

A System, Apparatus and Method For Laser Deflashing

FIELD OF INVENTION

5 The present invention relates broadly to a system, apparatus and method for laser deflashing.

BACKGROUND

10 During fabrication of a semiconductor package, the encapsulation process of an assembly of the semiconductor package often results in a bleeding of any excess molding compound or resin on the surface of leadframe and substrate. Thin layers of the excess molding compound or resin are known as mold bleeds while thick layers of the excess molding compound or resin are known as flashes. The mold bleeds and/or
15 flashes are removed after the encapsulation process during semiconductor fabrication. The method or process of removing the mold bleed from the leadframe and substrate is known as "Deflashing".

 There are both wet and dry methods for removing the mold bleeds and/or
20 flashes. The wet method typically uses chemicals to soften and loosen the mold bleeds and/or flashes from the leadframe and substrate and uses a high pressure water jet to remove the loosened resin. However, the wet method is a dirty and an environmentally unfriendly method.

25 On the other hand, the dry method uses a laser and directs a laser beam at the mold bleeds and/or flashes to remove them from the leadframe and substrate, without causing potential damage to the semiconductor package. As compared to the wet method, the dry method is a cleaner and more environmentally friendly method. Further, the dry method uses simple equipment, has higher productivity and is more cost
30 efficient. In addition, air and noise pollution is minimal by using the dry method.

The typical laser sources used in the dry method are an excimer laser having a wavelength between about 193nm and about 351nm and a Neodymium-doped Yttrium Aluminum Garnet (Nd:YAG) laser having a wavelength of about 532nm. This dry method of using a laser is known as "Laser Deflashing". However, using the excimer laser and the Nd:YAG laser having a wavelength of about 532nm is expensive and may also pose safety problems during usage.

Hence, there is a need to provide a new laser deflashing apparatus and method which address at least one of the above-mentioned problems.

SUMMARY

In accordance with a first aspect of the present invention, there is provided an apparatus for laser deflashing, the apparatus comprising a laser for generating a near infrared (NIR) laser beam having a wavelength between 1000nm and 1100nm; wherein the generated laser beam is directed to a surface of a semiconductor package to remove an excess molding compound.

The excess molding compound may comprise at least one of mold bleeds and flashes.

The apparatus may further comprise a scanning system having two scanning members, each of the scanning members having a reflective surface attached to one end.

The generated laser beam may be a continuous wave laser beam.

The apparatus may further comprise a Q-switch for converting the continuous wave laser beam to a pulse laser beam.

The apparatus may further comprise a beam expander and an f-theta lens, wherein the laser beam passes through the beam expander, is reflected by the reflective surface of at least one scanning member, is converged to a focal point by

the f-theta lens and is directed to the surface of the semiconductor package to remove the excess molding compound.

5 The apparatus may further comprise a controlling system for storing a pattern and parameters of a path of the generated laser beam.

10 The apparatus may further comprise a plurality of scanning systems, and one or more beam splitters and a bending mirror for directing the generated laser beam to each of the respective scanning systems.

15 The apparatus may further comprise a plurality of scanning systems, each scanning system having an associated beam expander and f-theta lens, for simultaneous removal of the excess molding compound on a plurality of semiconductor packages or for simultaneous removal of the excess molding compound on different areas of a semiconductor package.

20 In association with the plurality of scanning systems, the apparatus may further comprise a beam splitter and a bending mirror for directing the generated laser beam to the respective beam expanders.

The NIR laser beam may be a Neodymium-doped Yttrium Aluminum Garnet (Nd:YAG) laser beam having a wavelength of 1064nm.

25 In accordance with a second aspect of the present invention, there is provided a method of laser deflashing, the method comprising the steps of generating a near infrared (NIR) laser beam having a wavelength between 1000nm and 1100nm; and directing the generated laser beam to remove an excess molding compound.

