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CRYSTAL UNITS IN METAL HOLDER, BASED ON TYPE T1507, FREQUENCY RANGE 2.5 - 50MHZ

ESCC Detail Specification No. 3501/009

(Follow-up Specification to ESA/SCC Detail Specification No. 3501/002)

ISSUE 1 October 2002





ESCC Detail Specification

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CRYSTAL UNITS IN METAL HOLDER, BASED ON TYPE T1507,

FREQUENCY RANGE 2.5 - 50MHZ

ESA/SCC Detail Specification No. 3501/009

(Follow-up Specification to ESA/SCC Detail Specification No. 3501/002)



space components coordination group

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Rev. 'B'

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DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	CHANGE Reference Item	Approved DCR No.
		This Issue supersedes Issue 1 and incorporates all modifications defined in Revisions 'A', 'B' and 'C' to Issue 1 and the changes agreed in the following DCRs:- Cover Page DCN	None None
		Table 1(a) : Storage Temperature Range column deleted : Figure column deleted : Variant 03, "(2)" added to Frequency column : Variants 08 to 28 added : Note 2 added Table 1(b) : No. 4, in Remarks, Note number amended	221336 221337 221497 221497 221497 221336
		: No. 5, in Remarks, Note number amended : New Note 3 added : Existing Note 3 renumbered as "4" Table 1(c) : Item 19 deleted : Item 20 deleted and subsequent items renumbered : In old Item 22, Note number amended to "15"	221336 221336 221336 221337 221336 221337
		: Note 14 deleted and subsequent Notes renumbered Figure 2(a) : Figure deleted in toto Figure 2(b) : Subtitle deleted : Drawing and Table amended : Vibration Axes and Notes added	221337 221337 221381 221381 221381
		Para. 4.3.3 : Second sentence amended Para. 4.5.1 : Existing text deleted and new text added Para. 4.5.5 : Deleted in toto Para. 4.5.6 : Renumbered to "4.5.5" Para. 4.6.1 : Second sentence rewritten Table 6 : Table reformatted	221341 221465 221465 221465 221341 23799/
		Ind. Tables 1(a) : Item 19 deleted : Variant 01, Item 20 deleted and Item 21 renumbered as "19" : Variants 02 to 07, Item 20 deleted and subsequent Items renumbered : Variants 08 to 28, Tables added	221341/ 221380/ 221465 221337 221336 221336
'A'	Apr. '99	P1. Cover Page : Frequency Range amended in Title P2. DCN P5. Para. 1.1 : Frequency Range amended in first sentence P6. Table 1(a) : Variants 03 and 09, "(2)" deleted from Frequency column	21115 None 21115 21115
		P8. Table 1(a) : Note 2 deleted P38. Table 1(a) : Variant 16, No. 13 Limit moved to Min. column P40. Table 1(a) : Variant 18, No. 16 Max. Limit deleted	21115 23904 23903
'B'	May '00	P1. Cover Page P2. DCN P13. Figure 2 : In the Table, dimension 'C' max. amended	None None 221548



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DOCUMENTATION CHANGE NOTICE					
Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.	
'C'	Jun. '01	P1. Cover page P2A. DCN P6. Table 1(a) P51. to P57.	: Page added : Variants 29 to 35 added : New pages for Variants 29 to 35 added	221605 None 221605 221605	



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APPENDICES (Applicable to specific Manufacturers only)

None.



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1. GENERAL

1.1 SCOPE

This specification details the values, physical and electrical characteristics, test and inspection data for Crystal Units in Metal Holder, based on Type T1507, Frequency Range 2.5 - 50MHz.

It shall be read in conjunction with ESA/SCC Generic Specification No. 3501, the requirements for which are supplemented herein.

This is a follow-up specification to ESA/SCC Detail Specification No. 3501/002. ESA/SCC 3501/002 should also be consulted by:-

- (a) Users seeking information concerning the availability of variants additional to those listed in this specification.
- (b) Manufacturers before requesting the introduction of a new variant in accordance with the requirements of Para. 1.2 of this specification.

1.2 COMPONENT TYPE VARIANTS

A list of the type variants of the crystal units specified herein, which are also covered by this specification, is given in "Table 1(a) - Type Variant Summary".

