

# CL1 108 and CLA1 108

## Multi-phase power inductors



### Product features

- High current multi-phase inductor applications
- 50 nH per phase coupled inductor
- CLA Family features acoustic noise dampening properties
- Ferrite core material
- Patents pending
- Moisture Sensitivity Level (MSL): 1

### Applications

- For exclusive use with Volterra® or Maxim® VPR-Devices

### Environmental data

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



Volterra® is a registered trademark of Volterra Semiconductor, LLC.

Maxim® is a registered trademark of Maxim Integrated Devices, Inc.

Product specifications

| Part number <sup>4,5</sup>                     | Functional      |                        |  |                                      |  | Test                |                         |               |                         |  |
|--|-----------------|------------------------|--|--------------------------------------|--|---------------------|-------------------------|---------------|-------------------------|--|
|  | Inductor phases | DCR (mΩ) ±10% @ +20 °C | Rated inductance per phase <sup>3</sup> (nH) | I Rated per phase <sup>3</sup> (Adc) | I <sub>max</sub> Peak per phase <sup>3</sup> (Adc) | Pin numbers         | OCL <sup>1,2</sup> (nH) | Pin numbers   | OCL <sup>1,2</sup> (nH) | Magnetizing inductance <sup>2</sup> (nH) @ 10 Adc (+25 °C) |
| <b>CL1108 Family—Standard</b>                  |                 |                        |  |                                      |  |                     |                         |               |                         |  |
| CL1108-2-50TR-R                                | 2               | 0.28                   | 50 ± 20%                                     | 50                                   | 80   | (3-4)               | 380±20%                 | (1-2)         | 380±20%                 | 300  |
| CL1108-3-50TR-R                                | 3               | 0.28                   | 50 ± 20%                                     | 50                                   | 80   | (3-4)               | 400±20%                 | (1-2), (5-6)  | 380±20%                 | 300  |
| CL1108-4-50TR-R                                | 4               | 0.28                   | 50 ± 20%                                     | 50                                   | 80   | (3-4), (5-6)        | 400±20%                 | (1-2), (7-8)  | 380±20%                 | 300  |
| CL1108-5-50TR-R                                | 5               | 0.28                   | 50 ± 20%                                     | 50                                   | 80   | (3-4), (5-6), (7-8) | 400±20%                 | (1-2), (9-10) | 380±20%                 | 300  |
| <b>CLA1108 Family—Acoustic Noise Dampening</b> |                 |                        |  |                                      |  |                     |                         |               |                         |  |
| CLA1108-2-50TR-R                               | 2               | 0.28                   | 50 ± 20%                                     | 50                                   | 80   | (3-4)               | 380±20%                 | (1-2)         | 380±20%                 | 300  |
| CLA1108-3-50TR-R                               | 3               | 0.28                   | 50 ± 20%                                     | 50                                   | 80   | (3-4)               | 400±20%                 | (1-2), (5-6)  | 380±20%                 | 300  |
| CLA1108-4-50TR-R                               | 4               | 0.28                   | 50 ± 20%                                     | 50                                   | 80   | (3-4), (5-6)        | 400±20%                 | (1-2), (7-8)  | 380±20%                 | 300  |

