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

Package	Indicative RMS Current for 40°C Heating* above 25°C	Max Dimensions (LxWxH in mm)	Number of Pins	Weight (grams)
CMC15	0.6A - 6.7A	22 x 16 x 8	2 x 4 SMD	5
CMC18	0.9A - 9.9A	26.5 x 20 x 9	2 x 4 SMD	10
CMC22	1.9A - 14.3A	37 x 24 x 12.5	2 x 4 SMD	26

* Values without heatsink; these values can be increased with appropriate cooling device

- Microspire's «SESI Technology» planar solution for high grade common mode chokes
- Three standard packages in a qualified technology for extreme working conditions
- Compliant with MIL-STD-202, ECSS-Q-70-02 (aerospace) and DO-160 (avionics) standards
- Already qualified by the CNES for space applications (ESCC Capability Approval in progress with the European Space Agency)
- Low profile and light design
- Highly efficient and reliable technology
- Extended operating temperature range from -55 °C to +125 °C
- Enlarged temperature stability of the performances
- SMD versions suited for IR and vapor reflow soldering

Shielded versions with thin six-face tinned copper box upon request
(3 times less EMI radiation)

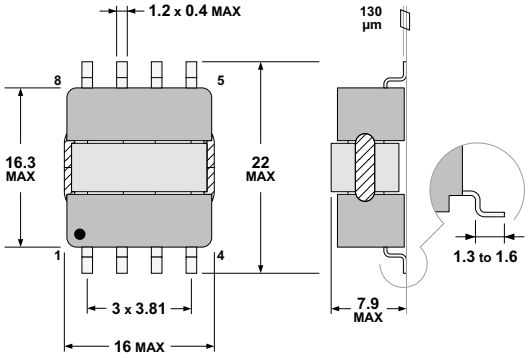
Common Mode Chokes for DC/DC Embedded Applications
CMC 15 xxx 2WR Series

- Based on Microspire's «SESI15 Planar Technology»
- Low-profile SMD package (2x4 pins)
- Applied standards: MIL-STD-202, ECSS-Q-70-02, DO-160
- 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
- Approx weight: 5 grams

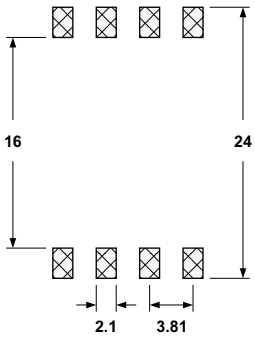
Electrical Data

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 DC Resistance (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

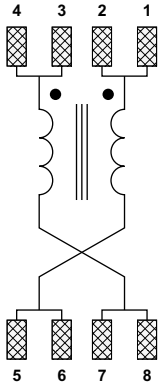
Typical Dimensions
(mm, top view)



PCB Layout
(suggested)

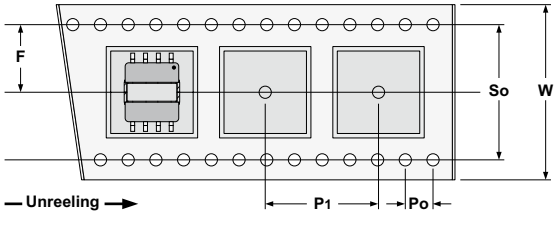


Connections
(top view)



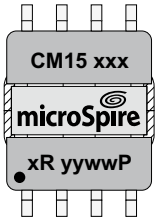
⚠ internal crossing for correct connection

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



F: 20.2
P1: 20.0
Po: 4.0
W: 44.0
So: 28.4

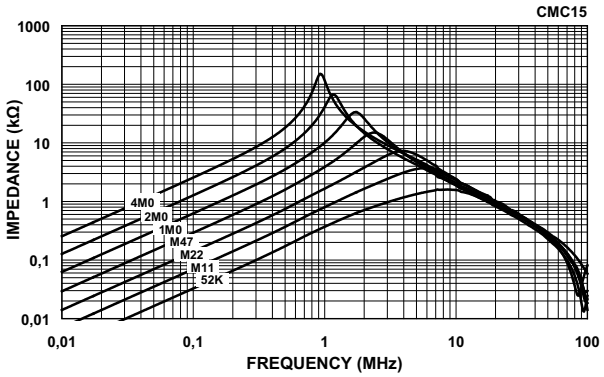
Marking



yyww : Date code

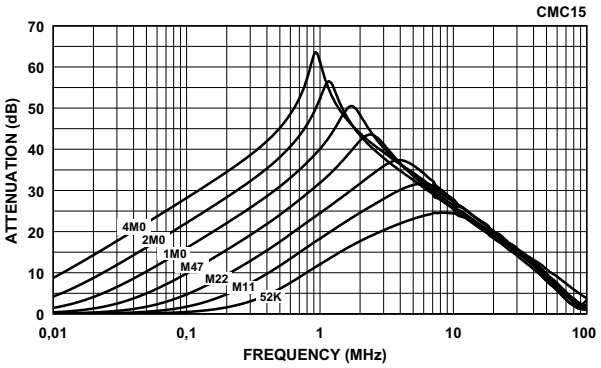
Common Mode Chokes for DC/DC Embedded Applications
CMC 15 xxx 2WR Series

