

Common Mode Chokes for DC/DC Embedded Applications - CMC 15 xxx 2WR Series

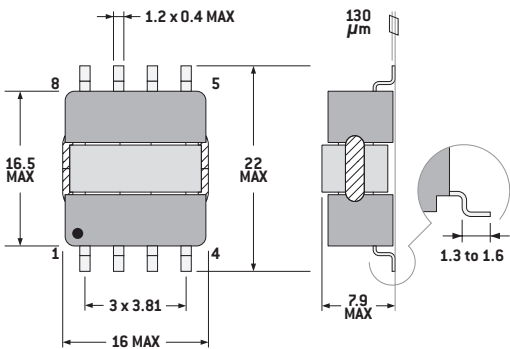


- Based on EXXELIA's «SESI15 Planar Technology»
- Low-profile SMD package (2 x 4 pins)
- Applied standards: MIL-STD-202, ECSS-Q-70-02, D0-160
- EESA ESCC 3201/010 version upon request
- RMS current range: from 0.6 A to 6.7 A for 40°C heating above 25°C
- Excellent impedance attenuation > 100 Ω from 300 kHz to 65 MHz
- Dielectric strength test up to 500 V (50 Hz - 1 min)
- Materials meet UL94-V0 rating
- Thermal index according to IEC85: H (180°C)
- Operating/storage temperature range: -55°C to +125°C
- Approximative weight: 5 grams

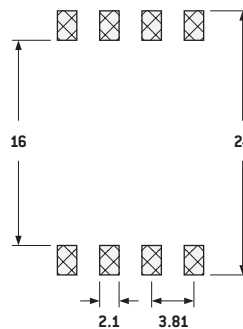
Electrical Data

| ID Code | Inductance Value at 25°C (±40%) | Typical SRF | max. Impedance (Typical) | max. Attenuation (Z = 50Ω) | max. RMS Current for ΔT = 40°C | max. R _{DC} (25°C) | Dielectric Strength (50Hz - 1min) |
|---------------|---------------------------------|-------------|--------------------------|----------------------------|--------------------------------|-----------------------------|-----------------------------------|
| CMC15 52K 2WR | 0.05 mH | 7.3 MHz | 1.6 kΩ | 25 dB | 6.7 A | 15 mΩ | 500 Vrms |
| CMC15 M11 2WR | 0.11 mH | 5.8 MHz | 3.7 kΩ | 32 dB | 4.4 A | 35 mΩ | 500 Vrms |
| CMC15 M22 2WR | 0.22 mH | 3.9 MHz | 7.3 kΩ | 37 dB | 3.3 A | 65 mΩ | 500 Vrms |
| CMC15 M47 2WR | 0.47 mH | 2.4 MHz | 15 kΩ | 44 dB | 2.2 A | 150 mΩ | 500 Vrms |
| CMC15 1M0 2WR | 1.0 mH | 1.8 MHz | 33.5 kΩ | 51 dB | 1.4 A | 350 mΩ | 500 Vrms |
| CMC15 2M0 2WR | 2.0 mH | 1.2 MHz | 66.9 kΩ | 57 dB | 0.95 A | 770 mΩ | 500 Vrms |
| CMC15 4M0 2WR | 4.0 mH | 0.9 MHz | 151 kΩ | 64 dB | 0.55 A | 1750 mΩ | 500 Vrms |

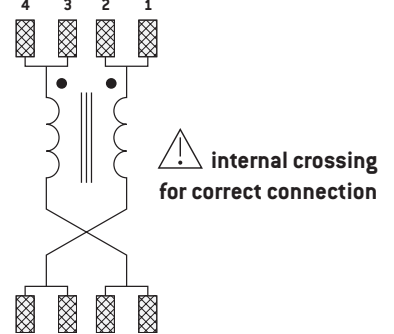
Typical Dimensions (mm, top view)



PCB Layout (suggested)

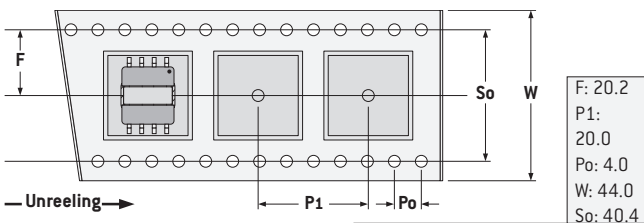


Connections (top view)

