Key components for
48 V\textsubscript{DC} BOARDNET

**THE VISHAY ADVANTAGE**
- New Semiconductor High-Voltage Technology, 80 V to 150 V
- EMI-Improved Semiconductors
- Diodes with Lowest Ringing Voltage
- High-Temperature Operation Up to 175 °C
- Newest Power SO-8 Packages Up to 240 A

- Integrated Starter Generators (48 V\textsubscript{DC})
- DC/DC Converters, Bidirectional (48 V\textsubscript{DC})
- HVAC (E-Compressor for 48 V\textsubscript{DC})
**Integrated Starter Generators (48 V<sub>DC</sub>)**

**MOSFETs**
- N-Channel MOSFETs in 5 mm x 6 mm PowerPAK<sup>®</sup> SO-8L Rated at 80 V, 7 mΩ
  - SQJA80EP
    - AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
    - Ultra-low R<sub>DS(on)</sub>, thermally enhanced PowerPAK<sup>®</sup> 8x8L replaces D²PAK in less than half of the area
- N-Channel MOSFETs as Known Good Die, 100 V, 3.6 mΩ
  - SQC260N10_3m6KDG
    - AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
    - Efficient KGD packaging allows high power density and reduced parasitics

**INDUCTORS**
- EMI Filters with Flat Copper Wire, SMD or Leaded Up to 260 A
  - Customized EMI Filters
    - Customized solutions for 48 V applications, low DCR, high current

**RESISTORS**
- Power Metal Strip<sup>®</sup> Meter Shunt Resistor, Very Low Value (Down to 100 μΩ)
  - WMS2908
    - Extremely low resistance values: 100 μΩ to 1000 μΩ
    - 3 W power capability with sensing terminals to mount on PCB

**NON-LINEAR RESISTORS**
- SMD Glass-Protected NTC Thermistors
  - NTCS...e3
    - Standard series, AEC-Q200 compliant
    - Glass-protected with soft terminations

**CERAMIC CAPACITORS**
- High Operating Temperature, Automotive Grade Leaded MLCC Capacitors
  - HOTcap<sup>®</sup> K...H, A...R, K...R
    - High-reliability MLCC insert with wet build process
    - High operating temperature (up to 175 °C for K...H and up to 160 °C for A...R and K...R), rated voltages: 50 V, 100 V, 200 V
- DC-Link Polyester Film Capacitors, Operating Temperature Up to 150 °C, High Ripple Current
  - MKT1820S
    - Low voltage DC-link capacitors with high-temperature capabilities
    - Customized solutions for 48 V applications
- TVS Clamping Diodes, Up to 1.5 kW
  - 1.5 SMC Series
    - DO-214AB (SMCJ) package to protect ICs, MOSFETs, and signal lines of sensor units against voltage transients induced by inductive load switching and lightning

**FILM CAPACITORS**
- DC-Link Polyester Film Capacitors, Operating Temperature Up to 150 °C, High Ripple Current
  - MKT1820S
    - Low voltage DC-link capacitors with high-temperature capabilities
    - Customized solutions for 48 V applications

**RECTIFIERS**
- TVS Clamping Diodes, Up to 1.5 kW
  - 1.5 SMC Series
    - DO-214AB (SMCJ) package to protect ICs, MOSFETs, and signal lines of sensor units against voltage transients induced by inductive load switching and lightning

**MODULES**
- MOSFET H Bridges or B6 Bridges Based on Customer Specifications
  - EMIPAK 1B/2B Customized
    - 80 V to 100 V MOSFET power modules

**www.vishay.com**
DC/DC Converters, Bidirectional (48 V<sub>DC</sub>)

**RESISTORS**
- **Professional High-Temperature Mini-MELF Resistors**
  - **MMA 0204 HT**
    - Operating temperature up to 175 °C, power handling of 500 mW, high surge capability
    - AEC-Q200 qualified, high overall stability |ΔR/R| ≤ 0.1 %, intrinsically sulfur-resistant

**MOSFETs**
- **N-Channel MOSFETs in 8 mm x 8 mm PowerPAK® 8x8L, 80 V, 150 A, 2.7 mΩ**
  - **SQJQ480E**
    - AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
    - Ultra-low R<sub>Dsat</sub> thermally enhanced package reduces board area

**INDUCTORS**
- **Shielded SMD Low-Profile, High-Current IHLP® Inductors, EMI Filter, 155 °C, Low DCR**
  - **IHLP-8767GZ-5A**
    - Very high-current and high-temperature operation for filters

**FILM CAPACITORS**
- **DC-Link Polyester Film Capacitors, Operating Temperature Up to 150 °C, High Ripple Current**
  - **MKT1820S**
    - Low voltage DC-link capacitors with high-temperature capabilities
    - Customized solutions for 48 V applications