Impedance



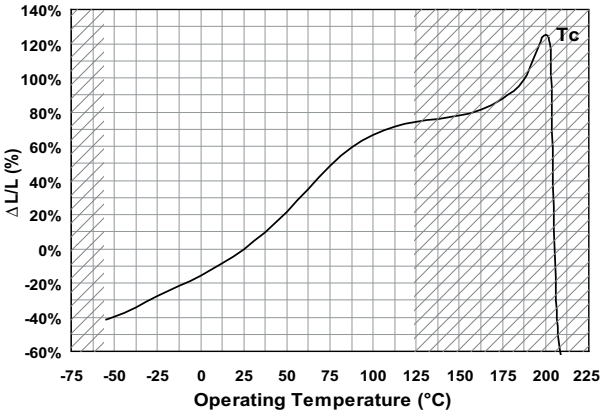
Typical values at 25°C with 1mT at 10kHz

Attenuation



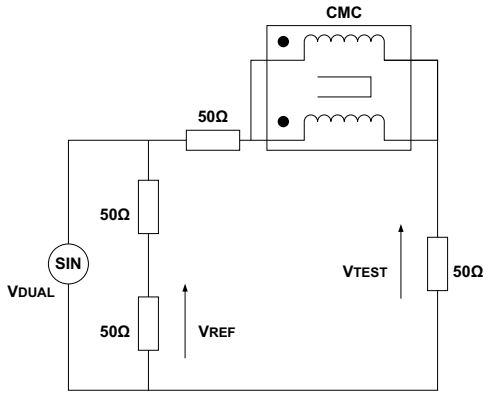
Typical values (Z=50Ω) at 25°C with 1mT at 10kHz

Variation vs Temperature



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

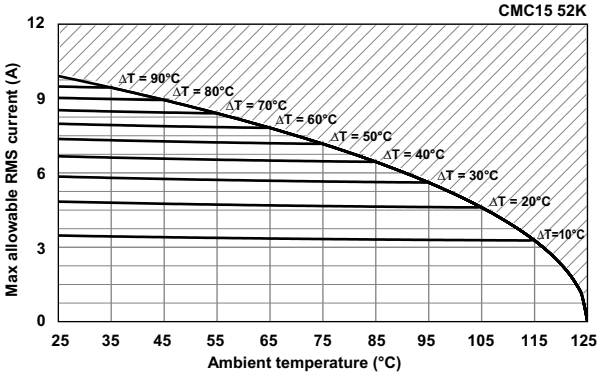
Attenuation Measurement Circuit

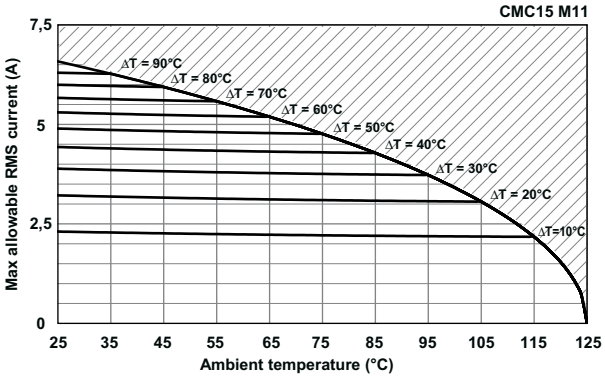


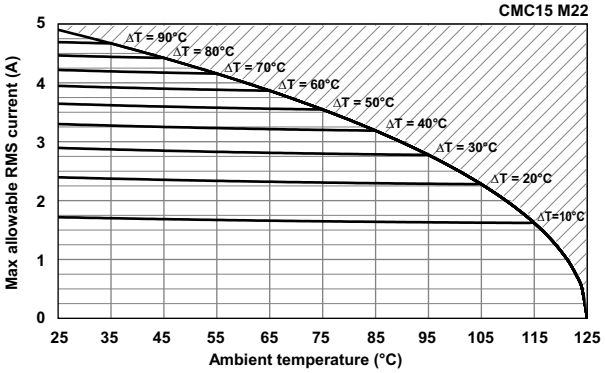
$$Att.\ (dB) = 20 \log_{10} \frac{V_{TEST}}{V_{REF}}$$

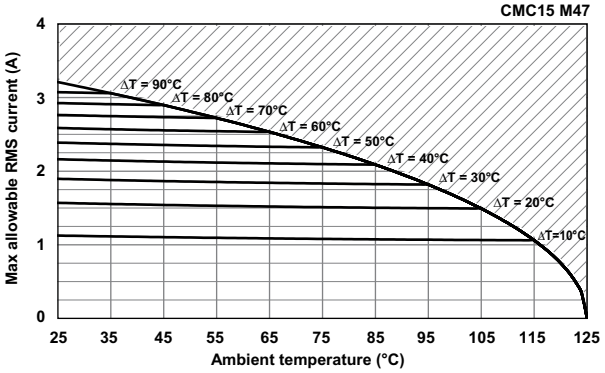
Common Mode Chokes for DC/DC Embedded Applications
CMC 15 xxx 2WR Series

