

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT3734509

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
SIMON RUFFELL	01/27/2016
ARVIND KUMAR	01/28/2016
TRISTAN MA	01/28/2016
KYU-HA SHIM	01/21/2016
JOHN HAUTALA	01/29/2016
STEVEN SHERMAN	01/29/2016
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	VARIAN SEMICONDUCTOR EQUIPMENT ASSOCIATES, INC.
<b>Street Address:</b>	35 DORY ROAD
<b>City:</b>	GLOUCESTER
<b>State/Country:</b>	MASSACHUSETTS
<b>Postal Code:</b>	01930
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
Application Number:	14978305
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	(919)999-2798
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>	
<b>Phone:</b>	6092704992
<b>Email:</b>	cseaton@kdbfirm.com
<b>Correspondent Name:</b>	KACVINSKY DAISAK BLUNI PLLC
<b>Address Line 1:</b>	3120 PRINCETON PIKE
<b>Address Line 2:</b>	SUITE 303
<b>Address Line 4:</b>	LAWRENCEVILLE, NEW JERSEY 08648
<b>ATTORNEY DOCKET NUMBER:</b>	023440
<b>NAME OF SUBMITTER:</b>	DANIEL N. DAISAK
<b>SIGNATURE:</b>	/DANIEL N. DAISAK/
<b>DATE SIGNED:</b>	02/11/2016

**Total Attachments: 20**

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WHEREAS, the undersigned, to wit:

Simon Ruffell  
Arvind Kumar  
Tristan Ma  
Kyu-Ha Shim  
John Hautala  
Steven Sherman

(Hereinafter collectively ASSIGNOR), have/has made a certain new and useful invention as set forth in an application for United States Letters Patent, entitled:

**NON-UNIFORM GATE OXIDE THICKNESS FOR DRAM DEVICE**

(X only one):

- (A) ☐ which was executed concurrently herewith and is being filed herewith in the United States Patent and Trademark Office;
- (B) ☐ which was executed on \_\_\_\_\_, 20\_\_\_\_, and is being filed herewith in the United States Patent and Trademark Office;
- (C) ☒ which was filed as US Patent Application No. 14/978,305, filed on December 22, 2015

AND WHEREAS, Varian Semiconductor Equipment Associates, Inc., (hereinafter ASSIGNEE), a corporation organized and existing under the laws of the state of Delaware, and having its principal place of business at 35 Dory Road, Gloucester, Massachusetts, 01930, is desirous of acquiring the entire right, title, and interest in and to said invention and any and all patents that may be obtained therefore, and in and to said application and any and all patents that may issue therefrom;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, ASSIGNOR does hereby sell, assign, transfer, and set over unto said ASSIGNEE, its successors, assigns, and legal representatives, all right, title, and interest in and to said invention throughout the world, and any and all patents of the United States and foreign countries that may be obtained therefor, and in and to said application, including any and all continuations, continuations-in-part, divisionals, reissues, re-examinations, substitutions, and extensions thereof, and any and all patents of the United States and foreign countries that may issue therefrom, such right, title, and interest including the right to file applications and obtain patents, utility models, industrial models and designs for said invention in the name of said ASSIGNEE, its successors, assigns, and legal representatives throughout the world, including all rights of priority, all rights to publish cautionary notices reserving ownership of said invention, and all rights to register said invention in appropriate registries;

ASSIGNOR also does hereby covenant that it has the full right to convey the entire right, title, and interest herein assigned, and that it has not and will not execute any agreement in conflict herewith;

ASSIGNOR also does hereby authorize and request the Commissioner of Patents and Trademarks to issue any and all Letters Patent of the United States on said invention or resulting from said application, including any continuations, continuations-in-part, divisions, reissues, re-examinations, substitutions, and extensions thereof, to said ASSIGNEE, its successors, assigns, and legal representatives as the ASSIGNEE of the entire right, title, and interest herein assigned;

ASSIGNOR also does hereby agree to, at any time, upon request, without further or additional consideration, but at the expense of said ASSIGNEE, its successors, assigns, or legal representatives, execute and deliver any and all papers, make all rightful oaths, and do all lawful acts that may be necessary or desirable to perfect the entire right, title, and interest here assigned in said ASSIGNEE, its successors, assigns, and legal representatives, and generally do everything possible to vest the entire right, title and interest herein assigned in said ASSIGNEE, its successors, assigns, and legal representatives;