For each type variant, the full electrical and physical characteristics are given in individual Tables 1(a) - "Type Variant Detailed Information" at the end of this specification.

The contents of the individual Tables 1(a) shall be as shown in Table 1(c) and the characteristics therein listed shall relate to the design parameters of the individual crystal units, optimised for the intended application.

The specific characteristics shall be negotiated between the Manufacturer and the Orderer. The Manufacturer shall then apply to the ESA/SCC Secretariat for a type variant number for each individual crystal unit concerned, by sending a finalised Table 1(a) which shall also be copied to the Qualifying Space Agency (QSA).

1.3 MAXIMUM RATINGS

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

1.4 PHYSICAL DIMENSIONS

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

1.5 FUNCTIONAL DIAGRAM

The functional diagram showing lead identification of the crystal units specified herein is shown in Figure 3.

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TABLE 1(a) - TYPE VARIANT SUMMARY

N.B. For additional information concerning type variants, see Para. 1.1.

	Resonance	Load	Reference	Operating Temp.	Intended	Lead
Variant	Frequency (MHz)	Capacitance (C _L pF)	Temp. (T _o °C)	Range (T _{op} °C)	Application	Finish
01	4.194304	30	+30	-10 to +80	-	2
02	8.192	50	+ 25	-25 to +80	-	3 or 4
03	26.0	00	+ 25	-25 to +80	-	2
04	7.198	30	+ 25	-55 to +105	<u>-</u>	2
05	5.0	30	+ 25	-40 to +80	-	2
06	18.0	30	+ 25	-45 to +80	-	2
07	10.0	30	+ 25	-55 to +125	-	2
08	10.0	30	+ 25	-55 to +100	XO	2
09	50.0	12	+ 25	-20 to +80	VCXO	2
10	4.0	30	+ 25	-40 to +80	XO	2
11	10.0	30	+ 25	-55 to +100	XO	2
12	8.0	∞	+ 25	-20 to +80	XO	2
13	10.0	∞	+ 25	-20 to +80	TCXO	2
14	6.4	30	+25	-45 to +80	ХО	4
15	12.605	∞	+ 25	-20 to +60	TCXO	2
16	7.0	30	+ 25	-35 to +70	TCXO	2
17	12.665	00	+ 25	-20 to +80	TCXO	2
18	5.760	30	+ 25	-40 to +90	XO	2
19	8.602893	30	+ 60	-40 to +85	XO	2
20	15.104893	∞	+ 25	-20 to +80	XO	2
21	20.0	30	+ 25	-30 to +70	XO	2
22	13.0	30	+ 25	-40 to +80	XO	2
23	10.0	30	+ 25	-55 to +100	XO	2
24	5.242880	30	+60	-40 to +85	ХО	2
25	5.625	30	+ 25	-40 to +85	XO	2
26	11.250	30	+ 25	-50 to +100	XO	2
27	8.0	∞	+ 25	-30 to +70	XO	2
28	3.494400	35	+ 25	-55 to +100	XO	2
29	3.832	30	+ 25	-40 to +80	XO	2
30	3.072	30	+ 25	-40 to +80	XO	2
31	4.0	30	+ 25	-40 to +80	хо	2
32	16.0	30	+ 25	-55 to +125	XO	2
33	11.059200	30	+ 25	-55 to +100	ХО	2
34	12.007125	30	+ 25	-40 to +90	TCXO	2
35	11.059300	50	+ 25	-55 to +100	ХО	2
36						

NOTES: See Page 8.



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TABLE 1(a) - TYPE VARIANT SUMMARY CONTINUED

		r				
Variant	Resonance Frequency (MHz)	Load Capacitance (C _L pF)	Reference Temp. (T _o °C)	Operating Temp. Range (T _{op} °C)	Intended Application	Lead Finish
37						
38						
39						
40						
41						
42						
43						
44						
45						
46				-		
47						
48						
49						
50						
51						
52						
53						
54						
55						
56						
57						
58						
59				1		
60						
61						
62		†		- 	 	<u> </u>
63						<u> </u>
64		1				
65						T
66						
67		†	t	 		
68			-			
69						<u> </u>
70						
71			-	 		
72						†
L_′ <u></u>	J	I	<u> </u>	<u> </u>	<u> </u>	<u> </u>

NOTES: See Page 8.



