Automotive
(Powertrain – Injection Control and Fuel Pump)
Powertrain – Injection Control and Fuel Pump

Direct Injector Control (Solenoid) 2
Piezo Injection Control 3
Fuel Pump Control 4
Key components for

POWERTRAIN – INJECTION CONTROL AND FUEL PUMP

THE VISHAY ADVANTAGE
AEC Qualifications
High-Temperature Performance
High Reliability
Low Profile
Long Life
High-Voltage SMD
## Direct Injector Control (Solenoid)

### ALUMINUM CAPACITORS
- **Advanced Temperature Range Up to 150 °C**
  - **160 CLA**
    - High ripple current: up to 1.4 A at 150 °C / 100 kHz
    - Useful life up to 2000 h at 150 °C

### RESISTORS
- **Precision Thin Film Chip Resistor Array, Superior Moisture Resistivity**
  - **ACAS...AT**
    - Arbitrary resistance ratio up to 1:20, superior tracking stability over lifetime
    - Relative TCR down to ± 5 ppm/K (tracking), AEC-Q200 qualified, sulfur resistant

### MOSFETs
- **Automotive Dual N-Channel 75 V (D-S) 175 °C MOSFET**
  - **SQJ986EP**
    - Medium-voltage ThunderFET® technology, AEC-Q101 qualified, maximum RDS(on) 21 mΩ
    - Thermally enhanced PowerPAK® SO-8L packaging

### INDUCTORS
- **Low-Profile, High-Current IHLP® Inductors**
  - **IHLP-2525CZ-5A**
    - Excellent high-temperature performance for DC/DC converter input and output filters

### RECTIFIERS
- **Ultrafast Rectifier, 1 A FRED Pt®**
  - **1EFH02W**
    - AEC-Q101 qualified, meets JESD 201 class 2 whisker test
    - Ultrafast recovery time, reduced Qrr and soft recovery with Tj maximum 175 °C

### POWER METAL STRIP® SMD RESISTORS
- **WSLP0805**
  - Very high power rating of 0.5 W in small 0805 package
  - All-welded construction offers high pulse capacity

### MOSFETs
- **Automotive N-Channel 100 V (D-S) 175 °C MOSFET**
  - **SQJ488EP**
    - 100 % UIS tested
    - Thermally enhanced PowerPAK SO-8L packaging

### RECTIFIERS
- **Ultrafast Rectifier, 3 A FRED Pt®**
  - **3EJH02**
    - Ultrafast recovery time, reduced Qrr and soft recovery

### TANTALUM CAPACITORS
- **Solid Tantalum Surface-Mount Chip Capacitors, TANTAMOUNT® Molded Case, Automotive Grade**
  - **TP3**
    - High-performance molded tantalum capacitor, AEC-Q200 qualified
    - Applications: motor control, body electronics, dash board

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View datasheets for these products
[www.vishay.com/ref/et3au2a](http://www.vishay.com/ref/et3au2a)
**Piezo Injection Control**

**RESISTORS**

**Professional High-Temperature MINI-MELF Resistor**

*MMA0204...HT*

- Operating temperature of 175 °C, power handling of 500 mW, high surge capability
- AEC-Q200 qualified, high overall stability < 0.1 %, sulfur resistant

**RESISTORS**

**MOSFETs**

**Automotive N-Channel 300 V (D-S) 175 °C MOSFET**

*SQD10N30-330H*

- Classic TrenchFET® technology, AEC-Q101 qualified, maximum R_{DS(on)} 330 mΩ
- Popular DPAK packaging

**CERAMIC CAPACITORS**

**AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NP0), X7R, and X8R**

*VJ....31/VJ....34 Automotive MLCC*

- RoHS and GREEN compliant parts available
- AgPd termination available for epoxy bonding

**RECTIFIERS**

**Ultrafast Rectifier, 6 A FRED Pt®**

*6ESU06*

- AEC-Q101 qualified, meets JESD 201 class 2 whisker test
- Ultrafast recovery time, reduced Q_r and soft recovery with T_j maximum 175 °C

**INDUCTORS**

**Low-Profile, High-Current IHLP® Inductors**

*IHLP-2525CZ-5A*

- Excellent high-temperature performance for DC/DC converter input and output filters

**NON-LINEAR RESISTORS**

**SMD, Glass Protected NTC Thermistors**

*NTCS...e3*

- Standard series, AEC-Q200 compliant
- Glass protected with soft terminations

**FILM CAPACITORS**

**DC Film Capacitors, MKT Radial Potted Type**

*MKT1820*

- Automotive general purpose MKT capacitor, with high-temperature capabilities
- Featuring capacitance up to 560 µF

