

# Diesel ECU and Fuel Injector Drivers

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# Diesel ECU and Fuel Injector Drivers

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## 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<sub>x</sub>), 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 Protections

### 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

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### 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

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### 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 $\pm 75$ ppm P70 = 2W	SMD 4527	AEC Q200
WSR-3		Current Sense Power Metal Strip; High Power; Molded;	R001...R2, 1% TCR $\pm 75$ ppm P70 = 3W	SMD 4527	AEC Q200

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

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### 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

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### Inductor

Product Name	Status	Description	Features	Package	Q-Level
IHLP1616AB-1A		Low Profile; High Current; Low DCR; High Saturation; Shielded;	0,047 $\mu$ H...2,2 $\mu$ H, Idc=15A...3A	SMD 1616	AEC Q200
IHLP1616BZ-A1		Low Profile; High Current; Low DCR; High Saturation; Shielded;	0,1 $\mu$ H...2,2 $\mu$ H, Idc=35A...6A	SMD 1616	AEC Q200
IHLP2525CZ-A1		Low Profile; High Current; Low DCR; High Saturation; Shielded;	0,1 $\mu$ H...10 $\mu$ H, 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; 0,33-100 $\mu$ F;	SMD A/B/C/D/E Case	AEC Q200



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

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### Resistor Array

Product Name	Status	Description	Features	Package	Q-Level
CRA04S CRA04P		Thick Film Resistor Array	10-1M $\Omega$ , 63mW	SMD	
CRA06S CRA06P		Thick Film Resistor Array	10-1M $\Omega$ , 63mW	SMD	AEC Q200
CRA12S CRA12E		Thick Film Resistor Array	10-1M $\Omega$ , 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 $\leq \pm 75\text{ppm}$ 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 $\leq \pm 75\text{ppm}$ 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 $\leq \pm 75\text{ppm}$ 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 $\leq \pm 75\text{ppm}$ 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 $\leq \pm 75\text{ppm}$ P70 = 1W	SMD 1206	AEC Q200
WSLT2512		Power Metal Strip Shunts; High Temp. (275°C); Low TCR; Low Thermal EMF;	R01...R5, 1%, TCR $\leq \pm 75\text{ppm}$ P70 = 1W	SMD 2512	AEC Q200
WSR-2		Current Sense Power Metal Strip; High Power; Molded;	R001...1R, 1% TCR $\pm 75\text{ppm}$ P70 = 2W	SMD 4527	AEC Q200
WSR-3		Current Sense Power Metal Strip; High Power; Molded;	R001...R2, 1% TCR $\leq \pm 75\text{ppm}$ P70 = 3W	SMD 4527	AEC Q200

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

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### 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

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### 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; High Power; Molded;	R001...R03, 1% TCR <= ± 75ppm P70 = 5W	SMD 4527	AEC Q200

## Film Capacitors

Product Name	Status	Description	Features	Package	Q-Level
MKT1820		High Transient Robust, >20V/ $\mu$ sec; Long Lifetime; Low Profile; Leaded Part;	400VDC / 0.68 $\mu$ 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 $\mu$ H...10 $\mu$ 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 $\mu$ H...10 $\mu$ H, Idc=90A...12A	SMD 4040	AEC Q200
IHLP5050FD-A1		Low Profile; High Current; Low DCR; High Transient Current Spike Capable, Shielded;	0,1 $\mu$ H...10 $\mu$ 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 <sup>2</sup> 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 <sup>2</sup> PAK)	
SUMxxN33-200H		N-Channel 330-V (D-S) MOSFET	N-Ch; 330V (D-S) MOSFET; rDS on = 0.200Ohm	SMD TO-263 (D <sup>2</sup> 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;	47μ...6800μF, Life@125°C = 8000h	TH / axial max 21x 38 mm	AEC Q200
136RVI		Aluminum Capacitors Radial; Very Low Impedance;	22...10000μF Life@105°C = 10000h	TH / radial max 18x35 mm	
140CRH		Aluminum Capacitors SMD (Chip); High Temperature; Pb-Free;	10μF...4700μF Life@125°C 6000h	SMD max.18x18x21	AEC Q200
140RTM		Aluminum Capacitors Radial; High Temperature Miniature;	22μ...4700μF, Life@125°C = 4000h	TH / radial max.18x31 mm	AEC Q200
146CTI		Aluminum Capacitors; SMD (Chip); low impedance, high temperature	22...4700μF, Life@125°C = 6000h	SMD	AEC Q200
146RTI		Aluminum Capacitors; Radial; low impedance, high temperature	68...6800μF, Life@125°C = 6000h	TH / Radial max 18x35	AEC Q200
150CRZ		Aluminum Capacitors SMD (Chip); Very Low Z;Pb- Free	4,7...10000μF, Life@105°C 10000h	SMD max18x18x21	AEC Q200
150RMI		Aluminum Capacitors Radial Miniature; Low Impedance	100μF...6800μF, 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 <= ± 75ppm 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 ≤ ± 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

