

PUBLIC EXHIBIT 12

U.S. Patent No. 9,831,306

Intel Product (Intel 7 node)

U.S. Patent No. 9,831,306: Claim 26(pre)
“An integrated circuit structure, comprising:”

26(pre). An integrated circuit structure, comprising:

The Intel 12th Generation i5-12500 processor (hereinafter, the “Intel Product”), code named Alder Lake, includes an integrated circuit structure.



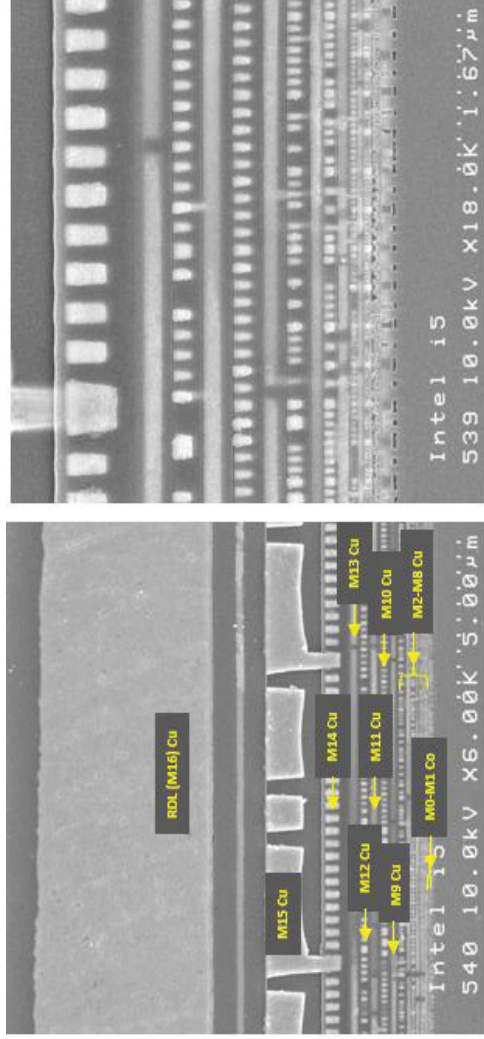
See Ex. 55 at 4, Photographs of the Domestic Industry Representative Article.

For example, the Intel Product is manufactured using the “Intel 7” technology node.

Product Collection	12th Generation Intel® Core™ i5 Processors		
Code Name	Products formerly Alder Lake		
Vertical Segment	Desktop		
Processor Number ?	i5-12500		
Status	Launched		
Launch Date ?	Q1'22		
Lithography ?	Intel 7		

See Ex. 90 at 1, Intel® Core™ i5-12500 Processor, <https://ark.intel.com/content/www/us/en/ark/products/96144/intel-core-i512500-processor-18m-cache-up-to-4-60-ghz.html>.

U.S. Patent No. 9,831,306: Claim 26(pre)
“An integrated circuit structure, comprising:”



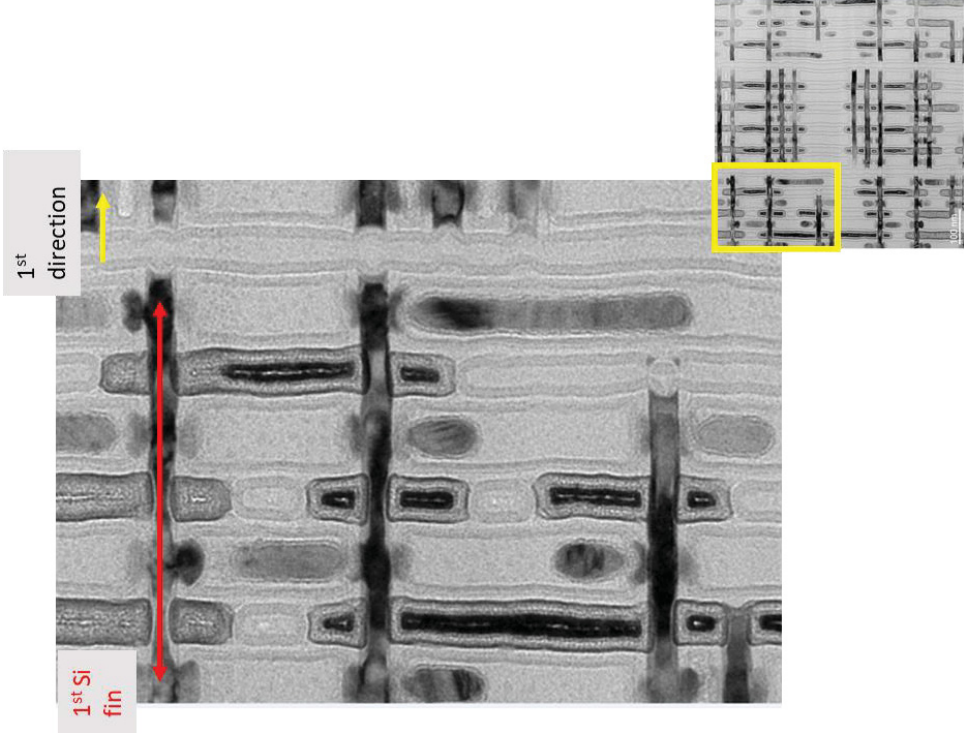
See Ex. 55 at 5 (left) (annotated), 6 (right), Photographs of the Domestic Industry Representative Article.