1. Open Circuit Inductance (OCL)

2. Test parameters: 1 MHz, 0.1 Vrms, 0.0 Adc. @ +25 °C

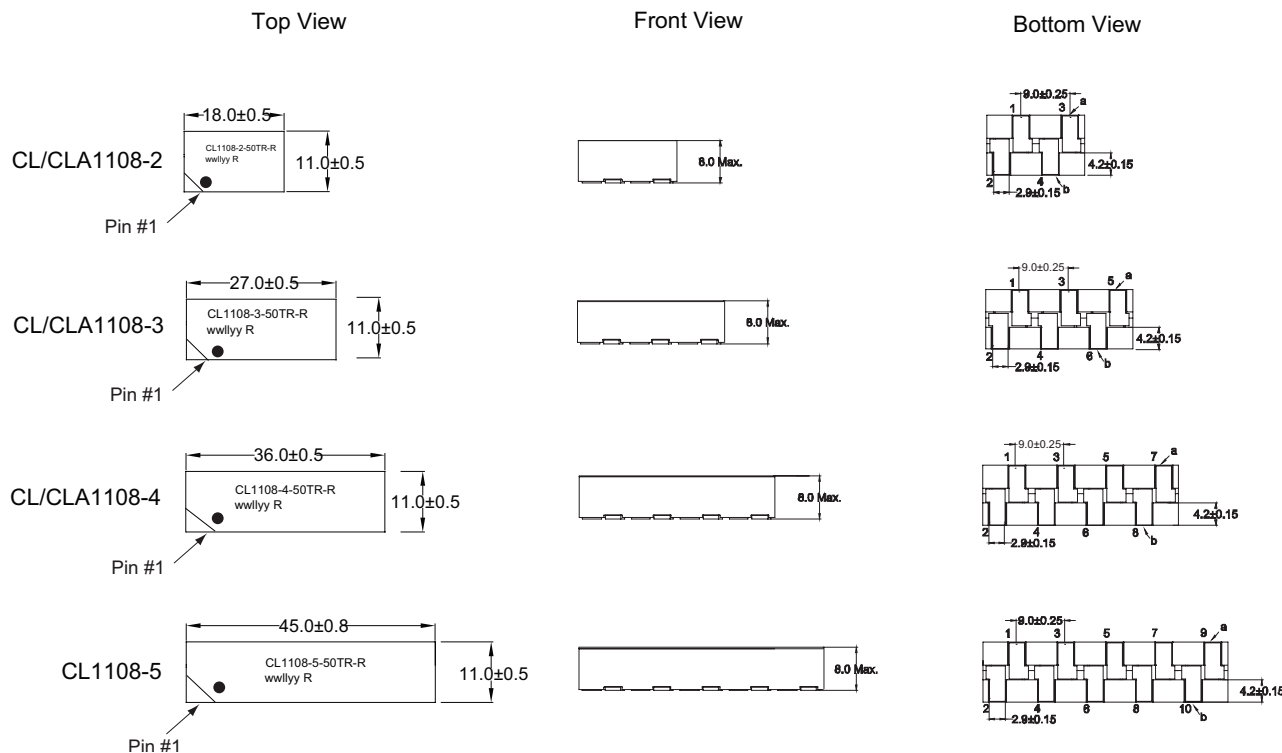
3. The rated current, I<sub>max</sub> peak current, and rated inductance per phase is determined by Volterra/Maxim's testing and circuit design. Additional information can be provided by contacting Volterra/Maxim.

4. Part Number Definition: CLx1108-y-50TR-R

- CL(x)1108 = Product code and size (CL= standard, CLA= Acoustic Noise Dampening)
- y = number of phases
- 50 = inductance value per phase nH
- TR = Tape and reel packaging
- -R suffix= RoHS compliant

5. This device is licensed for use only when incorporated within a voltage regulator employing power regulating devices manufactured by Volterra Semiconductor, LLC or Maxim Integrated Devices, Inc. No license is granted expressly or by implication to use this device with power regulating devices manufactured by any company other than Volterra or Maxim.

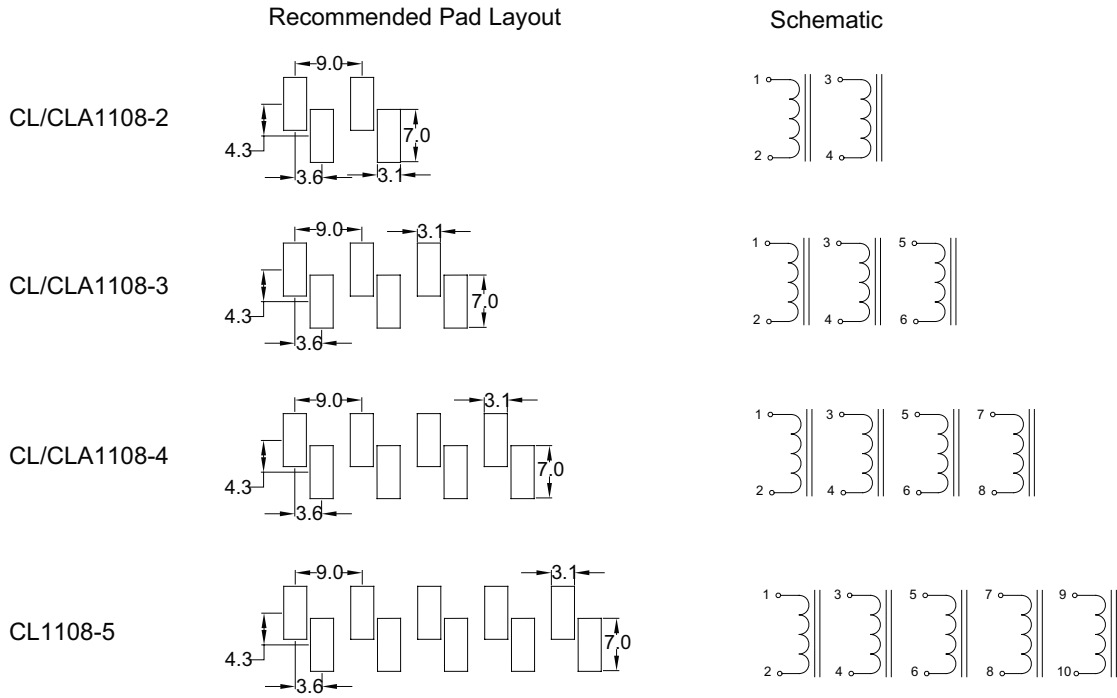
Dimensions (mm)



