Motorola SE4500
The re-invention of 2D imaging technology

Three models for maximum application flexibility

Twin LEDs with Lenses

Connector on back

Zinc Chassis

Imaging Lens

Aiming element
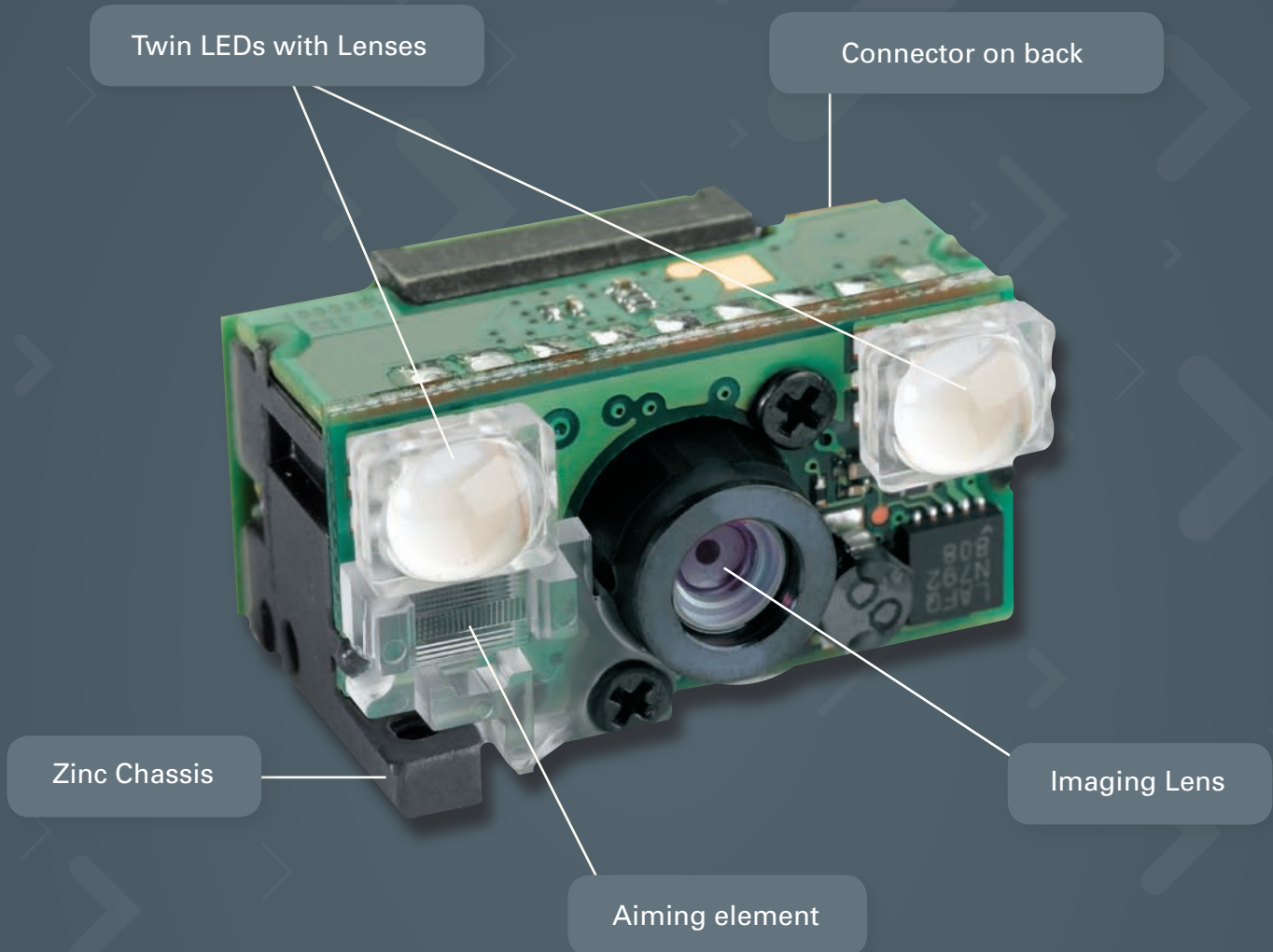
Dimensions: 11.8 mm H x 21.5 mm W x 16.3 mm D/0.46" H x 0.85" W x 0.64" D