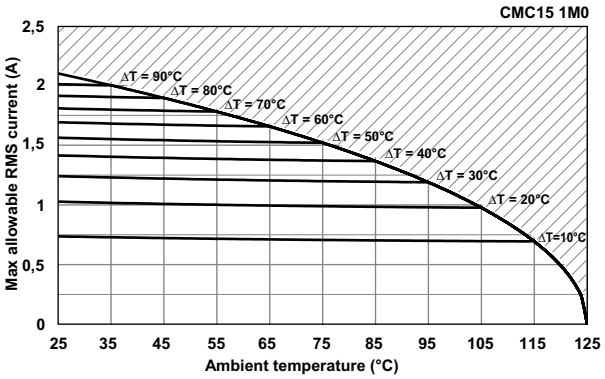
Derating Curves

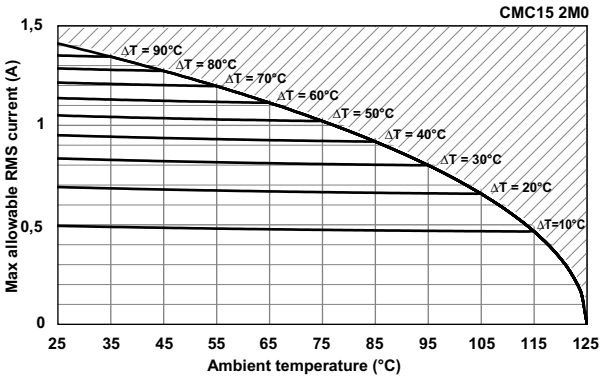


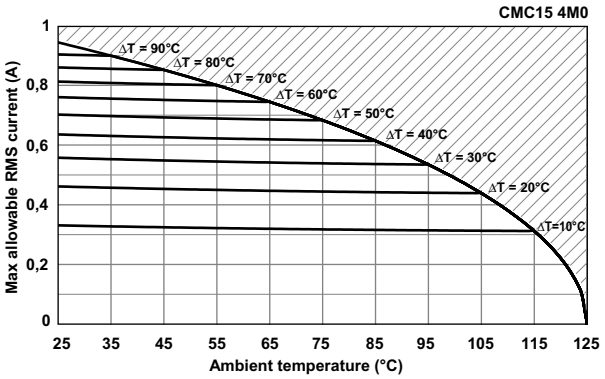












All thermal measurements under atmospheric conditions with component mounted on 1 dm^2 PCB without cooling device.

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 Tamb = + 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.

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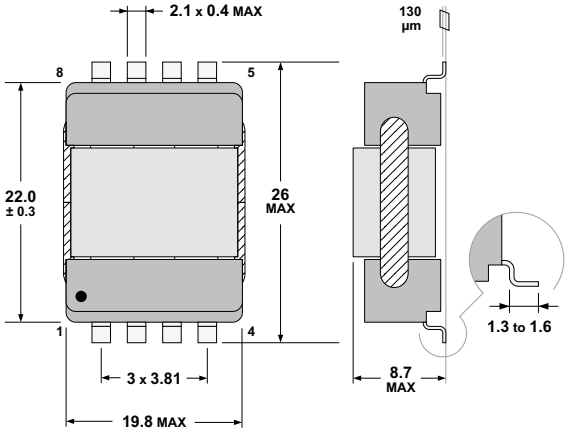
Common Mode Chokes for DC/DC Embedded Applications
CMC 18 xxx 2WR Series

- Based on Microspire's «SESI18 Planar Technology»
- Low-profile SMD package (2x4 pins)
- Applied standards : MIL-STD-202, ECSS-Q-70-02, DO-160
- RMS current range : from 0.9 A to 9.9 A for 40 °C heating above 25 °C
- Excellent impedance attenuation > 100 Ω from 300 kHz to 45 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
- Approx weight : 10 grams

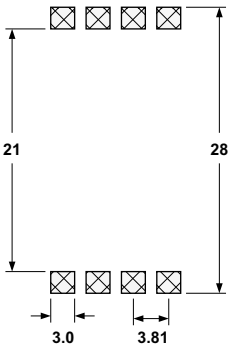
Electrical Data

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 DC Resistance (25°C)	Dielectric Strength (50Hz - 1min)
CMC18 60K 2WR	0.06 mH	4.5 MHz	1.4 kΩ	23 dB	9.9 A	7 mΩ	500 Vrms
CMC18 M13 2WR	0.13 mH	3.7 MHz	3 kΩ	30 dB	6.9 A	15 mΩ	500 Vrms
CMC18 M27 2WR	0.27 mH	2.5 MHz	6.3 kΩ	36 dB	4.5 A	35 mΩ	500 Vrms
CMC18 M54 2WR	0.54 mH	2 MHz	13.2 kΩ	42 dB	3 A	75 mΩ	500 Vrms
CMC18 1M1 2WR	1.1 mH	1.4 MHz	33.7 kΩ	51 dB	2 A	175 mΩ	500 Vrms
CMC18 2M4 2WR	2.4 mH	0.8 MHz	96.8 kΩ	60 dB	1.3 A	415 mΩ	500 Vrms
CMC18 4M9 2WR	4.9 mH	0.55 MHz	325 kΩ	70 dB	0.9 A	920 mΩ	500 Vrms

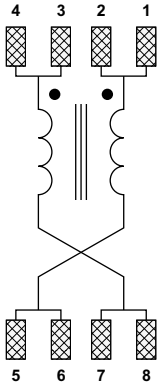
Typical Dimensions
(mm, top view)



