

# CMLA

## Automotive grade common-mode noise suppressor chip inductor



### Product features

- AEC-Q200 qualified
- Square type closed magnetic core allows smaller inductor
- Low profile design
- 700 ohm impedance in 3 sizes
- Excellent impedance characteristics to suppress common and differential-mode noise
- Moisture sensitivity level (MSL): 1

### Applications

- Automotive power line filter
- Automotive equipment and devices
- Infotainment
- ECU Power filtering
- LED Lighting
- DC power lines
- Multi-media devices

### Environmental compliance and general specifications

- Operating temperature range: -40 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant



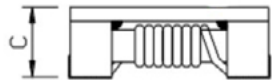
**Product specifications**

| Part number <sup>3</sup> | Common-mode impedance <sup>1</sup> (Ω) typical | Common-mode impedance <sup>1</sup> (Ω) minimum | DCR (mΩ) @ +25 °C maximum | Rated current <sup>2</sup> (A) maximum | Rated voltage (Vdc) maximum | Insulation resistance @ 100 Vdc (MΩ) minimum |
|--------------------------|--|--|---------------------------|--|-----------------------------|--|
| CMLA0706-701-R           | 700  | 500  | 15                        | 4.0                                    | 100                         | 10   |
| CMLA0907-701-R           | 700  | 500  | 10                        | 5.0                                    | 100                         | 10   |
| CMLA1211-701-R           | 700  | 500  | 6.0                       | 8.0                                    | 100                         | 10   |

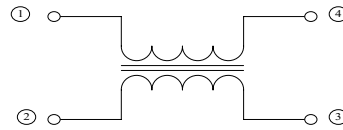
- Common-mode impedance test parameters: 100 MHz, 0.1 Vrms, +25 °C
- Rated current: DC current for an approximate temperature rise of 40 °C without core loss. It is recommended that the temperature of the part not exceed +125 °C under worst case operating conditions verified in the end application.

- Part Number Definition: CMLAxxx-yyy-R  
CMLA = Product code  
xxx= Size indicator  
yyy= Impedance value in ohms. R= decimal point, if no R is present then last digit indicates the number of zeros  
-R suffix = RoHS compliant

