

Diesel ECU and Fuel Injector Drivers

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Diesel ECU and Fuel Injector Drivers

VISHAY components used for diesel ECU include:

- Power MOSFETS
 - Diodes
 - Capacitors
 - Resistors
 - Inductors / EMI Filters
 - Transient / Overvoltage Protection Devices
 - ESD Protection Devices
 - Reverse Polarity Protection Devices
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Application Overview

Electronic control of diesel engines for passenger cars and commercial vehicles is a critical function in today's automotive industry. All functions in a modern diesel engine are controlled by an electronic control unit (ECU) that communicates with an elaborate array of sensors placed at strategic locations throughout the engine to monitor everything from engine speed to coolant and oil temperatures to piston position. Efficient electronic control means that fuel burns more thoroughly, delivers more power, provides greater fuel economy, and generates fewer emissions than yesterday's diesel engines. Modern direct-injection diesel engines produce low amounts of carbon dioxide, carbon monoxide, unburned hydrocarbons, reactive nitrogen compounds (NO_x), and particulate matter (PM). VISHAY's broad product line provides component solutions for power supplies (SMPS), input signal conditioning, fuel injector drivers, relay drivers, solenoid drivers, and vehicle communications.

Diesel ECU and Fuel Injector Drivers : CAN-BUS, ESD Protection

Ceramic Capacitors

| Product Name | Status | Description | Features | Package | Q-Level |
|---|--------|---|----------------------------------|--------------------|---------|
| VJ...31/ VJ...34 Automotive | | SMD Ceramic Capacitor Solutions High Temperature Application Boardflex-Sensitive Applications | 1.0pF...1µF 10Vdc ... 3000Vdc | SMD 0402...1812 | |

Small-Signal Diodes

| Product Name | Status | Description | Features | Package | Q-Level |
|-----------------------|--------|--|---------------------------------|---------------|---------|
| GL05T | | Low Capacitance ESD Protection; Data Line Protection; | Ppk=300W, Vrrm=70V, Ippm=17A | SMD SOT-23 | |
| GL24T | | Low Capacitance ESD Protection; Data Line Protection; | Ppk=300W, Vrrm=70V, Ippm=5A | SMD SOT-23 | |

Thick Film Resistors

| Product Name | Status | Description | Features | Package | Q-Level |
|--------------------------|--------|---|---------------------|-------------|----------|
| CRCW0402 | | Bulk Resistors, Pulse-Resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 0402 | AEC Q200 |
| CRCW0603 | | Bulk Resistors, Pulse-Resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 0603 | AEC Q200 |
| CRCW0805 | | Bulk Resistors, Pulse-Resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 0805 | AEC Q200 |
| CRCW1206 | | Bulk Resistors, Pulse-Resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 1206 | AEC Q200 |
| CRCW1210 | | Bulk Resistors, Pulse-Resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 1210 | AEC Q200 |
| CRCW2010 | | Bulk Resistors, Pulse-Resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 2010 | AEC Q200 |
| CRCW2512 | | Bulk Resistors, Pulse-Resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 2512 | AEC Q200 |
| RCA2010 | NEW | Sulfure Resistant Termination; Automotive Grade Thick Film Chip; | 1R..10M, 1%, TCR100 | SMD 2010 | AEC Q200 |
| RCA2512 | NEW | Sulfure Resistant Termination; Automotive Grade Thick Film Chip; | 1R..10M, 1%, TCR100 | SMD 2512 | AEC Q200 |

TVS Diodes

| Product Name | Status | Description | Features | Package | Q-Level |
|---------------------------|--------|--|--------------------|-----------------|----------|
| SM5A27HE3 | | High Surge, Low Vf, Low Leakage, High Reliability | Vbr=27V, Ifsm=500A | SMD DO-218AB | AEC Q101 |
| SM8A27HE3 | | High Surge, Low Vf, Low Leakage; High Reliability | Vbr=27V, Ifsm=700A | SMD DO-218AB | AEC Q101 |

Diesel ECU and Fuel Injector Drivers : CAN-BUS, ISO9141 Bus Transceiver

Integrated Circuit

| Product Name | Status | Description | Features | Package | Q-Level |
|---------------------------|--------|------------------------------|--|-------------|---------|
| Si9241AEY | | Single-Ended Bus Transceiver | 200kB typical, reverse BAT protection | SMD SO-8 | |
| Si9243AEY | | Single ended bus transceiver | 200kB typical, reverse BAT protection | SMD SO-8 | |

Diesel ECU and Fuel Injector Drivers : CAN-BUS, K-Line Bus Controller

Integrated Circuit

| Product Name | Status | Description | Features | Package | Q-Level |
|--------------------------------|--------|-----------------------------|---------------|-------------|---------|
| Si9200EY-T1-E3 | | CAN Bus Driver and Receiver | Single supply | SMD SO-8 | |

Diesel ECU and Fuel Injector Drivers : Common Rail Pump Control, Current Sensing

Current Sense Shunt Resistors

| Product Name | Status | Description | Features | Package | Q-Level |
|----------------------------|--------|--|--|-------------|----------|
| WSL1206-18 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R001...R2, 1%, TCR $\leq \pm 75$ ppm P70 = 0.5W | SMD 1206 | AEC Q200 |
| WSL2010-18 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R001...R5, 1%, TCR $\leq \pm 75$ ppm P70 = 1W | SMD 2010 | AEC Q200 |
| WSL2512-18 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R0005...R04 , 1%, TCR $\leq \pm 75$ ppm P70 = 2W | SMD 2512 | AEC Q200 |
| WSL2816 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R01...R1 , 1%, TCR $\leq \pm 75$ ppm P70 = 2W | SMD 2816 | AEC Q200 |
| WSLP1206 | | Power Metal Strip Shunts; Very High Power- Small Size; Very Low R Value; Very Low TCR; | R001...R05, 1%, TCR $\leq \pm 75$ ppm P70 = 1W | SMD 1206 | AEC Q200 |
| WSLT2512 | | Power Metal Strip Shunts; High Temp. (275°C); Low TCR; Low Thermal EMF; | R01...R5, 1%, TCR $\leq \pm 75$ ppm P70 = 1W | SMD 2512 | AEC Q200 |
| WSR-2 | | Current Sense Power Metal Strip; High Power; Molded; | R001...1R, 1% TCR ± 75 ppm P70 = 2W | SMD 4527 | AEC Q200 |
| WSR-3 | | Current Sense Power Metal Strip; High Power; Molded; | R001...R2, 1% TCR ± 75 ppm P70 = 3W | SMD 4527 | AEC Q200 |