PCB Layout
(suggested)

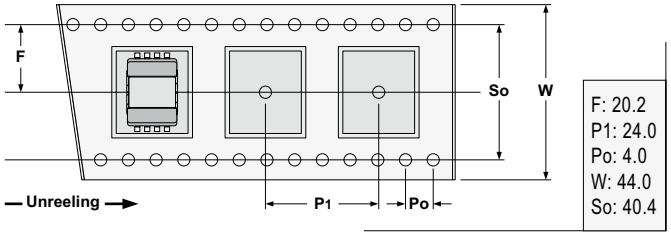


Connections
(top view)

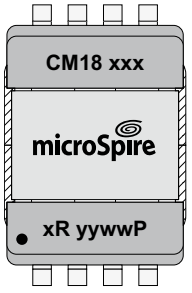


⚠ internal crossing for correct connection

Packaging
Tape and Reel:
300 pieces per reel of diameter 330 mm



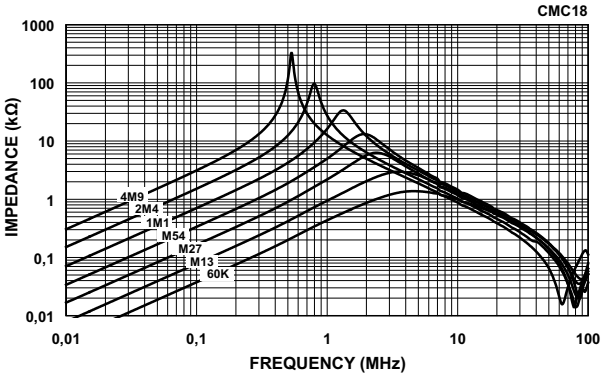
Marking



yyww : Date code

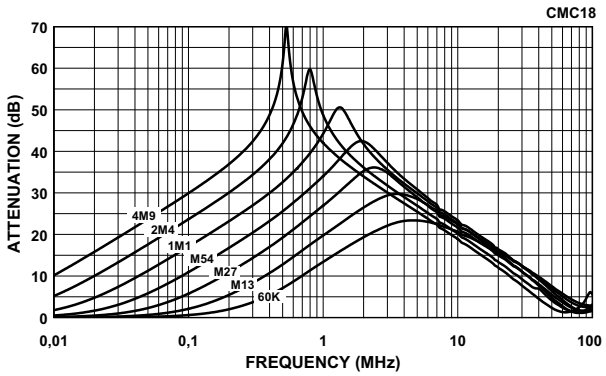
Common Mode Chokes for DC/DC Embedded Applications
CMC 18 xxx 2WR Series

Impedance



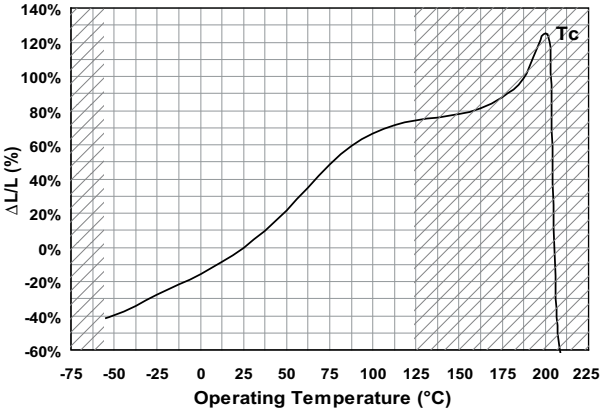
Typical values at 25°C with 1mT at 10kHz

Attenuation



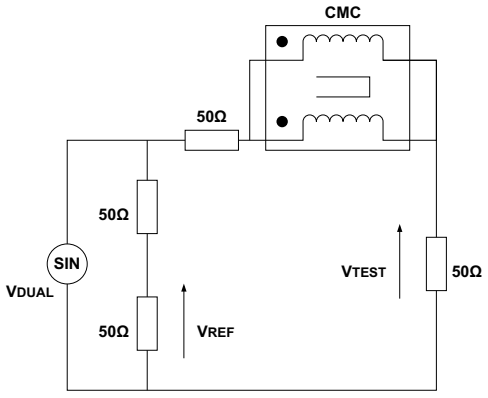
Typical values (Z=50Ω) at 25°C with 1mT at 10kHz