30 The directing step may further comprise directing the generated laser beam through a beam expander, reflecting the generated laser beam with a reflective surface of at least one scanning member and converging the generated laser beam with an f-theta lens.

The method may further comprise a step of storing a pattern and parameters of a path of the generated laser beam before the step of generating the laser beam.

5 The generated laser beam may be a continuous wave laser beam.

The method may further comprise a step of converting the continuous wave laser beam to a pulse laser beam before the directing step.

10 The method may further comprise a step of using a beam splitter and a bending mirror to direct the generated laser beam to two beam expanders.

The NIR laser beam may be a Neodymium-doped Yttrium Aluminum Garnet (Nd:YAG) laser beam having a wavelength of 1064nm.

15 In accordance with a third aspect of the present invention, there is provided a system for laser deflashing, the system comprising a laser that generates a near infrared (NIR) laser beam having a wavelength between 1000nm and 1100nm; a beam expander located proximate the laser; at least one scanning system located
20 proximate the beam expander; an f-theta lens; and a controlling system for storing a pattern and parameters of a path of the generated laser beam; wherein the generated laser beam passes through the beam expander and into the scanning system, the scanning system being controlled by the controlling system according to said pattern to direct the generated beam through the f-theta lens onto a surface of a
25 semiconductor package to remove an excess molding compound.

The system may further comprise a beam splitter and a bending mirror for directing the generated laser beam to each of a plurality of scanning systems, wherein the generated laser beam passes through a beam expander and an f-theta
30 lens associated with each scanning system.

Each scanning system may comprise two scanning members, each of the scanning members having a reflective surface attached to one end, and wherein the scanning members are controlled by the controlling system.

5 The generated laser beam may be a continuous wave laser beam.

The system may further comprise a Q-switch for converting the continuous wave laser beam to a pulse laser beam.

10 **BRIEF DESCRIPTION OF THE DRAWINGS**

Embodiments of the invention will be better understood and readily apparent to one of ordinary skill in the art from the following written description, by way of example only, and in conjunction with the drawings, in which:

15 Figure 1 shows a schematic diagram of a laser deflashing apparatus;

Figure 2 shows a computer implementation of a controlling system as shown in Figure 1;

20 Figure 3 shows a schematic drawing of a laser cavity of Figure 1;

Figure 4a shows a picture of an example integrated circuit (IC) package with mold bleed on a heat sink before laser deflashing is performed;

25 Figure 4b shows a picture of the example IC package of Figure 4a after the mold bleed is removed from the heat sink by laser deflashing;

Figure 5a shows a drawing of patterns of mold bleeds and/or flashes and measured dimensions of a periphery of the patterns for the example IC package of Figure 4;

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Figure 5b shows a drawing of one embodiment of pre-programmed patterns and dimensions of the periphery of the patterns for the IC package of Figure 4;

Figure 5c shows a schematic diagram of a leadframe or substrate that includes
5 an array of IC packages arranged in rows and columns;

Figure 6 shows a schematic diagram of an example implementation of the laser deflashing apparatus of Figure 1; and

10 Figure 7 shows a flowchart illustrating a method of laser deflashing using a near infrared (NIR) laser having a wavelength between about 1000nm and about 1100nm.

DETAILED DESCRIPTION

15 The example embodiments described herein provide a system, an apparatus and a method for removing excess molding compound (mold bleeds and/or flashes) from a semiconductor package after the encapsulation process, using a near infrared (NIR) laser.

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Figure 1 shows a schematic diagram of a laser deflashing apparatus 100 according to one example embodiment. The apparatus 100 comprises a controlling system 102, a scanning system 104, a laser head 106 containing a laser cavity 107 and a beam expander 108, and an f-theta lens 110 that direct a laser beam to an
25 integrated circuit device (see Figure 5c) on a leadframe or substrate 120. One example of a beam expander 108 is model number 4401-256-000-20 from LINOS Photonics. One example of an f-theta lens 110 is model number 4401-288-000-20 from LINOS Photonics. It is understood that the specific models of the beam expander 108 and the f-theta lens 110 are provided by way of example only. Other
30 models of the beam expander 108 and the f-theta lens 110 can be used without departing from the scope of the present invention.

