

CMC 17 Common Mode Chokes Series

High Grade - Improved Temperature Stability

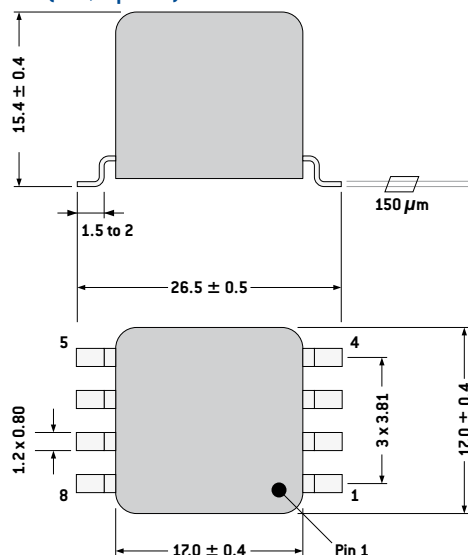


- Less than 20 % performance variations versus temperature [–55 °C/ +125 °C]
- Minimum impedance attenuation: 100 Ω from 100 kHz to 30 MHz
- Compact SMD package (2x4 pins)
- Applied standards: MIL-STD-202, ECSS-Q-ST-70-02C, D0-160 and ESCC 3201 generic specification for space products
- RMS current range : from 1.1 A to 11.7 A for 40 °C heating above 25 °C
- Materials meet UL94-V0 rating
- Thermal index according to IEC85 : H (180 °C)
- Operating/storage temperature range : –55 °C to +125 °C
- Approx weight : 10 grams

Electrical Data

| ID Code | Inductance Value at 25°C (-40/+35%) | Typical SRF | Max Impedance (Typical) | Max Attenuation (Z = 50Ω) | MAX RMS Current for ΔT = 40°C | MAX DC Resistance (25°C) | Typical Leakage Inductance (100kHz) |
|---------------|-------------------------------------|-------------|-------------------------|---------------------------|-------------------------------|--------------------------|-------------------------------------|
| CMC17 M45 1WR | 0.45 mH | 32 MHz | 1 kΩ | 20 dB | 11.7 A | 5 mΩ | 0.5 μH |
| CMC17 1M2 1WR | 1.15 mH | 15 MHz | 1.9 kΩ | 26 dB | 8.3 A | 10 mΩ | 1.1 μH |
| CMC17 2M6 1WR | 2.59 mH | 8 MHz | 3.7 kΩ | 32 dB | 6 A | 18 mΩ | 2.3 μH |
| CMC17 5M8 1WR | 5.83 mH | 1.5 MHz | 5.3 kΩ | 35 dB | 4 A | 40 mΩ | 6.3 μH |
| CMC17 13M 1WR | 13.1 mH | 0.6 MHz | 9.4 kΩ | 40 dB | 2.7 A | 90 mΩ | 13.4 μH |
| CMC17 30M 1WR | 30.3 mH | 0.3 MHz | 15.8 kΩ | 44 dB | 1.7 A | 220 mΩ | 32 μH |
| CMC17 69M 1WR | 69.2 mH | 0.1 MHz | 29 kΩ | 49 dB | 1.1 A | 500 mΩ | 70 μH |

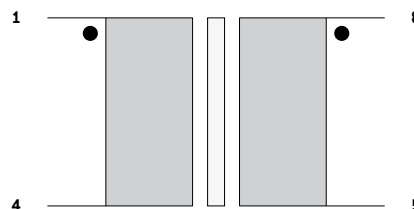
Typical Dimensions (mm, top view)



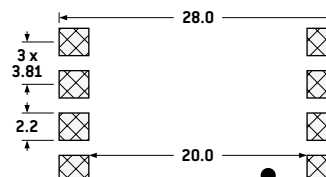
Notes

1. Dielectric strength test: 500v (50Hz - 1min)
2. 1:1 ratio (sector wound construction)

Connections

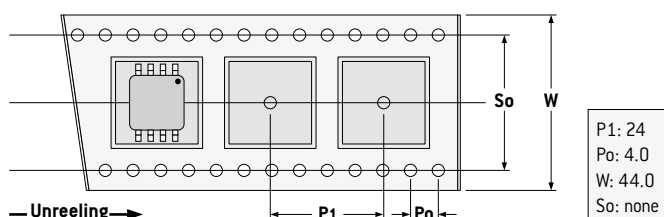


PCB Layout (suggested)



