SMD Power Inductor

TMPV1004SV-Series(N)-D02

1. Features

1. Low loss realized with low DCR.
2. High performance realized by metal dust core.
3. Ultra low buzz noise, due to composite construction.
4. 100% Lead(Pb)-Free & Halogen-Free and RoHS compliant.
5. High reliability -Reliability test complied with AEC-Q200.
6. Operating temperature: -55~+165°C(Including self - temperature rise)

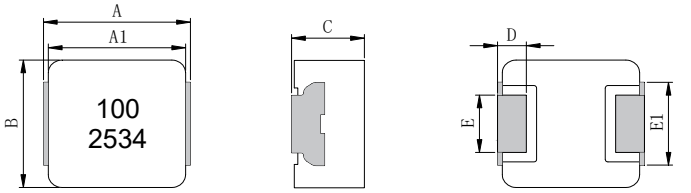

AEC-Q200

Lead-free Halogen-free RoHS

2. Applications

Automotive applications.

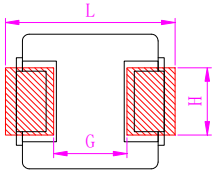
3. Dimensions



A	A1	B	C	D	E	E1
11.0±0.3	10.1±0.3	10.0±0.3	3.8±0.2	2.3±0.3	4.5±0.3	6.6±0.3

Unit: mm

Recommend PC Board Pattern



L	G	H
12.3	5.5	5.0

Note:
1. PCB layout is referred to standard IPC-7351B
2. The above PCB layout reference only.
3. Recommend solder paste thickness at 0.15mm and above.

4. Part Numbering

TMPV	1004	SV	-	100	MN	-	D02
A	B	C		D	E		F

A: Series	
B: Dimension	BxC
C: Type	Standard.
D: Inductance	100=10.0uH
E: Inductance Tolerance	M=±20%
F: Code	Marking: Black.100 and 2534 (25 YY, 34 WW, follow production date).

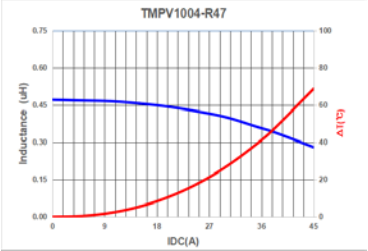
5. Specification

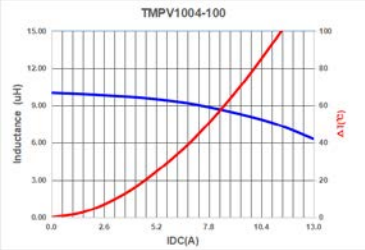
Part Number	Inductance (uH) ±20% @ 0 A DC	Irms(A)		I sat (A)		DCR(mΩ)	
		Typ	Max	Typ	Max	Typ	Max
TMPV1004SV-R47MN-D02	0.47	35.5	30.5	38	33	1.6	1.76
TMPV1004SV-100MN-D02	10.0	6.5	5.5	11.5	9.5	30.9	33.1
TMPV1004SV-220MN-D02	22.0	4.1	3.5	8.6	7.3	70.5	75.5
TMPV1004SV-330MN-D02	330	3.7	3.3	5.7	5	110	117

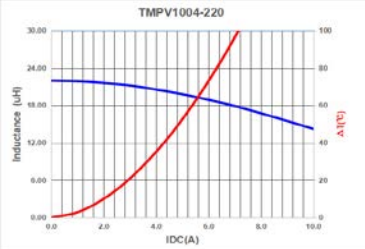
Note:

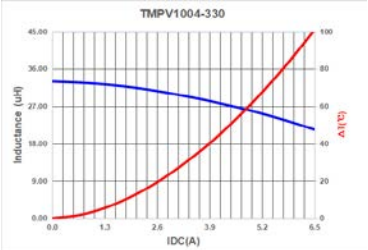
1. Test frequency : Ls : 100KHz /1.0V.
2. All test data referenced to 25℃ ambient.
3. Testing Instrument(or equ) : Agilent 4284A,E4991A,4339B,KEYSIGHT E4980A/AL,chroma3302,3250,16502.
4. Heat Rated current (Irms) will cause the coil temperature rise approximately ΔT of 40℃
5. Saturation current (Isat) will cause L0 to drop approximately 30%.
6. The part temperature (ambient + temp rise) should not exceed 165℃ under worst case operating conditions.Circuit design,component,PCB trace size and thickness,airflow and other cooling provisions all affect the part temperature. Part temperature should be verified in the end application.
7. Irms Testing : temperature rise is highly dependent on many factors including pcb land pattern, trace size, and proximity to other components. Therefore temperature rise should be verified in application conditions.
8. Rated DC current : the lower value of Irms and Isat.

6. Typical Performance Curves









12、Appearance criterion

一、Introduction：

1. Scope：

This document was written for the purpose of helping customers better understand the **TMPA、TMHC、TMPV** products they are purchasing. It will give the customer an idea as to the type of cosmetic irregularities that may occur from time to time during the manufacturing of the component itself, or during their use of the component.

This document also discusses the criteria that have been developed for the rejection of irregularities that are determined to be excessive.

