

AEC-Q200 Qualified Fuses NPI Presentation

June 2023

 **Littelfuse®**
Expertise Applied | Answers Delivered

AEC-Q200 qualified cartridge fuses

Problem/Solution

Littelfuse cartridge fuses (526, 527, and 828 Series) are designed and tested to meet the new test requirements as specified in the new AEC-Q200 revision. These robust fuses include a range from 500 to 1000 Vdc rating and provide an excellent interrupting rating. These fuses are ideal for the On-Board Chargers (OBCs) and Power Distribution Units (PDUs) in the latest electric vehicle designs.

Technical resources *(Click on below icons to learn more)*



526
Series Page



527
Series Page



828
Series Page



Tech Info



Benefits

- Reduces customer's qualification time to meet the new requirements of AEC-Q200 standards
- Eliminates the need for mounting accessories or lead-forming processes
- Provides reliable protection in extreme temperature environments



Features

- AEC-Q200 qualified
- Rated for 500 to 1000 Vdc with interrupting rating of 10 kA and 15–60 A nominal current rating in a small package
- End caps with integrated stand-off leads and bolt down
- Compact body size of 6x32 mm, 10x32 mm, and 10x38 mm
- Operating temperature range from -55 °C to 125 °C

Markets/Applications

- On-Board Charger (OBC)
- Power Distribution Unit (PDU)

AEC-Q200 qualified surface mount fuses

Problem/Solution

AEC-Q200 qualified surface mount fuses are specifically tested to cater to circuit protection needs of compact automotive electronics applications. The wide array of SMD fuse portfolio include high current fuse (500 VDC/1500 A) as well as variety of thin film chip fuses which excellent temperature stability, performance reliability, and high I²t values to ensure high inrush current withstand capability.

Technical resources *(Click on below icons to learn more)*



885

[Series Page](#)



881

[Series Page](#)



441A

[Series Page](#)



440A

[Series Page](#)



501A

[Series Page](#)



437A

[Series Page](#)



438A

[Series Page](#)



407A

[Series Page](#)



483A

[Series Page](#)



422A

[Series Page](#)



Expertise Applied | Answers Delivered

Benefits

- Reduces customer's qualification time to meet the new requirements of AEC-Q200 standards
- Helps the customer to optimize design by saving board space
- Suitable for a wide variety of voltage requirements and applications

Features

- AEC-Q200 qualified
- Small footprints
- Wide range of voltage ratings (24 to 500 VDC) and interrupting current rating up to 1500 A
- Operating Temperature from -55 °C to 150 °C
- Ultra high I²t values, Fast acting

Markets/Applications

- Sense line protection
- Battery Management System (BMS)
- High voltage DC/DC converter
- Automotive navigation system
- TFT display
- Cluster



521 series AEC-Q200 qualified PICO® II very fast-acting fuse

Problem/Solution

The 0521 PICO® II Very Fast-Acting Fuse Series is an AEC-Q200 qualified fuse designed to meet an extensive array of performance characteristics in a space-saving sub-miniature package.

Technical resources *(Click on below icons to learn more)*



Series Page



Datasheet



Tech Info



Benefits

- Reduces customer's qualification time to meet the new requirements of AEC-Q200 standards
- Helps the customer to optimize design by saving board space
- Suitable for a wide variety of voltage requirements and applications



Features

- AEC-Q200 qualified
- Very fast-acting
- Small size
- Applicable in wire harness application
- Wide operating temperature range
- Wide range of temperature applications

Markets/Applications

- Battery Management System protection



Markets and applications

Primary target markets, geographies, and customers

Markets	Applications	Notable OEMs	Geography
Automotive	<ul style="list-style-type: none"> ▪ Power train <ul style="list-style-type: none"> – Battery management – On-board charger – Traction motor – DC-DC converter 	<ul style="list-style-type: none"> ▪ Ford ▪ General Motors ▪ Tesla ▪ Hyundai ▪ KIA ▪ Volkswagen 	North America, Europe, Asia
Automotive	<ul style="list-style-type: none"> ▪ Connectivity & ADAS <ul style="list-style-type: none"> – Smart infotainment – V2X, E-call – Multi-purpose camera – Domain controller – Sensor fusion 	<ul style="list-style-type: none"> ▪ Ford ▪ General Motors ▪ Tesla ▪ Hyundai ▪ KIA ▪ Volkswagen 	North America, Europe, Asia
Transportation	<ul style="list-style-type: none"> ▪ Two-wheeler / three-wheeler <ul style="list-style-type: none"> – Battery management – ECU/Motor Drive – On-board charger 	<ul style="list-style-type: none"> ▪ Honda ▪ Yamaha ▪ Bajaj ▪ TVS ▪ Suzuki ▪ Hero 	North America, Europe, Asia