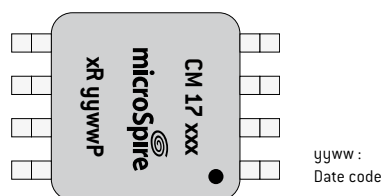
Packaging

Tape and Reel:
150 units per reel of diameter 330 mm



P1: 24
P0: 4.0
W: 44.0
So: none

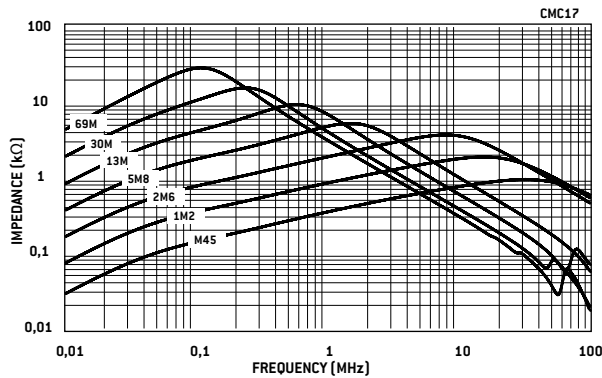
Marking



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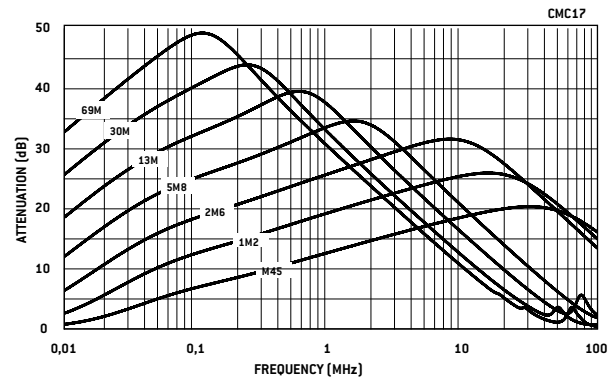
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Impedance



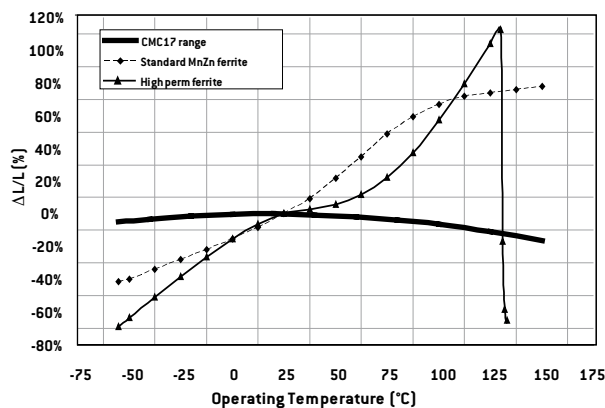
Typical values at 25°C with 1 mT at 10 kHz

Attenuation



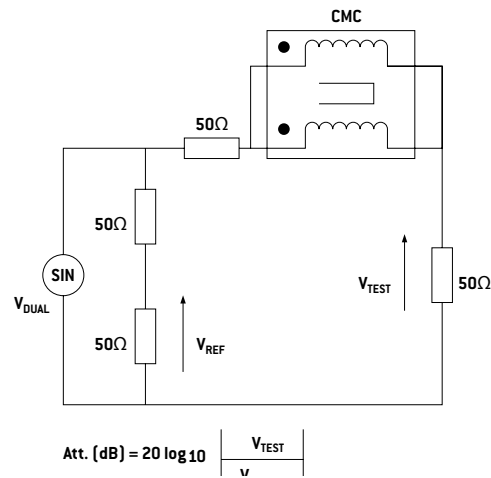
Typical values ($Z = 50 \Omega$) at 25°C with 1 mT at 10 kHz

Variation vs Temperature



Change in inductance value (< 1 mT at 10 kHz)