Diesel ECU and Fuel Injector Drivers : Common Rail Pump Control, Motor Switch

MOSFETs

| Product Name | Status | Description | Features | Package | Q-Level |
|---------------------------|--------|---|-----------------------|-------------------|----------|
| SQ7414EN | NEW | Fully AEC Q-101 Qualified; Low Thermal Resistance; Fast Switching; | N-Ch,Rds on =0.025Ohm | SMD PPAK1212-8 | AEC Q101 |
| SQ7415AEN | | Fully AEC Q-101 Qualified; Low Thermal Resistance; Fast Switching; | P-Ch,Rds on =0.065Ohm | SMD PPAK1212-8 | AEC Q101 |

Diesel ECU and Fuel Injector Drivers : Controller ASICs, Filtering

Inductor

| Product Name | Status | Description | Features | Package | Q-Level |
|-------------------------------|--------|--|----------------------------------|-------------|----------|
| IHLP1616AB-1A | | Low Profile; High Current; Low DCR; High Saturation; Shielded; | 0,047μH...2,2μH, Idc=15A...3A | SMD 1616 | AEC Q200 |
| IHLP1616BZ-A1 | | Low Profile; High Current; Low DCR; High Saturation; Shielded; | 0,1μH...2,2μH, Idc=35A...6A | SMD 1616 | AEC Q200 |
| IHLP2525CZ-A1 | | Low Profile; High Current; Low DCR; High Saturation; Shielded; | 0,1μH...10μH, Idc=60A...7A | SMD 2525 | AEC Q200 |

Tantalum Capacitor

| Product Name | Status | Description | Features | Package | Q-Level |
|---------------------|--------|---|------------------------|-----------------------|----------|
| TH3 | | 150°C Rated, Low ESR; 100% Surge Current Tested, | 10V-50VDC; 0,33-100μF; | SMD A/B/C/D/E Case | AEC Q200 |

Diesel ECU and Fuel Injector Drivers : Controller ASICs, Pull-Up/Down Resistors & Arrays

Resistor Array

| Product Name | Status | Description | Features | Package | Q-Level |
|--|--------|---------------------------|-------------------------|---------|----------|
| CRA04S CRA04P | | Thick Film Resistor Array | 10-1M Ω m, 63mW | SMD | |
| CRA06S CRA06P | | Thick Film Resistor Array | 10-1M Ω m, 63mW | SMD | AEC Q200 |
| CRA12S CRA12E | | Thick Film Resistor Array | 10-1M Ω m, 100mW | SMD | AEC Q200 |

Diesel ECU and Fuel Injector Drivers : Electrical Water Heater / Pump, Current Sensing

Current Sense Shunt Resistors

| Product Name | Status | Description | Features | Package | Q-Level |
|----------------------------|--------|---|--|-------------|----------|
| WSL1206-18 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R001...R2, 1%, TCR $\leq \pm 75$ ppm P70 = 0.5W | SMD 1206 | AEC Q200 |
| WSL2010-18 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R001...R5, 1%, TCR $\leq \pm 75$ ppm P70 = 1W | SMD 2010 | AEC Q200 |
| WSL2512-18 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R0005...R04 , 1%, TCR $\leq \pm 75$ ppm P70 = 2W | SMD 2512 | AEC Q200 |
| WSL2816 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R01...R1 , 1%, TCR $\leq \pm 75$ ppm P70 = 2W | SMD 2816 | AEC Q200 |
| WSLP1206 | | Very High Power- Small Size; Very Low R Value; Very Low TCR; Low Thermal EMF; | R001...R05, 1%, TCR $\leq \pm 75$ ppm P70 = 1W | SMD 1206 | AEC Q200 |
| WSLT2512 | | Power Metal Strip Shunts; High Temp. (275°C); Low TCR; Low Thermal EMF; | R01...R5, 1%, TCR $\leq \pm 75$ ppm P70 = 1W | SMD 2512 | AEC Q200 |
| WSR-2 | | Current Sense Power Metal Strip; High Power; Molded; | R001...1R, 1% TCR ± 75 ppm P70 = 2W | SMD 4527 | AEC Q200 |
| WSR-3 | | Current Sense Power Metal Strip; High Power; Molded; | R001...R2, 1% TCR $\leq \pm 75$ ppm P70 = 3W | SMD 4527 | AEC Q200 |

Diesel ECU and Fuel Injector Drivers : Electrical Water Heater / Pump, Motor Switch

MOSFETs

| Product Name | Status | Description | Features | Package | Q-Level |
|--------------------------|--------|---|-----------------------|-------------------|----------|
| SQ7414EN | NEW | Fully AEC Q-101 Qualified; Low Thermal Resistance; Fast Switching; | N-Ch,Rds on =0.025Ohm | SMD PPAK1212-8 | AEC Q101 |
| SQ7415EN | NEW | Fully AEC Q-101 Qualified; Low Thermal Resistance; Fast Switching; | P-Ch,Rds on =0.065Ohm | SMD PPAK1212-8 | AEC Q101 |

