

## **EMC filters**

2-line filters  
for PCB mounting

**Series/Type:**            **B84110A**

**Date:**                    December 2022

## 2-line filters

B84110A

### for PCB mounting

#### Power line filters for 1-phase systems

Rated voltage  $V_R$ : 250 V AC/DC

Rated current  $I_R$ : 0.5 A to 6 A

#### Construction

- 2-line filters
- Plastic case

#### Features

- High insertion loss
- For PCB mounting
- Cost-effective EMC solution
- ENEC, UL and cUL approval (0.5 A to 4 A)



Schematic picture

#### Typical applications

- Low and medium switch-mode power supplies
- Data systems, gambling machines, small-size equipment, industrial electronics
- DC applications

#### Terminals

- Pins fitting standard grid

#### Marking

Marking on component:

Manufacturer's logo, ordering code, rated voltage, rated current, date code, approvals

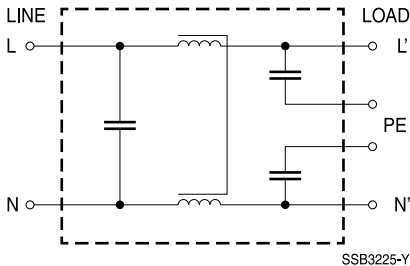
Minimum data on packaging:

Manufacturer's logo, ordering code, quantity, date code

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**Circuit diagram**



**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 $V_{test}$	1414 V DC, 2 s (line/line) 2700 V DC, 2 s (lines/case)
Leakage current $I_{LK}$	At $V_R$ and 50 Hz
Climatic category (IEC 60068-1: 2013)	25/100/21 (-25 °C/+100 °C/21 days damp heat test)
Weight	Approx. 53 g
Approvals	IEC 60939, UL 1283, CSA C22.2 No.8 (0.5 A to 4 A)

**Characteristics and ordering codes**

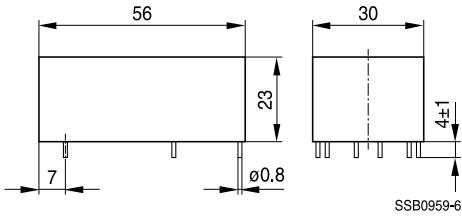
$I_R$	$C_R$ X2	$C_R$ Y2	$L_R$	$I_{LK}$	Ordering code	Approvals <sup>1)</sup>		
A	$\mu F$	pF	mH	mA				
$V_R = 250 \text{ V AC/DC}$								
0.5	0.22	2 x 4700	2 x 39	0.369	B84110A0000A005	x	x	x
1	0.22	2 x 4700	2 x 10	0.369	B84110A0000A010	x	x	x
2	0.22	2 x 4700	2 x 5.6	0.369	B84110A0000A020	x	x	x
4	0.22	2 x 4700	2 x 2.7	0.369	B84110A0000A040	x	x	x
6	0.22	2 x 4700	2 x 1.9	0.369	B84110A0000A060	x	—	—

<sup>1)</sup> x = Approval granted

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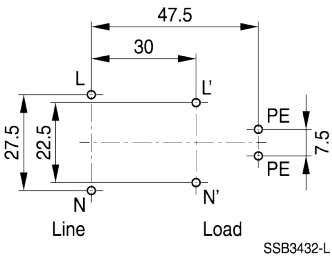
**B84110A**

