



# **SMT current sense transformers**

## **EE 12.6**

**Series/Type:**            **B82801C**  
**Date:**                    December 2012

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### Application

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

### Features

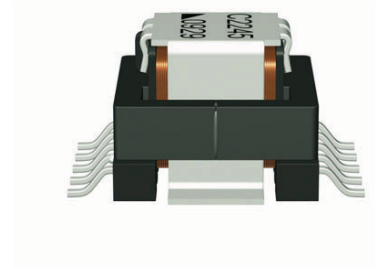
- Very low DC resistance
- Different turns ratios
- Small package
- Other pinning on request
- RoHS compatible

### Marking

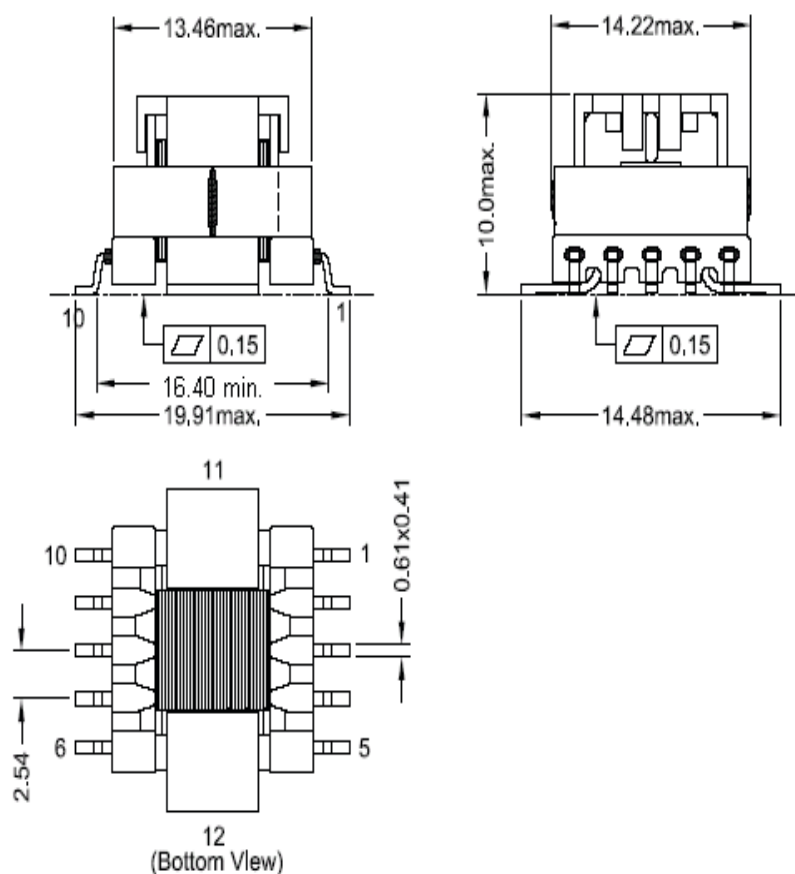
Middle block of ordering code

### Delivery mode and packing units

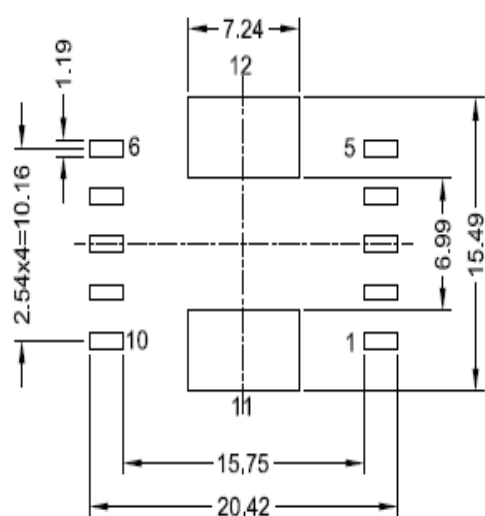
- 32 mm blister tape, 330 mm  $\varnothing$  reel
- Carton packaging
- Packing units: 200 pcs./reel;  
800 pcs./carton



## Dimensional drawing

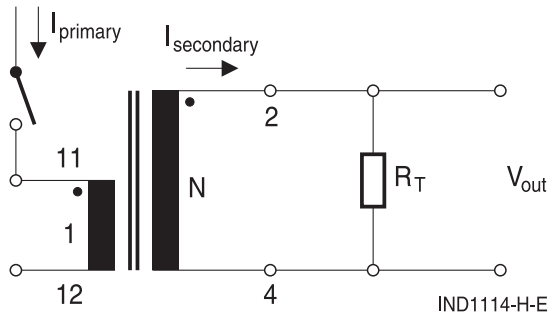


Recommended PCB Layout  
(Top View)