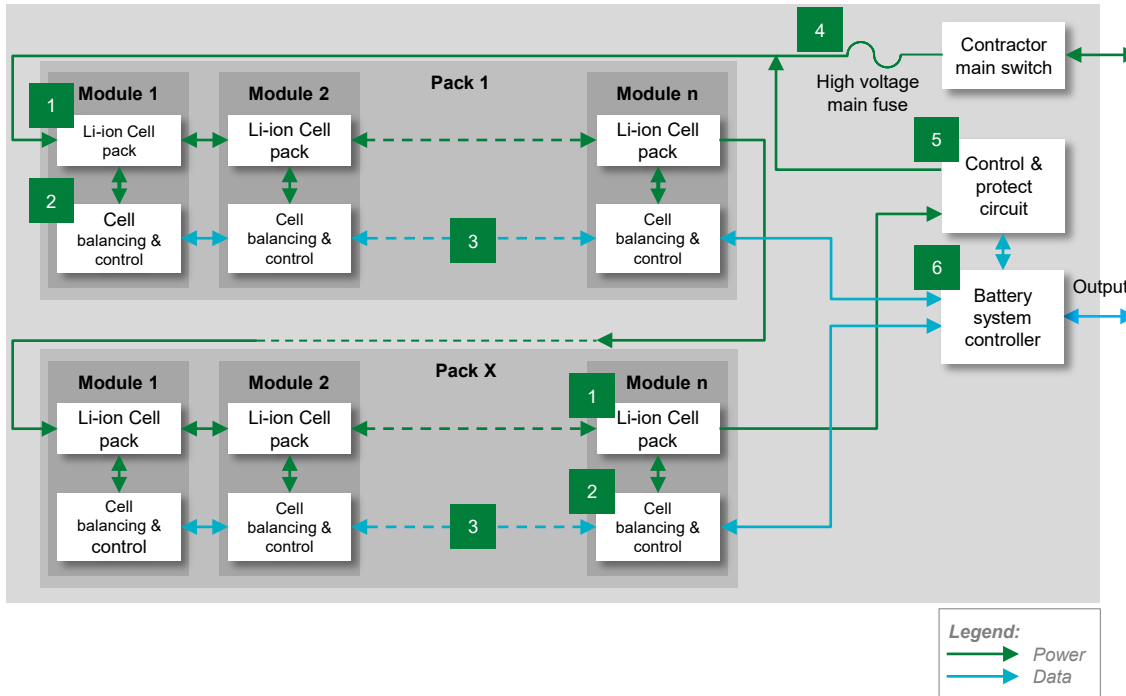


Power train

AEC-Q200 qualified surface mount fuses

 Click the product series in the table below for more info

for energy storage system in automotive application




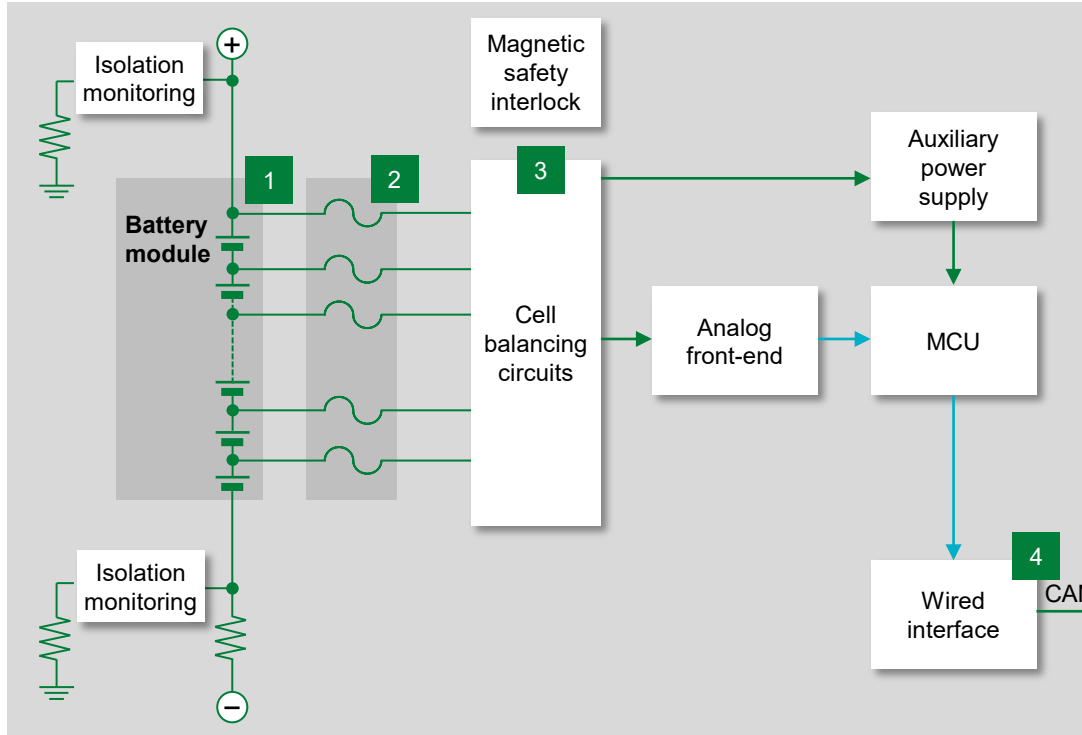
	Technology	Product Series
1	SMD Fuse	501A, 881
	TVS Diode	TPSMC, SZ1SMC,
2	SMD or In-line Fuse	SZ1.5SMC 438A, 441A, 521
	TVS Diode	TPSMB, SZ1SMB,
3	Diode Array	SZP6SMB AQ05C
	TVS Diode	TPSMA6L, SZ1SMA
4	High-voltage Fuse	SHEV, 20HEV, EV1K
5	Gate Driver	IXD_6xxSI
	Diode Array	AQ24CAN
	Fuse	885
6	TVS Diode	TPSMB, TPSMC

Acronyms:

MOV: metal oxide varistor
 TVS: transient voltage suppressor
 SMD: surface mount device