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TABLE 1(a) - TYPE VARIANT SUMMARY CONTINUED

Variant	Resonance Frequency (MHz)	Load Capacitance (C _L pF)	Reference Temp. (T ₀ °C)	Operating Temp. Range (T _{op} °C)	Intended Applicat.	Lead Finish
73						
74						
75						
76						
77						
78						
79						
80						
81						
82						
83						
84						
85						
86						
87						
88						
89						
90						
91						
92						
93						
94						
95						
96						
97						
98					<u> </u>	T
99						

NOTES

1. Full electrical and physical characteristics are given in the individual Tables 1(a) at the end of this specification.



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TABLE 1(b) - MAXIMUM RATINGS

No.	Characteristic	Symbol	Values	Unit	Remarks
1	Nominal Frequency Range	f	2.5 to 20	MHz	Note 1
2	Drive Level Range	Р	0.01 to 0.2	mW	
3	Operating Temperature Range	T _{op}	- '	°C	Note 2
4	Storage Temperature Range	T _{stg}	-65 to +125	°C	Note 3
5	Soldering Temperature	T _{sol}	+ 260	°C	Note 4

1	
ı	

Fundamental and Overtone Order	Approx. Frequency Range (MHz)
Fundamental	2.5 to 20
3	10 to 30
5	15 to 50

- 2. See Table 1(a).
- 3. The duration at maximum storage temperature shall not exceed 16 hours.
- 4. Duration 10 seconds maximum at a distance of not less than 3.0mm from the device body and the same lead shall not be resoldered until 3 minutes have elapsed.

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TABLE 1(c) - FORMAT FOR INDIVIDUAL TABLES 1(a) TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION TYPE VARIANT NO.

	<u> </u>		Lin	nits	11	Domestic
No.	Characteristic	Symbol	Min.	Max	Unit	Remarks
1	Resonance Frequency	f _r or f _L			MHz	Note 1
2	Reference Temperature	T _o			°C	Note 2
3	Overtone Order	-				
4	Load Capacitance	C _L			рF	Note 3
5	Rated Drive Level	Po			mW	Note 4
6	Frequency Adjustment Tolerance	<u>∆ f</u> f			10 ⁻⁶	At To °C Note 5
7	Resonance Resistance	R _r or R _L			Ω	At To °C Note 6
8	Frequency Variation with Temperature over Top	Δf f			10-9	From frequency measured at T _o °C Note 7
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R			%	From resistance measured at T ₀ °C Note 7
10	Operating Temperature Range	T _{op}			°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$			10-6	From $P_{S1} = mW$ to $P_{S2} = mW$ Note 8
12	Resistance variation with Drive Level	<u>∆ R</u> R			%	$ \begin{array}{cccc} From & P_{S1} = & mW \\ to & & \\ P_{S2} = & mW \\ Note 8 & & \end{array} $
13	Motional Inductance	L ₁			mH	Notes 9 and 10
14	Motional Capacitance	C ₁			fF	Note 9
15	Static Capacitance	Co			pF	Note 9
16	Q Factor	Q			-	Notes 9 and 11
17	Ratio of unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or ıZ _p i/R				In the frequency range: f - kHz to f + kHz
18	Ageing	<u>Δ f</u> f			10-6	Note 13
19	Lead Finish				-	
20	Intended Application					Note 15

NOTES: See Pages 11 and 12.



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NOTES TO TABLE 1(c)

- 1. (a) If C_L is not specified, Symbol and measurement shall be f_r.
 - (b) If C_L is specified, Symbol and measurement shall be f_L.

2. Reference Temperature To

- (a) For a crystal unit functioning in a non-controlled temperature environment, the reference temperature is normally +25 ±2 °C.
- (b) For a crystal unit functioning in a controlled temperature environment, the reference temperature shall normally be the mid-point of the temperature range of the controlled environment.

3. Load Capacitance CL

- (a) When a crystal unit must function at its series resonance frequency, C_L shall be infinite.
- (b) When a crystal must function with a load capacitance, the C_L value shall be specified. The standard values of load capacitance are as follows:
- Fundamental Frequency Operation: 20pF, 30pF, 50pF and 100pF.
- Overtone Operation: 8pF, 12pF, 15pF, 20pF and 30pF.

