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## **CHOKES, COMMON MODE, FIXED, MOULDED, SMD**

**BASED ON SERIES CMC 15, 18 AND 22**

**ESCC Detail Specification No. 3201/010**

Issue 5	November 2016
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Document Custodian: European Space Agency – see <https://escies.org>

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DCR No.	CHANGE DESCRIPTION
1016	Specification upissued to incorporate changes per DCR.

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## 1 GENERAL

### 1.1 SCOPE

This specification details the ratings, physical and electrical characteristics and test and inspection data for the component type variants and/or the range of components specified below. It supplements the requirements of, and shall be read in conjunction with, the ESCC Generic Specification listed under Applicable Documents.

### 1.2 APPLICABLE DOCUMENTS

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

- (a) ESCC Generic Specification No. [3201](#).

### 1.3 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. [21300](#) shall apply.

### 1.4 THE ESCC COMPONENT NUMBER AND COMPONENT TYPE VARIANTS

#### 1.4.1 The ESCC Component Number

The ESCC Component Number shall be constituted as follows:

Example: 320101001520

- Detail Specification Reference: 3201010
- Component Type Variant Number: 01 (as required)
- Characteristic code: Inductance Value (52 $\mu$ H): 520 (as required)

##### 1.4.1.1 *Characteristics Codes*

Characteristics to be codified as part of the ESCC Component Number shall be as follows:

- (a) Inductance Value (nominal) expressed by means of the following codes in accordance with ESCC Basic Specification No. [21700](#). The unit quantity shall be microhenries ( $\mu$ H):

Inductance Value $L_n$ ( $\mu$ H)	Code
XX	XX0
XX $10^1$	XX1
XX $10^2$	XX2

1.4.2 Component Type Variants and Range of Components

The component type variants and range of components applicable to this specification are as follows:

Variant Number	Type	Case Description (1)	Terminal Finish (2)	Weight Max (g)
01	CMC 15WR	Size 15 with 8 Gullwing terminals	Sn60Pb40	6
03	CMC 18WR	Size 18 with 8 Gullwing terminals	Sn60Pb40	11
05	CMC 22WR	Size 22 with 8 Gullwing terminals	Sn60Pb40	28

**RANGE OF COMPONENTS**

Variant Number	Nominal Inductance Each Winding (3) $L_n$ ( $\mu$ H)	Inductance Measurement Voltage Test Condition $V_T$ (mV)	Minimum Inductance Each Winding (3) $L_{min}$ ( $\mu$ H)	Max. DC Resistance Each Winding $R_{DC}$ (m $\Omega$ )	Rated RMS Current Each Winding $I_R$ (Arms)
01	52	10	31	15	5.2
	110	10	66	35	3.4
	220	10	134	65	2.5
	470	10	279	150	1.7
	1000	20	597	350	1.1
	2000	25	1210	770	0.7
	4000	35	2430	1750	0.5
03	60	10	36	7	7.7
	130	10	75	15	5.3
	270	20	160	35	3.5
	540	25	324	75	2.3
	1100	35	675	175	1.5
	2400	50	1440	415	1
	4900	70	2910	920	0.7
05	60	10	35	5	11
	140	20	86	10	7.3
	340	30	205	20	4.5
	740	45	443	40	3.3
	1600	65	970	95	2.1
	3300	90	1990	205	1.4

**NOTES:**

1. See Physical Dimensions and Terminal Identification.
2. See Materials and Finishes for details.
3. See Room Temperature Electrical Measurements for test conditions.

### 1.5 MAXIMUM RATINGS

The maximum ratings shall not be exceeded at any time during use or storage.

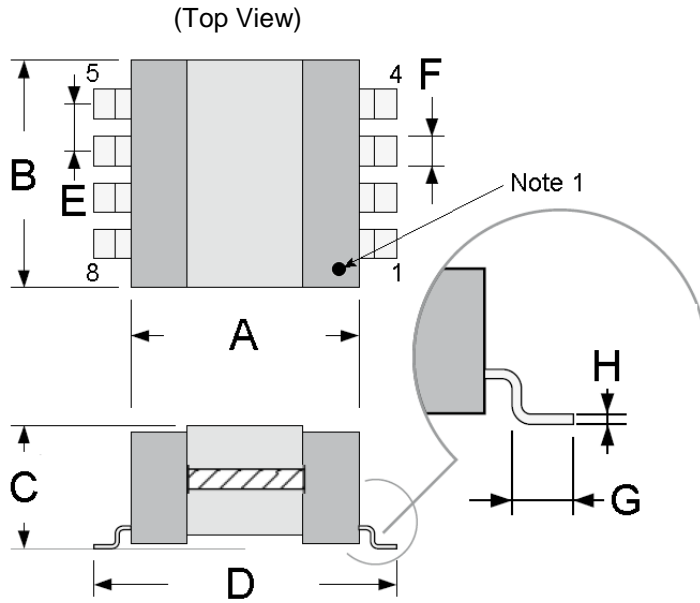
Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

