

## **EMC filters**

2-line filters

SIFI-G for enhanced insertion loss

**Series/Type:**        **B84112G**

**Date:**                January 2025

## Power line filters for 1-phase systems

Rated voltage  $V_R$ : 250 V AC/DC

Rated current  $I_R$ : 2 A to 36 A

### Construction

- 2-line filters
- Metal case
- Polyurethane potting (UL 94 V-0)

### Versions

- Standard version (B84112G0000B\*/G\*)
- Medical version without leakage current (B84112G0000M\*)

### Features

- Easy to install
- Compact design
- Cost optimized construction
- ENEC, UL and cUL approval



### Typical applications

- Switch-mode power supplies
- Industrial electronics
- Telecom systems
- Data systems
- DC applications
- Medical equipment (version B84112G0000M\*)

### Terminals

- 2 A ... 16 A: Tab connectors
- 20 A ... 36 A: Threaded studs

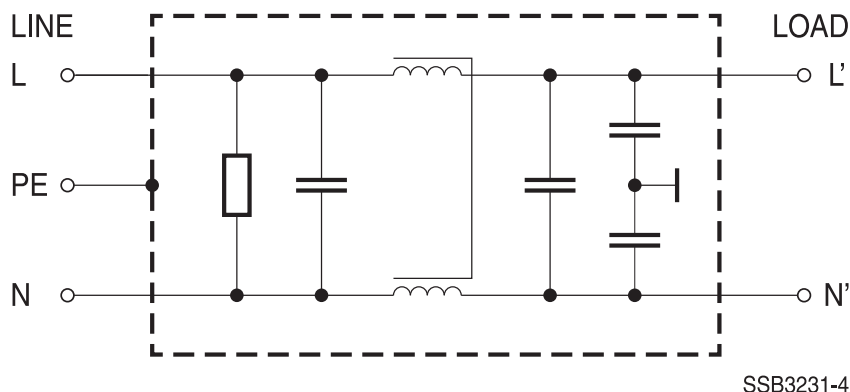
### Marking

- Marking on component:  
Manufacturer's logo, ordering code, rated voltage, rated current, rated temperature, climatic category, date code, approvals
- Minimum data on packaging:  
Manufacturer's logo, ordering code, quantity, date code

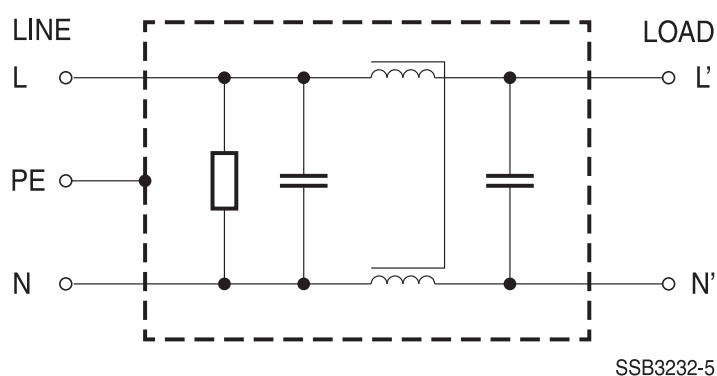


Schematic pictures

### Circuit diagram (standard version)



### Circuit diagram (medical version)



### Technical data and measuring conditions

Rated voltage $V_R$	250 V AC (50/60 Hz) / 250 V DC
Rated current $I_R$	Referred to 40 °C rated temperature
Test voltage $V_{test}$	1770 V DC, 2 s (line/line) Standard version: 2700 V DC, 2 s (lines/case) Medical version: 2500 V AC, 2 s (lines/case)
Leakage current $I_{LK}$	At 250 V AC and 50 Hz
Climatic category (IEC 60068-1)	25/100/21 (−25 °C/+100 °C/21 days damp heat test)
Approvals	IEC 60939, UL 1283, CSA C22.2 No.8