“a first fin comprising silicon, the first fin having a longest dimension along a first direction;”

26(a). a first fin comprising silicon, the first fin having a longest dimension along a first direction;

The Intel Product includes a first fin comprising silicon, the first fin having a longest dimension along a first direction.

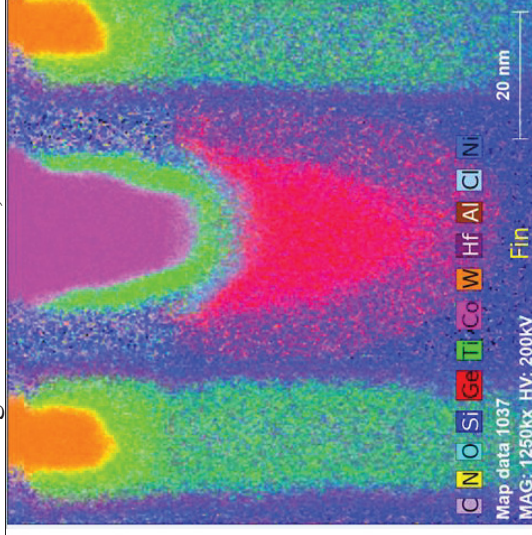
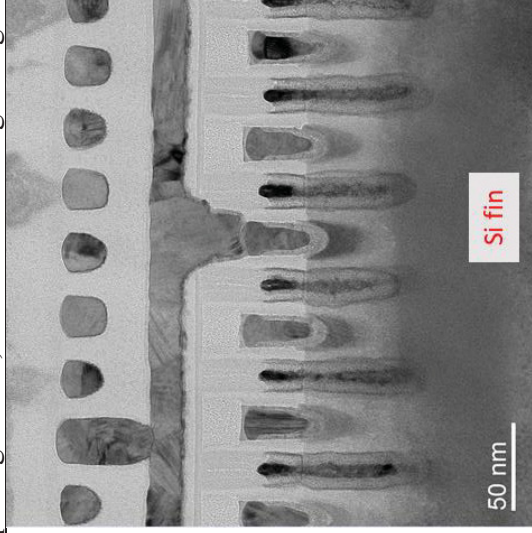
For example, the Intel Product includes a first fin having a longest dimension along a first direction.



See Ex. 55 at 16, Photographs of the Domestic Industry Representative Article (annotated).

Further, the first fin comprises silicon.

“a first fin comprising silicon, the first fin having a longest dimension along a first direction,”



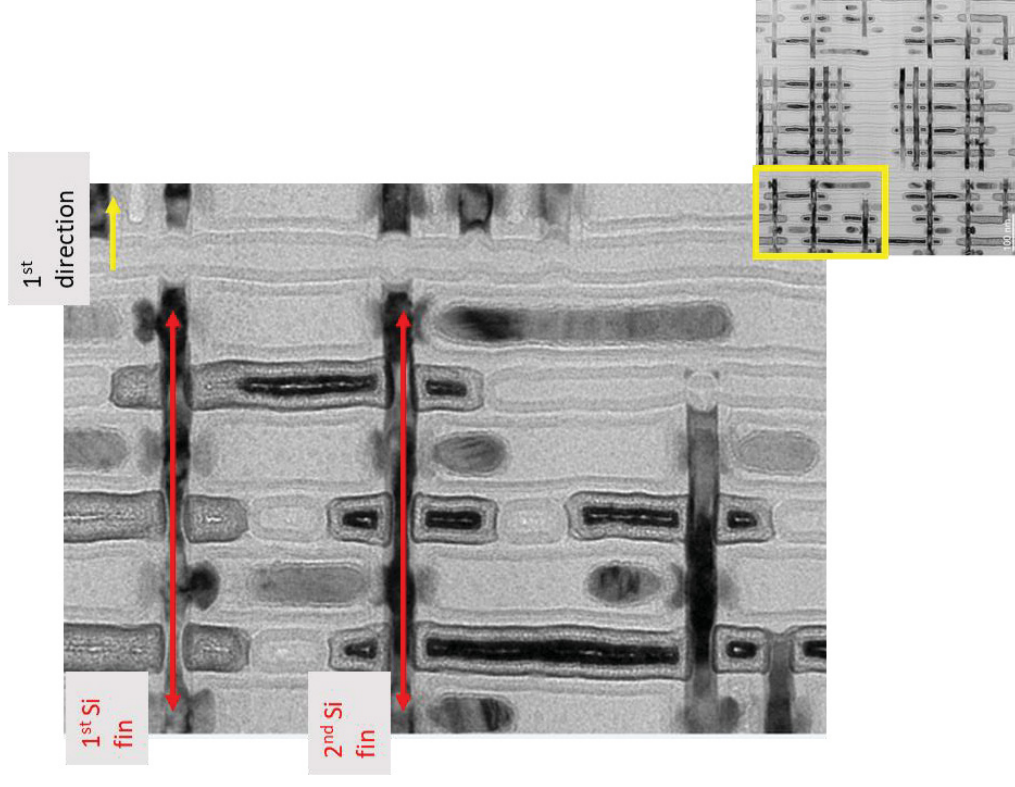
See Ex. 55 at 8 (left) (annotated), 9 (annotated) (right), Photographs of the Domestic Industry Representative Article.