AEC-Q200 qualified surface mount fuses for sense line protection

 Click the product series in the table below for more info



	Technology	Series
1	HV Fuse	885, 521
2	LV Fuse	440A, 437A, 438A
3	TVS Diode	TPSMB, SZ1SMB
4	Diode Array	AQ24CANA

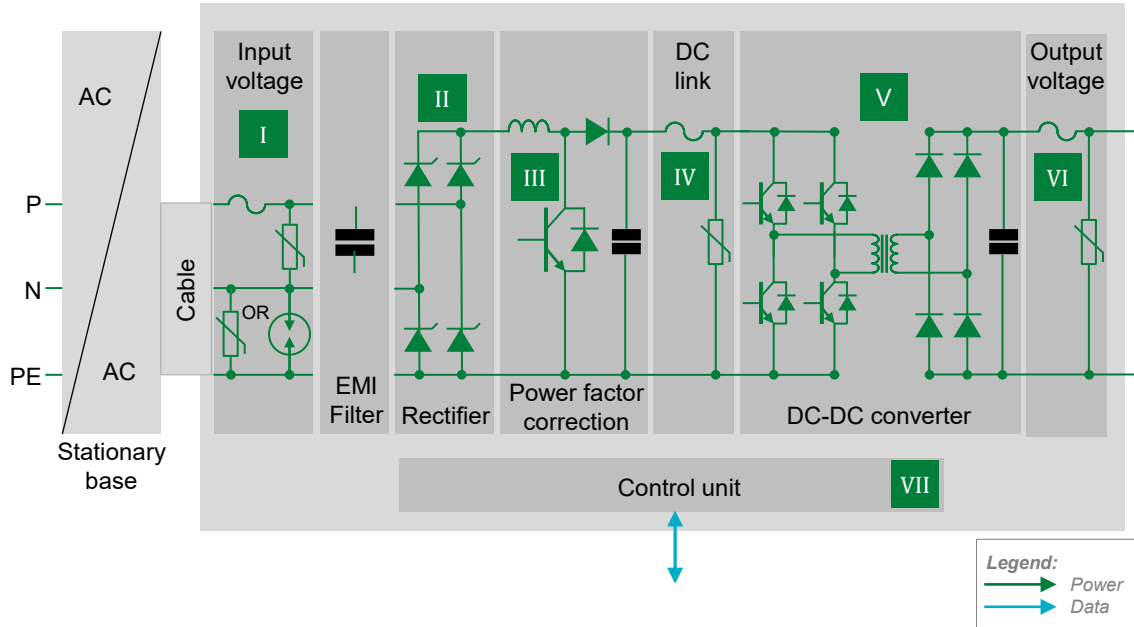
Acronyms:

HV: high voltage

LV: low voltage

AEC-Q200 qualified cartridge fuses for overcurrent protection in on-board charging


 Click the product series in the table below for more info

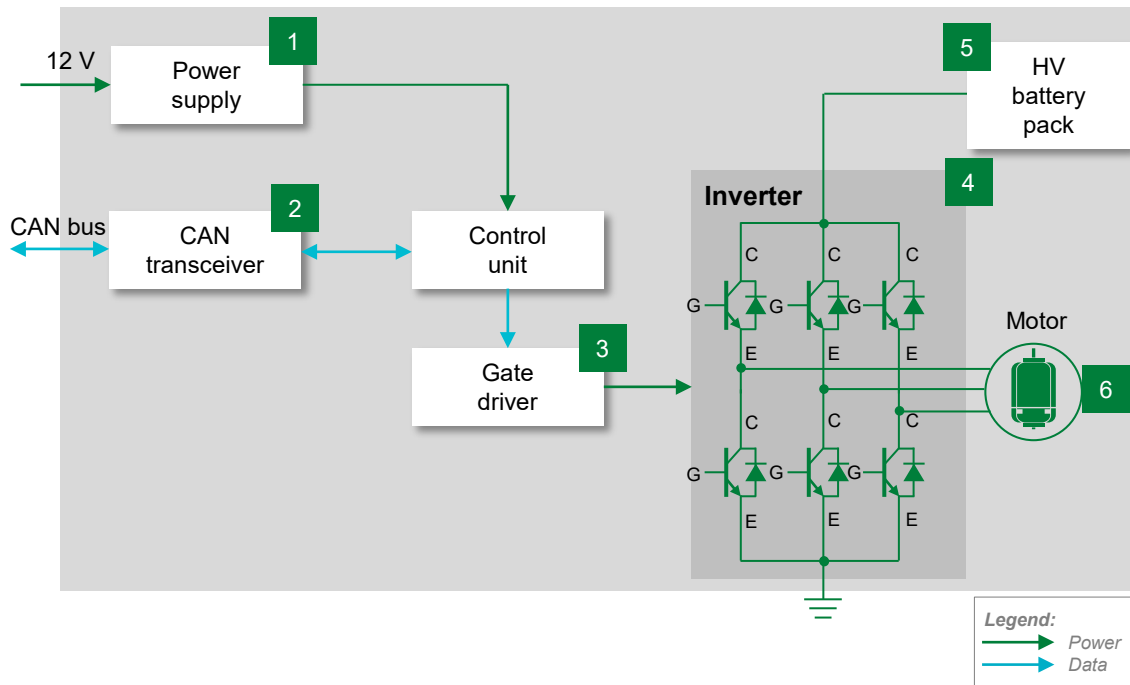


	Technology	Product series
I	Fuse	526, 527, 10EV, 20EV
	MOV	AUMOV
	GDT	CG2, CG3
	SIDACtor®	Pxxx0FNL, Pxxx0SD
II	Thyristor	S8016xA
III	Gate Driver	IXD_6xxSI, IX4340NE
IV	TVS Diode	TPSMB, SZ1SMB,
	Gate Driver	SZP6SMB IXD_6xxSI, IX4340NE
V	TVS Diode	TPSMB, SZ1SMB,
	Diode Array	SZP6SMB AQ4022
	Fuse	526, 527, 10EV, 20EV EV1K, 828
VI	MOV	AUMOV
	TVS Diode	TPSMB, SZ1SMB,
VII	Diode Array	SZP6SMB AQ24CANA