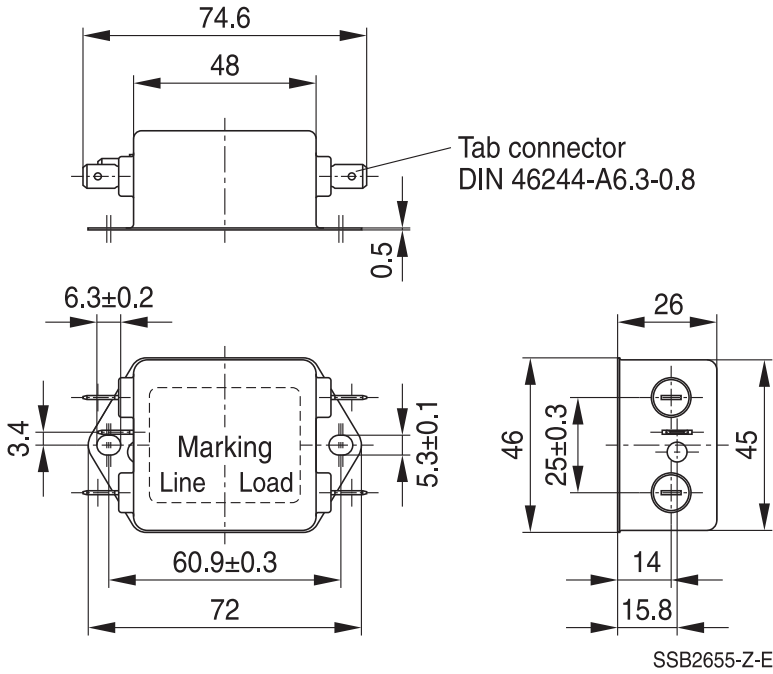
# Characteristics and ordering codes

$I_R$	$C_R$ X2	$C_R$ Y2	$L_R$	$I_{LK}$	Approx. weight	Ordering code	Approvals		
A	$\mu F$	pF	mH	mA	g				
$V_R = 250 \text{ V AC/DC}$									
2	$2 \times 0.15$	$2 \times 4700$	$2 \times 12$	0.369	90	B84112G0000B020	x	x	x
2	$2 \times 0.15$	—	$2 \times 12$	0	90	B84112G0000M020	x	x	x
3	$2 \times 0.22$	$2 \times 4700$	$2 \times 10$	0.369	200	B84112G0000B030	x	x	x
3	$2 \times 0.22$	—	$2 \times 10$	0	200	B84112G0000M030	x	x	x
6	$2 \times 0.47$	$2 \times 4700$	$2 \times 3.3$	0.369	200	B84112G0000B060	x	x	x
6	$2 \times 0.47$	—	$2 \times 3.3$	0	200	B84112G0000M060	x	x	x
8	$2 \times 0.47$	$2 \times 4700$	$2 \times 2.5$	0.369	200	B84112G0000B080	x	x	x
8	$2 \times 0.47$	—	$2 \times 2.5$	0	200	B84112G0000M080	x	x	x
10	$2 \times 0.68$	$2 \times 4700$	$2 \times 1.8$	0.369	200	B84112G0000B110	x	x	x
10	$2 \times 0.68$	—	$2 \times 1.8$	0	200	B84112G0000M110	x	x	x
12	$2 \times 0.68$	$2 \times 4700$	$2 \times 1.6$	0.369	200	B84112G0000B112	x	x	x
12	$2 \times 0.68$	—	$2 \times 1.6$	0	200	B84112G0000M112	x	x	x
16	$2 \times 0.47$	$2 \times 4700$	$2 \times 1.8$	0.369	210	B84112G0000B116	x	x	x
16	$2 \times 0.47$	—	$2 \times 1.8$	0	210	B84112G0000M116	x	x	x
20	$2 \times 1.0$	$2 \times 4700$	$2 \times 1.8$	0.369	440	B84112G0000G120	x	x	x
20	$2 \times 1.0$	—	$2 \times 1.8$	0	440	B84112G0000M120	x	x	x
25	$2 \times 1.0$	$2 \times 4700$	$2 \times 1.6$	0.369	440	B84112G0000G125	x	x	x
25	$2 \times 1.0$	—	$2 \times 1.6$	0	440	B84112G0000M125	x	x	x
36	$2 \times 1.5$	$2 \times 4700$	$2 \times 0.8$	0.369	470	B84112G0000G136	x	x	x
36	$2 \times 1.5$	—	$2 \times 0.8$	0	470	B84112G0000M136	x	x	x