“a second fin comprising silicon, the second fin having a longest dimension along the first direction;”

26(b). a second fin comprising silicon, the second fin having a longest dimension along the first direction;

The Intel Product includes a second fin comprising silicon, the second fin having a longest dimension along the first direction.

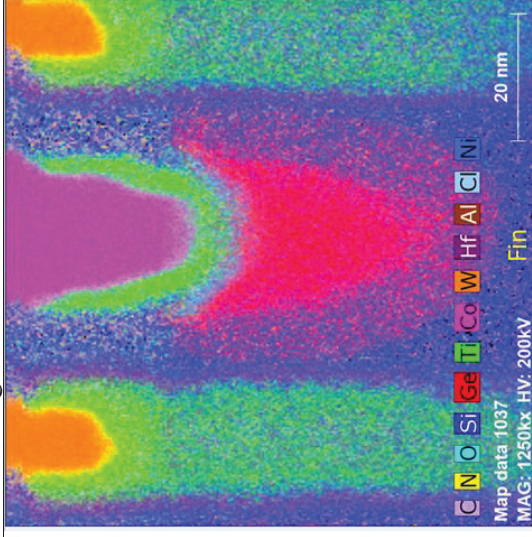
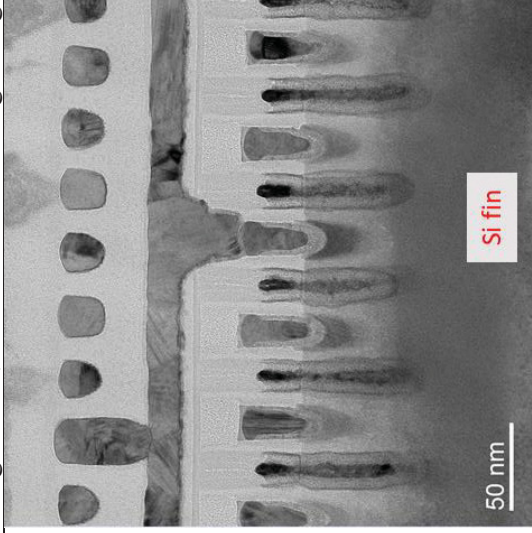
For example, the Intel Product includes a second fin having a longest dimension along a first direction.



See Ex. 55 at 16, Photographs of the Domestic Industry Representative Article (annotated).

Further, the second fin comprises silicon.

“a second fin comprising silicon, the second fin having a longest dimension along the first direction;”



