

Inductors for Power over Data Line (PoDL)

Differential Mode Inductors

Series/Type: ADL32VHR

Date: July 2026

Differential Mode Inductors

Typical inductance L_{single} : $2 \times 3.3 \dots 36 \mu\text{H}$

Rated inductance L_{PoDL} : $12.5 \dots 140 \mu\text{H}$

Rated voltage: 80 V DC



Construction

- Ferrite I-core, metal shielding
- Winding: enamel copper wire
- Winding welded to terminals

Features

- Operating temperature range: $-40 \text{ }^{\circ}\text{C}$ to $+150 \text{ }^{\circ}\text{C}$
- Suitable for lead-free reflow soldering as referenced in JEDEC J-STD-020E
- Qualified according to AEC-Q200
- RoHS compatible

Applications

- Automotive Electronics
- Power over Data Line (PoDL)

Terminals

One-sided tinned terminals

- Base material CuSn6
- Layer composition Ni, Sn
- Lead-free tinned

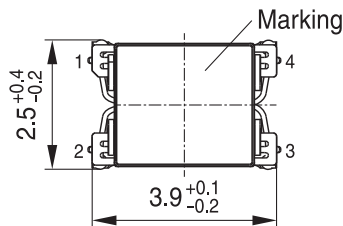
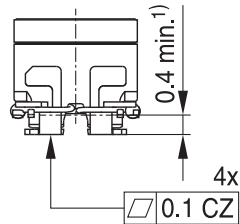
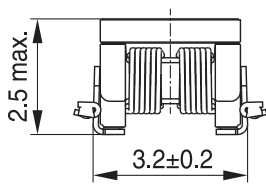
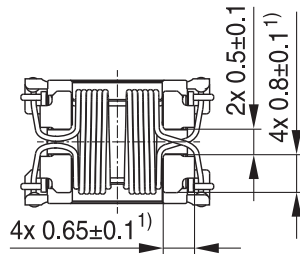
Marking

- Marking on component:
L value (in μH , coded), date code, pin 1 marking
- Minimum data on reel:
Lot number, part number, date of packing

Delivery mode and packing unit

- 12-mm blister tape, wound on 330 mm $\varnothing$ reel, acc. to IEC60286-3
- Packing unit: 6000 pcs. per reel