* Please contact Littelfuse Associates for details

AEC-Q200 qualified fuses for overcurrent protection in traction motor inverter


 Click the product series in the table below for more info

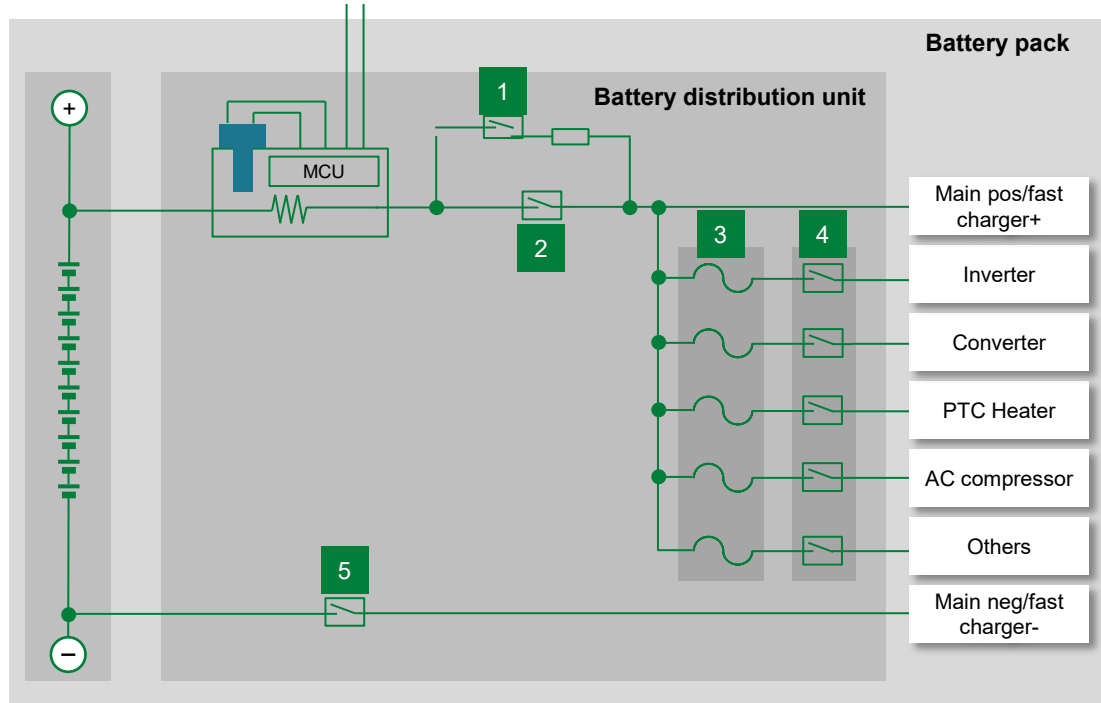


	Technology	Series
1	TVS Diode	TPSMB, TPSMA6L, SZ1SMB, SZP6SMB, SZ1SMA
	Fuse	441A
2	TVS Diode Array	AQ24CANA
3	Diode Array	AQ4022
	TVS Diode Array	TPSMF4L, SZSMF
	IGBT Gate Driver	IXD_6xxSI, IX4340NE
4	TVS Diode	TPSMB, SZ1SMB, SZP6SMB
5	Fuse	526, 527, EV1K, 828
6	TVS Diode	TPSMB
	Thermal Protector Mini	HCRTP-mini

* Please contact Littelfuse Associates for details

AEC-Q200 qualified fuses for short circuit and overload protection in power distribution unit

