

June 2020

Automotive Grade

Component Guide



BOURNS®

Introduction



Systems and electronics within automobiles have become increasingly more sophisticated with the introduction of new and improved features every year. Crucial to customer satisfaction is that each of these features must be reliably powered, protected and connected to its respective interface within the overall automotive system. Bourns has substantial automotive component level experience and supplies leading component solutions. The Bourns Automotive division has extensive experience designing, building and supplying high reliability AEC-Q compliant components. Bourns offers a wide variety of resistors and magnetics to condition and filter electronic circuits. To complement our conditioning products, we offer a portfolio of circuit protection products that have been used by our customers in typical automotive applications.

All Bourns® standard components that are approved for typical automotive applications are manufactured in facilities that are fully certified to IATF 16949, and have been tested, qualified using the AEC-Q product validation standard for passive components and presented to the customer for selection and approval using PPAP. Bourns also offers customers access to our application test lab.

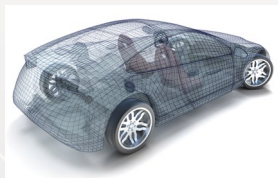
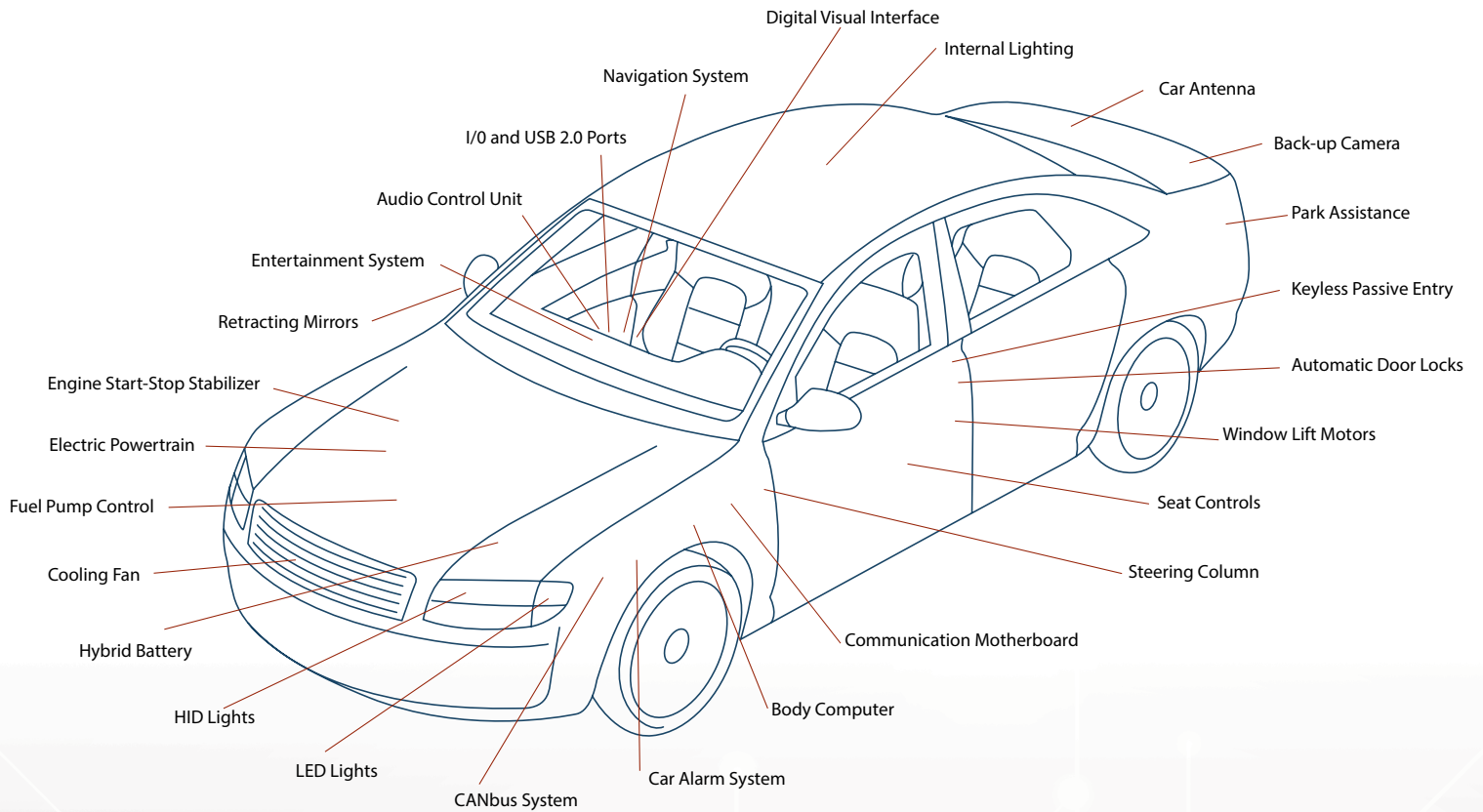
Bourns has a long history of serving the automotive market with quality sensor products. The company's inductive and circuit protection components are available to meet the board level requirements of many automotive applications. With excellent customer service and the availability of field application engineers, Bourns works closely with automotive system designers in helping customers select the right components, providing layout support, and making modifications as requested by the customer. Bourns performs surge tests and offers application and customer-specific testing.

