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**POWER INDUCTORS, MOULDED, SMD,
BASED ON SERIES 3508**

ESCC Detail Specification No. 3201.009

Issue 1

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Administrative/General Notes

(Refer to specifications for ESCC 0201 series)

Item No.	General Description
001	Administrative/General Notes/Specs/0201



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**5. GENERAL****5.1 SCOPE**

This specification details the ratings, physical and electrical characteristics, test and inspection data for Surface Mounting Inductors based on Series 0001. It shall be read in conjunction with ESCC Serial Specification No. 0001, the requirements of which are supplemented herein.

5.2 COMPONENT TYPE, VARIANTS AND RANGE OF COMPONENTS

The types and range of components of the inductor specified herein, which are also covered by this specification, are given in Table 1(a).

5.3 MAXIMUM RATINGS

The maximum ratings, which shall not be exceeded at any time during use or storage, applicable to the inductor specified herein, are set out in Table 1(b).

5.4 QUALIFICATION, INSPECTION AND ACCEPTANCE

Not applicable.

5.5 PHYSICAL DIMENSIONS

The physical dimensions of the inductor specified herein are shown in Figure 2.

5.6 ELECTRICAL SPECIFICATIONS

The functional diagram for the inductor specified herein, is shown in Figure 3.

5.7 RELATED AND REFERENCED DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:

- (a) ESCC Serial Specification No. 0001 for RF Coils, Power.

5.8 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Serial Specification No. 0001 shall apply.

TABLE 1(a) - RANGE OF COMPONENTS AND RANGE OF COMPONENTS

Variant	Type	Figure	Turnover Point	Weight (g)
01	0001-01	010	50%	4
02	0001-02	010	50%	5
03	0001-03	010	50%	6
04	0001-04	010	50%	11
05	0001-05	010	50%	2
06	0001-06	010	50%	26

**TABLE 4: CAPACITORS – 50V AC SERIES (continued)**

(1) Inductance (Max. L) L_{max} (pH)	(2) Tolerance %	(3) Rated DC Current I_{DC} (A)	(4) Inductance at I_{DC} L_{DC} (pH)	(5) Peak Current (Max. I) I_{PK} (A)	(6) Max. DC Resistance R_{DC} (m Ω)
1.1	20	1.0	2.1	0.3	10
1.7	20	1.4	3.1	0.3	10.1
2.1	20	1.8	4.1	0.3	10.1
2.7	20	2.3	5.1	0.3	10
3.3	20	3.0	6.1	0.3	10
4.7	20	4.0	8.1	0.3	10
6.8	20	5.5	11.0	0.3	10
10	20	7.5	15.0	0.3	10
15	20	10.0	20.0	0.3	10
22	20	13.0	26.0	0.3	10
33	20	18.0	36.0	0.3	10
47	20	24.0	49.0	0.3	10
68	20	32.0	66.0	0.3	10
100	20	44.0	89.0	0.3	10
150	20	60.0	120.0	0.3	10
220	20	82.0	164.0	0.3	10
330	20	110.0	220.0	0.3	10
470	20	150.0	300.0	0.3	10
680	20	200.0	400.0	0.3	10
1000	20	270.0	540.0	0.3	10
1500	20	360.0	720.0	0.3	10
2200	20	490.0	980.0	0.3	10
3300	20	660.0	1320.0	0.3	10

TABLE 4: CAPACITORS – 50V AC SERIES (continued)

