



Expertise Applied | Answers Delivered

Connectivity and Autonomous Driving



Automotive

Users must independently evaluate the suitability of and test each product selected for their own specific applications. It is the User's sole responsibility to determine fitness for a particular system or use based on their own performance criteria, conditions, specific application, compatibility with other parts, and environmental conditions. Users must independently provide appropriate design and operating safeguards to minimize any risks associated with their applications and products. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [littelfuse.com/disclaimer-electronics](https://www.littelfuse.com/disclaimer-electronics).

Advanced electronics are driving innovation in next-gen automotive applications

In-vehicle infotainment & communication

- Smart infotainment
- Navigation
- Multipurpose camera
- Telematics box



Domain Control Unit

- Domain controller architecture
- Zonal controller architecture



Advanced driver assistance system

- V2X Communication
- Radar
- eCall
- Sensor fusion



xEV(Hybrid/ Battery electric) & power train

- Battery management system
- Onboard Charger
- Traction motor inverter
- DC/DC converter



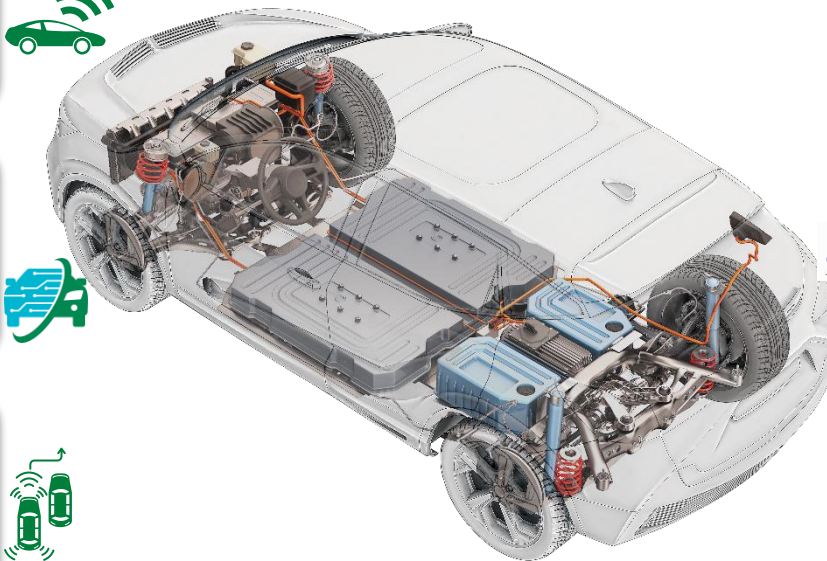
Network systems & body electronics

- CAN, LIN, USB
- LIN Bus
- Keyless entry
- Lighting control



Chassis & safety system

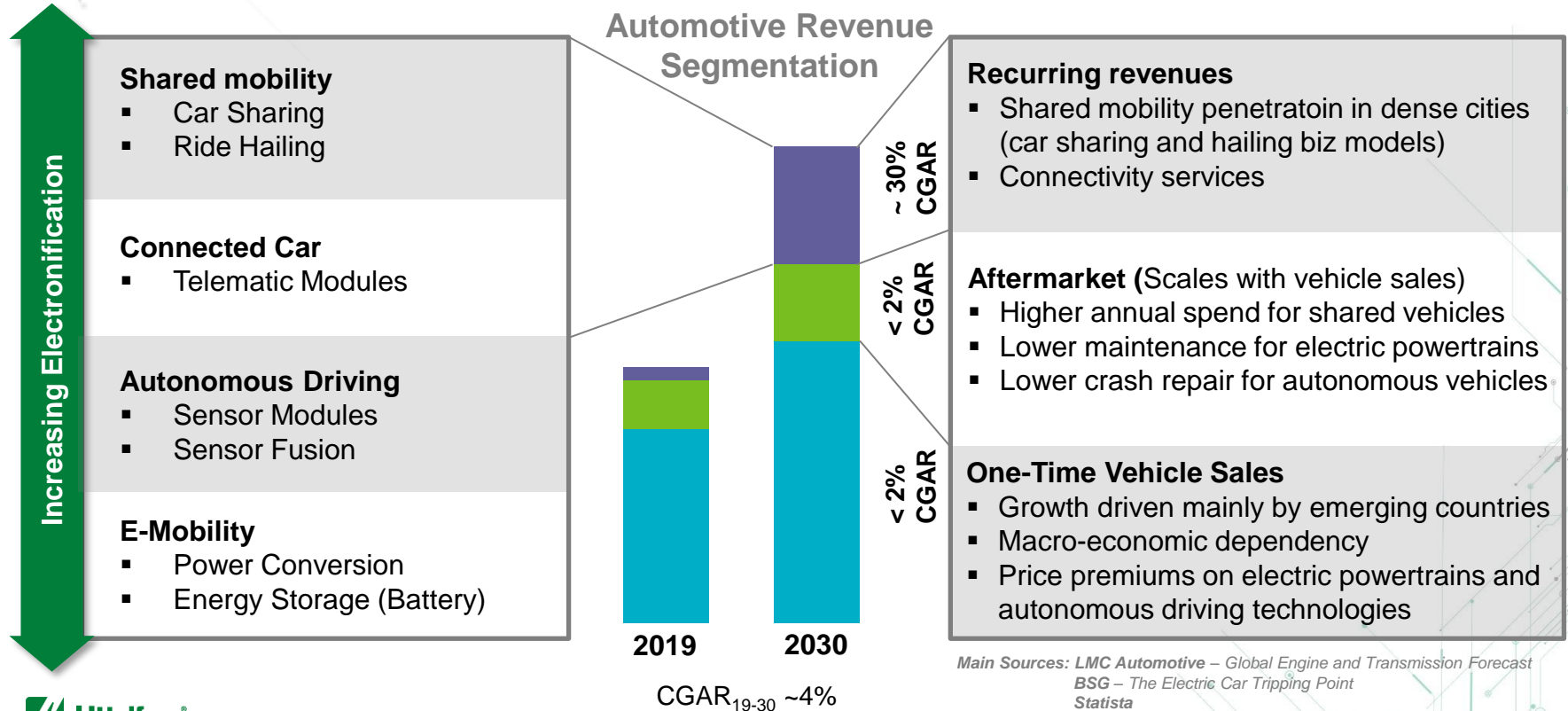
- Seat belt safety
- Tire pressure monitoring
- Battery disconnect
- Fuel level detection



Increase need of circuit protection, power control and sense products to ensure safety and reliability

Automotive mega trends and market drivers

Connectivity is essential to Autonomous driving will change the driving experience radically



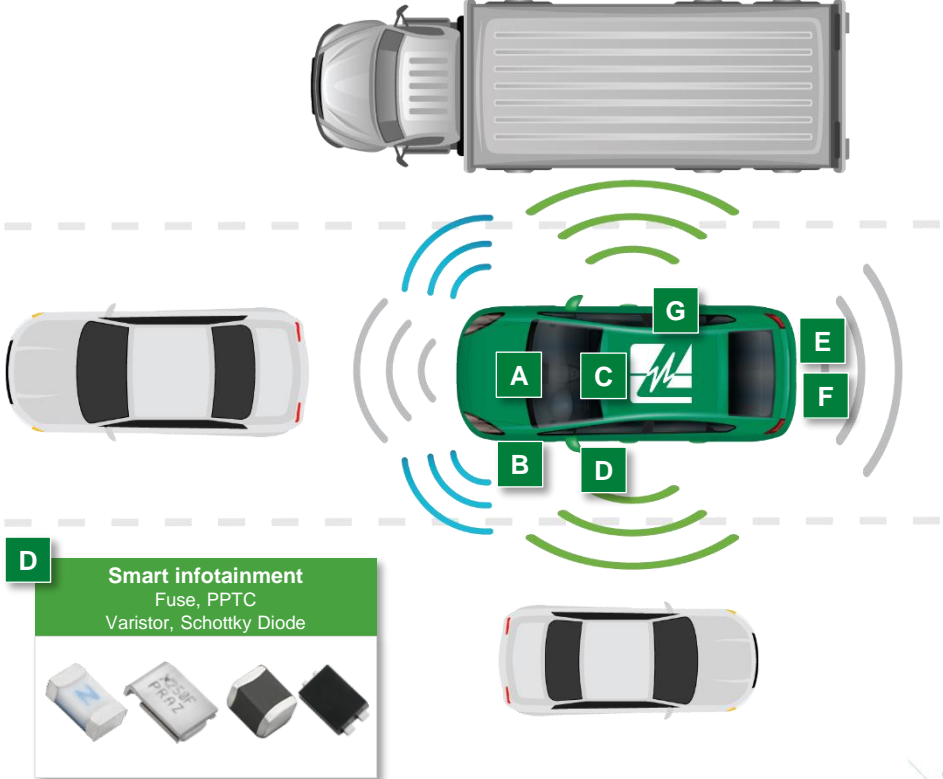
Main Sources: LMC Automotive – Global Engine and Transmission Forecast
 BSG – The Electric Car Tripping Point
 Statista
 Own estimations

