TIGFET10nm Design Rule Manual

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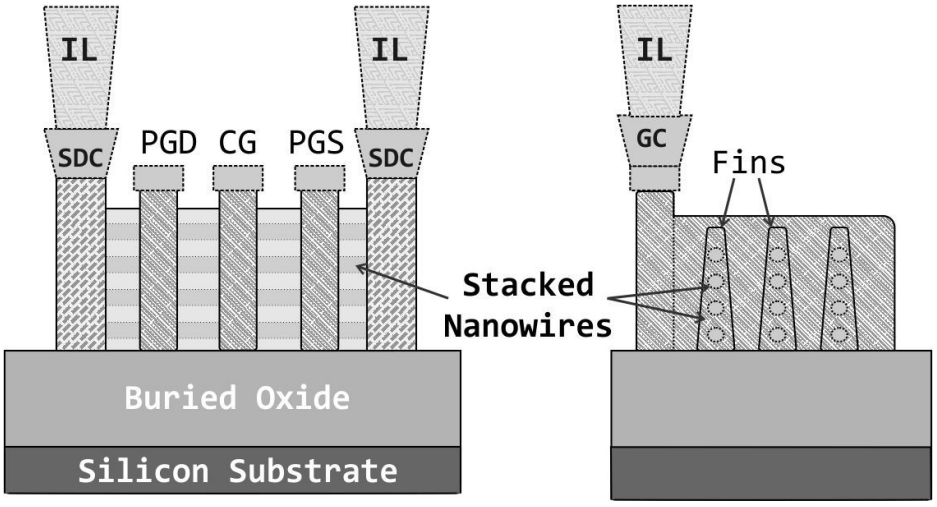
This document provides the graphical detail of the design rules used in TIGFET10nm PDK.

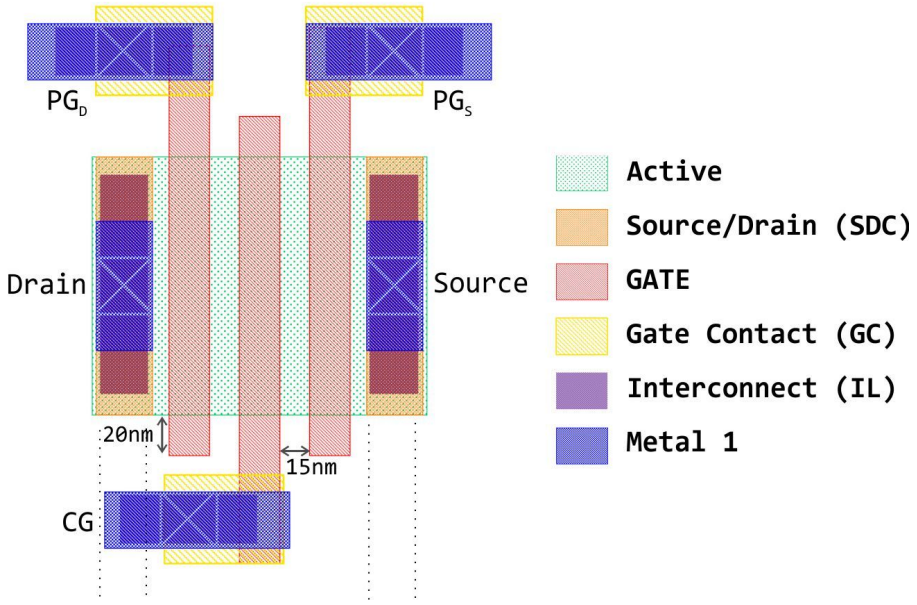
Cross-section of the Device



TIGFET10nm Layers

Name	Purpose
Active	Represents the active region of the device
GATE	Gate layer for all three gate terminals of the TIGFET device
SDC	Contact to connect Source and Drain terminals
GC	Contact for the GATE terminal
IL	MEOL layer to allow metal connections to the source/drain/gate through SDC and GC layers
VM0-VM4	Metal contacts to connect lower level metal to immediate higher-level metal
M1-M5	Lower level interconnect metal layers
VM5-VM9	Contacts for global metal layers
M6-M10	Global Metal layers