(1) Inductance (Max. L) L_{max} (pH)	(2) Tolerance %	(3) Rated DC Current I_{DC} (A)	(4) Inductance at I_{DC} L_{DC} (pH)	(5) Peak Current (Max. I) I_{PK} (A)	(6) Max. DC Resistance R_{DC} (m Ω)
1.1	20	10	21	0.3	10
1.7	20	14	31	0.3	10
2.7	20	23	51	0.3	10
3.3	20	30	61	0.3	10
4.7	20	40	81	0.3	10
6.8	20	55	110	0.3	10
10	20	75	150	0.3	10
15	20	100	200	0.3	10
22	20	130	260	0.3	10
33	20	180	360	0.3	10
47	20	240	490	0.3	10
68	20	320	660	0.3	10
100	20	440	890	0.3	10
150	20	600	1200	0.3	10
220	20	820	1640	0.3	10
330	20	1100	2200	0.3	10
470	20	1500	3000	0.3	10
680	20	2000	4000	0.3	10
1000	20	2700	5400	0.3	10
1500	20	3600	7200	0.3	10
2200	20	4900	9800	0.3	10
3300	20	6600	13200	0.3	10



(1) Indentation (Mass %) I_{100} (µm)	(2) Indentation 1%	(3) Based DC Current I_{DC} (µA)	(4) Indentation at I_{DC} (Mass %) I_{DC} (µm)	(5) Penetration (Mass %) I_{DC} (µm)	(6) Seal I_{DC} Penetration I_{DC} (µm)
20	20	0.4	10.0	10.0	10
30	30	1.0	20	20.0	20
40	40	2.0	30.0	30	30
50	50	5	50.0	50	50
60	60	10	60.0	60	60
70	70	20	70.0	70	70
80	80	30	80.0	80	80
90	90	50	90.0	90	90
100	100	100	100.0	100	100
200	100	200	100	100	100
300	100	300	100	100	100
400	100	400	100	100	100
500	100	500	100	100	100
600	100	600	100	100	100
700	100	700	100	100	100
800	100	800	100	100	100
900	100	900	100	100	100
1000	100	1000	100	100	100

NOTES:

1. Indentation measured at 200, 1000Pa.
2. Minimum value that the Indentation is measured under Based Current in DC.
3. Peak current is the maximum current in a square pulse of duration 10µs.

TABLE 100 - PENETRATION RANGES

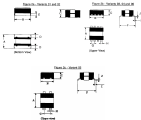
No.	Measurement	Symbol	Minimum Range	Unit	Remark
1	Based DC Current	I_{DC}	See Table 100	µA	
2	Sealless Indentation Range	Seal	See Table 100	µm	
3	Sealing Temperature Range	T_{Seal}	See Table 100	°C	
4	Storage Temperature Range	$T_{Storage}$	See Table 100	°C	$T_{Storage}$
5	Working Temperature	T_{Work}	See Table 100	°C	See Table 1

NOTES:

1. Section 5.2 second maximum, the same symbol shall not be considered until 5 minutes have elapsed.

TABLE 1 - ASSEMBLY AND SEAL INFORMATION

Not applicable

Figure 4. PERFORM DIMENSIONS


Type	Seal width		Seal height		Seal lip width		Seal lip height		Seal lip angle		Seal lip radius	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
01	10.7	10.7	10.7	10.7	10	10.5	10.7	10.5	10	10.5	10.5	10.5
02		10		10		10		10.5		10.5		10.5
03		10.5		10.5		10		10		10		10.5
04	10.5	10.5	10.5	10.5								
05	10.5	10.5	10.5	10.5								
06					10.7	10	10.7	10	10.5	10.5	10.5	10.5
07					10.7	10	10.7	10	10	10	10	10
08					10	10	10	10	10	10	10	10
09					10	10	10	10	10	10	10	10
1					10	10	10	10	10	10	10	10
2					10	10	10	10	10	10	10	10

NOTES

1. All dimensions are in millimeters.



FIGURE 1 – FUNCTIONAL DRAWINGS

(a) Item 1.1 and 1.2



(b) Item 2.1 and 2.2



(c) Item 2.3



4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the components specified herein are stated in this specification and ESCC Seal Specification No. 0201 for MP Gels. *Please* Deviations from the General Specification, applicable to this specification only, are detailed in Para 4.2.

Deviations from the General Specification and this Seal Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirements and do not affect the component's reliability, are listed in the appendices attached to this specification.