Bourns® Automotive Grade standard components are designed and developed to meet the following criteria:

- Compliance with the latest applicable AEC-Q200, AEC-Q101 or AEC-Q102 product validation standard or its equivalent as determined by Bourns
- New product and new process development meets or exceeds the requirements established in the latest AIAG revision of the Advanced Product Quality Planning (APQP) process. Bourns' design review process may be used if the Bourns quality and design engineering teams have established that the Bourns® standard component meets or exceeds the requirements of the APQP process
- The manufacturing facility(ies) has a VDA 6.3 process audit score greater than 80 % with no downgrade
- The manufacturing site (Bourns or third-party subcontractor) that manufactures the Bourns® standard components must be certified to IATF 16949
- The Bourns® standard components must be presented to a customer for approval using PPAP

The "Automotive Grade" designation is not a substitute for the customer's careful selection and testing of such Bourns® standard components in their particular applications.

Typical Uses by Customers - Bourns® Automotive Grade Components



Comfort & Positioning

- Window Lift Motor
- Seat Position Motor
- Seat Heater
- Park Assistance
- Back-up Camera
- Keyless Passive Entry
- Automatic Door Lock
- Body Computer
- Steering Column
- Retracting External Mirror
- Rear View Interior Mirror

Electrification

- Fuel Pump
- Start-Stop Module
- Battery Charger
- Cooling Fan
- Body Control
- Parking Assist
- Start-Stop Engine Control

Infotainment

- Instrument Cluster
- Stereo (Audio) Control
- In-Car Camera
- In-Car Television
- Ethernet Hub/Switch
- USB Charging Port
- Antenna
- Communications ECU
- GPS & Navigation Control

























Lighting

- HID Headlight
- LED Headlight
- Internal LED Light

Networks







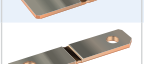




- CAN
- FlexRay
- LIN
- Ethernet

Fixed Resistors






Model	Photo	Tolerances	Temperature Coefficient, (ppm/°C)	Power (W)	Resistance Range (Ω)	AEC-Q200 Compliant	PPAP Documentation	IATF 16949 Factory
CR0201A-AS		1%, 5%	±100, ±200, -200+600	0.05	1 - 10 M	Yes	Level 3	Yes
CR0402A-AS		1%, 5%	±100, ±200, -200+500	0.063	1 - 20 M	Yes	Level 3	Yes
CR0603A-AS		1%, 5%	±100, ±200, ±400	0.1	1 - 20 M	Yes	Level 3	Yes
CR0805A-AS		1%, 5%	±100, ±200, ±400	0.125	1 - 20 M	Yes	Level 3	Yes
CR1206A-AS		1%, 5%	±100, ±200, ±400	0.25	1 - 20 M	Yes	Level 3	Yes
CR1210A-AS		1%, 5%	±100, ±200, ±400	0.33	1 - 20 M	Yes	Level 3	Yes
CR2010A-AS		1%, 5%	±100, ±200, ±400	0.5	1 - 20 M	Yes	Level 3	Yes
CR2512A-AS		1%, 5%	±100, ±200, ±400	1	1 - 20 M	Yes	Level 3	Yes
CRM0603A		0.5%, 1%, 5%	±100, ±200	0.125	50 m - 1 M	Yes	Level 3	Yes
CRM0805A		0.5%, 1%, 5%	±100, ±200	0.25	50 m - 1 M	Yes	Level 3	Yes
CRM1206A		0.5%, 1%, 5%	±100, ±200	0.5	50 m - 1 M	Yes	Level 3	Yes
CRM1210A		0.5%, 1%, 5%	±100, ±200	0.5	50 m - 1 M	Yes	Level 3	Yes
CRM2010A		0.5%, 1%, 5%	±100, ±200	1	50 m - 1 M	Yes	Level 3	Yes
CRM2512A		0.5%, 1%, 5%	±100, ±200	2	50 m - 1 M	Yes	Level 3	Yes
CRS0603A		1%, 5%	±100, ±200	0.125	1 - 1 M	Yes	Level 3	Yes
CRS0805A		1%, 5%	±100, ±200	0.25	1 - 1 M	Yes	Level 3	Yes
CRS1206A		1%, 5%	±100, ±200	0.5	1 - 1 M	Yes	Level 3	Yes
CRS1210A		1%, 5%	±100, ±200	0.5	1 - 1 M	Yes	Level 3	Yes
CRS2010A		1%, 5%	±100, ±200	1	1 - 1 M	Yes	Level 3	Yes
CRS2512A		1%, 5%	±100, ±200	2	1 - 1 M	Yes	Level 3	Yes
CST0612		1%	±100, ±200	1	0.5 m - 5 m	Yes	Level 3	Yes
CRF0805		1%, 5%	±50	0.5	3 m - 20 m	Yes	Level 3	Yes
CRF1206		1%, 5%	±50	1	1 m - 30 m	Yes	Level 3	Yes
CRF2512		1%, 5%	±50	1; 2	1 m - 50 m	Yes	Level 3	Yes
CRA2512		1%, 5%	±50	3	10 m - 100 m	Yes	Level 3	Yes