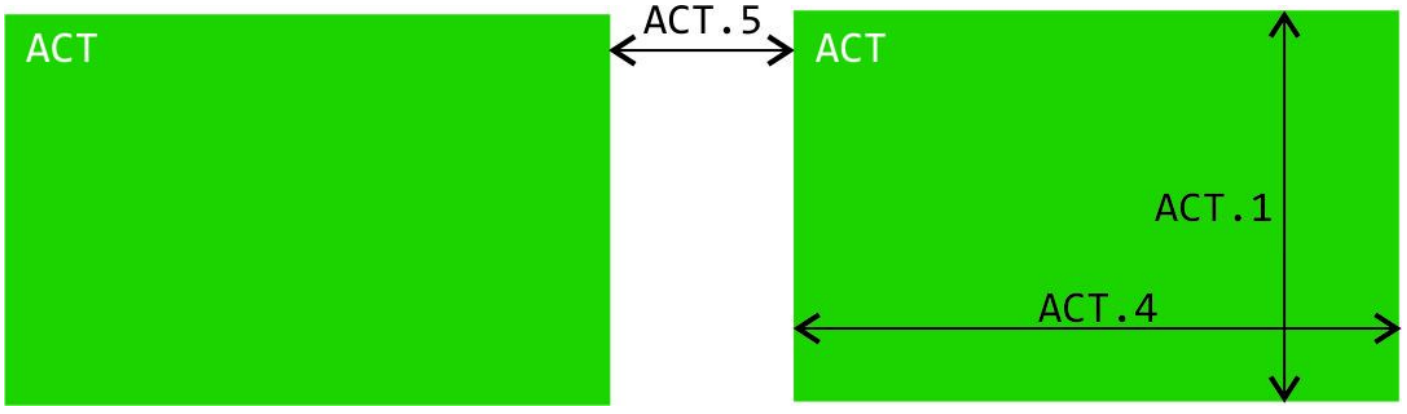
TIGFET Device Layout



Design Rules

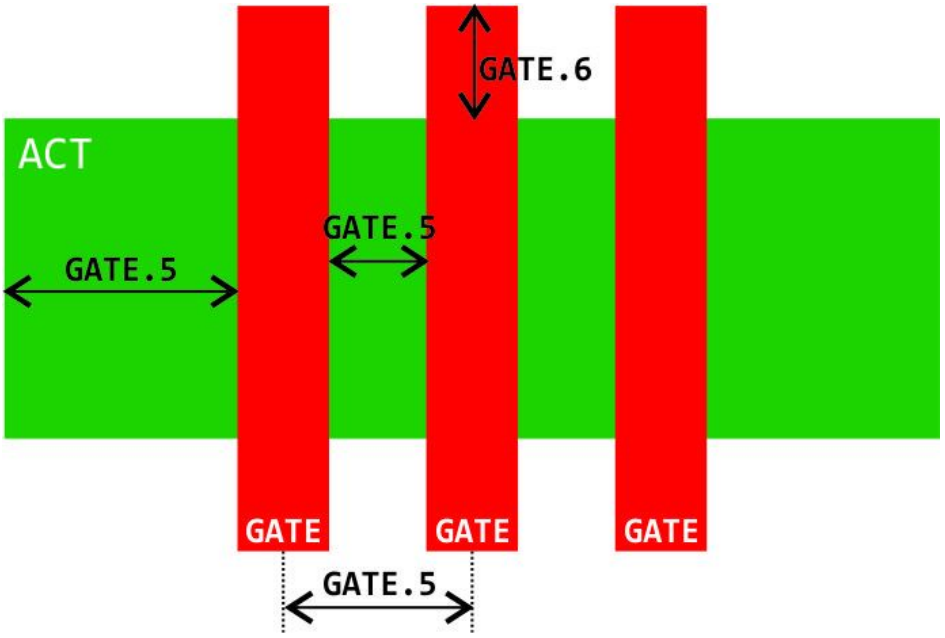
Active Region Design Rules

Rule	Value (nm)	Rule Description
ACT.1	128	Minimum height of the active region
ACT.2	[128, 168, 208, 248]	Incremental height of the active region
ACT.4	166	Minimum width of the active region
ACT.5	80	Vertical/Horizontal distance between two neighboring active regions
ACT.6	166	Notch not allowed