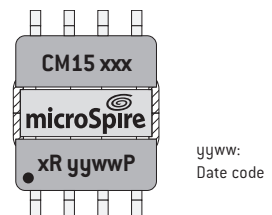


Packaging

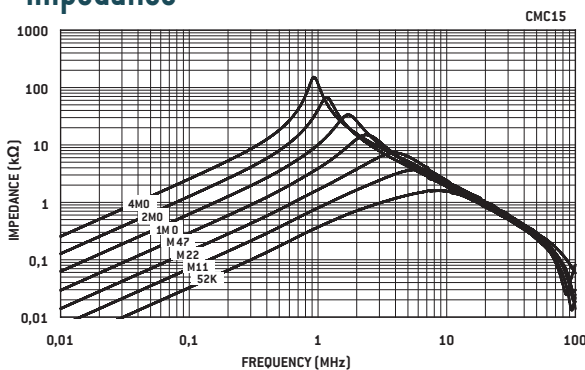
Tape and Reel:
400 units per reel of diameter 330 mm



Marking

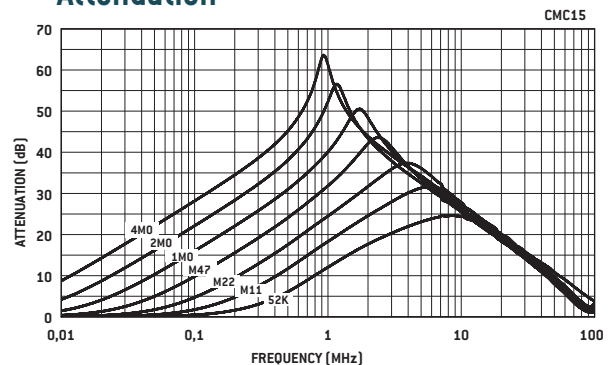


Impedance



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

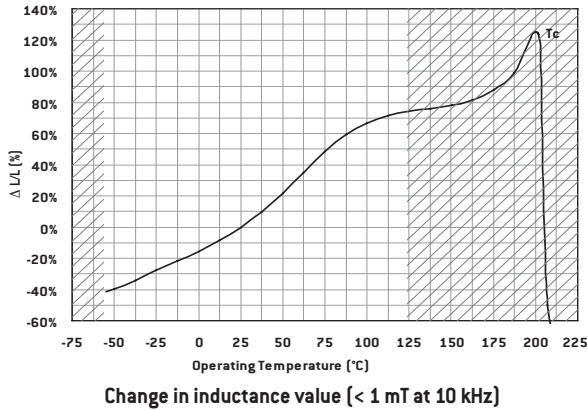
Attenuation



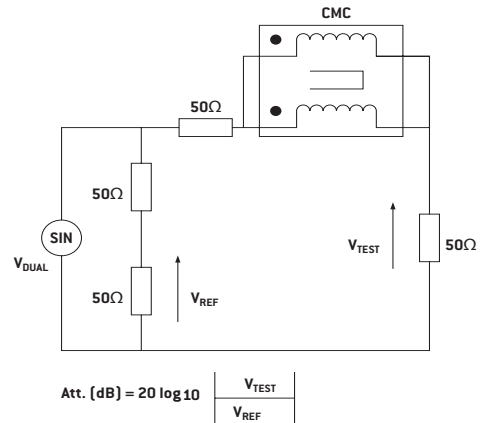
Typical values (Z = 50 Ω) at 25°C with 1 mT at 10 kHz