x = Approval granted

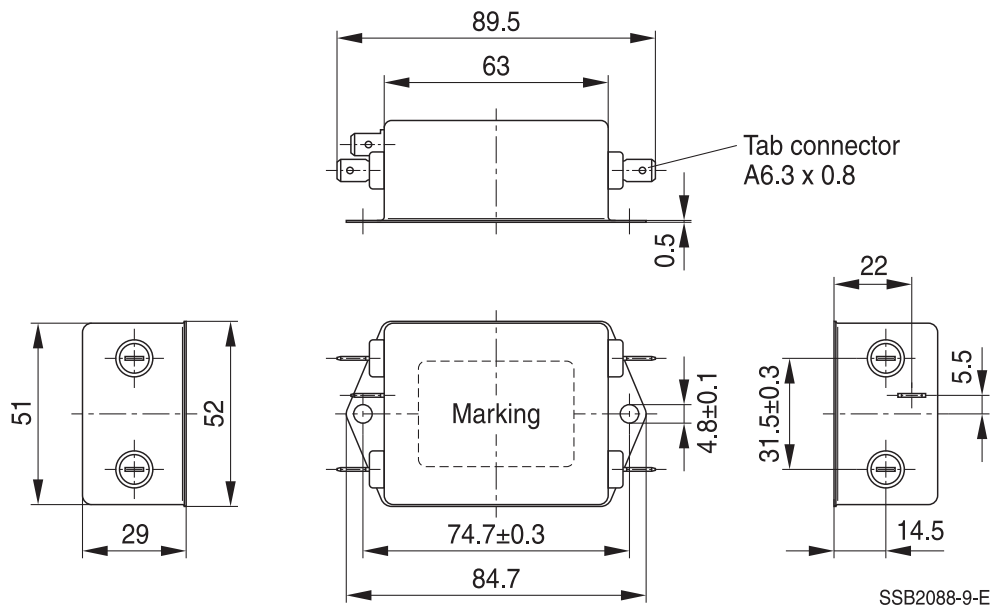
## Dimensional drawings

### B84112G0000B020 and B84112G0000M020 (2 A)



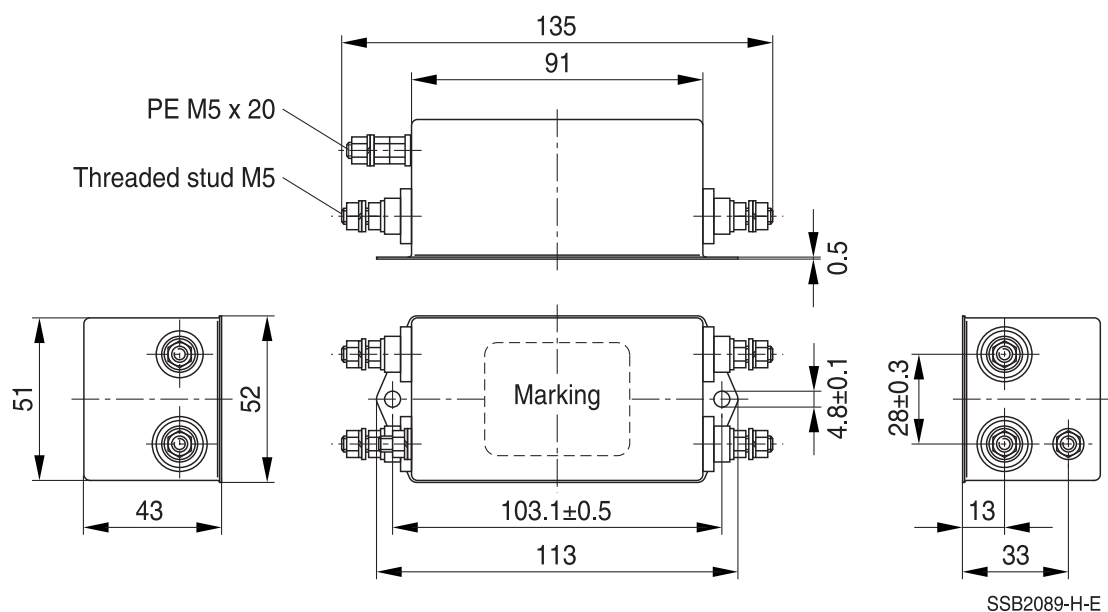
General tolerances according to ISO 2768–cL  
Dimensions in mm

