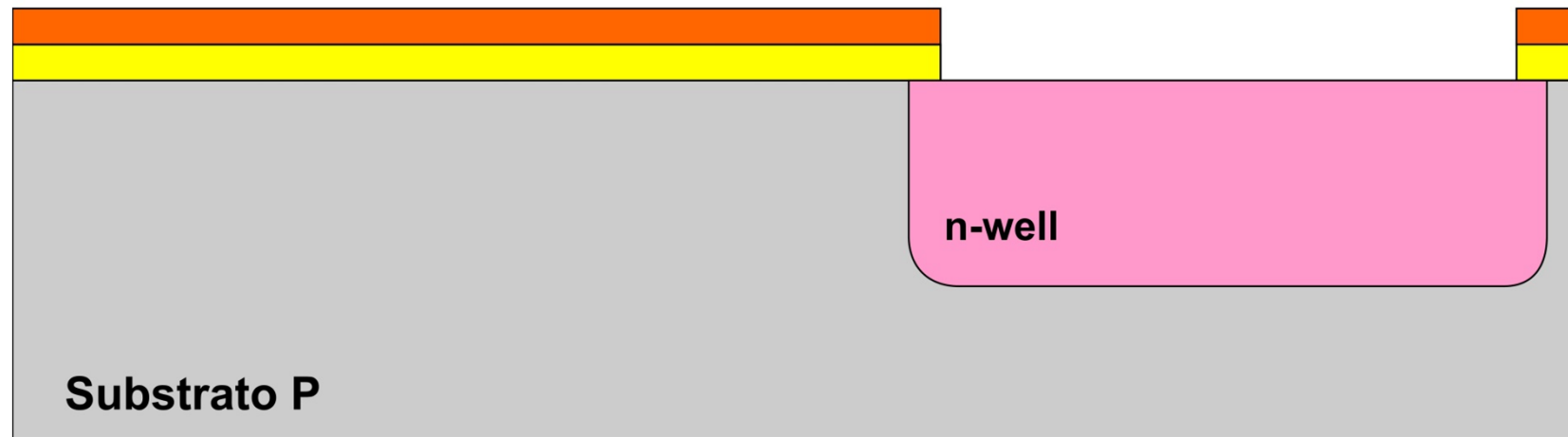
Passo 6 - Remoção do oxido de silício SiO_2

	SiO_2		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











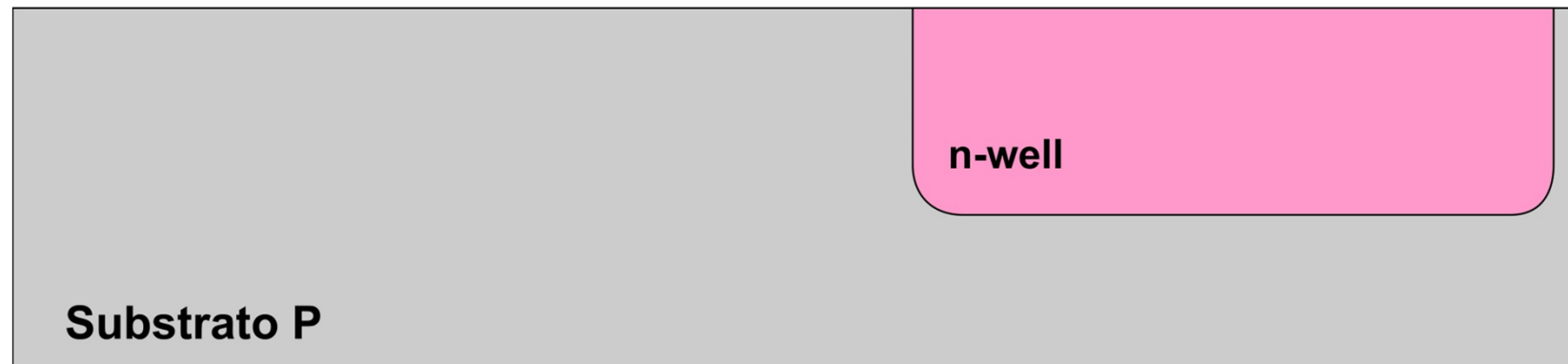
Passo 7 - Difusão do poço N (n-well)

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











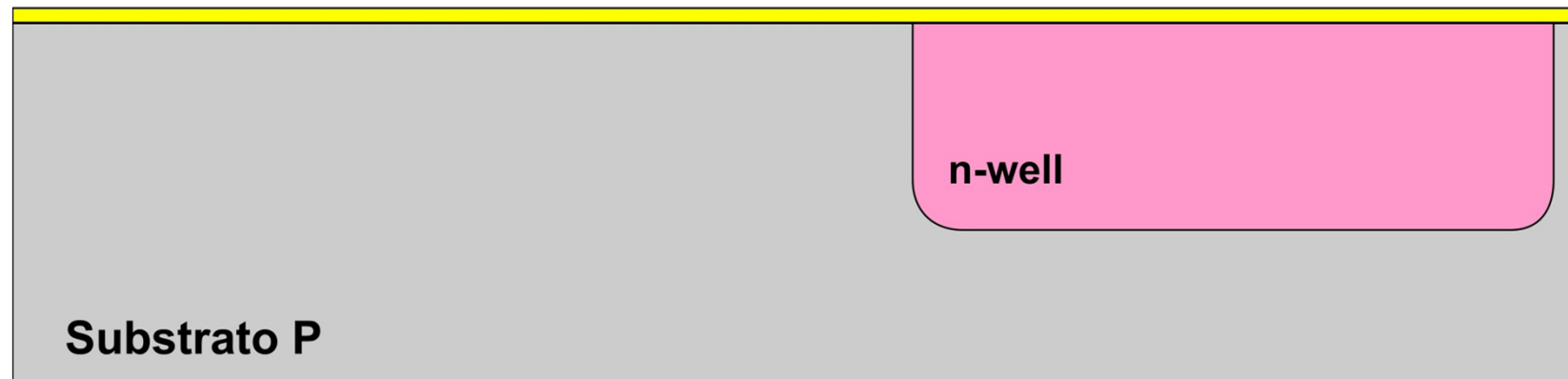
Passo 8 - Remoção do SiO_2

	SiO_2		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











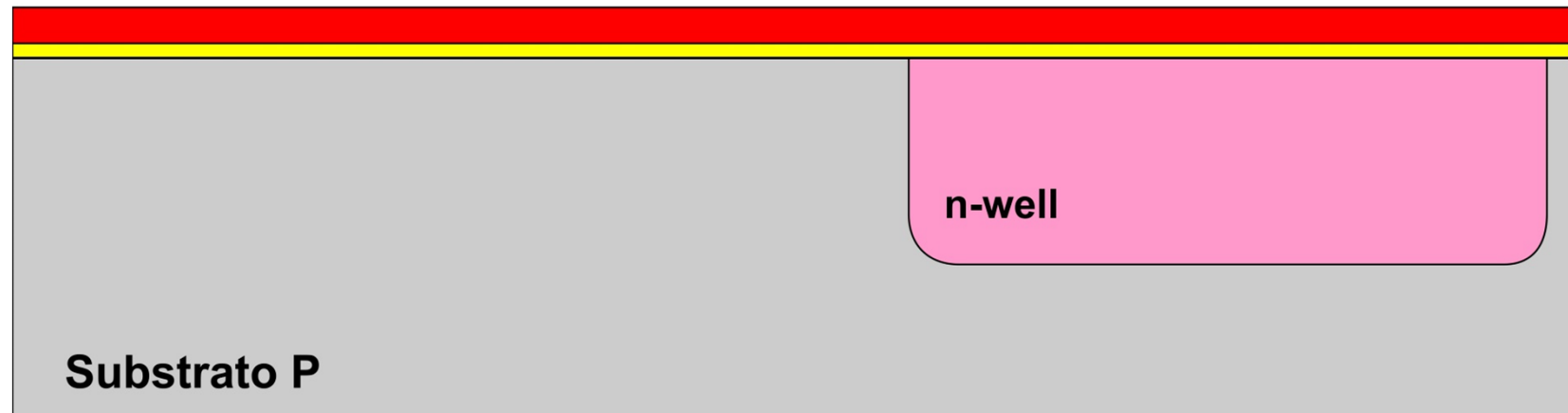
Passo 9 - Crescimento de óxido de gate

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











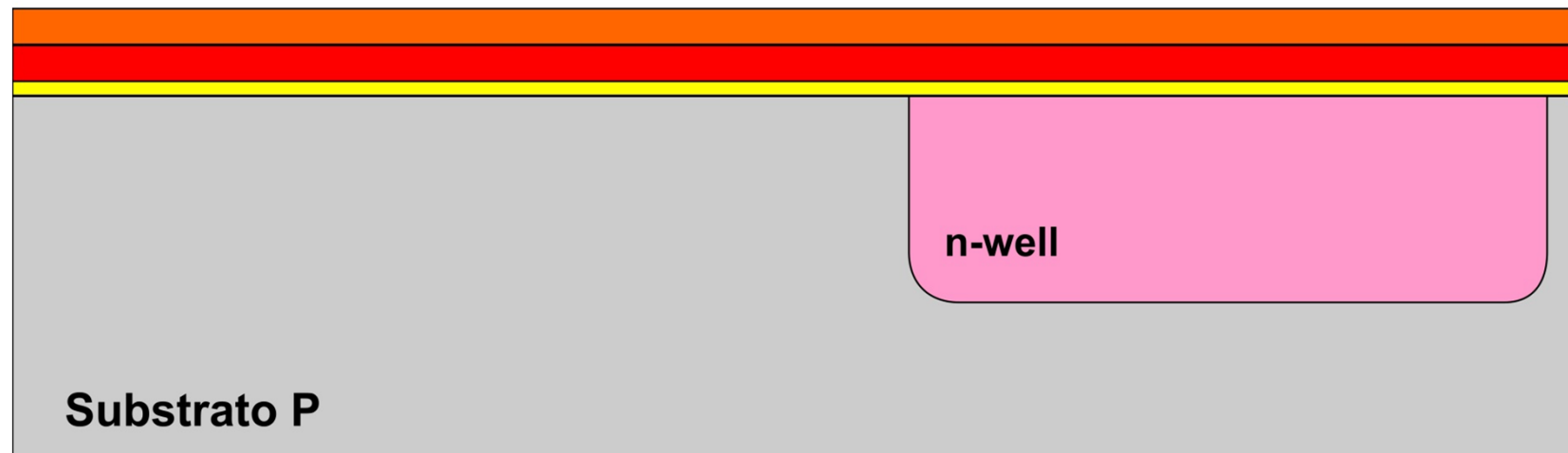
Passo 10 - Deposição de policilício

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		policilício











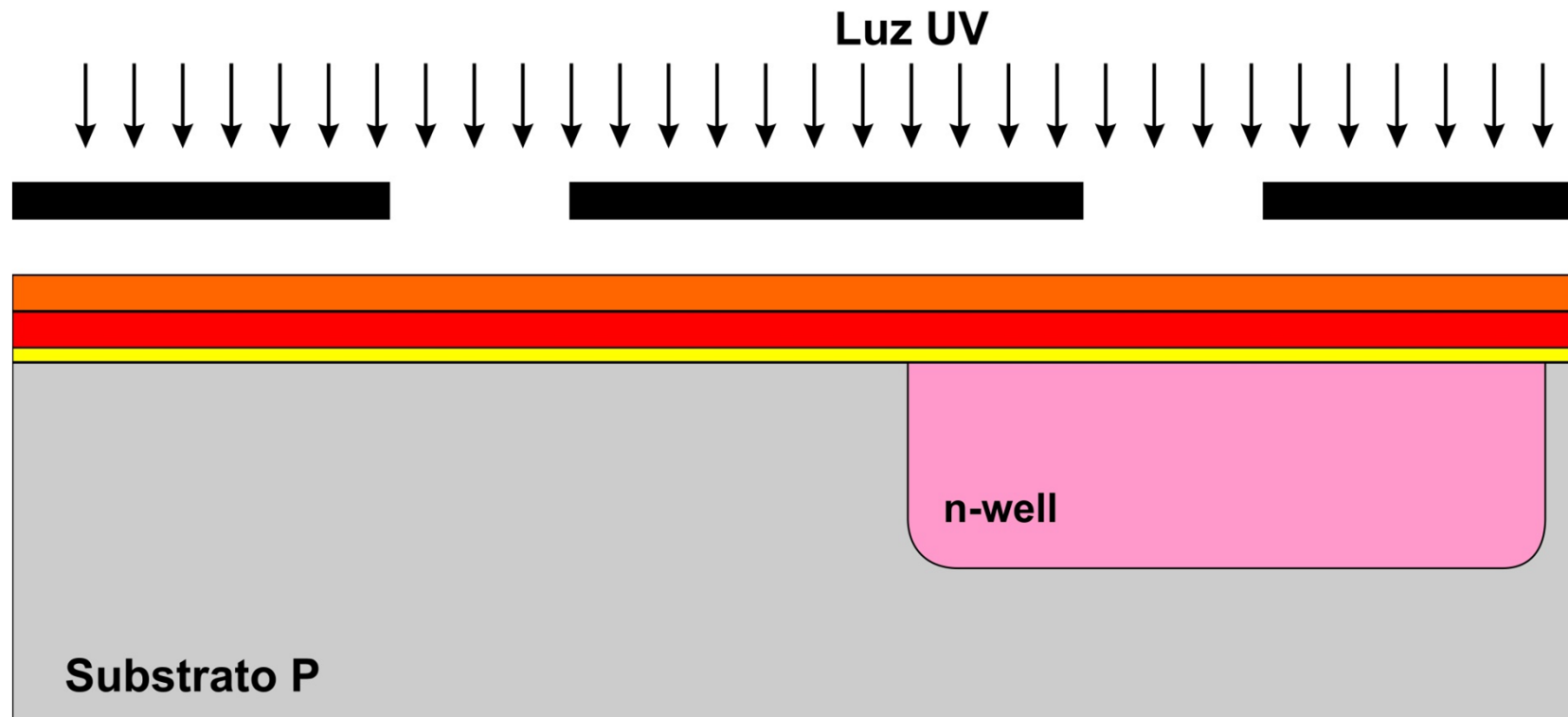
Passo 11 - Photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











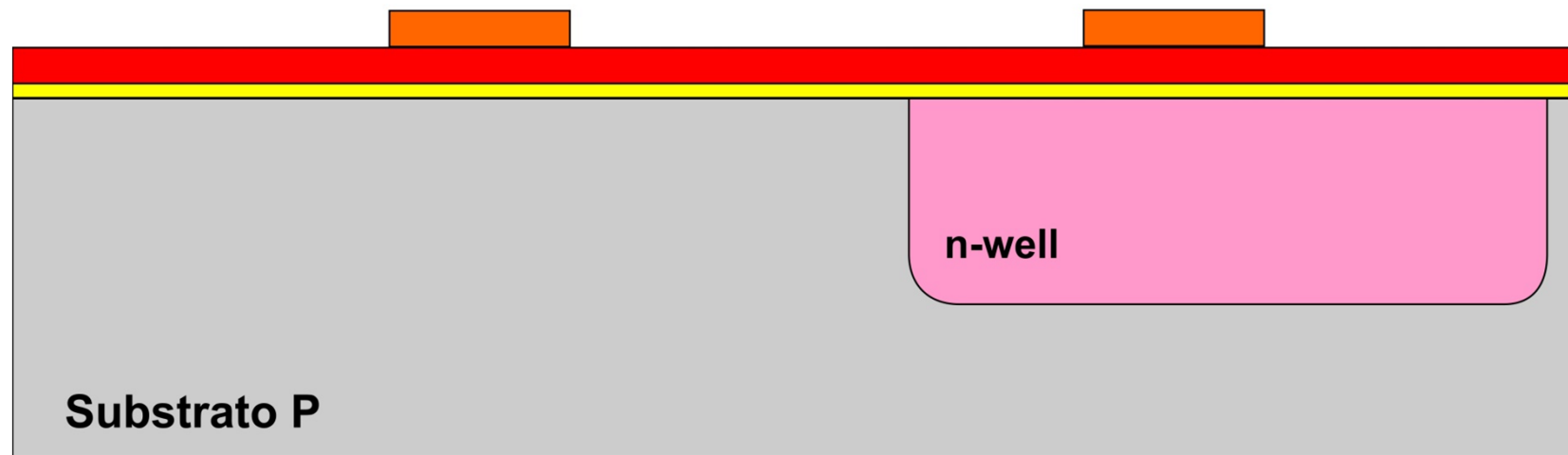
Passo 12 - Máscara de gate

	SiO ₂		n+
	substrato P		p+
	photoresist		alúminio
	n-well		polisilício











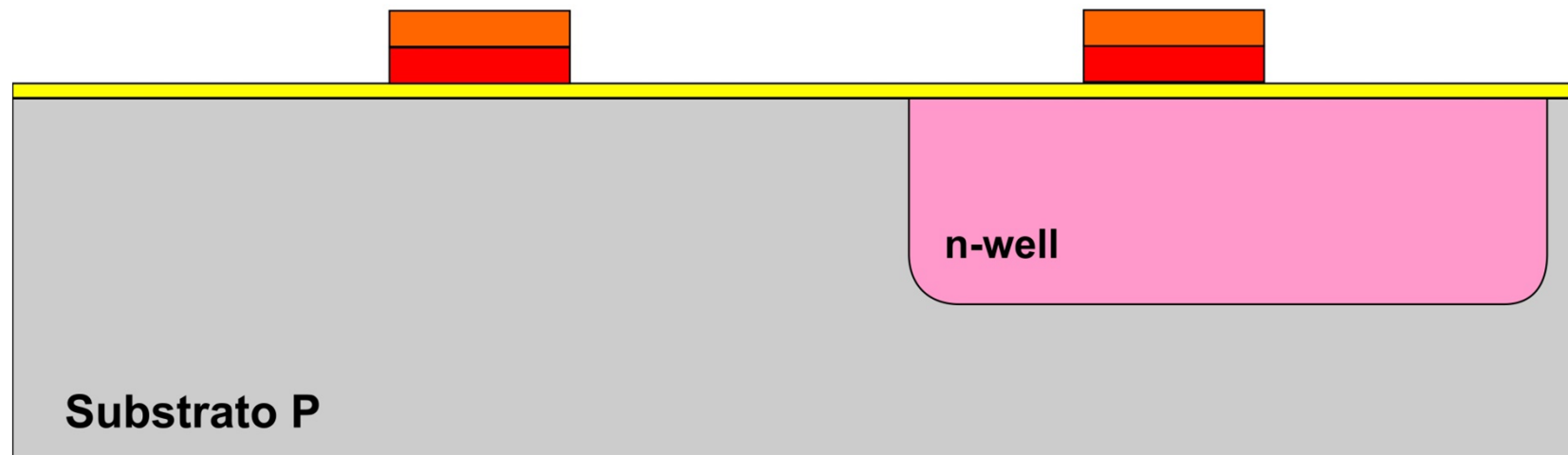
Passo 13 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