Littelfuse solutions for connectivity and ADAS

A **Multi-purpose camera**
Fuse, PPTC
Varistor, TVS Diode

B **V2X communication**
Fuse, PPTC,
Polymer ESD, Schottky Diode

C **E-call**
Fuse, PPTC
Varistor, TVS Diode



D **Smart infotainment**
Fuse, PPTC
Varistor, Schottky Diode

E **Sensor fusion**
TVS Diode, Diode Array
Schottky Diode

F **Radar**
Fuse, PPTC
Diode Array, Polymer ESD

G **Domain Controller**
Fuse, PPTC,
TVS Diode, MOV

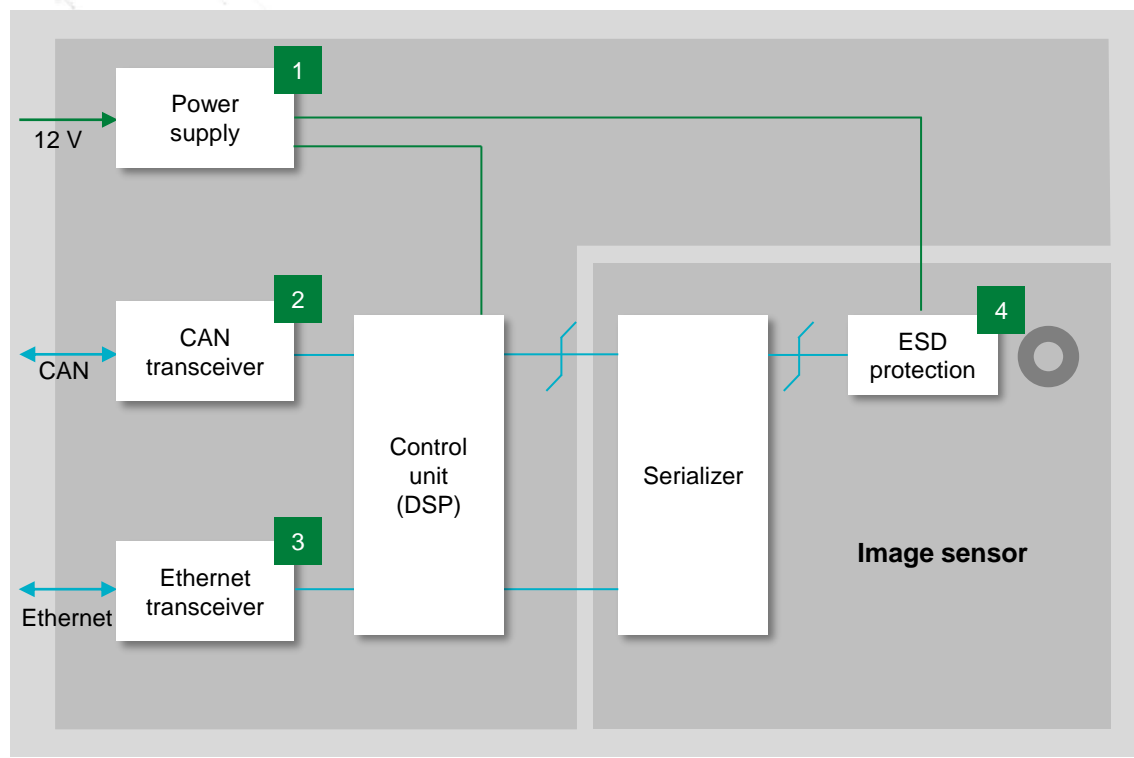


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Multi-purpose camera

Click the product series in the table below for more info

Multi-purpose camera block diagram



	Technology	Series
1	Fuse	437A , 438A , 440A
	PPTC	ASMD , miniASMD
	TVS Diode	SZ1SMB , SLD8S , SZSMF4L
	Varistor	AURL , MLA Auto
	Schottky Diode	DST
2	TVS Diode Array	AQ24COM-02
3	Polymer ESD Suppressor, TVS Diode Array	AXGD , AQ3102 , AQ3400
4	TVS Diode Array	AQ3045 , RF2943 , AQ3118E/AQ3130E

Legend:
 Power
 Data



Click the product series
in the table below for more info

Benefits of Littelfuse products in multi-purpose camera

	Technology	Function in application	Product series	Benefits	Features
1	Fuse	Short circuit protection	437A , 438A , 440A	Excellent temperature stability and performance reliability; compact design; high I_t values ensure high inrush current withstand capability	Tested to new AECQ specification; fast response to fault current; surface mount device
	PPTC		ASMD , miniASMD	Meets automotive industry standards; compact design	AEC-Q200 qualified; Small footprint 2029/1812 size
	TVS Diode	ISO 16750 /ISO7637-2 protection	SZ1SMB , SLD8S , SZSMF4L	Excellent clamping capability; meets automotive industry standards; fast response time; compact design	AEC-Q101 qualified; meets ISO 16750 /ISO7637-2 and IEC standards for ESD protection and ISO for load dump protection
	Varistor	Load dump protection	AUML , MLA Auto	Offers rugged protection and excellent transient energy absorption; compact design	AEC-Q200; load dump energy rated per SAE Specification J1113; surface mount device
	Schottky Diode	Reverse polarity protection	DST	Enables the design of high-efficiency power supplies by eliminating reverse polarity condition	Ultra-low V_F ; high temperature capability; low leakage; low forward voltage drop to 100 V and 10 A
2	TVS Diode Array	CAN bus ESD protection	AQ24COM-02	Ensures reliability of the equipment without performance degradation	AEC-Q101 qualified; meets ESD protection levels specified under IEC 61000-4-2, ISO10605; low leakage current and clamping voltage
3	Polymer ESD Suppressor, TVS Diode Array	Designed to provide protection against ESD, CDE ,EFT, and lightning induced surges for high-speed data lines	AXGD , AQ3102 , AQ3400	Maintains signal integrity by minimizing signal distortion; reduces voltage overshoot and provides a simplified PCB design	AEC-Q qualified; low capacitance (<0.1 pF, 1 pF, 2.5 pF respectively); low leakage current; small form factor
4	TVS Diode Array	High-speed ESD protection	AQ3045 , RF2943 , AQ3118E/AQ3130E	Back-to-back configuration allows for usage in RF circuits	AEC-Q101 qualified; low capacitance 0.35 pF; low leakage current (100 nA); small form factor (SOD882)



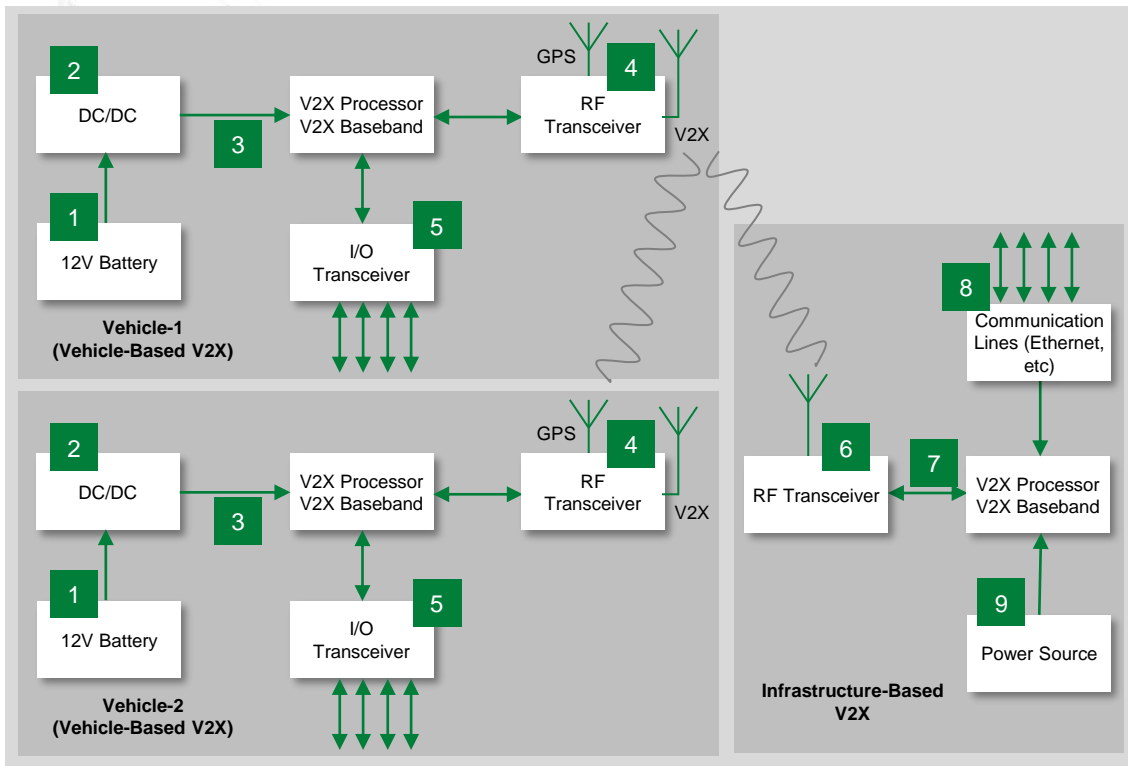
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V2X communication