 Click the product series in the table below for more info




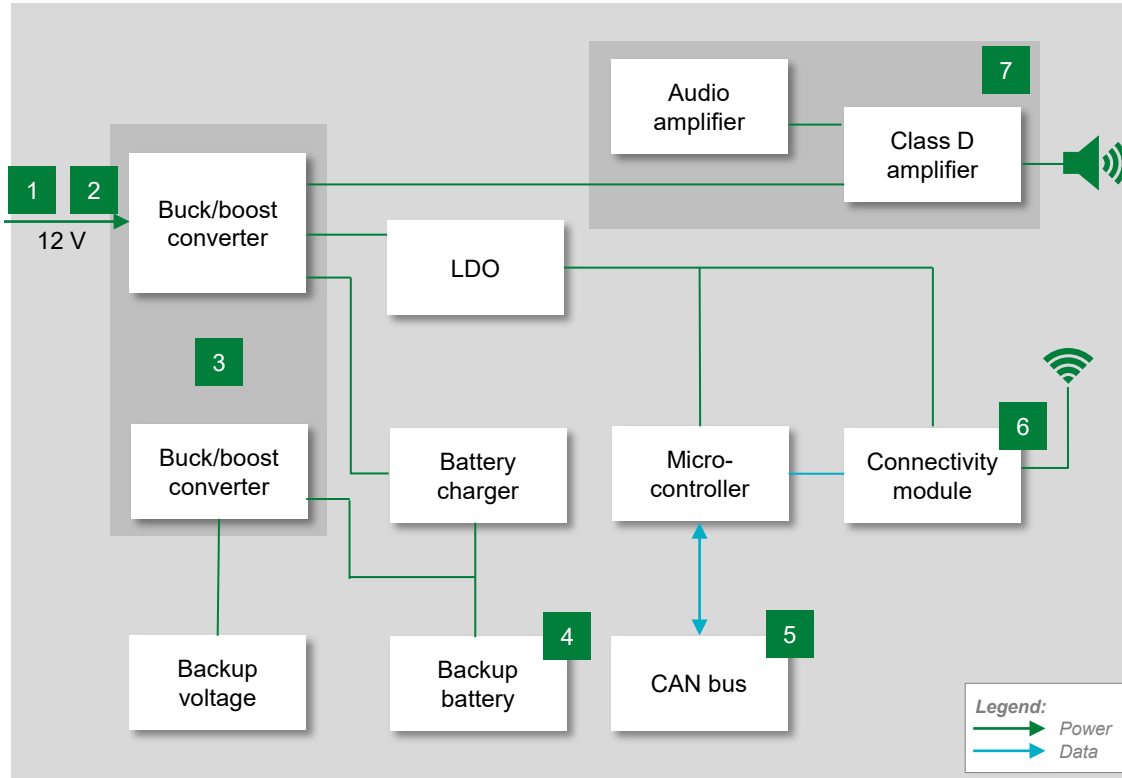
	Technology	Product series
1	Pre-Charge Contactor	DCN5EV, DCNLEV
2	Main Positive Contactor	DCNEV
3	Auxiliary Fuse	10EV, 20EV, SHEV, EV1K, 526, 828
4	Auxiliary Contactor	DCNEV, DCNLEV
5	Main Negative Contactor	DCNEV



Connectivity and ADAS

AEC-Q200 qualified surface mount fuses for emergency call (eCall) short circuit protection

 Click the product series in the table below for more info

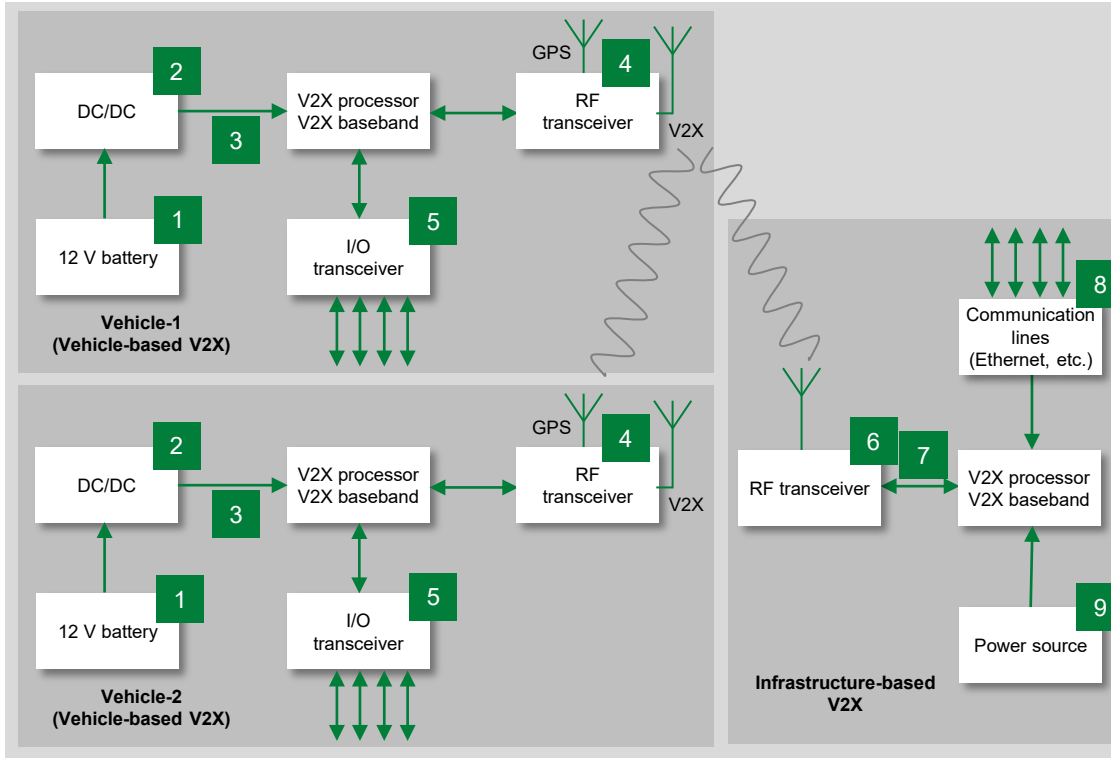


	Technology	Series
1	SMD Fuse	437A, 438A, 440A
2	TVS Diode	SLD8S, SZ1SMA, SZ1SMB
	Varistor	AUML, MLA Auto
3	Schottky Diode	DST
4	PPTC	ASMD, miniASMD, Battery Strap
5	Diode Arrays	AQ24CANA, AQ24CANFD
6	Polymer and Silicon ESD Diode	AXGD, AQ3130, AQ3118
7	Diode Arrays	AQ1005