Variation vs Temperature



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

Attenuation Measurement Circuit



$$Att.\ (dB) = 20 \log_{10} \frac{V_{TEST}}{V_{REF}}$$

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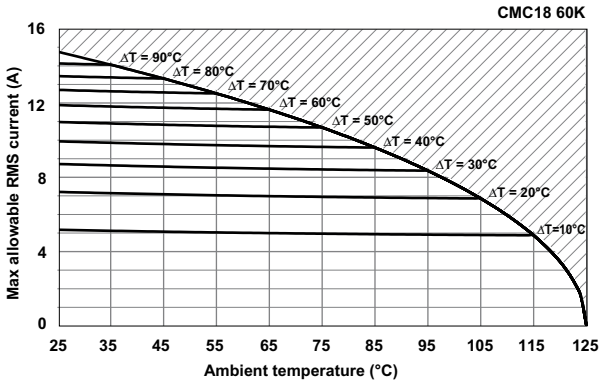
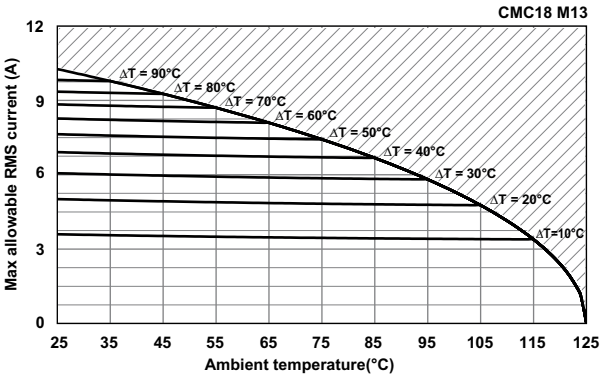
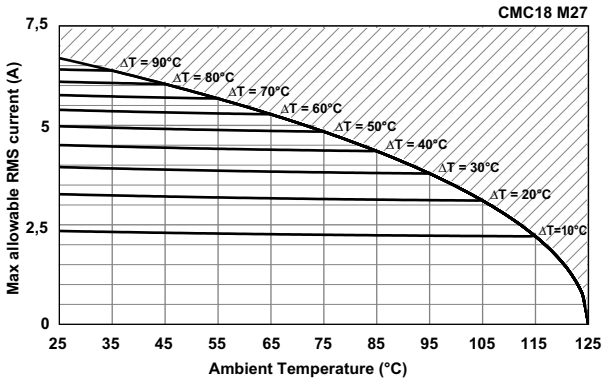
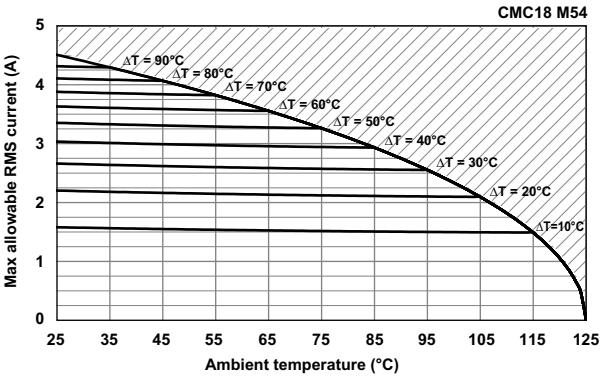
Common Mode Chokes for DC/DC Embedded Applications
CMC 18 xxx 2WR Series

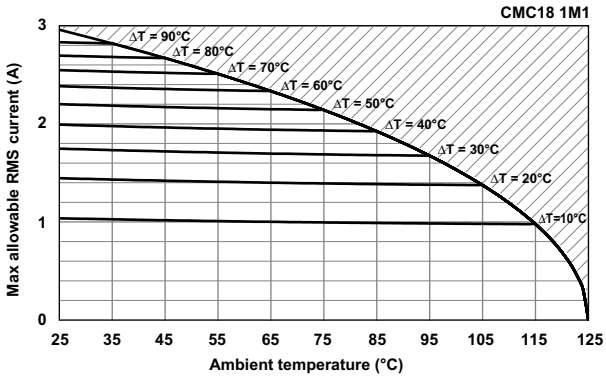
Derating Curves

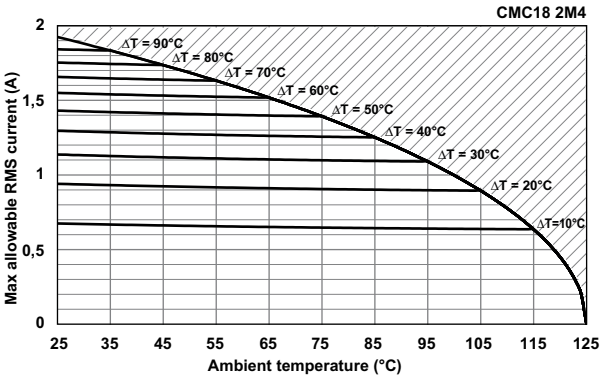


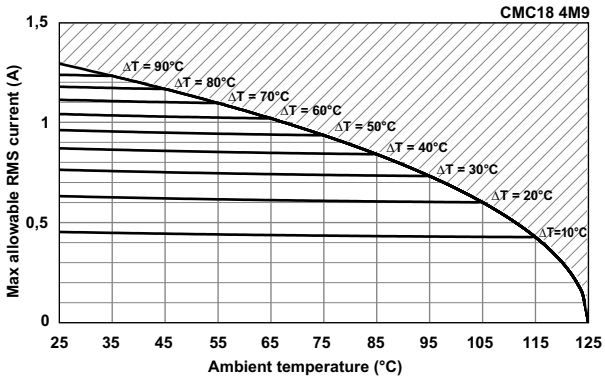












All thermal measurements under atmospheric conditions with component mounted on 1 dm^2 PCB without cooling device.

All above graphs indicate maximum RMS current allowed through component v. ambient temperature for a defined ΔT.

Maximum operating temperature is +125 °C.

Example :

CMC18 60K for application with Tamb = + 85 °C Max current allowed is <9.6 Arms with ΔT < 40 °C.

If temp increase allowed in application is limited to ΔT < 20 °C, current must be reduced to 7 Arms.