Three SE4500 engine models meet a wide variety of working ranges and applications:

- SR (Standard Range) designed for 1D intensive applications with medium to large bar codes

- DL (Driver's License optimized) ideal for small to medium bar codes and 2D intensive applications, including U.S. driver's license ID verification

- HD (High Density) for very small bar codes

The question: 2D or not 2D?

Until today, businesses were required to choose between a high performance laser engine for 1D bar code scanning or a 2D imager that offered both 1D and 2D scanning functionality — but reduced performance. The camera-based 2D imagers were not capable of capturing bar codes as rapidly or as accurately as laser technology, forcing enterprises to accept degradation in user productivity in order to implement the more information-rich 2D bar code symbologies throughout operations. As a result, businesses are often slow to embrace 2D symbologies — despite the many benefits that its increased data capacity and/or smaller symbol size can offer.

The answer: A new category of 2D imagers — bringing laser-like performance to all 1D/2D symbologies

Motorola set out to create a 2D imaging engine capable of delivering today's 1D laser performance levels for both 1D and 2D bar codes. The result is the SE4500, truly the embodiment of its design objectives. Multiple patented and patent-pending features break the barriers that have long separated 1D laser scanner and 2D imager technologies — speed and performance — paving the way for more strategic utilization of the bar code in today's enterprises.

The tiny and powerful device is about ¼ cubic inch (1 cubic centimeter) and weighs in at less than three tenths of an ounce (0.29 oz/8.22 grams), adding minimal weight and maximum data capture functionality to the devices in which it is embedded. Due to its size, the SE4500 can fit in the most space constrained mechanical designs, enabling the creation of smaller, lighter and more ergonomic products that are easier to hold — reducing user fatigue. When it comes to performance, the SE4500 shines, providing:

- **True laser speed for all bar codes.** Enterprises are now free to implement 2D bar codes without sacrificing scanning performance or the related decrease in employee productivity and operational throughput.

- **The ability to capture poor quality and damaged bar codes.** Whether your bar code labels are on products in the aisles of a retail store, on materials moving through a warehouse or on shipments in the back of a delivery truck, they can easily become scratched or dirty. The superior patented decoding software enables lightning-quick scanning of bar codes despite label damage, protecting productivity and minimizing time consuming and costly exceptions.

Until today, deploying 2D bar codes required a step down in scanning performance. But Motorola's SE4500 imager captures 1D and 2D bar codes with laser-like performance, allowing enterprises to embrace 2D symbologies and the many benefits that the information rich compact bar codes can deliver.
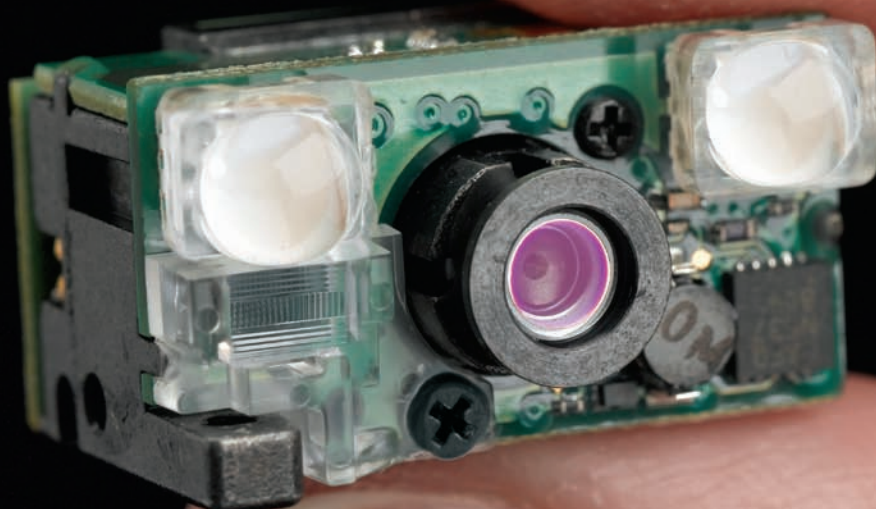
- **Omnidirectional scanning for both 1D and 2D bar codes.** Laser scanners require alignment of the laser with the bar code. But the SE4500 brings highly ergonomic omnidirectional scanning simplicity to both 1D and 2D bar codes. The need for constant wrist movement is eliminated, increasing comfort and productivity. And while it may not take more than a few seconds on average to align bar code and scanner, those seconds add up. For example, sorters in the distribution center of one major parcel/post carrier scan an average of 500 packages an hour. When omnidirectional laser-like 2D imaging shaved two seconds off of every scanning transaction, each worker reclaimed just over two hours a day, allowing the carrier to increase productivity in the sorting facility by nearly 25 percent through the deployment of best-in-class scanning technology — instead of staff.