AEC-Q200 qualified surface mount fuses

 Click the product series in the table below for more info

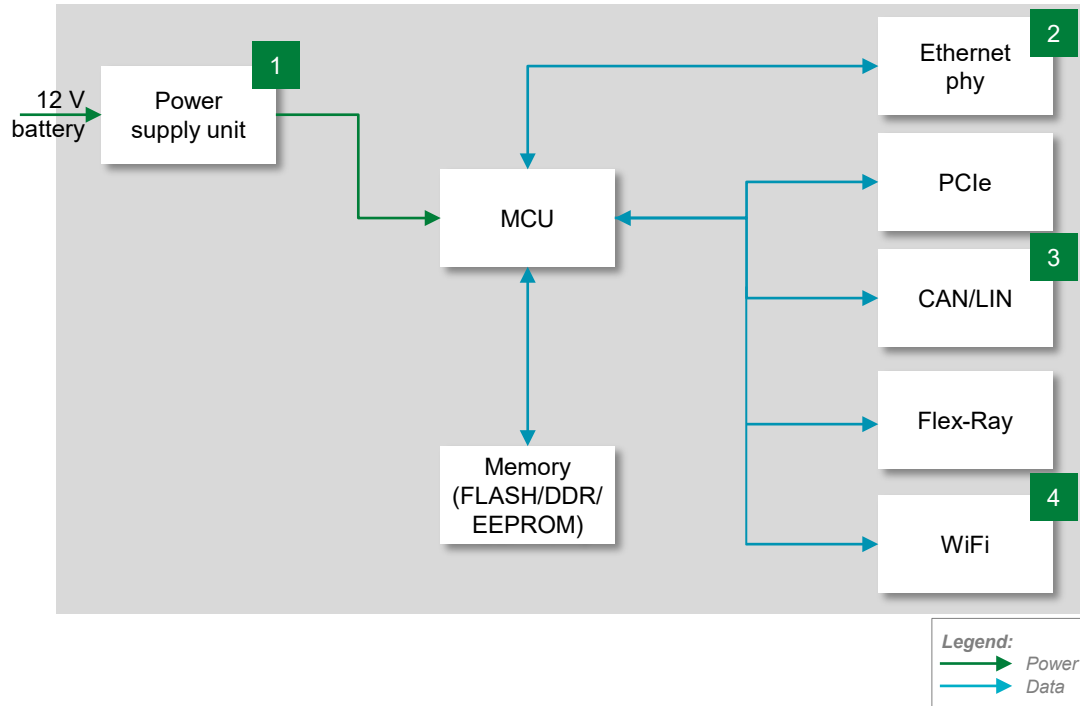
for overcurrent protection in V2X communication



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


AEC-Q200 qualified surface mount fuses for central and zonal domain controllers

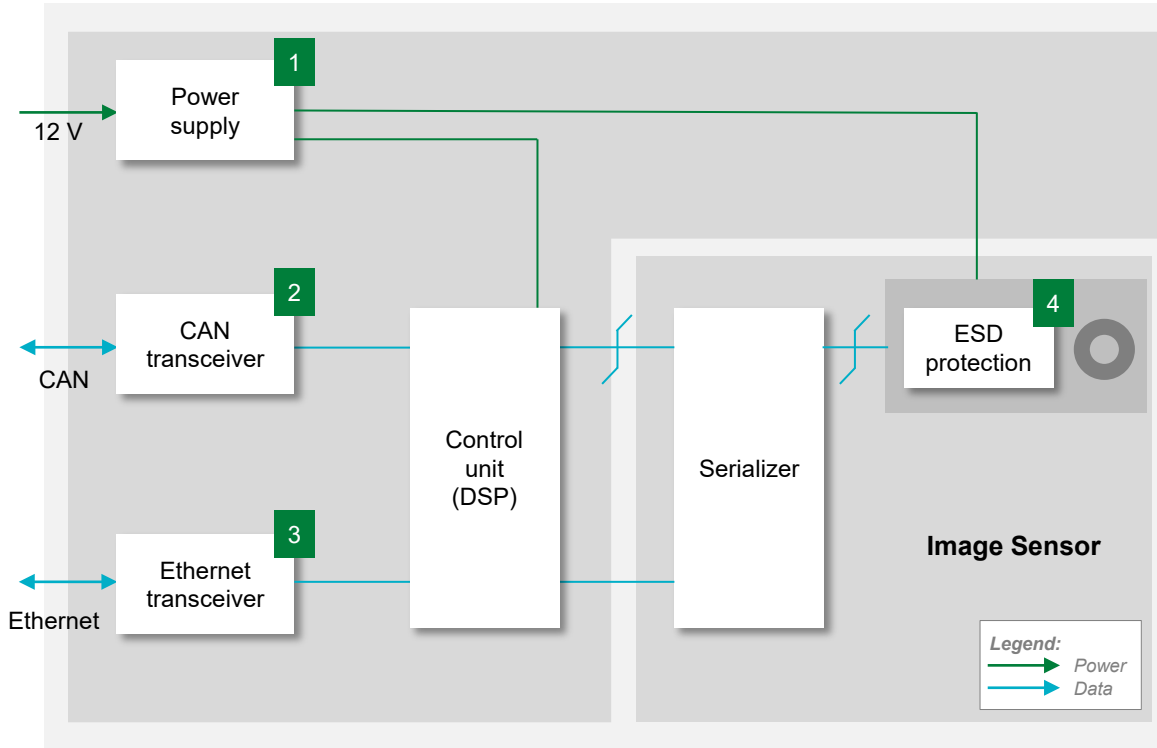
 Click the product series in the table below for more info