Fixed Resistors

Model	Photo	Tolerances	Temperature Coefficient, (ppm/ °C)	Power (W)	Resistance Range (Ω)	AEC-Q200 Compliant	PPAP Documentation	IATF 16949 Factory
CRE2512		1 %	±50	2/3	1 m - 9 m	Yes	Level 3	Yes
CSS2H-2512		1 %, 5 %	±50	1.5 - 6	0.3 m - 5 m	Yes	Level 3	Yes
CSS2H-3920		1 %, 5 %	±50	2 - 12	0.2 m - 5 m	Yes	Level 3	Yes
CSS2H-5930		1 %, 5 %	±50	4 - 15	0.2 m - 3 m	Yes	Level 3	Yes
CSS4J-4026		1 %, 5 %	±50	3 - 5	0.2 - 5 m	Yes	Level 3	Yes
CSM2F-6918		5 %	±50	36	0.05 m - 0.1 m	Yes	Level 3	Yes
CSM2F-7036		1 %, 5 %	±50	50	0.05 m - 0.1 m	Yes	Level 3	Yes
CSM2F-8518		5 %	±50	36	0.05 m - 0.1 m	Yes	Level 3	Yes
PWR163		1 %, 5 %	±100	25	20 m - 130 K	Yes	Level 3	Yes
PWR263S-20		1 %, 5 %	±100	20	20 m - 130 K	Yes	Level 3	Yes
PWR263S-35		1 %, 5 %	±100	35	20 m - 130 K	Yes	Level 3	Yes



Power Inductors

Model	Photo	Size (mm)	Shielded	Inductance Range (μH)	Current Range (A)	AEC-Q200 Compliant	PPAP Documentation	IATF 16949 Factory
PQ2614BHA		28 x 28 x 16	Yes	2.2 - 33	30	Yes	Level 3	Yes
PQ2614BLA		28 x 28 x 16	Yes	1 - 33	30	Yes	Level 3	Yes
PQ2617BHA		28 x 28 x 19	Yes	3.3 - 33	30	Yes	Level 3	Yes
SRP1040VA		11 x 10 x 3.8	Yes	1 - 68	3.5 - 27	Yes	Level 3	Yes
SRP6030VA		7.1 x 6.6 x 2.8	Yes	0.47 - 22	3.4 - 20	Yes	Level 3	Yes




Transformers

Model	Photo	Size (mm)	AEC-Q200 Compliant	PPAP Documentation	IATF 16949 Factory
SM91501AL		14.8 x 14.73 x 5	Yes	Level 3	Yes
SM91509AL		14.81 x 14.73 x 5	Yes	Level 3	Yes
SM91071AL		12.8 x 9.5 x 5.65	Yes	Level 3	Yes
SM91072AL		12.8 x 9.5 x 5.65	Yes	Level 3	Yes


Transformers

Model	Photo	Size (mm)	AEC-Q200 Compliant	PPAP Documentation	IATF 16949 Factory
SM91073AL		12.8 x 9.5 x 5.65	Yes	Level 3	Yes
SM91074AL		12.8 x 9.5 x 5.65	Yes	Level 3	Yes

Trimpot® Trimming Potentiometers & Position Sensors

Model	Photo	Size (mm)	Resistance Range	Rotational Life	Linearity	Power Rating	AEC-Q200 Compliant	PPAP Documentation	IATF 16949 Factory
3313		3	10 ohms - 2 megohms	100 cycles	–	.125 watts	Yes	Level 3	Yes
3314		4	10 ohms - 2 megohms	100 cycles	–	.25 watts	Yes	Level 3	Yes
3382		12	2.5 K ohms - 100 K ohms	1 M cycles	+/- 2%	.05 watts	Yes	Level 3	Yes