Diesel ECU and Fuel Injector Drivers : Electrical Water Heater / Pump, Temperature Sensing

Thermistor

| Product Name | Status | Description | Features | Package | Q-Level |
|----------------------------|--------|--|-------------------------|-----------------------|---------|
| 1T1002-1 | | Small Dimension, Conformal-Coated | 1K...100K,B=3000...5000 | TH / radial Leaded | |
| NTCS0402E3 | | Small Dimension; Rugged Construction; High Reliability; | 4K7...100K | SMD 0402 | |
| NTCS0603E3 | | Small Dimension; Rugged Construction; High Reliability; | 2K2...100K | SMD 0603 | |
| NTCS0805E3 | | Small Dimension; Rugged Construction; High Reliability; | 2K2...680K | SMD 0805 | |
| NTHS | | Small Dimension; Rugged Construction; High Reliability; | 1K...350K | SMD 0402...1012 | |

Diesel ECU and Fuel Injector Drivers : Fuel Injector Drivers, Piezo - Valve Switch

Alu Elcaps

| Product Name | Status | Description | Features | Package | Q-Level |
|------------------------|--------|---|--|--------------------------------------|----------|
| 120ATC | | Aluminum Capacitors Axial; High Temperature and High voltage; | 47μ...6800μF, Life@125°C = 2000h | TH / axial max 21x 38 mm | AEC Q200 |
| 136RVI | | Aluminum Capacitors Radial; Very Low Impedance; | 22...10000μF Life@105°C = 4000h | TH / radial max 18x35 mm | AEC Q200 |
| 140CRH | | Aluminum Capacitors SMD (Chip); High Temperature;Pb-Free; | 10μ...680μF, Life@125°C = 2000h | SMD max.10x10x14 mm | AEC Q200 |
| 140RTM | | Aluminum Capacitors Radial; High Temperature Miniature; | 22μ...4700μF, Life@125°C = 2000h | TH / radial max.18x31 mm | AEC Q200 |
| 146CTI | | Aluminum Capacitors; SMD (Chip); low impedance, high temperature | 22...4700μF, Life@125°C = 6000h | SMD max 18x18x21 | AEC Q200 |
| 146RTI | | Aluminum Capacitors; Radial; low impedance, high temperature | 68...6800μF, Life@125°C = 6000h | TH / Radial 10x12mm to 18x35mm | AEC Q200 |
| 150CRZ | | Alu Capacitors SMD (Chip), Pb-Free Very Low Z; | 4,7...10000μF, Life@105°C 10000h | SMD max 18x18x21 | AEC Q200 |
| 150RMI | | Aluminum Capacitors Radial Miniature; Low Impedance | 100μF...6800μF, Life@105°C = 10000h | TH / radial max.18x31 | AEC Q200 |

Ceramic Capacitors

| Product Name | Status | Description | Features | Package | Q-Level |
|--|--------|---|----------------------------------|--------------------|---------|
| VJ...31/ VJ...34 Automotive MLCC | | SMD Ceramic Capacitor Solutions High Temperature Application Boardflex-Sensitive Applications | 1.0pF...1μF 10Vdc ... 3000Vdc | SMD 0402...1812 | |

Current Sense Shunt Resistors

| Product Name | Status | Description | Features | Package | Q-Level |
|----------------------------|--------|--|--|-------------|----------|
| WSH2818 | NEW | Power Metal Strip Shunts; Very High Power- Small Size; Low Thermal EMF; | R001...R1, 1% TCR <= ± 75ppm P70 = 5W | SMD 2818 | AEC Q200 |
| WSL2010-18 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R001...R5, 1%, TCR <= ± 75ppm P70 = 1W | SMD 2010 | AEC Q200 |
| WSL2512-18 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R0005...R04 , 1%, TCR ≤ ± 75ppm P70 = 2W | SMD 2512 | AEC Q200 |
| WSL2726 | NEW | 4-Terminal Design For Accurate Sensin Very Low R Value; Very Low TCR; Low Thermal EMF; | R0003...R005; 1% TCR ≤ ± 75ppm P70 = 3W | SMD 2726 | AEC Q200 |
| WSL2816 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R01...R1 , 1%, TCR ≤ ± 75ppm P70 = 2W | SMD 2816 | AEC Q200 |
| WSLT2512 | NEW | Power Metal Strip Shunts; High Temp. (275°C); Low TCR; Low Thermal EMF; | R01...R5, 1%, TCR ? ± 75ppm P70 = 1W | SMD 2512 | AEC Q200 |
| WSR-2 | | Current Sense Power Metal Strip; High Power; Molded; | R001...1R, 1% TCR <= ± 75ppm P70 = 2W | SMD 4527 | AEC Q200 |
| WSR-3 | | Current Sense Power Metal Strip; High Power; Molded; | R001...R2, 1% TCR <= ± 75ppm P70 = 3W | SMD 4527 | AEC Q200 |
| WSR-5 | | Current Sense Power Metal Strip; | R001...R03, 1% | SMD | AEC Q200 |

| Product Name | Status | Description | Features | Package | Q-Level |
|--------------|--------|---------------------|-----------------------------------|---------|---------|
| | | High Power; Molded; | TCR $\leq \pm 75$ ppm P70 = 5W | 4527 | |

Film Capacitors

| Product Name | Status | Description | Features | Package | Q-Level |
|-------------------------|--------|--|------------------------|---------------------|----------|
| MKT1820 | | High Transient Robust, >20V/ μ sec; Long Lifetime; Low Profile; Leaded Part; | 400VDC / 0.68 μ F; | TH / radial 1820 | AEC Q200 |

