Power Semiconductor Module
LSIS is taking off as a global leader!

In the field of electric power solutions, producing a wide variety of products that are based on power supply technology and are highly competitive both in Korea and overseas.

Using technology that it has accumulated over more than 30 years in the electric power industry, LSIS develops, produces, and supplies a whole range of products related to power plants, power transmission & distribution, equipment for electricity users, and electric power it to overseas markets as well as within Korea.

LSIS’ electric equipment products are developed under the quality-first principle. Year on year, its sales in the global market have increased by 30 to 40 percent.

LSIS develops and produces various products in the field of power solutions.
Optimize your application designs: Less power loss! Save cost and time!

LSIS sets the long term goal as “Total solution provider in power semiconductors”, providing system solutions based on power semiconductors. LSIS is now producing and going to develop a low-cost and high-performance Power Semiconductor Modules including Application Specific IPMs (ASIPM) for Industry applications, Power supplies, Renewable energy, Automotive and Home appliances.

Our product portfolio includes:

- **Application Specific Power Modules**
  - Simple Solution Power Modules (SISPM™): 2-Pack, 4-Pack
  - Eco Friendly Power Modules (EFPM™): 2-Pack, 6-Pack

- **Standard IGBT Modules**
  - Super Solution Power Modules (SUSPM™): 2-Pack
  - Simple Solution Power Modules (SISPM™): CIB, CIP, CIPB, 6-Pack, 7-Pack
  - Total Power Solution (TOSPMTM) customized Power Modules

- **Application Specific Intelligent Power Modules (ASIPM)**
  - Total Solution Power intelligent Module (TOSPM™):
    - 6-Pack and 7-Pack CIB IPMs ICs, integrated drive peripheral circuit and protection functions in a single housing
  - Super Solution Power intelligent Module (SUSPM™):
    - 2-Pack IPMs integrated drive ICs, peripheral circuit and protection functions in a single housing

LSIS is continually discovering the new industry for the future and industrializing it.
LSIS releases 2-Pack SUSPM™ Product lines for industrial applications. These power modules are compact design with flexibility and optimized performance for each application with high reliability, which meets customers’ requirements. SUSPM™ product lines offer three standard package types (34mm, 48mm, 62mm) with the latest IGBT technology. And they cover the current range from 50A (\( @Tc \geq 80^\circ c \)) to 400A (\( @Tc \geq 80^\circ c \)) at 600V, 1200V and 1700V. LSIS also can provide some special products with ESD protection and Shoot-through protection functions for customer satisfaction.

**Features**
- Optimized characteristics for each applications
- Embedded protection functions
  - ESD and Transient voltage protection
  - Shoot-through protection
- Very low \( V_{CE(sat)} \) with positive temperature coefficient

**Application**
- Industrial Motor Drives
- Welding machines
- UPS/EPS
- Induction Heating

**SUSPM™ Topology (2-Pack IGBT Modules)**

- Ex) LUH75G1281
  - Standard Half-bridge

- Ex) LUH75G1281Z
  - Half-bridge with Zener diode for ESD protection
Special Functions

ESD Protection
- Protection the gate from the failure due to Electrostatic Discharge (ESD)
- Protection the gate from the failure due to transient voltage across the gate to the emitter

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<th>IC [A]</th>
<th>Part Number</th>
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<th>VBR(CEO) [V] typ</th>
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* Some values are target specification for development and specifications may change in any manner without notice.
† EON and EOFF of 602Z condition: Vcc=400V.
LSIS releases SISPMTM Product lines for low power inverter and treadmill applications. These power modules have compact design with flexibility and optimized performance for each application with high reliability, which meets customers’ requirements. SISPMTM product lines offer two package types of SISPM0 and SISPM1. They cover the current range from 6A (@Tc ≥ 80°C) to 50A (@Tc ≥ 80°C) at 600V and 1200V. SISPM1 product lines have three different configurations to satisfy the various customer system requirements.

- CIB : 3Φ or 1Φ Converter + Inverter + Brake
- CIP : 1Φ Converter + Inverter + PFC
- CIPB : 1Φ Converter + Inverter + PFC + Brake

Features
- Various configurations
- The latest IGBT technology
- Operation frequency
  - Inverter & Brake up to 15kHz
  - PFC up to 40kHz

Application
- General Purpose Inverter
- Servo Drive
- Sewing Machine
- Treadmill

CIB Modules Topology
## CIB Modules

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LSIS releases SISPMTM Product lines for half bridge application. These power modules are consisted of MOSFETs and meet customers’ requirements for compact design, flexibility, optimized performance for each application with high reliability. It offers a package type of SISPM1 and it covers the different current range from 200A to 400A (@Tc=80°C) at 75V, 100V and 150V.