**6.2 PROTECTIVE MEASURES SPECIFICATIONS****6.2.1 Examinations from Records or Previous Control**

None.

6.2.2 Examinations from Detail Examinations (Visual)

None.

6.2.3 Examinations from Records and Electrical Measurements (Visual)

(a) Para 6.14, Radiographic Inspection: Shall not be performed.

6.2.4 Examinations from Qualification Tests (Visual)

(a) Para 6.14, Ultrasonic Inspection: Shall not be performed.

(b) Para 6.14, Ultrasonic Resonance Tests: Shall be as prescribed, voltage halved.

6.2.5 Examinations from Lab. Inspection Tests (Visual)

(a) Para 6.14, Ultrasonic Resonance: Shall not be performed.

(b) Para 6.14, Ultrasonic (ML-UTD-20) method: Shall condition 2.

6.3 PROTECTIVE COATINGS SPECIFICATIONS**6.3.1 Examination Class**

The dimensions of the indicators specified herein shall be verified in accordance with the requirements set out in Para 6.14 of ESCC Detail Specification No. 1001 and they shall conform to those shown in Figure 2 of this specification.

6.3.2 Weight

The maximum weight of the indicators specified herein shall be as given in Table 1(a) - Component Type Indicators.

6.3.3 Examination Class

The requirements for minimal strength testing are specified in Para. 6.12 of ESCC Detail Specification No. 1001.

6.4 INDICATOR & TOOL MATERIALS

The materials and finishes shall be as specified herein. Where a definite material is not specified a manufacturer will enable the indicators specified herein to meet the performance requirements of this specification, shall be used; acceptance or approval of any constituent materials does not guarantee compliance of the finished product.

6.4.1 Case

For minimum, a case moulding shall enclose the indicator's protection.

6.4.2 Examination Material and Tools

The essential material shall be brass, plated with 2 to 3 µm of Nickel. The tool shall be the 500µm/0.1

**4.5 Marking****4.5.1 General**

The marking of all components delivered to this specification shall be in accordance with the requirements of ESCC Basic Specification No. 0201001 and the following paragraphs. Where the component is too small to accommodate all of the marking specified, as much space permitted be marked and the marking information, initial, shall accompany the component in primary package.

The information to be marked and the order of precedence shall be as follows:

- Final ESCC Component Number.
- Element Characteristics and Ratings.
- Traceability Information.

4.5.2 The ESCC Component Number

The ESCC Component Number shall be constructed as follows:

0201006

- Basic Specification Number (0201006)
- Type Feature Identifier (see Table 4.5.1)
- Lotting/Level (See G, as applicable) 'A'

4.5.3 Element Characteristics and Ratings

The element characteristics and ratings to be marked in the following order of precedence are:

- Nominal Values
- Tolerances

The information shall be presented and marked as follows:

0.250

- Nominal value ± 0.01
- Tolerance (priority) ±0

4.5.4 Nominal Values

The numerical values for information shall be represented by means of the following codes. The unit quantity for marking shall be in millimetres.

Nominal Value	Code
0.25	0.25
0.5	0.50
0.001	0.001
0.002	0.002

4.5.2 Tolerances

The tolerances on nominal values shall be indicated by the code letters specified hereafter.

Tolerance (µm)	Code Letter
±1	H
±2	h
±3	g

4.5.4 Dimensional Information

Each component shall be marked in respect of measurability information in accordance with the requirements of ESCC Seal Specification No. 10100.

4.6 PERFORMANCE REQUIREMENTS
4.6.1 General Measurements within Temperature

The parameters to be measured at Room Temperature are scheduled in Table 2. Unless otherwise specified, measurements shall be performed at $T_{amb} \pm 0.5^{\circ}\text{C}$.

4.6.2 General Measurements within extreme Temperature

The parameters to be measured at High and Low Temperatures are scheduled in Table 3. Unless otherwise specified, measurements shall be performed at $T_{max} = +70(±0.5)$ and $-80(±0.5)$ °C, respectively.