Inductors

| Product Name | Status | Description | Features | Package | Q-Level |
|-------------------------------|--------|---|---|-------------|----------|
| IHLP2525EZ-01 | | Low Profile; High Current; Low DCR; High Transient Current Spike Capable, Shielded; | 0,56 μ H...10 μ H, Idc=12A...4,5A | SMD 2525 | AEC Q200 |
| IHLP4040DZ-A1 | | Low Profile; High Current; Low DCR; High Transient Current Spike Capable, Shielded; | 0,19 μ H...10 μ H, Idc=90A...12A | SMD 4040 | AEC Q200 |
| IHLP5050FD-A1 | | Low Profile; High Current; Low DCR; High Transient Current Spike Capable, Shielded; | 0,1 μ H...10 μ H, Idc=120A...15,5A | SMD 5050 | AEC Q200 |

MOSFETs

| Product Name | Status | Description | Features | Package | Q-Level |
|-------------------------------|--------|---|---|------------------------------------|---------|
| SQM18N33-160H | | N-Channel 330-V (D-S) MOSFET Automotive AEC-Q101 Qualified | N-Ch; 330V (D-S) MOSFET; rDS on = 0.160Ohm Id=31Amp; | SMD TO-263 (D ² PAK) | AEC-Q |
| SUD35N10-26P | NEW | N-Channel 100-V (D-S) MOSFET | N-Ch; 100V (D-S) MOSFET; rDS on = 0.026Ohm | SMD T0-252 (DPAK) | |
| SUDxxN25-330 | | N-Channel 250-V (D-S) MOSFET | N-Ch; 250V (D-S) MOSFET; rDS on = 0.330Ohm | SMD T0-252 (DPAK) | |
| SUDxxN30-330H | | N-Channel 300-V (D-S) MOSFET | N-Ch; 300V (D-S) MOSFET; rDS on = 0.330Ohm | SMD T0-252 (DPAK) | |
| SUM110N08-07P | | N-Channel 75-V (D-S) MOSFET | N-Ch; 75-V (D-S) Mosfet rDS on = 0.007Ohm | SMD TO-263 (D ² PAK) | |
| SUMxxN33-200H | | N-Channel 330-V (D-S) MOSFET | N-Ch; 330V (D-S) MOSFET; rDS on = 0.200Ohm | SMD TO-263 (D ² PAK) | |

Ultrafast Diode

| Product Name | Status | Description | Features | Package | Q-Level |
|--------------------------|--------|---|---|----------------------|----------|
| ES1BHE3 | | SMD Ultrafast Plastic Rectifier | If=1A, Vrrm=100V, trr=15ns, Tj=150°C | SMD D0214AC (SMA) | AEC Q101 |
| ES2BHE3 | | SMD Ultrafast Plastic Rectifier | If=2A, Vrrm=100V, trr=20ns, Tj=150°C | SMD D0214AA (SMB) | AEC Q101 |
| ESH1BHE3 | | SMD Ultrafast Plastic Rectifier; High Temperature; | If=1A, Vrrm=100V, trr=25ns, Tj=175°C | SMD D0214AC (SMA) | AEC Q101 |
| ESH2BHE3 | | SMD Ultrafast Plastic Rectifier; High Temperature; | If=2A, Vrrm=100V, trr=25ns; Tj=175°C | SMD D0214AA (SMB) | AEC Q101 |
| UH6PJ | NEW | SMD Ultrafast High Voltage Rectifier | If=6A, Vrrm=600V, trr=25ns; Tj=175°C | SMD SMPC | AEC Q101 |
| USB160HE3 | NEW | SMD Ultrafast Plastic Rectifier | If=1A, Vrrm=600V, trr=30ns; Tj=150°C | SMD D0214AC (SMA) | AEC Q101 |

Diesel ECU and Fuel Injector Drivers : Fuel Injector Drivers, Solenoid - Valve Switch

Alu Elcaps

| Product Name | Status | Description | Features | Package | Q-Level |
|------------------------|--------|---|---|-----------------------------|----------|
| 120ATC | | Aluminum Capacitors Axial; High Temperature and High voltage; | 47 μ ...6800 μ F, Life@125°C = 8000h | TH / axial max 21x 38 mm | AEC Q200 |
| 136RVI | | Aluminum Capacitors Radial; Very Low Impedance; | 22...10000 μ F Life@105°C = 10000h | TH / radial max 18x35 mm | |
| 140CRH | | Aluminum Capacitors SMD (Chip); High Temperature; Pb-Free; | 10 μ F...4700 μ F Life@125°C 6000h | SMD max.18x18x21 | AEC Q200 |
| 140RTM | | Aluminum Capacitors Radial; High Temperature Miniature; | 22 μ ...4700 μ F, Life@125°C = 4000h | TH / radial max.18x31 mm | AEC Q200 |
| 146CTI | | Aluminum Capacitors; SMD (Chip); low impedance, high temperature | 22...4700 μ F, Life@125°C = 6000h | SMD | AEC Q200 |
| 146RTI | | Aluminum Capacitors; Radial; low impedance, high temperature | 68...6800 μ F, Life@125°C = 6000h | TH / Radial max 18x35 | AEC Q200 |
| 150CRZ | | Aluminum Capacitors SMD (Chip); Very Low Z;Pb- Free | 4,7...10000 μ F, Life@105°C 10000h | SMD max18x18x21 | AEC Q200 |
| 150RMI | | Aluminum Capacitors Radial Miniature; Low Impedance | 100 μ F..6800 μ F, Life@105°C = 10000h | TH / radial max.18x31 | AEC Q200 |