The controlling system 102 can be implemented on a computer system 200, schematically shown in Figure 2. It may be implemented as software, such as a

computer program being executed within the computer system 200, and instructing the computer system 200 to conduct the method of the example embodiment.

5 The computer system 200 comprises a computer module 202, input modules such as a keyboard 204 and mouse 206 and a plurality of output devices such as a display 208, and printer 210. The computer module 202 may be connected to a computer network 212 via a suitable transceiver device 214, to enable access to e.g. the Internet or other network systems such as a Local Area Network (LAN) or Wide Area Network (WAN).

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The computer module 202 in the example includes a processor 218, a Random Access Memory (RAM) 220 and a Read Only Memory (ROM) 222. The computer module 202 also includes a number of Input/Output (I/O) interfaces, for example I/O interface 224 to the display 208, and I/O interface 226 to the keyboard
15 204. The components of the computer module 202 typically communicate via an interconnected bus 228 and in a manner known to the person skilled in the relevant art.

20 The application program is typically supplied to the user of the computer system 200 encoded on a data storage medium such as a CD-ROM, floppy disk, etc., and read utilising a corresponding data storage medium drive of a data storage device 230. The application program is read and controlled in its execution by the processor 218. Intermediate storage of program data maybe accomplished using RAM 220.

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Referring back to Figure 1, the controlling system 102 is coupled to the scanning system 104. The scanning system 104 comprises two scanning members 112 and 114. Each of the scanning members 112 and 114 has a respective reflective surface 116 and 118 attached to one end. One example of the scanning
30 members 112 and 114 is a moving magnetic closed loop galvanometer optical scanner having model number 6230 from Cambridge Technology. One example of the reflective surfaces 116 and 118 is a corresponding symmetric mirror set having model number 6M 2310S-YA from Cambridge Technology. The symmetric mirror set

having model number 6M 2310S-YA is coated with a high power dielectric coating. In this embodiment, the reflective surfaces 116 and 118 are in the forms of an x-mirror and a y-mirror respectively. It is understood that the specific models of the scanning members 112 and 114 and the reflective surfaces 116 and 118 are provided by way of example only. Other models of the scanning members 112 and 114 and the reflective surfaces 116 and 118 can be used without departing from the scope of the present invention.

Figure 3 shows a schematic drawing of a laser cavity 107 disposed inside a laser head 106. The laser cavity 107 comprises a front mirror 302, a shutter 304, a laser source 306, a Q-switch 308, a rear mirror 310 and apertures 312. The laser source 306 is a Nd:YAG laser rod energised by diode bars. One example of the laser source 306 is model number RD40-1C2-FA1-0011 from CEO Inc. It is understood that the specific model of the laser source 306 is provided by way of example only. Other models of the laser source 306 can be used without departing from the scope of the present invention.

In this embodiment, the front mirror 302 is a partially reflective mirror, having a reflectance of about 80% to about 90%. The front mirror 302 is also known as an output coupler, through which a laser beam is emitted from the laser cavity 107. The shutter 304 is an open/close mechanical device for releasing or cutting off the laser beam. The rear mirror 310 is a highly reflective mirror, having a reflectance that is near 100%. The rear mirror 310 reflects the laser beam back through the laser source 306 to stimulate the release of photons. The apertures 312 are disposed between the shutter 304 and the laser source 306 and between the Q-switch 308 and the rear mirror 310. The apertures 312 are spatial filters used to remove the unwanted multiple-order energy peaks and to pass only the central maximum of the diffraction pattern

The Q-switch 308 is implemented as a separate component from the laser source 306. To remove the mold bleeds and/or flashes, the laser source 306 generates a Continuous Wave (CW) laser beam having a wavelength of about 1064nm. The Q-switch 308 generates very short laser pulses of high peak power. The CW laser beam is converted to a pulse laser beam by the Q-switch 308. The pulse laser beam travels

within the laser cavity 107 between the front mirror 302 and the rear mirror. When there is sufficient energy, the front mirror 302 emits the pulse laser beam from the cavity 107.