Click the product series in the table below for more info

V2X communication block diagram



	Technology	Series
1	Fuse	437A , 438A , 440A
2	TVS Diode	SZ1SMB , SLD8S , SZSMF4L
	PPTC	ASMD , miniASMD
3	Schottky Diode	DST
	PPTC	ASMD , miniASMD
4	TVS Diode	SZ1SMA , SZ1SMB
	Polymer ESD	AXGD
5	TVS Diode Array	AQ3400 , AQ2555
6	Polymer ESD	AXGD
7	Fuse	437A , 438A , 440A
	TVS Diode	SZ1SMA , SZ1SMB
8	TVS Diode Array	AQ3400 , AQ2555
9	TVS Diode	SZ1SMA , SZ1SMB



Click the product series
in the table below for more info

Benefits of Littelfuse products in V2X communication

	Technology	Function in application	Product series	Benefits	Features
1	Fuse	Short Circuit Protection	437A , 438A , 440A	Excellent temperature stability and performance reliability. compact design	Tested to new AECQ specification; fast response to fault current; surface mount device
2	TVS Diode	Overvoltage protection	SZ1SMB , SLD8S , SZSMF4L	Excellent clamping capability; fast response time; compact design	AEC-Q101 qualified; meets IEC standards for ESD protection and ISO16750/ISO7637-2
	PPTC	Overcurrent protection	ASMD , miniASMD	Meets automotive standards; compact design	AEC-Q200 qualified; Small footprint 2029/1812 size
3	Schottky Diode	Reverse Blocking/ Output Rectification	DST	Enables the design of high-efficiency power supplies by eliminating reverse polarity condition	Ultra-Low V_F ; high temperature capability; low leakage; low forward voltage drop to 100V and 10A
	PPTC	Secondary overcurrent protection	ASMD , miniASMD	Meets automotive standards; compact design	AEC-Q200 qualified; Small footprint 2029 / 1812 size
4	TVS Diode	Secondary overvoltage protection	SZ1SMA , SZ1SMB	Excellent clamping capability; fast response time; compact design	AEC-Q101 qualified; meets IEC standards for ESD protection and ISO for load dump protection
	Polymer ESD	ESD protection for GPS & RF antenna	AXGD	Preserve signal integrity; withstand high levels of ESD	AEC-Q200 Qualified; ultra-low capacitance; low leakage current
5	TVS Diode Array	ESD protection for high-speed IO ports (Ethernet, HDBaseT)	AQ3400 , AQ2555	Package optimized for high-speed data line routing; minimizes signal distortion	AEC-Q qualified; low capacitance; low leakage current; small form factor μ DFN
6	Polymer ESD	ESD protection for RF antenna	AXGD	Preserve signal integrity; withstand high levels of ESD	AEC-Q200 qualified; ultra-low capacitance; low leakage current
7	Fuse	To protection baseband processor from short circuit	437A , 438A , 440A	Excellent temperature stability and performance reliability. compact design;	Tested to new AEC-Q specification; fast response to fault current; surface mount device
	TVS Diode	To protection baseband processor from overvoltage	SZ1SMA , SZ1SMB	Excellent clamping capability; fast response time; compact design	AEC-Q101 qualified; meets IEC standards for ESD protection and ISO for load dump protection
8	TVS Diode Array	ESD protection against high-speed data lines on the V2X infrastructure side	AQ3400 , AQ2555	Package optimized for high-speed data line routing; minimizes signal distortion	AEC-Q qualified; low capacitance; low leakage current; small form factor μ DFN
9	TVS Diode	Overvoltage protection for power supply on the V2X infrastructure side	SZ1SMA , SZ1SMB	Excellent clamping capability; fast response time; compact design	AEC-Q101 qualified; meets IEC standards for ESD protection and ISO for load dump protection

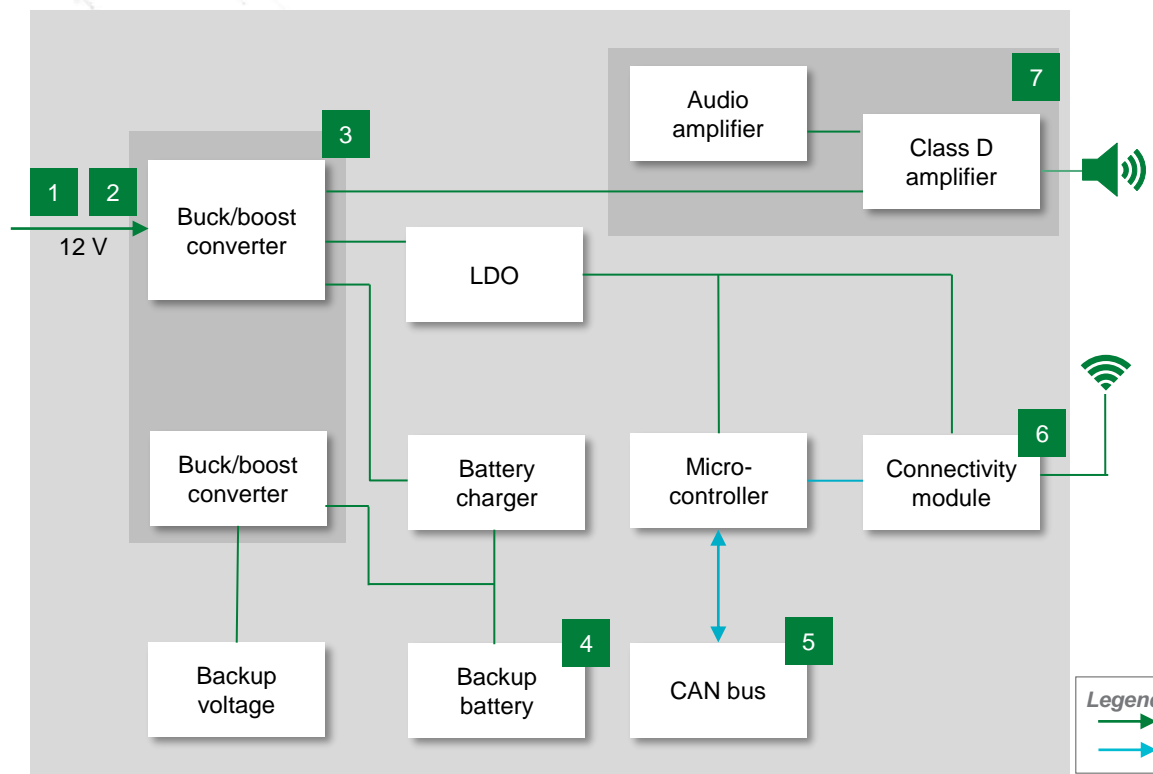


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eCall

Click the product series in the table below for more info

Emergency call (eCall) block diagram



	Technology	Series
1	SMD Fuse	437A , 438A , 440A , 501A
2	TVS Diode	SLD8S , SZ1SMA , SZ1SMB , SZSMF4L
	Varistor	AUML , MLA Auto
3	Schottky Diode	DST
4	PPTC	ASMD , miniASMD , Battery Strap
5	TVS Diode Array	AQ24COM-02
6	Polymer ESD Suppressor, TVS Diode Array	AXGD , AQ3118E/AQ3130E
7	TVS Diode Array	AQ1005 , AQ1205