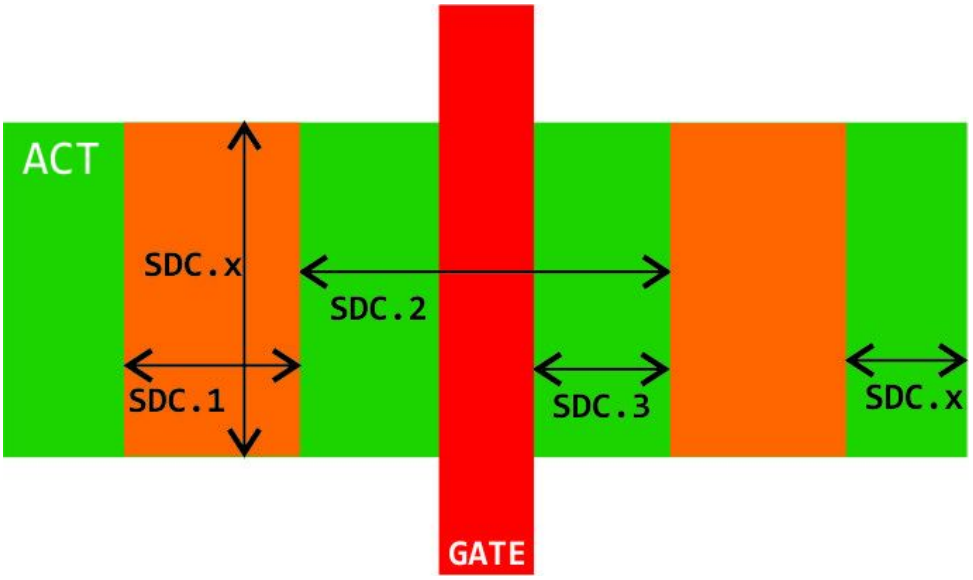
Gate design rules

Rule	Values (nm)	Rule Description
GATE.1	20	The Horizontal spacing between the electrically isolated gate layer
GATE.2	35	The horizontal pitch of the electrically isolated gate layer
GATE.3	-	GATE layer may not be routed
GATE.4	-	GATE layer not bend
GATE.5	15	A minimum distance of the Active layer extension past GATE layer
GATE.6	20	Minimum extension of GATE past ACTIVE layer
GATE.7	168	Minimum length of the GATE layer