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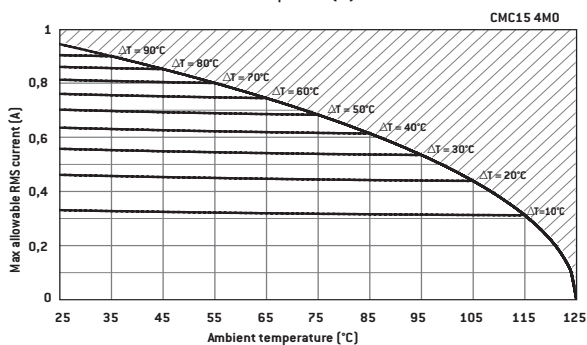
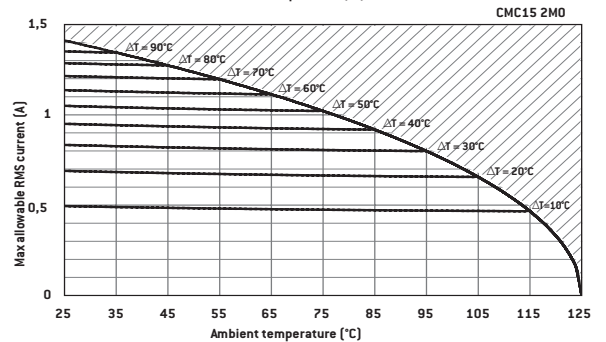
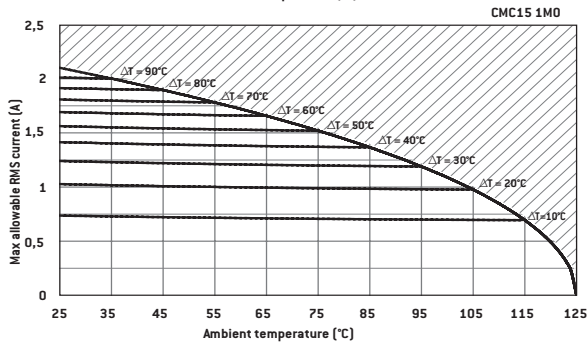
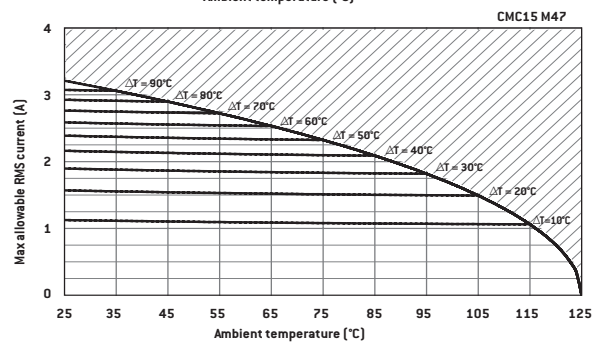
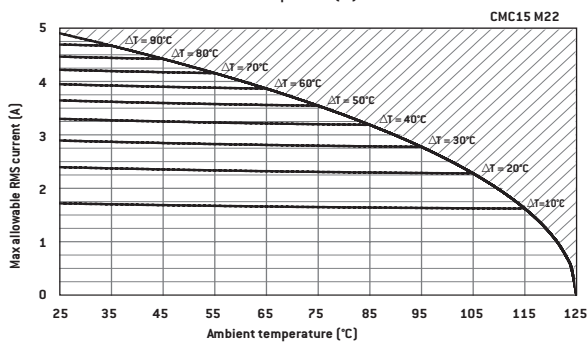
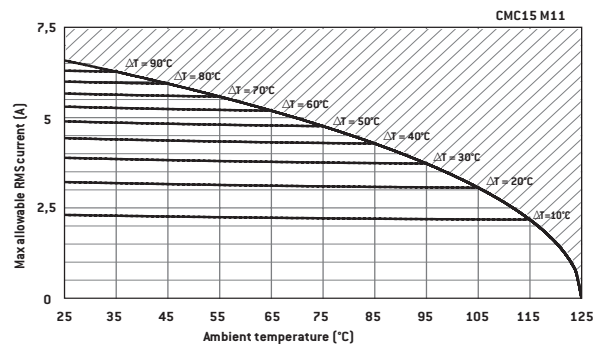
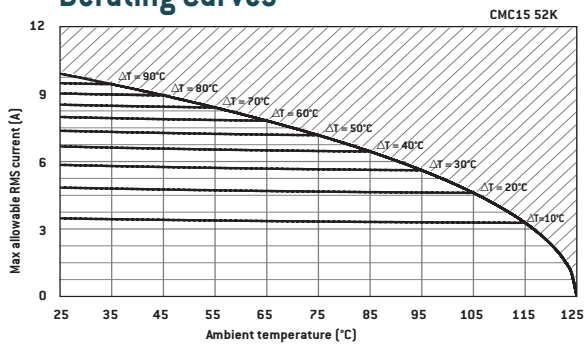
Variation vs Temperature



Attenuation Measurement Circuit



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:

CMC15 52K for application with T_{amb} = +85°C max. current allowed is < 6.5 Arms with ΔT < 40°C.

If temp increase allowed in application is limited to ΔT < 20°C, current must be reduced to 4.5 Arms.

SMD Power Inductors

CMC 15WR - 18WR - 22WR



Since 2013, EXXELIA has been manufacturing Common Mode Chokes, CMC15/18/22 WR series fulfilling ESA ESCC Generic specification N° 3201 and detail specification N° 3201/010.

This qualification approval includes final production tests Chart F2, burn-in and electrical measurements Chart F3 and qualification testing Chart F4.

For procurement, different quality levels are offered:

- Final production tests Chart F2
- Burn-in and electrical measurements Chart F3
- Lot acceptance testing Chart F4 if required

Components delivered through this specification need to be processed and inspected in accordance with the EXXELIA Process Identification Document (P.I.D.).