Part marking: Pin 1 dot, CL1108/CLA1108= (product code and size, CL= standard, CLA= acoustic noise dampening), -2,-3,-4,-5, = (number of phases), -50= inductance value per phase in nH, TR= tape and reel, -R = RoHS compliant  
wwlllyy = date code, R = revision level

Tolerances are ±0.25 millimeters unless stated otherwise  
All soldering surfaces to be coplanar within 0.13 millimeter  
Do not route traces or vias underneath the inductor

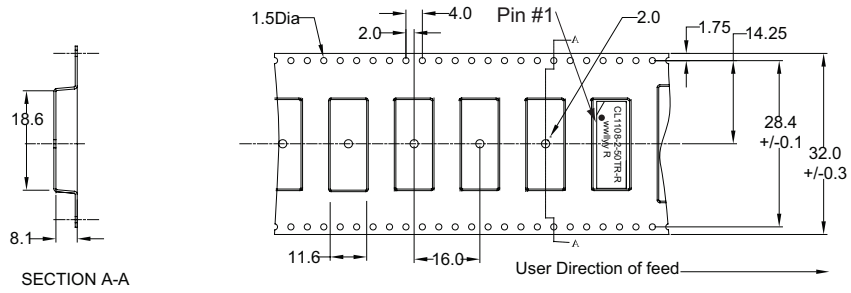
Pad layouts & schematics (mm)



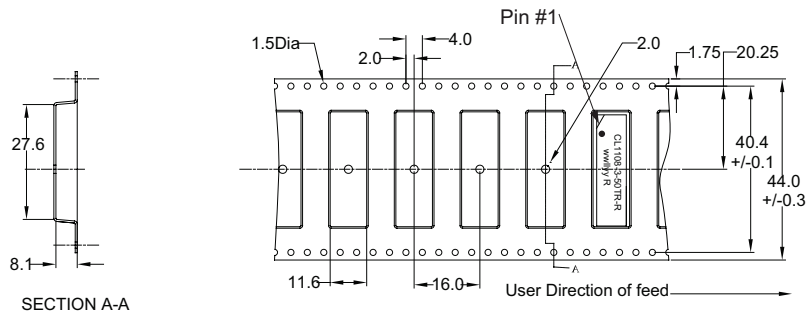
**Packaging information (mm)**

Supplied in tape and reel packaging on a 13" diameter reel.