Attenuation Measurement Circuit

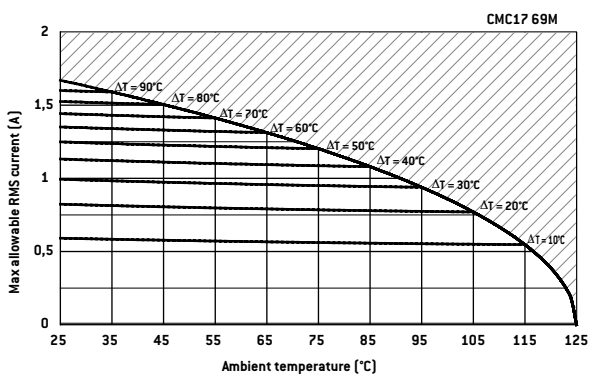
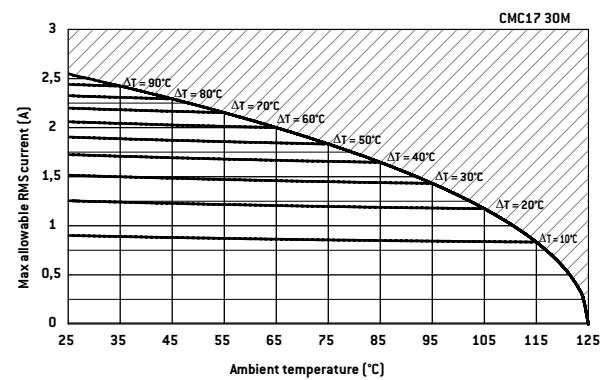
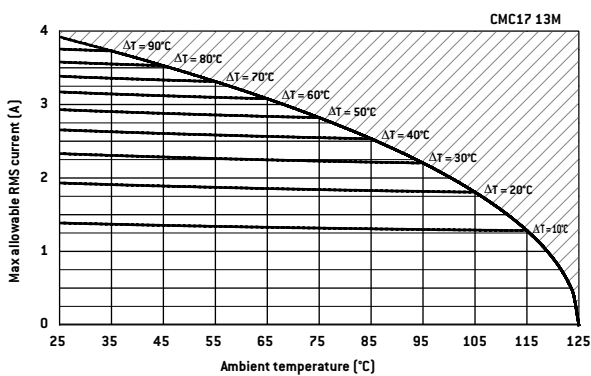
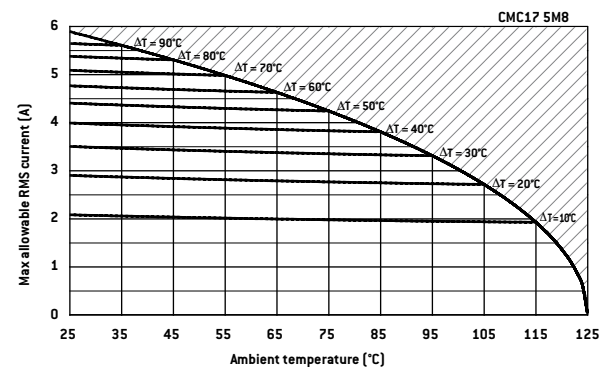
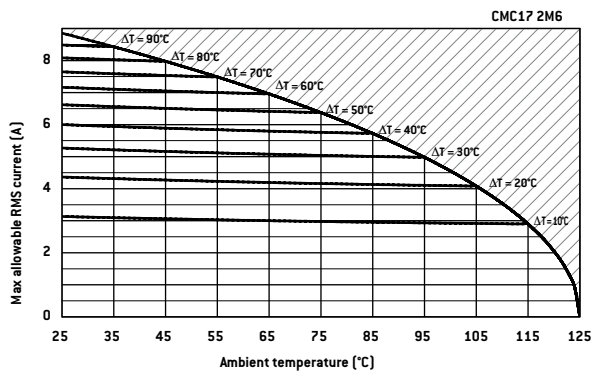
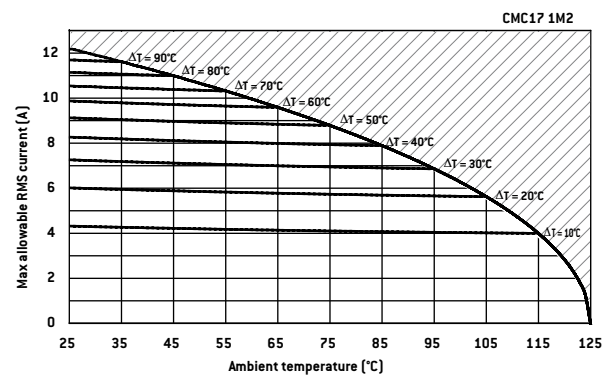
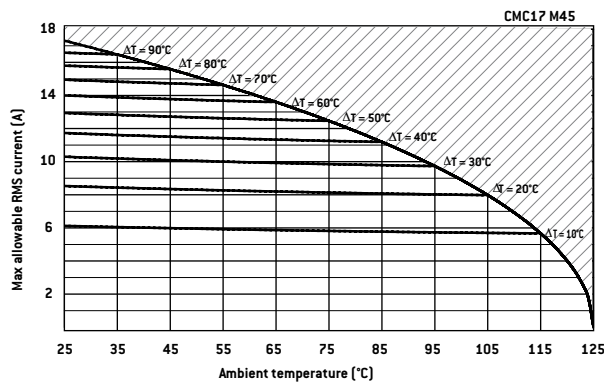


CMC17 range uses very high performance materials and therefore, offers remarkable temperature stability figures compared to standard or high-perm ferrite cores.