### B84112G0000\*030 ... B84112G0000\*116 (3 A ... 16 A)



General tolerances according to ISO 2768–cL  
Dimensions in mm

## B84112G0000\*120, B84112G0000\*136 (20 A ... 36 A)

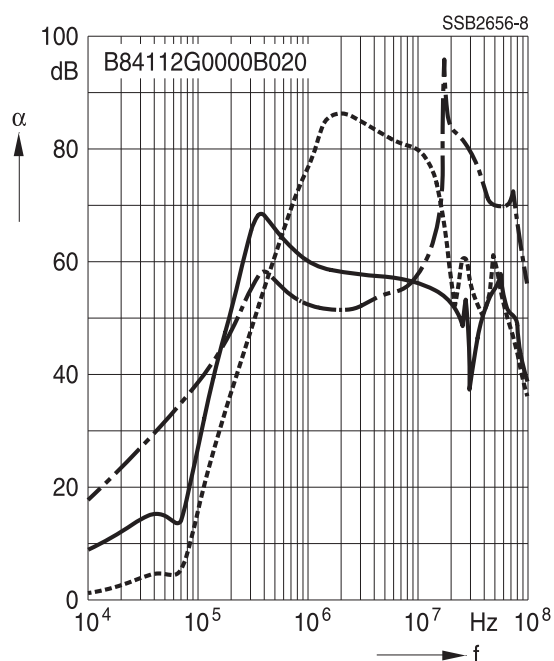


General tolerances according to ISO 2768-cL  
Dimensions in mm

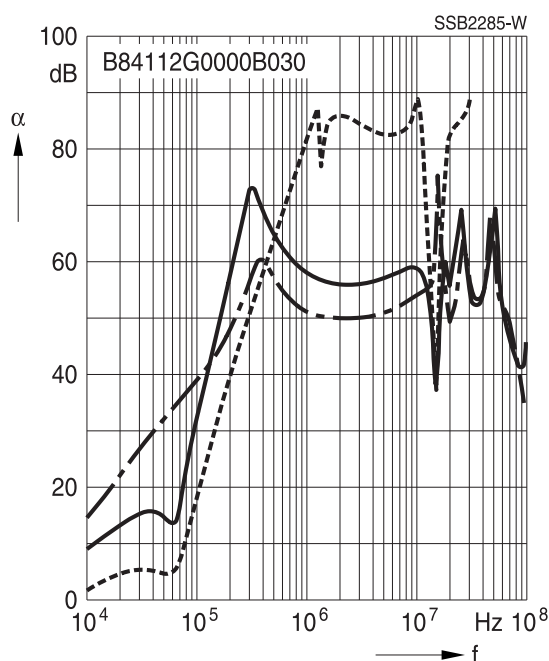
# Insertion loss for standard version (typical values at $Z = 50 \Omega$ )

—————	unsymmetrical, adjacent branches terminated
— · — · — · — · —	common mode, all branches in parallel (asymmetrical)
- - - - -	differential mode (symmetrical)