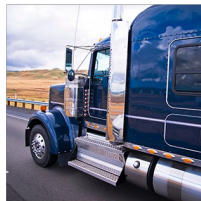
	Technology	Product series
1	Fuse	437A, 438A, 440A
	PPTC	ASMD, miniASMD
	TVS Diode	SZ1SMB, SLD8S
	MOV / MLV	AUML, MLA Auto
	Schottky Diode	<u>DST</u>
2	Polymer ESD/ TVS Diode Array	AXGD, AQ3400, AQ2555
3	TVS Diode Array	AQ24CANA, AQ24CANFD
4	Polymer ESD/ TVS Diode Array	AXGD, AQ3130, AQ3118

AEC-Q200 qualified surface mount fuses for multi-purpose camera short circuit protection

 Click the product series in the table below for more info



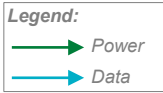
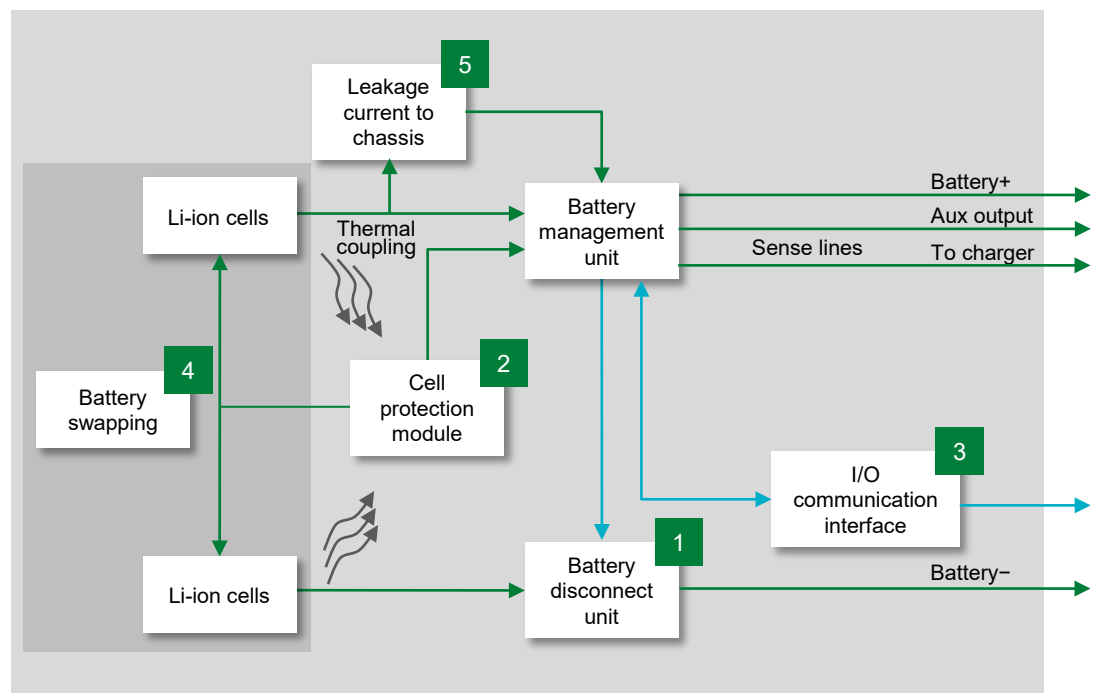
	Technology	Series
1	Fuse	437A, 438A, 440A
	PPTC	ASMD, miniASMD
	TVS Diode	SZ1SMB, SLD8S
	Varistor	AUML, MLA Auto
	Schottky Diode	DST
2	Diode Array	AQ24CANA, AQ24CANFD
3	Polymer and Silicon ESD Diode	AXGD, AQ3400, AQ2555
4	Diode Array	AQ3045



Two-wheeler and three-wheeler

AEC-Q200 qualified surface mount fuses for two-wheeler battery management protection