Legend:
 Power
 Data



Click the product series in the table below for more info

Benefits of Littelfuse products in eCall system

	Technology	Function in application	Product series	Benefits	Features
1	SMD Fuse	Short circuit protection	437A , 438A , 440A , 501A	Excellent temperature stability and performance reliability; compact design	Tested to new AECQ specification; fast response to fault current; surface mount device
2	TVS Diode	Overvoltage protection	SLD8S , SZ1SMA , SZ1SMB , SZSMF4L	Excellent clamping capability; fast response time; compact design	AEC-Q101 qualified; meets IEC standards for ESD protection and ISO for load dump protection; ISO16750/ISO7637-2
	Varistor		AUML , MLA Auto	Offers rugged protection and excellent transient energy absorption; compact design	AEC-Q200; load dump energy rated per SAE Specification J1113; surface mount device
3	Schottky Diode	Reverse blocking/output rectification	DST	Enables the design of high-efficiency power supplies by eliminating reverse polarity condition	Ultra-Low V_F ; high temperature capability; low leakage; low forward voltage drop to 100V and 10A
4	PPTC	Overcurrent protection for battery	ASMD , miniASMD , Battery Strap	Meets automotive standards; compact design	AEC-Q200 qualified; small footprint 2029/1812 size
5	TVS Diode Array	CAN Bus ESD protection	AQ24COM-02	Ensures reliability of the equipment without performance degradation	AEC-Q101 qualified; meets ESD protection levels specified under IEC 61000-4-2, ISO10605; low leakage current and clamping voltage
6	Polymer ESD Suppressor, TVS Diode Array	Designed to provide protection against ESD, CDE, EFT, and lightning induced surges for high-speed data lines and antenna	AXGD , AQ3118E/AQ3130E	Maintains signal integrity by minimizing signal distortion; reduces voltage overshoot and provides a simplified PCB design	AEC-Q qualified; low capacitance; low leakage current; small form factor
7	TVS Diode Array	ESD protection for audio amplifier	AQ1005 , AQ1205	Clamp transient to a safe level preventing catastrophic failure; compact design	Low capacitance 30 pF; leakage current (0.1 μ A); small form factor SOD882



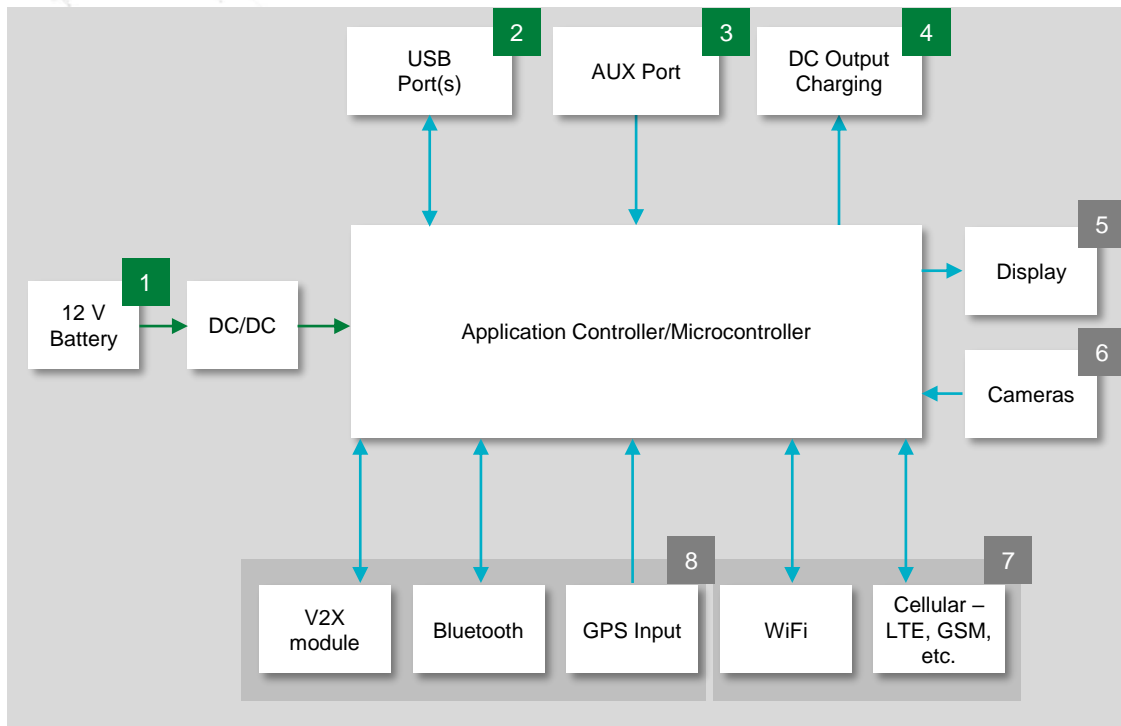
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Smart infotainment



Click the product series in the table below for more info

Smart infotainment block diagram



Legend:
 Power
 Data

	Technology	Series
1	Fuse	437A , 440A , 441A
	PPTC	ASMD , miniASMD
	TVS Diode	SZ1SMB , SLD8S , SZSMF4L
	Varistor	AUML , MLA Auto
	Schottky Diode	DST
2	PPTC	ASMD , miniASMD
	TVS Diode Array	AQ3400 , AQ3102
	TVS Diode Array	AQ1005 , AQ1205
	Varistor	MLA Auto
3	TVS Diode Array	AQ1005
	Varistor	MLA Auto
4	Fuse	437A , 440A , 441A
	TVS Diode	SZ1SMB , SLD8S , SZSMF4L
	Varistor	AUML , MLA Auto



Click the product series
in the table below for more info

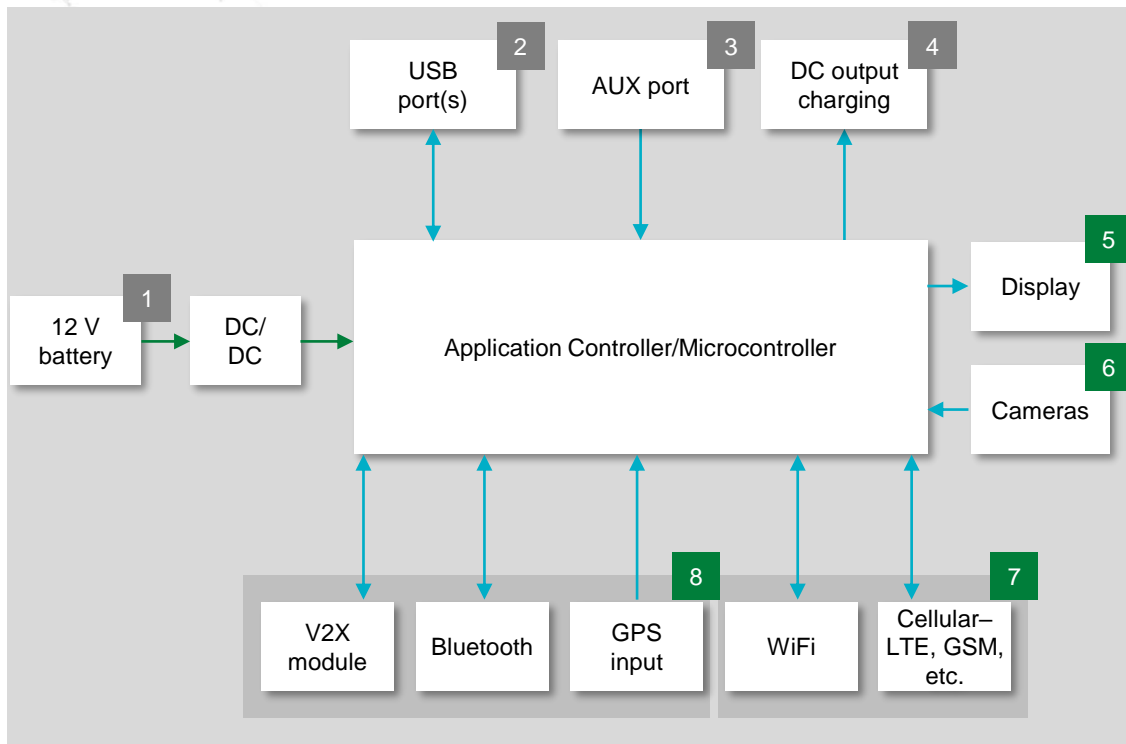
Benefits of Littelfuse components in infotainment