Dimensional drawing

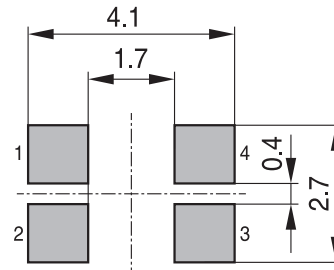


¹⁾ Soldering area

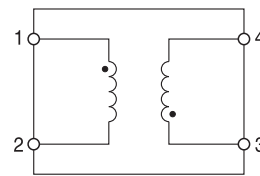
IND2531-K-E

Dimensions in mm

Layout recommendation



IND2546-D



No polarity

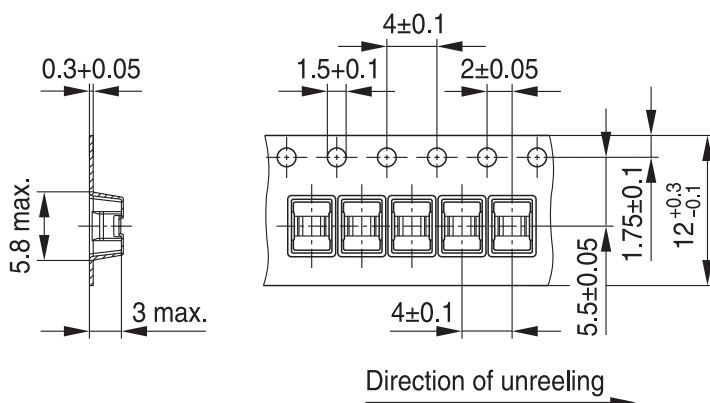
IND2532-W-E



IND1907-U

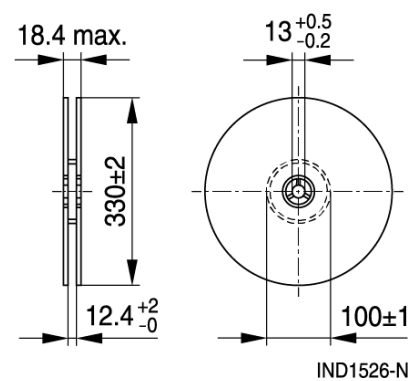
Taping and packing

Blister tape



IND1752-J-E

Reel



IND1526-N

Dimensions in mm

Technical data and measuring conditions

Test circuit for PoDL	
Inductance L_{PoDL}	Measured at 100 kHz, 100 mV, +23 °C ±3 °C, inductance when both windings are connected in series (measured in 1-4 with 2-3 shorted, see test circuit)
Inductance L_{PoDL} tolerance	±20% at +23 °C ±3 °C
Inductance L_{single}	Typical inductance per single winding
Inductance L_{single} relative tolerance	Typ. <5%, rel. tol. = $\frac{ L1 - L2 }{ L1 } \cdot 100\%$
DC resistance R_{DC}	Measured at +23 °C ±3 °C, resistance is specified per single winding
Parasitic capacitance C_p	Typ. <2.5 pF, measured at 5 MHz, 100 mV, between both windings
Saturation current I_{sat}	Based on the inductance change rate (30% below the initial value) I_{sat} is referred to the test circuit and is the current between point 1 and 4 (both windings connected in series)
Rated current I_{temp}	Based on the temperature increase (+40 °C by self-heating) I_{temp} is referred to the test circuit and is the current between point 1 and 4 (both windings connected in series) Temperature increase refers to PCB design acc. IEC 62024-2 for current class A ($I \leq 1$ A). Temperature increase also depends on the PCB structure.
Insulation resistance R_{iso}	Insulation resistance between both windings, measured at 80 V _{DC} , +23 °C ±3 °C
Rated voltage	Voltage that can be continuously applied to the component (between both windings)
Weight	Approx. 0.08 g

Inductors for Power over Data Line (PoDL)