**Mechanical parameters, schematic, pad layout (mm)**

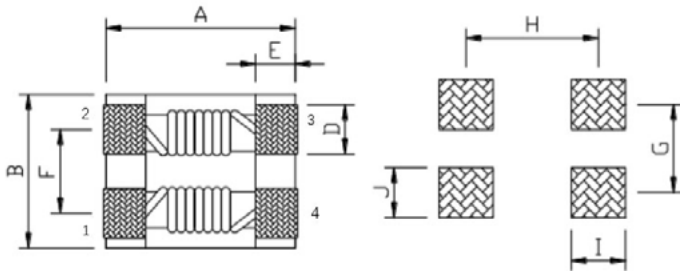


**Equivalent circuit**



No polarity

**Recommended pad layout**



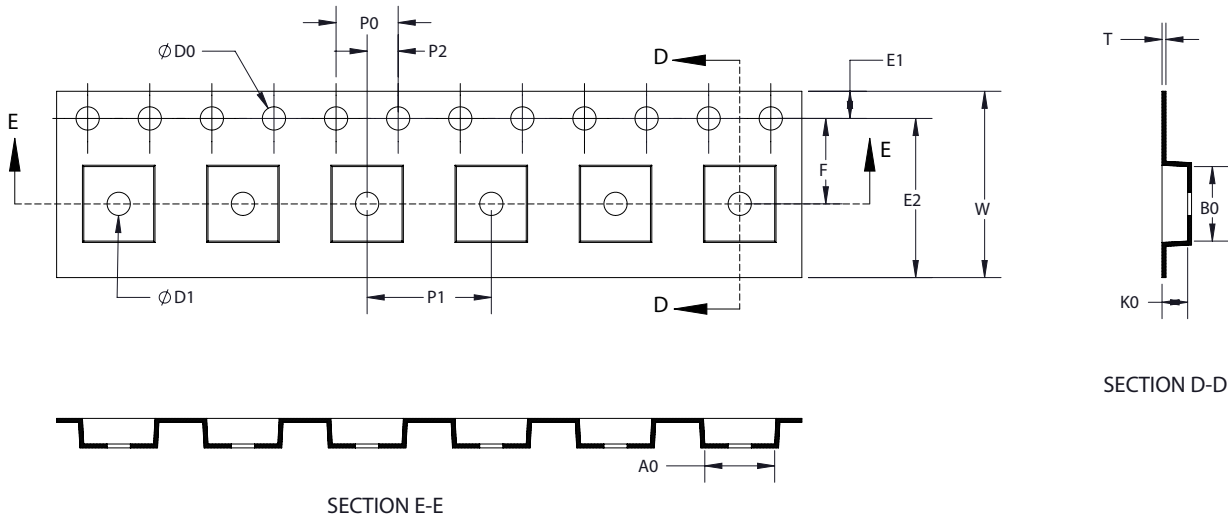
| Dimension | CMLA0706-701-R | CMLA0907-701-R | CMLA1211-701-R |
|-----------|----------------|----------------|----------------|
| A         | 8.0 maximum    | 10 maximum     | 13 maximum     |
| B         | 6.2 maximum    | 7.5 maximum    | 11.5 maximum   |
| C         | 4.0 maximum    | 4.8 maximum    | 7.0 maximum    |
| D         | 1.5 ±0.3       | 1.8 ±0.3       | 2.7 ±0.3       |
| E         | 1.7 ±0.3       | 1.7 ±0.3       | 2.57 ±0.3      |
| F         | 3.0 ref        | 3.8 ref        | 5.2 ref        |
| G         | 3.0 ref        | 3.8 ref        | 5.2 ref        |
| H         | 5.2 ref        | 7.3 ref        | 9.32 ref       |
| I         | 3.0 ref        | 2.7 ref        | 3.6 ref        |
| J         | 2.0 ref        | 2.0 ref        | 3.2 ref        |

- Part marking: xxx= Impedance value in ohms  
All soldering surfaces to be coplanar within 0.1 millimeters  
Tolerances are ±0.3 millimeters unless stated otherwise  
Pad layout tolerances are ±0.1 millimeters unless stated otherwise  
Pad layout dimensions are reference only  
Traces or vias underneath the inductor is not recommended

**Packaging information (mm)**

Supplied in tape and reel packaging, 13" diameter reel (EIA-481 compliant)

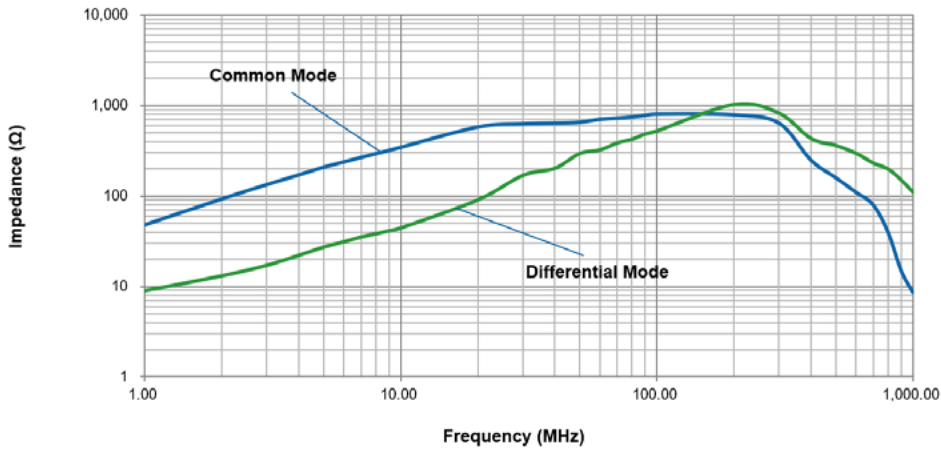
CMLA0706-xxx-R 1100 parts per reel, CMLA0907-xxx-R 800 parts per reel, CMLA1211-xxx-R 500 parts per reel