	Technology	Function in application	Product series	Benefits	Features
1	Fuse	Short circuit protection	437A , 440A , 441A	Excellent temperature stability and performance reliability; compact design	Tested to new AECQ specification; fast response to fault current; surface mount device
	PPTC		ASMD , miniASMD	Meets automotive standards; compact design	AEC-Q200 qualified; Small footprint 2029/1812 size
	TVS Diode	Load dump protection	SZ1SMB , SLD8S , SZSMF4L	Excellent clamping capability; fast response time; compact design	AEC-Q101 qualified; meets IEC standards for ESD protection and ISO for load dump protection; ISO 16750 /ISO7637-2
	Varistor		AUML , MLA Auto	Offers rugged protection and excellent transient energy absorption; compact design	AEC-Q200; load dump energy rated per SAE Specification J1113; surface mount device
	Schottky Diode	Reverse blocking/output rectification	DST	Enables the design of high-efficiency power supplies by eliminating reverse polarity condition	Ultra-low V_F ; high temperature capability; low leakage; low forward voltage drop to 100 V & 10 A
2	PPTC	Protects 5 VDC power supply from over current and over temperature	ASMD , miniASMD	Offers fast response to over current events; suitable for compact portable devices;	Ultra-low internal resistance; higher current holding in small SMD package
	TVS Diode Array	Protection of data lines against ESD	AQ3400 , AQ3102 , AQ1005 , AQ1205	Clamp transient to a safe level preventing catastrophic failure; compact design	Low capacitance 30 pF and leakage current (0.1 μ A); small form factor SOD882
	Varistor		MLA Auto	Provides design flexibility using discrete single-channel devices	AEC-Q200 compliant; standard low capacitance
3	TVS Diode Array	Protection of Aux port against ESD	AQ1005	Clamp transient to a safe level preventing catastrophic failure; compact design	Low capacitance 30 pF and leakage current (0.1 μ A); small form factor SOD882
	Varistor		MLA Auto	Provides design flexibility using discrete single-channel devices	AEC-Q200 compliant; standard low capacitance
4	Fuse	Secondary overcurrent protection on DC charging port	437A , 440A , 441A	Excellent temperature stability and performance reliability; compact design	Tested to new AECQ specification; fast response to fault current; surface mount device
	TVS Diode	Secondary ESD protection	SZ1SMB , SLD8S , SZSMF4L	Excellent clamping capability; fast response time; compact design	AEC-Q101 qualified; meets IEC standards for ESD protection and ISO for load dump protection; ISO 16750 /ISO7637-2
	Varistor		AUML , MLA Auto	Offers rugged protection and excellent transient energy absorption; compact design	AEC-Q200 qualified; load dump energy rated per SAE Specification J1113; surface mount device



Click the product series in the table below for more info

Smart infotainment block diagram contd.



	Technology	Series
5	TVS Diode Array	AQ3045
6	Resettable PTC	ASMD , miniASMD
	TVS Diode Array	AQ1005 , AQ3045
7	Varistor	MLA Auto
	TVS Diode Array	AQ3045 , AQ3118E/AQ3130E
	Polymer ESD Suppressor	AXGD
8	TVS Diode Array	AQ1005 , AQ3118E/AQ3130E
	Varistor	MLA Auto
	Polymer ESD Suppressor	AXGD

Legend:

- Power
- Data



Click the product series
in the table below for more info

Benefits of Littelfuse components in infotainment

	Technology	Function in application	Product series	Benefits	Features
5	TVS Diode Array	ESD protection	AQ3045	Preserve signal integrity; withstand high levels of ESD	AEC-Q101 qualified; low capacitance; low leakage current; small form factor
	Resettable PTC	Overcurrent protection of high-speed data lines in camera	ASMD , miniASMD	Meets automotive industry standards; compact design	AEC-Q200 qualified; Small footprint 2029/1812 size
6	TVS Diode Array	Protection of data lines against ESD	AQ1005 , AQ3045	Clamp transient to a safe level preventing catastrophic failure; compact design	Low capacitance and leakage current; small form factor
	Varistor		MLA Auto	Provides design flexibility using discrete single-channel devices	AEC-Q200 compliant; standard low capacitance
7	TVS Diode Array	ESD protection for antenna, WiFi, and another chipset	AQ3045 , AQ3118E/AQ3130E	Back-to-back configuration allows for usage in RF circuits	AEC-Q101 qualified; low capacitance; low leakage current; small form factor
	Polymer ESD Suppressor		AXGD	Preserve signal integrity; withstand high levels of ESD	AEC-Q200 qualified; ultra-low capacitance; low leakage current
8	TVS Diode Array	ESD protection for Bluetooth, GPS, and V2X modules	AQ1005 , AQ3118E/AQ3130E	Clamp transient to a safe level preventing catastrophic failure; compact design	Low capacitance and leakage current; small form factor
	Varistor		MLA Auto	Provides design flexibility using discrete single-channel devices	AEC-Q200 compliant; standard low capacitance
	Polymer ESD Suppressor		AXGD	Preserve signal integrity; withstand high levels of ESD	AEC-Q200 Qualified; ultra-low capacitance; low leakage current

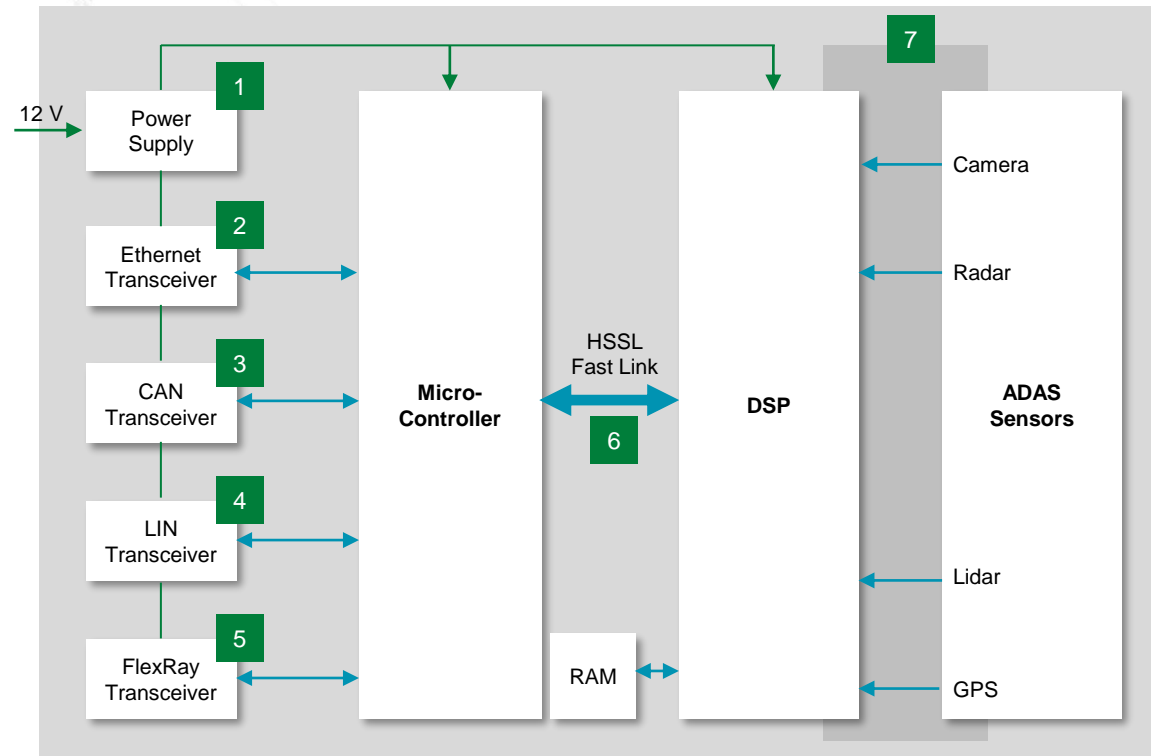


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Sensor fusion

Click the product series in the table below for more info

Sensor fusion block diagram



	Technology	Series
1	TVS Diode	SZ1SMB , SZSMF4L
	Schottky Diode	DST
2	TVS Diode Array	AQ3400 , AQ3102
	Polymer ESD Suppressor	AXGD1
3	TVS Diode Array	AQ24COM-02
4	TVS Diode Array	AQ24COM-01
5	TVS Diode Array	AQ24CANFD
6	TVS Diode Array	AQ3045 , SP3522 , AQ3400 , SESD Discrete , SESD Array
7	TVS Diode Array	AQ3045 , SP3522 , SESD Discrete , SESD Array

