SMT current sense transformers

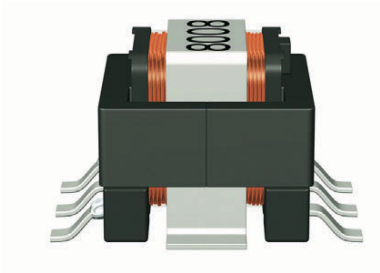
EE 5.0 core

Series/Type: **B82801B**

Date: December 2012

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

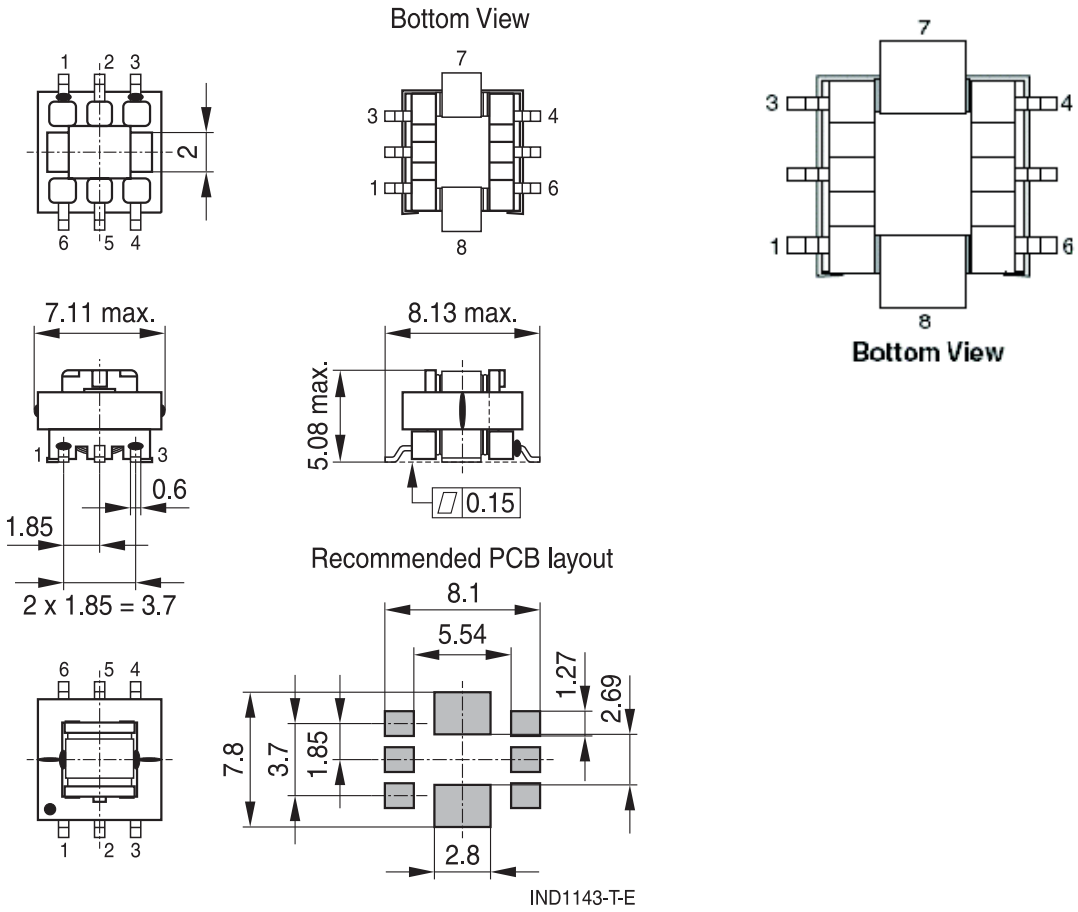
Marking

Middle block of ordering code

Delivery mode and packing units

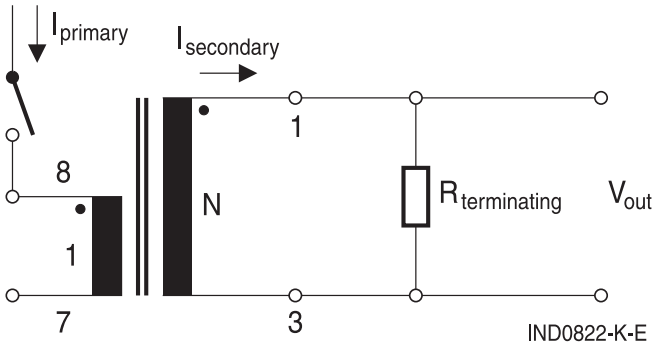
- 16 mm blister tape, 330 mm ∅ reel
- Carton packaging
- Packing units: 900 pcs./reel;
  7200 pcs./carton