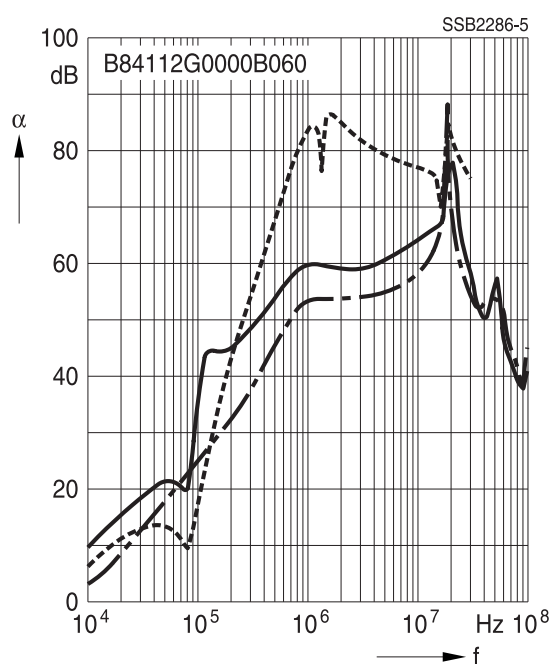
Filters for 2 A



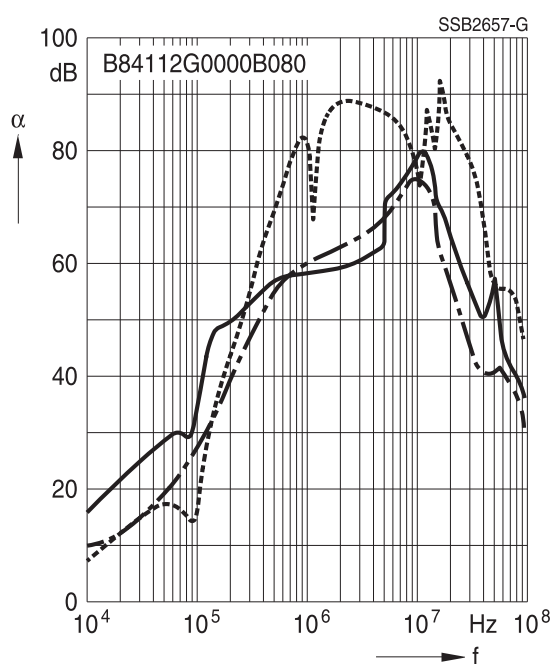
Filters for 3 A



Filters for 6 A



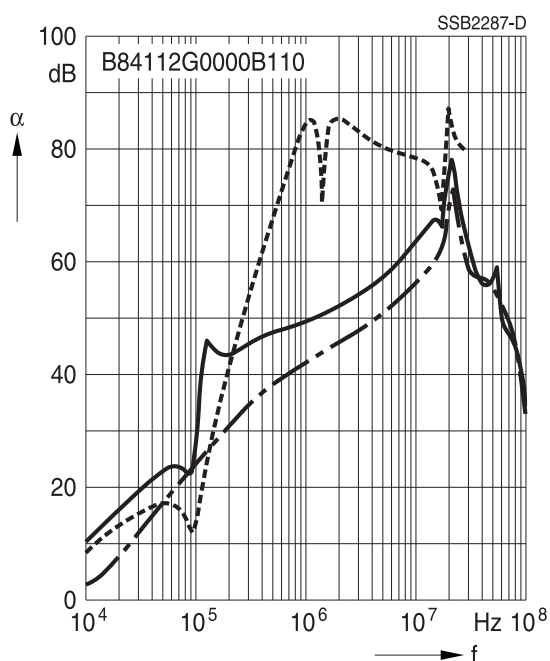
Filters for 8 A



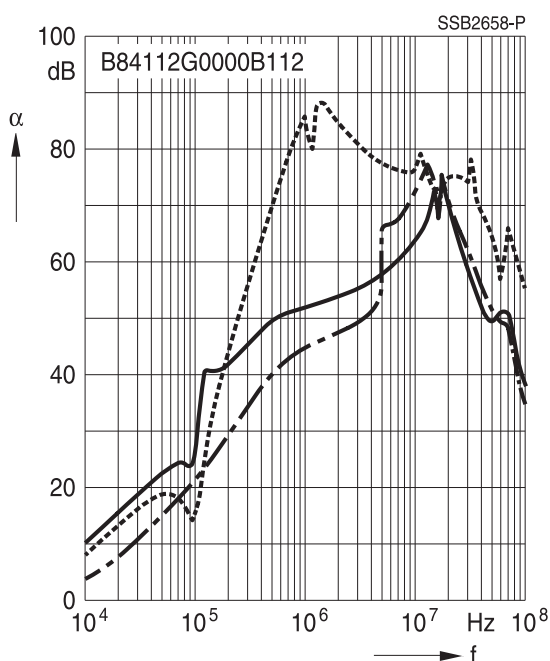
# Insertion loss for standard version (typical values at $Z = 50 \Omega$ )

_____	unsymmetrical, adjacent branches terminated
-----	common mode, all branches in parallel (asymmetrical)
-----	differential mode (symmetrical)