The result is the ability to expand the value of bar code technology throughout your business operations. Since 2D bar codes hold more information, you can supercharge your workers and processes with a richer set of data that can sharpen your competitive advantage by:

- Automating everyday processes to boost employee productivity and reduce errors

- Enabling real-time track and trace capabilities for cost-effective compliance with government and industry regulations

- Enabling better decision-making

The technological advantages of the SE4500

User and Environmental features

Three features address application and user environmental requirements. The rugged design provides enterprise class dependability in demanding business conditions, while other features make scanning as simple as possible for your end users.

Rugged: built for demanding business environments
While the host mobile device in which the SE4500 is installed will offer its own rugged specifications, the SE4500 offers many features to help ensure reliable operation in scan intensive operations in demanding enterprise applications, including:

- A very strong zinc chassis

- Anchoring of all major components to the chassis for additional protection, including the circuit board, aiming element, lens and laser

- A shock rating of 2000 G at -22° F and 158° F/ -30° C and 70° C, ensuring the ability to survive a drop in extreme temperatures

A sharper, brighter and more intuitive aiming pattern
In order to develop the most intuitive and easy-to-see aiming pattern, Motorola combined the best of technology with the findings from an end-user study. Multiple patterns were tested in real-world applications, enabling the selection of the pattern that provided users with 'point and shoot' scanning simplicity. For several reasons, a laser light source was selected instead of a light emitting diode (LED) to project the aiming pattern. In contrast to the soft diffused light of an LED, a laser emits a very focused and directed light, creating the sharp and defined pattern required to produce a high performance engine for scan intensive applications. Finally, to obtain the most definite edges possible, the laser is projected through a stencil-like element. The result is a super crisp, very bright aiming pattern that is easy to see in virtually any lighting condition, providing the first time every time accurate aim required to boost end user productivity in any application — and any environment.

The greatest depth of field for maximum application flexibility
The SE4500 is engineered to deliver the greatest depth of field in any 2D imager in its class, able to read bar codes closer and farther away than competitive 2D imagers. The increase in depth of field directly relates to ease of use — bar codes can be captured anywhere within the depth of field, eliminating the need for the more precise positioning required for imagers with less range. And the world of application possibilities expands with the extended range, enabling the scanning of tiny items on a manufacturing assembly line or items moving down a conveyor belt.

The electronic features

At the heart of all 2D imagers is a camera. Three features differentiate the camera in the SE4500, allowing the capture of the best image possible, every time — shutter technology, the frame rate and patent-pending Motion Freezing Illumination technology.