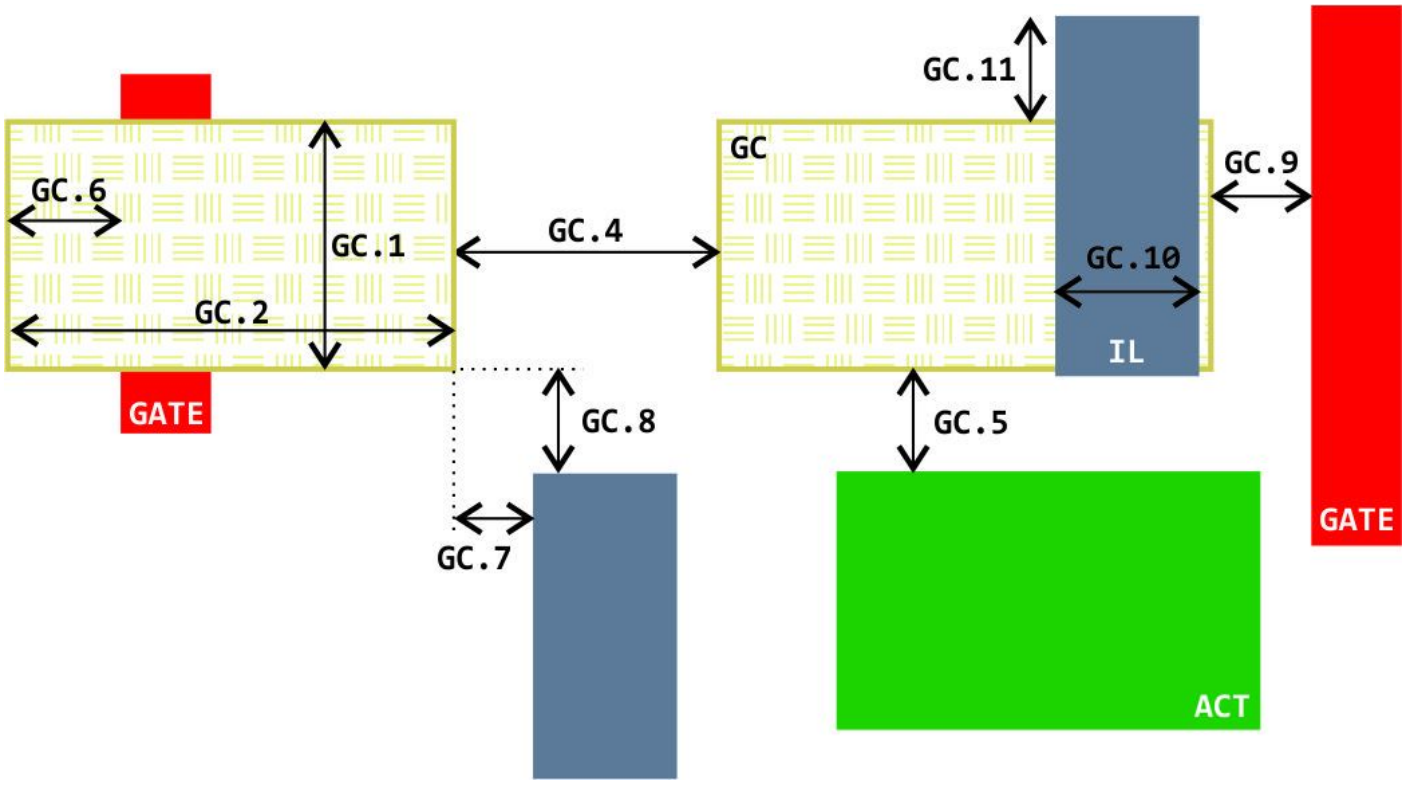
SDC - Source/Drain connect design rule

Rule	Values (nm)	Rule Description
SDC.1	28	Width of the SDC layer
SDC.2	36	Vertical/Horizontal spacing of the SDC layer
SDC.3	8	Minimum spacing of SDC from GATE layer
SDC.4	128	Minimum hight of SDC Layer
SDC.5	-	SDC layer May not bend
SDC.6	2	Spacing from the edge of the ACTIVE layer



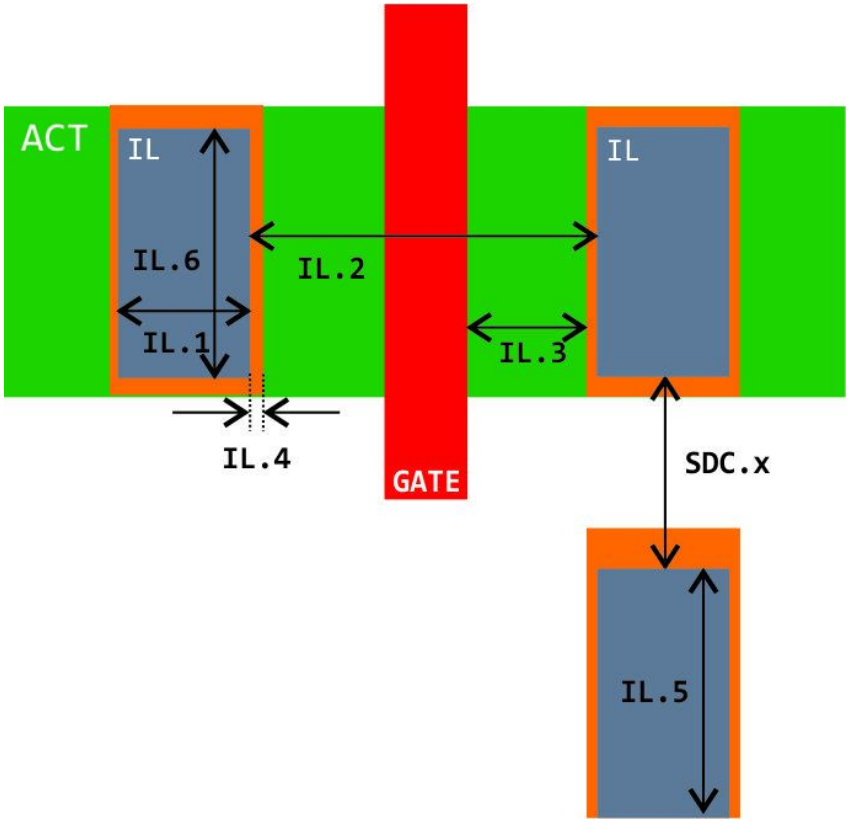
GC - Gate Connect Design Rule

Rule	Values (nm)	Rule Description
GC.1	44	Height of the GC layer
GC.2	56	Width of the GC layer
GC.3	-	GC may not bend
GC.4	40	GC spacing between electrically isolated layers
GC.5	6	Spacing from the ACTIVE layer
GC.6	2	Minimum extension of GC past gate layer
GC.7	4	Minimum vertical spacing from IL layer
GC.8	4	Minimum horizontal spacing from IL layer
GC.9	10	Spacing Fron electrically isolated Gate layer
GC.10	24	IL minimum width over GC
GC.11	4	Extention of IL fro GC layer