**RESISTORS**

**Power Metal Strip® SMD Resistors, Very High Power (to 9 W), Low Value (Down to 0.0002 Ω)**

*WSLP3921*

- Very low resistance values from 0.0002 Ω to 0.004 Ω, with tolerance of 1 %

**ALUMINUM CAPACITORS**

**Radial Miniature, High Voltage 250 V_{DC} to 270 V_{DC} with C_{r} up to 220 µF**

*152 RMH*

- High-voltage applications, 105 °C long life
- Miniaturized, ultra high CV-product per unit volume

**INDUCTORS**

**Low-Profile, High-Current IHLP® Inductors**

*IHLP-5050FD-5A*

- Excellent high-temperature performance and noise filtering

**RESISTORS**

**Thick Film Surface-Mount Chip Resistors, Wraparound, Extremely Low Value**

*RCWE*

- Low resistance values from 0.01 Ω to 0.976 Ω and tolerance of 1 %
- Thick film construction with 2x power capacity

View datasheets for these products
www.vishay.com/ref/et3au2b
# Fuel Pump Control

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<tr>
<th>MOSFETs</th>
<th>CERAMIC CAPACITORS</th>
<th>RECTIFIERS</th>
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</thead>
<tbody>
<tr>
<td><strong>Automotive N-Channel 40 V (D-S) 175 °C MOSFET</strong> SQJ422EP</td>
<td><strong>Radial Leaded Multilayer Ceramic Capacitors for Automotive Applications</strong> K,... V</td>
<td><strong>HEXFRED® Ultrafast Soft Recovery Diode, 30 A</strong> HFA30PB120PbF</td>
</tr>
<tr>
<td>• TrenchFET® Gen III technology, AEC-Q101 qualified, maximum $R_{DS(ON)} 3.4 \text{ mΩ}$</td>
<td>• High-reliability MLCC insert with wet build process</td>
<td>• Very low $I_{RMS}$ and $Q_{rr}$</td>
</tr>
<tr>
<td>• Thermally enhanced PowerPAK® SO-8L packaging</td>
<td>• High operating temp. up to 160 °C, rated voltages: 50 V, 100 V, and 200 V</td>
<td>• Ultrafast and ultrasoft recovery</td>
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<tr>
<th>RESISTORS</th>
<th>DIODES</th>
<th>CERAMIC CAPACITORS</th>
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<tr>
<td><strong>Power Metal Strip® SMD Resistors, Very High Power (to 9 W), Low Value (Down to 0.0002 Ω)</strong> WSLP3921</td>
<td><strong>Surface-Mount PAR® Transient Voltage Suppressors</strong> SM8S24A</td>
<td><strong>AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NP0), X7R, and X8R</strong> VJ,...31/VJ,...34 Automotive MLCC</td>
</tr>
<tr>
<td>• High power rating of 5 W to 9 W in WSLP3921 package</td>
<td>• AEC-Q101 qualified</td>
<td>• RoHS and GREEN compliant parts available</td>
</tr>
<tr>
<td>• Very low resistance values from 0.0002 Ω to 0.004 Ω, with tolerance of 1 %</td>
<td>• Meets ISO7637-2 surge specification (varied by test condition)</td>
<td>• AgPd termination available for epoxy bonding</td>
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<th>RECTIFIERS</th>
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<th>RESISTORS</th>
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<td><strong>High Current Density Surface-Mount Schottky Rectifiers</strong> SS3P4HM3</td>
<td><strong>Low-Profile, High-Current IHLP® Inductors</strong> IHLP-4040DZ-5A</td>
<td><strong>Ultrafast Rectifier, 1 A FRED Pt®</strong> 1EFH02W</td>
</tr>
<tr>
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<td></td>
<td><strong>Power Metal Strip® SMD Resistors, Very High Power (3 W), Low Value (to 0.0005 Ω)</strong> WSLP2512</td>
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<td></td>
<td>• AEC-Q101 qualified</td>
<td>• AEC-Q101 qualified, meets JESD 201 class 2 whisker test</td>
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<td></td>
<td>• Very low profile – typical height of 1.0 mm</td>
<td>• Ultrafast recovery time, reduced $Q_{rr}$ and soft recovery with $T_j$ maximum 175 °C</td>
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<td></td>
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<td>• 175 °C maximum operating junction temperature and halogen-free</td>
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<td></td>
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<td>• Very high power rating of 3 W in 2512 package</td>
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<tr>
<td></td>
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<td>• Extremely low resistance values from 0.0005 Ω to 0.01 Ω and tolerance of 1 %</td>
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View datasheets for these products [www.vishay.com/ref/et3au2c](http://www.vishay.com/ref/et3au2c)