Figure 4a shows a picture of an example integrated circuit (IC) package 400 with excess molding compound (mold bleeds and/or flashes) 402 on a heat sink 404 before laser deflashing is performed. The heat sink 404 is partially covered by the mold bleeds and/or flashes 402 after mold encapsulation. This affects heat dissipation from the IC package 400. As a result, the performance of the IC package 400 can deteriorate and the IC package may eventually break down. The mold bleeds and/or flashes 402 are irradiated by the laser (i.e. laser deflashing) to expose the heat sink 404. Optimization of the laser parameters, e.g. frequency and power, and other process parameters, e.g. scanning speeds and paths of the laser beam, can advantageously remove the mold bleeds and/or flashes 402 efficiently and effectively. Figure 4b shows a picture of the example IC package 400 after the mold bleed 402 (Figure 4a) is removed from the heat sink 404 by laser deflashing.

With reference to Figures 1 and 5a-5c, in one embodiment, the dimensions of the mold bleeds and/or flashes on each IC package 400 on the leadframes or substrates 120 can be measured manually by a user before deflashing. The measurements can also be taken by using machines. Based on the mold bleeds and/or flashes with the largest measured dimension, the user inputs the pattern and the dimensions of the mold bleeds and/or flashes with the largest dimension by using application software installed in the controlling system 102.

Figure 5a shows a drawing of the patterns 502 of the mold bleeds and/or flashes and the measured dimensions of a periphery 504 of the patterns 502 for the example IC package 400. Figure 5b shows a drawing of one embodiment of pre-programmed patterns 502 and dimensions of the periphery 504 of the patterns 502 for the IC package 400. This embodiment of pre-programmed patterns 502 is provided by way of example only. It is possible to pre-program many different patterns, depending on the design of the IC package 400.

Figure 5c shows a schematic diagram of the leadframe or substrate 120 comprising an array of IC packages 400 arranged in rows 508 and columns 510. The user also inputs the number of rows 508 and columns 510 of the IC packages 400 of the leadframes or substrates 120 (Figure 1). Other parameters, such as current, frequency and power of the laser beam, step length, and delay time can also be pre-programmed. Some trials can be conducted on sample leadframes or substrates 120 (Figure 1) before the actual deflashing process is carried out.

Details of one embodiment of a process of laser deflashing are described below. Referring back to Figure 1, the pulse laser beam travels along a path 122 after leaving the laser cavity 107. Along the path 122, the pulse laser beam passes through the beam expander 108. The pulse laser beam is then reflected by the y-mirror 118 of the scanning member 114 and travels along a path 124 before it is reflected by the x-mirror 116 of the scanning member 112. After the pulse laser beam is reflected by the x-mirror 116, it travels along a path 126 and passes through the f-theta lens 110. The pulse laser beam can also be reflected by the x-mirror 116 first before being reflected by the y-mirror 118.

The beam expander 108 expands a size of the pulse laser beam. In one embodiment, the beam expander 108 expands the diameter of the pulse laser beam from about 4 mm to about 10 mm. As the optical power of the pulse laser beam remains the same, the power intensity of the pulse laser beam decreases with an increase in beam diameter. This prevents the x-mirror 116 and the y-mirror 118 from being damaged by the pulse laser beam. The beam expander 108 also provides a desired entrance beam size to the f-theta lens 112. The scanning members 112 and 114 of the scanning system 104 control the x-mirror 116 and y-mirror 118 respectively to direct the laser beam from the laser source 106 to the mold bleed of the IC packages 400 of the leadframe or substrate 120 with high speed and accuracy. Adjusting the scanning members 112 and 114 allows the laser beam to "scan" the surfaces of the IC packages 400 of the leadframe or substrate 120, according to the pre-programmed parameters discussed above.