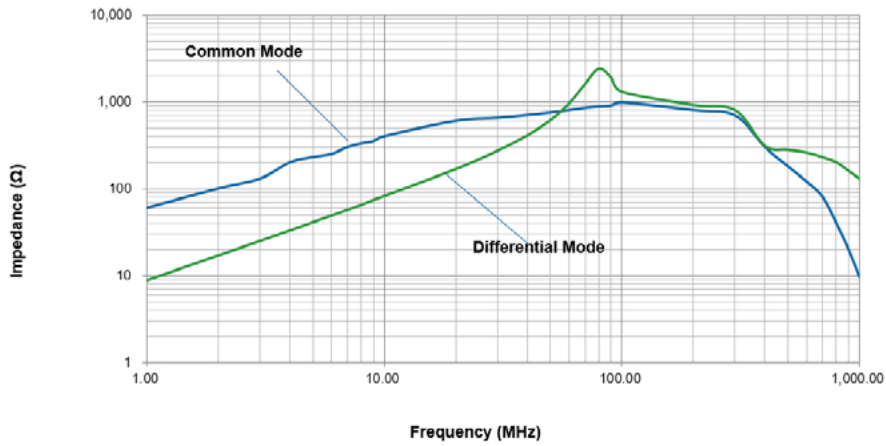
| Dimension | CMLA0706-701-R | CMLA0907-701-R | CMLA1211-701-R |
|-----------|----------------|----------------|----------------|
| W         | 24 ±0.3        | 24 ±0.3        | 24 ±0.3        |
| F         | 11.5 ±0.1      | 11.5 ±0.1      | 11.5 ±0.1      |
| E1        | 1.75 ±0.1      | 1.75 ±0.1      | 1.75 ±0.1      |
| E2        | na             | na             | na             |
| P0        | 4.0 ±0.1       | 4.0 ±0.1       | 4.0 ±0.1       |
| P1        | 12 ±0.1        | 12 ±0.1        | 16 ±0.1        |
| P2        | 2.0 ±0.1       | 2.0 ±0.1       | 2.0 ±0.1       |
| D0        | 1.5 +0.1/-0    | 1.5 +0.1/-0    | 1.5 +0.1/-0    |
| D1        | na             | na             | 1.5            |
| A0        | 6.5 ±0.2       | 7.6 ±0.1       | 11.2 ±0.2      |
| B0        | 8.3 ±0.2       | 9.6 ±0.1       | 12.9 ±0.2      |
| K0        | 4.4 ±0.2       | 5.0 ±0.1       | 7.0 ±0.2       |
| T         | 0.4 ±0.05      | 0.4 ±0.05      | 0.4 ±0.05      |