Characteristics	Symbols	Maximum Ratings	Units	Remarks
Rated RMS Current	$I_R$	Note 1	Arms	Over $T_{op}$
Dielectric Withstanding Voltage	DWV	500	Vrms	Over $T_{op}$ . Note 2
Operating Temperature Range	$T_{op}$	-55 to +125	°C	$T_{amb}$
Storage Temperature Range	$T_{stg}$	-55 to +175	°C	
Soldering Temperature	$T_{sol}$	+260	°C	Note 3

#### **NOTES:**

1. See Component Type Variants and Range of Components for values.
2. Between the windings, and between the windings and the case.
3. Duration 5 seconds maximum, the same terminal shall not be resoldered until 3 minutes have elapsed.

1.6 PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

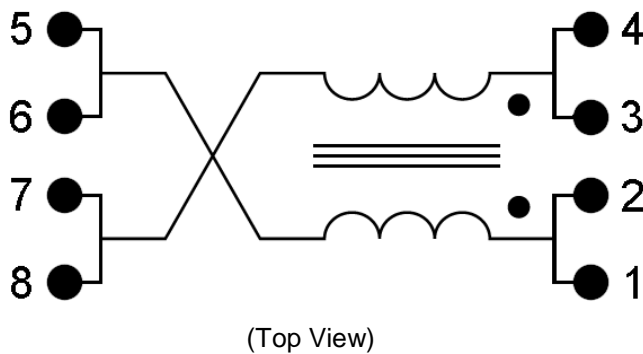


Symbols	Dimensions (mm)					
	Variant 01		Variant 03		Variant 05	
	Min	Max	Min	Max	Min	Max
A	16	16.5	21.7	22.3	30.4	31.2
B	-	16	-	19.8	-	23.5
C	-	7.9	-	8.9	-	12.2
D	21.1	22	25.1	26	34.4	35.3
E	3.7	3.9	3.7	3.9	3.7	3.9
F	1	1.2	1.9	2.1	1.9	2.1
G	1.3	1.6	1.3	1.6	1.3	1.6
H	0.2	-	0.2	-	0.2	-

**NOTES:**

- Terminal identification: Terminal 1 shall be identified with a contrasting coloured identification mark or indent on top of the body in the area shown.

1.7 FUNCTIONAL DIAGRAM





## 1.8 MATERIALS AND FINISHES

### 1.8.1 Case

As a minimum, a resin moulding shall ensure the inductor's protection.

### 1.8.2 Terminals

The terminal material shall be brass, plated with 2 to 4µm of nickel or copper. The finish shall be Sn60Pb40.

## 2 REQUIREMENTS

### 2.1 GENERAL

The complete requirements for procurement of the components specified herein are as stated in this specification and the ESCC Generic Specification. Permitted deviations from the Generic Specification, applicable to this specification only, are listed below.

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

#### 2.1.1 Deviations from the Generic Specification

##### 2.1.1.1 *Deviations from Qualification and Periodic Tests (Chart F4)*

- (a) Temperature Rise: Ambient test temperature shall be  $+90 \pm 5^{\circ}\text{C}$ .
- (b) Immersion: shall not be performed.
- (c) Moisture Resistance, Polarisation: there shall be no polarising voltage applied during test.

### 2.2 MARKING

The marking of all components delivered to this specification shall be in accordance with the requirements of ESCC Basic Specification No. 21700. When the component is too small to accommodate all of the marking specified, as much as space permits shall be marked and the marking information, in full, shall accompany each component in its primary package.

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

- (a) The ESCC qualified components symbol (for ESCC qualified components only).
- (b) The ESCC Component Number.
- (c) Traceability information.

2.3 ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES

2.3.1 Room Temperature Electrical Measurements

The measurements shall be performed at  $T_{amb} = +22 \pm 3 \text{ }^\circ\text{C}$ .

Characteristics	Symbols	Test Method and Conditions	Limits		Units
			Min	Max	
Inductance	$L_{min}$	ESCC No. 3201 $f = 10\text{kHz}$ $I = 0\text{Adc}$ $V = V_T$ (Note 1) Note 2	Note 1	-	$\mu\text{H}$
DC Resistance	$R_{DC}$	ESCC No. 3201	-	Note 1	$\text{m}\Omega$
Dielectric Withstanding Voltage	DWV	ESCC No. 3201 Note 3	500	-	$\text{V}_{rms}$
Dielectric Withstanding Voltage Leakage Current	$I_L$	Note 4	-	100	$\mu\text{A}$

**NOTES:**

1. See Component Type Variants and Range of Components for values for each winding.
2. Any magnetic field present during testing of Inductance shall be  $< 10\text{mT}$ .
3. Tested both between the windings and between the windings and the case.
4. Measured during Dielectric Withstanding Voltage.