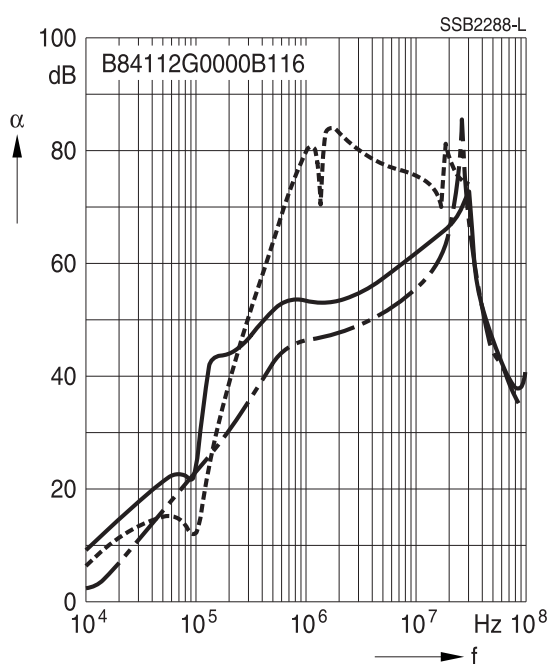
Filters for 10 A



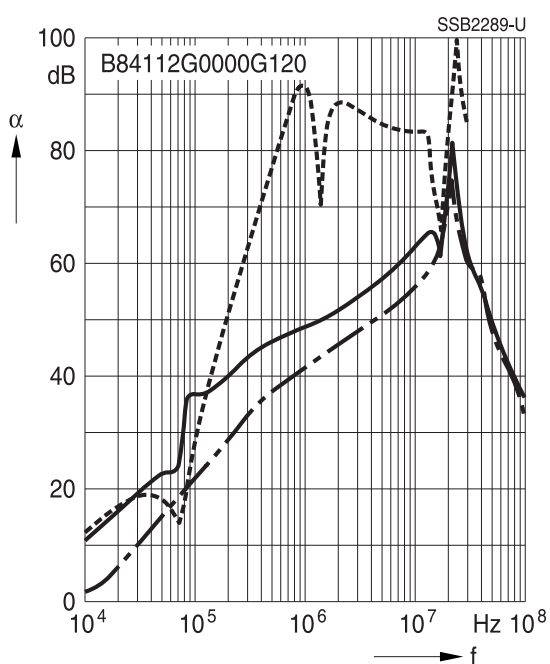
Filters for 12 A



Filters for 16 A



Filters for 20 A





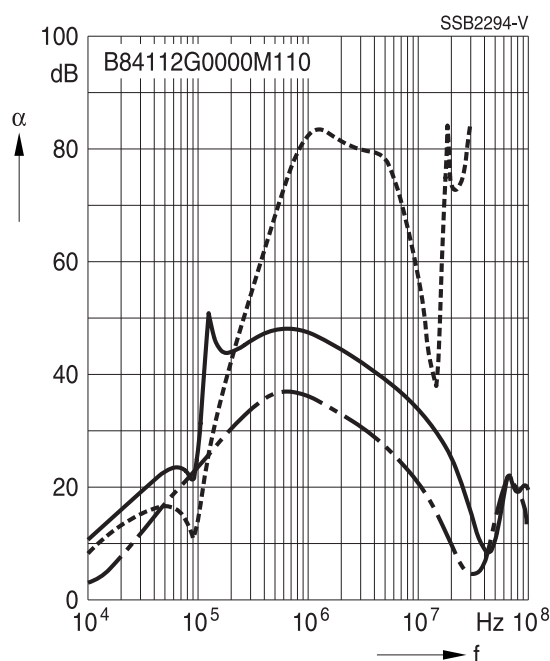




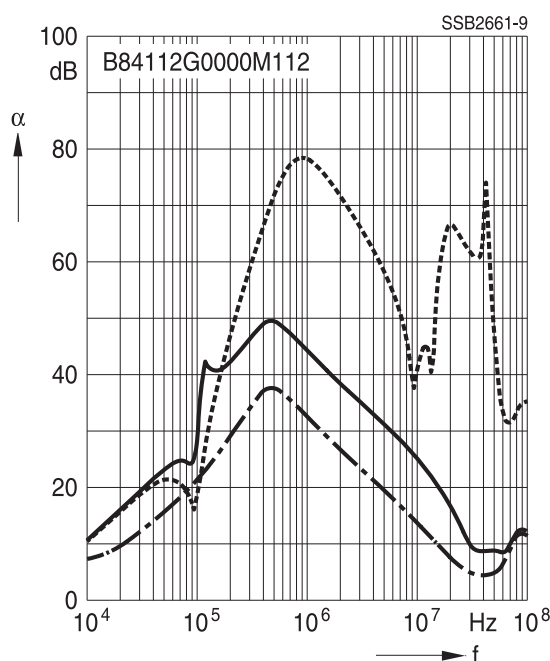
# Insertion loss for medical version (typical values at $Z = 50 \Omega$ )

_____	unsymmetrical, adjacent branches terminated
-----	common mode, all branches in parallel (asymmetrical)
-----	differential mode (symmetrical)