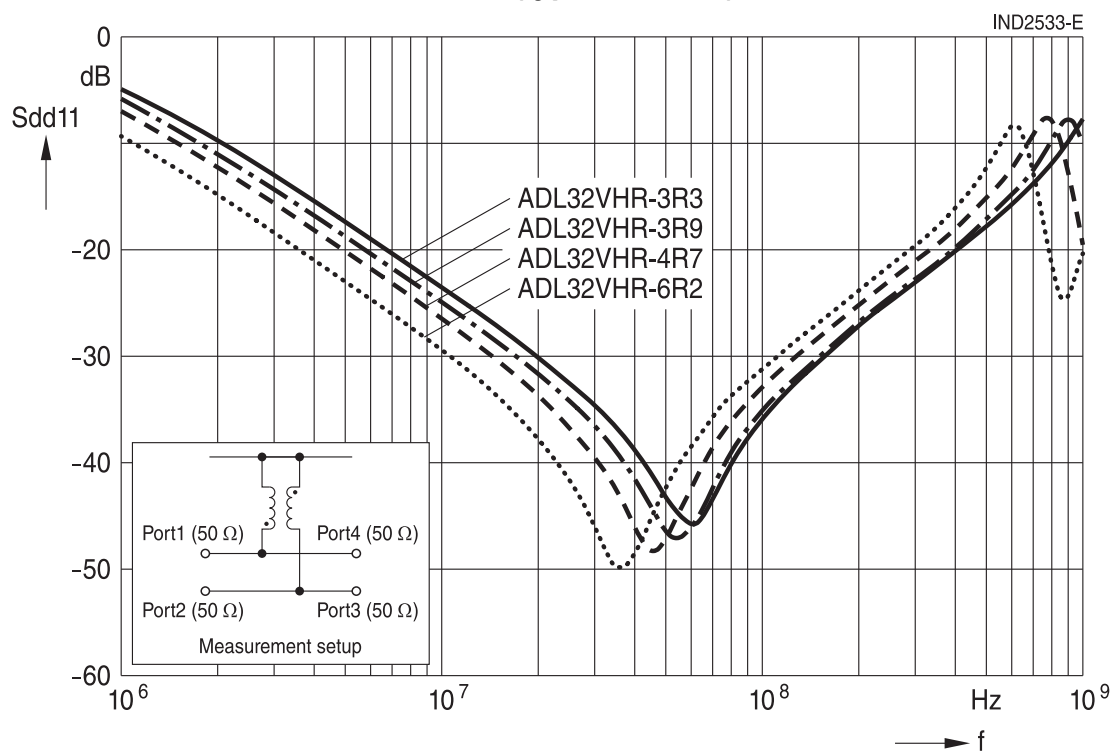
ADL32VHR

Differential Mode Inductors

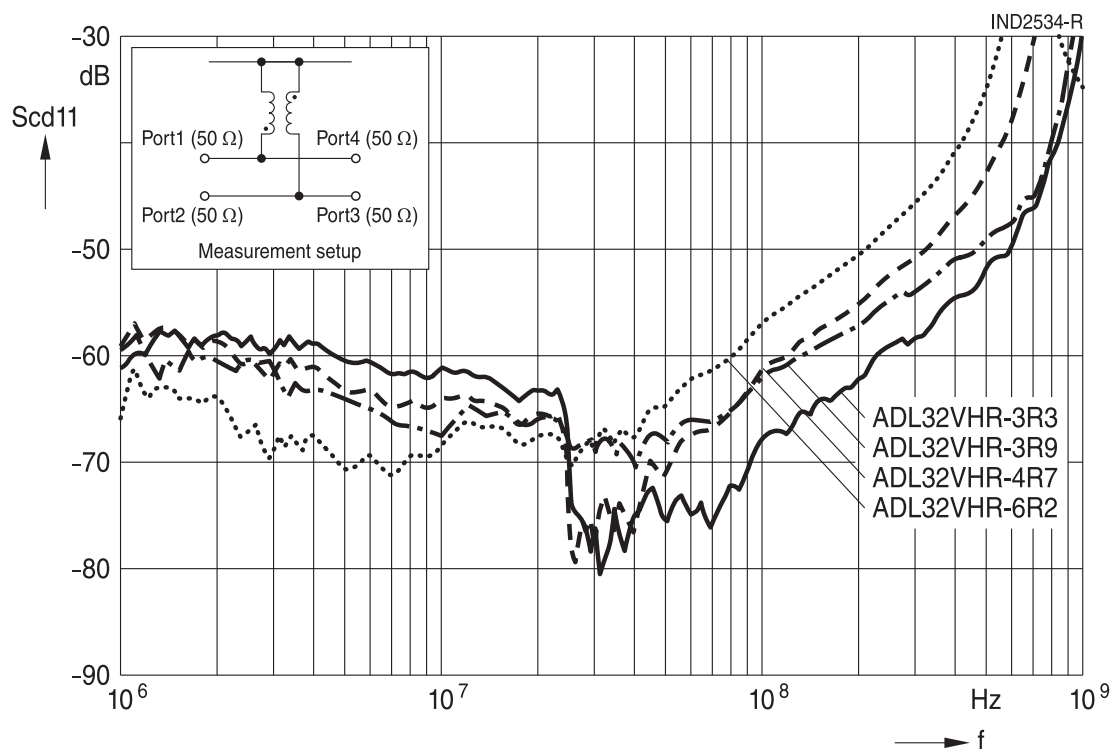
Characteristics and ordering codes

L _{PoDL}	L _{single,typ}	R _{DC,max}	R _{iso,min}	I _{sat,typ} @T _{amb}		I _{temp,typ} @T _{amb}		Internal code	Ordering code
μH	μH	Ω	MΩ	+25°C	+105°C	+25°C	+105°C		
12.5	3.3	0.25	10	920	760	780	710	B82782L2332H500	ADL32VHR-3R3
14.8	3.9	0.27	10	830	690	760	690	B82782L2392H500	ADL32VHR-3R9
17.4	4.7	0.29	10	770	630	720	650	B82782L2472H500	ADL32VHR-4R7
23.5	6.2	0.33	10	640	530	680	610	B82782L2622H500	ADL32VHR-6R2
64.8	18	0.84	10	380	320	410	370	B82782L2183H500	ADL32VHR-180
140	36	2.1	10	250	210	250	230	B82782L2363H500	ADL32VHR-360

1000BASE-T1 PoDL Return losses (typical curves)

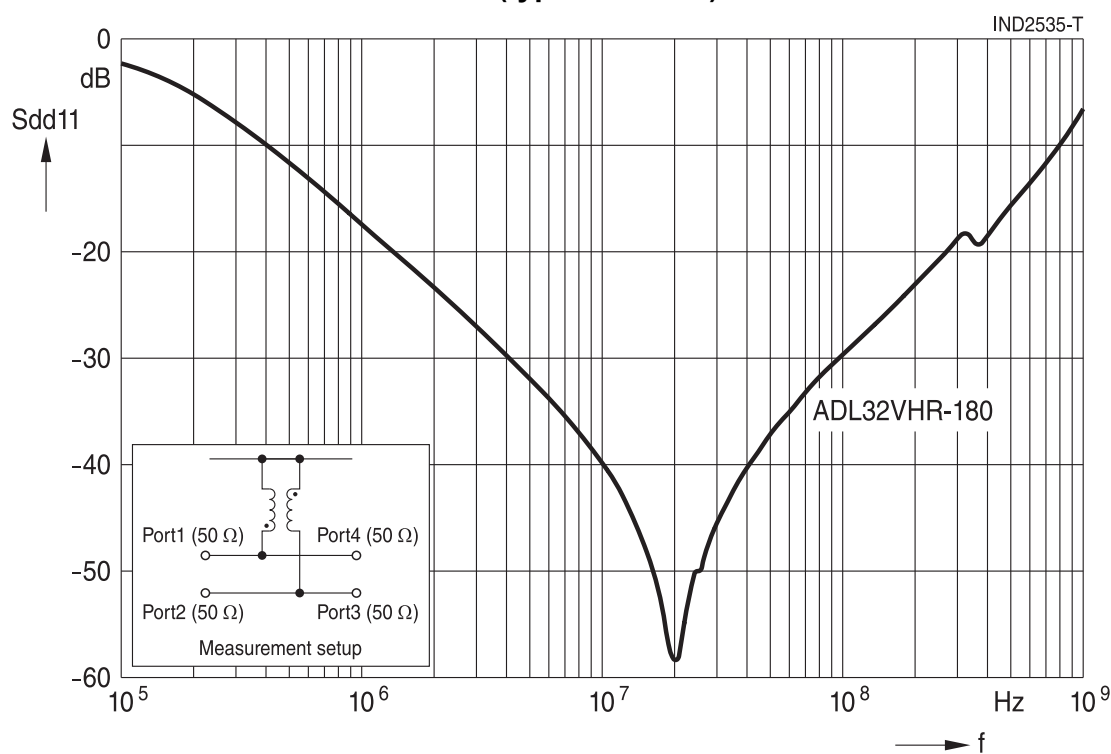


1000BASE-T1 PoDL Mode conversion losses (typical curves)