While it is desirable to have cosmetically perfect **TMPA、TMHC 、TMPV** inductors, the powdered iron manufacturing technique has cosmetic limitations.

Certified test labs have performed extensive environmental testing on **TMPA、TMHC、TMPV** inductors with and without cosmetic imperfections according to AEC-Q200 standards for thermal shock ,mechanical shock, vibration, humidity, and others. This testing has shown that the cosmetic imperfections listed in this document do not affect the performance or reliability of the **TMPA、TMHC 、TMPV** inductors.

Test results are available upon request.

2.Product：

The **TMPA、TMHC、TMPV** inductors are different from most inductors. The inductor body is a soft magnetic composite (SMC), not a ferrite. It is made from an iron powder mixture and cemented together using a resin binder. This powder mixture, when pressed around the inductor coil, greatly enhances the electrical properties of the inductor and gives protection from environmental forces. After pressing, the component is cured in an oven to increase the bonding strength of the resin binders with the iron powder, yielding excellent electrical and physical properties.

3. The TMPA、TMHC、TMPV inductors provide the best combination of:

- Inductance
- Low core loss
- Saturation
- Temperature stability
- Smallest footprint
- Lowest profile

二、Surface irregularities：

The following pages include descriptions of the most common irregularities seen on **TMPA、TMHC、TMPV** inductors. Common causes are described along with variations in their magnitude. Customers may sometimes see one or all of these irregularities.

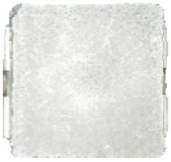
Those that are determined to adversely affect the customer's use of the component are rejected, thought minor (acceptable) irregularities can occasionally be present. With the use of this guide, a customer will has better understand the effect of each irregularity.

TMPA&TMHC

TMPV

Cracks

TMPA&TMHC



TMPV

Chip off

TMPA&TMHC

TMPV

Oxidation

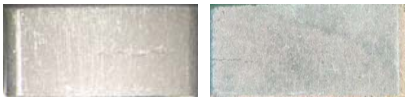
1.Cracks：

Cracks within the inductor body are unavoidable during the manufacturing process. Small cracks are caused by die wall friction when the parts are ejected during the pressing process, and by expansion of the coil during the process of curing the resin binder in the powdered iron body. Unlike ferrite material, cracks on the body do not affect the electrical performance of the component.

Reliability testing has shown that even cracks in excess of 0.005 inch will not cause the component to fail electrically or physically in field applications. Acceptance widths are adopted based on the ability to detect cracks both at the component and circuit level.

TMPA&TMHC TMPV

Terminal area crack, acceptable
Cracks coming from the top corner of the terminal are normal and are caused by terminal expansion during curing operations.



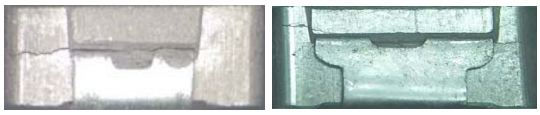
TMPA&TMHC TMPV

Negligible crack, acceptable
Negligible cracks are those that are nearly invisible without magnification.

TMPA&TMHC TMPV

Minor crack, acceptable
Minor cracks are those that are visible without magnification but are not apparent without close inspection.

1-1. Crack：



TMPA&TMHC TMPV

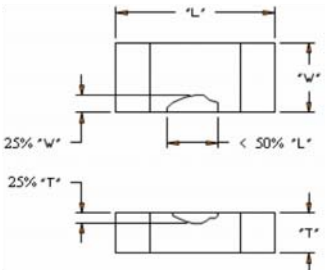
Moderate crack, rejectable
Moderate cracks are those that are obvious upon inspection and extend across most of the component.

TMPA&TMHC TMPV

Major crack, rejectable
Major cracks are those that are obvious to a customer and would possibly result in large chip-outs that would expose the coil and lead frame.

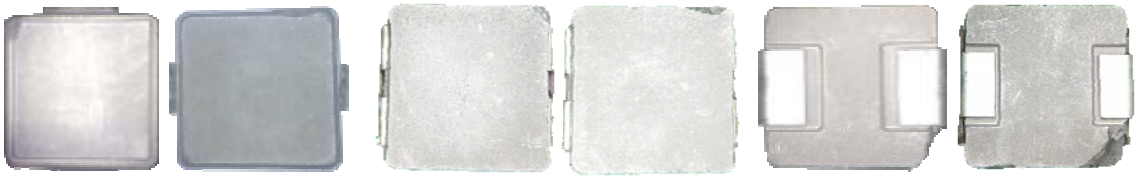
2.Chip off：

Chipping of the inductor body can occur during normal processing and testing of the inductor. The acceptance criteria for chipping vary with the size of the component, our current acceptance standards are based on IPC-A-610. The effect of chipping is negligible as long as the inductor coil is not showing.
See IPC standard for class 1 and 2 components below.



T	25 % of the thickness
W	25 % of the width
L	50 % of the length

Chips typically occur on the edges and corners of the inductor body They are slightly darker in color and rougher in appearance than the surrounding material.