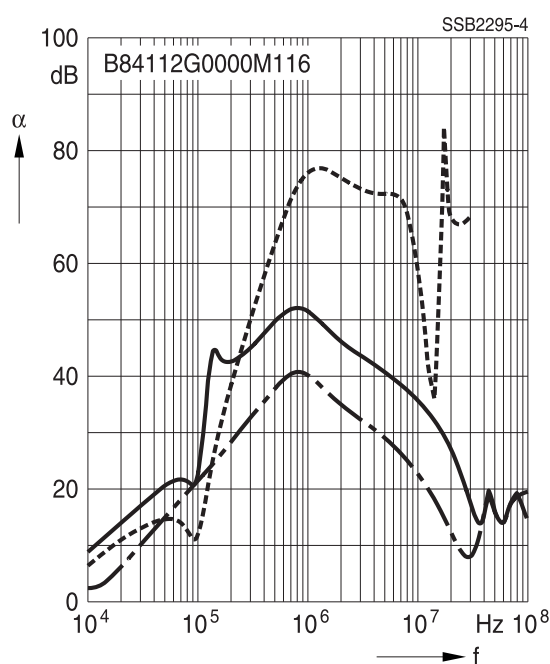
Filters for 10 A



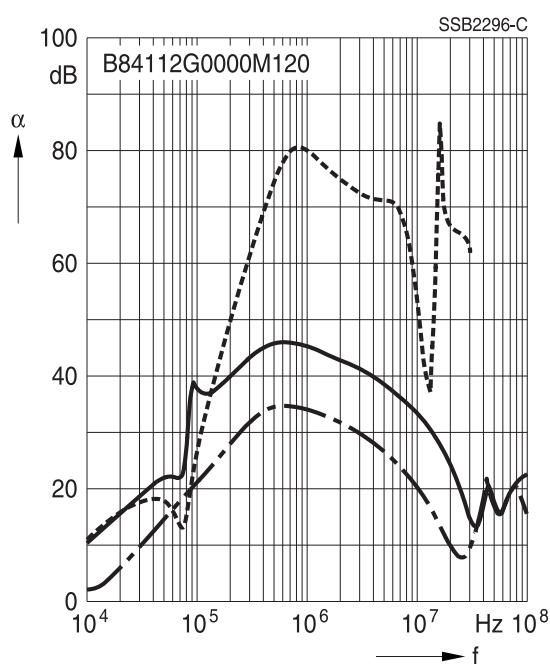
Filters for 12 A



Filters for 16 A



Filters for 20 A





## Cautions and warnings

- Please note further advice in our website [www.tdk-electronics.tdk.com/pemc\\_filters\\_gti](http://www.tdk-electronics.tdk.com/pemc_filters_gti)
- It shall be ensured that only qualified persons (electricity specialists) are engaged on work such as planning, assembly, installation, operation, repair and maintenance. They must be provided with the corresponding documentation.
- Danger of electric shock: The products contain components that store an electric charge. Dangerous voltages can continue to exist at the product terminals for longer than five minutes even after the power has been switched off.
- The protective earth connections shall be the first to be made when the product is installed and secured against loosening by defined tightening torque. Remove them at last, when uninstalling. Depending on the magnitude of the leakage currents, the particular specifications for making the protective-earth connection must be observed.
- Impermissible overloading of the product, such as with circuits able to cause resonances, impermissible voltages at higher frequencies etc. can lead to bodily injury and death as well as cause substantial material damages (e.g. destruction of the product housing).
- The products must be protected in the application against impermissible exceeding of the rated currents by overcurrent protective devices.
- For leakage currents  $>10$  mA, a fixed connection of the protective earth conductor to the public power grid is required. This means that connection via plug connectors is not permitted. The protective conductor must have a minimum cross-section of  $10 \text{ mm}^2$  Cu or  $16 \text{ mm}^2$  Al over its entire length. Alternatively, two separate protective conductors with the minimum cross-section specified in each case can also be connected.
- For leakage currents  $3.5 \text{ mA} < I_{LK}^a) \leq 10 \text{ mA}$ , the following solutions are possible:
  - Stationary device with fixed connection
  - Stationary device with type B plug-in connection (industrial plug-in connection according to IEC 60309) and cross-section  $\geq 2.5 \text{ mm}^2$
  - Stationary device with type A plug-in connection (non-industrial plug-in device) and additional second protective earth connection
  - Movable equipment with type A plug-in connection and additional second protective earth connection in premises with restricted access
- The products must be protected in the application against impermissible exceeding of the specification parameter.
- The converter output frequency must be within the specified range to avoid resonances and uncontrolled warming of the output chokes and output filters.
- The components can become very hot during operation, there is the risk of burns if touched. The product can remain hot for some time after the power is switched off!
- The products are only to be attached to the fixings or mounting holes provided for this purpose in accordance with the data sheet. It is not permitted for the product specified in the data sheet to assume a mechanical function in the final application, in particular any type of tension or pressure on the product must be prevented.

a)  $I_{LK}$  = Leakage current

## Display of ordering codes for TDK Electronics products

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications, on the company website, or in order-related documents such as shipping notes, order confirmations and product labels. The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.

Detailed information can be found on the Internet under [www.tdk-electronics.tdk.com/orderingcodes](http://www.tdk-electronics.tdk.com/orderingcodes).