Current Sense Shunt Resistors

| Product Name | Status | Description | Features | Package | Q-Level |
|----------------------------|--------|--|---|-------------|----------|
| WSL2010-18 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R001...R5, 1%, TCR $\leq \pm 75$ ppm P70 = 1W | SMD 2010 | AEC Q200 |
| WSL2726 | NEW | Power Metal Strip Shunts; 4-Term Design For Accurate Sensing Very Low R Value; Very Low TCR; | R0003...R005; 1% TCR $\leq \pm 75$ ppm P70 = 3W | SMD 2726 | AEC Q200 |
| WSL2816 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R01...R1 , 1%, TCR $\leq \pm 75$ ppm P70 = 2W | SMD 2816 | AEC Q200 |
| WSLT2512 | NEW | Power Metal Strip Shunts; High Temp. (275°C); Low TCR; Low Thermal EMF; | R01...R5, 1%, TCR $\leq \pm 75$ ppm P70 = 1W | SMD 2512 | AEC Q200 |
| WSR-2 | | Current Sense Power Metal Strip; High Power; Molded; | R001...1R, 1% TCR $\leq \pm 75$ ppm P70 = 2W | SMD 4527 | AEC Q200 |
| WSR-3 | | Current Sense Power Metal Strip; High Power; Molded; | R001...R2, 1% TCR $\leq \pm 75$ ppm P70 = 3W | SMD 4527 | AEC Q200 |

Diode

| Product Name | Status | Description | Features | Package | Q-Level |
|--------------------------|--------|---|---|----------------------|----------|
| ES1BHE3 | | SMD Ultrafast Plastic Rectifier | If=1A, Vrrm=100V, trr=15ns, Tj=150°C | SMD D0214AC (SMA) | AEC Q101 |
| ES2BHE3 | | SMD Ultrafast Plastic Rectifier | If=2A, Vrrm=100V, trr=20ns, Tj=150°C | SMD D0214AA (SMB) | AEC Q101 |
| ESH1BHE3 | | SMD Ultrafast Plastic Rectifier; High Temperature; | If=1A, Vrrm=100V, trr=25ns, Tj=175°C | SMD D0214AC (SMA) | AEC Q101 |
| ESH2BHE3 | | SMD Ultrafast Plastic Rectifier; High Temperature; | If=2A, Vrrm=100V, trr=25ns, Tj=175°C | SMD D0214AA (SMB) | AEC Q101 |

Inductors

| Product Name | Status | Description | Features | Package | Q-Level |
|-------------------------------|--------|-------------------------------------|----------------------------|---------|----------|
| IHLP2525EZ-01 | | Low Profile; High Current; Low DCR; | 0,56 μ H...10 μ H, | SMD | AEC Q200 |

| Product Name | Status | Description | Features | Package | Q-Level |
|-------------------------------|--------|---|--------------------------------|----------|----------|
| | | High Transient Current Spike Capable, Shielded; | Idc=12A...4,5A | 2525 | |
| IHLP4040DZ-A1 | | Low Profile; High Current; Low DCR; High Transient Current Spike Capable, Shielded; | 0,19µH...10µH, Idc=90A...12A | SMD 4040 | AEC Q200 |
| IHLP5050FD-A1 | | Low Profile; High Current; Low DCR; High Transient Current Spike Capable, Shielded; | 0,1µH...10µH, Idc=120A...15,5A | SMD 5050 | AEC Q200 |

MOSFETs

| Product Name | Status | Description | Features | Package | Q-Level |
|------------------------------|--------|------------------------------|--|---------------------------------|---------|
| SQD50P08-25L | | P-Channel 80-V (D-S) MOSFET | N-Ch; 80V (D-S) MOSFET; rDS on = 0.025Ohm | SMD TO-252 (DPAK) | AEC-Q |
| SQM40N10-30 | | N-Channel 100-V (D-S) MOSFET | N-Ch; 100V (D-S) MOSFET; rDS on = 0.030Ohm | SMD TO-263 (D ² PAK) | AEC-Q |
| SUD35N10-26P | NEW | N-Channel 100-V (D-S) MOSFET | N-Ch; 100V (D-S) MOSFET; rDS on = 0.026Ohm | SMD TO-252 (DPAK) | |
| SUD40N08-16 | | N-Channel 80-V (D-S) MOSFET | N-Ch; 80V (D-S) MOSFET; rDS on = 0.016Ohm | SMD TO-252 (DPAK) | |
| SUM40N10-30 | | N-Channel 100-V (D-S) MOSFET | N-Ch; 100V (D-S) MOSFET; rDS on = 0.03Ohm | SMD TO-263 (D ² PAK) | |

Diesel ECU and Fuel Injector Drivers : Glow Plug Driver, Current Sensing

Shunt Resistors

| Product Name | Status | Description | Features | Package | Q-Level |
|----------------------------|--------|--|---|-------------|----------|
| WSL1206-18 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R002...R2, 1%, TCR $\leq \pm 75$ ppm P70 = 0.5W | SMD 1206 | AEC Q200 |
| WSL2010-18 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R001...R5, 1%, TCR $\leq \pm 75$ ppm P70 = 1W | SMD 2010 | AEC Q200 |
| WSL2512-18 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R001...R01, 1%, TCR $\leq \pm 75$ ppm P70 = 2W | SMD 2512 | AEC Q200 |
| WSL2816 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R01...R1, 1%, TCR $\leq \pm 75$ ppm P70 = 2 ... 3W | SMD 2816 | AEC Q200 |
| WSLP1206 | | Power Metal Strip Shunts; Very Low R Value; Very Low TCR; Low Thermal EMF; | R001...R05, 1%, TCR $\leq \pm 75$ ppm P70 = 1W | SMD 1206 | AEC Q200 |
| WSLT2512 | | Power Metal Strip Shunts; High Temp. (275°C); Low TCR; Low Thermal EMF; | 0.01 - 0.50 Ohm, 1%, TCR $\leq \pm 75$ ppm P70 = 1W | SMD 2512 | AEC Q200 |

