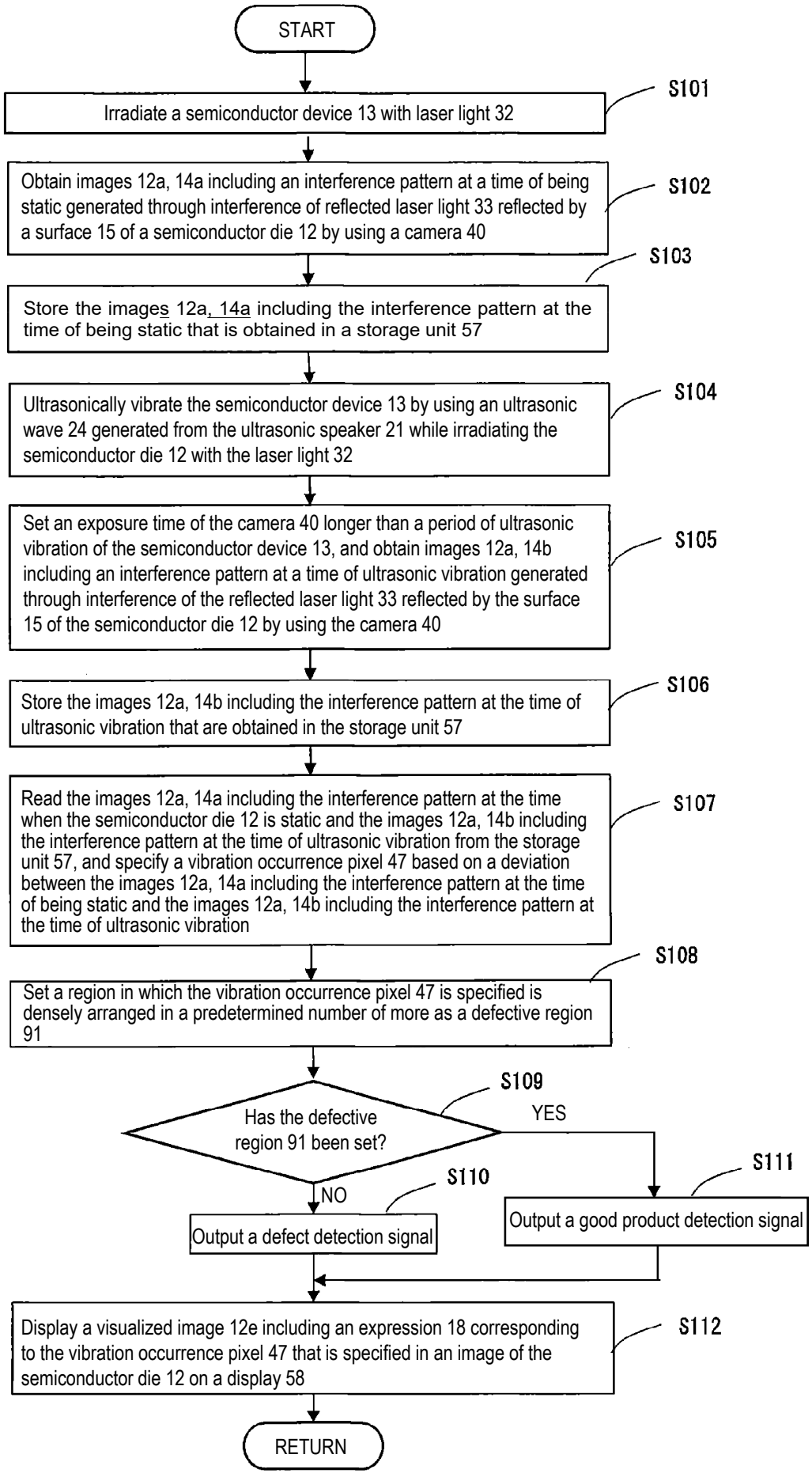

START
Irradiate a semiconductor device 13 with laser light 32
S101
Obtain images 12a, 14a including an interference pattern at a time of being static generated through interference of reflected laser light 33 reflected by a surface 15 of a semiconductor die 12 by using a camera 40
S102
Store the images 12a, 14a including the interference pattern at the time of being static that is obtained in a storage unit 57
S103
Ultrasonically vibrate the semiconductor device 13 by using an ultrasonic wave 24 generated from the ultrasonic speaker 21 while irradiating the semiconductor die 12 with the laser light 32
S104
Set an exposure time of the camera 40 longer than a period of ultrasonic vibration of the semiconductor device 13, and obtain images 12a, 14b including an interference pattern at a time of ultrasonic vibration generated through interference of the reflected laser light 33 reflected by the surface 15 of the semiconductor die 12 by using the camera 40
S105
Store the images 12a, 14b including the interference pattern at the time of ultrasonic vibration that are obtained in the storage unit 57
S106
Read the images 12a, 14a including the interference pattern at the time when the semiconductor die 12 is static and the images 12a, 14b including the interference pattern at the time of ultrasonic vibration from the storage unit 57, and specify a vibration occurrence pixel 47 based on a deviation between the images 12a, 14a including the interference pattern at the time of being static and the images 12a, 14b including the interference pattern at the time of ultrasonic vibration
S107
Set a region in which the vibration occurrence pixel 47 is specified is densely arranged in a predetermined number of more as a defective region 91
S108
Has the defective region 91 been set?
S109
YES
NO
S110
Output a defect detection signal
S111
Output a good product detection signal
Display a visualized image 12e including an expression 18 corresponding to the vibration occurrence pixel 47 that is specified in an image of the semiconductor die 12 on a display 58
S112
RETURN

