February 1, 2008

Product innovation
New standard series of current sense transformers

EPCOS has developed two series of current sense transformers that are particularly suitable for compact DC/DC converters thanks to their SMT design. They represent a complete solution with the primary winding already integrated.

The first series represents a compatible solution for existing designs based on an EE5 core. The second was developed as a miniature variant with the much more compact E4.2 core. In addition, the primary winding is not implemented on an external bracket as in the EE5 series but is integrated in the coil former in a space-saving design.

Current sense transformers can only be used to measure AC. The measured current flows via the primary winding of a transformer, and a voltage signal proportional to the current is detected on the secondary side. This technology combines the advantage of low losses with reliability, ruggedness and simple implementation.

Application

Current sense transformers are used wherever control, protection or load-detection functions are required. Typical applications are compact DC/DC converters with mid-range outputs.

EE4.2 series

The DC resistance of the primary winding is 2.5 mΩ for all types at a rated current of 7 A. The test voltage for these types is 360 V AC.

L_{min} [µH]	Turn ratio	DC resistance secondary [mΩ]	Ordering code
33	1 : 20	320	B78302A8041A003
74	1 : 30	800	B78302A8042A003
132	1 : 40	1300	B78302A8043A003
205	1 : 50	2200	B78302A8044A003
295	1 : 60	3600	B78302A8044A003
400	1 : 70	4600	B78302A7981A003
820	1 : 100	8700	B78302A8046A003
1280	1 : 125	13000	B78302A8047A003

EE5 series
The DC resistance of the primary winding is 0.8 mΩ for all types, at a rated current of 20 A. The test voltage for these types is 500 V AC.

L_{min} [µH]	Turn ratio	DC resistance secondary [mΩ]	Ordering code
80	1 : 20	400	B78302A8009A003
180	1 : 30	870	B78302A8010A003
320	1 : 40	1140	B78302A8011A003
500	1 : 50	1500	B78302A8012A003
720	1 : 60	1980	B78302A8013A003
980	1 : 70	4750	B78302A8014A003
2000	1 : 100	5500	B78302A7760A003
3000	1 : 125	6500	B78302A8015A003

Samples are now available.

Enclosures Data sheets

Contact Thomas Smorra, IN TC PMD, Mch M/An

Customers should address inquiries straight to their EPCOS sales contacts.

SMT current sense transformers

E 4.2 core
L_{min} 33 … 1280 µH, sensed current 7 A

Series/Type: **B78302A*A003**

Date: December 2007

Applications

- Switching power supplies
- Feedback control
- Overload sensing
- Load drop/shut down detection

Features

- Very low DC resistance
- Different turn ratios
- Very small package
- RoHS-compatible

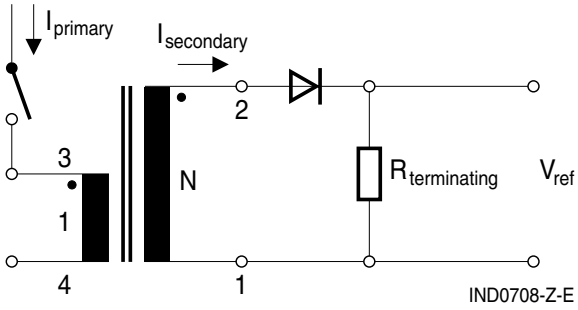
Marking

No marking on component

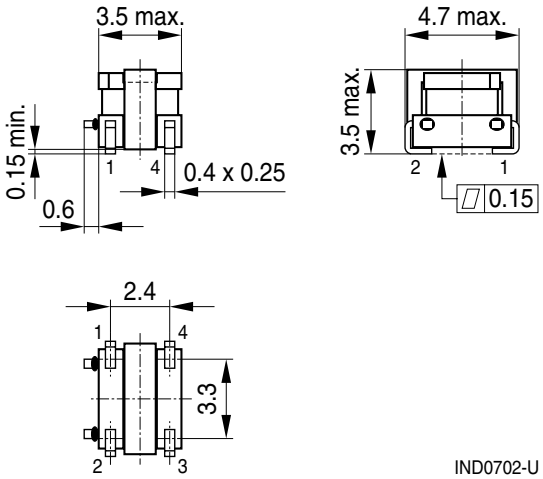
Delivery mode and packing units

- 12-mm blister tape, ∅ 178-mm reel
- Carton packaging
- Packing units: 600 pcs./reel; 3000 pcs./carton