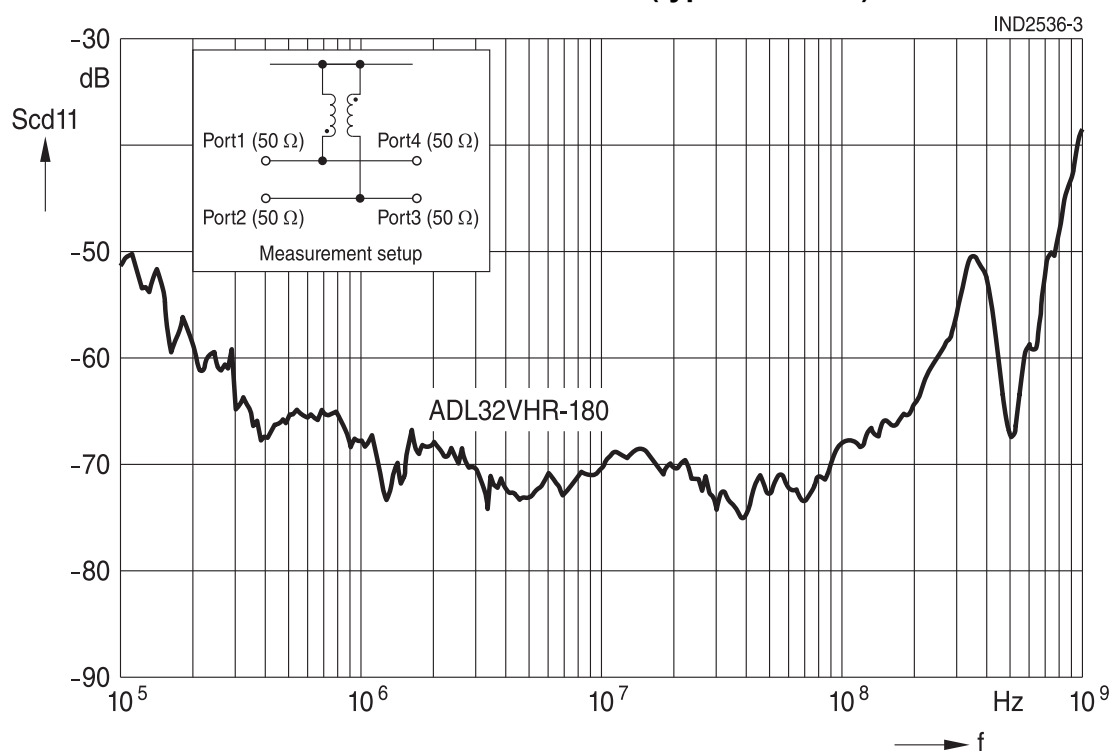


Note: S-parameters information is for reference only, shown data represents typical component performance.

100BASE-T1 PoDL Return losses (typical curves)