Diesel ECU and Fuel Injector Drivers : Glow Plug Driver, High-Side Switch

MOSFET

| Product Name | Status | Description | Features | Package | Q-Level |
|-----------------------------|--------|-------------------------------------|--|---------------------------|----------|
| SQ7414EN | | N-Channel 60-V (D-S) MOSFET | N-Ch; 60V (D-S) MOSFET; rDS on = 0.025Ohm | SMD PowerPAK 1212-8 | AEC Q101 |
| SUD23N06-31 | | N-Channel 60-V (D-S), 175°C MOSFET; | N-Ch; 60V (D-S) MOSFET; rDS on = 0.031Ohm ID= 9.1A | SMD T0-252 (DPAK) | |

Diesel ECU and Fuel Injector Drivers : Glow Plug Driver, Low-Side Switch

MOSFET

| Product Name | Status | Description | Features | Package | Q-Level |
|-----------------------------|--------|-----------------------------|--|---------------------------|----------|
| SQ7415EN | | P-Channel 60-V (D-S) MOSFET | P-Ch; 60V (D-S) MOSFET; rDS on = 0.065Ohm | SMD PowerPAK 1212-8 | AEC Q101 |
| SUD50P06-15 | | P-Channel 60-V (D-S) MOSFET | P-Ch; 60V (D-S) MOSFET; rDS on = 0.015Ohm | SMD T0-252 (DPAK) | |

Diesel ECU and Fuel Injector Drivers : Glow Plug Driver, Temperature Sensing

Thermistor

| Product Name | Status | Description | Features | Package | Q-Level |
|----------------------------|--------|--|-------------------------|-----------------------|---------|
| 1T1002-1 | | Small Dimension, Conformal-Coated | 1K...100K,B=3000...5000 | TH / radial Leaded | |
| NTCS0402E3 | | Small Dimension; Rugged Construction; High Reliability; | 4K7...100K | SMD 0402 | |
| NTCS0603E3 | | Small Dimension; Rugged Construction; High Reliability; | 2K2...100K | SMD 0603 | |
| NTCS0805E3 | | Small Dimension; Rugged Construction; High Reliability; | 2K2...680K | SMD 0805 | |
| NTHS | | Small Dimension; Rugged Construction; High Reliability; | 1K...350K | SMD 0402...1012 | |

Diesel ECU and Fuel Injector Drivers : Input Signal Conditioning, ESD Protection

Ceramic Capacitors

| Product Name | Status | Description | Features | Package | Q-Level |
|--|--------|---|----------------------------------|--------------------|---------|
| VJ....31/ VJ....34 Automotive MLCC | | SMD Ceramic Capacitor Solutions High Temperature Application Boardflex-Sensitive Applications | 1.0pF...1μF 10Vdc ... 3000Vdc | SMD 0402...1812 | |

Small-Signal Diodes

| Product Name | Status | Description | Features | Package | Q-Level |
|-----------------------|--------|--|-----------------------------------|---------------|---------|
| GL05T | | Low Capacitance ESD Protection; Data Line Protection; | Ppk=300W, Vrrm=70V, Ippm = 17A | SMD SOT-23 | |
| GL24T | | Low Capacitance ESD Protection; Data Line Protection; | Ppk=300W, Vrrm=70V, Ippm = 5A | SMD SOT-23 | |

Thick Film Resistors

| Product Name | Status | Description | Features | Package | Q-Level |
|--------------------------|--------|--|---------------------|-------------|----------|
| CRCW0402 | | Bulk Resistors, Pulse resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 0402 | AEC Q200 |
| CRCW0603 | | Bulk Resistors, Pulse resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 0603 | AEC Q200 |
| CRCW0805 | | Bulk Resistors, Pulse resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 0805 | AEC Q200 |
| CRCW1206 | | Bulk Resistors, Pulse resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 1206 | AEC Q200 |
| CRCW1210 | | Bulk Resistors, Pulse resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 1210 | AEC Q200 |
| CRCW2010 | | Bulk Resistors, Pulse resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 2010 | AEC Q200 |
| CRCW2512 | | Bulk Resistors, Pulse resistant; Good Long-Term Stability; | 1R..10M, 1%, TCR100 | SMD 2512 | AEC Q200 |
| RCA2010 | NEW | Sulfur-Resistant Termination; Automotive Grade Thick Film Chip; | 1R..10M, 1%, TCR100 | SMD 2010 | AEC Q200 |
| RCA2512 | NEW | Sulfur-Resistant Termination; Automotive Grade Thick Film Chip; | 1R..10M, 1%, TCR100 | SMD 2512 | AEC Q200 |

TVS Diodes

| Product Name | Status | Description | Features | Package | Q-Level |
|---------------------------|--------|--|--------------------|-----------------|----------|
| SM5A27HE3 | | High Surge, Low Vf, Low Leakage; High Reliability | Vbr=27V, Ifsm=500A | SMD DO-218AB | AEC Q101 |
| SM8A27HE3 | | High Surge, Low Vf, Low Leakage; High Reliability | Vbr=27V, Ifsm=700A | SMD DO-218AB | AEC Q101 |

Diesel ECU and Fuel Injector Drivers : Input Signal Conditioning, Temperature

NTC

| Product Name | Status | Description | Features | Package | Q-Level |
|----------------------------|--------|--|------------|--------------------|---------|
| NTCS0402E3 | | Small Dimension; Rugged Construction; High Reliability; | 4K7...100K | SMD 0402 | |
| NTCS0603E3 | | Small Dimension; Rugged Construction; High Reliability; | 2K2...100K | SMD 0603 | |
| NTCS0805E3 | | Small Dimension; Rugged Construction; High Reliability; | 2K2...680K | SMD 0805 | |
| NTHS | | Small Dimension; Rugged Construction; High Reliability; | 1K...350K | SMD 0402...1012 | |