ASSIGNOR also does hereby agree to, at any time, upon request, without further or additional consideration, but at the expense of said ASSIGNEE, its successors, assigns, or legal representatives, execute and deliver any and all papers, make all rightful oaths, and do all lawful acts that may be necessary or desirable to make application for and obtain any and all continuations, continuations-in-part, divisions, reissues, re-examinations, substitutions, and extensions of said application, or any application on said invention, or any patent issuing therefor or therefrom;

ASSIGNOR also does hereby agree to, at any time, upon request, without further or additional consideration but at the expense of said ASSIGNEE, its successors, assigns, and legal representatives, communicate to said ASSIGNEE, its successors, assigns, and legal representatives, any known facts relating to said invention or said application or any patent issuing therefor or therefrom, and testify as to the same in any interference or other litigation proceeding when requested to do so, and aid said ASSIGNEE, its successors, assigns, and legal representatives, in obtaining and enforcing property protection for said invention in all countries;

ASSIGNOR also does hereby grant the Legal Department of Varian Semiconductor Equipment Associates, Inc., at the address shown above, the power to insert on this assignment any further information, including, but not limited to application number(s) and filing date(s), which may be necessary or desirable in order to comply with any rule or request of the United States Patent and Trademark Office for the purposes of recording this document.

ASSIGNOR also does now hereby execute this document on the date(s) indicated below:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 27 day of January  
2016.

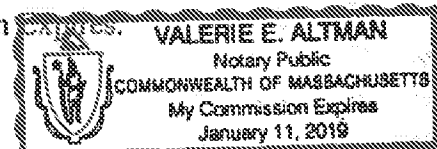
S. Ruffell  
Name: Simon Ruffell

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Simon Ruffell, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this 27<sup>th</sup> day of January, 2016.

Valerie E. Altman  
Notary Public

My Commission Expires:



IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_,  
2016.

\_\_\_\_\_  
Name: Arvind Kumar

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Arvind Kumar, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Notary Public My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Name: Tristan Ma

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named Tristan Ma, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Notary Public My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Name: Kyu-Ha Shim

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named Kyu-Ha Shim, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Notary Public My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_,  
2016.

\_\_\_\_\_  
Name: John Hautala

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named John Hautala, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Notary Public My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_,  
2016.

\_\_\_\_\_  
Name: Steven Sherman

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named Steven Sherman, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Notary Public My Commission Expires:

WHEREAS, the undersigned, to wit:

Simon Ruffell  
Arvind Kumar  
Tristan Ma  
Kyu-Ha Shim  
John Hautala  
Steven Sherman

(Hereinafter collectively **ASSIGNOR**), have/has made a certain new and useful invention as set forth in an application for United States Letters Patent, entitled:

**NON-UNIFORM GATE OXIDE THICKNESS FOR DRAM DEVICE**

(X only one):

- (A) ☐ which was executed concurrently herewith and is being filed herewith in the United States Patent and Trademark Office;
- (B) ☐ which was executed on \_\_\_\_\_, 20\_\_\_\_, and is being filed herewith in the United States Patent and Trademark Office;
- (C) ☒ which was filed as US Patent Application No. 14/978,305, filed on December 22, 2015

**AND WHEREAS**, Varian Semiconductor Equipment Associates, Inc., (hereinafter **ASSIGNEE**), a corporation organized and existing under the laws of the state of Delaware, and having its principal place of business at 35 Dory Road, Gloucester, Massachusetts, 01930, is desirous of acquiring the entire right, title, and interest in and to said invention and any and all patents that may be obtained therefore, and in and to said application and any and all patents that may issue therefrom;

**NOW, THEREFORE**, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, **ASSIGNOR** does hereby sell, assign, transfer, and set over unto said **ASSIGNEE**, its successors, assigns, and legal representatives, all right, title, and interest in and to said invention throughout the world, and any and all patents of the United States and foreign countries that may be obtained therefor, and in and to said application, including any and all continuations, continuations-in-part, divisionals, reissues, re-examinations, substitutions, and extensions thereof, and any and all patents of the United States and foreign countries that may issue therefrom, such right, title, and interest including the right to file applications and obtain patents, utility models, industrial models and designs for said invention in the name of said **ASSIGNEE**, its successors, assigns, and legal representatives throughout the world, including all rights of priority, all rights to publish cautionary notices reserving ownership of said invention, and all rights to register said invention in appropriate registries;