N.B

The tolerance on the load capacitance shall be that value which results in a frequency change not exceeding 10% of the frequency tolerance at T_0 or 1% of the nominal load capacitance, whichever is smaller.

4. Rated Drive Level Po

The rated drive level shall be selected from the standard drive levels specified below:

- Preferred values: 2mW, 1mW, 0.5mW, 0.2mW, 0.1mW, 0.05mW, 0.02mW, 0.01mW, 0.001mW or 0.0001mW at ±20%.
- Non-preferred values: 10mW, 5mW and 4mW all at ±20%.

5. Frequency Adjustment Tolerance

- (a) When a crystal must function at its series resonance frequency, the standard value of the adjustment tolerance shall be $\pm 10 \times 10^{-6}$.
- (b) When a crystal has to function with a load capacitance, the standard value of the adjustment tolerance shall also be ±10 x 10⁻⁶. However, if the load capacitance is adjustable, it is preferable to specify that the nominal frequency be obtained with a load capacitance value between the minimum and maximum value when the crystal is functioning in its fundamental mode.

6. Resonance Resistance

(a) Generally, the maximum value only is specified.

(b)
$$R_L$$
 may be calculated by $R_L = R_r \left(1 + \frac{C_o}{C_L}\right)^2$.



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NOTES TO TABLE 1(c) (Continued)

7. Frequency and Resistance Variation with Temperature

These values shall be specified such that they are consistent with the operating temperature range.

8. Frequency and Resistance Variation with Drive Level

These limits and the Drive Level range (P_{S1} to P_{S2}) shall be specified for very special crystals only (i.e. crystals used in very high stability oscillators).

9. Electrical Values

The electrical values shall be specified only when required for the correct functioning of the equipment in which the crystal is used.

10. Motional Inductance L₁

Because the inductance value may be restricted by other chosen parameters, the Manufacturer shall propose the value of L₁ in accordance with the Customer's requirements.

11. 'Q' Factor

If 'R' and 'L' have been already specified, it will not be necessary to specify the minimum value of the 'Q' factor.

The maximum value of the 'Q' factor is never specified.

12. Ratio of Unwanted Response Resistance to Resonance Resistance

The standard minimum value is 2, but it is possible to obtain higher values.

The frequency range within which the minimum value of the ratio is required shall also be specified.

13. Ageing

Specify limits under appropriate column and ageing period under "Remarks".

14. Not applicable Items

For all items where limits are not specified, "Not applicable" shall be entered in the Limits column.

15. Intended Application

For definitions of the selected symbols to be added, see ESA/SCC Generic Specification No. 3501, Para, 3.



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FIGURE 1 - PARAMETER DERATING INFORMATION

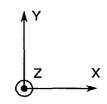
Not applicable.

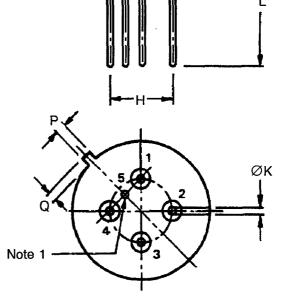
FIGURE 2 - PHYSICAL DIMENSIONS

SYMBOL	MILLIM	ETRES	REMARKS
STIVIBUL	MIN. MAX.		NEWARKS
ØA	_	15.75	
С	-	6.80	
Н	6.90	7.40	Pitch 7.16mm
⊘K	0.40	0.48	
L	12.70	-	
Р	_	0.90	Note 2
Q	_	0.95	Note 2

NOTES

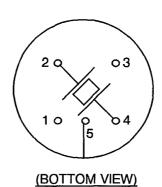
- 1. Lead No. 5 is grounded to case.
- 2. The tag's position or presence is optional.





ØA:

FIGURE 3 - FUNCTIONAL DIAGRAM





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2. APPLICABLE DOCUMENTS

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

(a) ESA/SCC Generic Specification No. 3501 for Quartz Crystal Units.

3. TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESA/SCC Basic Specification No. 21300 shall apply. In addition, the following symbols are used:-

Resonance Frequency $= f_r$ $= f_{L}$ Load Resonance Frequency $= T_0$ Reference Temperature Resonance Resistance $= R_r$ Load Resonance Resistance = R_L $= P_o$ Rated Drive Level $= C_0$ Static Capacitance Load Capacitance $= C_L$ Motional Capacitance $= C_1$ = L1 Motional Inductance Response Resistance $= R_P$ Response Impedance $= |Z_P|$ Insulation Resistance = Ri

4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the crystal units specified herein shall be as stated in this specification and ESA/SCC Generic Specification No. 3501 for Quartz Crystal Units. Deviations from the Generic Specification applicable to this specification only, are detailed in Para. 4.2.

Deviations from the applicable Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESA/SCC requirements and do not affect the components' reliability, are listed in the appendices attached to this specification.

4.2 <u>DEVIATIONS FROM GENERIC SPECIFICATION</u>

4.2.1 <u>Deviations from Special In-process Controls</u>

None.

4.2.2 <u>Deviations from Final Production Tests (Chart II)</u>

None.

4.2.3 <u>Deviations from Burn-in Tests (Chart III)</u>

None.

4.2.4 <u>Deviations from Qualification Tests (Chart IV)</u>

None.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

None.



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4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

The dimensions of the crystal units specified herein shall be checked. They shall conform to those shown in Figure 2.

4.3.2 Weight

The maximum weight of the crystal units specified herein shall be 3.0 grammes.

4.3.3 Robustness of Terminations

The requirements for robustness of termination testing are specified in Section 9 of ESA/SCC Generic Specification No. 3501.

4.4 MATERIALS AND FINISHES

The materials and finishes shall be as specified herein. Where a definite material is not specified, a material which will enable the crystal units specified herein to meet the performance requirements of this specification shall be used. Acceptance or approval of any constituent material does not quarantee acceptance of the finished product.

4.4.1 <u>Case</u>

4.4.1.1 Cap

Copper, nickel plated or nickel and gold plated.

4.4.1.2 Base

Kovar, nickel plated or nickel and gold plated.

4.4.2 Lead Material and Finish

The lead material shall be Type 'D' with either Type '2' or Type '3 or 4' finish in accordance with the requirements of ESA/SCC Basic Specification No. 23500. (See Tables 1(a) for Type Variants).

4.5 MARKING

4.5.1 General

The marking of all components delivered to this specification shall be in accordance with the requirements of ESA/SCC Basic Specification No. 21700 and the following paragraphs. 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 the component in its primary package.

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

- (a) The SCC Component Number.
- (b) Characteristics.
- (c) Traceability Information.

4.5.2 <u>The SCC Component Number</u>

Each component shall bear the SCC Component Number, which shall be constituted and marked as follows:-

Detail Specification Number	
Type Variant (see Table 1(a))	
Testing Level (B or C, as applicable)	_



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4.5.3 Characteristics

The resonance frequency of the crystal units shall be clearly specified in MHz. Where necessary, it shall be specified to 6 decimal places.

4.5.4 Traceability Information

Each component shall be marked in respect of traceability information in accordance with the requirements of ESA/SCC Basic Specification No. 21700.

4.5.5 Manufacturer's Name, Symbol or Code

The Manufacturer's marking shall be in accordance with the requirements of ESA/SCC Basic Specification No. 21700.

4.6 ELECTRICAL MEASUREMENTS

4.6.1 Electrical Measurements at Reference Temperature

The parameters to be measured in respect of electrical characteristics are scheduled in Table 2. The measurements shall be performed at the temperatures specified in the individual Tables 1(a), Item 2.

4.6.2 <u>Electrical Measurements at High and Low Temperatures</u>

The parameters to be measured at high and low temperatures are scheduled in Table 3. These measurements shall only be performed if values are specified in Table 1(a) Items 8 and/or 9.

4.6.3 <u>Circuits for Electrical Measurements (Figure 4)</u>

Not applicable.

4.7 BURN-IN TESTS

4.7.1 Parameter Drift Values

The parameter drift values applicable to burn-in are specified in Table 4 of this specification. Unless otherwise stated, measurements shall be performed at $T_{amb} = T_0 \pm 2$ °C. The parameter drift values (Delta) applicable to the scheduled parameters shall not be exceeded. In addition to these drift value requirements for a given parameter, the appropriate limit value specified in Table 2 shall not be exceeded.