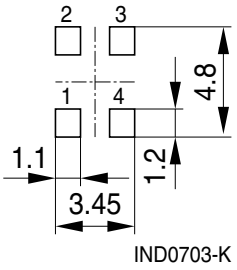
Application circuit and pinning



Dimensional drawing



Layout recommendation



Technical data and measuring conditions

Main inductance L (3-4)	100 kHz, 1.0 V, 25 °C
DC resistance R_{max}	Measured at 25 °C
Sensed current	The max. primary current of 5 A cause approx. 40 °C temperature rise
Operating temperature range	–40 °C … +125 °C
Weight	Approx. 0.15 g

Characteristics and ordering codes

L_{min}	Turn ratio	DC resistance R_{max} (mΩ)		Sensed current	V_{test}	Ordering code
µH	N_p : N_s	primary	secondary	A	V AC	
33	1 : 20	2.5	320	7	360	B78302A8041A003
74	1 : 30	2.5	800	7	360	B78302A8042A003
132	1 : 40	2.5	1300	7	360	B78302A8043A003
205	1 : 50	2.5	2200	7	360	B78302A8044A003
295	1 : 60	2.5	3600	7	360	B78302A8045A003
400	1 : 70	2.5	4600	7	360	B78302A7981A003
820	1 : 100	2.5	8700	7	360	B78302A8046A003
1280	1 : 125	2.5	13000	7	360	B78302A8047A003

Cautions and warnings

- Please note the recommendations in our data book “Chokes and Inductors” (latest edition).
  - Particular attention should be paid to the derating curves given there.
  - The soldering conditions should also be observed. Temperatures quoted in relation to wave soldering refer to the pin, not the housing.
- If the components are to be washed varnished it is necessary to check whether any washing varnish agent that is used has an negative effect on the wire insulation, any plastics that are used, or on glued joints. In particular, it is possible for washing varnish agent residues to have a negative effect in the long-term on wire insulation.
- The following points must be observed if the components are potted in customer applications:
  - Many potting materials shrink as they harden. They therefore exert a pressure on the plastic housing or core. This pressure can have a deleterious effect on electrical properties, and in extreme cases can damage the core mechanically.
  - It is necessary to check whether the potting material used attacks or destroys the wire insulation, plastics or glue.
  - The effect of the potting material can change the high-frequency behaviour of the components.
- Ferrites are sensitive to direct impact.
  This can cause the core material to flake, or lead to breakage of the core.
- Even for customer-specific products, conclusive validation of the component in the circuit can only be carried out by the customer.

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, EPCOS is 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 an EPCOS 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 passive 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 a passive 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 a passive 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.epcos.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 the current version of the "General Terms of Delivery for Products and Services in the Electrical Industry" published by the German Electrical and Electronics Industry Association (ZVEI)**.

7. The trade names EPCOS, BAOKE, Alu-X, CeraDiode, CSSP, MiniBlue, MKK, MLSC, MotorCap, PCC, PhaseCap, PhaseMod, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SIMID, SineFormer, SIOV, SIP5D, SIP5K, ThermoFuse, WindCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.epcos.com/trademarks.

SMT current sense transformers

E 5 core
L_{min} 80 … 3000 µH, sensed current 20 A

Series/Type: **B78302A*A003**

Date: December 2007

Application

- Switching power supplies
- Feedback control
- Overload sensing
- Load drop/shut down detection

Features

- Very low DC resistance
- Different turn ratios
- Small package
- RoHS-compatible

