

Getting Started

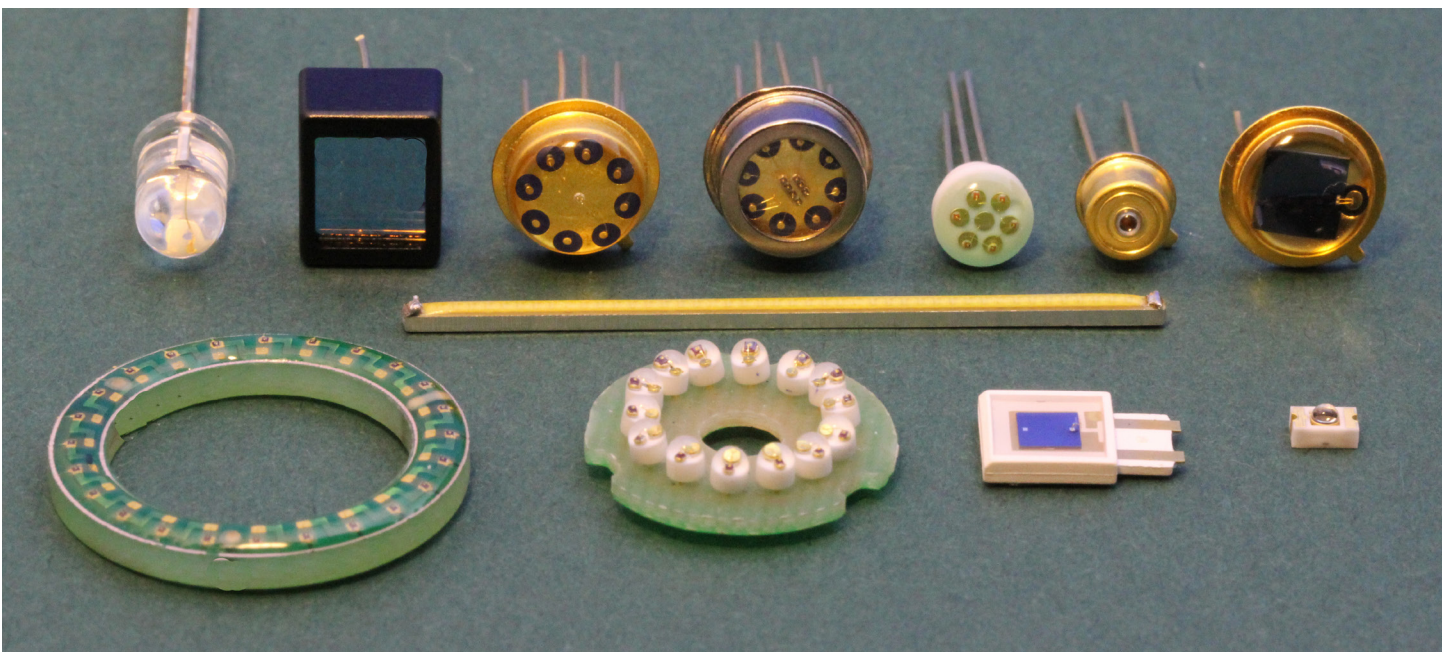
Part 5 of a 5 part series



In this fifth installment of our five-part series on Marktech's capabilities, we focus on the overall steps that can be used to provide customization as a solution for your application needs.

Utilizing our 30 years of experience in optoelectronics, Marktech's customization process focuses on customer needs and applications. Instead of using standardized—but perhaps non-optimized—parts, Marktech allows advantageous custom product variations to enhance your product design needs. Marktech Optoelectronics has solved challenging LED design, assembly and manufacturing problems for a wide range of customers. Marktech's company size and market focus, along with 30+ years of engineering and marketing experience, allows it to offer customized variations of products that are not available from typical optoelectronic suppliers.

Resources are provided for component selection, packaging options, testing and expert advice, providing the designer with insights concerning custom variations that can be leveraged to optimize electrical, optical, and thermal characteristics—without the need for large volume commitments.



Customized assemblies

Customized assemblies can provide prototypes for what-if product builds, evaluation test products, and products incorporating specific emitter and detector chips needed for demanding customer applications.

Pursuing a Custom Device

To develop a custom device that solves your needs –from proof-of-concept to manufacture and launch, Marktech engineers will discuss with you these following areas, which are detailed further below:

Application support for needs specific to your project

Component optimization recommendations involving technology selection (see [Product Selector Guide](#)) and assembly packaging, including:

Emitter selection (Cree and Marktech UV, visible, and NIR /SWIR chips)

- High-brightness and high-power LEDs
- Multichip emitters and chip-on-board packaging
- Infrared, ultraviolet, and visible LED emitters
- Single or multi-chip LED packages or modules for multiple wavelength applications
- Single or multiple LED die configurations

Detector selection (photo transistors, and photodiodes with the ability to detect light in the UV, visible, and infrared spectrums)

