MONOLITHIC MICROWAVE INTEGRATED CIRCUIT (MMIC)

GENERIC CATALOG
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elisra-MW Business Line</td>
<td>5</td>
</tr>
<tr>
<td>Amplifier Set</td>
<td>9</td>
</tr>
<tr>
<td>Single Bias</td>
<td>9</td>
</tr>
<tr>
<td>High Gain</td>
<td>9</td>
</tr>
<tr>
<td>Narrow Band</td>
<td>10</td>
</tr>
<tr>
<td>Attenuators Set</td>
<td>11</td>
</tr>
<tr>
<td>DCA Set</td>
<td>12</td>
</tr>
<tr>
<td>Multi Bit</td>
<td>12</td>
</tr>
<tr>
<td>1 Bit</td>
<td>12</td>
</tr>
<tr>
<td>5 Bit DPS</td>
<td>13</td>
</tr>
<tr>
<td>Equalizer Set</td>
<td>14</td>
</tr>
<tr>
<td>Parabolic Equalizer Set</td>
<td>15</td>
</tr>
<tr>
<td>LPF Set</td>
<td>16</td>
</tr>
<tr>
<td>HPF Set</td>
<td>16</td>
</tr>
<tr>
<td>BPF Set</td>
<td>17</td>
</tr>
<tr>
<td>Double Balanced Mixer Set</td>
<td>18</td>
</tr>
<tr>
<td>Ka Band x3 Frequency Multiplier</td>
<td>18</td>
</tr>
<tr>
<td>Switch Set</td>
<td>19</td>
</tr>
<tr>
<td>Power Divider Set</td>
<td>19</td>
</tr>
<tr>
<td>Active &amp; Passive</td>
<td>19</td>
</tr>
<tr>
<td>QFN Packaged MMICs</td>
<td>20</td>
</tr>
</tbody>
</table>
Elisra-MW Business Line
Assemblies and Subsystems in Various RF & Microwave Technologies

General

Elisra-MW Business Line is a recognized leader in sophisticated electronic systems, subsystems and supercomponents (Integrated Multi-function Assemblies) for the defense and commercial markets.

Elisra-MW Business Line has over 45 years of proven experience in supplying best-of-class and state-of-the-art supercomponents and subassemblies for a wide variety of RF and microwave applications covering the frequency range of DC to 50 GHz. Elisra-MW Business Line has gained vast experience in all relevant technologies required to design, develop and produce passive and active microwave products as follows:

Main Technologies Vs Products

<table>
<thead>
<tr>
<th>Technologies</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-Layer RF Circuits</td>
<td>Receivers</td>
</tr>
<tr>
<td>High Reliability MIC &amp; MMIC Transmitters</td>
<td>Transmitters</td>
</tr>
<tr>
<td>MCM</td>
<td>Transponders</td>
</tr>
<tr>
<td>Connectorized Integration</td>
<td>Power Amplifiers</td>
</tr>
<tr>
<td>Si, GaAs, GaN, V/ LDMOS Components</td>
<td>Synthesizers &amp; RF Sources</td>
</tr>
<tr>
<td>Thin-Film &amp; Thick-Film</td>
<td>Datalink Transmitters</td>
</tr>
<tr>
<td>Opto-Electronics Packaging</td>
<td>Repeaters</td>
</tr>
<tr>
<td>RF &amp; Digital Integration</td>
<td>Low &amp; High Power PIN Diode Switches</td>
</tr>
<tr>
<td></td>
<td>DLVA's</td>
</tr>
<tr>
<td></td>
<td>Digital &amp; Analog MCM</td>
</tr>
</tbody>
</table>

Elisra-MW Business Line’s highly skilled teams of engineers and technicians, renowned for their technological expertise, has been the cornerstone of our leadership status in both military and commercial markets. Elisra-MW Business Line is an excellence center in global scale for microwave and miniaturization technologies.

Modern production facilities operating under a stringent framework of quality assurance standards have established Elisra-MW Business Line as a world class and preferred supplier of products with unsurpassed reliability.

The Elisra-MW Business Line has cooperated with major EW system suppliers throughout the world. Our teams have worked with other development teams and shared efforts in a large variety of EW programs, such as RWRs, ECMs, ESMs, Elint, MWS COM-JAM, SIGINT and others. The mutual efforts of our engineers together with the EW system engineers generate definition of microwave subsystems which enable the system to achieve optimization in performance and costs which has been implemented in technologies within Elisra-MW Business Line’s Microwave control and expertise such as Supercomponents and MCMs, discrete components sub-assemblies and more.
Subsystems & SuperComponenets

Elisra-MW Business Line can provide excellent cost-effective solutions to these challenges. Such intimate effort of our and your engineering teams can generate subsystems such as super-heterodyne receivers (SHR), IFM receivers, low-power RF ECM Systems, video transmitters, Front End Receivers (FER), etc. Implementation of such subsystems can result in a line replaceable unit (LRU), stand alone units/boxes or shop replaceable units (SRU) or subassemblies.