FIG. 9

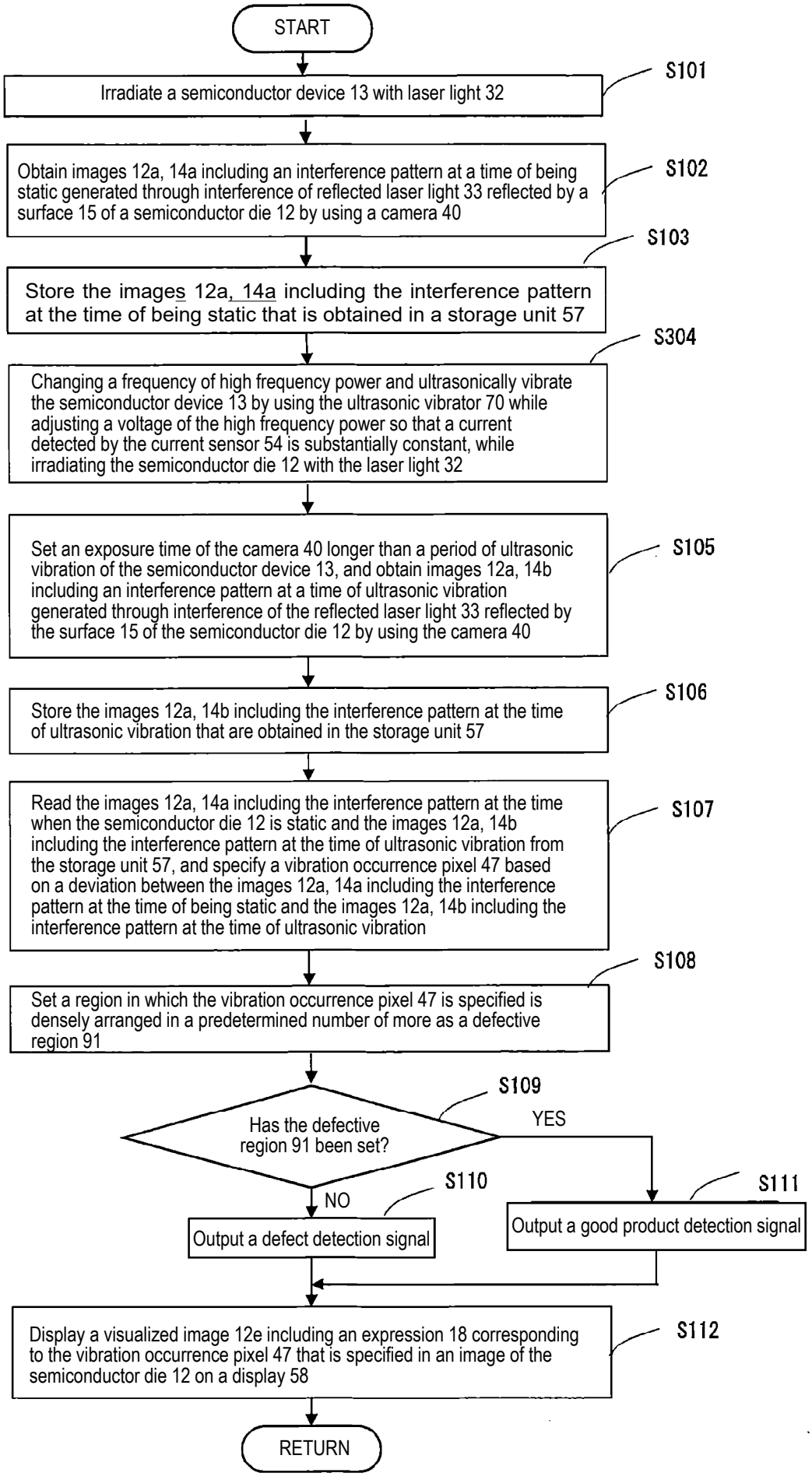

START
Irradiate a semiconductor device 13 with laser light 32
S101
Obtain images 12a, 14a including an interference pattern at a time of being static generated through interference of reflected laser light 33 reflected by a surface 15 of a semiconductor die 12 by using a camera 40
S102
Store the images 12a, 14a including the interference pattern at the time of being static that is obtained in a storage unit 57
S103
Changing a frequency of high frequency power and ultrasonically vibrate the semiconductor device 13 by using the ultrasonic vibrator 70 while adjusting a voltage of the high frequency power so that a current detected by the current sensor 54 is substantially constant, while irradiating the semiconductor die 12 with the laser light 32
S304
Set an exposure time of the camera 40 longer than a period of ultrasonic vibration of the semiconductor device 13, and obtain images 12a, 14b including an interference pattern at a time of ultrasonic vibration generated through interference of the reflected laser light 33 reflected by the surface 15 of the semiconductor die 12 by using the camera 40
S105
Store the images 12a, 14b including the interference pattern at the time of ultrasonic vibration that are obtained in the storage unit 57
S106
Read the images 12a, 14a including the interference pattern at the time when the semiconductor die 12 is static and the images 12a, 14b including the interference pattern at the time of ultrasonic vibration from the storage unit 57, and specify a vibration occurrence pixel 47 based on a deviation between the images 12a, 14a including the interference pattern at the time of being static and the images 12a, 14b including the interference pattern at the time of ultrasonic vibration
S107
Set a region in which the vibration occurrence pixel 47 is specified is densely arranged in a predetermined number of more as a defective region 91
S108
Has the defective region 91 been set?
S109
YES
NO
S110
Output a defect detection signal
S111
Output a good product detection signal
Display a visualized image 12e including an expression 18 corresponding to the vibration occurrence pixel 47 that is specified in an image of the semiconductor die 12 on a display 58
S112
RETURN

FIG. 15