- Specialty photo detectors (GaP Schottky)
- Standard photovoltaic silicon photodiodes
- Silicon photo transistor and Avalanche photodiodes
- InGaAs and InP PIN photodiodes
- InGaAs/InP epitaxial wafers
- Custom detectors from Marktech are also available through Digi-Key by filling out a form <https://www.digikey.com/en/supplier-centers/m/marktech-optoelectronics/custom-detectors>

Packaging selection

- A variety of packaging can be selected, including:
- Ceramic surface mount package with or without an added lens

- Plastic 2, 4 or 6-leaded surface mount package with no added lens
- 8 pin, TO-39 metal can package with multiple lens options
- 2mm – 5mm ceramic stem with drip lens encapsulation
- Reflective sensor package for both emitter and detector
- Custom chip-on-board (COB) mounting to FR-4 boards, metal core PCBs, and ceramic and flex polyimide

Test Services

Marktech's application support includes electrical parameter test, environmental test screening and reliability testing for your specific needs. Testing is supported by a complete onsite components lab with measurement capability for validation of wavelength, angles, simulation of specific conditions, and full optical and electrical parametric characterization.

Manufacturing

Complete turn-key manufacturing from Epi growth to finished products, and from pilot runs to full production is available. Completed assemblies have ranged from two chips to 140, with no restrictions on the number of chips we can mount. Whether your LED assembly needs are surface mount, through-hole, or a combination of the two, we provide an efficient, hassle-free, cost-effective solution to LED assembly-related challenges.

Application Support:

A discussion with our engineers about custom assemblies can answer these concerns:

- Does your application require multiple chips, either for emission or detection or both?
- What is the best material for your assembly: FR-4 to ceramic, flex, or metal core?
- How many chips are required based on output and drive conditions. (At Marktech, we have completed assemblies ranging from two chips to 140, however, there are no restrictions on the number of chips we can mount.)
- Is complete turn-key manufacturing needed? Marktech can supply this from Epi growth to finished products.

Test Services

Marktech provides customized testing for your products. Unlike many optoelectronic device producers that only will supply standard parts with standard testing, Marktech has the equipment, knowledge, procedures, and most important—the willingness to custom test your parts as needed by you. Testing is done in Marktech's NY, California, and Japan facilities.

Test equipment includes:

- Photo Research
- Oriel Instruments (Newport)
- Labsphere
- Gooch and Housego
- Instrument Systems (Konica Minolta)
- Blue M (85/C/85%RH testing)
- Tenney (air to air thermal shock, and temperature cycling)
- Ransco (air to air thermal shock)
- UV to SWIR detector parametric test (utilizing customized equipment not available in the market)
 - Spectral response
 - Quantum efficiency
 - Shunt resistance
 - Dark current
- Bare emitter die test, with blue membrane tape (pick/test/replace die on tape), as well as waffle pack/tray test.

Agilent / HP Parametric testing

Keithley electrical characterization

Manufacturing

With manufacturing facilities in California, Germany, and Japan, Marktech is a vertically-integrated company, allowing quick production of components, thus decreasing your time to market. We can produce your entire package in the United States, if need be.

LED Assembly Capabilities

- SMD, Thru-Hole & Chip-on-Board assembly
- High Density Pick & Place
- Prototyping
- High Volume Production Runs
- PCB Design and Fabrication
 - Single or Multi-Layer
 - Flexible or Rigid
 - Aluminum, FR4 and Polyimide
- Eng. Software Capabilities
- Schematic Capture
- PCB Design
- Simulation
- CAD & CAM
- Consigned or purchased materials
- In-circuit testing
- GenRad functional testing
- Reliability testing
- Potting
- Conformal Coating
- IPC Standard Assembly
- Use of your Part Numbering System
- Shipped to your packaging requirements
- Additional Outsourced Capabilities Include:
 - Plastic injection molding
 - Metal work fabrication

To Get Started Marktech May Need

- Assembly drawing
- PCB FAB drawing and Gerber files
- Bill of Materials (BOM) with manufacturer's name, part numbers, and circuit references
- Drawings and BOM for any custom items; cable assemblies, transformers, metal or plastic cases, etc.
- Is this consigned or turnkey material?
- Conformal Coating requirements
- Testing instructions
- Packaging requirements
- Target Costs
- Quantity and proposed delivery schedule
- Any existing vendors or special arrangements Marktech needs to know about

Conclusion

Marktech offers our customers many options to achieve their goal of having a custom component or assembly device designed to their specific needs. To accomplish this Marktech offers a wide selection of emitter materials ranging from 280nm UV, the Cree line of visible materials, near IR, and SWIR materials. Our range for emitter materials is one of the largest commercially available from one source and ranges from 280nm to 2600nm with higher wavelengths available.

On the detector side we offer both silicon, GaP, and InGaAs materials. Available wavelengths begin at 150nm (UV) through the visible range (440 to 700nm), near infrared (710 to 1050nm and Short Wave Infrared (1050 to 1720nm).

Our packaging options include both components and assemblies for emitters, detectors and a combination of both. Packages include surface mount, multi-chip and chip on board. Design assemblies using ring lights, star- boards and linear boards to name a few.

We are able to test for any electrical and optical parameter for emitters and detectors. In most cases this includes plus or minus 1 nanometer for emission.

For more information:

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