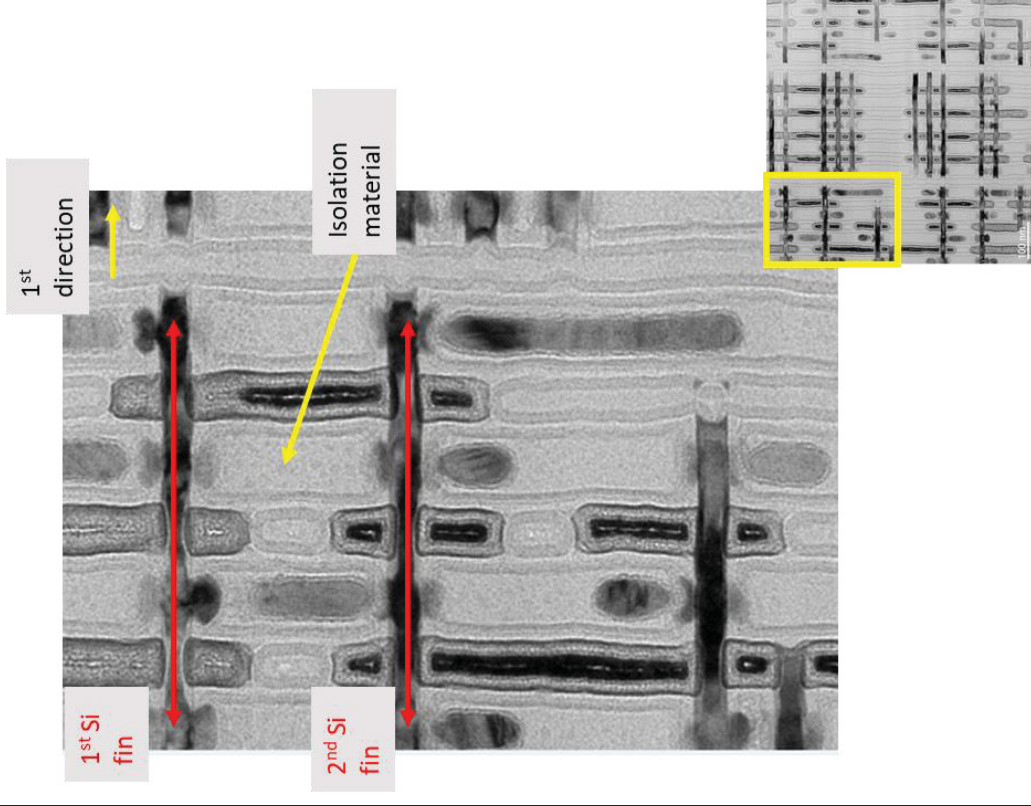
See Ex. 55 at 8 (left) (annotated), 9 (right) (annotated), Photographs of the Domestic Industry Representative Article.

U.S. Patent No. 9,831,306: Claim 26(c)
“an isolation material between the first fin and the second fin;”

26(c). an isolation material between the first fin and the second fin;

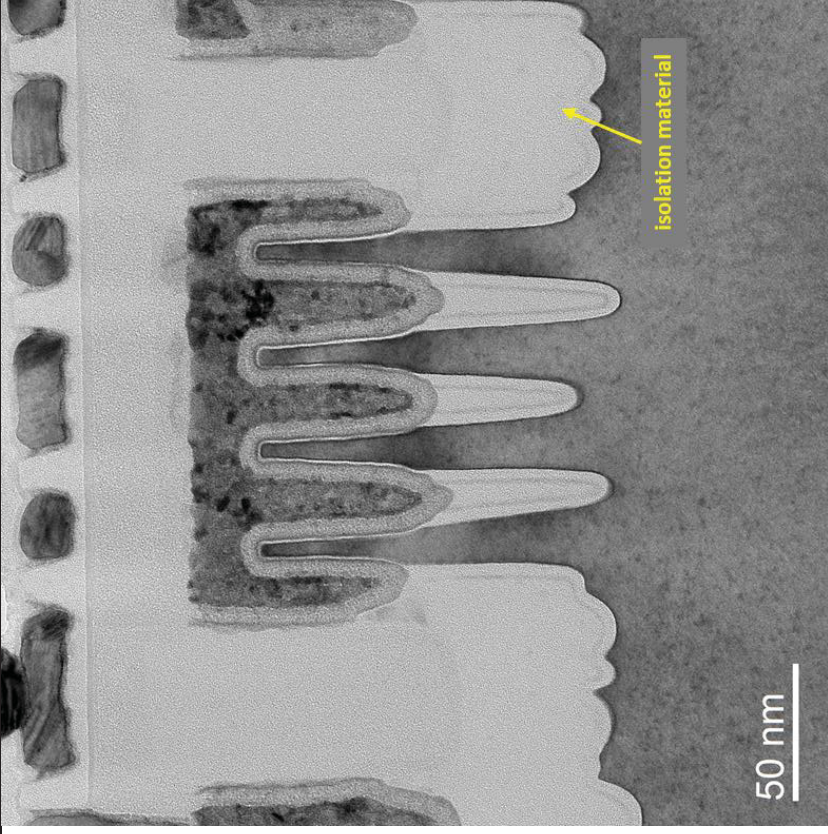
The Intel Product includes an isolation material between the first fin and the second fin.

For example, the Intel Product includes isolation material between the first silicon fin and the second silicon fin.



See Ex. 55 at 16, Photographs of the Domestic Industry Representative Article (annotated).