4.7.2 Conditions for Burn-in

The requirements for burn-in are specified in Section 7 of ESA/SCC Generic Specification No. 3501. The conditions for burn-in shall be as specified in Table 5 of this specification.

4.7.3 <u>Electrical Circuits for Burn-in (Figure 5)</u>

Not applicable.

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TABLE 2 - ELECTRICAL MEASUREMENTS AT REFERENCE TEMPERATURE

No.	Characteristics	Symbol	ESA/SCC 3501 Test Method	Limits	Unit
1	Resonance frequency at reference temperature and rated drive level - with C _O - with C _L	f _r (T _o , P _o) f _L (T _o , P _o)	Para. 9.2.1.1	Table 1(a), Item 1 ± Item 6	MHz
2	Resonance resistance at reference temperature and rated drive level - with C _O - with C _L	R _r (T _o , P _o) R _L (T _o , P _o)	Para. 9.2.1.1	Table 1(a), Item 7	Ω
3	Frequency variation with Drive Level	$\frac{\Delta f}{f}$ (T _o , ΔP)	Para. 9.2.1.1	Table 1(a), Item 11	10-6
4	Resistance variation with Drive Level	<u>Δ R</u> (T _o , ΔP) R	Para. 9.2.1.1	Table 1(a), Item 12	%
5	Motional Inductance	L ₁	Para. 9.2.1.3	Table 1(a), Item 13	mH
6	Static Capacitance	Co	Para. 9.2.1.4	Table 1(a), Item 15	pF
7	Unwanted response	R _P /R or IZ _P I/R	Para. 9.2.1.5	Table 1(a), Item 17	-
8	Insulation Resistance	Ri	Para. 9.2.1.6	500 Min.	МΩ

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TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES

No.	Characteristics	Symbol	ESA/SCC 3501 Test Method	Limits	Unit
9	Frequency variation with Temperature over Top	$\frac{\Delta f}{f}$ (ΔT , P_0)	Para. 9.2.1.2	Table 1(a) Item 8	10-6
10	Resistance variation with Temperature over Top	Δ R (ΔT, P _o)	Para. 9.2.1.2	Table 1(a) Item 9	%

FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS

Not applicable.

TABLE 4 - PARAMETER DRIFT VALUES

No.	Characteristics	Symbol	Spec. and/or Test Method	Test Conditions	Change Limits (Δ)	Unit
1	Resonance frequency drift	<u>Δ f</u>	As per Table 2	As per Table 2	± 2.0	10-6
2	Resonance resistance drift	<u>Δ R</u> R	As per Table 2	As per Table 2	± 10 or (1) ± 1.0	% Ω

NOTES 1. Whichever is the highest value.

TABLE 5 - CONDITIONS FOR BURN-IN AND LIFE TEST

No.	Characteristics	Symbol	Condition	Unit
1	Ambient Temperature	T _{amb}	+85 ±5	°C

FIGURE 5 - ELECTRICAL CIRCUIT FOR BURN-IN AND LIFE TEST

Not applicable.



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4.8 <u>ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESA/SCC GENERIC SPECIFICATION NO. 3501)</u>

4.8.1 Measurements and Inspections on Completion of Environmental Tests

The parameters to be measured and inspections to be performed on completion of environmental tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at $T_{amb} = T_0 \pm 2$ °C.

4.8.2 Measurements and Inspections at Intermediate Points and on Completion of Endurance Tests

The parameters to be measured and inspections to be performed at intermediate points and on completion of endurance tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at $T_{amb} = T_0 \pm 2$ °C.

4.8.3 Conditions for Operating Life Test (Part of Endurance Testing)

The requirements for the operating life test are specified in Section 9 of ESA/SCC Generic Specification No. 3501. The test shall be performed as a high temperature storage test and the temperature to be applied shall be the maximum operating temperature specified in the individual Tables 1(a) given in this specification.