Transient Voltage Suppressor (TVS) Diodes

Model	Photo	Package	Size	P _{pp} (W)		V _{RWM} (V)	AEC-Q101 Compliant	PPAP Documentation	IATF 16949 Factory
				8.20 μs	10/1000 μs				
SMAJ-Q / P4SMA-Q		DO-214AC (SMA)	5.1 mm x 2.3 mm		400	5 ~ 220	Yes	Level 3	Yes
SMBJ-Q / P6SMB-Q		DO-214AA (SMB)	5.4 mm x 3.6 mm		600	12 ~ 58	Yes	Level 3	Yes
SMCJ-Q / 1.5SMC-Q		DO-214AB (SMC)	7.9 mm x 5.9 mm		1500	12 ~ 58	Yes	Level 3	Yes
SMLJ-Q		DO-214AB (SMC)	7.9 mm x 5.9 mm		3000	12 ~ 58	Yes	Level 3	Yes
5.0SMDJ-Q		DO-214AB (SMC)	7.9 mm x 5.9 mm		5000	12 ~ 85	Yes	Level 3	Yes
SM8S-Q		DO-218	15.5 mm x 10.0 mm		6000	16 ~ 43	Yes	Level 3	Yes
SM8SF-Q		DFN	10.5 mm x 8.1 mm		7000	24 ~ 36	Yes	Level 3	Yes
1.5SMC-Q		DO-214AB (SMC)	7.75 mm x 5.59 mm		1500	15 ~ 68	Yes	Level 3	Yes
15KPA-SD-Q		DO-218	15.5 mm x 10.0 mm		1500	16 ~ 66V	Yes	Level 3	Yes
CDSOD323-TxxS-Q		SOD-323	Various		500	5 ~ 18	Yes	Level 3	Yes



Multifuse® PPTC Resettable Fuses

Model	Photo	Size (EIA, mm)	Hold Current (A)	Max. Operating Voltage (V)	Max. Operating Current (A)	AEC-Q200 Compliant	PPAP Documentation	IATF 16949 Factory
MF-PSHT		0805, 2012	0.05 - 0.50	12 - 16	40	Yes	Level 3	Yes
MF-NSMF		1206, 3216	0.12 - 2.0	6 - 30	10 - 100	Yes	Level 3	Yes
MF-NSHT		1206, 3216	0.10 - 0.75	12 - 30	20 - 40	Yes	Level 3	Yes
MF-USMF		1210, 3225	.05 - 1.75	6 - 30	10 - 40	Yes	Level 3	Yes
MF-USHT		1210, 3225	0.10 - 1.50	12 - 30	20 - 40	Yes	Level 3	Yes
MF-MSMF		1812, 4532	0.1 - 2.6	6 - 60	10 - 100	Yes	Level 3	Yes
MF-LSMF		2920, 7555	1.85 - 4.0	6 - 33	20 - 40	Yes	Level 3	Yes
MF-SMHT		3425, 8763 / 2920, 7555	1.36, 1.6	16	100	Yes	Level 3	Yes
MF-RG		Various	3.0 - 11.0	16	100	Yes	Level 3	Yes
MF-RHT		Various	0.50 - 13.0	16 - 32	40, 100	Yes	Level 3	Yes
MF-DC		Custom	Custom	16	50	Yes	Level 3	Yes

SinglFuse™ SMD Fuses

Model	Photo	Size (EIA, mm)	Rated Current (A)	Rated Voltage (V)	Operating Temperature (°C)	AEC-Q200 Compliant	PPAP Documentation	IATF 16949 Factory
SF-0603HIA-M		0603, 1608	1 - 5	32	-55 - +125	Yes	Level 3	Yes
SF-1206HIA-M		1206, 3216	0.5 - 6	24 - 65	-55 - +150	Yes	Level 3	Yes
SF-1206SA-W		1206, 3216	1.5 - 15	32 - 110	-55 - +125	Yes	Level 3	Yes
SF-2410FA-W		2410, 6125	1 - 10	125 - 250	-55 - +125	Yes	Level 3	Yes
SF-2410FPA-W		2410, 6125	12 - 20	65	-55 - +125	Yes	Level 3	Yes

Varistor Products

Model	Photo	Size (EIA, mm)	Peak Single Pulse Current 8/20 μs (A)	Operating Temperature (°C)	AEC-Q200 Compliant	PPAP Documentation	IATF 16949 Factory
AV-SMD		0805, 1206, 1812, 2220, 3225	200 - 2000	-55 - +125	Yes	Level 3	Yes
AVHT-SMD		0805, 1206, 1812, 2220, 3225	200 - 2000	-55 - +150	Yes	Level 3	Yes
AV-TH		602, 802, 902, 1103	400 - 2000	-55 - +125	Yes	Level 3	Yes
OV		9, 12	800, 1200	-55 - +125	Yes	Level 3	Yes

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