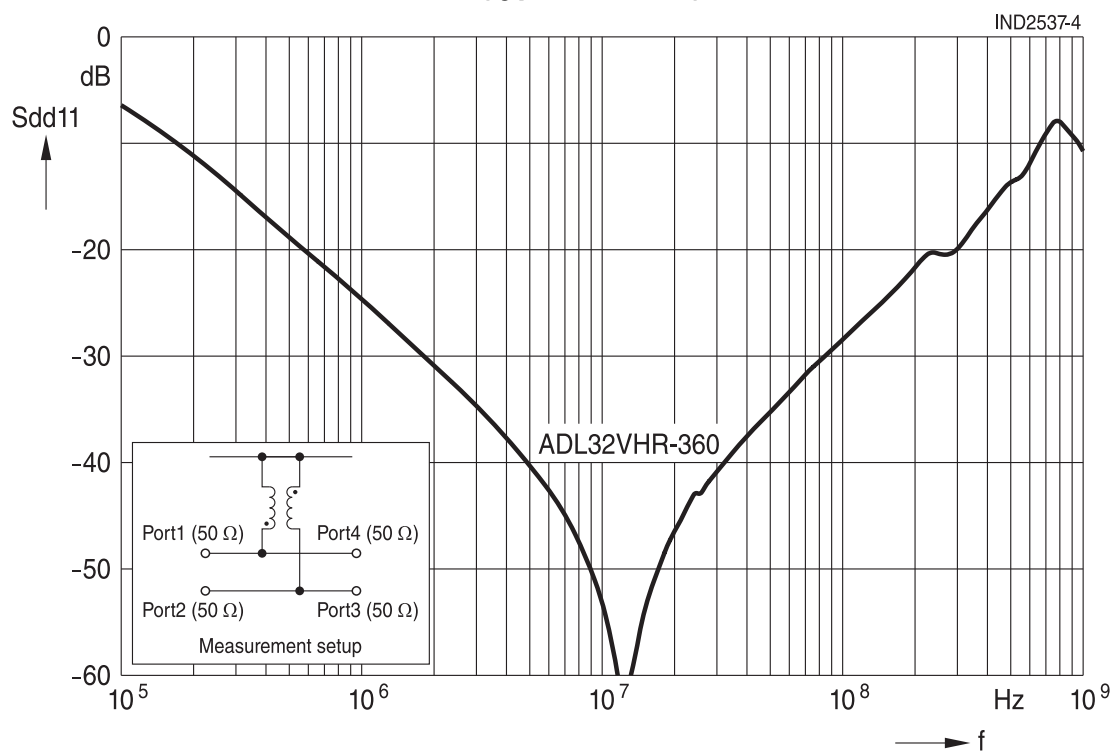


100BASE-T1 PoDL Mode conversion losses (typical curves)

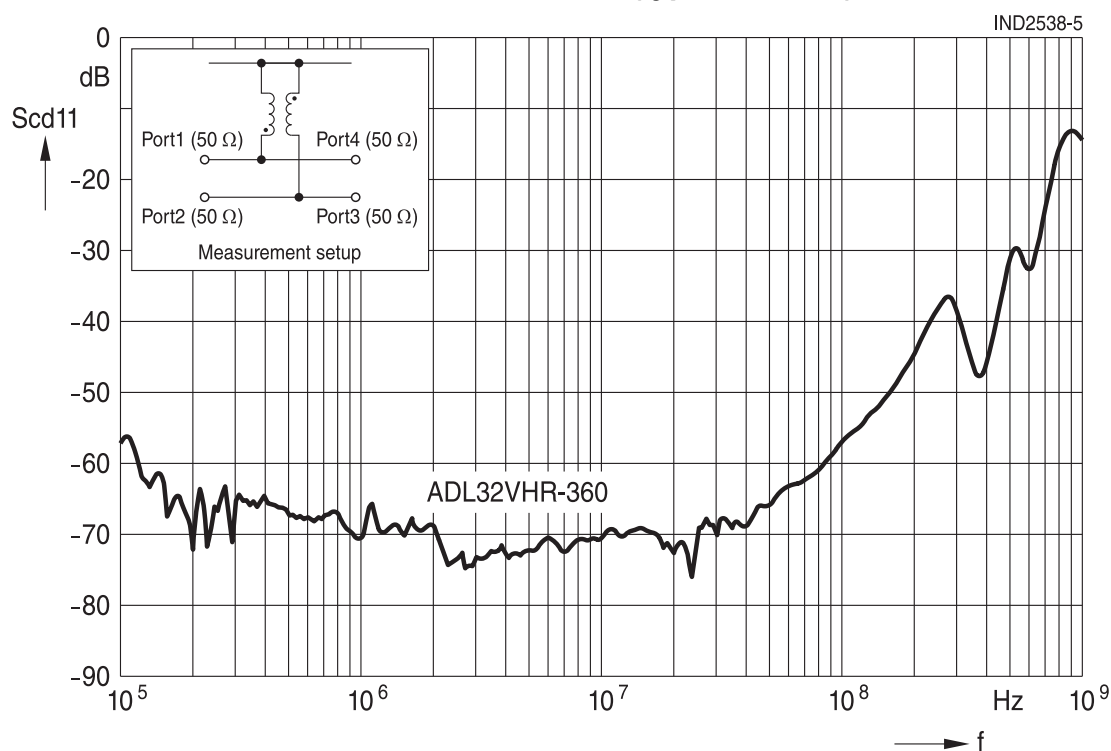


Note: S-parameters information is for reference only, shown data represents typical component performance.

10BASE-T1 PoDL Return losses (typical curves)



