SMT power inductors

Size 12.5 × 12.5 × 10.5 (mm)

Series/Type: **B82477D6**

Date: January 2020

SMD

Rated inductance 3.9 ... 47 µH
Rated current 2.83 ... 7.05 A

Construction

- Ferrite core
- Magnetically shielded
- Winding: enamel copper wire
- Winding welded to terminals
- Special winding technology for tight coupling of the 2 windings

Features

- Temperature range up to +150 °C
- High rated current
- Low DC resistance
- Tight coupling, coupling factor typically 99%
- Suitable for lead-free reflow soldering as referenced in JEDEC J-STD 020D
- Qualified to AEC-Q200
- RoHS-compatible

Applications

- Common-mode choke
- DC/DC converters, especially for SEPIC topology
- 1:1 transformers

Terminals

- Base material CuSn6P
- Lead-finish Sn (lead-free)
- Electro-plated

Marking

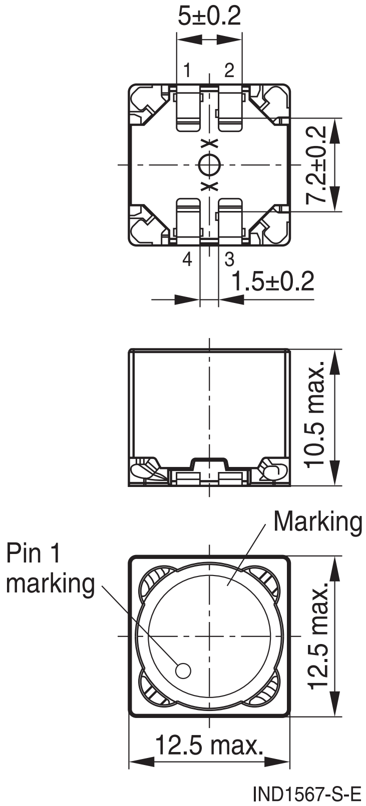
- Marking on component:
  Manufacturer, L value (µH, coded), date of manufacture (YWWD), two last digits of production order, dot for Pin1 identification
- Minimum data on reel:
  Manufacturer, ordering code,
  L value, quantity, date of packing

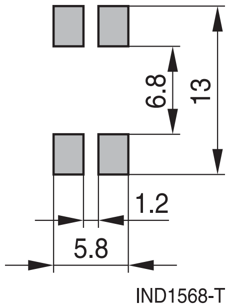
Delivery mode and packing unit

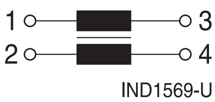
- 24-mm blister tape, wound on 330-mm ∅ reel
- Packing unit: 250 pcs./reel