**ASSIGNOR** also does hereby covenant that it has the full right to convey the entire right, title, and interest herein assigned, and that it has not and will not execute any agreement in conflict herewith;



ASSIGNOR also does hereby authorize and request the Commissioner of Patents and Trademarks to issue any and all Letters Patent of the United States on said invention or resulting from said application, including any continuations, continuations-in-part, divisions, reissues, re-examinations, substitutions, and extensions thereof, to said ASSIGNEE, its successors, assigns, and legal representatives as the ASSIGNEE of the entire right, title, and interest herein assigned;

ASSIGNOR also does hereby agree to, at any time, upon request, without further or additional consideration, but at the expense of said ASSIGNEE, its successors, assigns, or legal representatives, execute and deliver any and all papers, make all rightful oaths, and do all lawful acts that may be necessary or desirable to perfect the entire right, title, and interest here assigned in said ASSIGNEE, its successors, assigns, and legal representatives, and generally do everything possible to vest the entire right, title and interest herein assigned in said ASSIGNEE, its successors, assigns, and legal representatives;

ASSIGNOR also does hereby agree to, at any time, upon request, without further or additional consideration, but at the expense of said ASSIGNEE, its successors, assigns, or legal representatives, execute and deliver any and all papers, make all rightful oaths, and do all lawful acts that may be necessary or desirable to make application for and obtain any and all continuations, continuations-in-part, divisions, reissues, re-examinations, substitutions, and extensions of said application, or any application on said invention, or any patent issuing therefor or therefrom;

ASSIGNOR also does hereby agree to, at any time, upon request, without further or additional consideration but at the expense of said ASSIGNEE, its successors, assigns, and legal representatives, communicate to said ASSIGNEE, its successors, assigns, and legal representatives, any known facts relating to said invention or said application or any patent issuing therefor or therefrom, and testify as to the same in any interference or other litigation proceeding when requested to do so, and aid said ASSIGNEE, its successors, assigns, and legal representatives, in obtaining and enforcing property protection for said invention in all countries;

ASSIGNOR also does hereby grant the Legal Department of Varian Semiconductor Equipment Associates, Inc., at the address shown above, the power to insert on this assignment any further information, including, but not limited to application number(s) and filing date(s), which may be necessary or desirable in order to comply with any rule or request of the United States Patent and Trademark Office for the purposes of recording this document.

ASSIGNOR also does now hereby execute this document on the date(s) indicated below:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

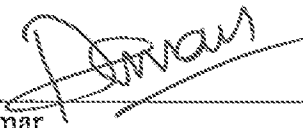
\_\_\_\_\_  
Name: Simon Ruffell

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Simon Ruffell, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

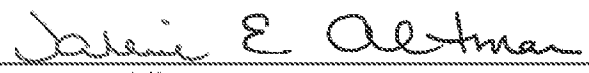
\_\_\_\_\_  
Notary Public My Commission Expires:

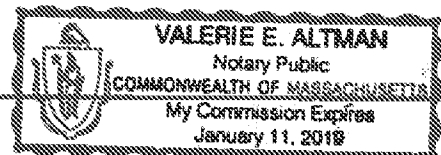
IN WITNESS WHEREOF, I have hereunto set my hand and seal this 28 day of Jan, 2016.

  
\_\_\_\_\_  
Name: Arvind Kumar

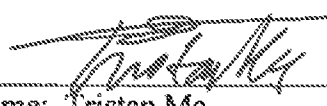
COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Arvind Kumar, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this 28<sup>th</sup> day of January, 2016.

  
\_\_\_\_\_  
Notary Public My Commission Expires:

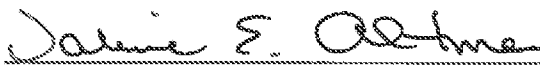


IN WITNESS WHEREOF, I have hereunto set my hand and seal this 28<sup>th</sup> day of Jan, 2016.