Dimensions in mm

### Application circuit and pinning



### Technical data and measuring conditions

|                              |                                                                                                                                    |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Frequency range              | 50 ... 500 kHz                                                                                                                     |
| Hi-pot                       | 1500 V AC, 2 s (winding to winding)                                                                                                |
| Inductance L (1-3)           | 100 kHz, 100 mV, @ +25 °C                                                                                                          |
| DC resistance $R_{max}$      | Measured at +25 °C (specified per winding)                                                                                         |
| Sensed current               | The max. primary current of 40 A causes approx. +40 °C temperature rise                                                            |
| Solderability                | ≥ 99.9 Sn, lead-free. Or<br>Sn96.5Ag3.0Cu0.5: +(245 ± 5) °C, (3 ± 0.3) s<br>Wetting of soldering area ≥ 95%<br>(to IEC 60068-2-58) |
| Resistance to soldering heat | +(260 ± 5) °C, (10 ± 1 s) to IEC 60068-2-58                                                                                        |
| Storage conditions           | −20 °C ... +40 °C, ≤ 75% RH                                                                                                        |
| Test voltage $V_{test}$      | 50 Hz, 1 s                                                                                                                         |
| Operating temperature range  | −40 °C ... +125 °C                                                                                                                 |
| Weight                       | Approx. 4.8 g                                                                                                                      |

$$B_{\max} = \frac{V_{\text{sense, max}} \cdot \delta_{\max}}{n_s \cdot A_e \cdot f_{\text{osc}}}$$

**With:**

$B_{\max}$  Maximum magnetic flux density in the ferrite core of the current sense transformer

$V_{\text{sense, max}}$  Maximum output voltage of the measurement signal

$\delta_{\max}$  Maximum duty cycle

$n_s$  Number of turns of the secondary winding of the current sense transformer

$A_e$  Effective magnetic area of the ferrite core

$f_{\text{osc}}$  Operating frequency of the switching operator IC

Typical value for  $A_e$ :  $12.4 \times 10^{-6} \text{ m}^2$

Typical  $B_{\max}$ : 200 mT

$$R_T = \frac{V_{\text{sense, max}} \cdot n_s}{I_{\text{prim, max}}}$$

**With:**

$R_T$  Resistance of burden resistor

$V_{\text{sense, max}}$  Maximum output voltage of the measurement signal

$n_s$  Number of turns on the secondary side of the CT

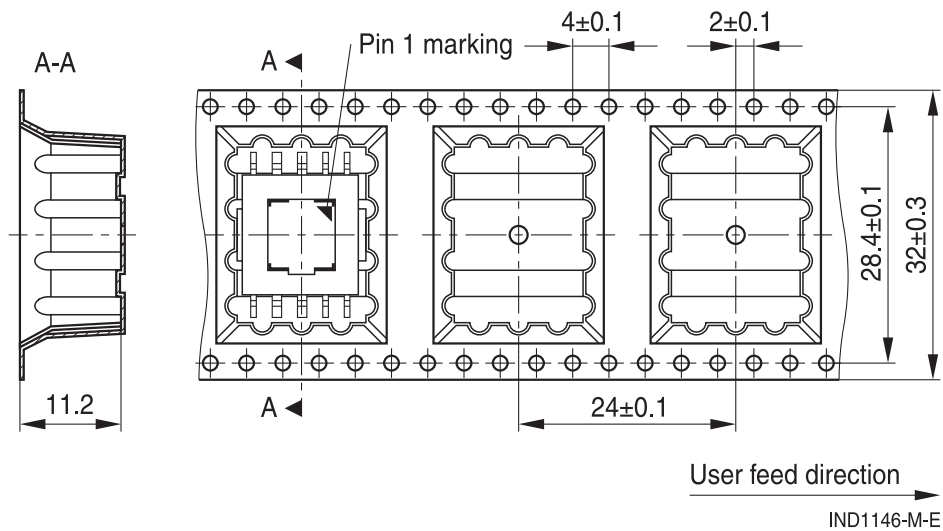
$I_{\text{prim, max}}$  Maximum primary current (peak current)