SMD

Dimensional drawing and layout recommendation



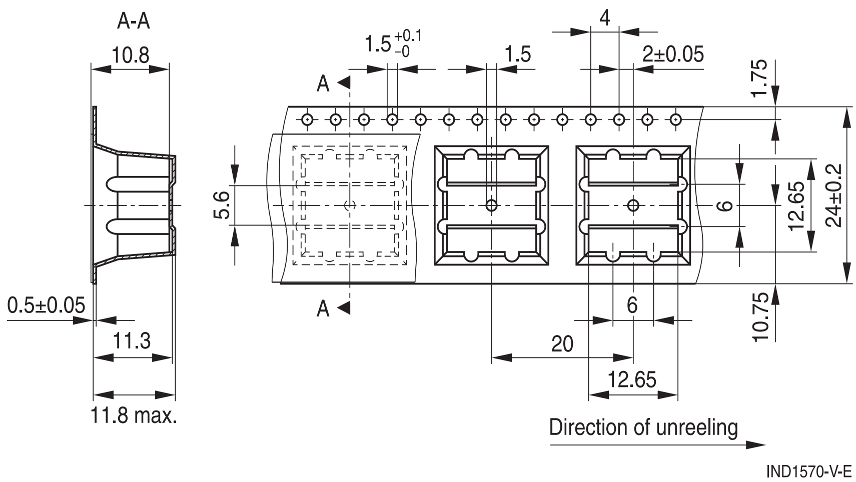




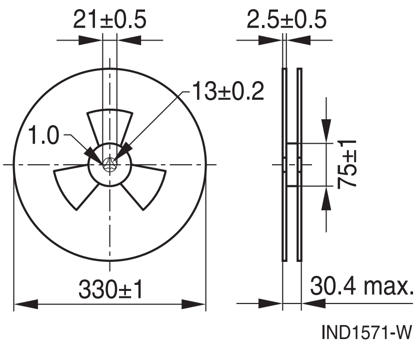
Dimensions in mm

Taping and packing

Blister tape



Reel



Dimensions in mm

Technical data and measuring conditions

Rated inductance L_1 , L_2	Measured with LCR meter Agilent 4284 or equivalent at frequency f_L, 0.1 V, +20 °C
Coupling factor K_{typ}	Coupling in between the 2 windings $k = \sqrt{1 - \frac{L_s}{L_n}}$
Operating temperature range	–55 °C … +150 °C
Rated current I_R	Max. permissible DC with temperature increase of ≤ 40 K
Saturation current I_{sat}	Max. permissible DC with inductance decrease $\Delta L/L_0$ of approx. 10%
DC resistance $R_{1,max}$, $R_{2,max}$	Measured at +20 °C
Solderability (lead-free)	Dip and look method Sn95.5Ag3.8Cu0.7: +(245 ±5) °C, (5 +0/-0.5) s Wetting of soldering area ≥ 90% (based on IEC 60068-2-58)
Resistance to soldering heat	+245 °C, 30 s (as referenced in JEDEC J-STD 020D)
Climatic category	55/150/56 (to IEC 60068-1)
Storage conditions	Mounted: –55 °C … +150 °C Packaged: –25 °C … +40 °C, ≤ 75% RH
Weight	Approx. 5 g

Characteristics and ordering codes

L_R µH	K_{typ} %	Tolerance	f_L MHz	$I_{sat,typ}$ A	$I_{sat,min}$ A	I_R A	$R_{1,2,max}$ Ω	$R_{1,2,typ}$ Ω	Ordering code
3.9	97	±20% ≙ M	0.1	16.1	14.0	7.05	0.018	0.0139	B82477D6392M603
6.8	98		0.1	11.8	10.0	6.40	0.021	0.0170	B82477D6682M603
10	98		0.1	9.9	8.40	5.65	0.027	0.0225	B82477D6103M603
15	99		0.1	8.7	7.5	4.92	0.035	0.0296	B82477D6153M603
22	99		0.1	7.2	6.2	3.85	0.053	0.0450	B82477D6223M603
33	99		0.1	5.6	4.7	3.22	0.075	0.0605	B82477D6333M603
47	99		0.1	4.7	4.0	2.83	0.094	0.0818	B82477D6473M603

Inductance is per winding.

When leads are connected in parallel, inductance L_R is the same value.

When leads are connected in series, inductance L_R is four times the value.

DCR is for each winding. When leads are connected in parallel, $DCR = \frac{(R1 \times R2)}{(R1 + R2)}$.

When leads are connected in series, DCR is R1+R2.

I_{sat} ist the current flowing through one winding.

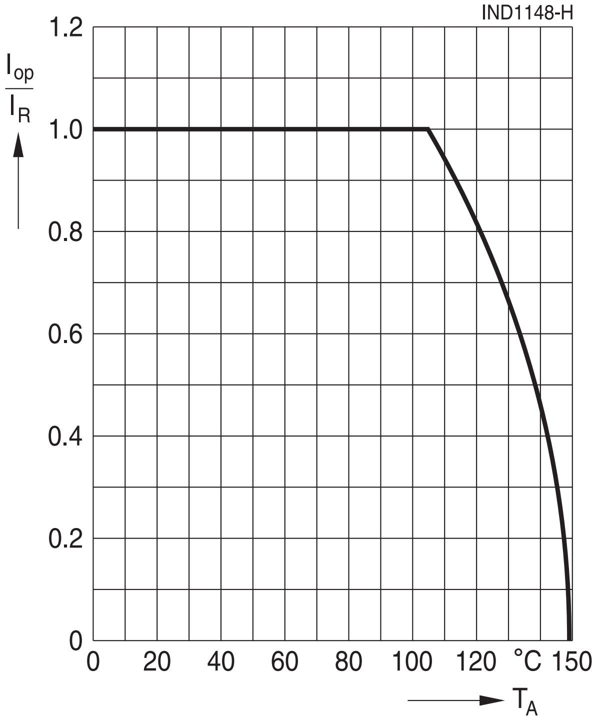
When leads are connected in parallel, I_{sat} is the same.

When leads are connected in series, I_{sat} is half the value.

I_R is the total current through both windings

I_1 and I_2 can be calculated like this: $I_1^2 + I_2^2 = I_R^2$

Current derating I_{op}/I_R versus ambient temperature T_A



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, wire insulation, plastics or glue.
  - The effect of the potting material can change the high-frequency behaviour of the components.
  - Many coating materials have a negative effect (chemically and mechanically) on the winding wires, insulation materials and connecting points. Customers are always obligated to determine whether and to what extent their coating materials influence the component.
    Customers are responsible and bear all risk for the use of the coating material. TDK Electronics does not assume any liability for failures of our components that are caused by the coating material.
- Ceramics / 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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