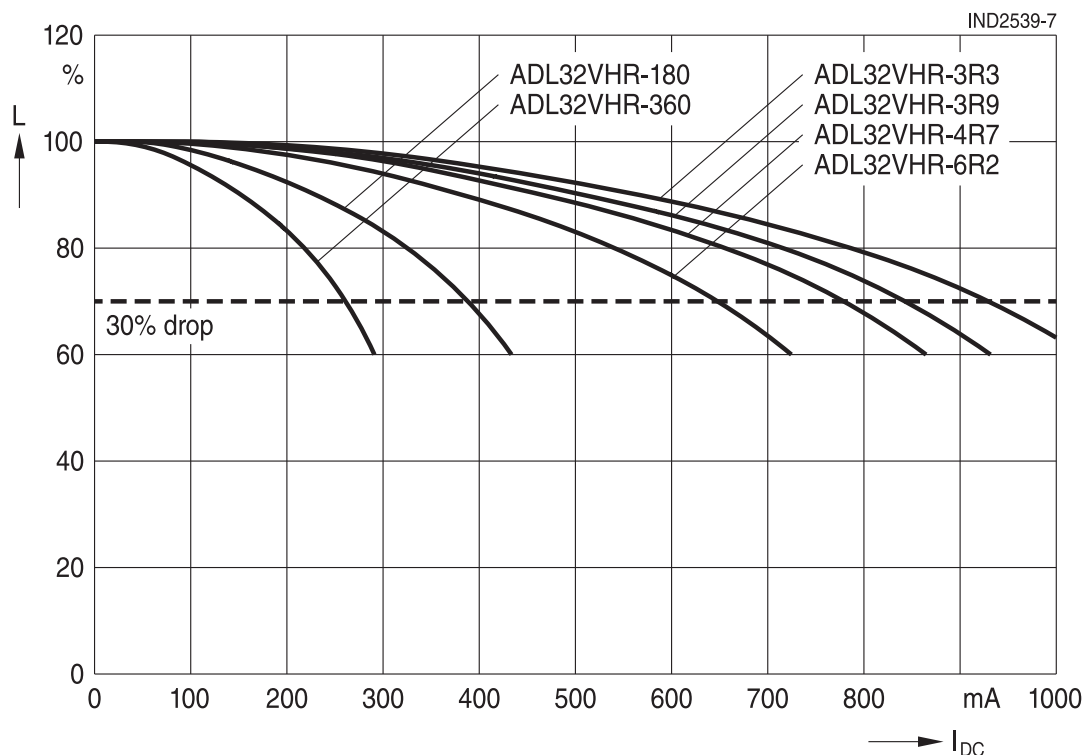
10BASE-T1 PoDL Mode conversion losses (typical curves)



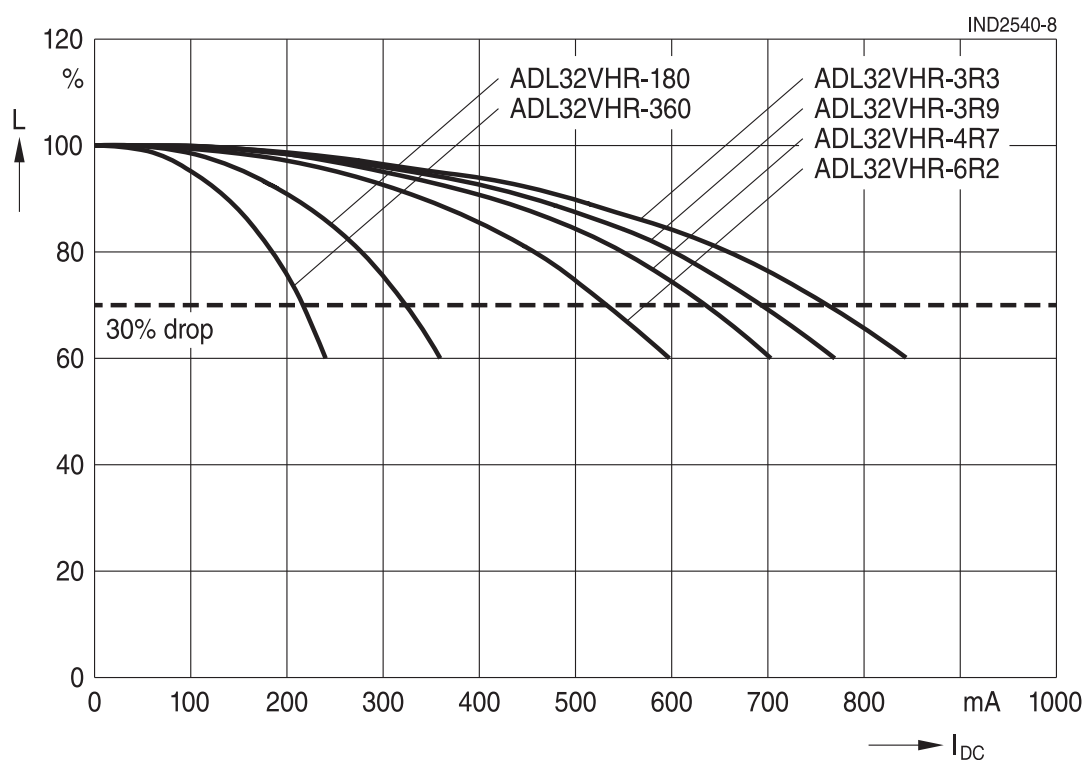
Note: S-parameters information is for reference only, shown data represents typical component performance.