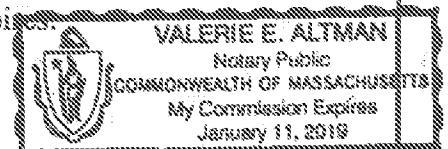
  
Name: Tristan Ma

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

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Notary Public

My Commission Expires:



IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Name: Kyu-Ha Shim

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

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\_\_\_\_\_  
Notary Public

My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

Name: John Hautala

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named John Hautala, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

My Commission Expires:

Notary Public

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

Name: Steven Sherman

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Steven Sherman, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

**My Commission Expires:**

Notary Public

WHEREAS, the undersigned, to wit:

Simon Ruffell  
Arvind Kumar  
Tristan Ma  
Kyu-Ha Shim  
John Hautala  
Steven Sherman

(Hereinafter collectively **ASSIGNOR**), have/has made a certain new and useful invention as set forth in an application for United States Letters Patent, entitled:

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(X only one):

- (A) ☐ which was executed concurrently herewith and is being filed herewith in the United States Patent and Trademark Office;
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ASSIGNOR also does now hereby execute this document on the date(s) indicated below:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Name: Simon Ruffell

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named Simon Ruffell, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Notary Public      My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Name: Arvind Kumar

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named Arvind Kumar, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Notary Public      My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Name: Tristan Ma

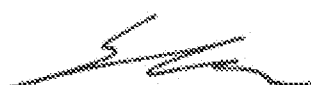
**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

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\_\_\_\_\_  
Notary Public

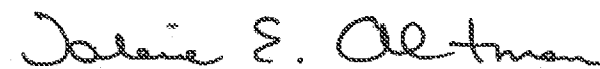
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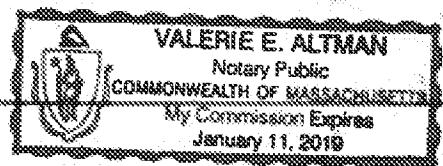
  
\_\_\_\_\_  
Name: Kyu-Ha Shim

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

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\_\_\_\_\_  
Notary Public

My Commission Expires:





IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

Name: John Hautala

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named John Hautala, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

**My Commission Expires:**

Notary Public

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

Name: Steven Sherman

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Steven Sherman, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this       day of       , 2016.

My Commission Expires:

Notary Public

WHEREAS, the undersigned, to wit:

Simon Ruffell  
Arvind Kumar  
Tristan Ma  
Kyu-Ha Shim  
John Hautala  
Steven Sherman

(Hereinafter collectively ASSIGNOR), have/has made a certain new and useful invention as set forth in an application for United States Letters Patent, entitled:

**NON-UNIFORM GATE OXIDE THICKNESS FOR DRAM DEVICE**

(X only one):

- (A) ☐ which was executed concurrently herewith and is being filed herewith in the United States Patent and Trademark Office;
- (B) ☐ which was executed on \_\_\_\_\_, 20\_\_\_\_, and is being filed herewith in the United States Patent and Trademark Office;
- (C) ☒ which was filed as US Patent Application No. 14/978,305, filed on December 22, 2015

AND WHEREAS, Varian Semiconductor Equipment Associates, Inc., (hereinafter ASSIGNEE), a corporation organized and existing under the laws of the state of Delaware, and having its principal place of business at 35 Dory Road, Gloucester, Massachusetts, 01930, is desirous of acquiring the entire right, title, and interest in and to said invention and any and all patents that may be obtained therefore, and in and to said application and any and all patents that may issue therefrom;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, ASSIGNOR does hereby sell, assign, transfer, and set over unto said ASSIGNEE, its successors, assigns, and legal representatives, all right, title, and interest in and to said invention throughout the world, and any and all patents of the United States and foreign countries that may be obtained therefor, and in and to said application, including any and all continuations, continuations-in-part, divisionals, reissues, re-examinations, substitutions, and extensions thereof, and any and all patents of the United States and foreign countries that may issue therefrom, such right, title, and interest including the right to file applications and obtain patents, utility models, industrial models and designs for said invention in the name of said ASSIGNEE, its successors, assigns, and legal representatives throughout the world, including all rights of priority, all rights to publish cautionary notices reserving ownership of said invention, and all rights to register said invention in appropriate registries;