U.S. Patent No. 9,831,306: Claim 26(c)
“an isolation material between the first fin and the second fin;”



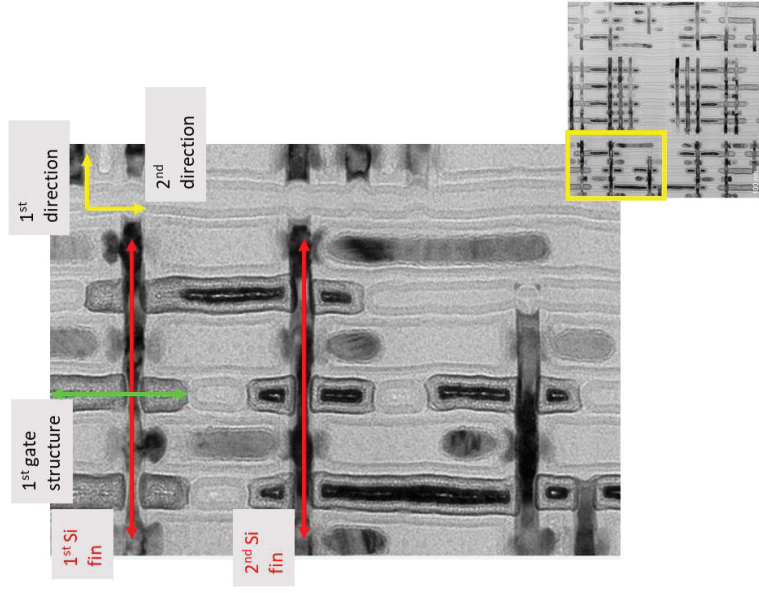
See Ex. 55 at 15, Photographs of the Domestic Industry Representative Article (annotated).

“a first gate structure over the first fin, the first gate structure having a longest dimension along a second direction, the second direction orthogonal to the first direction, wherein the first gate structure comprises a first gate dielectric layer and a first gate electrode;”

26(d). a first gate structure over the first fin, the first gate structure having a longest dimension along a second direction, the second direction orthogonal to the first direction, wherein the first gate structure comprises a first gate dielectric layer and a first gate electrode;

The Intel Product includes a first gate structure over the first fin, the first gate structure having a longest dimension along a second direction, the second direction orthogonal to the first direction, wherein the first gate structure comprises a first gate dielectric layer and a first gate electrode.

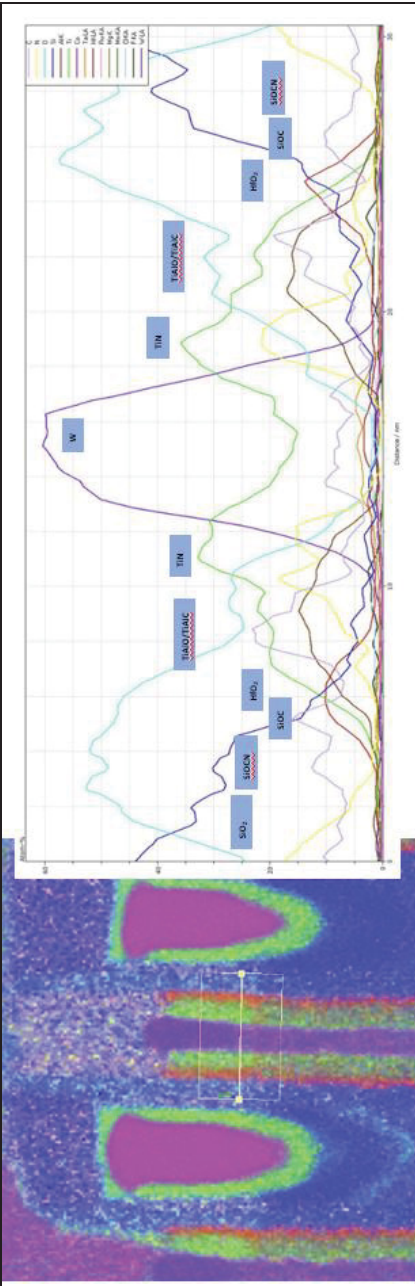
For example, the Intel Product includes a first gate structure over the first fin, the first gate structure having a longest dimension along a second direction, the second direction orthogonal to the first direction.



See Ex. 55 at 16, Photographs of the Domestic Industry Representative Article (annotated).