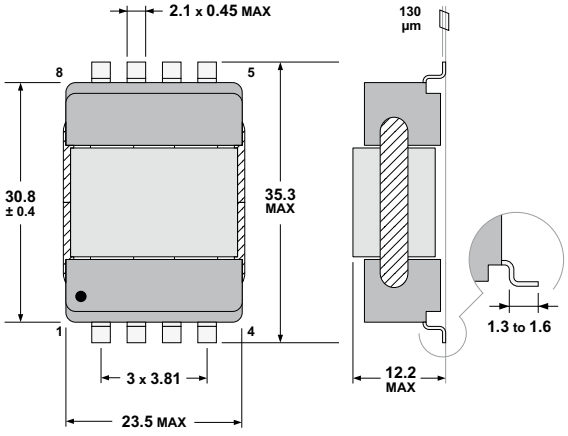
Common Mode Chokes for DC/DC Embedded Applications
CMC 22 xxx 2WR Series

- Based on Microspire's «SESI22 Planar Technology»
- Low-profile SMD package (2x4 pins)
- Applied standards: MIL-STD-202, ECSS-Q-70-02, DO-160
- RMS current range: from 1.9 A to 14.3 A for 40 °C heating above 25 °C
- Excellent impedance attenuation >100 Ω from 300 kHz to 35 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
- Approx weight: 26 grams

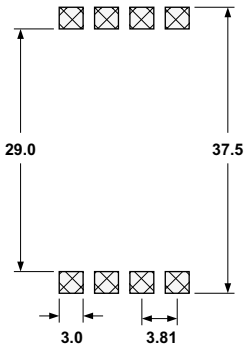
Electrical Data

ID Code	Inductance Value at 25°C (±40%)	Typical SRF	Max Impedance (Typical)	Max Attenuation (Z = 50Ω)	MAX RMS Current for ΔT = 40°C Heating	MAX DC Resistance (25°C)	Dielectric Strength (50Hz - 1min)
CMC22 58K 2WR	0.06 mH	3 MHz	1.1 kΩ	22 dB	14.3 A	5 mΩ	500 Vrms
CMC22 M14 2WR	0.14 mH	2 MHz	2.9 kΩ	30 dB	9.1 A	10 mΩ	500 Vrms
CMC22 M34 2WR	0.34 mH	1.5 MHz	9.1 kΩ	39 dB	5.8 A	20 mΩ	500 Vrms
CMC22 M74 2WR	0.74 mH	1.1 MHz	21.8 kΩ	47 dB	4.3 A	40 mΩ	500 Vrms
CMC22 1M6 2WR	1.6 mH	0.7 MHz	64.6 kΩ	56 dB	2.8 A	95 mΩ	500 Vrms
CMC22 3M3 2WR	3.3 mH	0.65 MHz	250 kΩ	68 dB	1.9 A	205 mΩ	500 Vrms

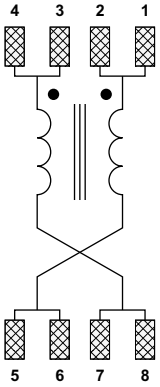
Typical Dimensions
(mm, top view)



PCB Layout
(suggested)

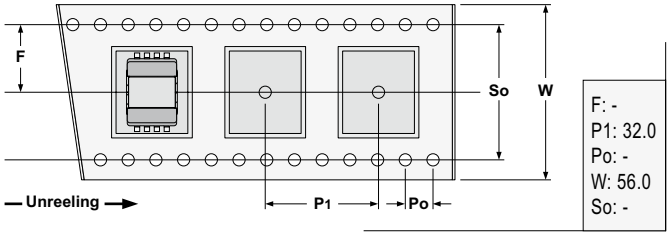


Connections
(top view)

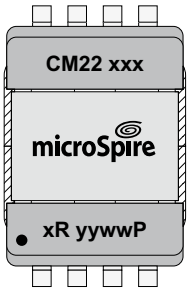


⚠ internal crossing for correct connection

Packaging
Tape and Reel:
100 units per reel of diameter 330 mm



Marking



yyww : Date code

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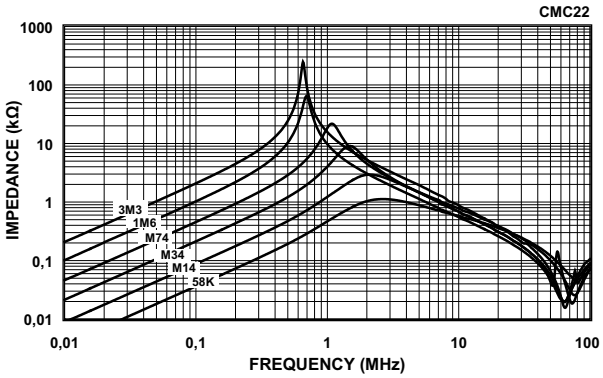
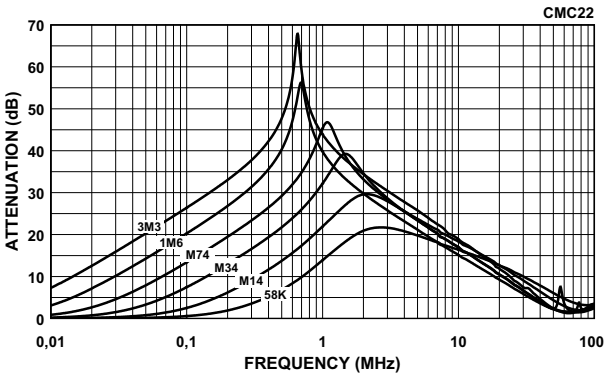
Common Mode Chokes for DC/DC Embedded Applications
CMC 22 xxx 2WR Series