## Symbols and terms

Symbol	English	German
$\alpha$	Insertion loss	Einfügdungsämpfung
$C_R$	Rated capacitance	Bemessungskapazität
$C_X$	Capacitance X capacitor	Kapazität X-Kondensator
$C_Y$	Capacitance Y capacitor	Kapazität Y-Kondensator
$\Delta V$	Voltage drop (input to output)	Spannungsabfall (Eingang zu Ausgang)
$dv/dt$	Rate of voltage rise	Spannungsanstiegsgeschwindigkeit
$f$	Frequency	Frequenz
$f_M$	Converter output frequency	Motorfrequenz
$f_P$	Pulse frequency	Pulsfrequenz
$f_R$	Rated frequency	Bemessungsfrequenz
$f_{res}$	Resonant frequency	Resonanzfrequenz
$I_C$	Current through capacitor	Strom durch Kondensator
$I_{LK}$	Filter leakage current	Filter-Ableitstrom
$I_{max}$	Maximum current	Maximalstrom
$I_N$	Nominal current	Nennstrom
$I_{op}$	Operating current (design current)	Betriebsstrom
$I_{pk}$	Rated peak withstand current	Bemessungsstoßstromfestigkeit
$I_q$	Capacitive reactive current	Kapazitiver Blindstrom
$I_R$	Rated current	Bemessungsstrom
$I_S$	Interference current	Störstrom
$L$	Inductance	Induktivität
$L_R$	Rated inductance	Bemessungsinduktivität
$L_{stray}$	Stray inductance	Streuinduktivität
$P_L$	Power loss	Verlustleistung
$R$	Resistance	Widerstand
$R_{is}$	Insulation resistance	Isolationswiderstand
$R_{typ}$	DC resistance, typical value	Gleichstromwiderstand typisch
$T_A$	Ambient temperature	Umgebungstemperatur
$T_{max}$	Upper category temperature	Obere Kategorietemperatur

Symbol	English	German
$T_{\min}$	Lower category temperature	Untere Kategorietemperatur
$T_R$	Rated temperature	Bemessungstemperatur
$u_k$	Referred voltage drop in %	Bezogener Spannungsabfall in %
$V_{\text{eff}}$	RMS voltage	Effektivspannung
$V_K$	Voltage drop	Spannungsabfall
$V_{LE}$	Voltage line to earth; voltage line to ground	Spannung Phase zu Erdpotential
$V_N$	Nominal voltage	Nennspannung
$V_R$	Rated voltage	Bemessungsspannung
$V_{\text{peak}}$	Peak voltage	Spitzenspannung
$V_{\text{test}}$	Test voltage	Prüfspannung
$V_X$	Voltage over X capacitor	Spannung über X-Kondensator
$V_Y$	Voltage over Y capacitor	Spannung über Y-Kondensator
$X_L$	Inductive reactance	Induktiver Blindwiderstand
$Z$	Impedance	Scheinwiderstand
$ Z $	Impedance, absolute value	Scheinwiderstand (Betragswert)

## Important notes

The following applies to all products named in this publication:

- 1 Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule we are either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether a product with the properties described in the product specification is suitable for use in a particular customer application.
- 2 We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
- 3 **The warnings, cautions and product-specific notes must be observed.**
- 4 In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet ([www.tdk-electronics.tdk.com/material](http://www.tdk-electronics.tdk.com/material)). Should you have any more detailed questions, please contact our sales offices.
- 5 We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order.  
We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.
- 6 Unless otherwise agreed in individual contracts, **all orders are subject to our General Terms and Conditions of Supply**.
- 7 **Our manufacturing sites serving the automotive business apply the IATF 16949 standard**. The IATF certifications confirm our compliance with requirements regarding the quality management system in the automotive industry. Referring to customer requirements and customer specific requirements ("CSR") TDK always has and will continue to have the policy of respecting individual agreements. Even if IATF 16949 may appear to support the acceptance of unilateral requirements, we hereby like to emphasize that **only requirements mutually agreed upon can and will be implemented in our Quality Management System**. For clarification purposes we like to point out that obligations from IATF 16949 shall only become legally binding if individually agreed upon.



## Important notes

- 8 The trade names EPCOS, CarXield, CeraCharge, CeraDiode, CeraLink, CeraPad, CeraPlas, CSMP, CTVS, DeltaCap, DigiSiMic, FilterCap, FormFit, InsuGate, LeaXield, MediPlas, MiniBlue, MiniCell, MKD, MKK, ModCap, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, PiezoBrush, PlasmaBrush, PowerHap, PQSine, PQvar, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SiMic, SIMID, SineFormer, SIOV, SurfIND, ThermoFuse, WindCap, XieldCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at [www.tdk-electronics.tdk.com/trademarks](http://www.tdk-electronics.tdk.com/trademarks).

Release 2024-02