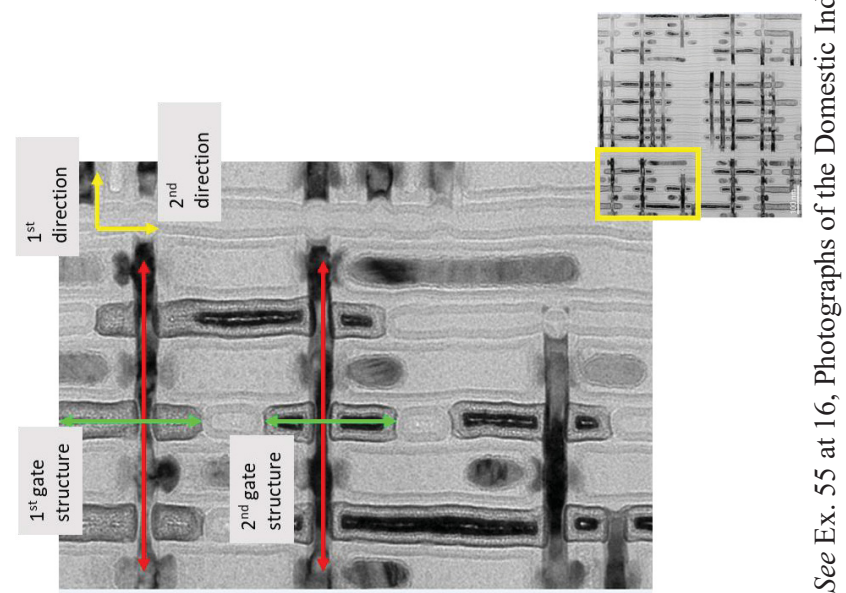
The first gate structure comprises a first gate dielectric layer and a first gate electrode. For example, the transistors include an HfO₂ gate dielectric and a TiAlO/TiAlC/TiN and W fill gate electrode.

“a first gate structure over the first fin, the first gate structure having a longest dimension along a second direction, the second direction orthogonal to the first direction, wherein the first gate structure comprises a first gate dielectric layer and a first gate electrode;”



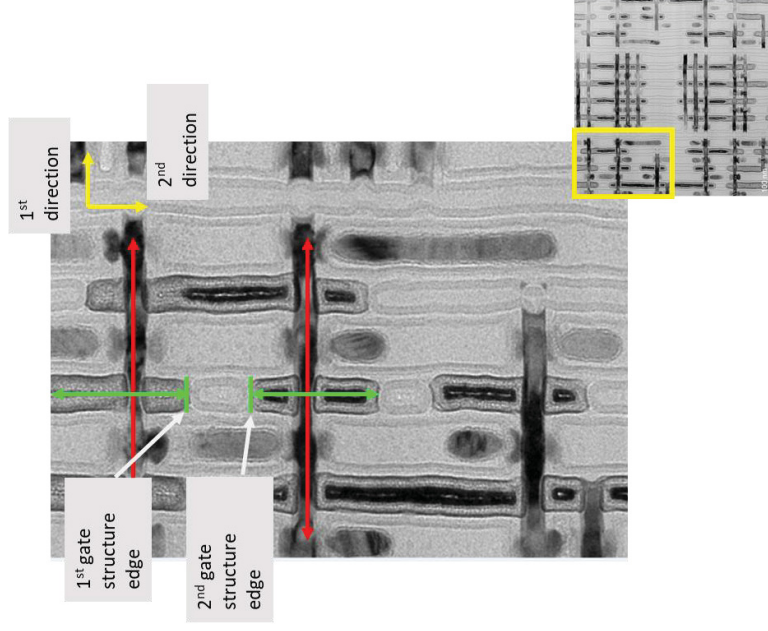
See Ex. 55 at 10 (left) (annotated), 11 (right) (annotated), Photographs of the Domestic Industry Representative Article.

“a second gate structure over the second fin, the second gate structure having a longest dimension along the second direction, the second gate structure discontinuous with the first gate structure along the second direction, and the second gate structure having an edge facing an edge of the first gate structure along the second direction, wherein the second gate structure comprises a second gate dielectric layer and a second gate electrode;”

26(e). a second gate structure over the second fin, the second gate structure having a longest dimension along the second direction, the second gate structure discontinuous with the first gate structure along the second direction, and the second gate structure having an edge facing an edge of the first gate structure along the second direction, wherein the second gate structure comprises a second gate dielectric layer and a second gate electrode;	The Intel Product includes a second gate structure over the second fin, the second gate structure having a longest dimension along the second direction, the second gate structure discontinuous with the first gate structure along the second direction, and the second gate structure having an edge facing an edge of the first gate structure along the second direction, wherein the second gate structure comprises a second gate dielectric layer and a second gate electrode. For example, the Intel Product includes a second gate structure over the second fin, the second gate structure having a longest dimension along the second direction, the second gate structure discontinuous with the first gate structure along the second direction.  See Ex. 55 at 16, Photographs of the Domestic Industry Representative Article (annotated).
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“a second gate structure over the second fin, the second gate structure having a longest dimension along the second direction, the second gate structure discontinuous with the first gate structure along the second direction, and the second gate structure having an edge facing an edge of the first gate structure along the second direction, wherein the second gate structure comprises a second gate dielectric layer and a second gate electrode;”

As shown below, the second gate structure having an edge facing an edge of the first gate structure along the second direction.