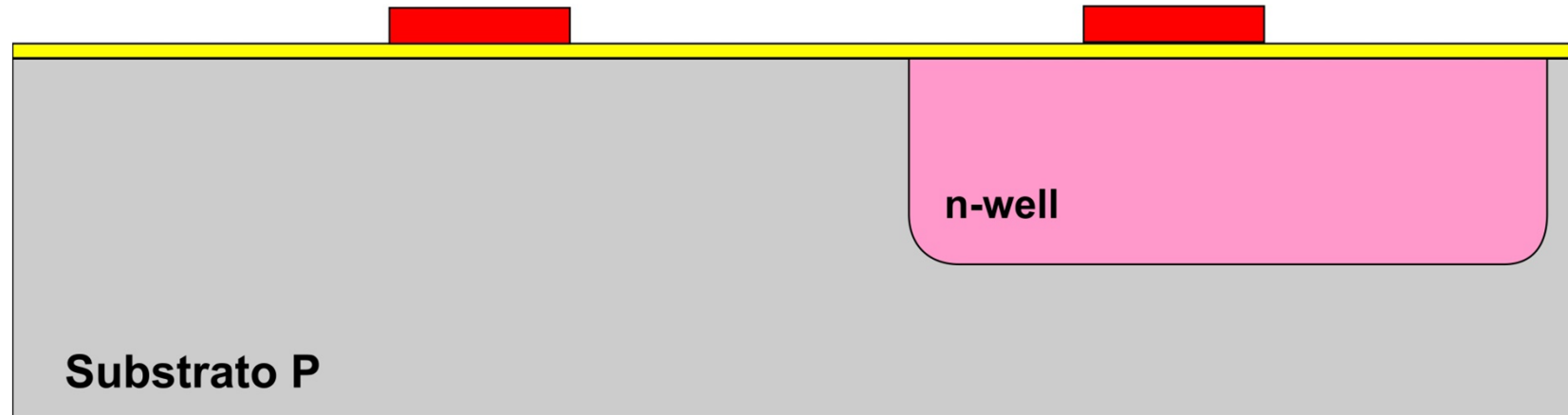
Passo 14 - Remoção do polisilício

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











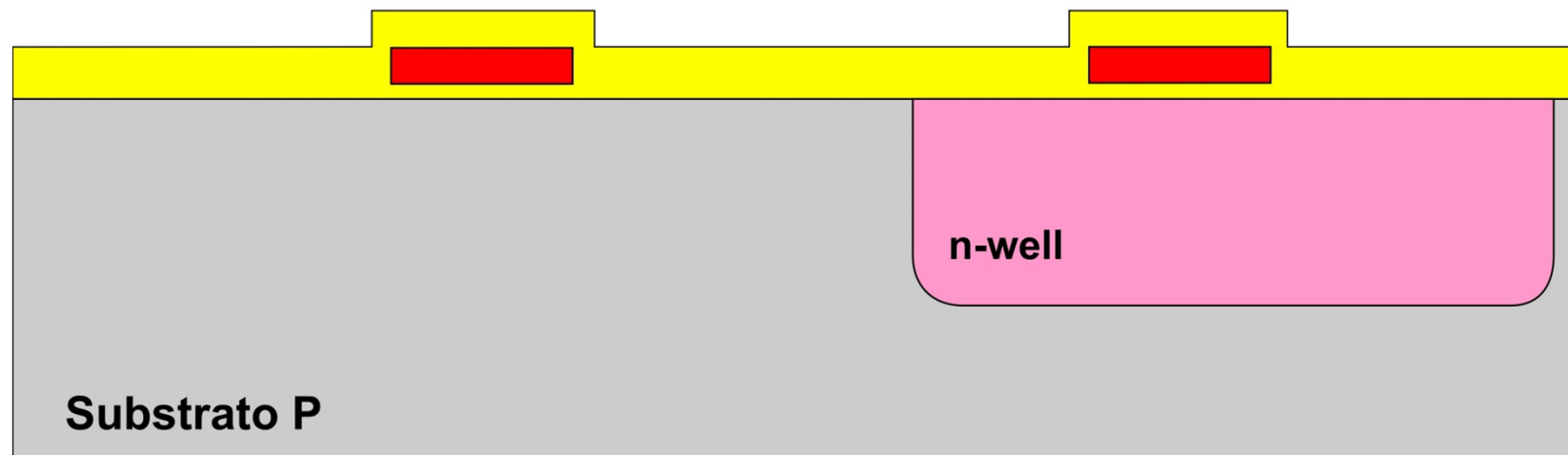
Passo 15 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











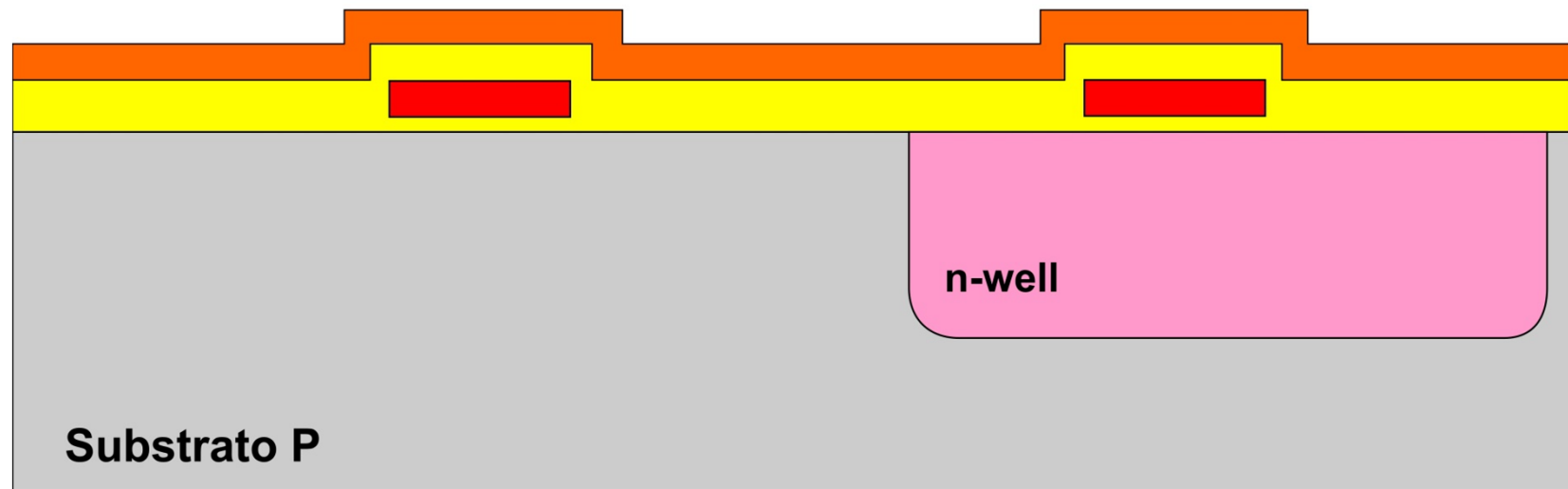
Passo 16 - Crescimento do óxido SiO_2

	SiO_2		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











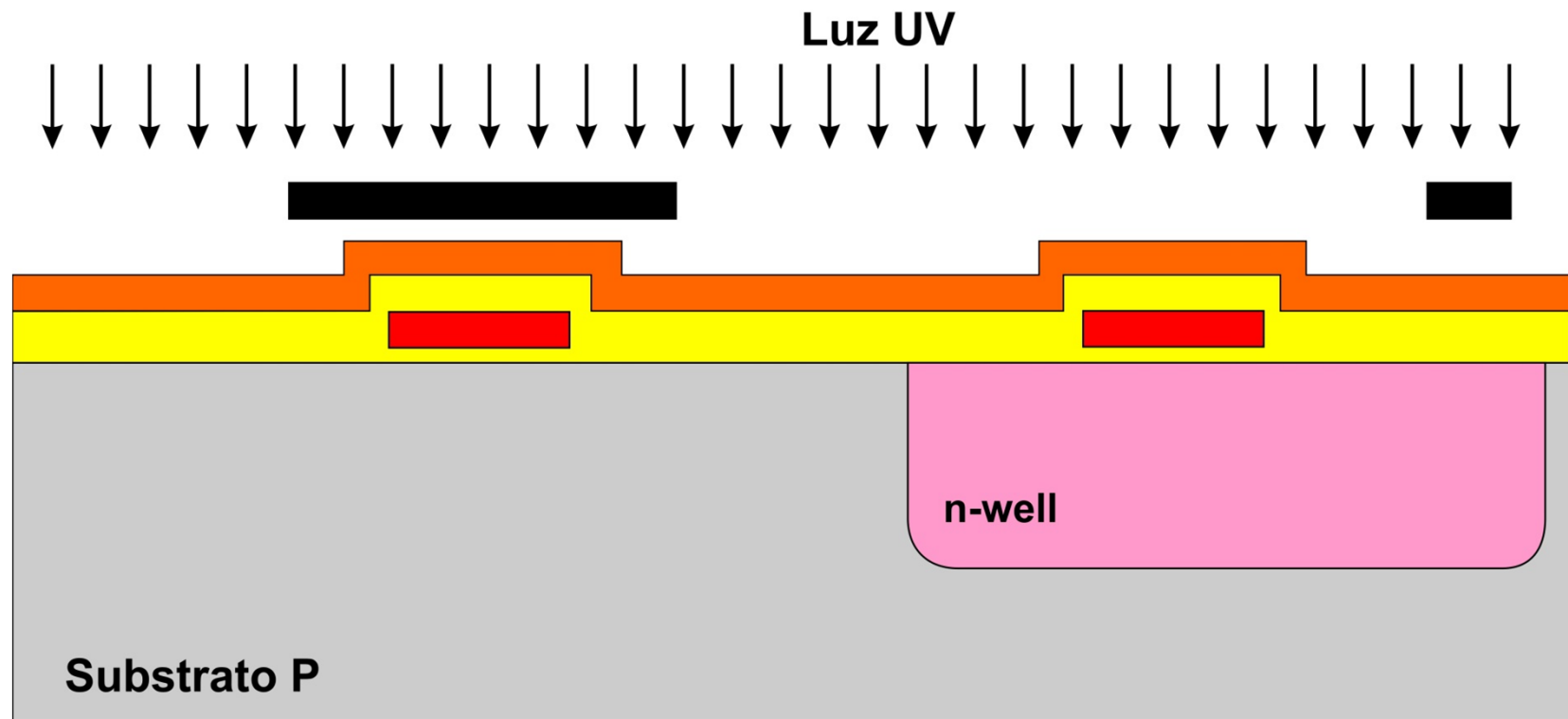
Passo 17 - Photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











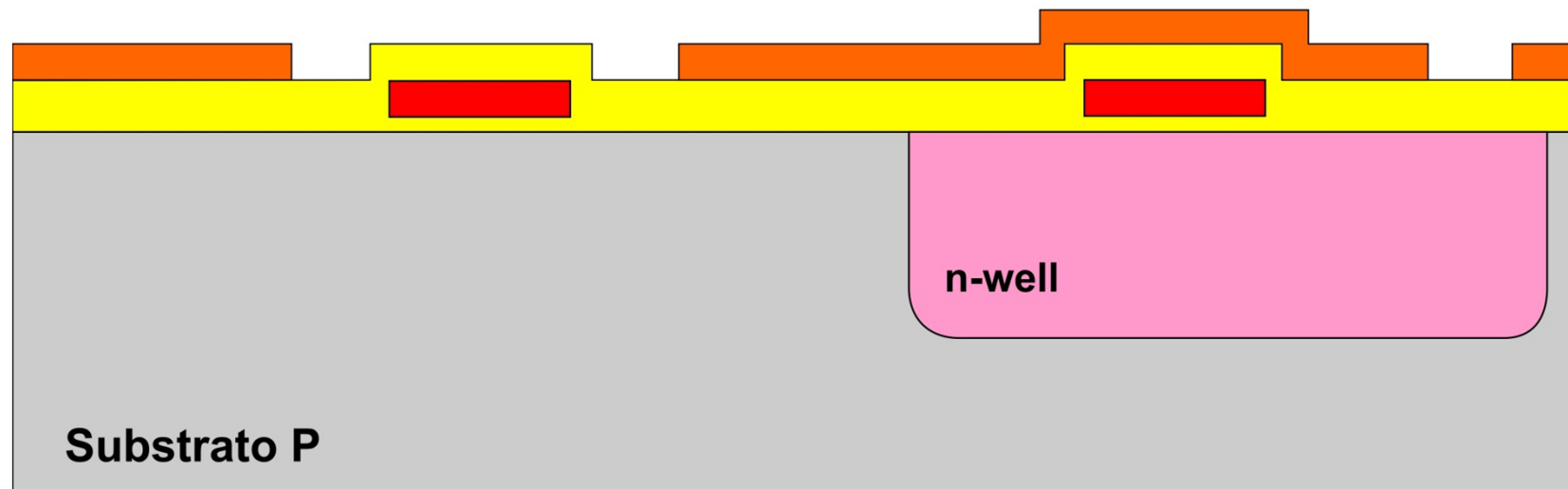
Passo 18 - Máscara de difusão n+

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











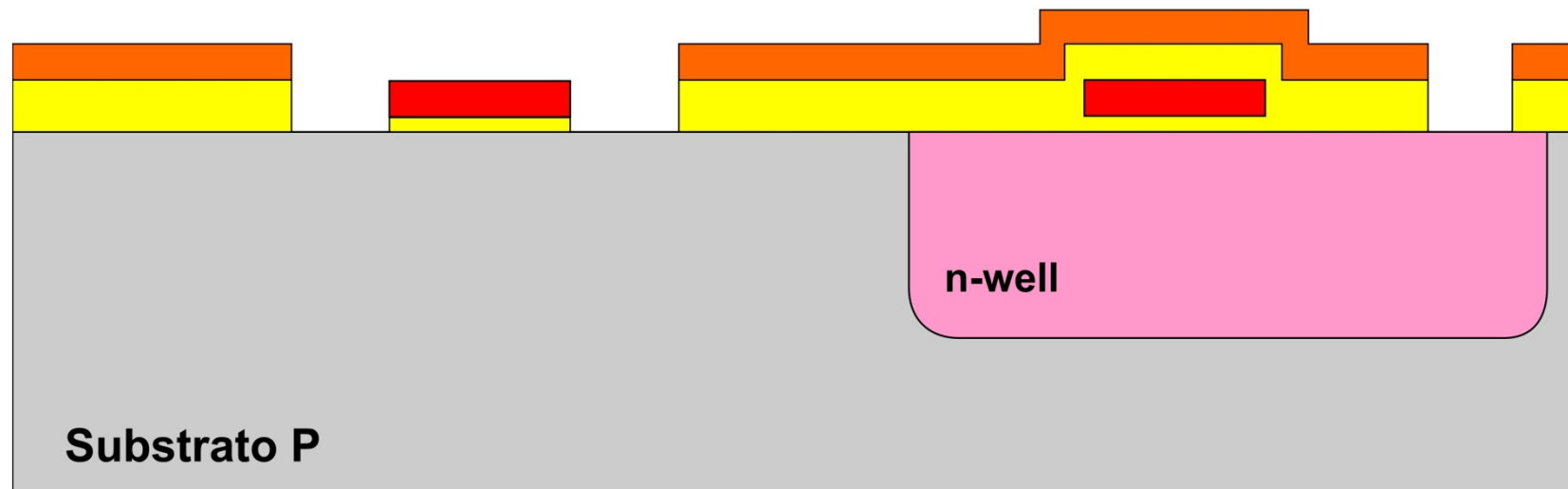
Passo 19 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