4.6.3 Checks for General Measurements (Phase 2)

Not applicable.

4.7 Tests in Phase 2
4.7.1 Parameter Test Values

The parameter test values applicable to turn-in are specified in Table 4 of this specification. Unless otherwise noted, measurements shall be performed at $T_{amb} \pm 0.5^{\circ}\text{C}$.

The parameter test values (a) applicable to the parameters scheduled shall not be exceeded. In addition to these test value requirements for a given parameter, the appropriate test values specified in Table 4 shall not be exceeded.

4.7.2 Conditions for Turn-In

The requirements for turn-in are specified in Section 7 of the ESCC General Specification No. 1001. The conditions for turn-in shall be as specified in Table 5(a) of this specification.

As completion of turn-in, a necessary period of 24h is necessary before the seal measurements.

4.7.3 General Checks for Seal in Phase 2(a)

Not applicable.

**TABLE 1 - ELECTRICAL RESISTANCE TESTS AT ROOM TEMPERATURE**

No.	Characteristic	Symbol	ESCC Seal Test Method	Test Condition	Limits		Unit
					Min.	Max.	
10	Insulation (Class A)	R_{10}	Pass (A.1.1)	Pass (A.1.1)	0.1	∞	Ω
11	Conductance (Class B)	G_{11}	Pass (A.1.1)	Pass (A.1.1)	0	-	μS
12	AC Resistance	R_{12}	Pass (A.1.1)	Pass (A.1.1)	-	∞	Ω
13	Insulation Resistance	R_{13}	Pass (A.1.1)	Pass (A.1.1)	10	-	MΩ

NOTES:

1. For actual values see Column 7 and 8 of Table 1 (a).
2. Tests measured at 0.20V r.m.s.
3. Tests measured at 0.20V r.m.s with Read Currents defined in Column 4 of Table 1 (a).
4. For actual values see Column 8 of Table 1 (a).

TABLE 1 - ELECTRICAL RESISTANCE TESTS AT HIGH AND LOW TEMPERATURES

No.	Characteristic	Symbol	ESCC Seal Test Method	Test Condition (Note 1)	Limits		Unit
					Min.	Max.	
14	Insulation (Class B)	R_{14}	Pass (A.1.1)	Pass (A.1.1)	0.1	-	Ω

NOTES:

1. Tests performed at 0 temperatures.
2. Tests measured at 0.20V r.m.s with Read Currents defined in Column 4 of Table 1 (a).

TABLE 2 - ELECTRICAL TESTS RELATED TO MECHANICALS**TABLE 2 - MECHANICAL TESTS RELATED TO ELECTRICALS**

No.	Characteristic	Symbol	Temperature Transformation	Temperature	Change Limit (Δ)	Unit
15	Insulation	R_{15}	ΔTemp (A.1.1)	ΔTemp (A.1.1)	10%	%

TABLE 2 - MECHANICAL TESTS RELATED TO ELECTRICALS

No.	Characteristic	Symbol	Conditions	Unit
16	Minimum Temperature	T_{min}	ΔTemp (A.1)	°C

**TABLE 6a. CONDITIONS FOR OPERATING LIFE TEST**

No.	Description	Symbol	Conditions	Unit
01	Ambient temperature	T_{amb}	20(±2) °C	°C
02	Operating frequency	-	Non-resonant (500 Hz)	-

REMARKS TO BE OBSERVED DURING THIS METHOD
None applicable**TABLE 6b. ELECTROSTATIC DISCHARGE TEST CONDITIONS FOR LIFE TEST**

None applicable

0.01 **Pre-Installation, and Installation Testing (aspects covered in the ESCC Standard), and End-of-Life Testing**

0.02 **Measurements and Inspections at Completion of Endurance Tests**

The parameters to be measured and inspections to be performed at completion of accelerated testing are indicated in Table 6, unless otherwise stated. The measurements shall be performed at $T_{amb} \pm 0.5$ °C.