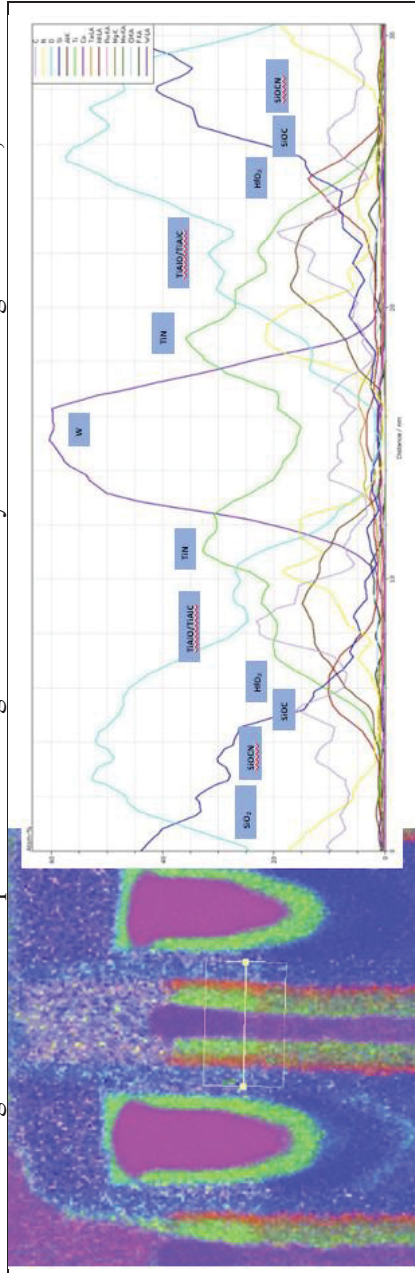


See Ex. 55 at 16, Photographs of the Domestic Industry Representative Article (annotated).

The second gate structure comprises a second gate dielectric layer and a second gate electrode. For example, the transistors include an HfO₂ gate dielectric and a TiAlO/TiAlC/TiN and W fill gate electrode.

U.S. Patent No. 9,831,306: Claim 26(e)

“a second gate structure over the second fin, the second gate structure having a longest dimension along the second direction, the second gate structure discontinuous with the first gate structure along the second direction, and the second gate structure having an edge facing an edge of the first gate structure along the second direction, wherein the second gate structure comprises a second gate dielectric layer and a second gate electrode;”

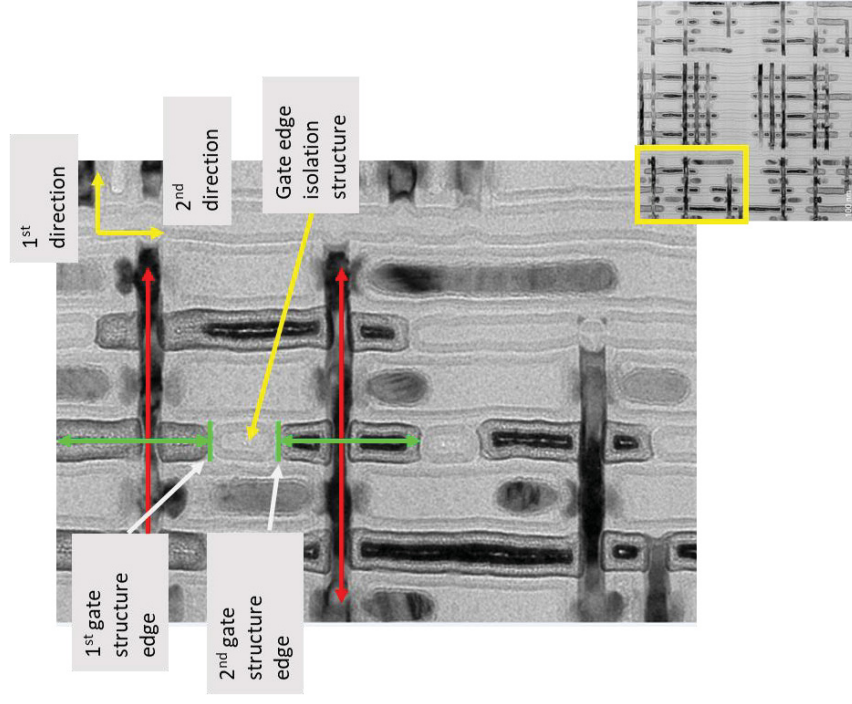


“a gate edge isolation structure between and in contact with the edge of the first gate structure and the edge of the second gate structure along the second direction, the gate edge isolation structure over the isolation material; and”

26(f). a gate edge isolation structure between and in contact with the edge of the first gate structure and the edge of the second gate structure along the second direction, the gate edge isolation structure over the isolation material; and

The Intel Product includes a gate edge isolation structure between and in contact with the edge of the first gate structure and the edge of the second gate structure along the second direction, the gate edge isolation structure over the isolation material.