SuperComponenets (Integrated Multi-function Assemblies)
A complete miniaturized subsystem, consisting of quality microwave components densely packaged into one enclosure. Supercomponents represent an answer to the ever-present challenge of integrating high microwave performance into small packages. As a recognized leader in the development and manufacture of supercomponents, Elisra-MW Business Line has leveraged its knowledge-base of diverse technologies and microwave components into providing the best possible subassemblies on the market today.

These miniaturized subsystems consist of numerous microwave components which are assembled into a small package. The package includes such diverse components as amplifiers, switches, oscillators, filters and MMIC devices. Every component is carefully designed and adapted to meet full performance custom-specifications, while taking into account the particularly compact supercomponent enclosure requirements.

Since compact integration eliminates many connector interfaces, overall electrical performance is often enhanced. Our supercomponents frequently demonstrate improved VSWR and enhanced gain and phase characteristics.

In House MMIC Development Suit

- Passive and Active 0.15um PHEMT GaAs MMICs D.C-50GHz
- Passive components printed on Hard substrates
- Multi Function Integrated Circuits
- Multi - Layer Technology
- In House On-Wafer (Probe Station) Testing
- Multi Layer Buried Components

Micro-Electronics

Elisra-MW Business Line’s Microelectronics group has been a leader in the innovative utilization of hybrid technologies for over 45 years. Our hybrid products are key elements in EW systems produced by some of the major manufacturers of the world. With core competencies in hybrid technologies we have been able to offer advanced products with superior and reliable performance, such as:

- Detector Log Video Amplifiers (DLVAs)
- Logarithmic IF Amplifiers
- Frequency Discriminators

Expertise in thin/thick film and MCM technologies, backed by modern facilities and know-how, has made Elisra-MW Business Line a distinguished contender in the hybrid product arena.

Transmitters

Elisra-MW Business Line’s RF Transmitter Activity, a section within the company’s Microwave Business Line, is a technological leader in the design and development of a wide range of compact reliable RF transmitters and amplifiers for communications and ECM applications. Our RF Transmitter section capabilities are proven in the microprocessor control and computer interfaces used in its transmitters and amplifiers. Our development Main Features enable sophisticated real-time control of amplitude, frequency, modulation type and in-depth BIT. Just as well, our products offer high speed solid-state switching and frequency hopping technologies. Our standard product range is enhanced by flexible production facilities, enabling us to handle customized orders rapidly and cost effectively. The facility at Elisra-MW Business Line is equipped to deal with most methods of environmental testing. Tests are performed during R&D qualification (MIL-STD-810). Environmental stress screening (utilizing MILSTD- 2164) is applied on 100% of our amplifiers. Our growing list of satisfied clients list includes notable companies from Europe, Asia and Israel

Optimal Operating Efficiency and Linearity (Class AB)

- Solid State Architecture: GaAs, GaN, MOSFET, LDMOS, Bipolar
- Digital full Status Monitoring
- System Structures include: Amplifiers, OPU, Antennas and Installation Support.
- Remote Operation: RS232 / RS422 / RS485/ USB /Dry Contact
Activities

Microwave Multi-function Assemblies
- Multi-Function Assemblies (MIC’s)
- Frequency Synthesizers
- RF & Microwave- Receivers
- mmw Sub-Assemblies
- Pin Diode Control Devices

High Power Systems SS HPA
- Hp Switches
- Pulsed AMPS
- TWT Replacement
- Microwave Links
- Transmitters

Microelectronics & Electroptics
- Receiving Products
- MCM’s
- Custom Hybrids
- Laser Receivers

Modern Facilities and Experienced Staff

- CAD Tools
- Clean Room
- Automatic Bonder
- Automatic Test Setup
- Laser Welder
- Hermetically Sealing
- Environmental Lab
- Thermal Vacuum Chamber
- Quality Assurance
Amplifier Set

Single Bias

Main Features

- Frequency Range : DC to 18GHz
- Gain: 7 - 11dB
- Positive Slope: 2 - 4dB
- OP1dB: 12 - 18dBm
- Noise Figure: 3 to 7dB
- Vd: 5 - 8V
- Id: 35 - 70mA

Amplifier Set

High Gain

Main Features

- Frequency Range : DC to 18GHz
- Gain: 15 - 19dB
- OP1dB: 18 - 26dBm
- Noise Figure: 4 to 6dB
- Vd: 4 - 8V
- Id: 85 - 260mA

For custom electrical and mechanical specifications, please contact
EW and Sigint - ELISRA Sales: microwave@elbitsystems.com (or) +972-77-2935655
Amplifier Set