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Derating Curves



All thermal measurements under atmospheric conditions with component mounted on 1 dm² PCB without cooling device. All above graphs indicate maximum RMS current allowed through component v. ambient temperature for a defined ΔT. Maximum operating temperature is +125°C.

Example:

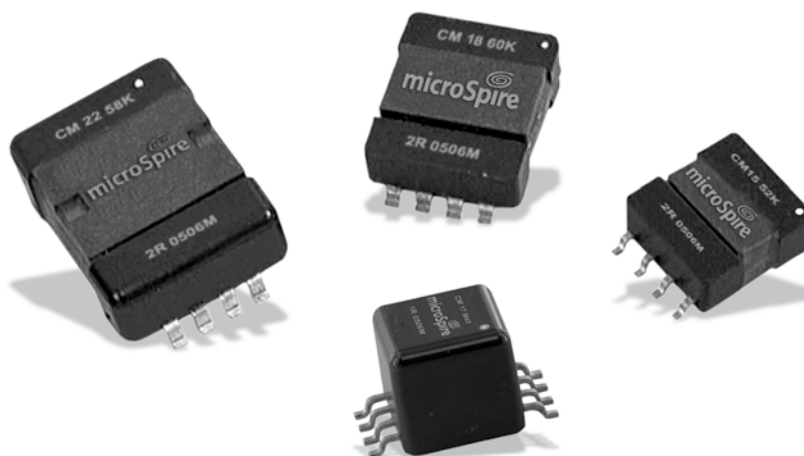
CMC17 M45 for application with $T_{amb} = +85^{\circ}\text{C}$ Max current allowed is < 11 Arms with $\Delta T < 40^{\circ}\text{C}$.

If temp increase allowed in application is limited to $\Delta T < 20^{\circ}\text{C}$, current must be reduced to 8 Arms.



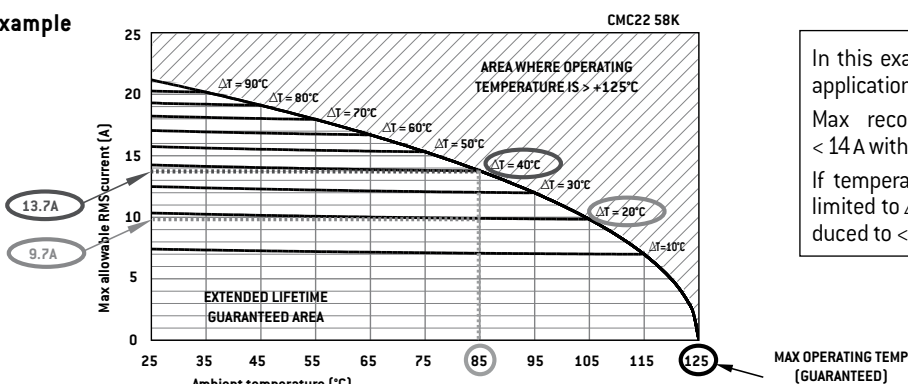
Technical note - Appendix

CMC 15 - 18 - 22 & CMC 17 Temperature Application



- The operating temperature announced in the datasheets takes into account maximum ambient temperature around the component + its self heating temperature in operation.
- Typical T° range is -55°C + 125°C for usual embedded applications (avionics, defence, space...) in order to ensure a good ageing of the products.
- Microspire guarantees an extended lifetime in this operational T° range, because only high temperature class materials are used and offer sufficient safety margin: all plastic materials used are H class according to IEC85 standard (180°C during 20.000 hours) and magnetic cores show a high Curie temperature value ($T_c > 200^{\circ}\text{C}$).
- Typical values for admissible current at $+25^{\circ}\text{C}$ ambient for a 40°C nominal temperature increase are defined without any heatsink in our literature.
- When using an appropriate cooling device, these values can be slightly increased
- The associated derating curves allow to check maximum current possible in the component versus acceptable temperature increase above ambient temperature of the application.

Example



In this example, CMC22 58K is chosen for an application at $T_{\text{amb}} = +85^{\circ}\text{C}$.

Max recommended RMS current is then $< 14\text{A}$ with $\Delta T < 40^{\circ}\text{C}$.

If temperature increase in the application is limited to $\Delta T < 20^{\circ}\text{C}$, current value must be reduced to $< 10\text{A}$.

- With the above data, it is clear that the « theoretical » maximum possible current reaches zero for $+125^{\circ}\text{C}$ ambient temperature (because heating above is not recommended) !
- However, it still remains possible to load the component with current leading to operating temperature greater than $+125^{\circ}\text{C}$ but in this case, extended lifetime for the product is not guaranteed any longer.
- Heating values versus current above $+125^{\circ}\text{C}$ operating temperature can still be calculated upon request.