### 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; High Transient Current Spike Capable, Shielded;	0,56μH...10μH, Idc=12A...4,5A	SMD 2525	AEC Q200

Product Name	Status	Description	Features	Package	Q-Level
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 T0-252 (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 <sup>2</sup> 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)	
SUD40N08-16		N-Channel 80-V (D-S) MOSFET	N-Ch; 80V (D-S) MOSFET; rDS on = 0.016Ohm	SMD T0-252 (DPAK)	
SUM40N10-30		N-Channel 100-V (D-S) MOSFET	N-Ch; 100V (D-S) MOSFET; rDS on = 0.030Ohm	SMD TO-263 (D <sup>2</sup> 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

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### 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

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### 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

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### 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

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### 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

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### 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

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### 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 $\mu$ H...10 $\mu$ 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 $\mu$ H...10 $\mu$ H, Idc=90A...12A	SMD 4040	AEC Q200
IHLP5050FD-A1		Low Profile; High Current; Low DCR; High Transient Current Spike Capable, Shielded;	0,1 $\mu$ H...10 $\mu$ H, Idc=120A...15,5A	SMD 5050	AEC Q200



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

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### 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 <sup>2</sup> 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 <sup>2</sup> 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 Breakdown Voltages; High Reliability;	Vbr=27V, Ifsm=500A	SMD DO-218AB	AEC Q101
SM8A27HE3		High Surge, Low Vf, Low Leakage; Broad Range of Breakdown Voltages; High Reliability;	Vbr=27V, Ifsm=700A	SMD DO-218AB	AEC Q101
SM8S24AHE3		High Surge, Low Vf, Low Leakage; Broad Range of Breakdown 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, I <sub>dc</sub> =35A...6A	SMD 1616	AEC Q200
IHLP2525AH-A1		Low Profile; High Current; Low DCR; High Saturation; Shielded;	0,1µH...4,7µH, I <sub>dc</sub> = 40A...8A	SMD 2525	AEC Q200
IHLP2525CZ-A1		Low Profile; High Current; Low DCR; High Saturation; Shielded;	0,1µH...10µH, I <sub>dc</sub> = 60A...7A	SMD 2525	AEC Q200
IHLP2525EZ-01		Low Profile; High Current; Low DCR; High Saturation; Shielded;	0,56µH...10µH, I <sub>dc</sub> = 12A...4,5A	SMD 2525	AEC Q200

### MOSFETs

Product Name	Status	Description	Features	Package	Q-Level
Si2318CDS	NEW	N-Ch MOSFET 40V (D-S)	r <sub>DS on</sub> = 0.042Ohm I <sub>D</sub> =5.6A	SMD TO-236 (SOT-23)	

Product Name	Status	Description	Features	Package	Q-Level
SQ2328ES		N-Ch MOSFET for 24V Boardnet SMPS, Buck Automotive AEC-Q101 qualified	N-Ch; 100V (D-S) MOSFET; rDS on = 0.300Ohm 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 TO-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 TO-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

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### 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