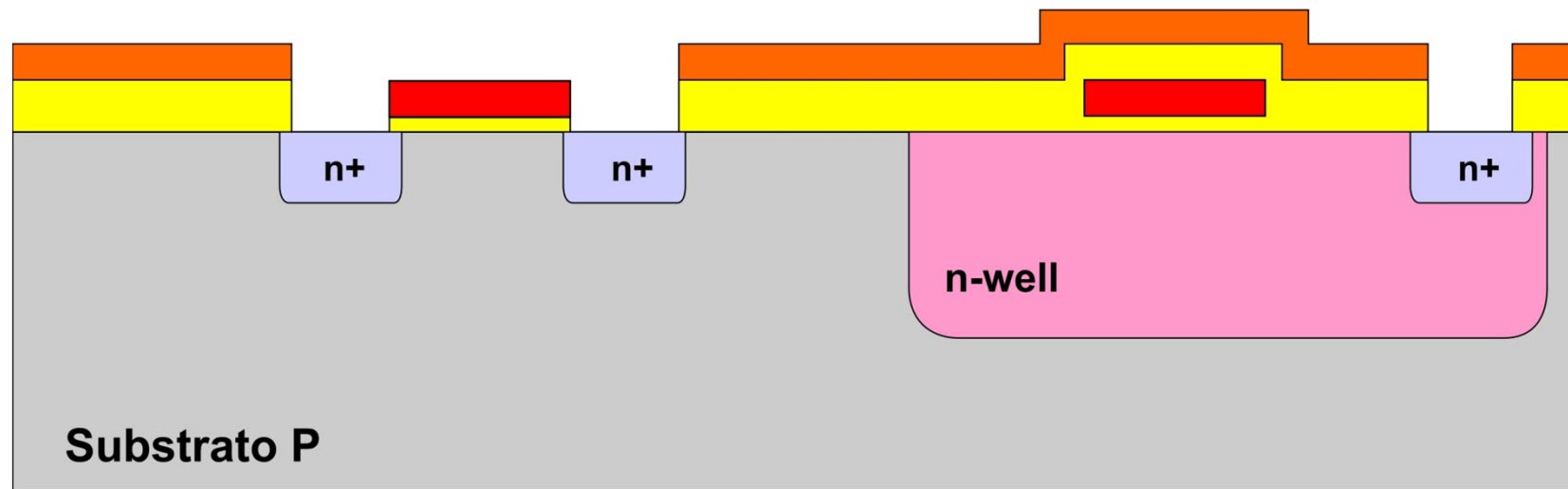
Passo 20 - Remoção do óxido

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











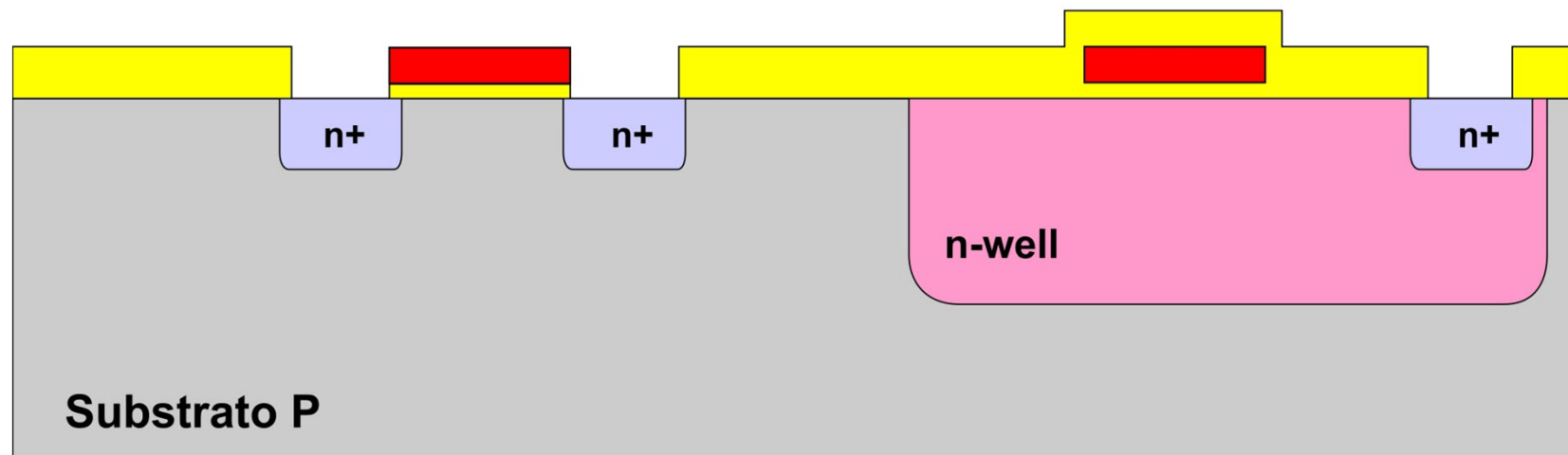
Passo 21 - Difusão n+

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











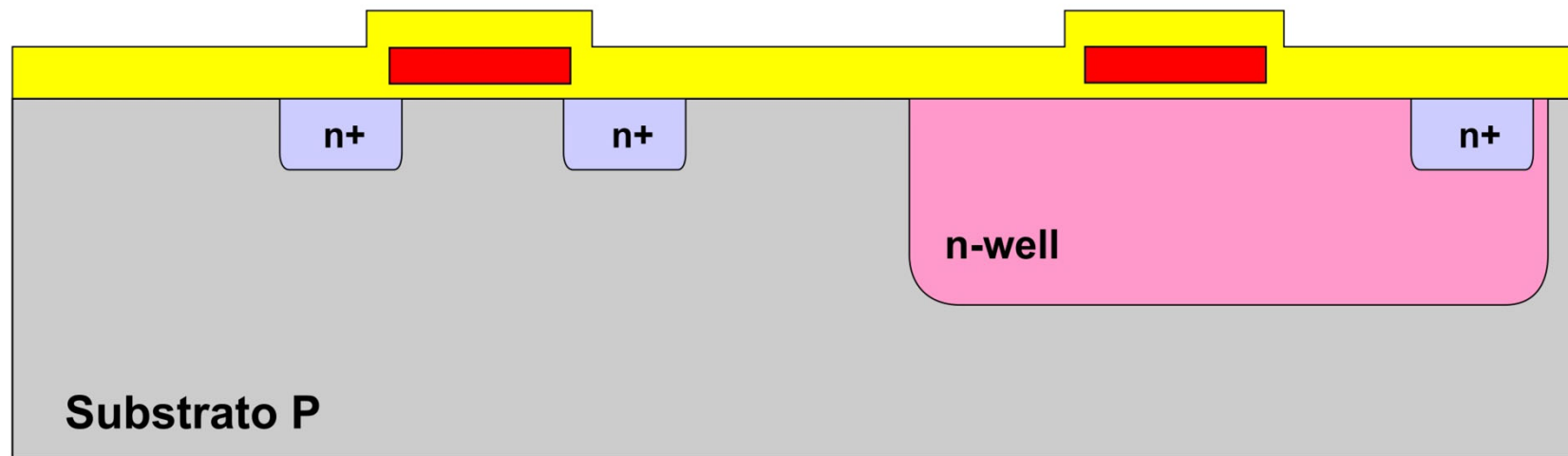
Passo 22 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











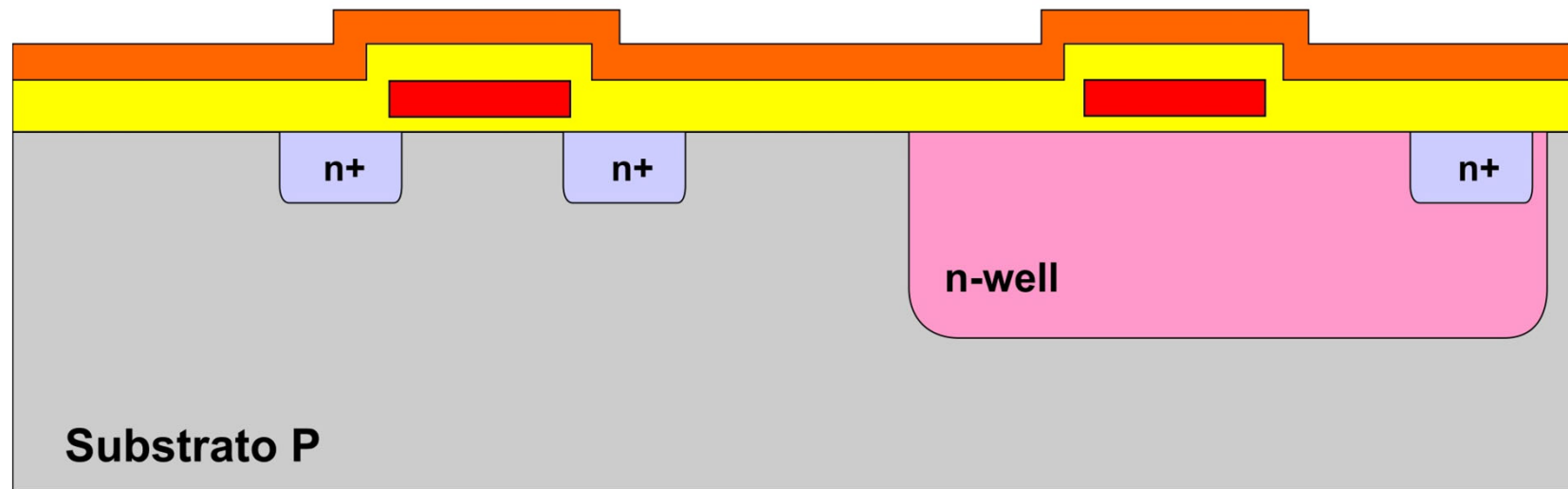
Passo 23 - Crescimento do óxido

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











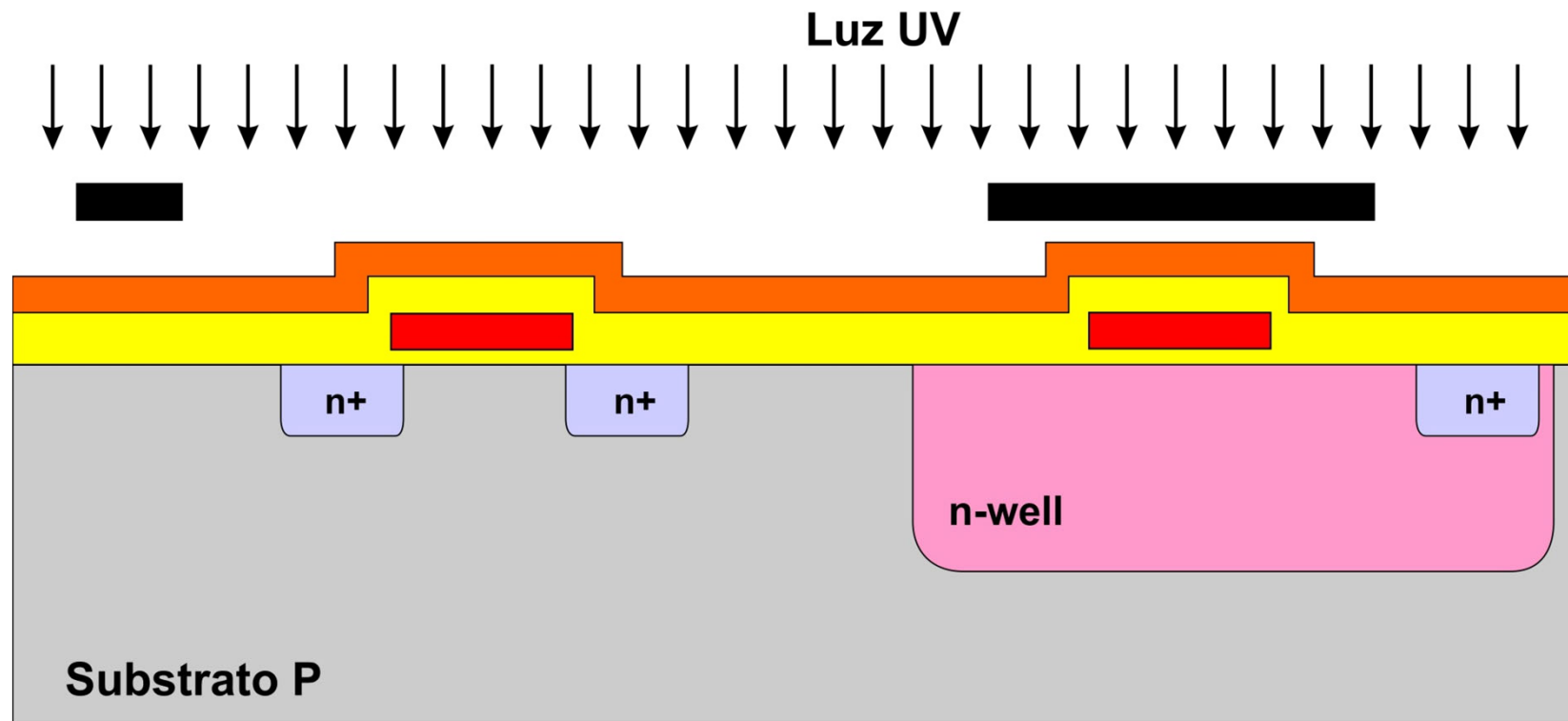
Passo 24 - Photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











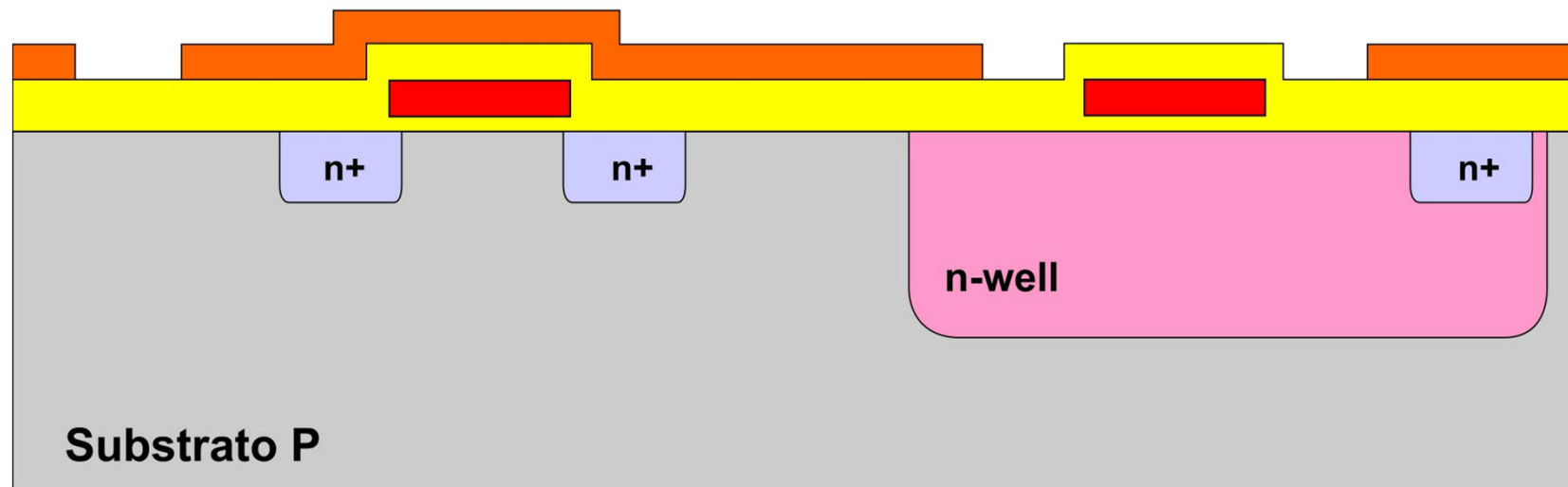
Passo 25 - Máscara de difusão p+

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











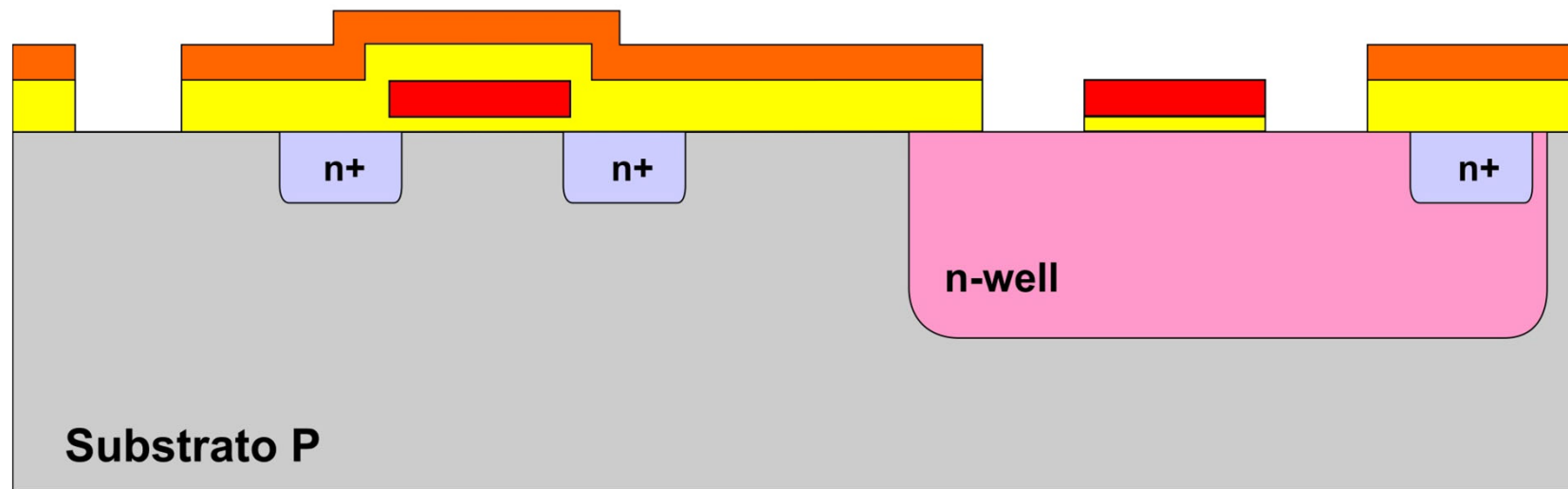
Passo 26 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