TMPA&TMHC TMPV TMPA&TMHC TMPV TMPA&TMHC TMPV

Minor chipping, acceptable
Minor chips in the inductor body are those that are typically shallow imperfections that occur on the corners and edge of components.
No coil wire or lead frame is showing and the chip does not affect the performance or reliability of the component.

Major chipping, rejectable
Major chips in the inductor body are those that are very obvious to the customer and may expose the wire coil or lead frame.

3. Oxidation：

The **TMPA、TMHC、TMPV** inductors is predominately iron, and oxidation may occur in a small percentage of inductors.

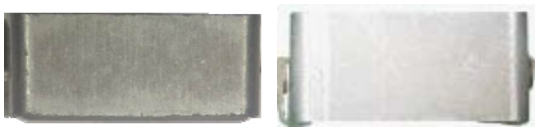
Resin binders give moderate protection, but some slight oxidation may occur. All components should be stored away from heat, humidity, and ionized atmospheres as much as possible before mounting.

Basic steps should be taken in order to limit surface oxidation, including keeping the **TMPA、TMHC、TMPV** inductors sealed in their packaging until PCB mounting.

In case that oxidation does occur, the effects are contained only in the surface of the component and will not penetrate into the core material. No electrical effects have ever been documented due to oxidation of the **TMPA、TMHC、TMPV** products. Oxidation should never be considered a reliability risk.

TMPA&TMHC TMPV

Top view

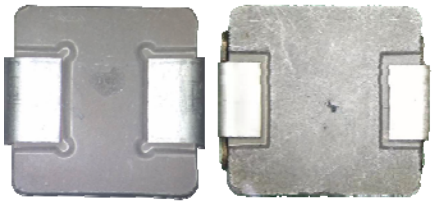


TMPA&TMHC TMPV

Side view

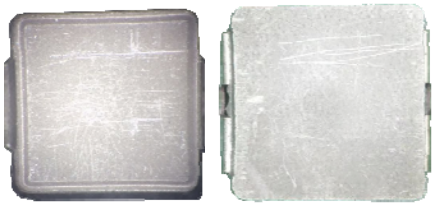
4.Other：

A very small number of other irregularities have been reported. These occur at an exceedingly low rates and typically do not affect the components electrically. These include: Foreign material may be seen pressed into the upper terminals. This material is of the same material as the inductor body and should not be a reason for rejection unless solderability is affected.



TMPA&TMHC TMPV

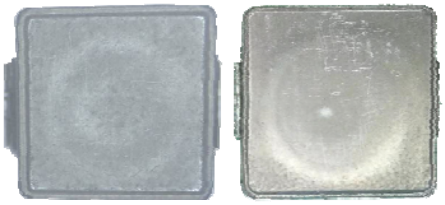
Foreign material: acceptable



TMPA&TMHC TMPV

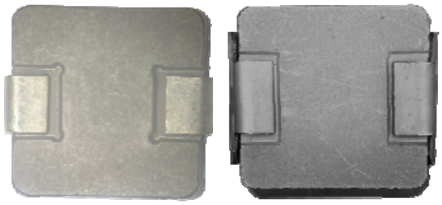
Scratch: acceptable

Scratches may be seen on the surface of the inductor body. Scratches are an acceptable surface irregularity.



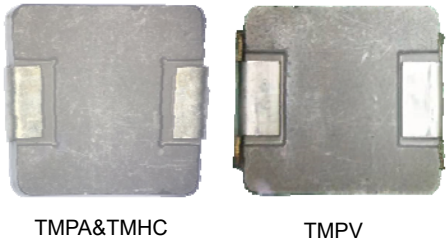
TMPA&TMHC TMPV

Imprinting：acceptable



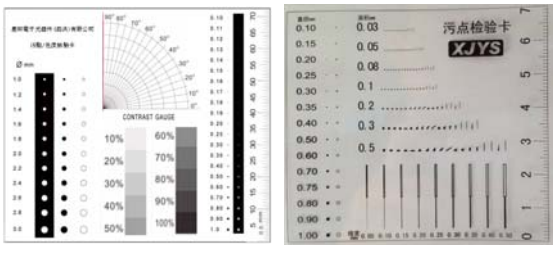
TMPA&TMHC TMPV

Blackening:PAD black/ brightness ratio less than 20% is OK



TMPA&TMHC TMPV

Yellowing：PAD yellowing ratio less than 20% is OK



三、Summary：

The **TMPA、TMHC、TMPV** inductors are comprised of an iron powder body compressed around a coil. Due to the fact that this iron powder body is not as solid like sintered ferrite material, irregularities such as cracks and chips do not affect the

electrical properties or the reliability of the component. Criteria have been determined for the acceptability of the components that allow for a robust manufacturing process as well as an acceptable degree of cosmetic irregularity.

Reliability testing has been done on the effects of cracking of the iron powder body and on the oxidation of the iron particles that are present on the surface. Testing has shown no reliability issues from either of these cosmetic differences, Please feel free to use it!

The products described herein and this document technical questions and specific disclaimer, If you have any questions or need, please contact our corresponding business specialist or E-mail at sales@tai-tech.com.tw.

Thank you for your support!