0.03 **Measurements and Inspections at Intermediate Tests (as per Endurance Tests)**

The parameters to be measured and inspections to be performed during accelerated testing are indicated in Table 6, unless otherwise stated. The measurements shall be performed at $T_{amb} \pm 0.5$ °C.

0.04 **Measurements and Inspections at Completion of Endurance Tests**

The parameters to be measured and inspections at performance completion after endurance tests are indicated in Table 6, unless otherwise stated. The measurements shall be performed at $T_{amb} \pm 0.5$ °C.

0.05 **Conditions for Operation in Test (as per Endurance Tests)**

The requirements for operating the testing are specified in Annex B of ESCC Board Specification No. 0001. The conditions for operating the testing shall be as specified in Table 6(b) of this specification.

0.06 **Electrostatic Discharge (as per Test Clause 6b)**

None applicable

TABLE 7. RELIABILITY AND INSPECTIONS AT COMPLETION OF ACCELERATED LIFE TESTS AND AT INTERMEDIATE TESTS AND END-OF-LIFE TESTING OF ACCELERATED LIFE TESTS

No.	ESCC Board Spec. No. 0001		Measurements and Inspections		Type of	Units		Unit
	Measurement Method/ Test Type (See 7)	Frequency and Conditions	Measurement	Inspection		Min.	Max.	
01	Reliability	Clause 6.1	Power Dissipation	Excessive change in operating characteristics	-	-	-	-
02	Reliability	Clause 6.1	Power Dissipation	Excessive change in operating characteristics	-	-	-	-
03	Electrostatic Discharge	Clause 6.1	ESD Test	ESD test failure modes	-	-	-	-

No.	ESCC Section Spec. No. 0201		Measurements and Inspection		Typical	Units		Min.
	Measurement	Frequency and Conditions	Measurement	Conditions		Min.	Max.	
			Joint Measurements	Vertical movement measured 15m or 10m depending	-	-	-	-
			Concrete (Reinforcing Cage)	See 0201 Form 02010				
			Joint Coverage (Joint)	Concrete	3	-	100	100
			Concrete Reinforce	Table 0201.01	10	100	-	100
			Concrete	Table 0201.01	3	Table 0201.01	-	100
			Joint Reinforce	Table 0201.01	R_{yk}	Table 0201.01	-	100
			Joint Seal					
			Joint Reinforce	Reinforce concrete see	-	-	-	-
10	Spalling	Class II	Joint Measurements					
			Concrete	Table 0201.01	3	Table 0201.01	-	100
			Structural Member Rebar	See 0201 Form 02010 Reinforcement of 02010	-	-	-	-
			Concrete (Reinforcing Cage)	See 0201 Form 02010				
			Joint Coverage (Joint)	Concrete	3	-	100	100
			Concrete (Reinforcing Cage)	Table 0201.01	100	100	100	100
			Joint Measurements	See 0201 Form and 0201 Form 02010 Reinforcement of 02010				
			Concrete (Reinforcing Cage)	See 0201 Form 02010				
			Joint Coverage (Joint)	Concrete	3	-	100	100
			Concrete (Reinforcing Cage)	Table 0201.01	100	100	100	100
			Joint Reinforce	Table 0201.01	R_{yk}	Table 0201.01	-	100
			Concrete Reinforce	Table 0201.01	10	100	-	100

020104

5. Tables in this table refer to other Class II or V and shall read as applicable.

**APPENDIX****AGREED DEVIATIONS FOR MICROPILE (B)**

DEVIATION	DESCRIPTION OF DEVIATION
Para. 6.2.2, Deviations from Final Production Tests (Chart B)	Para. 6.2.2, Normal Tests: Final tests performed.
Para. 6.2.3, Deviations from Para. 6.2.2.2 (Chart B) Measurements (Chart B)	Normal Tests: Final tests performed. Para. 6.2.2.2 (Chart B) Specification for Chart Reading: shall be performed) for reading tests (B) and (C), immediately prior to but in after the initial Posture Settlement Measurements.