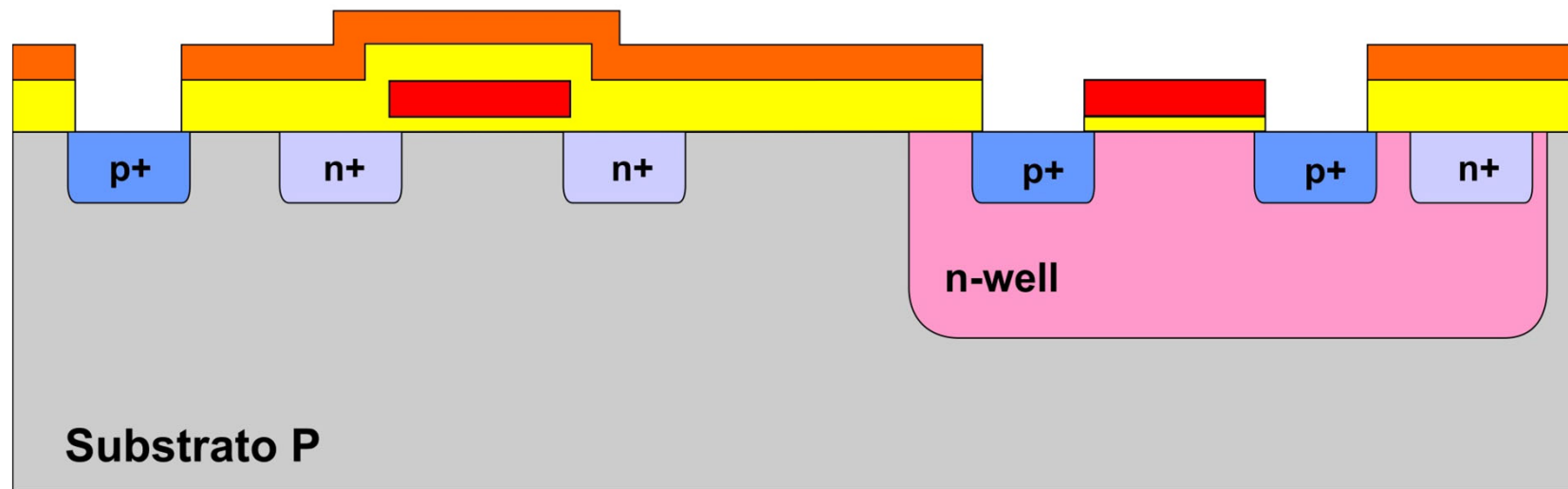
Passo 27 - Remoção do óxido

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











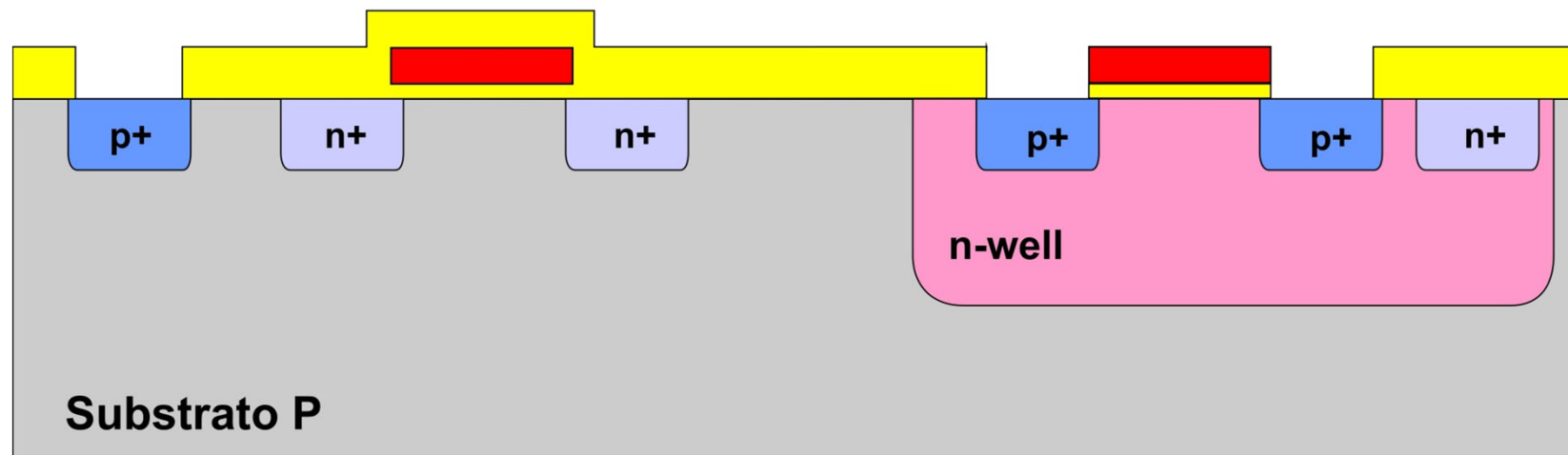
Passo 28 - Difusão p+

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











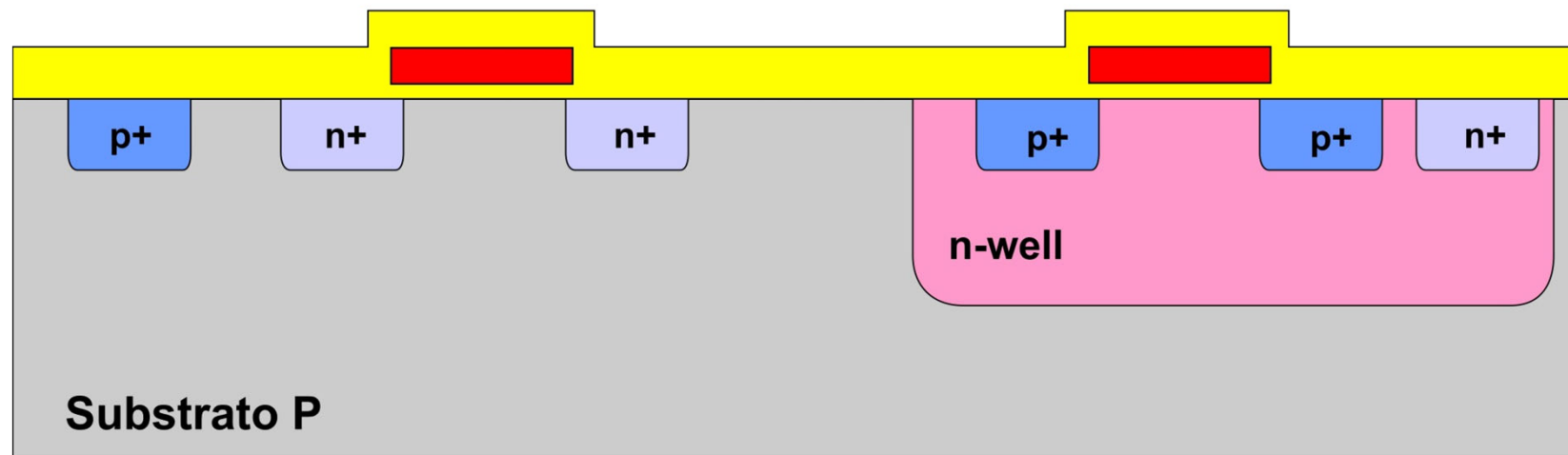
Passo 29 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











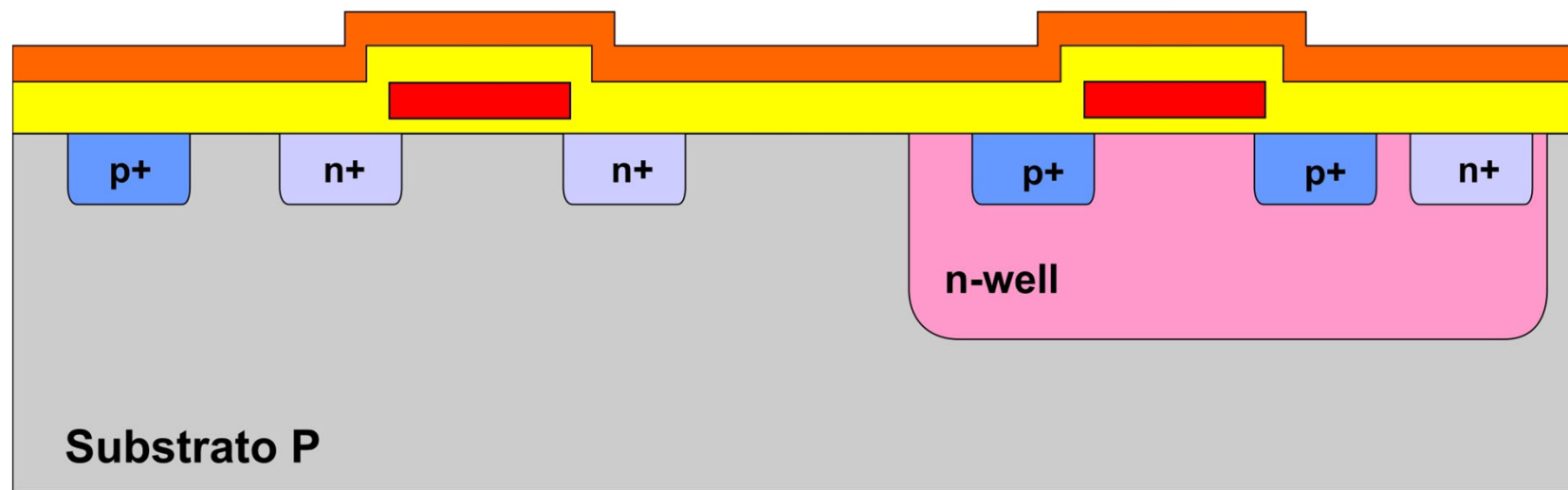
Passo 30 - Crescimento do óxido

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











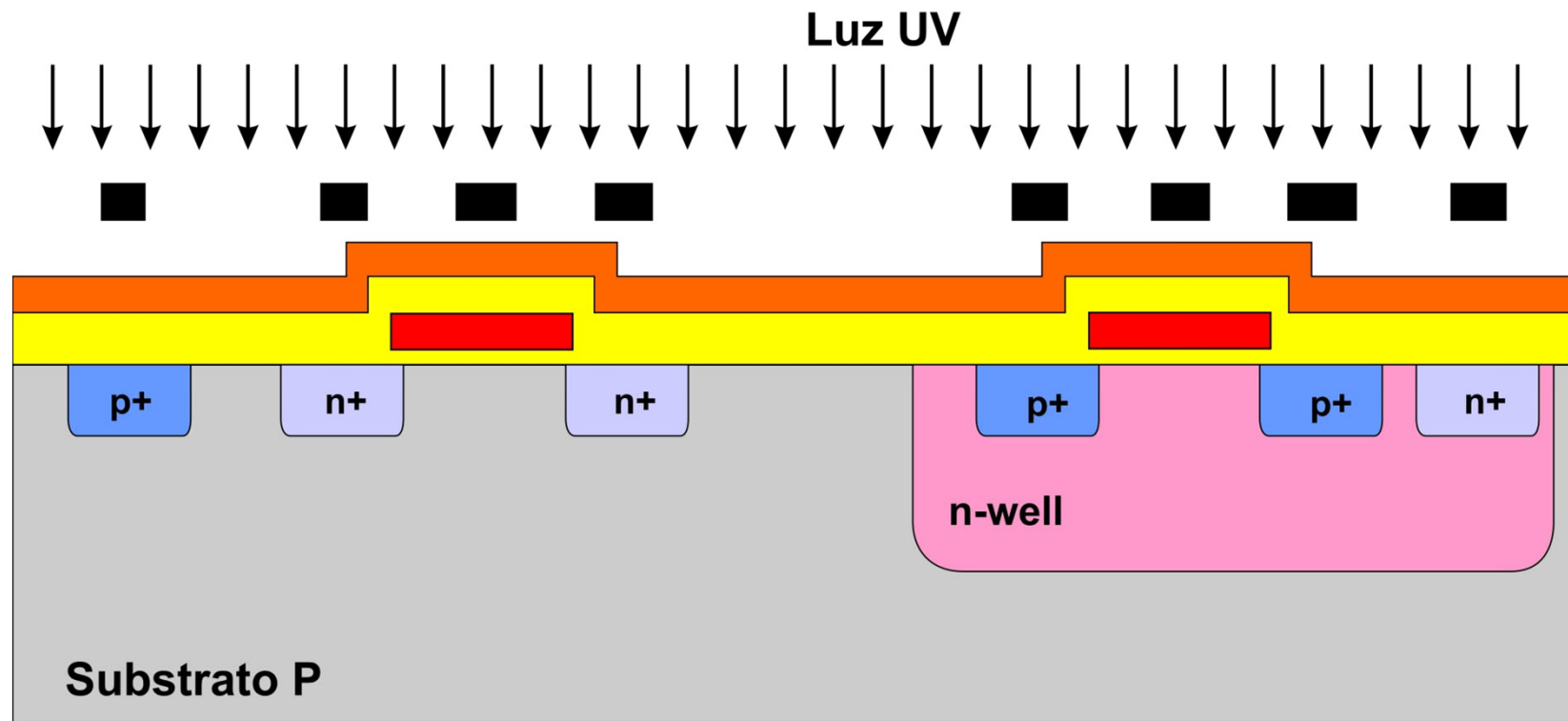
Passo 31 - Photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