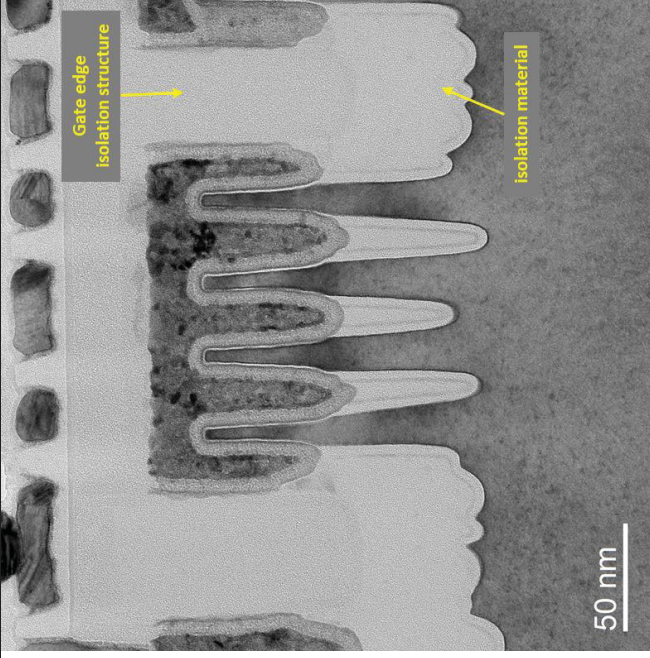
For example, the Intel Product includes a gate edge isolation structure between and in contact with the edge of the first gate structure and the edge of the second gate structure along the second direction.



See Ex. 55 at 16, Photographs of the Domestic Industry Representative Article (annotated).

The gate edge isolation structure is over the isolation material.

“a gate edge isolation structure between and in contact with the edge of the first gate structure and the edge of the second gate structure along the second direction, the gate edge isolation structure over the isolation material; and”



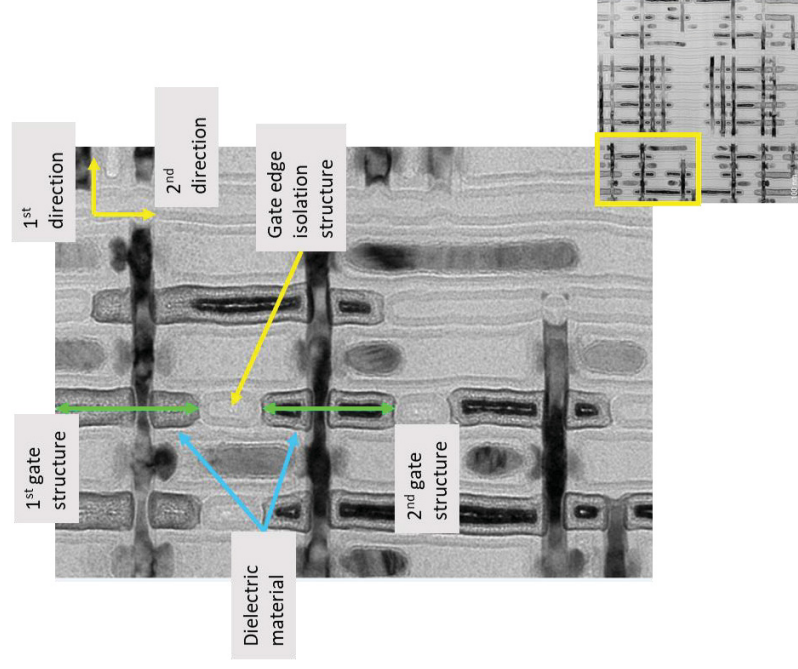
See Ex. 55 at 15 (annotated), Photographs of the Domestic Industry Representative Article.

“a dielectric material laterally adjacent to the first and second gate structures along the first direction, the dielectric material laterally adjacent to the gate edge isolation structure along the first direction, and the dielectric material discrete from the gate edge isolation structure.”

26(g). a dielectric material laterally adjacent to the first and second gate structures along the first direction, the dielectric material laterally adjacent to the gate edge isolation structure along the first direction, and the dielectric material discrete from the gate edge isolation structure.

The Intel Product includes a dielectric material laterally adjacent to the first and second gate structures along the first direction, the dielectric material laterally adjacent to the gate edge isolation structure along the first direction, and the dielectric material discrete from the gate edge isolation structure.

For example, the Intel Product includes a dielectric material laterally adjacent to the first and second gate structures along the first direction, the dielectric material laterally adjacent to the gate edge isolation structure along the first direction, and the dielectric material discrete from the gate edge isolation structure.



See Ex. 55 at 16, Photographs of the Domestic Industry Representative Article (annotated).