**Features**
- Half bridge configuration
- Latest MOSFET technology
- Operation frequency - up to 100kHz
- Included temperature sensor

**Application**
- Battery Vehicle

### Half Bridge Modules (MOSFET)

<table>
<thead>
<tr>
<th>Package</th>
<th>V_{DS} [V]</th>
<th>I_{D} [A]</th>
<th>Part Number</th>
<th>Type (MOSFET Tech)</th>
<th>Frequency</th>
<th>R_{on} [mΩ]</th>
<th>E_{on} [μJ]</th>
<th>E_{off} [μJ]</th>
<th>R_{THJ-C} [°C/W]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SISPM1</td>
<td>75</td>
<td>400</td>
<td>LEH400M076</td>
<td>076</td>
<td>≤10kHz</td>
<td>3.0</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>400</td>
<td>LEH400M106</td>
<td>106</td>
<td>≤10kHz</td>
<td>3.95</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>200</td>
<td>LEH200M106</td>
<td>106</td>
<td>≤10kHz</td>
<td>3.5</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>200</td>
<td>LEH200M156</td>
<td>156</td>
<td>≤10kHz</td>
<td>7.5</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>

*Some values are target specification for development and specifications may change in any manner without notice.*
LSIS releases SISP™ Product lines for Full Bridge Application.
These power modules are consisted of IGBTs and meet customers’ requirements for compact design, flexibility, optimized performance for each application with high reliability. It offers a package type of SISPM1 and it covers the different current range from 50A to 100A (@Tc≥80°C) at 600V.

**Features**
- Full bridge configuration
- Latest IGBT technology
- Operation frequency - up to 40 kHz

**Application**
- Welding Machine
- SMPS
- UPS
- PV Inverter

### Full Bridge Modules (IGBT)

<table>
<thead>
<tr>
<th>Package</th>
<th>VCES [V]</th>
<th>Ic [A]</th>
<th>Part Number</th>
<th>Type (IGBT Tech)</th>
<th>Frequency</th>
<th>VCE(sat) typ</th>
<th>Eon [mJ] typ</th>
<th>Eoff [mJ] typ</th>
<th>Rthjc-typ</th>
</tr>
</thead>
<tbody>
<tr>
<td>SISPM1</td>
<td>600</td>
<td>75</td>
<td>LEF75G602</td>
<td>602Z (Planar NPT)</td>
<td>≤40kHz</td>
<td>2.7</td>
<td>4.2@150°C</td>
<td>3.3@150°C</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>100</td>
<td>LEF100G602</td>
<td></td>
<td>≤40kHz</td>
<td>2.7</td>
<td>9.8@150°C</td>
<td>8.8@150°C</td>
<td>0.35</td>
</tr>
</tbody>
</table>

* Some values are target specification for development and specifications may change in any manner without notice.

---

LSIS releases SISP™ Product lines for Full Bridge Application.
These power modules are consisted of MOSFETs and meet customers’ requirements for compact design, flexibility, optimized performance for each application with high reliability. It offers a package type of SISPM1 and it covers the different current range from 30A to 60A (@Tc=25°C) at 500V and 900V.

**Features**
- Full bridge configuration
- Latest MOSFET technology
- Operation frequency - up to 100kHz
- Included temperature sensor

**Application**
- SMPS
- Welding Machines
- UPS

### Full Bridge Modules (MOSFET)

<table>
<thead>
<tr>
<th>Package</th>
<th>VCES [V]</th>
<th>Ic [A]</th>
<th>Part Number</th>
<th>Type (MOSFET Tech)</th>
<th>Frequency</th>
<th>Ron (Ω) typ</th>
<th>Eon [mJ] typ</th>
<th>Eoff [mJ] typ</th>
<th>Rthjc-typ</th>
</tr>
</thead>
<tbody>
<tr>
<td>SISPM1</td>
<td>500</td>
<td>45</td>
<td>LEF45M50T</td>
<td>50T</td>
<td>≤100kHz</td>
<td>177</td>
<td>TBD</td>
<td>TBD</td>
<td>0.31</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>60</td>
<td>LEF60M50T</td>
<td>50T</td>
<td>≤100kHz</td>
<td>109</td>
<td>TBD</td>
<td>TBD</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>900</td>
<td>30</td>
<td>LEF30M90T</td>
<td>90T</td>
<td>≤100kHz</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>

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EFPM1

LSIS releases EFPM™ Product lines for automotive and battery vehicle. These power modules are consisted of MOSFETs and meet customers’ requirements for compact design, flexibility, and optimized performance for each application with high reliability. EFPM1 covers the different current range from 500A to 900A (Tc=80°C) at 75V, 100V and 150V.

