

# Maximizing Superior Elemental Technologies in Growth Markets Driven by Technological Innovation



**“Outstanding elemental technologies, together with a road map that effectively responded to market and technological trends and facilitated strategic product development, enabled Minebea to become a top manufacturer of small LED backlights soon after it entered this market.”**

**Hirotaka Fujita**

Managing Executive Officer and Head of the Electronic Device Business Unit

A late entrant to the market for small LED backlights about five years ago, Minebea today has a global market share of approximately 10% and is one of the world’s top three manufacturers. This achievement is attributable to the fact that Minebea:

- 1) possesses outstanding and directly relevant elemental technologies,
- 2) formulated a road map that effectively responded to market and technological trends, and
- 3) facilitated strategic product development.

The key to developing advanced small LED backlights is to design light guide plates that provide greater and more uniform luminance and have a slimmer profile, thereby bringing the light source to the surface.

At present, light guide plates with a thickness of approximately 0.6 mm dominate the market. Simply making the plate slimmer reduces the amount of light that is carried from the light source to

the LED surface. Accordingly, designing a slimmer light guide plate demands ultraprecision machining technologies as well as highly advanced optical simulation and optical thin film technologies.

Minebea has amassed outstanding ultraprecision machining technologies through the manufacture of its mainstay bearings and small motors. Going forward, these technologies will have increased currency in the area of LED backlights.

In line with our development road map for LED backlights, we are promoting product development that maximizes while at the same time reflects a solid grasp of trends in the displays market. One initiative to date has involved the development of a high-performance LED backlight in collaboration with a leading LED manufacturer. Through such moves, we will endeavor to increase our share of the market for small LED backlights as well as expand our focus to include the markets for medium-sized and large units.

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**Display Market**

Minebea’s lineup includes products for the small, medium-sized and large display markets.



Optical evaluation



A wide range of equipment enables precise optical evaluation

Circuit technologies



Advanced circuit design technologies facilitate highly efficient and reliable circuitry

Circuit evaluation



Performance evaluation supports efforts to enhance the reliability and attributes of circuitry developed in-house

# FPD Peripheral Components

LED Backlights

CCFL Backlight Inverters

Color Wheels

Ballasts

**Thin film technology**

**Design technologies**

**Lighting technologies**



Minebea boasts advanced thin film coating technology and a clean room work area



A range of two- and three-dimensional computer-assisted design (CAD) systems help shorten lead times from die design to production of the finished unit



Optical simulation is essential to elemental technologies used in the manufacture of high-performance optical components.

For medium-sized LED backlights for car navigation systems—a newer market for Minebea—technologies to reduce thermal radiation are also essential. The heat reduction technologies we accumulated through the manufacture of fan motors and switching power supplies are enabling us to develop highly competitive products.

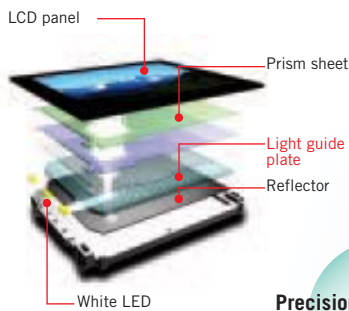
In the area of backlight inverters, we are capitalizing on circuit design technologies cultivated through the manufacture of switching power supplies and optical thin film technologies. The area of color wheels allows us to use optical thin film technologies amassed through the manufacture of MODs and precision small-

motor technologies accumulated through the manufacture of HDD spindle motors. These technologies are underpinning efforts to develop products that boast distinctive competitive advantages.

Going forward, we will continue to develop attractive and commercially viable products by integrating these key technologies. These efforts will focus on products that satisfy two key conditions, that is, they:

- 1) allow us to maximize Minebea's core technologies, and
- 2) are in growth markets driven by technological innovation.

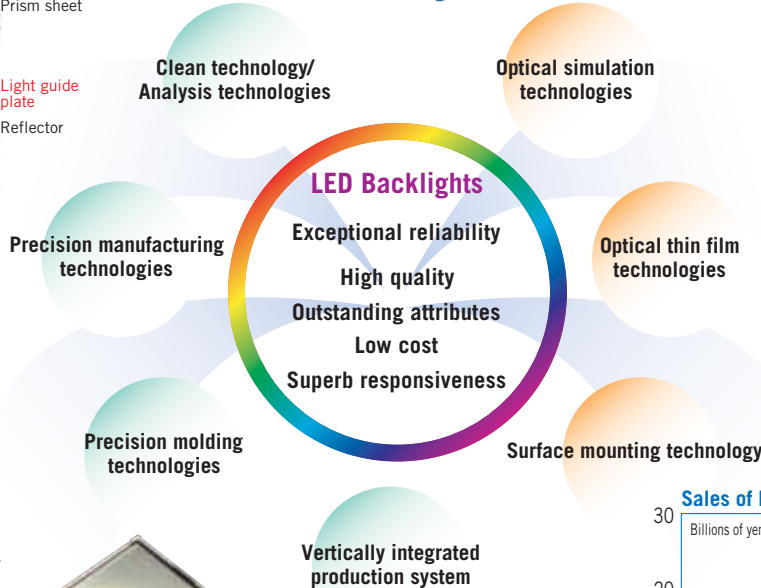
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**LED Backlights**

The light from an LED display actually comes from a backlight, which, as its name indicates, is positioned at the back of the display unit. The performance of a standard LED backlight is largely determined by the performance of the LED, optical film and light guide plate. Minebea's technologies and expertise in such areas as molding, precision manufacturing, optical simulation and optical thin film formation are particularly relevant to the manufacture of superior light guide plates.

**Technologies Supporting the Manufacture of High-Performance LED Backlights**



Clean room assembly line for LED backlights



**Sales of Electronic Devices**