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, 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)
Test voltage V_{test}	50 Hz, 1 s
Operating temperature range	–40 °C … +125 °C
Weight	Approx. 0.4 g

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

With:

B_{max} Maximum magnetic flux density in the ferrite core of the current sense transformer
$V_{sense,max}$ 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: 2.5×10^{-6} m^2
Typical B_{max}: 200 mT

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

With:

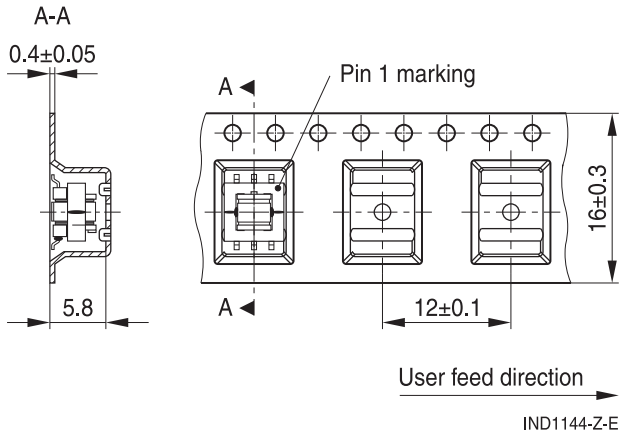
R_T Resistance of burden resistor
$V_{sense,max}$ Maximum output voltage of the measurement signal
n_s Number of turns on the secondary side of the CT
$I_{prim,max}$ Maximum primary current (peak current)

Characteristics and ordering codes

L_{min}	Turns ratio	DC resistance R_{max} (mΩ)		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

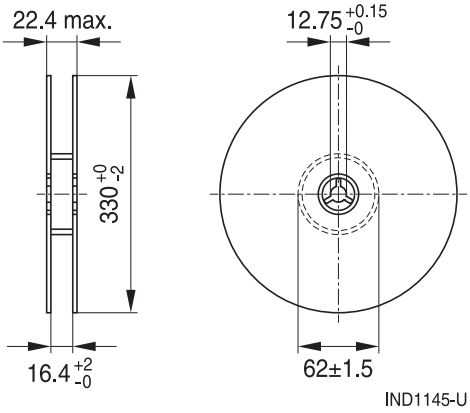
Taping and packing

Blister tape



Dimensions in mm

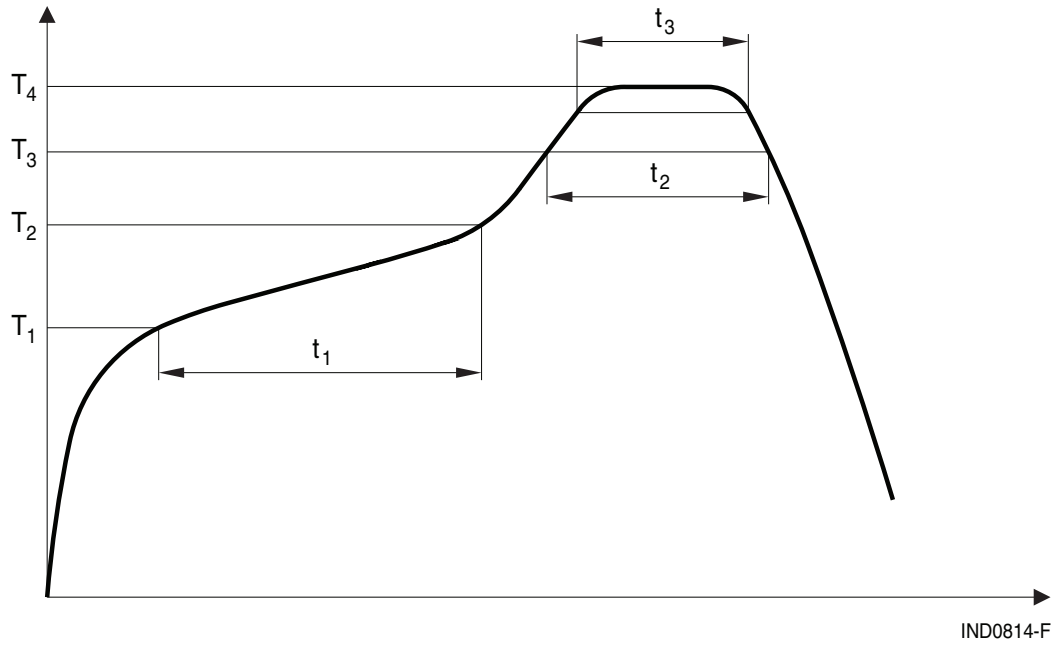
Reel



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. 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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