Legend:
 Power
 Data



Click the product series
in the table below for more info

Benefits of Littelfuse products in sensor fusion

	Technology	Function in application	Product series	Benefits	Features
1	TVS Diode	Overvoltage protection for the power supply	SZ1SMB , SZSMF4L	Excellent clamping capability; fast response time; compact design; low leakage current and high operating junction temperature	AEC-Q101 qualified; meets IEC standards for ESD protection & ISO 16750 /ISO7637-2
	Schottky Diode	Reverse blocking/output rectification	DST	Enables the design of high-efficiency power supplies by eliminating reverse polarity condition	Ultra-Low V_F ; high temperature capability; low leakage; low forward voltage drop to 100 V & 10 A
2	TVS Diode Array	Designed to provide protection against ESD, CDE ,EFT, and lightning induced surges for high-speed data lines.	AQ3400 , AQ3102	Package optimized for high-speed data line routing; minimizes signal distortion; reduces voltage overshoot and provides a simplified PCB design	AEC-Q qualified; low capacitance (1.0 pF 2.5 pF respectively); low leakage current; small form factor μ DFN
	Polymer ESD Suppressor		AXGD1	Preserve signal integrity; withstand high levels of ESD	AEC-Q200 Qualified; ultra-low capacitance; low leakage current
3	TVS Diode Array	Protects CAN bus against ESD protection	AQ24COM-02	Ensures reliability of the equipment without performance degradation	AEC-Q101 qualified; meets ESD protection levels specified under IEC 61000-4-2, ISO10605; low leakage current and clamping voltage
4	TVS Diode Array	Protect LIN bus against ESD and surge transients	AQ24COM-01	Ensures reliability of the equipment without performance degradation	AEC-Q101 qualified; low clamping voltage and leakage current
5	TVS Diode Array	Protect FlexRay bus against ESD and surge transients	AQ24CANFD	Ensures reliability of the equipment without performance degradation	AEC-Q101 qualified; low clamping voltage and leakage current
6	TVS Diode Array	Protects High speed serial link against ESD and surge transients	AQ3045 , SP3522 , AQ3400 , SESD Discrete , SESD Array	Ensures reliability of the equipment without performance degradation; compact design	AEC-Q101 qualified; low capacitance (0.35 pF) and leakage current (100 nA); small package
7	TVS Diode Array	ESD protection of multiple sensor fusion inputs like GPS, lidar, radar, & camera	AQ3045 , SP3522 , SESD Discrete , SESD Array	Package optimized for high-speed data line routing; minimizes signal distortion	AEC-Q qualified; low capacitance; low leakage current; small form factor (μ DFN)

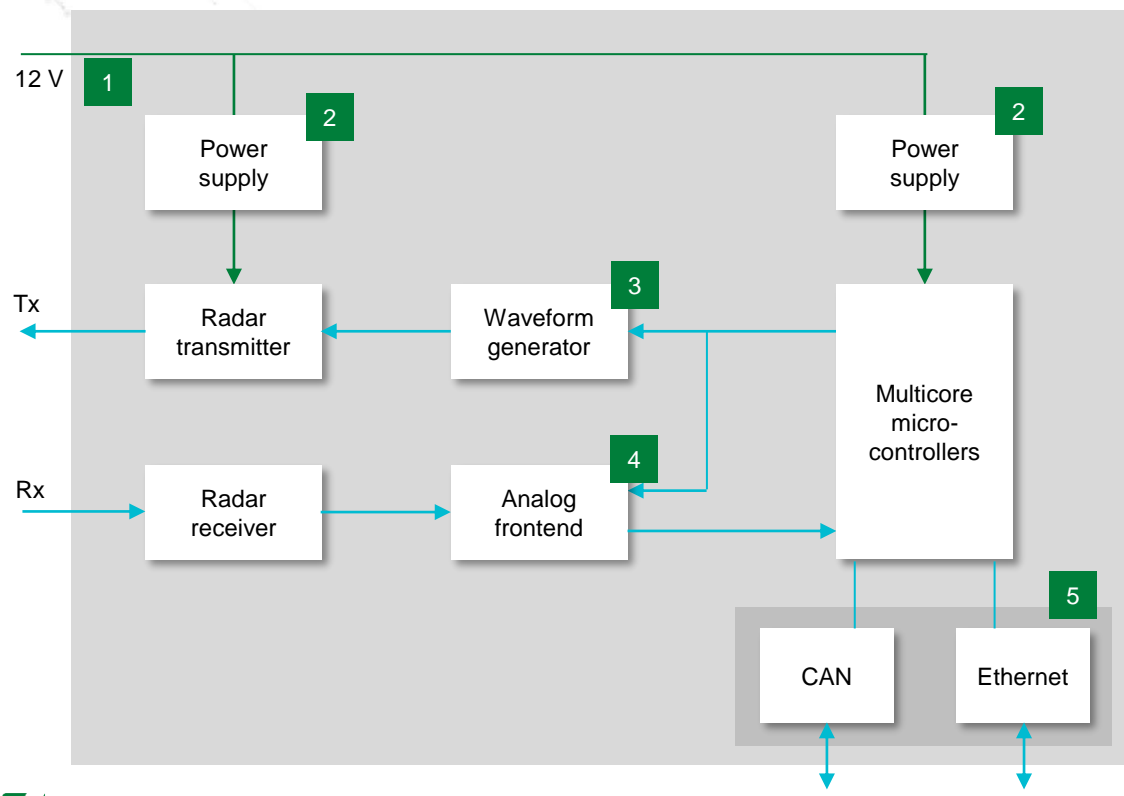


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Radar

Click the product series in the table below for more info

Radar system block diagram



	Technology	Series
1	SMD Fuse	437A, 440A, 441A, 501A, 881
	Resettable PTC	ASMD, miniASMD
	Schottky Diode	DST
2	TVS Diode	SZ1SMB, SLD8S, SZSMF4L
3	Diode Arrays	AQ3045
4	Polymer ESD Suppressor	AXGD, SESD
5	TVS Diode Array	AQ24CANA, AQ24CANFD, AQ24COM-02, AQ3102
	Polymer ESD Suppressor	AXGD1

Legend:
 Power
 Data



Click the product series
in the table below for more info

Benefits of Littelfuse products in radar

	Technology	Function in application	Product series	Benefits	Features
1	SMD Fuse	Short Circuit Protection	437A , 440A , 441A , 501A , 881	Excellent temperature stability and performance reliability; compact design	Tested to new AEC-Q specification; fast response to fault current; surface mount device
	Resettable PTC	Overcurrent protection	ASMD , miniASMD	Meets automotive standards; compact design	AEC-Q200 qualified; Small footprint 2029/1812 size
	Schottky Diode	Reverse Blocking/ Output Rectification	DST	Enables the design of high-efficiency power supplies by eliminating reverse polarity condition	Ultra-Low V_F ; high temperature capability; low leakage; low forward voltage drop to 100 V and 10 A
2	TVS Diode	Overvoltage protection for the power supply	SZ1SMB , SLD8S , SZSMF4L	Excellent clamping capability; fast response time; compact design	AEC-Q101 qualified; meets IEC standards for ESD protection & ISO for load dump protection
3	Diode Arrays	ESD protection for waveform generator	AQ3045	Ensures reliability of the equipment without performance degradation; compact design	AEC-Q101 qualified; low capacitance (0.35 pF) & leakage current (100 nA); small package
4	Polymer ESD Suppressor	ESD protection for analog front end	AXGD , SESD	Maintains signal integrity by minimizing signal distortion; reduces voltage overshoot and provides a simplified PCB design	AEC-Q qualified; low capacitance; low leakage current; small form factor
5	TVS Diode Array	ESD Protection	AQ24CANA , AQ24CANFD , AQ24COM-02 , AQ3102	Ensures reliability of the equipment without performance degradation	AEC-Q101 qualified; meets ESD protection levels specified under IEC 61000-4-2, ISO10605; low leakage current & clamping voltage
	Polymer ESD Suppressor		AXGD1	Maintains signal integrity by minimizing signal distortion; reduces voltage overshoot and provides a simplified PCB design	AEC-Q qualified; low capacitance; low leakage current; small form factor