### Impedance vs frequency

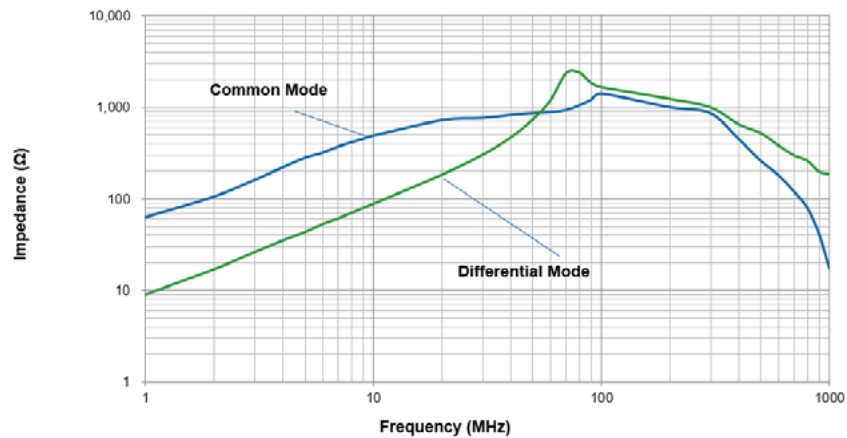
CMLA0706-701-R



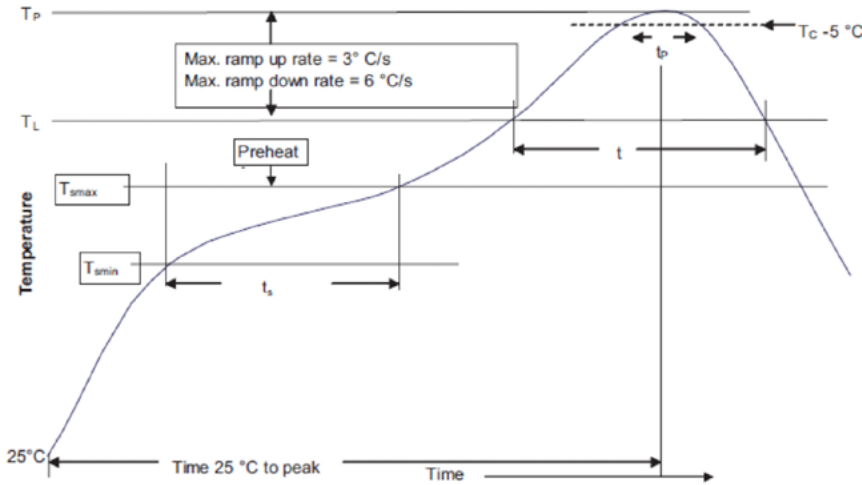
CMLA0907-701-R



CMLA1211-701-R



**Solder reflow profile**



**Table 1 - Standard SnPb solder (T<sub>C</sub>)**

| Package Thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5 mm           | 235 °C                      | 220 °C                      |
| ≥2.5 mm           | 220 °C                      | 220 °C                      |

**Table 2 - Lead (Pb) free solder (T<sub>C</sub>)**

| Package thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> 350 - 2000 | Volume mm <sup>3</sup> >2000 |
|-------------------|-----------------------------|-----------------------------------|------------------------------|
| <1.6 mm           | 260 °C                      | 260 °C                            | 260 °C                       |
| 1.6 – 2.5 mm      | 260 °C                      | 250 °C                            | 245 °C                       |
| >2.5 mm           | 250 °C                      | 245 °C                            | 245 °C                       |

**Reference J-STD-020**

| Profile feature   | Standard SnPb solder | Lead (Pb) free solder |
|---|----------------------|-----------------------|
| Preheat and soak  |                      |                       |
| • Temperature min. (T <sub>smin</sub> )   | 100 °C               | 150 °C                |
| • Temperature max. (T <sub>smax</sub> )   | 150 °C               | 200 °C                |
| • Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )                                | 60-120 seconds       | 60-120 seconds        |
| Ramp up rate T <sub>L</sub> to T <sub>P</sub>   | 3 °C/ second max.    | 3 °C/ second max.     |
| Liquidous temperature (T <sub>L</sub> )   | 183 °C               | 217 °C                |
| Time (t <sub>L</sub> ) maintained above T <sub>L</sub>  | 60-150 seconds       | 60-150 seconds        |
| Peak package body temperature (T <sub>P</sub> )*  | Table 1              | Table 2               |
| Time (t <sub>P</sub> )* within 5 °C of the specified classification temperature (T <sub>C</sub> ) | 20 seconds*          | 30 seconds*           |
| Ramp-down rate (T <sub>P</sub> to T <sub>L</sub> )  | 6 °C/ second max.    | 6 °C/ second max.     |
| Time 25 °C to peak temperature  | 6 minutes max.       | 8 minutes max.        |

\* Tolerance for peak profile temperature (T<sub>P</sub>) is defined as a supplier minimum and a user maximum.

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