Diesel ECU and Fuel Injector Drivers : Input Signal Conditioning, Ultra-Stable Voltage Divider

Resistor Arrays

| Product Name | Status | Description | Features | Package | Q-Level |
|--|--------|--------------------------|--|-------------------|----------|
| ACAS 0612 -Precision- | | Flat Chip Resistor Array | 100 - 221k Ohm; TCR $\leq \pm 25$ ppm; Ratio $\leq 0.25\%$ | SMD array 0612 | AEC Q200 |

Diesel ECU and Fuel Injector Drivers : Power Supply, EMI Filtering

Inductors

| Product Name | Status | Description | Features | Package | Q-Level |
|-------------------------------|--------|---|---|-------------|----------|
| IHLP2525EZ-01 | | Low Profile; High Current; Low DCR; High Transient Current Spike Capable, Shielded; | 0,56 μ H...10 μ H, Idc=12A...4,5A | SMD 2525 | AEC Q200 |
| IHLP4040DZ-A1 | | Low Profile; High Current; Low DCR; High Transient Current Spike Capable, Shielded; | 0,19 μ H...10 μ H, Idc=90A...12A | SMD 4040 | AEC Q200 |
| IHLP5050FD-A1 | | Low Profile; High Current; Low DCR; High Transient Current Spike Capable, Shielded; | 0,1 μ H...10 μ H, Idc=120A...15,5A | SMD 5050 | AEC Q200 |

Diesel ECU and Fuel Injector Drivers : Power Supply, Quiescent Current Switch-Off

MOSFETs

| Product Name | Status | Description | Features | Package | Q-Level |
|-------------------------------|--------|--|---|------------------------------------|---------|
| SUD50P04-09L | | P-Ch, Tj=175°C Power MOSFET; Low Leakage Current; | N-Ch; 40V (D-S) MOSFET; rDS on = 0.0094Ohm | SMD TO-252 (DPAK) | |
| SUD50P06-15L | | P-Ch, Tj=175°C Power MOSFET; Low Leakage Current; | P-Ch; 60V (D-S) MOSFET; rDS on = 0.0150Ohm | SMD TO-252 (DPAK) | |
| SUM110P04-05 | | P-Ch MOSFET; 12V/24V Boardnet, (KL15); High-Side Power Switch; Stand-By Mode; | N-Ch; 40V (D-S) MOSFET; rDS on = 0.005Ohm | SMD TO-263 (D ² PAK) | |
| SUM110P06-08L | | P-Ch 60-V (D-S) 175°C Mosfet | P-Ch; 60V (D-S) MOSFET; rDS on = 0.008Ohm | SMD TO-263 (D ² PAK) | |

Diesel ECU and Fuel Injector Drivers : Power Supply, Reverse Polarity Protection

MOSFETs

| Product Name | Status | Description | Features | Package | Q-Level |
|------------------------------|--------|--|---|------------------------|----------|
| SQ2309ES | NEW | P-Ch; MOSFET for General Application; IC Protection; Automotive AEC-Q101 Qualified | P-Ch; 60V (D-S) MOSFET; rDS on = 0.335R@10V Id=-1,7Amp; | SMD TO-236 (SOT-23) | AEC-Q |
| SQ7415EN | NEW | Fully AEC Q-101 Qualified; Low Thermal Resistance; Fast Switching; | P-Ch;Rds on =0,065Ohm | SMD PPAK1212-8 | AEC Q101 |
| SUD19P06-60L | | P-Ch, Tj=175°C Power MOSFET, Low Leakage Current; | P-Ch,Rds on =0,06Ohm | SMD TO-252 (DPAK) | |

Schottky Diodes

| Product Name | Status | Description | Features | Package | Q-Level |
|---------------------------|--------|---|-----------|-----------------------|----------|
| SS3P6LHE3 | NEW | Low Profile; Low Vf; High Current Density; | Vf=0,478V | SMD TO-277A (SMPC) | AEC Q101 |
| SS5P5HE3 | NEW | Low Profile; Low Vf; High Current Density; | Vf=0,560V | SMD TO-277A (SMPC) | AEC Q101 |

TVS Diodes

| Product Name | Status | Description | Features | Package | Q-Level |
|----------------------------|--------|--|-----------------------|-----------------|----------|
| SM5A27HE3 | | High Surge, Low Vf, Low Leakage; Broad Range of Breakedown Voltages; High Reliability; | Vbr=27V, Ifsm=500A | SMD DO-218AB | AEC Q101 |
| SM8A27HE3 | | High Surge, Low Vf, Low Leakage; Broad Range of Breakedown Voltages; High Reliability; | Vbr=27V, Ifsm=700A | SMD DO-218AB | AEC Q101 |
| SM8S24AHE3 | | High Surge, Low Vf, Low Leakage; Broad Range of Breakedown Voltages; High Reliability; | Ippm=38,9A, Ifsm=700A | SMD DO-218AB | AEC Q101 |

Diesel ECU and Fuel Injector Drivers : Power Supply, SMPS Buck

Alu Elcaps

| Product Name | Status | Description | Features | Package | Q-Level |
|------------------------|--------|--|----------------------------------|------------------------|----------|
| 146CTI | | Aluminum Capacitors; SMD (Chip); low impedance, high temperature | 22...4700µF, Life@125°C = 6000h | SMD max 18x18x21 | AEC Q200 |
| 146RTI | | Aluminum Capacitors; Radial; low impedance, high temperature | 68...6800µF, Life@125°C = 6000h | TH / Radial max18x35mm | AEC Q200 |
| 150CRZ | | Aluminum Capacitors SMD (Chip), Very Low Z, Pb-Free | 4,7...10000µF, Life@105°C 10000h | SMD max 18x18x21 | AEC Q200 |
| 153CRV | | Aluminum Capacitors SMD (Chip); Long-Life Vertical, Pb-Free | 0,47...1000µF, Life@105°C 3000h | SMD max.10x10x14 | |