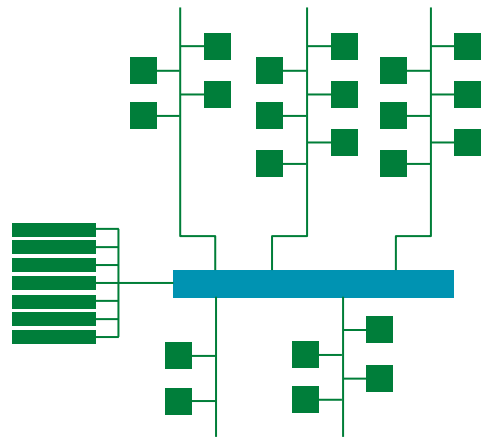


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Domain Controller

In-vehicle functional architecture evolution

Distributed Established



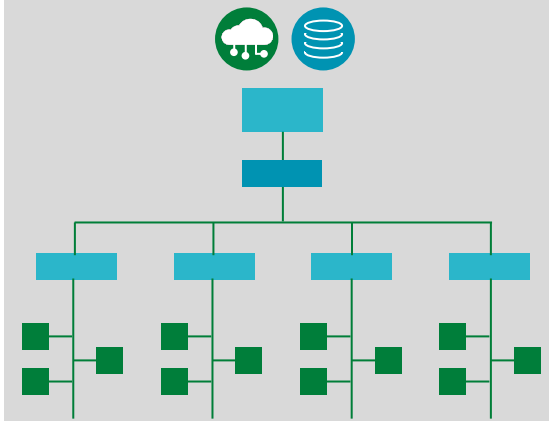
Source: Elektrobit; Roland Berger

Characteristics:

- Distributed control
- Many nodes
- Inter-communication through central gateway

■ Gateway
 ■ DCU
 ■ ECU

Domain-centralized Next generation (~2021-2025)

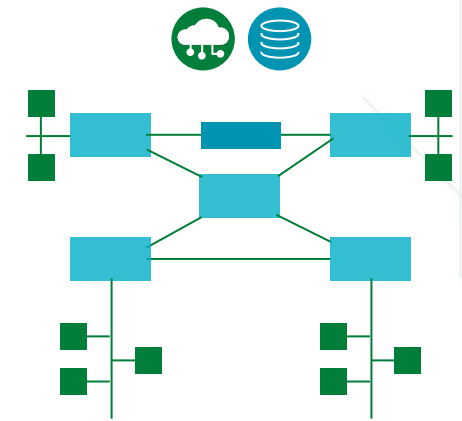


*Distinctive hardware platforms,
limited HW abstraction*

Characteristics:

- Dedicated domains
- Consolidation of functions in DCUs
- Routing between DCUs handled by advanced gateway

Zonal Future (long term)

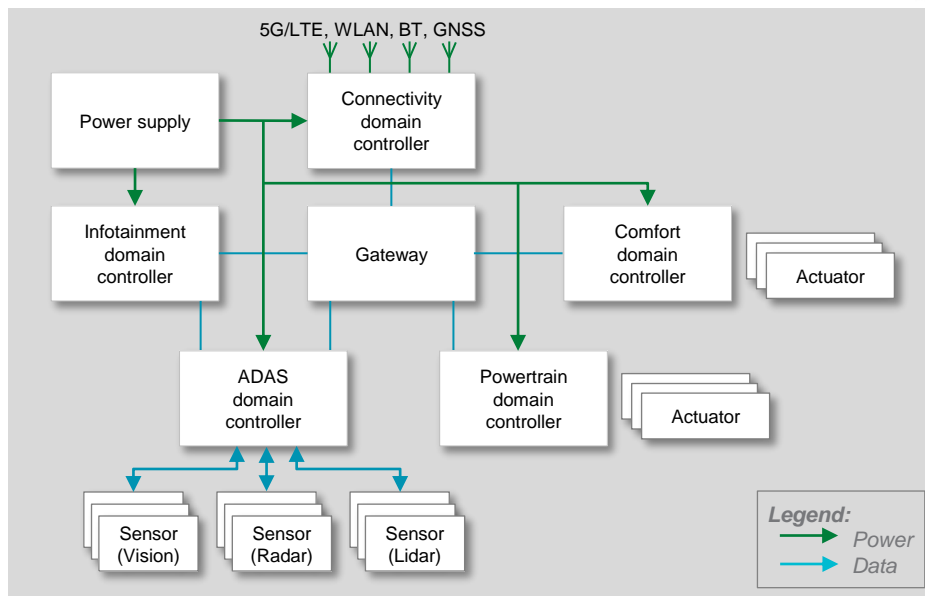


*Single software platform,
full HW abstraction*

Characteristics:

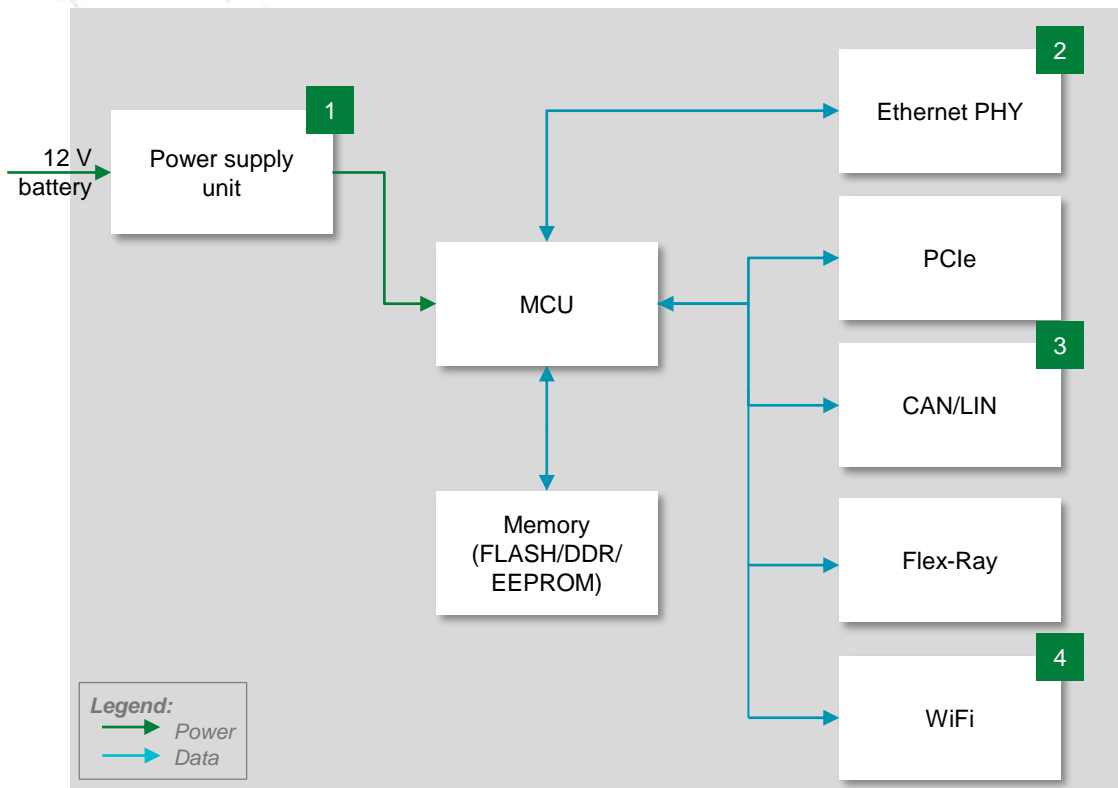
- Virtualized functions executed in high-performance computers
- Zone-dependent sensors / actuator ECUs (domain-independent, scalable)
- Routing complexity handled by advanced gateway

Automotive domain controller architecture



In automotive applications, a domain controller is a computer that controls a set of vehicle functions related to a specific area, or domain. Functional domains that require a domain controller are typically compute-intensive and connect to many input/output (I/O) devices. Examples of relevant domains include active safety, user experience, and body and chassis.

Central and zonal domain controllers block diagram



	Technology	Product series
1	SMD Fuse	437A, 438A, 440A, 501A, 881
	PPTC	ASMD, miniASMD
	TVS Diode	SZ1SMB, SZSMF4L
	MOV / MLV	AUML, MLA Auto
	Schottky Diode	DST
2	Polymer ESD/TVS Diode Array	AXGD, AQ3400, SESD, AQ3102
3	TVS Diode Array	AQ24COM-02/AQ24COM-01
4	Polymer ESD/TVS Diode Array	AXGD, AQ3118E/AQ3130E