**RESISTORS**
- **Thin Film Resistors, 4.7 Ω to 3.01 MΩ, 0402 to 1210 Case Sizes, 50 V to 200 V**
  - **TNPW e3**
    - Excellent stability |ΔR/R| ≤ 0.05 % after 1000 h at 70 °C, 0402 to 1210 case sizes

**MOSFETs**
- **N-Channel MOSFETs in 8 mm x 8 mm PowerPAK® 8x8L, 40 V, 160 A, 1.2 mΩ**
  - **SQJQ100EL**
    - AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
    - Ultra-low R<sub>Dsat</sub> thermally enhanced PowerPAK® 8x8L replaces D²PAK in less than half of the area

**INDUCTORS**
- **Coupled Inductors for SEPIC Converter**
  - **IHCL-3232DZ-5A**
    - High-temperature operation up to 155 °C
    - Frequency range up to 5.0 MHz

**FILM CAPACITORS**
- **SMD Aluminum Capacitors, High Temperature Up to 150 °C, Low ESR**
  - **260 CLA-V**
    - High ripple current up to 1400 mA at 150 °C, capacitance up to 3300 µF
    - Useful life up to 2000 h at 150 °C, high vibration capability

**CERAMIC CAPACITORS**
- **X1/Y2 AC Line Rated Ceramic Disc Capacitors for Automotive Applications**
  - **AY2**
    - AEC-Q200 qualified, X1/Y2 safety rating according to IEC 60384-14, 3rd edition
    - Proven to withstand 3000 temperature cycles from -55 °C to +125 °C
## HVAC

(E-Compressor for 48 V<sub>DC</sub>)

### CERAMIC CAPACITORS

**High Operating Temperature, Automotive Grade Leaded MLCC Capacitors**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOTcap® K…H, A…R, K…R</td>
<td>High-reliability MLCC insert with wet build process</td>
<td>Rated voltages: 50 V, 100 V, 200 V</td>
</tr>
</tbody>
</table>

### MOSFETs

**N-Channel MOSFETs in 8 mm x 8 mm PowerPAK<sup>®</sup> 8x8L, 80 V, 150 A, 2.7 mΩ**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQJQ480E</td>
<td>AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation</td>
<td>Ultra-low $R_{DS(on)}$, thermally enhanced package reduces board area</td>
</tr>
</tbody>
</table>

### RESISTORS

**Power Metal Strip<sup>®</sup> SMD Resistors, 4-Terminal; Low Value (Down to 0.0001 Ω)**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSK1216</td>
<td>High power rating of 3 W to 5 W with TCR = 20 ppm/K</td>
<td>Very low resistance values, 0.0001 Ω to 0.004 Ω, with tolerance of 1 %</td>
</tr>
</tbody>
</table>

### NON-LINEAR RESISTORS

**SMD Glass-Protected NTC Thermistors**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTCS...e3</td>
<td>Standard series, AEC-Q200 compliant</td>
<td>Glass-protected with soft terminations</td>
</tr>
</tbody>
</table>

### INDUCTORS

**Low Profile, High Current IHLP<sup>®</sup> Inductors**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHLP-8787MZ-5A</td>
<td>Highest current composite inductor available</td>
<td>High temperature operation up to 155 °C, shielded construction</td>
</tr>
</tbody>
</table>

### RESISTORS

**Shielded EMI Filters Up to 190 A $I_{DC}$, 2.2µH, Ultra-Low DCR (0.22 mΩ)**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHXL-2000VZ-5A</td>
<td>Very high-current and high-temperature operation for filters and energy storage</td>
<td></td>
</tr>
</tbody>
</table>

### CAPACITORS MLCC

**AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>VJ…31X RoHS Automotive MLCCs</td>
<td>RoHS and Green compliant parts available</td>
<td>AgPd termination available for epoxy bonding</td>
</tr>
</tbody>
</table>

### FILM CAPACITORS

**DC-Link Polyester Film Capacitors, Operating Temperature Up to 150 °C, High Ripple Current**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKT1820</td>
<td>Automotive general purpose capacitors with high temperature capabilities</td>
<td>Capacitance up to 560 µF</td>
</tr>
</tbody>
</table>

### ALUMINUM CAPACITORS

**SMD Aluminum Capacitors, High Temperature Up to 150 °C, Low ESR**

<table>
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<tr>
<th>Part Number</th>
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<tr>
<td>260 CLA-V</td>
<td>High ripple current up to 1400 mA at 150 °C, capacitance up to 3300 µF</td>
<td>Useful life up to 2000 h at 150 °C, high vibration capability</td>
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