**Characteristics and ordering codes**

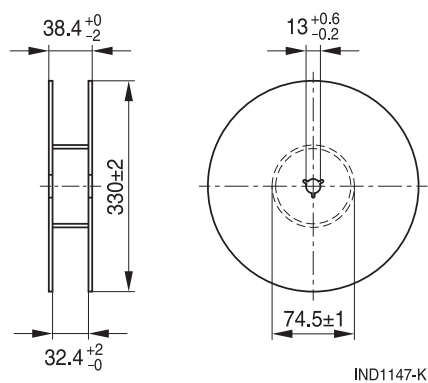
| $L_{\min}$ | Turns ratio | DC resistance<br>$R_{\max}$ (m $\Omega$ ) |           | Voltage-<br>time product | Recomm.<br>$R_T$ | Ordering code   |
|------------|-------------|-------------------------------------------|-----------|--------------------------|------------------|-----------------|
| mH         | $N_p : N_s$ | primary                                   | secondary | V $\cdot$ $\mu$ s        | $\Omega$         |                 |
| 1.4        | 1 : 50      | 0.28                                      | 400       | 124                      | 50               | B82801C0145A050 |
| 5.6        | 1 : 100     | 0.28                                      | 1000      | 248                      | 100              | B82801C0565A100 |
| 12.6       | 1 : 150     | 0.28                                      | 2200      | 372                      | 150              | B82801C1265A150 |
| 22.4       | 1 : 200     | 0.28                                      | 2900      | 496                      | 200              | B82801C2245A200 |

## Taping and packing

### Blister tape



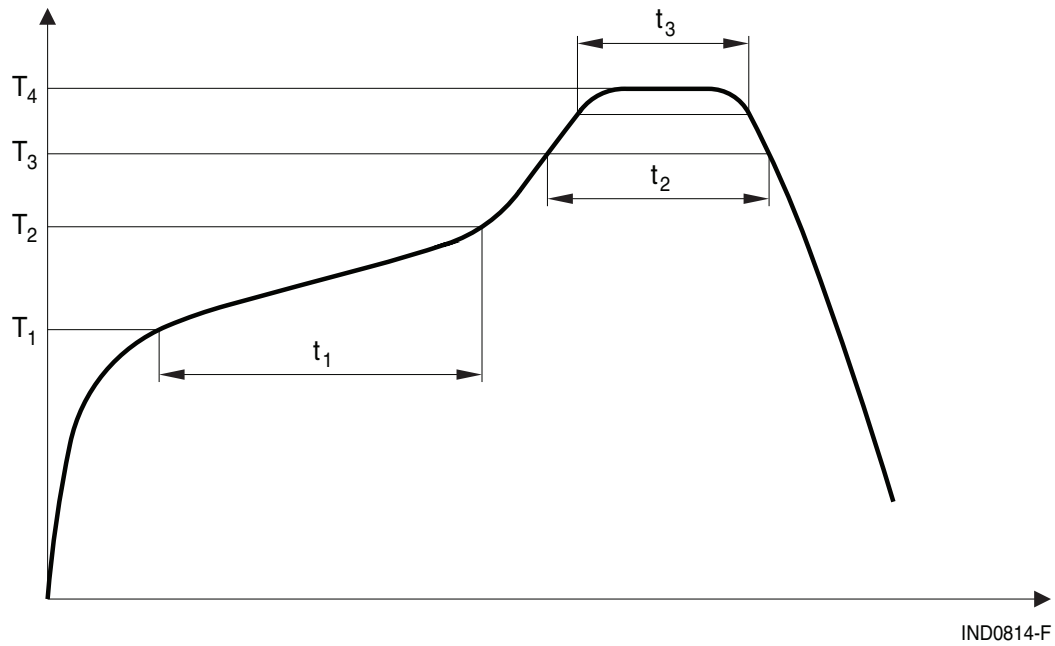
### Reel



Dimensions in mm

### Recommended reflow soldering curve

Pb-free solder material (based on JEDEC J-STD 020D)



| $T_1$<br>°C | $T_2$<br>°C | $T_3$<br>°C | $T_4$<br>°C | $T_1$<br>sec | $T_2$<br>sec | $T_3$<br>sec |
|-------------|-------------|-------------|-------------|--------------|--------------|--------------|
| 150         | 200         | 217         | 245         | <110         | <90          | 20 ... 40    |

Max. time from +25 °C to T: 300 seconds

Max. 3 reflow cycles

## Cautions and warnings

- Please note the recommendations in our Inductors data book (latest edition) and in the data sheets.
  - Particular attention should be paid to the derating curves given there. Derating must be applied in case the ambient temperature in the application exceeds the rated temperature of the component.
  - Ensure the operation temperature (which is the sum of the ambient temperature and the temperature rise caused by losses / self-heating) of the component in the application does not exceed the maximum value specified in the climatic category.
  - 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 the washing varnish agent that is used has a 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.

Washing processes may damage the product due to the possible static or cyclic mechanical loads (e.g. ultrasonic cleaning). They may cause cracks to develop on the product and its parts, which might lead to reduced reliability or lifetime.
- 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 or plastic housing 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.

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