 Click the product series in the table below for more info

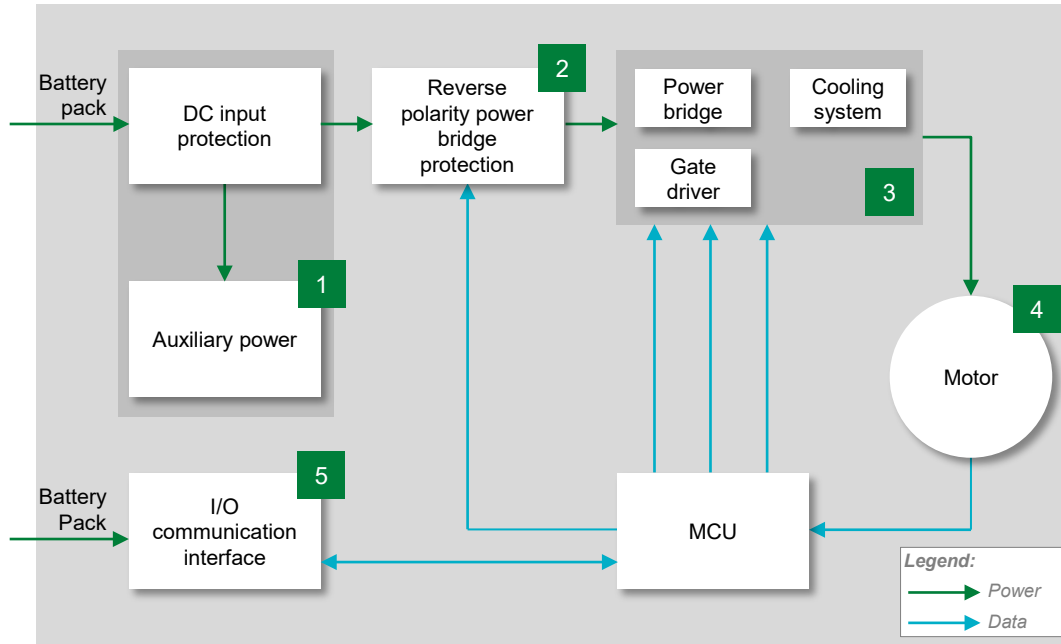


	Technology	Series
1	Fuse	MIDI 70V, Mega, BF1 32V, 881, LP Jcase, ATO
	TVS Diode	TPSMB
	Fuse	438A, 437A, MINI, 521
	HV DC Contactor Relay*	DCNEV, DCNLEV, DCNLR
2	NTC**	Leaded, Surface Mount
3	TVS Diode Array	AQ24CANA
4	Reed Switch	<u>MDSR-10</u>
	C&K Switch	ZMS, ZMSM, LCS, KSC, ZMV, ZMW
5	Solid State Relay***	CPC1009N

* Recommended for three-wheeler vehicles
 ** Thermally coupled with Li-ion cells
 *** Suitable for high-end two wheelers with $V_{bat} > 60 V$

AEC-Q200 qualified surface mount fuses in two-wheeler ECU/Motor Drive protection

 Click the product series in the table below for more info

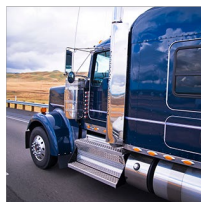


Acronyms:

AC: Alternate Current
 DC: Direct Current
 I/O: Input/Output




MCU: Microcontroller Unit
 PPTC: Polymeric Positive Temperature Coefficient Device
 Si / SiC: Silicon / Silicon Carbide

	Technology	Series
1	High-Current Fuse	881
	Low-Current Fuse	438A, 437A
	PPTC	RXEF, RKEF
2	TVS Diode	TPSMB
	Schottky Diode	DST
3	Thermal Protector	HCRTP-mini
	Si / SiC MOSFET	X4 Class LSICMOxx
	MOSFET Module	MTI200WX75GD/ MTI145WX100GD
	Gate Driver	IXD_6xxSI, IX4340NE
4	Temperature Detection	setP™
	NTC	Surface Mount, USUR1000
	Hall Effect Sensor	55100
5	TVS Diode Array	AQ24CANA



AEC-Q200 fuses portfolio comparison



AEC-Q200 qualified cartridge fuse portfolio

Parameter	828	526	527
Product Photo			
Footprint/Height	38 x Φ 10 mm	32 x Φ 10 mm	32 x Φ 6 mm
Voltage Rating	1000 VDC	500 VAC/VDC	500 VAC
Interrupting Rating	10 kA @ 1000 VDC	10 kA @ 500 VAC/VDC	10 kA @ 500 VAC
Amperage Rating	15 A ~ 30 A	30–60 A	30–50 A
Operating Temperature	-55 °C to +125 °C	-55 °C to +125 °C	-55 °C to 125 °C

Key highlights

- AEC-Q200 qualified
- Rated from 500 VDC/ VAC – 1000 VDC with interrupting rating of 10 kA and 15–60 A nominal current rating in small package
- Compact body size (6 x 32 mm, 10 x 32mm, 10x38 mm)








AEC-Q200 qualified high-current surface mount fuses

Parameter	885	881
Product Photo		
Footprint/Height	10.86 mm x 4.78 mm	12.5 mm x 10 mm
Voltage Rating	500 VDC	100 VDC
Interrupting Rating	1500 A @ 350 VDC	1500A @ 75VDC
Amperage Rating	1 A–5 A	60A ~ 100A
Operating Temperature	-55 °C to 105 °C	-55 °C to 100 °C

Key highlights

- AEC-Q200 qualified
- High DC Voltage up to 500 VDC and Interrupting Current Rating up to 1500 A
- Compact body size (10.86 x 4.78mm)

AEC-Q200 qualified surface mount thin film chip fuses

Parameter	441A	501A	407A	438A	440A	483A	437A	422A
Product photo								
Footprint/ height	0603	1206	1206	0603	1206	1206	1206	2410
Voltage rating	32 VDC	32 VDC	24–63 VDC	24–63 VDC	50–125 VDC	75 VAC/VDC	32–125 VDC	125–250 VAC/VDC
Interrupting rating at rated voltage	50 A	150 A	50 A	50 A	50 A	50 A	50 A	50–100 A
Amperage rating	2–6 A	10–20 A	1–8 A	0.25–6 A	0.25–8 A	0.75–2 A	0.25–8 A	0.75–5 A
Operating temperature	-55 °C to 150 °C	-55 °C to 150 °C	-55 °C to 150 °C	-55 °C to 150 °C	-55 °C to 150 °C	-55 °C to 125 °C	-55 °C to 150 °C	-55 °C to 125 °C

Key highlights

- AEC-Q200 qualified
- Wide range of fuse selection (24–250 VAC/VDC) and amperage rating (0.25–20 A)
- Compact body size (0603, 1206, and 2410)



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