After passing through the f-theta lens 110, the pulse laser beam converges to a focal point and is directed to the mold bleed on the surface of the IC packages 400. The pulse laser beam is advantageously directed to the IC packages 400 according to the pre-programmed pattern. Besides converging the pulse laser beam, the f-theta lens 110 also maintains a shape and a size of the converged pulse laser beam and a proportionality of scanning path patterns of the converged pulse laser beam within a calibrated flat field (e.g. about 160mm x 160mm) at a predetermined working height. The predetermined working height depends on the nominal focal length of the f-theta lens 110.

The laser beam moves across every IC package 400 of the leadframe or substrate 120 according to the pre-programmed pattern 502 and the dimensions of the periphery 504 of the pattern 502 of the IC package 400. After removing the mold bleed on the surface of one IC package 400, the laser beam can be directed to a next IC package 400 arranged in a same row 508 or column 510 by the scanning members 112 and 114. Alternatively, the leadframe or substrate 120 can be disposed on a handling system, e.g. a conveyor belt (not shown), and the conveyor belt can move the next IC package 400 to a position of a previous IC package 400.

A high precision and accuracy when removing the mold bleed is advantageously provided. Two example mechanisms by which the mold bleed can be removed are by using the laser as both a heat and a momentum source. The effect of the difference in thermal expansion between the surface metal and the mold bleed material, and the impact of the pulse laser beam when the pulse laser beam hits the surface of the IC package 400 of the leadframe or substrate 120 causes the mold bleed on the surface of the IC package 400 to burn and vaporize rapidly. Any residual fine particles of the mold bleed material can be removed by using a brush and/or a vacuum.

Figure 6 shows a schematic diagram of an example implementation of the laser deflashing apparatus 600. In this example implementation, the apparatus 600 comprises two scanning systems 104, two beam expanders 108 and two f-theta lenses 110. The two scanning systems 104, beam expanders 108 and f-theta lenses 110 facilitate simultaneous removal of mold bleeds and/or flashes for two leadframes

or substrates 120. In this embodiment, the apparatus 600 further comprises a beam splitter 602 and a bending mirror 604 to direct the pulse laser beam to each of the two beam expanders 108. A laser head 606 of the apparatus 600 comprises a laser cavity 107 of Figure 3, the two beam expanders 108, the beam splitter 602 and the bending mirror 604. The laser beam passes through the beam splitter 602 and/or the bending mirror 604 before passing through the beam expanders 108. In this example implementation, the pattern 502 and the parameters can be pre-programmed before the deflashing is carried out.

After passing through the beam expanders 108, the pulse laser beam is reflected by the y-mirrors 118 of the scanning members 114 followed by the x-mirrors 116 of the scanning members 112. Alternatively, the pulse laser beam can be reflected by the x-mirrors 116 first, before being reflected by the y-mirrors 118. The pulse laser beam then passes through the f-theta lenses 110. After passing through the f-theta lenses 110, the pulse laser beam converges to a focal point and is directed to the mold bleeds and/or flashes on the surfaces of the IC packages 400 of the leadframes or substrates 120.

Similarly, the laser beam moves across every IC package 400 of the leadframes or substrates 120 according to the pre-programmed pattern 502 and the dimensions of the periphery 504 of the pattern 502. After removing the mold bleed on the surface of one IC package 400, the scanning members 112 and 114 of the respective scanning systems 104 move the x-mirrors 116 and y-mirrors 118 to direct the laser beam to a next IC package 400 arranged in a same row 508 or column 510 by. Alternatively, the two leadframes or substrates 120 can be disposed on handling systems, e.g. conveyor belts (not shown), and the conveyor belts (not shown) can move the next IC package 400 to a position of a previous IC package 400.