**Dimensional drawing**



General tolerances according to ISO 2768-cL  
Dimensions in mm

**Pin Layout**



General tolerances according to ISO 2768-cL  
Dimensions in mm

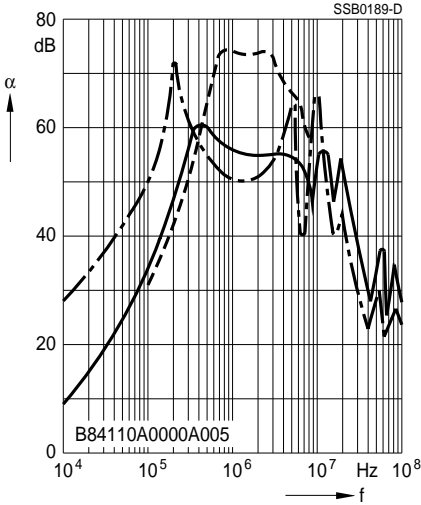
**2-line filters  
for PCB mounting**

**B84110A**

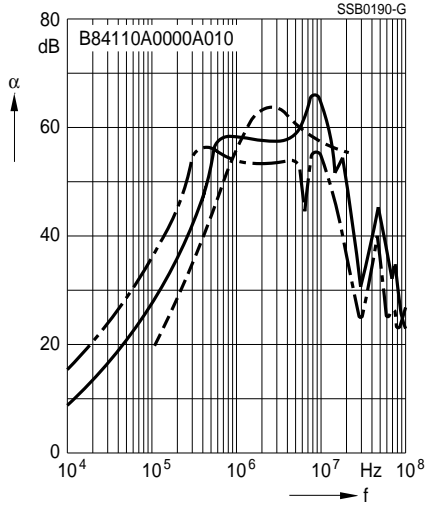
**Insertion loss** (typical values at  $Z = 50 \Omega$ )

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

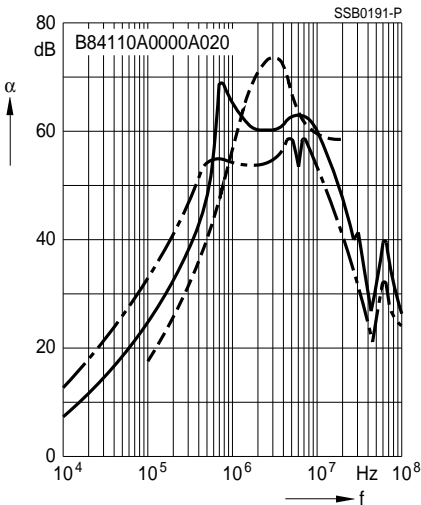
Filters for 0.5 A



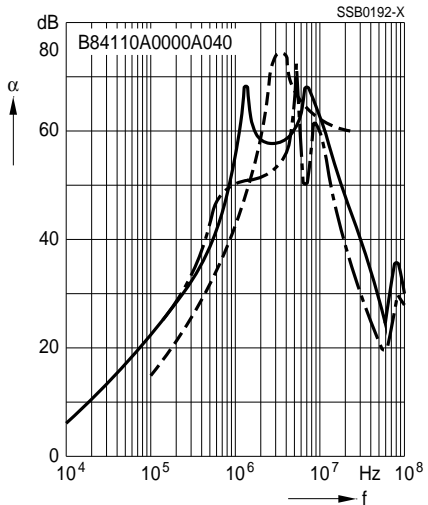
Filters for 1 A



Filters for 2 A



Filters for 4 A



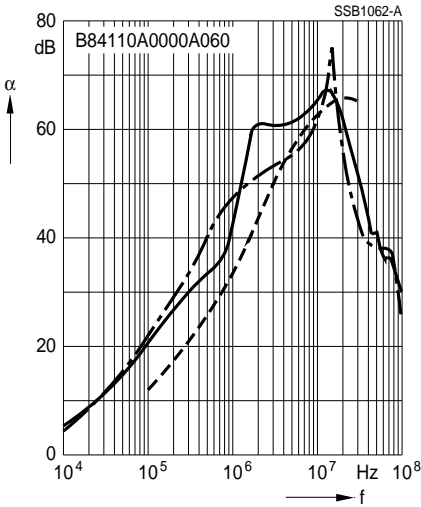
**2-line filters**  
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**Insertion loss** (typical values at  $Z = 50 \Omega$ )

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

Filters for 6 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	Einfügungsdämpfung
$C_R$	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
$T_{min}$	Lower category temperature	Untere Kategorietemperatur
$T_R$	Rated temperature	Bemessungstemperatur
$u_k$	Referred voltage drop in %	Bezogener Spannungsabfall in %
$V_{eff}$	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
$V_{peak}$	Peak voltage	Spitzenspannung
$V_{test}$	Test voltage	Prüfspannung

Symbol	English	German
$V_X$	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.
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## Important notes

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Release 2022-07

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