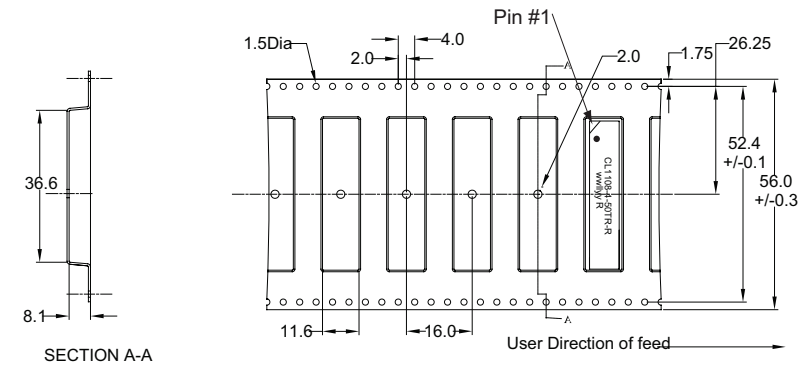
CL/CLA1108-2  
500 parts per reel



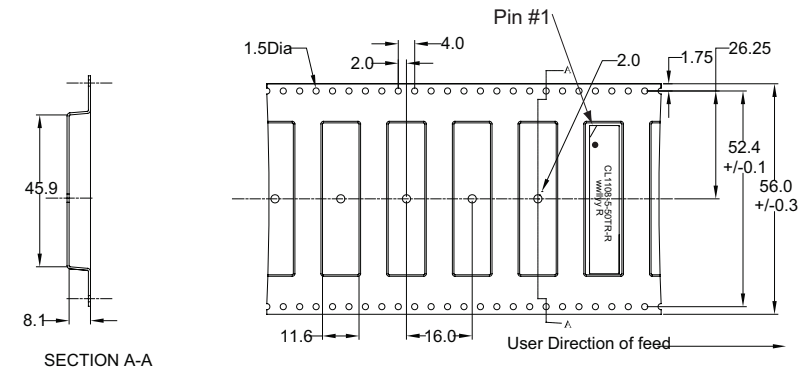
CL/CLA1108-3  
200 parts per reel



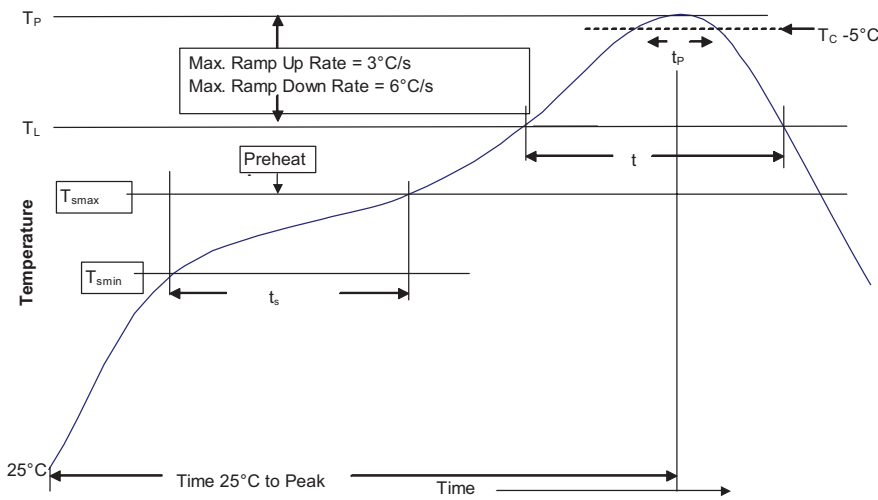
CL/CLA1108-4  
200 parts per reel



CL1108-5  
150 parts per reel



**Solder reflow profile**



**Table 1 - Standard SnPb Solder ( $T_C$ )**

| 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 ( $T_C$ )**

| 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 JDEC J-STD-020**

| Profile Feature  | Standard SnPb Solder | Lead (Pb) Free Solder |
|--|----------------------|-----------------------|
| Preheat and Soak   |                      |                       |
| • Temperature min. ( $T_{smin}$ )  | 100 °C               | 150 °C                |
| • Temperature max. ( $T_{smax}$ )  | 150 °C               | 200 °C                |
| • Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )                                      | 60-120 Seconds       | 60-120 Seconds        |
| Average ramp up rate $T_{smax}$ to $T_p$   | 3°C/ Second Max.     | 3 °C/ Second Max.     |
| Liquidous temperature ( $T_L$ )  | 183 °C               | 217 °C                |
| Time at liquidous ( $t_L$ )  | 60-150 Seconds       | 60-150 Seconds        |
| Peak package body temperature ( $T_p$ )*   | Table 1              | Table 2               |
| Time ( $t_p$ )** within 5 °C of the specified classification temperature ( $T_C$ ) | 20 Seconds**         | 30 Seconds**          |
| Average ramp-down rate ( $T_p$ to $T_{smax}$ )                                     | 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 ( $T_p$ ) is defined as a supplier minimum and a user maximum.  
 \*\* Tolerance for time at peak profile temperature ( $t_p$ ) is defined as a supplier minimum and a user maximum.

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

**Eaton**  
**Electronics Division**  
 1000 Eaton Boulevard  
 Cleveland, OH 44122  
 United States  
[www.eaton.com/electronics](http://www.eaton.com/electronics)

© 2018 Eaton  
 All Rights Reserved  
 Printed in USA  
 Publication No. 4380 PCN18034  
 August 2018

Eaton is a registered trademark.  
 All other trademarks are property of their respective owners.

Follow us on social media to get the latest product and support information.