Features
- Low loss & High ruggedness MOSFET
  - Low RDS(ON)
  - Enhanced body diode dv/dt, di/dt capability
  - Improved gate, avalanche, dynamic dv/dt ruggedness
- Half bridge configuration
- Insulated package without copper base plate
- Fully characterized capacitance & avalanche SOA
- Included temperature sensor

Application
- Automotive
- Battery vehicle
- SMPS

<table>
<thead>
<tr>
<th>Package</th>
<th>VDSS [V]</th>
<th>ID [A]</th>
<th>Part Number</th>
<th>Type (MOSFET Tech)</th>
<th>Frequency</th>
<th>RDS(ON) typ@25°C</th>
<th>EON [mJ] typ</th>
<th>EOFF [mJ] typ</th>
<th>RTHJ [°C/W] typ</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFPM1</td>
<td>75</td>
<td>900</td>
<td>LMH900M0076</td>
<td>076</td>
<td>≤10kHz</td>
<td>0.375</td>
<td>TBD</td>
<td>TBD</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>800</td>
<td>LMH900M106</td>
<td>106</td>
<td>≤10kHz</td>
<td>1.4</td>
<td>TBD</td>
<td>TBD</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>500</td>
<td>LMH500M156</td>
<td>156</td>
<td>≤10kHz</td>
<td>1.97</td>
<td>TBD</td>
<td>TBD</td>
<td>0.025</td>
</tr>
</tbody>
</table>

* Some values are target specification for development and specifications may change in any manner without notice.
LSIS releases EFPM™ Product lines for automotive and battery vehicle.
These power modules are consisted of MOSFETs or IGBTs, which meet the customers’ requirements for compact design, flexibility, and optimized performance for each application with high reliability. EFPM2 covers the different current ranges.
- MOSFET: 350A–650A (\(\Delta T_c=80^\circ C\)) at 75V, 100V and 150V
- IGBT: 400A (\(\Delta T_c=80^\circ C\)) at 600V

Features

MOSFET 6 in one
- Low loss & High ruggedness MOSFET
- Low \(R_{DS(ON)}\)
- Enhanced body diode \(dv/dt, di/dt\) capability
- Improved gate, avalanche, dynamic \(dv/dt\) ruggedness
- 6-pack configuration
- Insulated package with copper base plate
- Fully characterized capacitance & avalanche SOA
- Included temperature sensor

IGBT 6 in one
- Latest IGBT Technology
- Low loss & low \(V_{CE(SAT)}\)
- 6-pack configuration
- Insulated package with copper base plate
- Included temperature sensor

Application
- Automotive
- Inverter
- Low voltage battery vehicle

EFPM™2 Topology

Package | \(V_{DS} [V]\) | \(I_D [A]\) | Part Number | Type (MOSFET Tech) | Frequency | \(R_{DS(ON)} [m\Omega]\) typ | \(E_{ON} [mJ]\) typ | \(E_{OFF} [mJ]\) typ | \(R_{THJC} [{^\circ C/W}]\) Max
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
6 Pack MOSFET
- 75 650 LN650M076 076 | \(\leq 10kHz\) | 0.5 | TBD | TBD | 0.047
- 100 600 LN600M106 106 | \(\leq 10kHz\) | 0.73 | TBD | TBD | 0.047
- 150 350 LN300M156 156 | \(\leq 10kHz\) | 1.6 | TBD | TBD | 0.047

EFPM2

Part Number | Type (IGBT Tech) | Frequency | \(V_{CE(SAT)} [V] @25^\circ C\) | \(E_{ON} [mJ]\) typ | \(E_{OFF} [mJ]\) typ | \(R_{THJC} [{^\circ C/W}]\) Max
--- | --- | --- | --- | --- | --- | ---
6 Pack IGBT
- 600 400 LN400G603Z 603Z(Trench F/S) | \(\leq 20kHz\) | TBD | TBD | TBD

*Some values are target specification for development and specifications may change in any manner without notice.*
Ordering information

1. **Product Family**
   - SUSPM (Super Solution Power Module)
     - U: SUSPM1 / V: SUSPM2 / W: SUSPM3
   - SISPM (Simple Solution Power Module)
     - E: SISPM1 / F: SISPM0 / H: SISPM3 / J: SISPM4
   - EFPM (Eco Friendly Power Module)
     - M: EFPM1 / N: EFPM2

2. **Circuit Diagram (Power Part)**
   - S: 1-Phase CIB (Converter + Brake + Inverter)
   - C: 3-Phase CIB (Converter + Brake + Inverter)
   - B: 1-Phase CIB (Converter + Brake + Inverter)
   - L: 1-Phase CI (Converter + Inverter)
   - P: 3-Phase CI (Converter + Inverter)
   - A: Single (1-PACK)
   - R: Chopper
   - H: Half-Bridge (2-PACK)
   - F: Full-Bridge (4-PACK)
   - I: Inverter (6-PACK)

3. **Current Rating**
   - 30: 30A / 100: 100A

4. **Chip Technology**
   - G: IGBT / M: MOSFET

5. **Voltage Rating (x10)**
   - 60: 600V / 120: 1200V / 170: 1700V

6. **Chip Information**
   - 1: Planar SPT+
   - 2: Planar NPT
   - 3: Trench Field Stop
   - 4: Trench Field Stop
   - 5: SuperMESH
   - 6: HEXFET
   - 7: Trench Field Stop
   - T: TRIMos

7. **Option**
   - None
   - Z: Zener Diode Embedded
Green Innovators of Innovation

Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance.
- Do not disassemble or repair by yourself.
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.

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