ASSIGNOR also does hereby covenant that it has the full right to convey the entire right, title, and interest herein assigned, and that it has not and will not execute any agreement in conflict herewith;

ASSIGNOR also does hereby authorize and request the Commissioner of Patents and Trademarks to issue any and all Letters Patent of the United States on said invention or resulting from said application, including any continuations, continuations-in-part, divisions, reissues, re-examinations, substitutions, and extensions thereof, to said ASSIGNEE, its successors, assigns, and legal representatives as the ASSIGNEE of the entire right, title, and interest herein assigned;

ASSIGNOR also does hereby agree to, at any time, upon request, without further or additional consideration, but at the expense of said ASSIGNEE, its successors, assigns, or legal representatives, execute and deliver any and all papers, make all rightful oaths, and do all lawful acts that may be necessary or desirable to perfect the entire right, title, and interest here assigned in said ASSIGNEE, its successors, assigns, and legal representatives, and generally do everything possible to vest the entire right, title and interest herein assigned in said ASSIGNEE, its successors, assigns, and legal representatives;

ASSIGNOR also does hereby agree to, at any time, upon request, without further or additional consideration, but at the expense of said ASSIGNEE, its successors, assigns, or legal representatives, execute and deliver any and all papers, make all rightful oaths, and do all lawful acts that may be necessary or desirable to make application for and obtain any and all continuations, continuations-in-part, divisions, reissues, re-examinations, substitutions, and extensions of said application, or any application on said invention, or any patent issuing therefor or therefrom;

ASSIGNOR also does hereby agree to, at any time, upon request, without further or additional consideration but at the expense of said ASSIGNEE, its successors, assigns, and legal representatives, communicate to said ASSIGNEE, its successors, assigns, and legal representatives, any known facts relating to said invention or said application or any patent issuing therefor or therefrom, and testify as to the same in any interference or other litigation proceeding when requested to do so, and aid said ASSIGNEE, its successors, assigns, and legal representatives, in obtaining and enforcing property protection for said invention in all countries;

ASSIGNOR also does hereby grant the Legal Department of Varian Semiconductor Equipment Associates, Inc., at the address shown above, the power to insert on this assignment any further information, including, but not limited to application number(s) and filing date(s), which may be necessary or desirable in order to comply with any rule or request of the United States Patent and Trademark Office for the purposes of recording this document.

ASSIGNOR also does now hereby execute this document on the date(s) indicated below:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Name: Simon Ruffell

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named Simon Ruffell, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Notary Public

My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Name: Arvind Kumar

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named Arvind Kumar, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Notary Public

My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Name: Tristan Ma

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named Tristan Ma, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Notary Public My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

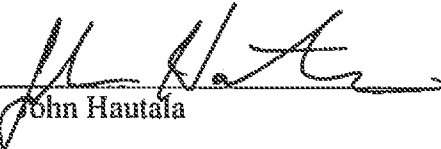
\_\_\_\_\_  
Name: Kyu-Ha Shim

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named Kyu-Ha Shim, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2016.


\_\_\_\_\_  
Notary Public My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 29<sup>th</sup> day of January, 2016.

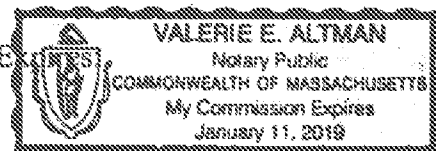
  
Name: John Hautala

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

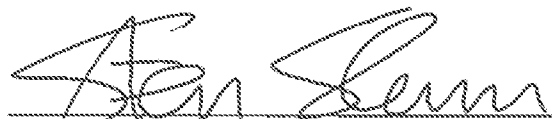
Before me, a Notary Public did personally appear the above-named John Hautala, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this 29<sup>th</sup> day of January, 2016.

  
Notary Public

My Commission Expires:

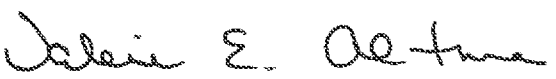


IN WITNESS WHEREOF, I have hereunto set my hand and seal this 29 day of January, 2016.

  
Name: Steven Sherman

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Steven Sherman, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this 29<sup>th</sup> day of January, 2016.

  
Notary Public

My Commission Expires:

