

ABS/ESP ECU and Actuator Control

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ABS/ESP ECU and Actuator Control

VISHAY components used for diesel ECU include:

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

The ABS/ESP control unit for passenger cars and commercial vehicles is the most important active safety function in today's automotive technology. All functions in a modern ABS/ESP system are controlled by electronic control units (ECU) that communicates with an elaborate array of sensors placed at strategic locations throughout the car to monitor everything from wheel speed to driving direction, centrifugal force and wheel blocking. Tight electronic control means that braking gets much safer, to avoid accidents by the new possibility of having full steering control while braking, to shorten braking distance, with ESP - to eliminate skidding on curves (up to physical borders), than this has been in yesterday's cars. Modern ABS/ESP systems are going to replace more and more electrohydraulic to electromechanical components to gain more brake sensitivity and save energy. Park brake functions could be integrated in this new technologies, which enables new functions like drive-on aid. Additionally the weight of the new systems are supposed to be far fewer. Newest ABS/ESP system are even capable to handle complex situations with trailers.

ABS/ESP ECU and Actuator Control : ABS/ESP Pump Motor Switch, 3-phase Motor Switch

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQD50N04-5m6		P-Channel 40-V (D-S) MOSFET	Rdson=5,0mOhm	TO-263 (D ² PAK)	AEC Q101
SQJ858AEP		N-Channel 40-V (D-S) 175°C MOSFET	Rdson=3,5mOhm	TO-263 (D ² PAK)	AEC Q101

ABS/ESP ECU and Actuator Control : ABS/ESP Pump Motor Switch, Current Sensing

Shunt

Product Name	Status	Description	Features	Package	Q-Level
WSL2512		Power Metal Strip® Resistors, High Power, Low Value, Surface Mount	0,001 to 0,500 Ohm	SMD2512	AEC Q200
WSLP2010		Power Metal Strip® Resistors, High Power, Low Value, Surface Mount	R001...R05, 1%, TCR75 1W	1206	AEC Q200

ABS/ESP ECU and Actuator Control : ABS/ESP Pump Motor Switch, Filtering

Inductor

Product Name	Status	Description	Features	Package	Q-Level
IHLP-2525CZ-5A		Low Profile, High Current, Shielded, Low DCR, High Saturation	0,56uH...10uH, Idc=12A...4,5A	2525	AEC Q200
IHLP-3232DZ-5A		Low Profile, High Current, Shielded, Low DCR, High Saturation	0,1uH...4,7uH, Idc=40A...8A	2525	AEC Q200
IHLP-4040DZ-5A		Low Profile, High Current, Shielded, Low DCR, High Saturation	0,19uH...10uH, Idc=90A...12A	4040	AEC Q200

ABS/ESP ECU and Actuator Control : ABS/ESP Pump Motor Switch, Freewheeling Diode

Dual Common-Cathode Schottky Rectifier

Product Name	Status	Description	Features	Package	Q-Level
ES1PC		Dual Common-Cathode Schottky Rectifi	$V_f=0,73V$ $I_r=1mA$, $T_j=150^{\circ}C$	DO-220AA (SMP)	AEC Q101
MSS1P4		Dual Common-Cathode Schottky Rectifier	$V_f=0,54V$, $I_r=100\mu A$ $T_j=175^{\circ}C$	MicroSMP	AEC Q101

ABS/ESP ECU and Actuator Control : CAN Bus, CAN protection

TVS Diodes

Product Name	Status	Description	Features	Package	Q-Level
VCAN		CAN bus driver and receiver	Single supply	SO-8	AEC Q101

ABS/ESP ECU and Actuator Control : CAN Bus, ESD Protection

Ceramic Capacitors

Product Name	Status	Description	Features	Package	Q-Level
VJ...31X RoHS Automotive MLCC		ML-Capacitors for High Reliability Applications	100p...6,8uF, 6,3Vdc...500Vdc	0402...3640	AEC Q200

Small Signal Diodes

Product Name	Status	Description	Features	Package	Q-Level
SMF5V0A - SMF51A		Low Capacitance ESD Protection, Data Line Protection	Ppk=300W, Vrrm=70V, Ippm=17A	SOT-23	AEC Q101

Thick Film Resistors

Product Name	Status	Description	Features	Package	Q-Level
CRCW0402		Bulk Resistors, Pulse resistant, good long term stability	1R..10M, 1%, TCR100	0402	AEC Q200
CRCW0603		Bulk Resistors, Pulse resistant, good long term stability	1R..10M, 1%, TCR100	0603	AEC Q200
CRCW0805		Bulk Resistors, Pulse resistant, good long term stability	1R..10M, 1%, TCR100	0805	AEC Q200
CRCW1206		Bulk Resistors, Pulse resistant, good long term stability	1R..10M, 1%, TCR100	1206	AEC Q200
CRCW1210		Bulk Resistors, Pulse resistant, good long term stability	1R..10M, 1%, TCR100	1210	AEC Q200
CRCW2010		Bulk Resistors, Pulse resistant, good long term stability	1R..10M, 1%, TCR100	2010	AEC Q200
CRCW2512		Bulk Resistors, Pulse resistant, good long term stability	1R..10M, 1%, TCR100	2512	AEC Q200

TVS Diodes

Product Name	Status	Description	Features	Package	Q-Level
SM5S10HE3		High Surge, Low Vf, Low Leakage, High Reliability		DO-218AB	AEC Q101
SM8S10HE3		High Surge, Low Vf, Low Leakage, High Reliability		DO-218AB	AEC Q101

ABS/ESP ECU and Actuator Control : Controller Asics, Filtering

Inductor

Product Name	Status	Description	Features	Package	Q-Level
IHLP-1616AB-1A		Low Profile, High Current, Shielded, Low DCR, High Saturation	0,1uH...2,2uH, Idc=35A...6A	1616	AEC Q200
IHLP-2020CZ-5A		Low Profile, High Current, Shielded, Low DCR, High Saturation	0,047uH...2,2uH, Idc=15A...3A	2020	AEC Q200

ABS/ESP ECU and Actuator Control : EMB - Electro Mechanical Brake, 3-phase Motor Switch

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQD50N04-5m6		N-Channel 60 V (D-S), 175 °C MOSFET, Logic Level	Rdson=9,3mOhm	T0-252 (DPAK)	AEC Q101
SQJ858AEP		P-Channel 40-V (D-S) MOSFET	Rdson=5,0mOhm	TO-263 (D ² PAK)	AEC Q101

ABS/ESP ECU and Actuator Control : EMB - Electro Mechanical Brake, Current Sensing

Shunt

Product Name	Status	Description	Features	Package	Q-Level
WSK-Serie		Power Metal Strip® Resistors, High Power, Low Value, Surface Mount	R001...R5, 1%, TCR75 1W	2010	AEC Q200
WSL-Serie		Power Metal Strip® Resistors, Very High Power (1 W), Low Value (down to 0.001 Ω).	0,02 - 0,05 Ohm 1W	1206	AEC Q200
WSP-Serie		Power Metal Strip® Resistors, High Power, Low Value, Surface Mount	0,001 to 0,500 Ohm 2W	2512	AEC Q200

ABS/ESP ECU and Actuator Control : EMB - Electro Mechanical Brake, PI Filter

Inductors

Product Name	Status	Description	Features	Package	Q-Level
IHLP-2525CZ-5A		Low Profile, High Current, High Transient Current Spike Capable, Shielded, Low DCR	0,56uH...10uH, I _{dc} =12A...4,	2525	AEC Q200
IHLP-4040DZ-5A		Low Profile, High Current, High Transient Current Spike Capable, Shielded, Low DCR	0,19uH...10uH, I _{dc} =90A...12A	4040	AEC Q200
IHLP-5050FD-5A		Low Profile, High Current, High Transient Current Spike Capable, Shielded, Low DCR	0,1uH...10uH, I _{dc} =120A...15,5A	5050	AEC Q200

ABS/ESP ECU and Actuator Control : EMB - Electro Mechanical Brake, Reverse Battery Protection

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQD50P04-09L		N-Channel 40-V (D-S) 175°C MOSFET	Rdson=3,5mOhm	TO-263 (D ² PAK)	AEC Q101
SQJ463EP		N-Channel 60 V (D-S), 175 °C MOSFET, Logic Level	Rdson=9,3mOhm	T0-252 (DPAK)	AEC Q101

ABS/ESP ECU and Actuator Control : EPB - Electrical Park Brake, 3-phase Motor Switch

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQD50N04-5m6		N-Channel 60 V (D-S), 175 °C MOSFET, Logic Level	Rdson=9,3mOhm	T0-252 (DPAK)	AEC Q101
SQJ858AEP		N-Channel 40-V (D-S), 175 °C MOSFET	Rdson=7,4mOhm	T0-252 (DPAK)	AEC Q101

ABS/ESP ECU and Actuator Control : EPB - Electrical Park Brake, Current Sensing

Shunt

Product Name	Status	Description	Features	Package	Q-Level
WSL2512		Power Metal Strip® Resistors, High Power, Low Value, Surface Mount	0,001 to 0,500 Ohm	SMD2512	AEC Q200
WSLP2010		Power Metal Strip® Resistors, Very High Power (1 W), Low Value (down to 0.001 Ω), Surface Mount	0,02 - 0,05 Ohm	SMD1206	AEC Q200

ABS/ESP ECU and Actuator Control : EPB - Electrical Park Brake, Freewheeling Diode

Ultrafast Diodes

Product Name	Status	Description	Features	Package	Q-Level
ES1PC		Ultrafast Avalanche SMD Rectifier	$V_f=1,4V$, $I_r=1,0\mu A$, $T_j=150^\circ C$, $T_{rr}=75ns$	SMA	AEC Q101

ABS/ESP ECU and Actuator Control : EPB - Electrical Park Brake, PI Filter

Inductor

Product Name	Status	Description	Features	Package	Q-Level
IHLP-2525CZ-5A		Low Profile, High Current, Shielded, Low DCR, High Saturation	0,56uH...10uH, Idc=12A...4,5A	2525	AEC Q200
IHLP-4040DZ-5A		Low Profile, High Current, Shielded, Low DCR, High Saturation	0.47u...47uH,	4040	AEC Q200
IHLP-5050FD-5A		Low Profile, High Current, Shielded, Low DCR, High Saturation	0.22...22μH,	5050	AEC Q200

ABS/ESP ECU and Actuator Control : Power Supply, EMI Filtering

Inductors

Product Name	Status	Description	Features	Package	Q-Level
IHLP-2525CZ-5A		Low Profile, High Current, High Transient Current Spike Capable, Shielded, Low DCR	0,56uH...10uH, Idc=12A...4,5A	2525	AEC Q200
IHLP-4040DZ-5A		Low Profile, High Current, High Transient Current Spike Capable, Shielded, Low DCR	0,19uH...10uH, Idc=90A...12A	4040	AEC Q200
IHLP-5050FD-5A		Low Profile, High Current, High Transient Current Spike Capable, Shielded, Low DCR	0,1uH...10uH, Idc=120A...15,5A	5050	AEC Q200

ABS/ESP ECU and Actuator Control : Power Supply, Reverse Polarity Protection

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQD50P04-09L		P-Ch, Tj=175°C Power MOSFET, Low Leakage Current	P-Ch,Rds on =0,06Ohm	TO-252 (DPAK)	AEC-Q101
SQJ463EP		Fully AEC Q-101 Qualified, Low Thermal Resistance, Fast Switching	P-Ch,Rds on =0,065Ohm	PPAK1212-8	AEC Q101

Schottky Diodes

Product Name	Status	Description	Features	Package	Q-Level
V10D45C		Low Profile, Low Vf, High Current Densit	Vf=0,478V	TO-277A (SMPC)	AEC Q101

TVS Diodes

Product Name	Status	Description	Features	Package	Q-Level
SM5S10HE3		High Surge, Low Vf, Low Leakage, High Reliability, Broad Range of Breakdown Voltages	Vbr=27V, Ifsm=500A	DO-218AB	AEC Q101
SM8S10HE3		High Surge, Low Vf, Low Leakage High Reliability, Broad Range of Breakdown Voltages	Vbr=27V, Ifsm=700A	DO-218AB	AEC Q101

ABS/ESP ECU and Actuator Control : Power Supply, SMPS Buck

Alu Elcaps

Product Name	Status	Description	Features	Package	Q-Level
150CRZ		Aluminum Capacitors SMD (Chip), Very Low Z, Pb-Free	33...2200µF, Life 105°C 5000h	max 12,5x12,5x16	AEC Q200

Ceramic Capacitors

Product Name	Status	Description	Features	Package	Q-Level
VJ...31X RoHS Automotive MLCC		Surface Mount Ceramic Capacitor Solutions for Boardflex Sensitive Applications	100p...1,8uF, 50Vdc...3000Vdc	1206...2225	AEC Q200

Current Sense Shunt Resistors

Product Name	Status	Description	Features	Package	Q-Level
WSK-Serie		Power Metal Strip Shunts, Very Low R-Value, Very Low TCR, Low Thermal EMF	R001...R05, 1%, TCR75 1W	1206	AEC Q200
WSL-Serie		Power Metal Strip Shunts Very Low R-Value, Very Low TCR, Low Thermal EMF	R001...R5, 1%, TCR75 1W	2010	AEC Q200
WSLP-Serie		Power Metal Strip Shunts, Very Low R-Value, Very Low TCR, Low Thermal EMF	R002...R2, 1%, TCR75 0,5W	1206	AEC Q200
WSLT-Serie		Power Metal Strip Shunts, Very Low R-Value, Very Low TCR, Low Thermal EMF	R001...R01 , 1%, TCR75 2W	2512	AEC Q200

Diodes

Product Name	Status	Description	Features	Package	Q-Level
SS3P4LHE3		Low Vf, High Current Density	Vf=0,335V	TO-277A (SMPC)	AEC Q101
V3PAL45		Low Vf, High Current Density	Vf=0,478V	TO-277A (SMPC)	AEC Q101

Inductors

Product Name	Status	Description	Features	Package	Q-Level
IHLP-2525CZ-5A		Low Profile, High Current, Shielded, Low DCR, High Saturation	0,1uH...10uH, Idc=60A...7A	2525	AEC Q200

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQD50N04-5m6		N-Channel 60-V (D-S), 175C MOSFET, Logic Level	N-Ch, 60V, Rds on=0,090Ohm	T0-252 (DPAK)	AEC Q101
SQJ858AEP		N-Channel 60-V (D-S), 175C MOSFET, Logic Level	N-Ch, 60V, Rds on=0,009Ohm	T0-252 (DPAK)	AEC Q101

Thick Film Resistors

Product Name	Status	Description	Features	Package	Q-Level
CRCW-HP		Sense Resistors, Pulse resistant, good long term stability, Jumper	R10...R91, 5%, TCR200	2512	AEC Q200
CRCW-IF		Sense Resistors, Pulse resistant, good long term stability, Jumper	R10...R91, 5%, TCR200	2010	AEC Q200

ABS/ESP ECU and Actuator Control : Power Supply, Transient Protection

TVS Diodes

Product Name	Status	Description	Features	Package	Q-Level
SM5S10HE3		High Surge, Low Vf, Low Leakage, High Reliability	Vbr=27V, Ifsm=500A	DO-218AB	AEC Q101
SM8S10HE3		High Surge, Low Vf, Low Leakage, High Reliability	Vbr=27V, Ifsm=700A	DO-218AB	AEC Q101

ABS/ESP ECU and Actuator Control : Signal Conditioning for Analogue Sensors, Acceleration Sensing

Resistors

Product Name	Status	Description	Features	Package	Q-Level
TNPW e3		High Stability Thin Film Flat Chip Resistor	10 - 8,87M Ohm, +/-0,1%, +/-10ppm/K		AEC Q200

ABS/ESP ECU and Actuator Control : Signal Conditioning for Analogue Sensors, Brake Fluid Level Sensing

Wire Wound Resistor

Product Name	Status	Description	Features	Package	Q-Level
WSZ6720		SMD, All welded construction, Non flammable cement coating	1R...3,3kR , TCR <180ppm	17mmx4.8mm	AEC Q200

ABS/ESP ECU and Actuator Control : Signal Conditioning for Analogue Sensors, Brake Pad Wear Indication

Wire Wound Resistor

Product Name	Status	Description	Features	Package	Q-Level
WSZ6720		SMD, All welded construction, Non flammable cement coating	1R...3,3kR , TCR <180ppm	17mmx4.8mm	AEC Q200

ABS/ESP ECU and Actuator Control : Signal Conditioning for Analogue Sensors, Brake Pedal Position

Sensing

Thin film Resistor Arrays

Product Name	Status	Description	Features	Package	Q-Level
ACAS 0612		Flat Chip Resistor Array	100 - 221k Ohm, +-25ppm/K +-0,25%		AEC Q200

ABS/ESP ECU and Actuator Control : Signal Conditioning for Analogue Sensors, Steering Angle Sensing

Opto

Product Name	Status	Description	Features	Package	Q-Level
TCUT1350X01		Subminiature Dual Channel Transmissive Optical Sensor with Phototransistor Outputs			AEC Q101

ABS/ESP ECU and Actuator Control : Signal Conditioning for Analogue Sensors, Temperature Compensation

and Sensing

Thin film Resistor Arrays

Product Name	Status	Description	Features	Package	Q-Level
ACAC 0612		Flat Chip Resistor Array	100 - 221k Ohm, +-25ppm/K +-0,25%		AEC Q200

ABS/ESP ECU and Actuator Control : Signal Conditioning for Analogue Sensors, Wheel Speed Sensing

Thin film Resistor Arrays

Product Name	Status	Description	Features	Package	Q-Level
ACAC 0612		Flat Chip Resistor Array	100 - 221k Ohm, +-25ppm/K +-0,25%		AEC Q200

ABS/ESP ECU and Actuator Control : Solenoid Valve Driver, Avalanche Rectifier

Ultrafast Diodes

Product Name	Status	Description	Features	Package	Q-Level
BYG20HE3		Ultrafast Avalanche SMD Rectifier	$V_f=1,4V$, $I_r=1,0\mu A$, $T_j=150^\circ C$, $T_{rr}=75ns$	SMA	AEC Q101
BYG22HE3		Ultrafast Avalanche SMD Rectifier	$V_f=1,1V$, $I_r=1,0\mu A$, $T_j=150^\circ C$, $T_{rr}=25ns$	SMA	AEC Q101

ABS/ESP ECU and Actuator Control : Solenoid Valve Driver, Current Sensing

Shunt

Product Name	Status	Description	Features	Package	Q-Level
WSLP2512		Power Metal Strip Shunts, Very Low R-Value, Very Low TCR, Low Thermal EMF	R001...R5, 1%, TCR75	2010	AEC Q200

ABS/ESP ECU and Actuator Control : Solenoid Valve Driver, Filtering

Inductors

Product Name	Status	Description	Features	Package	Q-Level
IHLP-2525CZ-5A		Low Profile, High Current, High Transient Current Spike Capable, Shielded, Low DCR	0,1uH...10uH, Idc=120A...15,5A	5050	AEC Q200
IHLP-4040DZ-5A		Low Profile, High Current, High Transient Current Spike Capable Shielded, Low DCR	0,19uH...10uH, Idc=90A...12A	4040	AEC Q200

ABS/ESP ECU and Actuator Control : Solenoid Valve Driver, Freewheeling Diodes

Ultrafast Diodes

Product Name	Status	Description	Features	Package	Q-Level
MSS1P4		Surface Mount Ultrafast Plastic Rectifier	$V_f=0,92V$, $I_r=5,0...100\mu A$ $T_J=150^\circ C$ $t_{rr}=15ns$	SMA	AEC Q101
SS1P4		Surface Mount Glass Passivated Rectifier	$V_f=1,1V$, $I_r=1,0\mu A...5,0\mu A$, $T_J=150^\circ C$; $t_{rr}=1,8\mu s$	SMA	AEC Q101

ABS/ESP ECU and Actuator Control : Solenoid Valve Driver, High Side Switch

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQD50N04-5m6		N-Channel 100-V (D-S) MOSFET	N-Ch, 100V, Rds on=0,025 Ohm	T0-252 (DPAK)	AEC Q101
SQJ858AEP		N-Channel 60-V (D-S) 175C MOSFET, Logic Level		DPAK	AEC Q101

ABS/ESP ECU and Actuator Control : Solenoid Valve Driver, Low Side Switch

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQD50N04-5m6		N-Channel 80-V (D-S) MOSFET	N-Ch, 80V, Rds on=0,016 Ohm	T0-252 (DPAK)	AEC Q101
SQJ858AEP		P-Channel 60-V (D-S) MOSFET		DPAK	AEC Q101

ABS/ESP ECU and Actuator Control : Wheel Control Unit, Backup Battery Control

Shunt

Product Name	Status	Description	Features	Package	Q-Level
WSL2512		Power Metal Strip® Resistors, High Power, Low Value, Surface Mount	0,001 to 0,500 Ohm	SMD2512	AEC Q200

ABS/ESP ECU and Actuator Control : Wheel Control Unit, Intelligent Energy Manag. for Rear- and Front WCU

Shunt

Product Name	Status	Description	Features	Package	Q-Level
WSLP2010		Power Metal Strip® Resistors, High Power, Low Value, Surface Mount	0,001 to 0,500 Ohm	SMD2512	AEC Q200

ABS/ESP ECU and Actuator Control : Wheel Control Unit, PI-Filter

Inductor

Product Name	Status	Description	Features	Package	Q-Level
IHLP-5050FD-5A		Low Profile, High Current, High Transient Current Spike Capable, Shielded, Low DCR	0,1uH...10uH, Idc=43A...7A	5050	AEC Q200