

SMT current sense transformers

EE 5.0 core

Series/Type: **B82801B**
Date: August 2015

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Application

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

Features

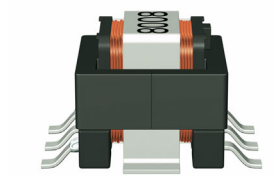
- Very low DC resistance
- Different turns ratios
- Small package
- Other pinning on request
- RoHS compatible

Marking

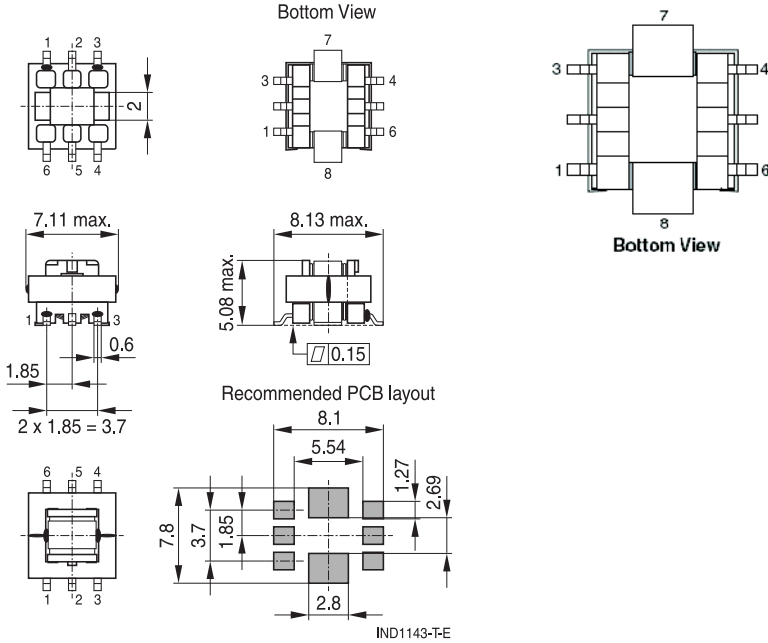
- Middle block of ordering code

Delivery mode and packing units

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

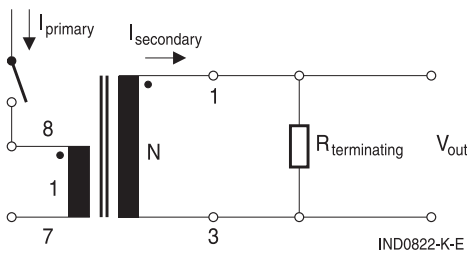


Dimensional drawing



Dimensions in mm

Application circuit and pinning



Technical data and measuring conditions

| | |
|--------------------------------|--|
| Frequency range | 50 kHz ... 1 MHz |
| Hi-pot | 1000 V AC, 50 Hz, 2 s (winding to winding) |
| Inductance L (1-3) | 100 kHz, 100 mV, @ +25 °C |
| DC resistance R _{max} | Measured at +25 °C |
| Sensed current | The max. primary current of 20 A causes approx. +40 °C temperature rise |
| Solderability | ≥ 99.9 Sn, lead-free. Or Sn96.5Ag3.0Cu0.5: +(245 ± 5) °C, (3 ± 0.3) s Wetting of soldering area ≥ 95% (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 (packaged) |
| Operating temperature range | -40 °C ... +125 °C |
| Weight | Approx. 0.4 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
 δ_{\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_{osc} Operating frequency of the switching operator IC
 Typical value for A_e : $2.5 \times 10^{-6} \text{ m}^2$
 Typical B_{\max} : 200 mT

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

With:

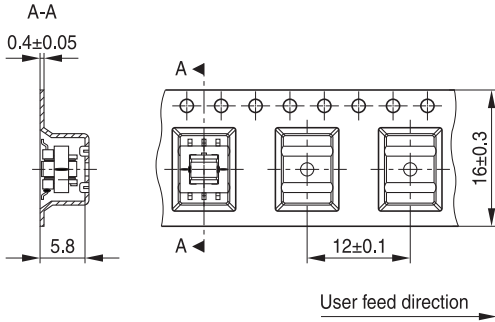
R_T Resistance of burden resistor
 $V_{\text{sense,max}}$ Maximum output voltage of the measurement signal
 n_s Number of turns on the secondary side of the CT
 $I_{\text{prim,max}}$ Maximum primary current (peak current)

Characteristics and ordering codes

| L_{\min} | Turns ratio | DC resistance R_{\max} (m Ω) | | Voltage-time product | Recomm. R_T | Ordering code |
|---------------|-------------|---|-----------|----------------------|------------------|-----------------|
| μH | $N_p : N_s$ | primary | secondary | V · μs | Ω | |
| 80 | 1 : 20 | 0.6 | 400 | 10.0 | 20 | B82801B0803A020 |
| 180 | 1 : 30 | 0.6 | 870 | 15.0 | 30 | B82801B0184A030 |
| 320 | 1 : 40 | 0.6 | 1140 | 20.0 | 40 | B82801B0324A040 |
| 500 | 1 : 50 | 0.6 | 1500 | 25.0 | 50 | B82801B0504A050 |
| 720 | 1 : 60 | 0.6 | 1980 | 30.0 | 60 | B82801B0724A060 |
| 980 | 1 : 70 | 0.6 | 3000 | 35.0 | 70 | B82801B0984A070 |
| 2000 | 1 : 100 | 0.6 | 5500 | 50.0 | 100 | B82801B0205A100 |
| 3000 | 1 : 125 | 0.6 | 6500 | 62.5 | 125 | B82801B0305A125 |
| 8000 | 1 : 200 | 0.6 | 33240 | 100.0 | 200 | B82801B0925A200 |

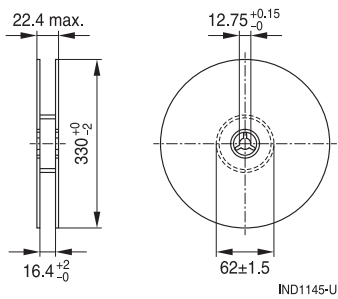
Taping and packing

Blister tape



Dimensions in mm

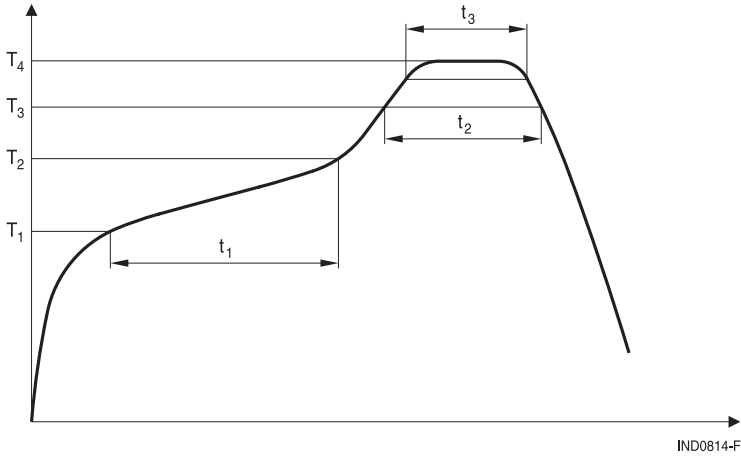
Reel



Dimensions in mm

Recommended reflow soldering curve

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



| T ₁ °C | T ₂ °C | T ₃ °C | T ₄ °C | T ₁ sec | T ₂ sec | T ₃ 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.
 - 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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