If the calibrated flat field for one scanning system 104 does not cover the whole area of one leadframe or substrate 120, the two scanning systems 104 can be used to remove the mold bleeds and/or flashes. One scanning system 104 starts the deflashing process from one end of the leadframe or substrate 120 and the other

scanning system 104 starts the deflashing process from the center of the leadframe or substrate 120.

Similarly, the laser beam moves across every IC package 400 of the leadframe or substrate 120 according to the pre-programmed pattern 502. After removing the mold bleed on the surface of one IC package 400, the scanning members 112 and 114 of the respective scanning systems 104 move the x-mirrors 116 and y-mirrors 118 to direct the laser beam. Alternatively, the two leadframes or substrates 120 can be disposed on handling systems, e.g. conveyor belts (not shown), and the conveyor belts can move the next IC package 400 to a position of a IC package 400.

It is understood that the numbers of the scanning systems 104, beam expanders 108, beam splitters 602 and bending mirrors 604 and f-theta lenses 110 are not limited to those described in the above example implementation. Different arrangements using more than two scanning systems 104 are also possible.

Figure 7 shows a flowchart 700 illustrating one embodiment of a method of laser deflashing using a near infrared (NIR) laser having a wavelength between about 1000nm and about 1100nm. At step 702, mold bleeds and/or flashes on a surface of a semiconductor package can be studied by a user (e.g. process engineer) to determine the pattern and parameters to be used in the method. At step 704, the pattern and parameters of a laser path are programmed. At step 706, a near infrared (NIR) laser beam having a wavelength between about 1000nm and about 1100nm is generated. At step 708, the generated laser beam is directed to remove the mold bleeds and/or flashes using the programmed pattern/parameters.

Using a near infrared (NIR) laser having a wavelength between about 1000nm and about 1100nm for laser deflashing is advantageously environmentally friendly. As compared to other lasers e.g. Excimer laser, the NIR laser is relatively inexpensive and safer to use. Furthermore, as compared to a green laser having a wavelength of about 532nm, the electrical to optical efficiency is advantageously higher since the NIR laser with a wavelength between about 1000nm and about 1100nm is the first harmonic

generation, while the green laser having a wavelength of about 532nm is the second harmonic generation. Using the NIR laser having a wavelength between about 1000nm and about 1100nm for laser deflashing can advantageously be more cost effective, safer and more accurate as compared to the other known lasers. One example of the NIR laser is a Neodymium-doped Yttrium Aluminum Garnet (Nd:YAG) laser having a wavelength of about 1064nm. Other examples of the NIR laser can be used without departing from the scope of the present invention. For example, using a fiber laser advantageously shrinks the overall laser head size as the laser cavity structure is not required.

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In alternate embodiments, the apparatus 100 as described above can also be used for laser marking. In these embodiments, rather than remove mold bleeds and/or flashes, the lasers can mark an object with, for example, text and/or graphics.

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It will be appreciated by a person skilled in the art that numerous variations and/or modifications may be made to the present invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects to be illustrative and not restrictive.