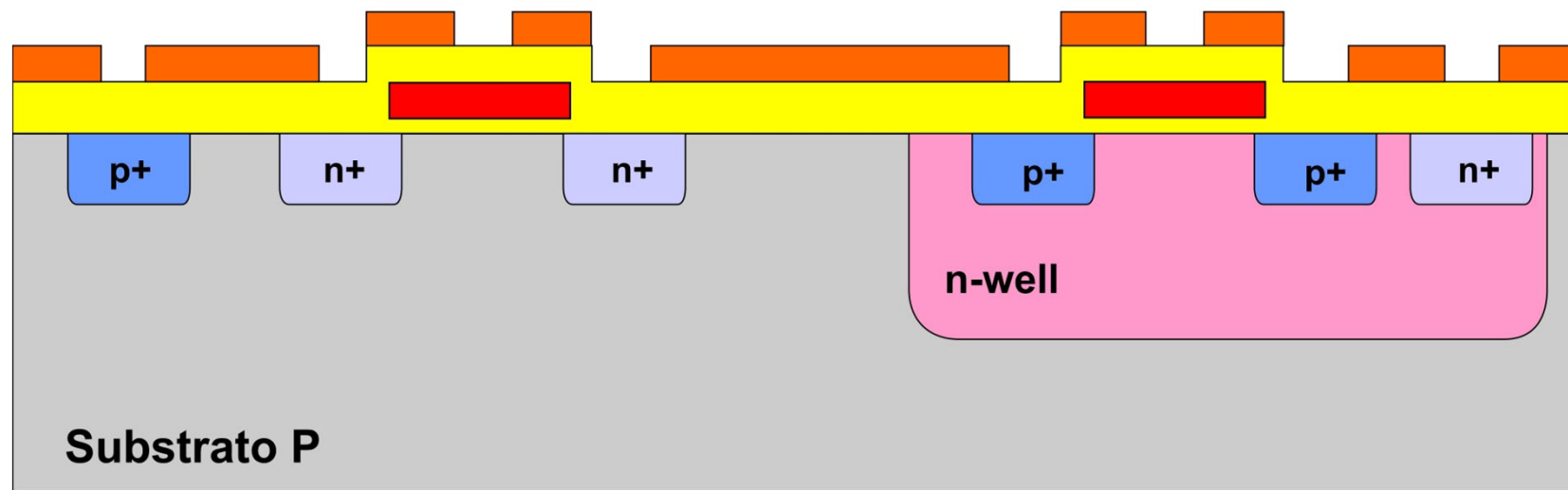
Passo 32 - Máscara de contatos

	SiO ₂		n+
	substrato P		p+
	photoresist		alúminio
	n-well		polisilício











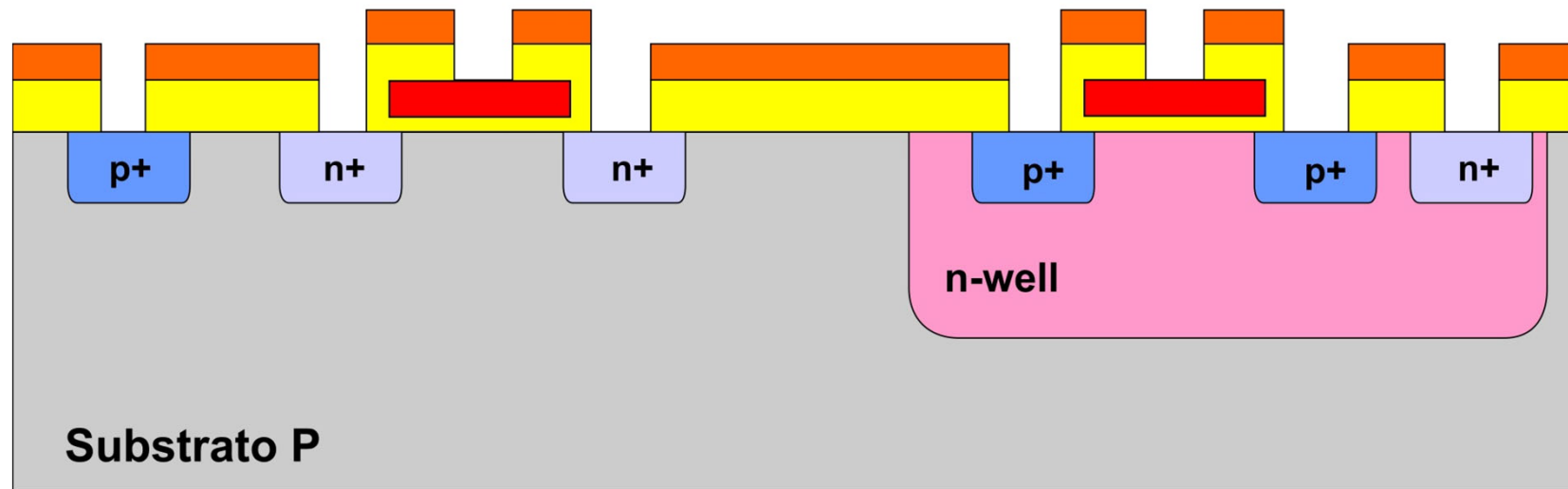
Passo 33 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











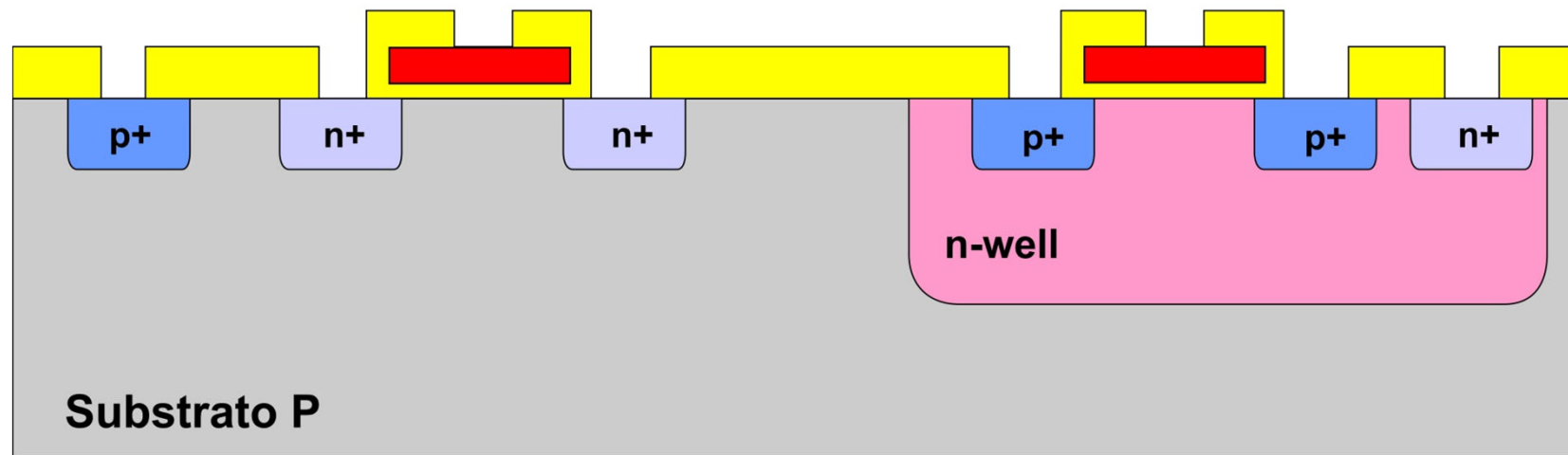
Passo 34 - Remoção do óxido

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











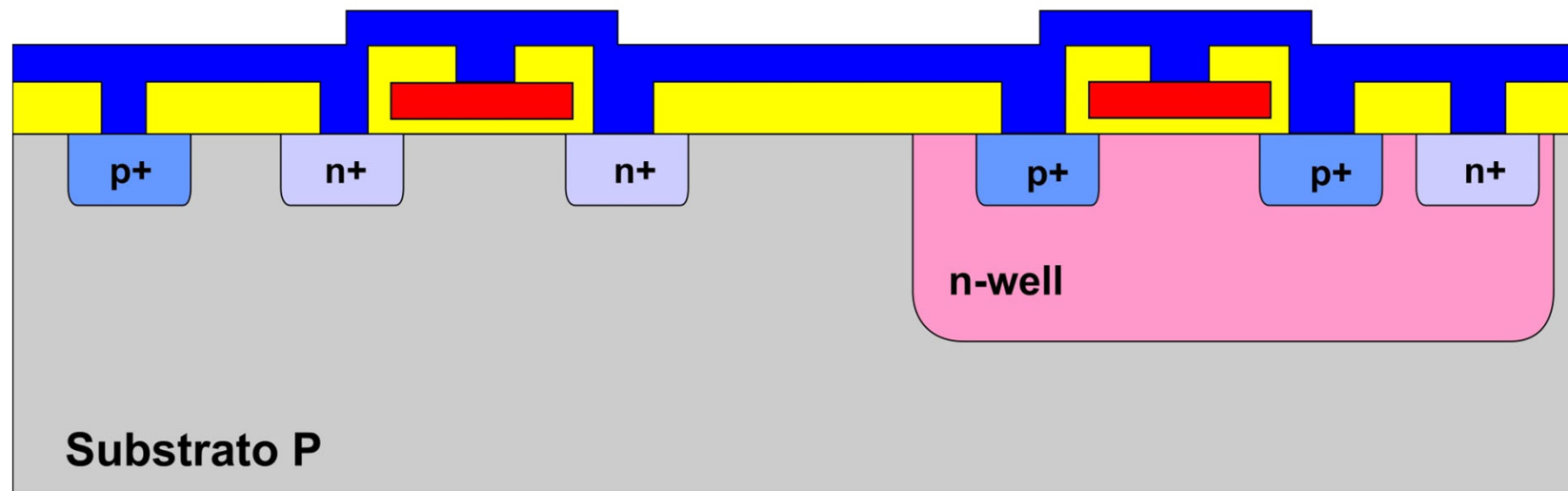
Passo 35 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











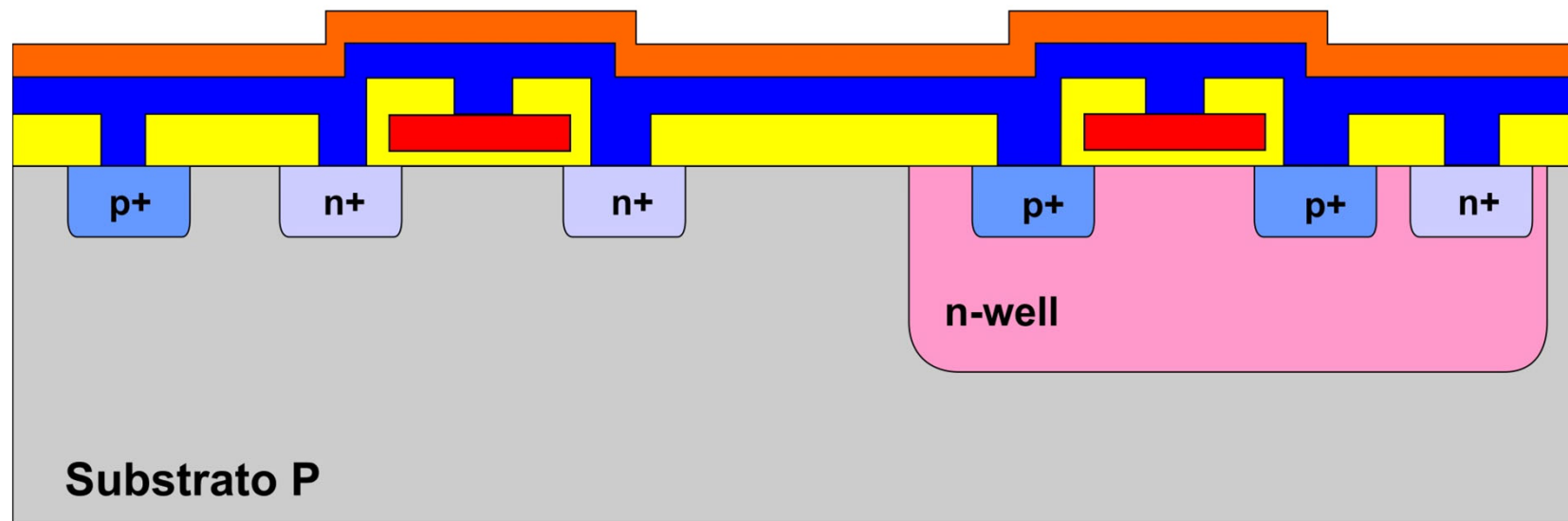
Passo 36 - Deposição de alumínio, M1

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício

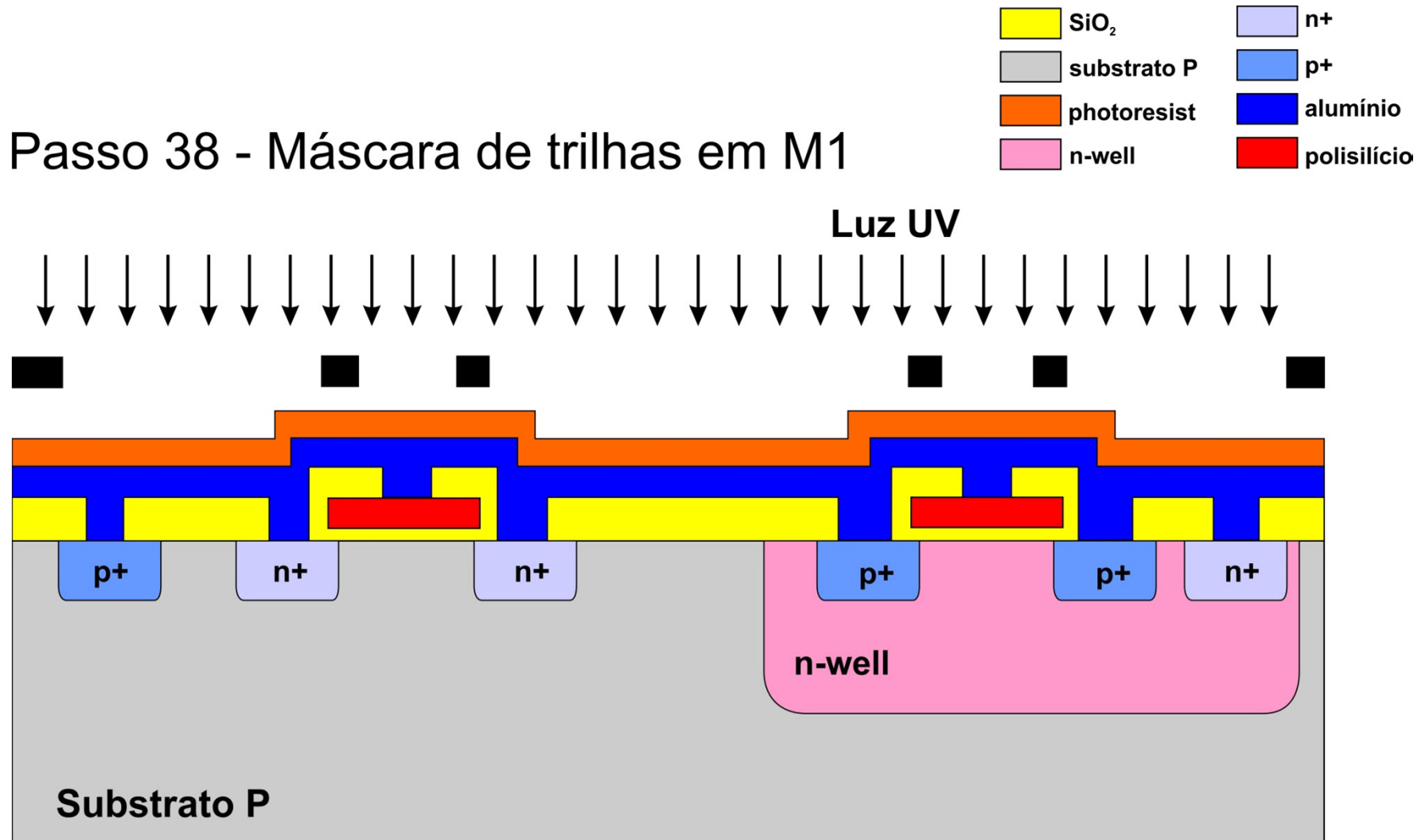


Passo 37 - Photoresist









	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício

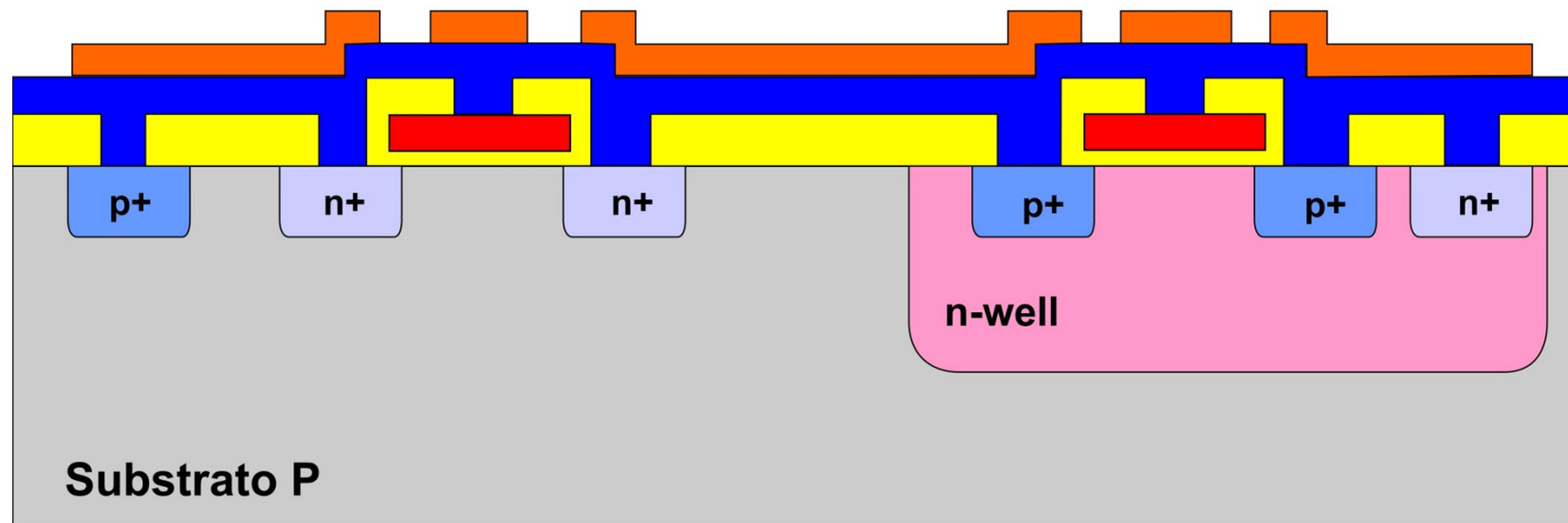


Passo 38 - Máscara de trilhas em M1











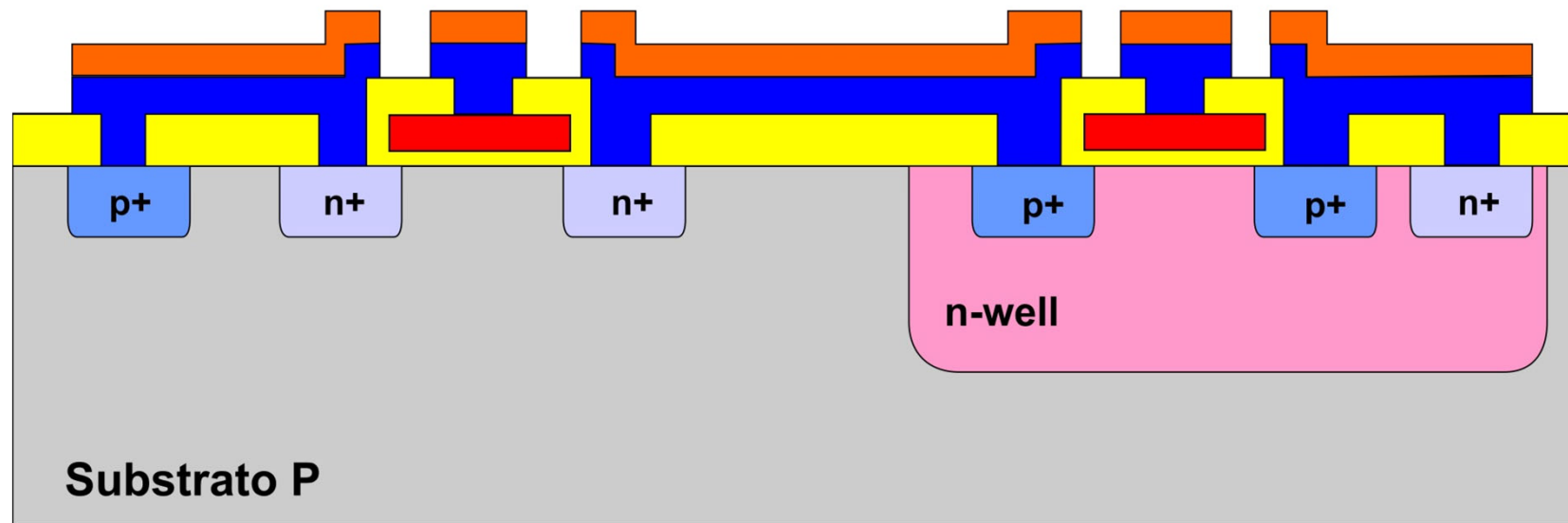
Passo 39 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











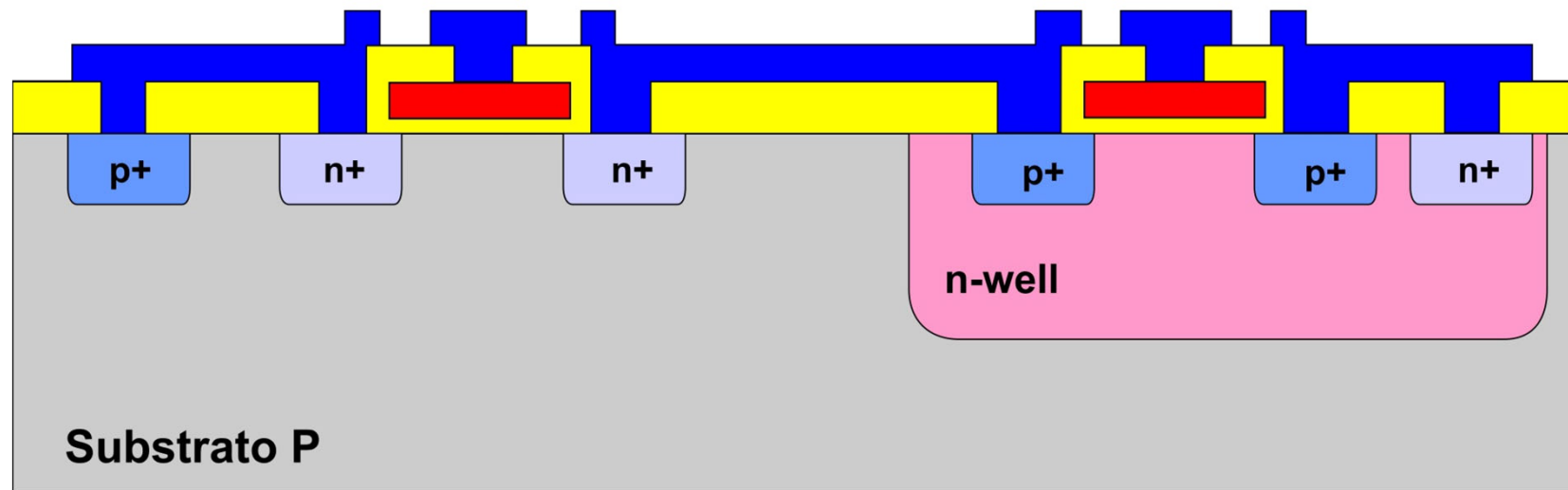
Passo 40 - Remoção do metal, M1

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











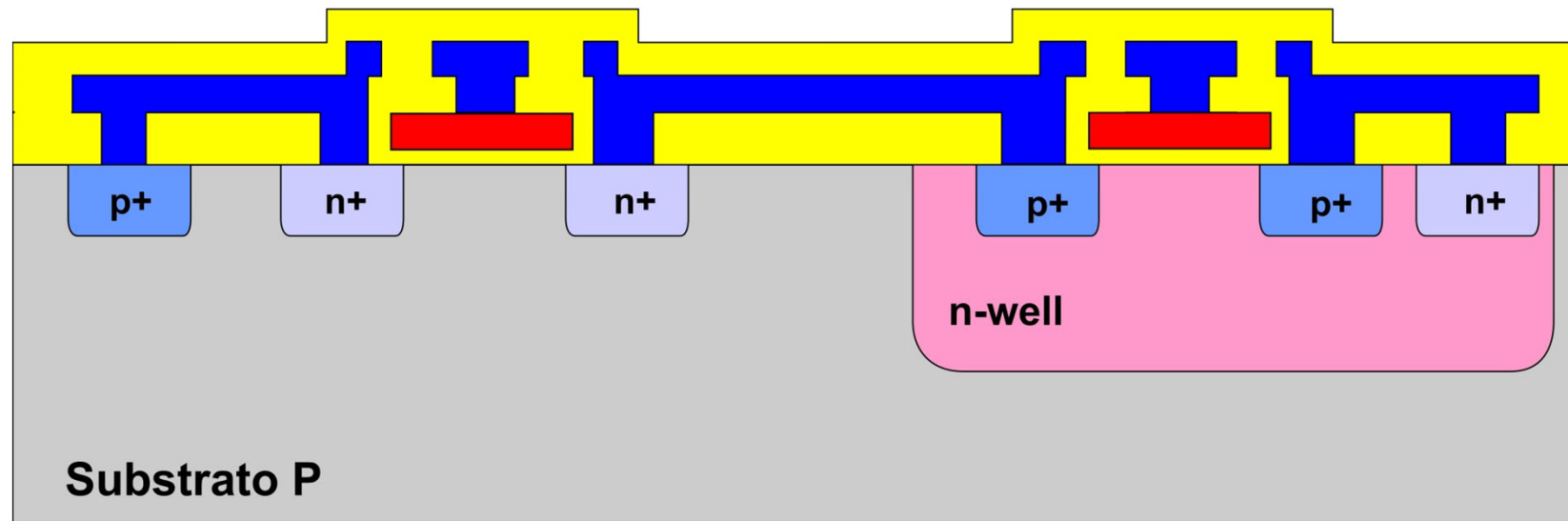
Passo 41 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











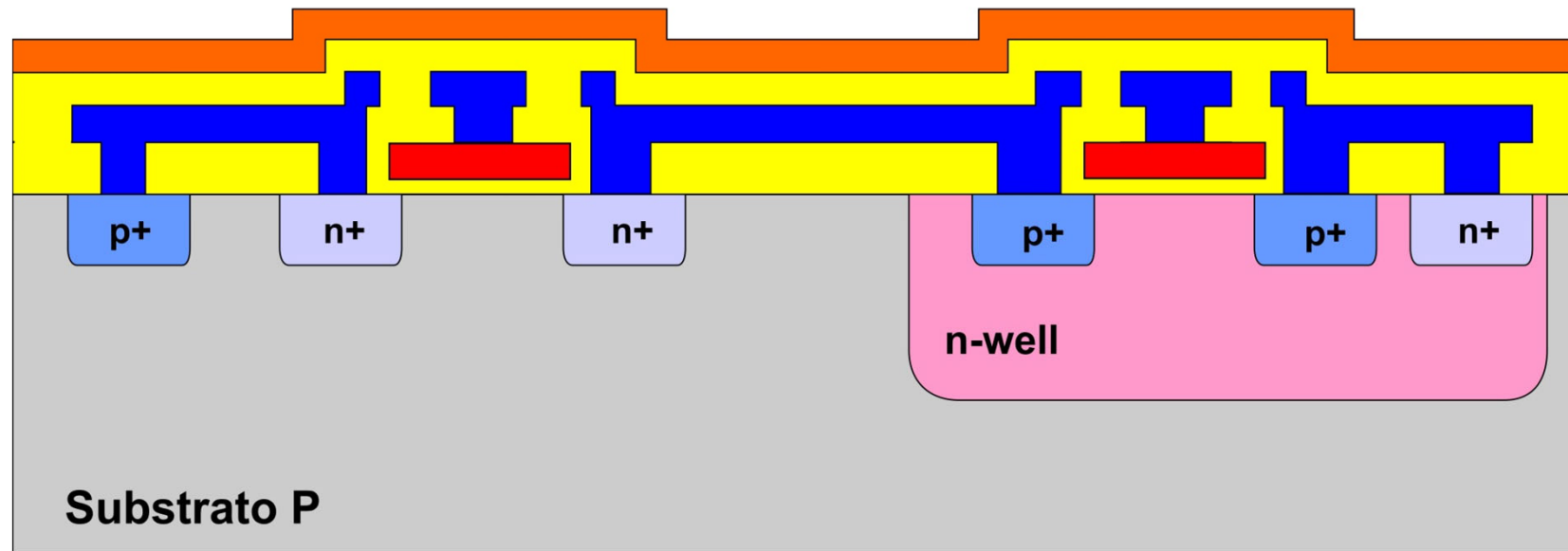
Passo 42 - Deposição de óxido

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício

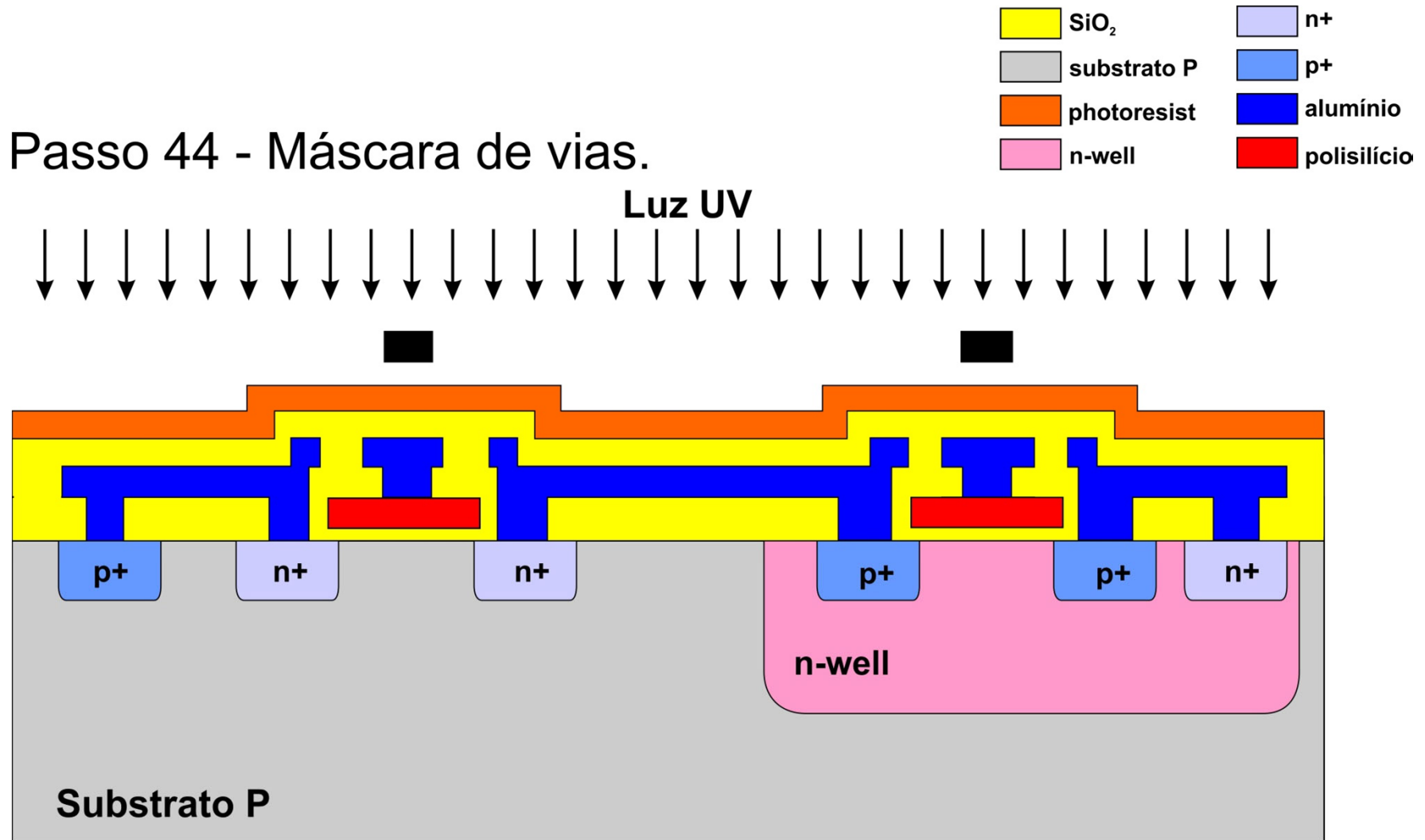


Passo 43 - Photoresist









	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício

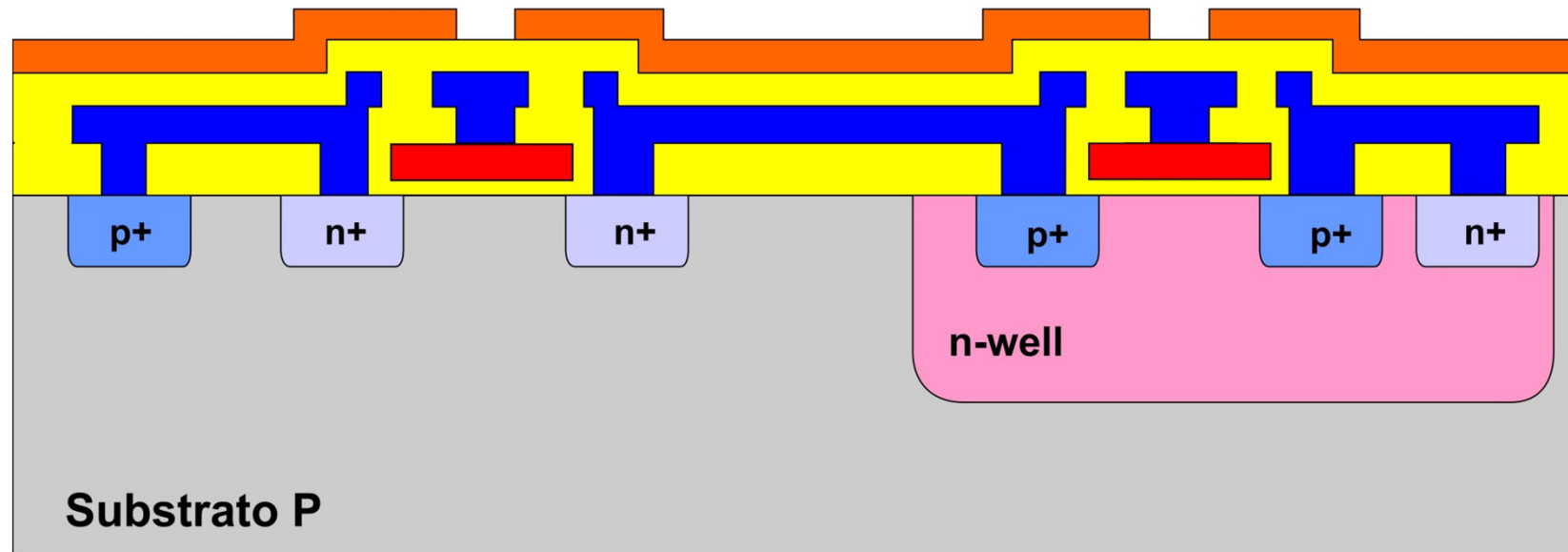


Passo 44 - Máscara de vias.