Impedance



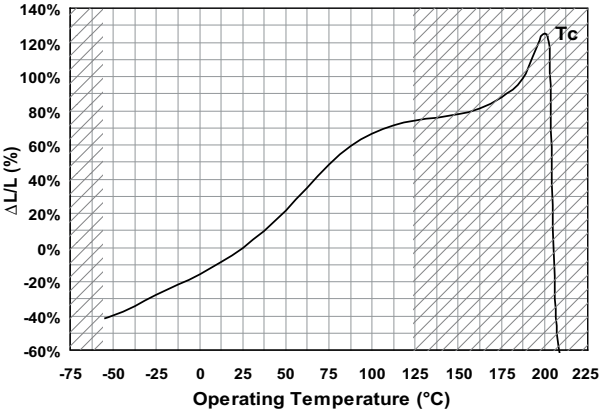
Typical values at 25°C with 1mT at 10kHz

Attenuation



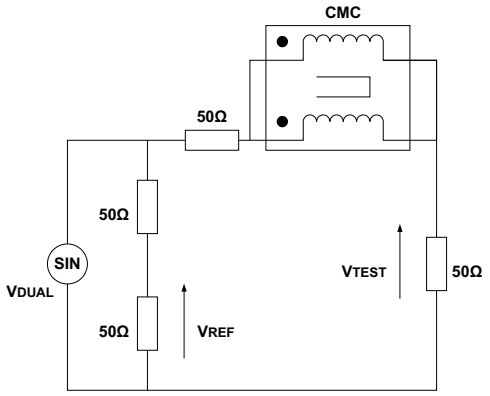
Typical values (Z=50Ω) at 25°C with 1mT at 10kHz

Variation vs Temperature



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

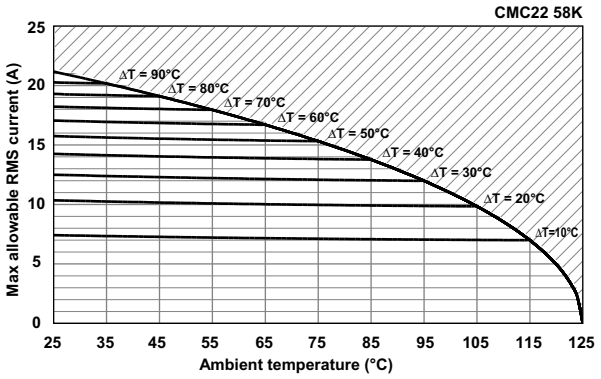
Attenuation Measurement Circuit

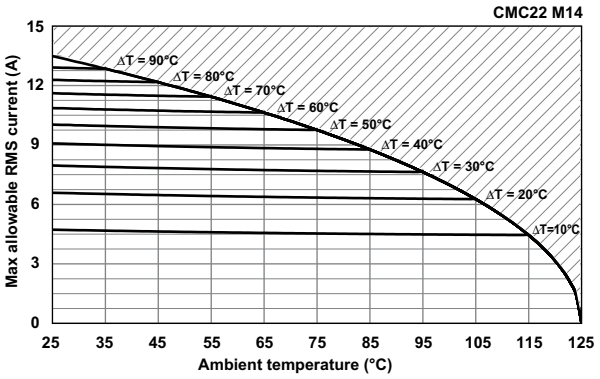


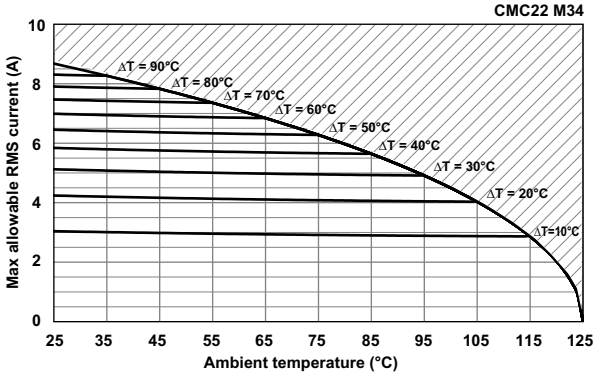
$$Att.\ (dB) = 20 \log_{10} \frac{V_{TEST}}{V_{REF}}$$

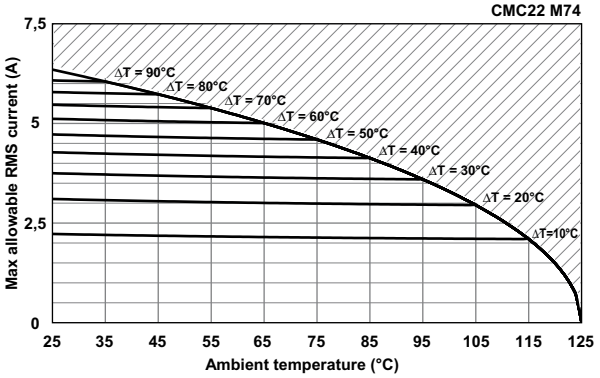
Common Mode Chokes for DC/DC Embedded Applications
CMC 22 xxx 2WR Series