Each component delivered is traceable to its production lot.

The terminal material and finish shall be brass, plated with 2 to 4 μm of Nickel, the finish shall be either Sn60Pb40 or Sn90Pb10.

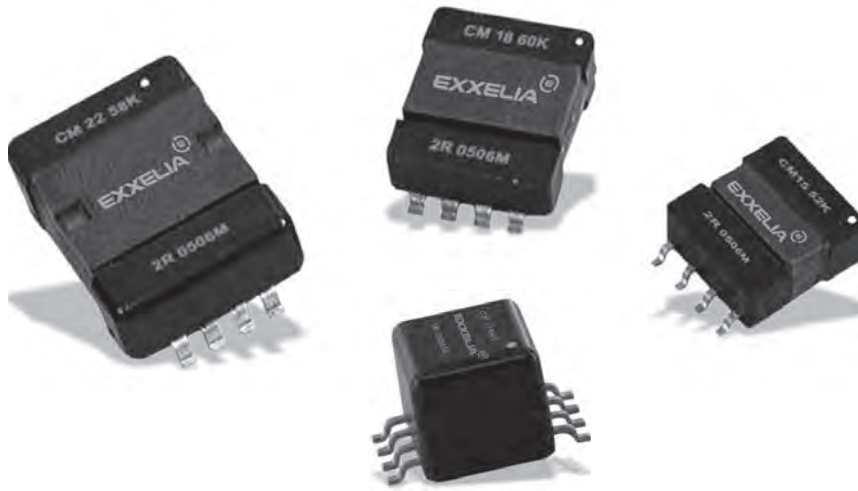
Cross reference chart

| EXXELIA Non-QPL ID Code | ESA SCC Component Part Number |
|-------------------------|----------------------------------|
| CMC 15 52K 2WR | 3201010 01 520 |
| CMC 15 M11 2WR | 3201010 01 111 |
| CMC 15 M22 2WR | 3201010 01 221 |
| CMC 15 M47 2WR | 3201010 01 471 |
| CMC 15 1M0 2WR | 3201010 01 102 |
| CMC 15 2M0 2WR | 3201010 01 202 |
| CMC 15 4M0 2WR | 3201010 01 402 |
| | |
| CMC 18 60K 2WR | 3201010 03 600 |
| CMC 18 M13 2WR | 3201010 03 131 |
| CMC 18 M27 2WR | 3201010 03 271 |
| CMC 18 M54 2WR | 3201010 03 541 |
| CMC 18 1M1 2WR | 3201010 03 112 |
| CMC 18 2M4 2WR | 3201010 03 242 |
| CMC 18 4M9 2WR | 3201010 03 492 |
| | |
| CMC 22 60K 2WR | 3201010 05 580 |
| CMC 22 M14 2WR | 3201010 05 141 |
| CMC 22 M34 2WR | 3201010 05 341 |
| CMC 22 M74 2WR | 3201010 05 741 |
| CMC 22 1M6 2WR | 3201010 05 162 |
| CMC 22 3M3 2WR | 3201010 05 332 |
| | |
| 3201010 0 ### y | |

Tolerance: $\pm 40\%$

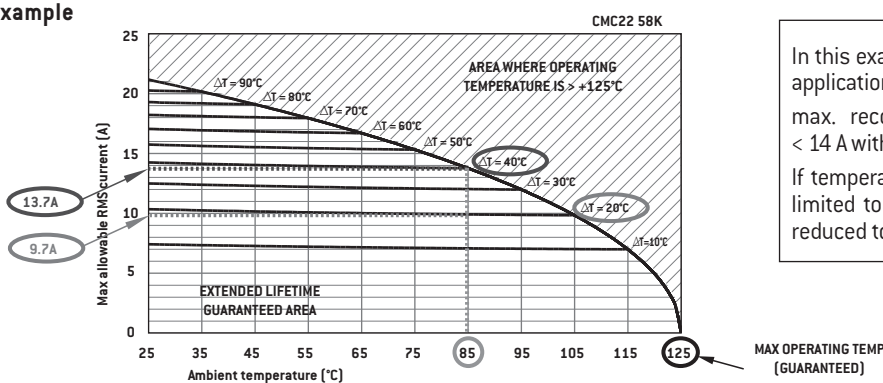
Technical note - Appendix

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 $+125^{\circ}\text{C}$ for usual embedded applications (avionics, defence, space...) in order to ensure a good ageing of the products.
- EXXELIA 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 heats ink 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.