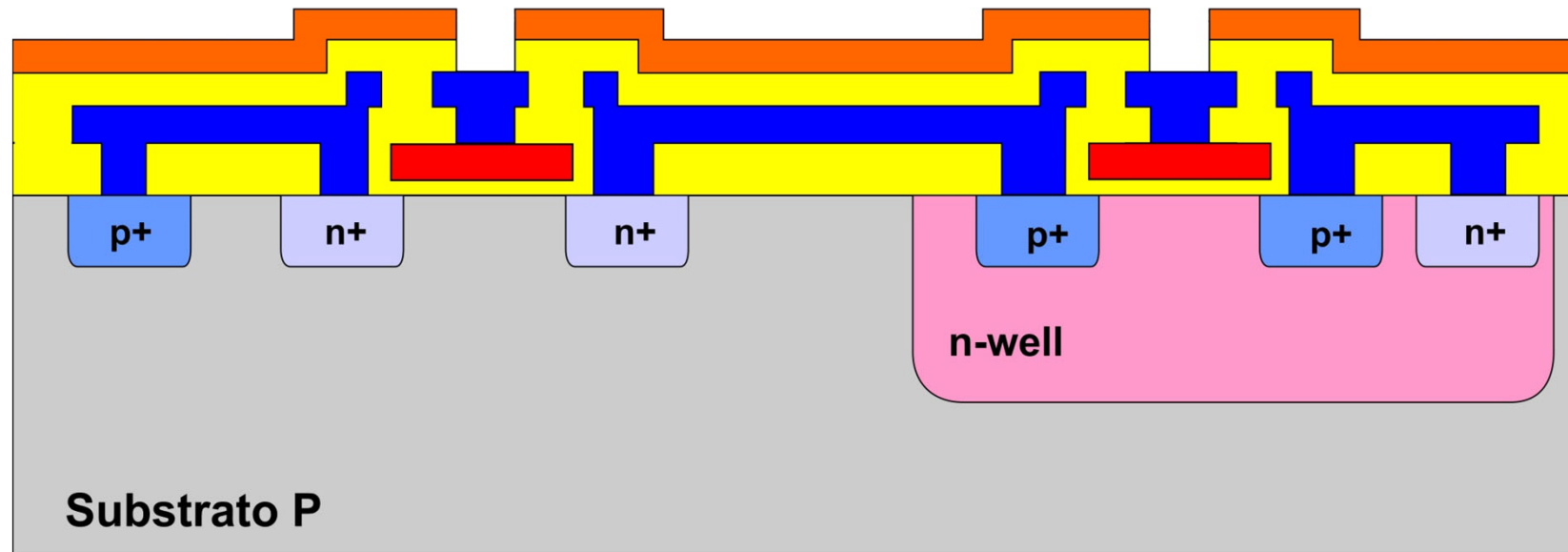
Passo 45 - Remoção do photoresist.

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











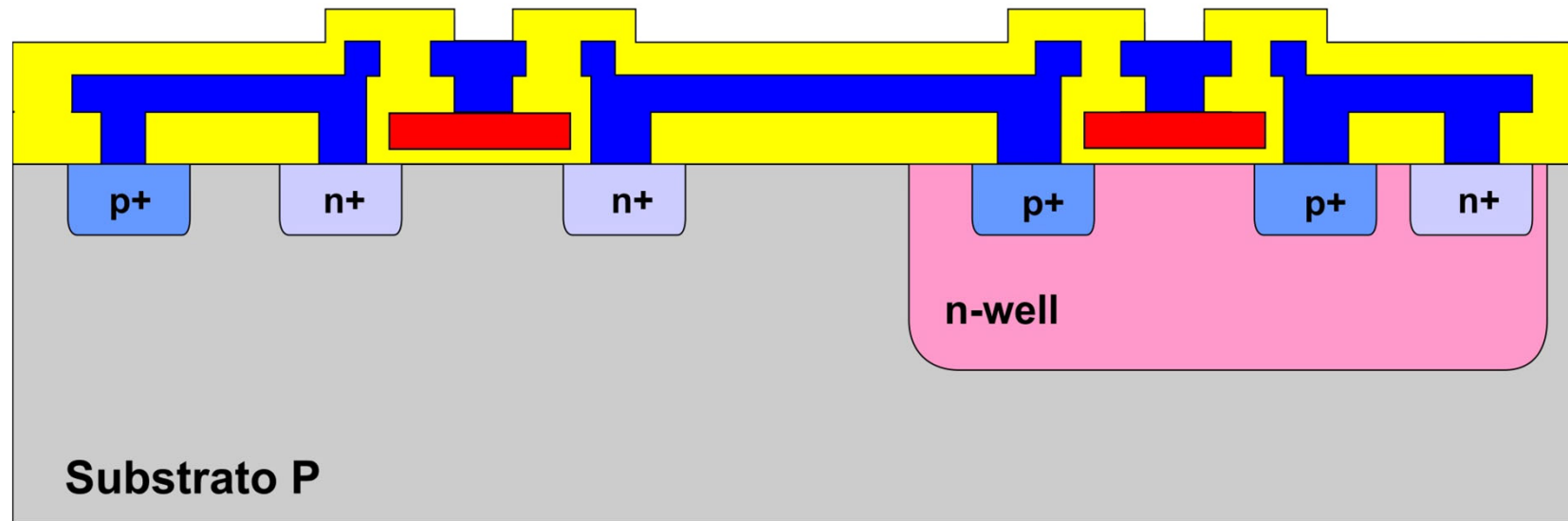
Passo 46 - Remoção do óxido

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polissilício











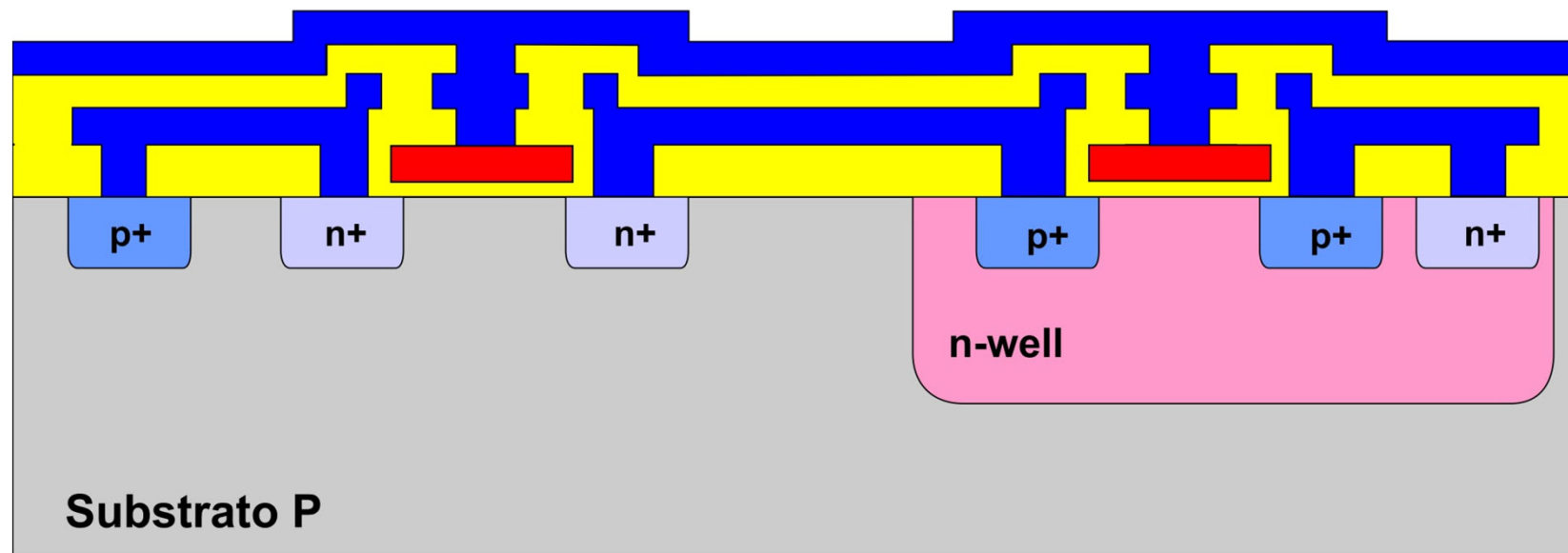
Passo 47 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