Narrow Band

Main Features

- Frequency Range: 10 to 16GHz
- Gain: 7 - 9dB
- OP1dB: 5 - 9dBm
- Noise Figure: 6 to 7dB
- Vd: 2.5 - 4V
- Id: 24 - 45mA
Attenuators Set

Main Features

- Frequency Range: DC to 50GHz
- Attenuation: 0.25 to 20 dB
- RF input: AC or DC coupled
- 1W power handling

For custom electrical and mechanical specifications, please contact
EW and Sigint- ELISRA Sales: microwave@elbitsystems.com (or) +972-77-2935655
DCA Set

Multi Bit

Main Features

- Frequency Range: DC to 18GHz
- No. of Bits: 3 to 6 bits
- Step Resolution: 0.5 to 2dB
- Attenuation: 3 to 9 dB
- 1W power handling

DCA Set

1 Bit

Main Features

- Frequency Range: DC to 40GHz
- Insertion Loss: 2 to 3dB
- Attenuation: 10 to 40 dB
- Power handling up to 0.5W

For custom electrical and mechanical specifications, please contact EW and Sigint- ELISRA Sales: microwave@elbitsystems.com (or) +972-77-2935655
5 Bit DPS

Main Features

- Frequency Range: Ku Band
- No. of Bits: 5 bits
- Step Resolution: 11.25°
- Attenuation: 9dB
- 1W power handling
Equalizer Set

Main Features
- Frequency Range: DC to 18GHz
- Positive Slope: from 2 to 9dB
- Attenuation: 0.5 to 1.5dB at 18GHz
- RF input: AC or DC coupled
- Power handling: up to 0.5W

Equalizer Set

Main Features
- Frequency Range: 24-40GHz
- Attenuation: 0.5 to 1.5dB
- Negative and Positive Slope
- Slope: 3 to 7 dB
- Power handling: up to 0.5W

For custom electrical and mechanical specifications, please contact EW and Sigint – ELISRA Sales: microwave@elbitsystems.com (or) +972-77-2935655
Parabolic Equalizer Set

Main Features

- Frequency Range: DC to 18GHz
- Attenuation: 0.5 to 1.5dB at 18GHz
- RF input: DC coupled
- Power handling: up to 0.5W
LPF Set

Main Features

- “knee point”: 4 to 42GHz
- Insertion Loss: 1 to 3dB
- Power handling: 10 to 28dBm

HPF Set

Main Features

- “knee point”: 2 to 35GHz
- Insertion Loss: 1 to 3dB
- Power handling: 10 to 30dBm
BPF Set

Main Features

- “knee point”: 2 to 35GHz
- Insertion Loss: 1 to 3dB
- Power handling: 10 to 30dBm

For custom electrical and mechanical specifications, please contact
EW and Sigint- ELISRA Sales: microwave@elbitsystems.com (or) +972-77-2935655
### Double Balanced Mixer Set

**Main Features**
- RF\LO Frequency Range: 10 to 40GHz
- IF Frequency Range: DC-18GHz
- Conversion Loss: 7 - 11dB
- LO Rejection: 20 - 40 dBc
- LO Input Power: 10 - 17 dBm

### Ka Band x3 Frequency Multiplier

**Main Features**
- Input Frequency Range: 10 to 16GHz
- Output Frequency Range: 30-48GHz
- Conversion Loss: 0dB
- Input Power: 0dBm
- Fundamental Frequency Rejection: 0-35dBc
- Second harmonic Rejection: 20-30dBc

---

For custom electrical and mechanical specifications, please contact EW and Sigint- ELISRA Sales: microwave@elbitsystems.com (or) +972-77-2935655
Switch Set

Main Features
- Frequency Range: DC to 40GHz
- Insertion Loss: 1 - 3dB
- Isolation: 20-50dB
- Switching Speed: 20ns
- Control: Complementary or TTL

Power Divider Set

Active & Passive

Main Features
- Frequency Range: DC to 40GHz
- Insertion Loss: 3 - 6dB
- Isolation: 6 to 20dB
- Input Power: 13 to 28dBm

For custom electrical and mechanical specifications, please contact EW and Sigint- ELISRA Sales: microwave@elbitsystems.com (or) +972-77-2935655
QFN Packaged MMICs

Main Features

- Frequency Range: DC to 18GHz
- We offer our MMICs in QFN packages per demand

For custom electrical and mechanical specifications, please contact
EW and Sigint - ELISRA Sales: microwave@elbitsystems.com (or) +972-77-2935655
For custom electrical and mechanical specifications, please contact
EW and Sigint- ELISRA Sales: microwave@elbitsystems.com (or) +972-77-2935655
For custom electrical and mechanical specifications,
Please contact EW and Sigint- ELISRA
Sales: microwave@elbitsystems.com (or) +972-77-2935655