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CLAIMS

1. An apparatus for laser deflashing, the apparatus comprising:
a laser for generating a near infrared (NIR) laser beam having a wavelength
5 between 1000nm and 1100nm; wherein the generated laser beam is directed to a
surface of a semiconductor package to remove an excess molding compound.
2. The apparatus as claimed in claim 1, wherein the excess molding compound
comprises at least one of mold bleeds and flashes.
- 10 3. The apparatus as claimed in claims 1 or 2, further comprising a scanning
system having two scanning members, each of the scanning members having a
reflective surface attached to one end.
- 15 4. The apparatus as claimed in any one of claims 1 to 3, wherein the generated
laser beam is a continuous wave laser beam.
5. The apparatus as claimed in claim 4, further comprising a Q-switch for
converting the continuous wave laser beam to a pulse laser beam.
- 20 6. The apparatus as claimed in any one of claims 1 to 5, further comprising a
beam expander and an f-theta lens, wherein the laser beam passes through the
beam expander, is reflected by the reflective surface of at least one scanning
member, is converged to a focal point by the f-theta lens and is directed to the
25 surface of the semiconductor package to remove the excess molding compound.
7. The apparatus as claimed in any one of claims 1 to 6, further comprising a
controlling system for storing a pattern and parameters of a path of the generated
laser beam.
- 30 8. The apparatus as claimed in any one of claims 1 to 7, further comprising a
plurality of scanning systems, and one or more beam splitters and a bending mirror
for directing the generated laser beam to each of the respective scanning systems.

9. The apparatus as claimed in any one of claims 1 to 7, further comprising a plurality of scanning systems, each scanning system having an associated beam expander and f-theta lens, for simultaneous removal of the excess molding compound on a plurality of semiconductor packages or for simultaneous removal of the excess molding compound on different areas of a semiconductor package.

10. The apparatus as claimed in claim 9, further comprising a beam splitter and a bending mirror for directing the generated laser beam to the respective beam expanders.

11. The apparatus as claimed in any one of claims 1 to 10, wherein the NIR laser beam is a Neodymium-doped Yttrium Aluminum Garnet (Nd:YAG) laser beam having a wavelength of 1064nm.

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12. A method of laser deflashing, the method comprising the steps of:
generating a near infrared (NIR) laser beam having a wavelength between 1000nm and 1100nm; and
directing the generated laser beam to remove an excess molding compound.

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13. The method as claimed in claim 12, wherein the directing step further comprises directing the generated laser beam through a beam expander, reflecting the generated laser beam with a reflective surface of at least one scanning member and converging the generated laser beam with an f-theta lens.

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14. The method as claimed in claims 12 or 13, further comprising a step of storing a pattern and parameters of a path of the generated laser beam before the step of generating the laser beam.

30 15. The method as claimed in any one of claims 12 to 14, wherein the generated laser beam is a continuous wave laser beam.

16. The method as claimed in claim 15, further comprising a step of converting the continuous wave laser beam to a pulse laser beam before the directing step.

17. The method as claimed in any one of claims 12 to 16, further comprising a step of using a beam splitter and a bending mirror to direct the generated laser beam to two beam expanders.

18. The method as claimed in any one of claims 12 to 17, wherein the NIR laser beam is a Neodymium-doped Yttrium Aluminum Garnet (Nd:YAG) laser beam having a wavelength of 1064nm.

19. A system for laser deflashing, the system comprising:

a laser that generates a near infrared (NIR) laser beam having a wavelength between 1000nm and 1100nm;

a beam expander located proximate the laser;

at least one scanning system located proximate the beam expander;

an f-theta lens; and

a controlling system for storing a pattern and parameters of a path of the generated laser beam;

wherein the generated laser beam passes through the beam expander and into the scanning system, the scanning system being controlled by the controlling system according to said pattern to direct the generated beam through the f-theta lens onto a surface of a semiconductor package to remove an excess molding compound.

20. The system as claimed in claim 19, further comprising a beam splitter and a bending mirror for directing the generated laser beam to each of a plurality of scanning systems, wherein the generated laser beam passes through a beam expander and an f-theta lens associated with each scanning system.

21. The system as claimed in claims 19 or 20, wherein each scanning system comprises two scanning members, each of the scanning members having a

reflective surface attached to one end, and wherein the scanning members are controlled by the controlling system.

22. The system as claimed in any one of claims 19 to 21, wherein the generated
5 laser beam is a continuous wave laser beam.

23. The system as claimed in claim 22, further comprising a Q-switch for converting the continuous wave laser beam to a pulse laser beam.