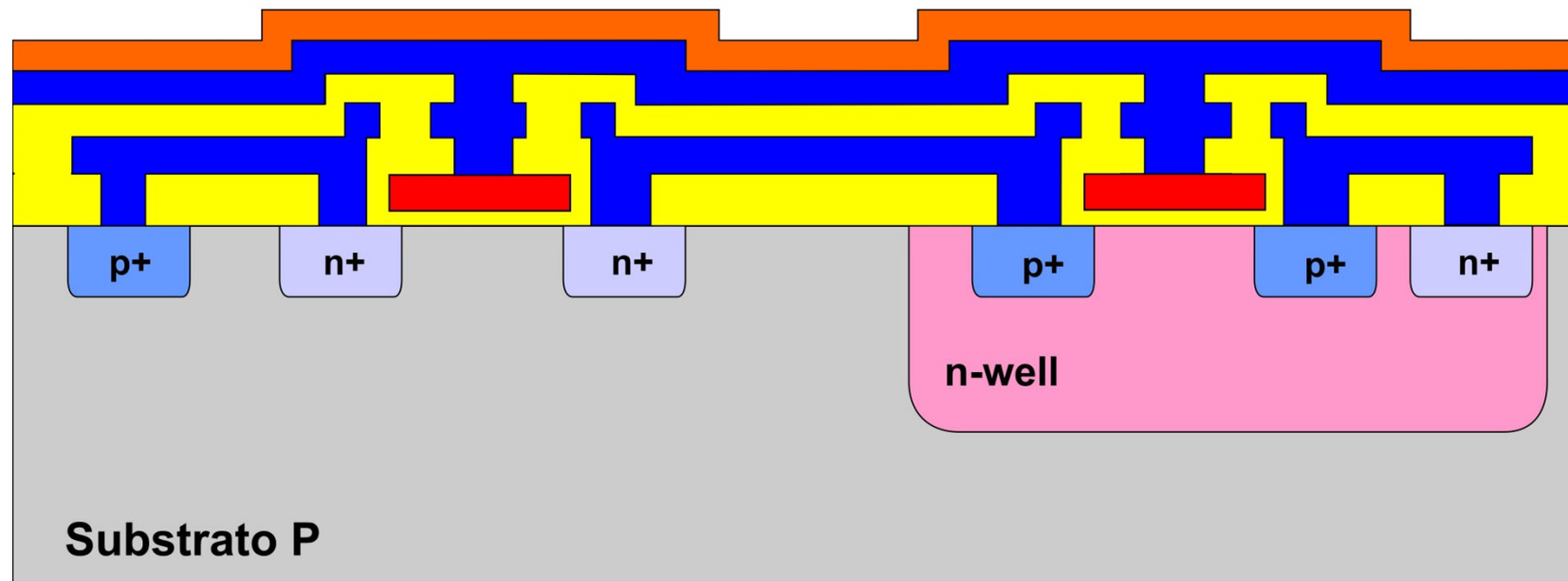
Passo 48 - Deposição de metal, M2

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício

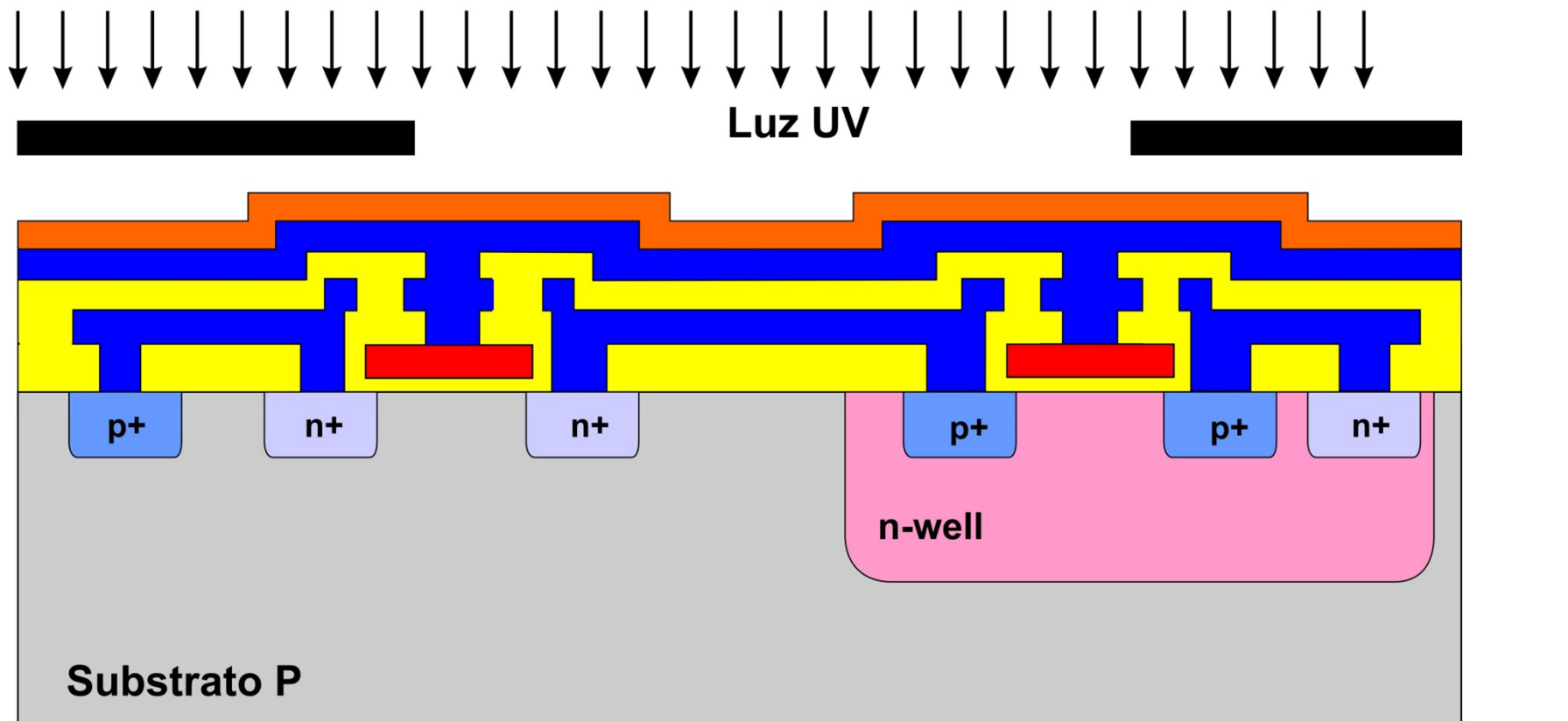


Passo 49 - Photoresist









	SiO ₂		n+
	substrato P		p+
	photoresist		aluminio
	n-well		polisilício

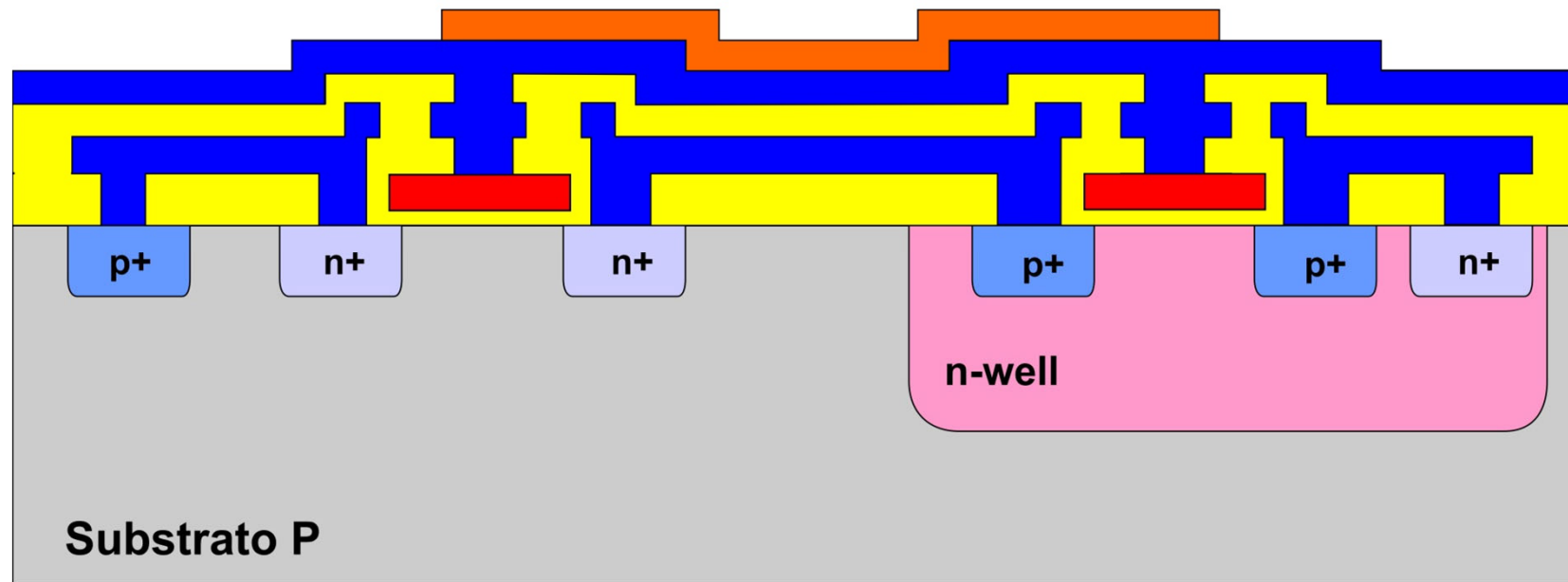


Passo 50 - Máscara de trilhas em M2











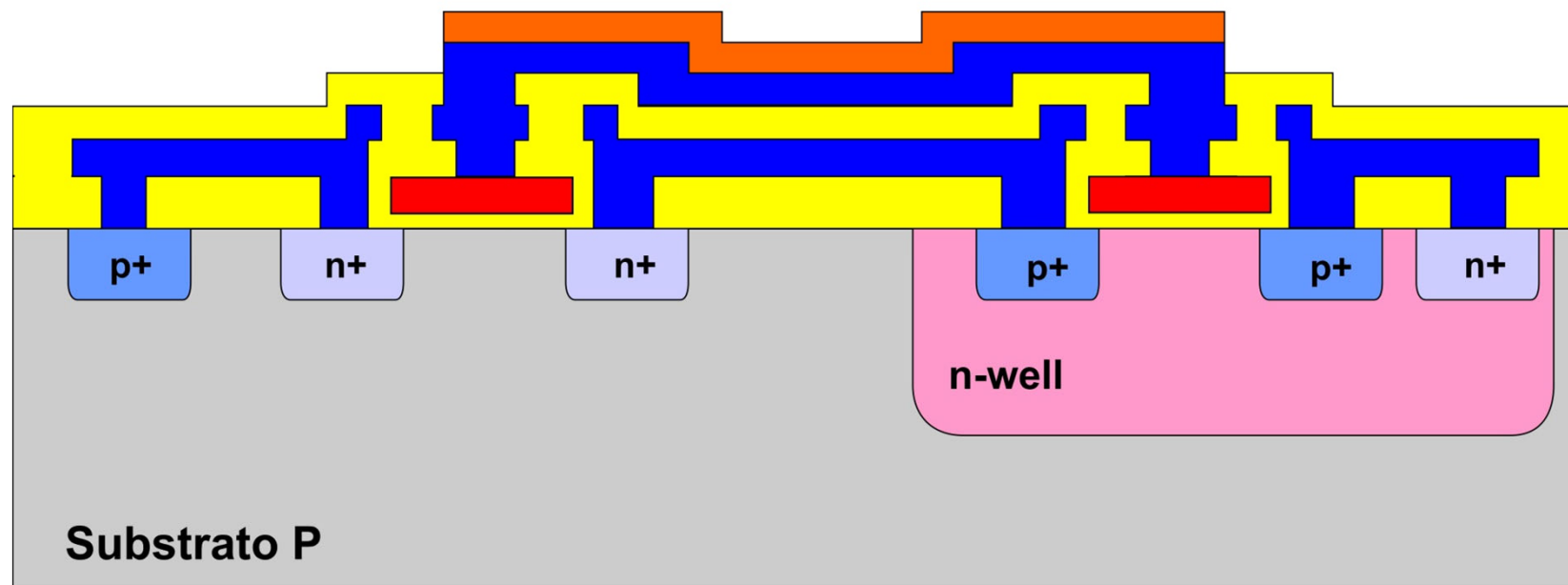
Passo 51 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











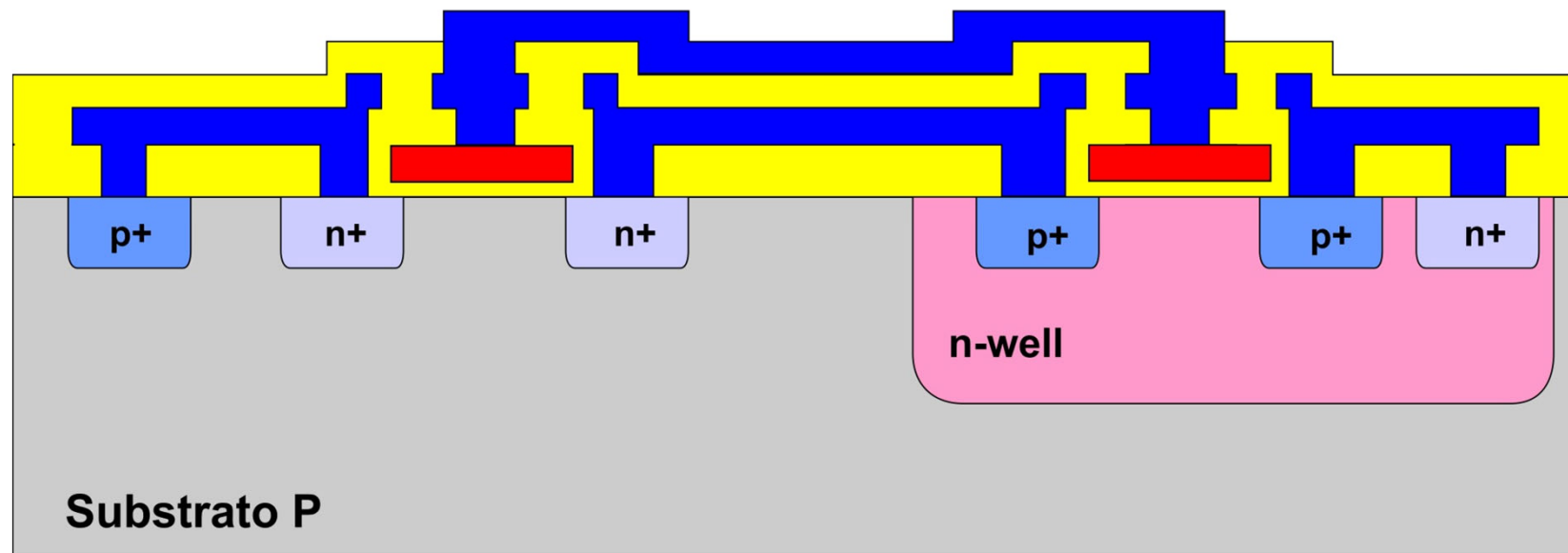
Passo 52 - Remoção do metal, M2

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











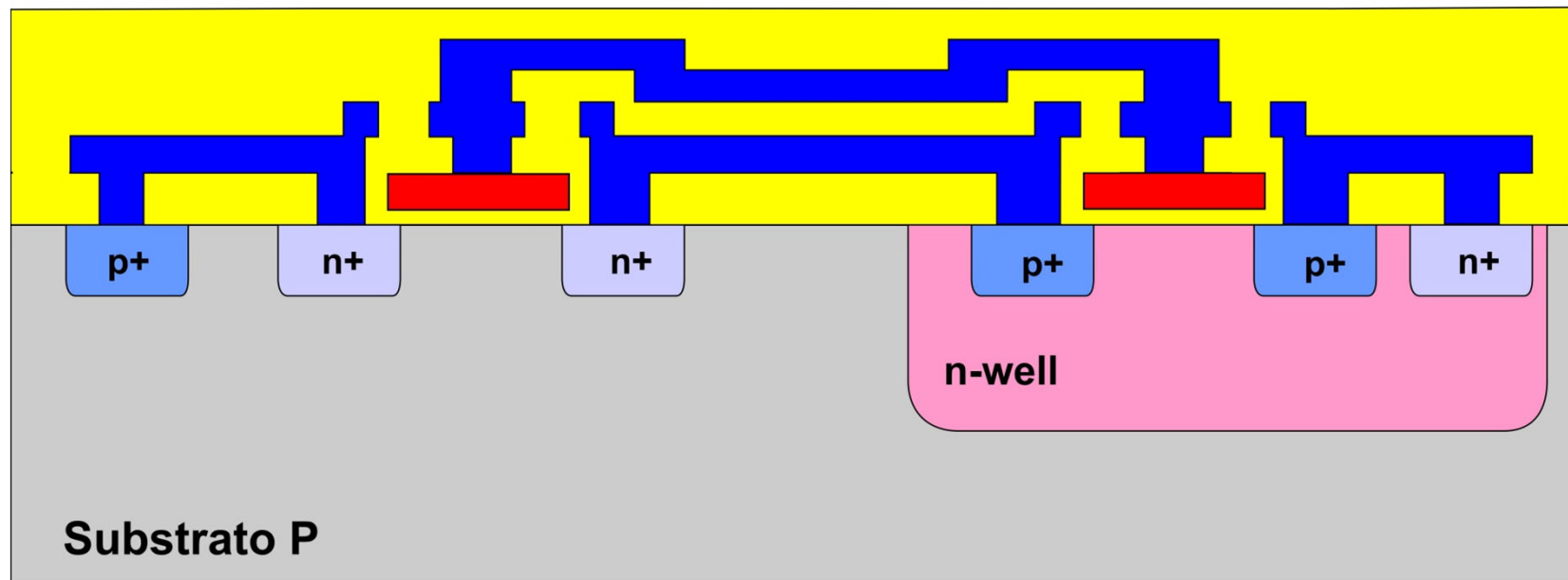
Passo 53 - Remoção do photoresist

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











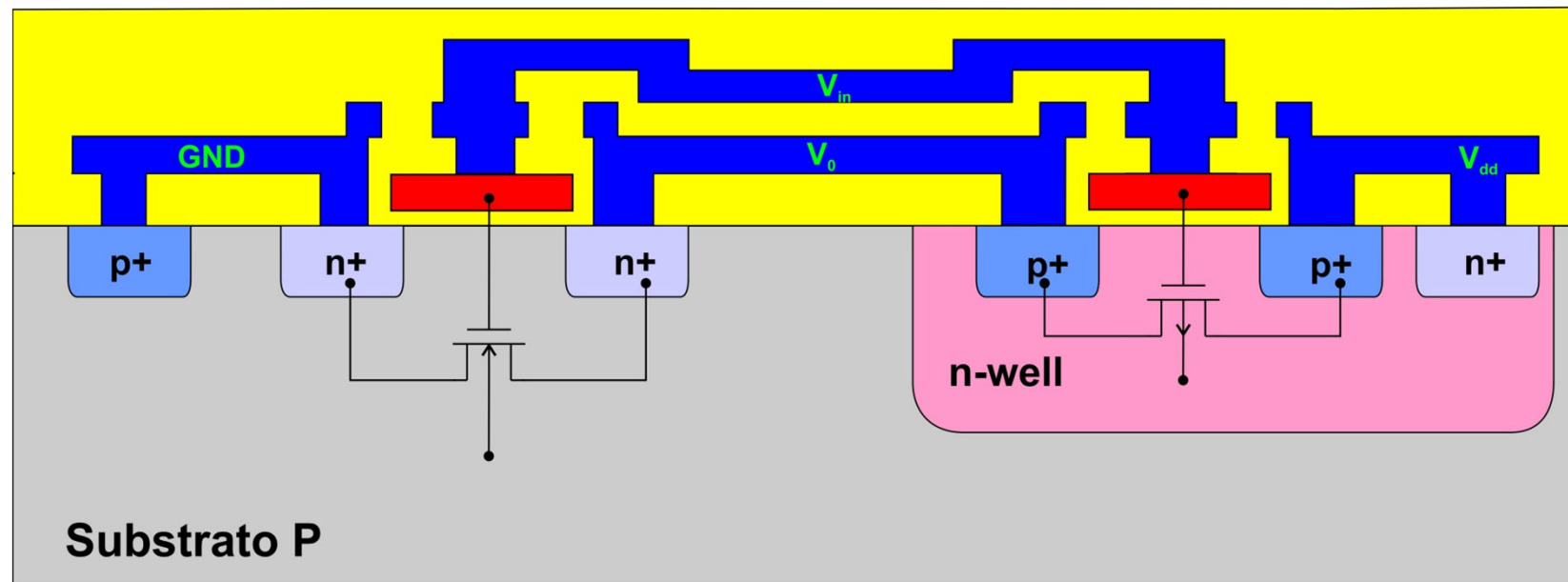
Passo 54 - Passivação

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício











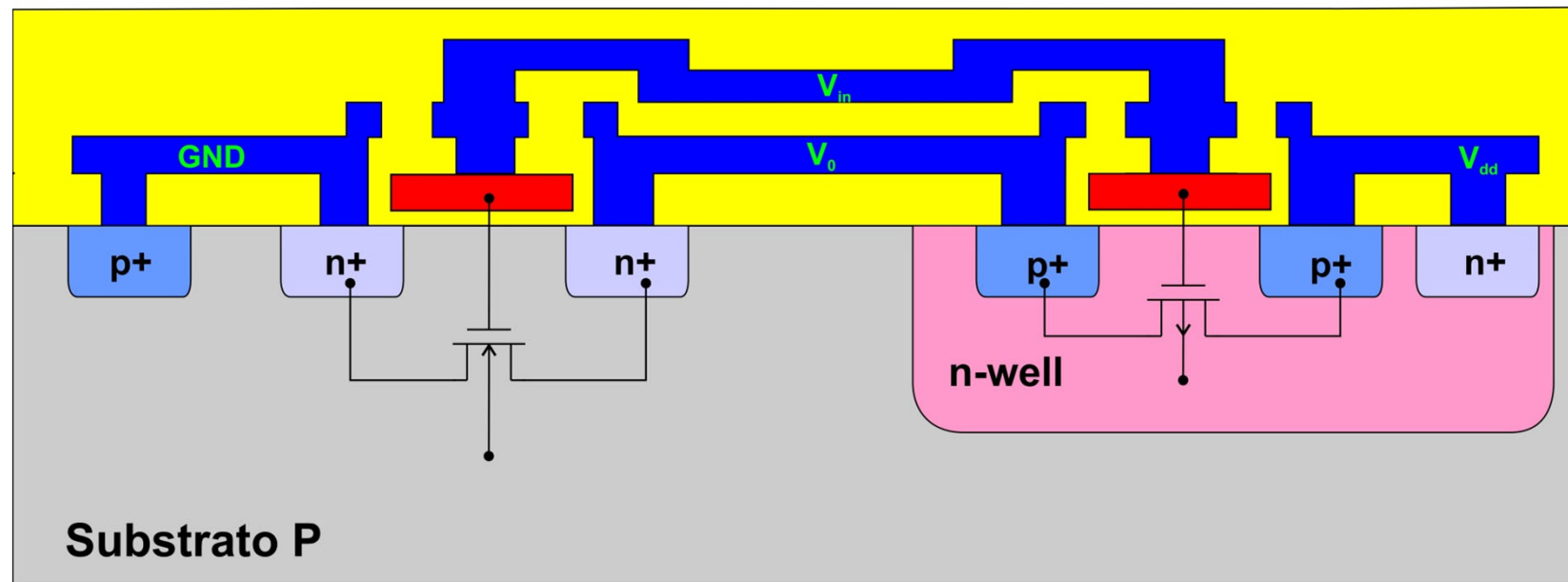
Passo 55 - Inversor CMOS

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício



Passo 55 - Inversor CMOS

	SiO ₂		n+
	substrato P		p+
	photoresist		alumínio
	n-well		polisilício



**Final deste
Tópico**