Saturation current I_{sat} (typical curves)

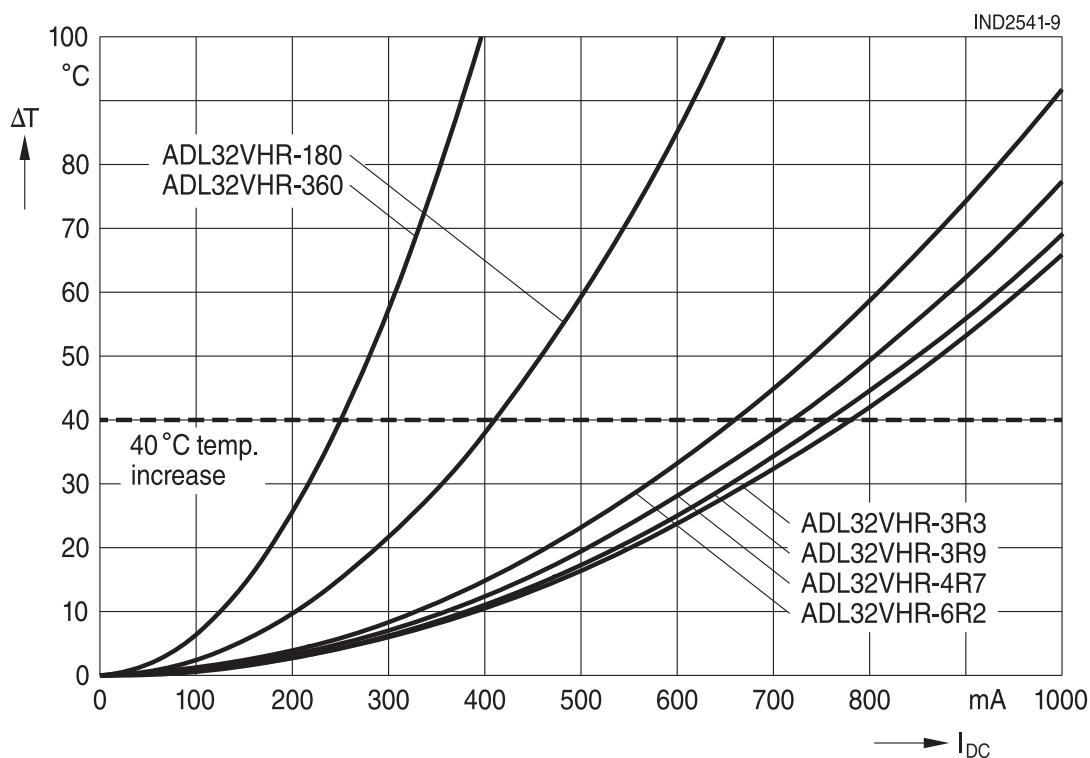
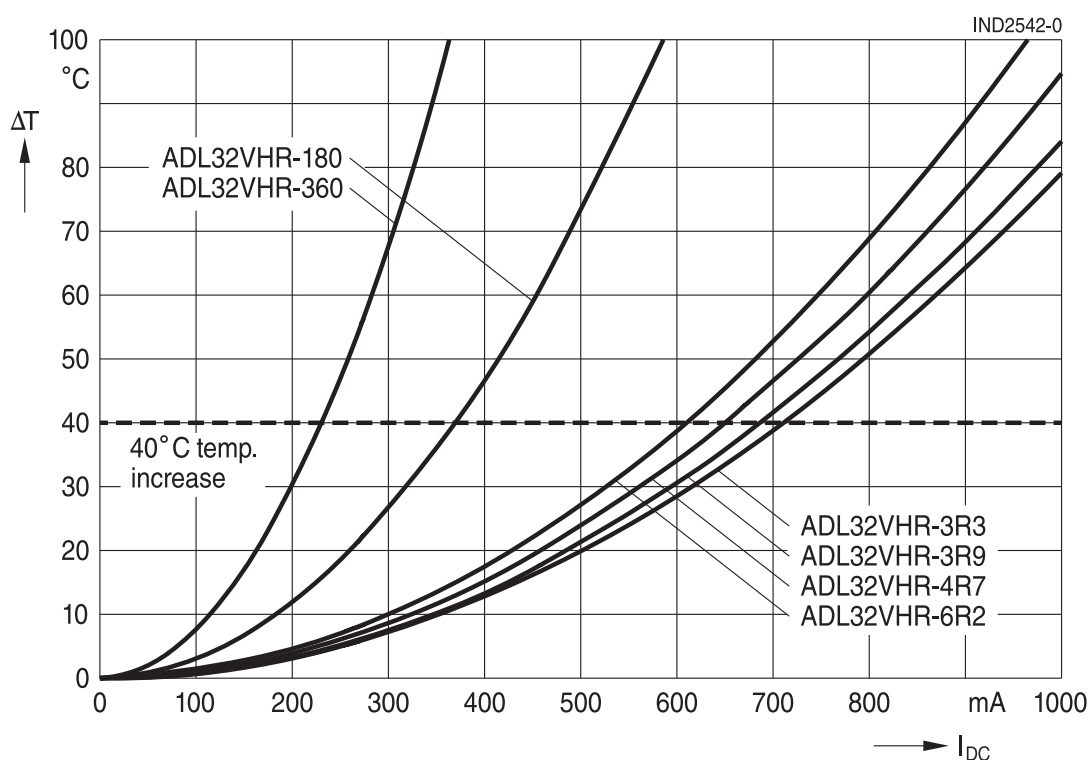
Inductance L versus DC load current I_{DC} @ 25 °C