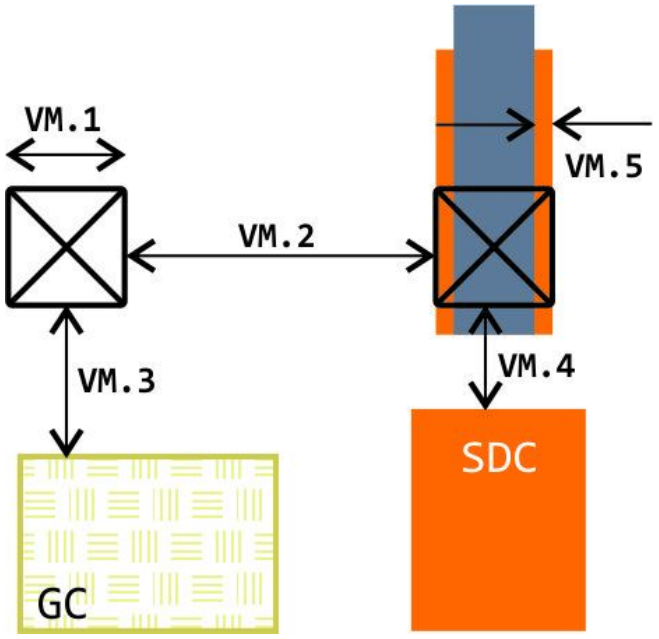
IL - Interconnect Layer Design Rules

Rule	Values (nm)	Rule Description
IL.1	24	Width of IL layer
IL.2	40	Horizontal spacing of IL layer
IL.3	10	Minimum spacing of IL layer from the GATE layer
IL.4	2	Minimum enclosure of IL layer from SDC layer
IL.5	58	Minimum vertical overlap on IL on SDC
IL.6	68	Minimum height of IL layer
Il.7	-	IL layer may not bend



VM0-VM4 - Metal interconnect vias design rule

Rule	Values (nm)	Rule Description
VM0.1	28	The minimum size of the shortest sides of the rectangular contact
VM0.2	36	Spacing between two VM connects
VM0.3	38	Minimum spacing between contact and GC interconnect
VM0.4	38	Minimum spacing between contact and SDC interconnect
VM0.5	-2	Minimum enclosed distance between IL and VMx contact

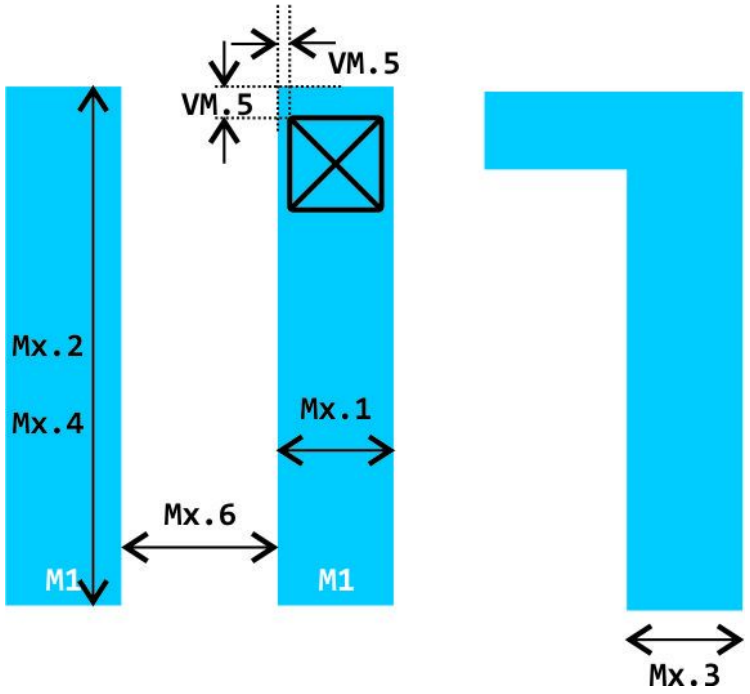


VM5-VM9 - Global metal interconnect rule

Rule	Values (nm)	Rule Description
VM5.1	48	The minimum size of the sides of the rectangular connect
VM5.2	72	Spacing between two VM connects

M1-M5 - Metal design rule

Rule	Values (nm)	Rule Description
M0.1	28	Minimum width of the Metal layer
M0.2	56	Minimum length of the Metal Layer
M0.3	56	Minimum length of one of two edges connected to the same vortex
M0.4	2000	The maximum length of metal wire
M0.5	[32, 2]	Enclosure by Metal around contact
M0.6	44	Spacing from an electrically isolated neighboring metal layer



M6-M10 - Global metal design rule

Rule	Values (nm)	Rule Description
M0.1	56	Minimum width of the Metal layer
M0.2	112	Minimum length of the Metal Layer
M0.3	112	Minimum length of one of two edges connected to the same vortex
M0.4	8000	The maximum length of metal wire
M0.5	[64, 4]	Enclosure by Metal around contact
M0.6	120	Spacing from an electrically isolated neighboring metal layer