The Global Shutter
Two types of shutters are available for 2D imagers: Global Shutter and Rolling Shutter. A Rolling Shutter reads the image line by line, from top to bottom. Even though the image is read in the time it takes to snap the shutter — just milliseconds — the image may have changed slightly. The target object may have moved, the camera may have moved, or the lighting on the target object may have changed. The resulting blurring of the image that has been captured can impair readability — even though the blurring may be slight.

In contrast, a Global Shutter captures the entire image simultaneously, eliminating the opportunity for any change to take place during the exposure — guaranteeing the capture of very crisp and defined edges in all areas of a bar code, regardless of the symbology. In addition, the Global Shutter provides exceptional motion tolerance. Accurate scans are captured even while the scanner or bar code is in motion, eliminating the need for employees to pause until the bar code is captured. The ability to continuously scan also enables a more natural workflow, again protecting scanning productivity.

Frame rate: 60 unique frames per second for an information rich image

Every unproductive scan slows your users down, wasting time — and money. The SE4500 offers a frame rate that allows the sensor to capture up to 60 unique images per second, providing the richly detailed bar code image required to enable first-time every time rapid and accurate scanning.

Motion Freezing Illumination technology shines the right light on every bar code

While the Global Shutter captures 60 unique images per second, Motorola's patent-pending Motion Freezing Illumination technology allows the SE4500 to get the most out of each and every frame. In order to capture the best image possible, the bar code must be properly lit, each and every time. With Motion Freezing Illumination, a strobe-style light emits a very strong brief burst of light that effectively freezes the image, ensuring that the proper lighting is always present to capture the best picture possible.

The 'secret sauce': the software

The electronic advantages engineered into the SE4500 allow the capture of the very best image possible for decoding. With the addition of Motorola's proprietary patented software — the 'secret sauce' — the SE4500 delivers an industry first: laser-scanning speed for both 1D and 2D bar codes. The advanced decoding software was written from the ground up to create the very aggressive, computationally intensive algorithms necessary to bring laser speed to camera-based technology.

As a result, businesses can implement 2D bar code symbologies without impacting user productivity. And since 2D bar codes can hold a much greater repository of data than their 1D counterparts, enterprises can provide users with more information — information that can further streamline business processes, improve productivity and reduce the opportunity for error. For example, a hospital can embed more information on a patient wristband —

such as blood type, known allergies and existing medical conditions — to help prevent errors in medication administration. Or, a manufacturer can allow technicians in the field to print and place a bar code label that contains the complete repair history and Service Level Agreement (SLA) information on equipment that was serviced, providing the information required to improve first time fix rates and ensure customers receive appropriate levels of service.

For more information

The Motorola SE4500 is available in select Motorola mobile computers and as a component that can enable superior comprehensive scanning in a wide variety of products. For more information on how you can reap the benefits of the SE4500, please visit us on the Web at www.motorola.com/ or access our global contact directory at www.motorola.com/enterprisemobility/contactus

Why Motorola

Every day, organizations of all sizes all over the world count on Motorola mobility solutions to maximize personnel effectiveness, improve services, and increase revenue potential. When you choose Motorola for your mobility solution, you get the peace of mind that comes with choosing an industry leader as your technology partner. Motorola offers the proven expertise and technology you need to achieve maximum value and a fast return on investment — as well as first hand experience in virtually every size organization in nearly every major industry. And our end-to-end solutions offer the simplicity of a single accountable source — regardless of the number of vendors involved.

Our comprehensive product offering includes: rugged and enterprise class mobile computers with extensive advanced data capture and wireless communications options; rugged two-way radios for always on voice communications; private wide area and local area wireless network infrastructure enables robust real-time wireless connectivity indoors and outdoors in a campus-style facility — as well as between multiple location; comprehensive RFID infrastructure, including fixed, mobile and handheld RFID readers; a partner channel delivering best-in class applications; software solutions that enable centralized and remote management of every aspect of your mobility solution; and a complete range of pre-and post-deployment services to help get and keep your mobility solution up and running at peak performance every day of the year.

MOTOROLA

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