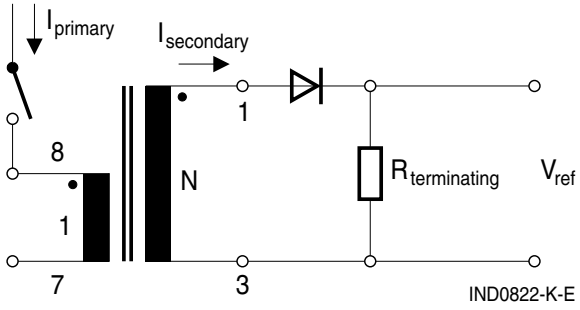
Marking

Middle block of ordering code

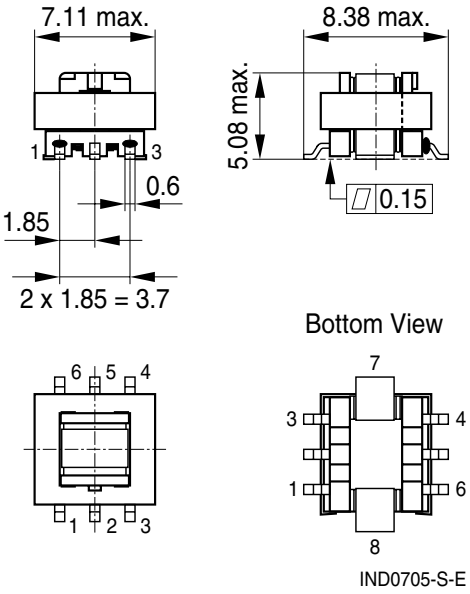
Delivery mode and packing units

- 16-mm blister tape, ∅ 330-mm reel
- Carton packaging
- Packing units: 900 pcs./reel; 7200 pcs./carton

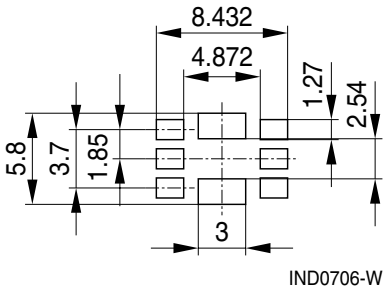
Application circuit and pinning



Dimensional drawing



Layout recommendation



Technical data and measuring conditions

Main inductance L (7-8)	100 kHz, 1.0 V, 25 °C
DC resistance R_{max}	Measured at 25 °C
Sensed current	The max. primary current of 20 A cause approx. 40 °C temperature rise
Operating temperature range	–40 … +125 °C
Weight	Approx. 0.35 g

Characteristics and ordering codes

L_{min}	Turn ratio	DC resistance R_{max} (mΩ)		Sensed current	V_{test}	Ordering code
µH	$N_p : N_s$	primary	secondary	A	V AC	
80	1 : 20	0.8	400	20	500	B78302A8009A003
180	1 : 30	0.8	870	20	500	B78302A8010A003
320	1 : 40	0.8	1140	20	500	B78302A8011A003
500	1 : 50	0.8	1500	20	500	B78302A8012A003
720	1 : 60	0.8	1980	20	500	B78302A8013A003
980	1 : 70	0.8	4750	20	500	B78302A8014A003
2000	1 : 100	0.8	5500	20	500	B78302A7760A003
3000	1 : 125	0.8	6500	20	500	B78302A8015A003

Cautions and warnings

- Please note the recommendations in our data book “Chokes and Inductors” (latest edition).
  - Particular attention should be paid to the derating curves given there.
  - The soldering conditions should also be observed. Temperatures quoted in relation to wave soldering refer to the pin, not the housing.
- If the components are to be washed varnished it is necessary to check whether any washing varnish agent that is used has an negative effect on the wire insulation, any plastics that are used, or on glued joints. In particular, it is possible for washing varnish agent residues to have a negative effect in the long-term on wire insulation.
- The following points must be observed if the components are potted in customer applications:
  - Many potting materials shrink as they harden. They therefore exert a pressure on the plastic housing or core. This pressure can have a deleterious effect on electrical properties, and in extreme cases can damage the core mechanically.
  - It is necessary to check whether the potting material used attacks or destroys the wire insulation, plastics or glue.
  - The effect of the potting material can change the high-frequency behaviour of the components.
- Ferrites are sensitive to direct impact.
  This can cause the core material to flake, or lead to breakage of the core.
- Even for customer-specific products, conclusive validation of the component in the circuit can only be carried out by the customer.

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, EPCOS is 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 an EPCOS 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 passive 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 a passive 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 a passive 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.epcos.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 the current version of the "General Terms of Delivery for Products and Services in the Electrical Industry" published by the German Electrical and Electronics Industry Association (ZVEI)**.

7. The trade names EPCOS, BAOKE, Alu-X, CeraDiode, CSSP, MiniBlue, MKK, MLSC, MotorCap, PCC, PhaseCap, PhaseMod, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SIMID, SineFormer, SIOV, SIP5D, SIP5K, ThermoFuse, WindCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.epcos.com/trademarks.