

SMT power inductors

Size 12.5 x 12.5 x 10.5 (mm)

Series/Type: **B82477D6**

Date: **May 2024**

SMT power inductors
B82477D6
Size 12.5 x 12.5 x 10.5 (mm)
Rated inductance 3.9 ... 47 μ H
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 020
- 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

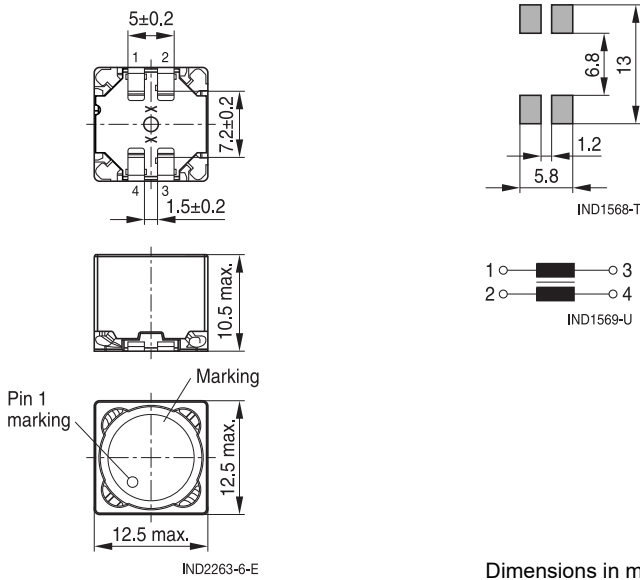
Marking

- Marking on component:
Manufacturer, L value (μ H, 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

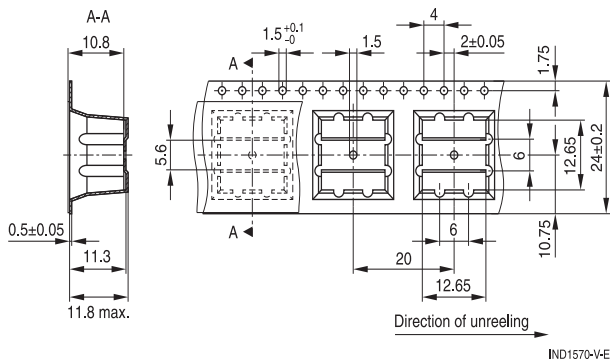
- 24-mm blister tape, wound on 330-mm \varnothing reel
- Packing unit: 250 pcs./reel

Dimensional drawing and layout recommendation

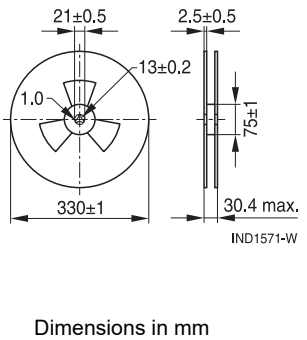


Taping and packing

Blister tape



Reel



Technical data and measuring conditions

Rated inductance L_1, L_2	Measured with LCR meter Keysight E4980 or equivalent at frequency f_L , 0.1 V, room temperature.
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
Temperature rise current I_{temp}	Max. permissible DC with temperature increase of ≤ 40 K Method as per IEC62024-2
Saturation current I_{sat}	Max. permissible DC with inductance decrease $\Delta L/L_0$ of approx. 10%
Rated current I_R	Smaller value of either I_{temp} or I_{sat}
DC resistance $R_{1,max}, R_{2,max}$	Measured at room temperature
Isolation (functional)	Tested with 500 V, 0.4 s by 100%, 3 s during qualification
Solderability (lead-free)	Dip and look method Sn95.5Ag3.8Cu0.7: +(245 ±5) °C, (5 +0/-0.5) s Wetting of soldering area $\geq 90\%$ (based on IEC 60068-2-58)
Resistance to soldering heat	+245 °C, 30 s (as referenced in JEDEC J-STD 020)
Climatic category	55/150/56 (to IEC 60068-1)
Storage conditions	Mounted: -55 °C ... +150 °C Packaged: -25 °C ... +40 °C, $\leq 75\%$ RH
Weight	Approx. 5 g

Characteristics and ordering codes

L_R μH	K_{typ} %	Tolerance	f_L MHz	$I_{\text{sat,typ}}$ A	$I_{\text{sat,min}}$ A	I_{temp} A	$R_{1,2,\text{max}}$ Ω	$R_{1,2,\text{typ}}$ Ω	Ordering code
3.9	97	$\pm 20\% \triangleq M$	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} is the current flowing through one winding.

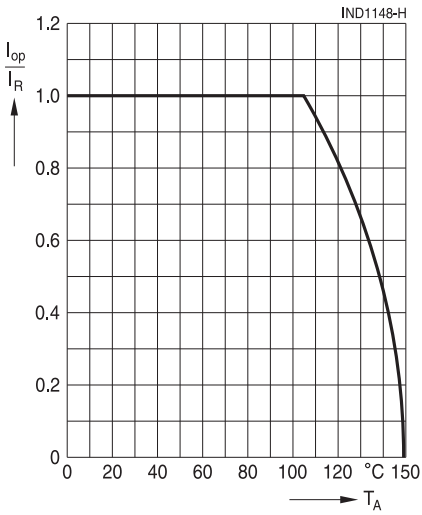
When leads are connected in parallel, I_{sat} is the same.

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), online catalogs and in the data sheets.
 - Particular attention should be paid to the derating curves, if given. Derating applies in the case the ambient temperature in application exceeds the rated temperature of the component.
 - Ensure the operation temperature of the component in application not to exceed the maximum specified value or the upper climatic category temperature.
 - 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. 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, sealed, or varnished in customer applications:
 - Many potting, sealing, or varnishing 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, sealing or varnishing materials used attack or destroy the wire insulation, plastics, or glue.
 - The effect of the potting, sealing, or varnishing materials may change the high-frequency behavior of the components.
- Magnetic core materials such as ferrites are sensitive to direct impact. This can cause the core material to flake or lead to breakage of the magnetic core material.
- Any type of tension or pressure on the product may result in damage and affect its functionality and reliability.
 - The products are only to be attached to fixings or mounting holes provided for this purpose in accordance with the data sheet.
 - If additional mechanical forces are applied to the component, e.g., application of gap pads, it is necessary to check whether they attack or destroy any part of the component.
 - It is not permitted for the product specified in the data sheet to assume a mechanical function in the final application.
- Inductance value can drop if external metallic or magnetic parts will be put close to the coil or into the air gap of the coil or core or magnetic material.
- 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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Important notes

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