Click the product series
in the table below for more info

Benefits of Littelfuse products for domain controller

	Technology	Function in application	Product series	Benefits	Features
1	SMD Fuse	Short Circuit Protection	437A , 438A , 440A , 501A , 881	Excellent temperature stability and performance reliability; compact design; high I ² t values ensure high inrush current withstand capability	Tested to new AECQ specification; fast response to fault current; surface mount device
	PPTC		ASMD , miniASMD	Meets automotive industry standards; compact design	AEC-Q200 qualified; small footprint 2029/1812 size
	TVS Diode	Load Dump Protection	SZ1SMB , SZSMF4L	Excellent clamping capability; meets automotive industry standards; fast response time; compact design	AEC-Q101 qualified; meets IEC standards for ESD protection and ISO 16750 /ISO7637-2
	Varistor		AUML , MLA Auto	Offers rugged protection and excellent transient energy absorption; compact design	AEC-Q200; load dump energy rated per SAE Specification J1113; surface mount device
	Schottky Diode	Reverse Polarity Protection	DST	Enables the design of high-efficiency power supplies by eliminating reverse polarity condition	Ultra-Low V _F ; high temperature capability; low leakage; low forward voltage drop to 100 V and 10 A
2	Polymer ESD/TVS Diode Array	Designed to provide protection against ESD, CDE ,EFT, and lightning induced surges for high-speed data lines.	AXGD , AQ3400 , SESD , AQ3102	Maintains signal integrity by minimizing signal distortion; reduces voltage overshoot and provides a simplified PCB design.	AEC-Q qualified; low capacitance (<0.1 pF, 1 pF, 2.5 pF respectively); low leakage current; small form factor
3	TVS Diode Array	CAN Bus ESD Protection	AQ24COM-02/ AQ24COM-01	Ensures reliability of the equipment without performance degradation	AEC-Q101 qualified; meets ESD protection levels specified under IEC 61000-4-2 , ISO10605; low leakage current & clamping voltage
4	Polymer ESD/TVS Diode Array	Designed to provide protection against ESD, CDE ,EFT, and lightning induced surges for antenna	AXGD , AQ3118E/ AQ3130E	Maintains signal integrity by minimizing signal distortion; reduces voltage overshoot and provides a simplified PCB design	AEC-Q qualified; low capacitance; low leakage current; small form factor

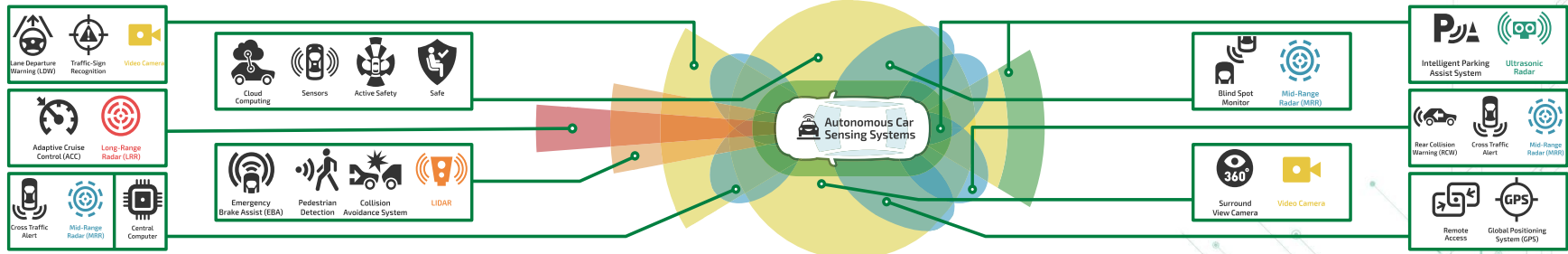
Littelfuse solution for ESD protection

- Each communication interface has a unique set of requirements
 - Voltage Rating
 - ESD Rating
 - Number of channels
 - Polarity
 - Capacitance
- We can offer a large portfolio of automotive qualified ESD protection devices
- Our FAEs can help to find the best fit product for your application

Protocol	Bit Rate/Frequency	Best Fit Product
LIN	<20 kbps	AQ24COM-01FTG
Classic CAN	<1 Mbps	AQ24COM-02HTG
CANFD	<10 Mbps	AQ24CANFD-02HTG
Automotive Audio Bus (A ² B)	50 Mbps	AQ3045-01ETG , AQ3400-02UTG
Broad R-Reach	100 Mbps	AQ3400-02UTG
Automotive Ethernet	100 Mbps, 1 Gbps	AXGD1 , AQ3102-02HTG , AQ3400-02UTG
Automotive HDBaseT	~1 Gbps	AQ2555NUTG
USB 2.0	Data-480 Mbps	AQ3045-01ETG , AQ3400-02UTG
	V _{BUS} – DC Bus	AQ1003-01ETG
USD 3.2 Gen1	Data -5 Gbps	AQ7538-08UTG
	V _{BUS} – DC Bus	AQ1003-01ETG
USB 3.2 Gen1	V _{BUS} – 15 W Options (5 V)	AQ1003-01ETG
	V _{BUS} – 27 W Options (9 V)	AQHV12-01ETG
	V _{BUS} – 45 W Options (15 V)	AQHV15-01ETG
	V _{BUS} – 60 W Options (20 V)	AQHV24-01ETG
Automotive AHD	100 MHz	AQ3045-01ETG , AXGD10402
GPS Antenna	1.5 GHz	AQ3045-01ETG
Bluetooth	2.4 GHz	AQ3045-01ETG
WiFi	2.4 GHz–5.0 GHz	AXGD10402
4G/LTE	1.8 GHz–8.0 GHz	AXGD10402

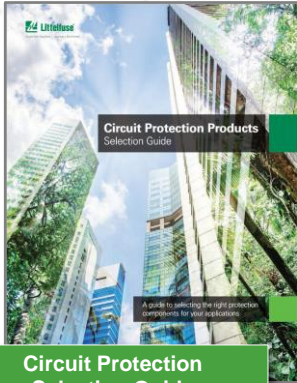
Select ISO standards for automotive applications

Standard	Title	General scope	Littelfuse Technology	Region
ISO7637-2	Road vehicles — Electrical disturbances from conduction and coupling — Part 2: Electrical transient conduction along supply lines only	Specifies test methods and procedures to ensure the compatibility to conducted electrical transients of equipment installed on passenger cars and commercial vehicles fitted with 12 V or 24 V electrical systems. It describes bench tests for both the injection and measurement of transients. It is applicable to all types of road vehicles independent of the propulsion system (for example, spark ignition or diesel engine, electric motor).	TVS Diode	Global
ISO16750-2	Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 2: Electrical loads	This standard applies to electric and electronic systems/components for road vehicles. It describes the potential environmental stresses and specifies tests and requirements recommended for the specific mounting location on/in the road vehicle.	TVS Diode	Global
ISO 10605:2008	Road vehicles – Test methods for electrical disturbances from electrostatic discharge	This standard specifies the electrostatic discharge (ESD) test methods necessary to evaluate electronic modules intended for vehicle use. It includes these sources of ESD: in assembly, by service staff, by vehicle occupants.	Diode Array PulseGuard (AXGD) Multilayer Varistor	Global

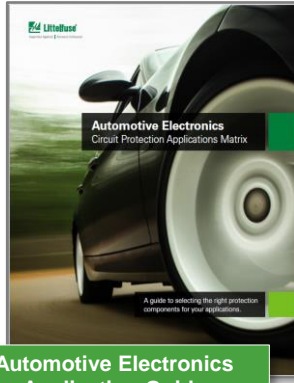


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Circuit Protection Selection Guide



Automotive Electronics Application Guide

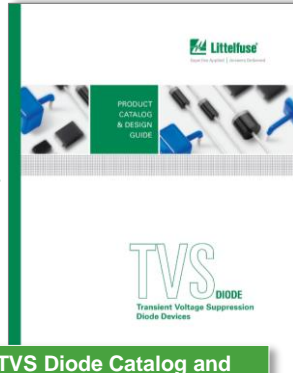


ESD Suppression Selection Guide

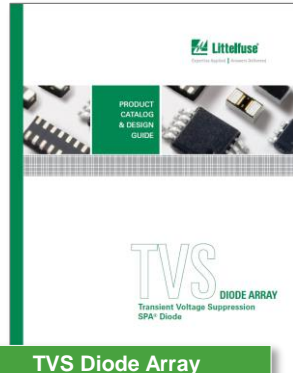


ESD Protection Selection Guide

Click on images for more information



TVS Diode Catalog and Design Guide



TVS Diode Array Selection Guide



Powertrain Spotlight

Local resources supporting our global customers



Legend
 ■ Sales
 ■ R&D
 ■ Manufacturing

Partner for tomorrow's electronic systems

Broad product portfolio

We are an industrial technology manufacturing company empowering a sustainable, connected, and safer world

Application expertise

Our engineers partner directly with customers to help speed up product design and meet unique needs

Global customer service

Our global customer service team will work with you to anticipate your needs and ensure a seamless experience

Compliance & regulatory expertise

We help customers in the design process to account for requirements set by global regulatory authorities

Testing capabilities

We help customers get products to market faster and offer certification testing to global regulatory standards

Global manufacturing

We offer high-quality manufacturing that is committed to the highest quality standards



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