2.3.2 High and Low Temperatures Electrical Measurements

Characteristics	Symbols	Test Method and Conditions (Note 1)	Limits		Unit
			Min	Max	
Inductance Change between $-55 (+3 -0)^\circ\text{C}$ and $+22 \pm 3 \text{ }^\circ\text{C}$	$\Delta L/L$	As per Room Temperature Electrical Measurements Note 2	-75	+100	%
Inductance Change between $+125 (+0 -3)^\circ\text{C}$ and $+22 \pm 3^\circ\text{C}$	$\Delta L/L$	As per Room Temperature Electrical Measurements Note 2	-75	+100	%

**NOTES:**

1. Performed only for qualification or qualification maintenance. The measurements shall be performed on a sample of 5 components from the lot with 0 failures allowed. In the event of any failure a 100% inspection may be performed.
2. For each winding.

2.4 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

Unless otherwise specified, the measurements shall be performed at  $T_{amb} = +22 \pm 3^{\circ}\text{C}$ .

Unless otherwise specified the test methods and test conditions shall be as per the corresponding test defined in Room Temperature Electrical Measurements.

Test Reference per ESCC No. 3201	Characteristics	Symbols	Limits		Units
			Min	Max	
Thermal Shock	DC Resistance	$R_{DC}$	Note 1		m $\Omega$
Barometric Pressure Whilst at low pressure:	Dielectric Withstanding Voltage	DWV	500	-	Vrms
	DWV Leakage Current	$I_L$	-	100	$\mu\text{A}$
Temperature Rise Initial Measurements	Test temperature: $T_{amb} = +90 \pm 5^{\circ}\text{C}$				
	DC Resistance (at $0.1I_r$ )	$R_{DC}$	Record Value		m $\Omega$
Final Measurements (within 30s of the removal of power)	DC Resistance (at $I_r$ )	$R_{DC}$	Record Value		m $\Omega$
	Temperature Rise	$\Delta T$	-	25	$^{\circ}\text{C}$
Overload	DC Resistance	$R_{DC}$	-	Note 1	m $\Omega$
	Insulation Resistance (2)	$R_i$	1000	-	M $\Omega$
	Dielectric Withstanding Voltage	DWV	500	-	Vrms
	DWV Leakage Current	$I_L$	-	100	$\mu\text{A}$
Resistance to Soldering Heat	Inductance	$L_{min}$	Note 1	-	$\mu\text{H}$
	DC Resistance	$R_{DC}$	-	Note 1	m $\Omega$
	Dielectric Withstanding Voltage	DWV	500	-	Vrms
	DWV Leakage Current	$I_L$	-	100	$\mu\text{A}$
Moisture Resistance Within 30 min of removal from conditioning:	Dielectric Withstanding Voltage	DWV	500	-	Vrms
	DWV Leakage Current	$I_L$	-	100	$\mu\text{A}$
	Insulation Resistance (2)	$R_i$	1000	-	M $\Omega$
Within 1 hour of previous measurements:	Inductance	$L_{min}$	Note 1	-	$\mu\text{H}$
	DC Resistance	$R_{DC}$	-	Note 1	m $\Omega$

Test Reference per ESCC No. 3201	Characteristics	Symbols	Limits		Units
			Min	Max	
Operating Life Initial Measurements (0 hour)	Inductance	$L_{min}$	Note 1	-	$\mu H$
	Dielectric Withstanding Voltage	DWV	500	-	Vrms
	DWV Leakage Current	$I_L$	-	100	$\mu A$
Intermediate Measurements (1000 hours)(after 30 min recovery)	Inductance Change	$\Delta L/L$	-10	+10	%
	Dielectric Withstanding Voltage	DWV	500	-	Vrms
	DWV Leakage Current	$I_L$	-	100	$\mu A$
Final Measurements (2000 hours)(after 30 min recovery)	Inductance Change	$\Delta L/L$	-10	+10	%
	DC Resistance	$R_{DC}$	-	Note 1	$m\Omega$
	Insulation Resistance (2)	$R_I$	1000	-	$M\Omega$

**NOTES:**

1. See Component Type Variants and Range of Components for values.
2. Test method and conditions per ESCC No. 3201.

2.5

**BURN-IN CONDITIONS**

Characteristics	Symbols	Test Conditions	Units
Ambient Temperature	$T_{amb}$	+125 (+0 -3)	$^{\circ}C$

**NOTES:**

1. After Burn-in, the components shall be removed from the chamber and allowed to cool under normal atmospheric conditions for recovery for 24 hours minimum.

2.6

**OPERATING LIFE CONDITIONS**

Characteristics	Symbols	Test Conditions	Units
Ambient Temperature	$T_{amb}$	+125 (+0 -3)	$^{\circ}C$
Rated RMS Current	$I$	$I_R$ (Notes 1, 2)	$mA$

**NOTES:**

1. See Component Type Variants and Range of Components for values for each winding.
2. Current shall be applied to both windings connected in series.