Ceramic Capacitors

| Product Name | Status | Description | Features | Package | Q-Level |
|--|--------|---|----------------------------------|--------------------|---------|
| VJ...31/ VJ...34 Automotive MLCC | | SMD Ceramic Capacitor Solutions High Temperature Application for Boardflex-Sensitive Applications | 1.0pF...1µF 10Vdc ... 3000Vdc | SMD 0402...1812 | |

Current Sense Shunt Resistors

| Product Name | Status | Description | Features | Package | Q-Level |
|----------------------------|--------|--|--|-------------|----------|
| WSL1206-18 | | Power Metal Strip Shunts; Very Low R-Value; Very Low TCR; Low Thermal EMF; | R001...R2, 1%, TCR <= ± 75ppm P70 = 0.5W | SMD 1206 | AEC Q200 |
| WSL2010-18 | | Power Metal Strip Shunts; Very Low R-Value; Very Low TCR; Low Thermal EMF; | R001...R5, 1%, TCR <= ± 75ppm P70 = 1W | SMD 2010 | AEC Q200 |
| WSL2512-18 | | Power Metal Strip Shunts; Very Low R-Value; Very Low TCR; Low Thermal EMF; | R0005...R04 , 1%, TCR <= ± 75ppm P70 = 2W | SMD 2512 | AEC Q200 |
| WSL2816 | NEW | Power Metal Strip Shunts; Very Low R-Value; Very Low TCR; Low Thermal EMF; | R01...R1 , 1%, TCR <= ± 75ppm P70 = 2W | SMD 2816 | AEC Q200 |
| WSLP1206 | | Power Metal Strip Shunts; Very High Power- Small Size; Very Low R Value; Very Low TCR; | R001...R05, 1%, TCR <= ± 75ppm P70 = 1W | SMD 1206 | AEC Q200 |
| WSLT2512 | | Power Metal Strip Shunts; High Temp. (275°C); Low TCR; Low Thermal EMF; | R01...R5, 1%, TCR ≤ 75ppm P70 = 1W | SMD 2512 | AEC Q200 |

Inductors

| Product Name | Status | Description | Features | Package | Q-Level |
|-------------------------------|--------|--|---------------------------------|-------------|----------|
| IHLP1616BZ-A1 | | Low Profile; High Current; Low DCR; High Saturation; Shielded; | 0,1µH...2,2µH, Idc=35A...6A | SMD 1616 | AEC Q200 |
| IHLP2525AH-A1 | | Low Profile; High Current; Low DCR; High Saturation; Shielded; | 0,1µH...4,7µH, Idc = 40A...8A | SMD 2525 | AEC Q200 |
| IHLP2525CZ-A1 | | Low Profile; High Current; Low DCR; High Saturation; Shielded; | 0,1µH...10µH, Idc = 60A...7A | SMD 2525 | AEC Q200 |
| IHLP2525EZ-01 | | Low Profile; High Current; Low DCR; High Saturation; Shielded; | 0,56µH...10µH, Idc = 12A...4,5A | SMD 2525 | AEC Q200 |

MOSFETs

| Product Name | Status | Description | Features | Package | Q-Level |
|---------------------------|--------|-----------------------|-------------------|---------|---------|
| Si2318CDS | NEW | N-Ch MOSFET 40V (D-S) | rDS on = 0.042Ohm | SMD | |

| Product Name | Status | Description | Features | Package | Q-Level |
|------------------------------|--------|--|--|------------------------|---------|
| | | | ID=5.6A | TO-236 (SOT-23) | |
| SQ2328ES | | N-Ch MOSFET for 24V Boardnet SMPS, Buck Automotive AEC-Q101 qualified | N-Ch; 100V (D-S) MOSFET; rDS on = 0.30Ohm ID= 2Amp | SMD TO-236 (SOT-23) | AEC-Q |
| SQD50N06-09L | | N-Channel 60-V (D-S), 175C MOSFET; Logic Level; | N-Ch; 60V (D-S) MOSFET; rDS on = 0.009Ohm | SMD T0-252 (DPAK) | AEC-Q |
| SUD15N06-90L | | N-Channel 60-V (D-S), 175°C MOSFET; Logic Level; | N-Ch; 60V (D-S) MOSFET; rDS on = 0.090Ohm | SMD T0-252 (DPAK) | |

Schottky Diodes

| Product Name | Status | Description | Features | Package | Q-Level |
|---------------------------|--------|------------------------------|-----------|-----------------------|----------|
| SS3P4LHE3 | NEW | Low Vf, High Current Density | Vf=0,335V | SMD TO-277A (SMPC) | AEC Q101 |
| SS3P6LHE3 | NEW | Low Vf, High Current Density | Vf=0,478V | SMD TO-277A (SMPC) | AEC Q101 |

Tantalum Capacitor

| Product Name | Status | Description | Features | Package | Q-Level |
|---------------------|--------|---|------------------------|-----------------------|----------|
| TH3 | | 150°C rated, Low ESR; 100% Surge Current Tested, | 10V-50VDC; 0,33-100µF; | SMD A/B/C/D/E Case | AEC Q200 |

Diesel ECU and Fuel Injector Drivers : Power Supply, Transient Protection

TVS Diodes

| Product Name | Status | Description | Features | Package | Q-Level |
|---------------------------|--------|--|--------------------|-----------------|----------|
| SM5A27HE3 | | High Surge, Low Vf, Low Leakage; High Reliability | Vbr=27V, Ifsm=500A | SMD DO-218AB | AEC Q101 |
| SM8A27HE3 | | High Surge, Low Vf, Low Leakage; High Reliability | Vbr=27V, Ifsm=700A | SMD DO-218AB | AEC Q101 |