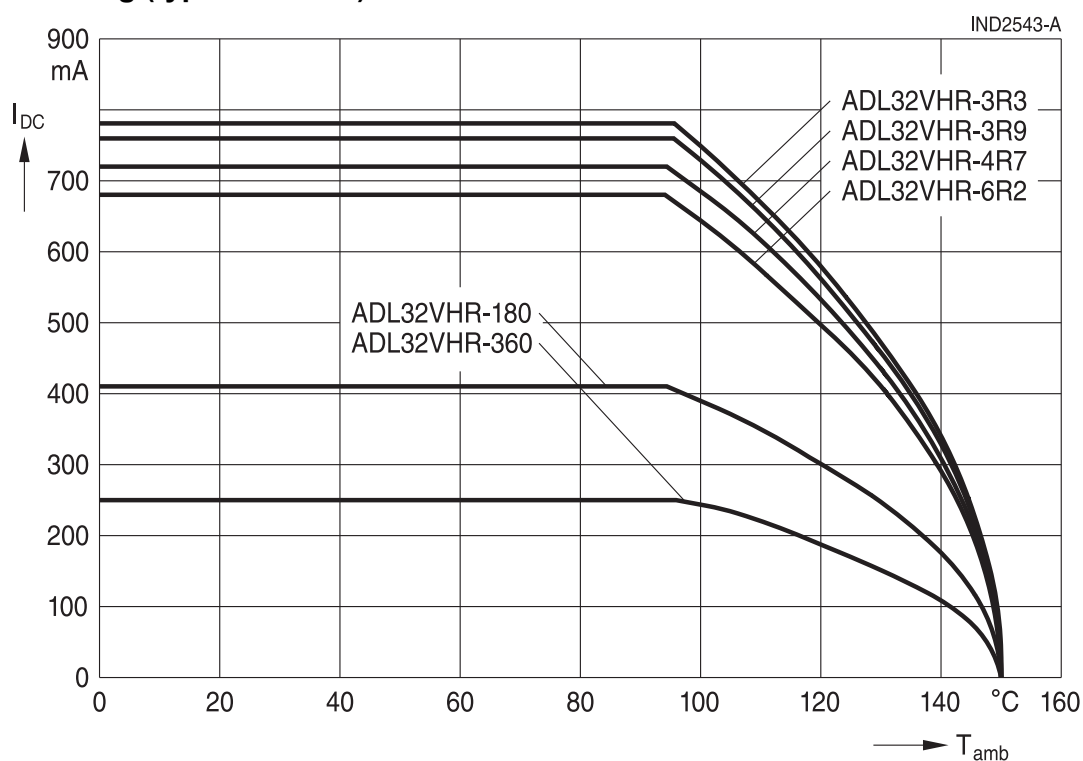
Inductance L versus DC load current I_{DC} @ 105 °C



Rated current I_{temp} (typical curves)

 ΔT vs DC load current I_{DC} @ 25 °C

 ΔT vs DC load current I_{DC} @ 105 °C


Derating (typical curves)



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 pins only. Temperatures specified in relation to reflow soldering can also refer to the pins or terminals for products with larger thermal mass, as in such cases, the temperature difference to the top of the component is too big (e.g., high proportion of core within the component).
- If the components are to be washed or varnished it is necessary to check whether the washing or 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 or 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, wire insulation, plastics or glue.
 - The effect of the potting, sealing, or varnishing materials may change the high-frequency behavior 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 obliged 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.
- 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.

Cautions and warnings

- Due to product design and applied manufacturing process, appearance, symmetry, and shape of not dimensioned details could vary within same lot, as well discoloration of housing is possible. TDK does not expect detrimental effects on product function or reliability. In case of conflicts, TDK reference standard shall prevail.
- 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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The ordering code for one and the same product can be represented differently in data sheets, data books, other publications, on the company website, or in order-related documents such as shipping notes, order confirmations and product labels. **The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.** Detailed information can be found on the Internet under www.tdk-electronics.tdk.com/orderingcodes.

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The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule we are either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether a product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
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Important notes

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The IATF certifications confirm our compliance with requirements regarding the quality management system in the automotive industry. Referring to customer requirements and customer specific requirements ("CSR") TDK always has and will continue to have the policy of respecting individual agreements. Even if IATF 16949 may appear to support the acceptance of unilateral requirements, we hereby like to emphasize that **only requirements mutually agreed upon can and will be implemented in our Quality Management System**. For clarification purposes we like to point out that obligations from IATF 16949 shall only become legally binding if individually agreed upon.
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