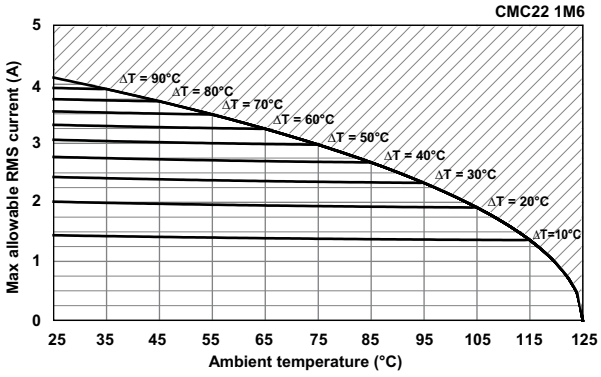
Derating Curves

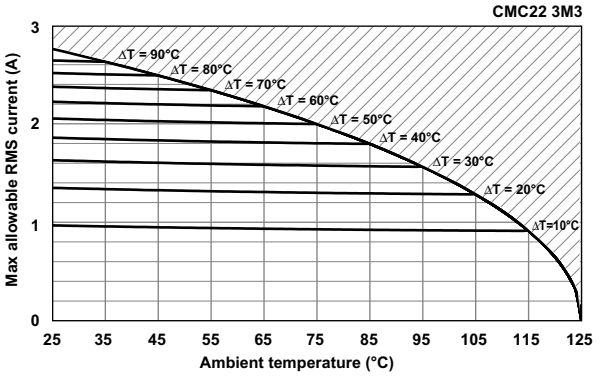












All thermal measurements under atmospheric conditions with component mounted on 1 dm^2 PCB without cooling device.
All above graphs indicate maximum RMS current allowed through component v. ambient temperature for a defined ΔT.
Maximum operating temperature is +125 °C.

Example :
CMC22 58K for application with Tamb = +85 °C. Max current allowed is < 14 Arms with ΔT < 40 °C.
If temp increase allowed in application is limited to ΔT < 20 °C, current must be reduced to 10 Arms.

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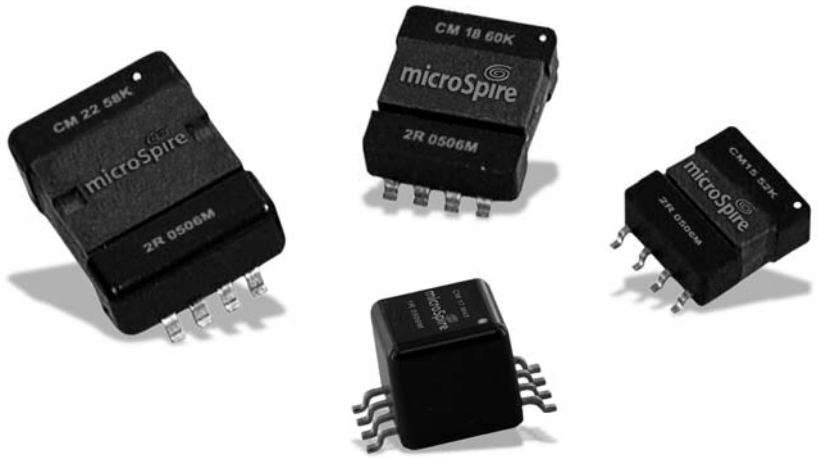
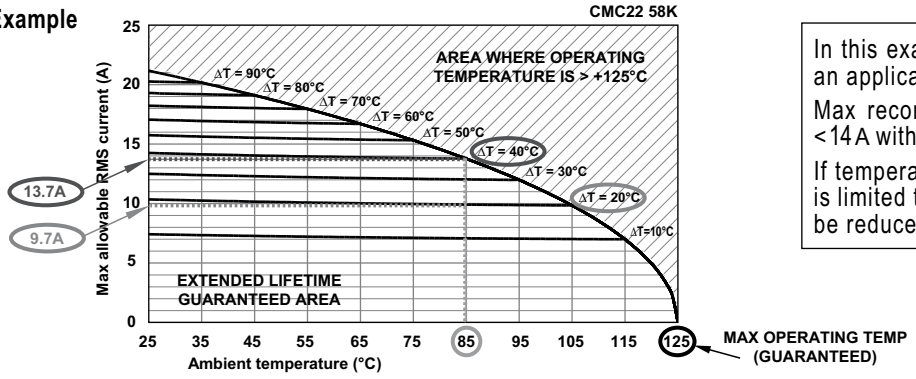
Technical note - Appendix

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 (Tc>200 °C).
- Typical values for admissible current at +25 °C ambient for a 40 °C nominal temperature increase are defined without any heatsink in our litterature.
- 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 Tamb = +85 °C.

Max recommended RMS current is then <14 A with ΔT<40 °C.

If temperature increase in the application is limited to ΔT<20 °C. current value must be reduced to <10 A.

- With the above data, it is clear that the « theoretical » maximum possible current reaches zero for +125 °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 °C but in this case, extended lifetime for the product is not guaranteed any longer.
- Heating values versus current above +125 °C operating temperature can still be calculated upon request.