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TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING

	ESA/SCC GENERIC SPEC. NO. 3501		MEASUREMENTS A	MEASUREMENTS AND INSPECTIONS			LIMITS	
NO.	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS	SYMBOL	Min.	Мах.	UNIT
01	Electrical Measurements at Reference Temperature	Para. 9.2.4	Electrical Measurements	Table 2		Table	e 1(a)	
02	Shock	Para. 9.3	Initial Measurements Resonance Frequency Resonance Resistance Final Measurements Resonance Frequency Drift Resonance Resistance Drift	Table 2 Item 1 Table 2 Item 2 Table 2 Item 1 Table 2 Item 2	f R <u>Δf</u> f <u>ΔR</u> R ΔR		2 Item 1 2 Item 2 +1.0 +10 +1.0	10 ⁻⁶ % Ω
03	Vibration	Para. 9.4	Initial Measurements Resonance Frequency Resonance Resistance Final Measurements Resonance Frequency Drift Resonance Resistance Drift	Table 2 Item 1 Table 2 Item 2 Table 2 Item 1 Table 2 Item 2	f R <u>Δf</u> f <u>ΔR</u> R ΔR		2 Item 1 2 Item 2 +1.0 +10 +1.0	10 ⁻⁶ %
04	Seal Test	Para. 9.5	Fine Leak Gross Leak	Para. 9.5.1 Para. 9.5.2			. 9.5.1 . 9.5.2	
05	Permanence of Marking	Para. 9.8	Final Measurements Visual Examination	No corrosion or obliteration of marking	-	_	-	-
06	External Visual Inspection	Para. 9.9	Final Measurements Visual Inspection	ESA/SCC No. 20500	-	-	-	
07	Solderability	Para. 9.13	-	-	_	-	-	

- 1. The tests in this table refer to either Chart IV or V, and shall be used as applicable.
- 2. Whichever is the highest value.



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TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING (Cont.)

								
	ESA/SCC GENERIC S	PEC. NO. 3501	MEASUREMENTS AN	ID INSPECTIONS		LIM	IITS	
NO.	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS	SYMBOL	Min.	Max.	UNIT
	Climatic Sequence	Para. 9.14						
08	Dry Heat	Para. 9.14.1	Initial Measurements					
			Resonance Frequency	Table 2 Item 1	f		2 Item 1	
İ			Resonance Resistance	Table 2 Item 2	R	Table 2	2 Item 2	
			Final Measurements	711 611 4				10.6
			Resonance Frequency	Table 2 Item 1	Δf f	-2.0	+ 2.0	10-6
			Drift Resonance Resistance	Table 2 Item 2	<u>Δ R</u>	- 10	+10	%
			Drift	1 abic 2 item 2	R	or (2)	. 10	~
			J		ΔR	-1.0	+1.0	Ω
09	Cold	Para. 9.14.3	Initial Measurements		[
			Resonance Frequency	Table 2 Item 1	f	Para. 9	9.14.1.3	
			Resonance Resistance	Table 2 Item 2	R	Final Mea	surements	
]	Final Measurements]]
			Resonance Frequency	Table 2 Item 1	Δf	-2.0	+ 2.0	10 ⁻⁶
1		Ì	Drift	Table Oltare O	f f	4.0		١ ,,
			Resonance Resistance	Table 2 Item 2	∆R R	- 10	+10	%
\		<u> </u>	Drift		ΔR	or (2) - 1.0	+ 1.0	Ω
10	Damp Heat (Acclerated)	Para. 9.14.4	Initial Measurements			1.0	' '0	3.
'0	Remaining Cycles	1 4/4. 5.17.7	Resonance Frequency	Table 2 Item 1	f	Para. 9	9.14.3.2	
	Tromaining Oyoloo		Resonance Resistance	Table 2 Item 2	R		surements	
			Final Measurements	-	İ			
			Resonance Frequency	Table 2 Item 1	<u>∆ f</u>	- 2.0	+ 2.0	10-6
1			Drift		f			
			Resonance Resistance	Table 2 Item 2	ΔR	- 10	+10	%
		ļ	Drift		R ΔR	or (2)		
			Insulation Resistance	Table 2 Item 8	Ι ΔΗ Ri	- 1.0 500	+1.0	Ω $M\Omega$
ļ			insulation nesistance	Table 2 Itelli 6	- Ni	300	ļ	14125
11	Rapid Change of	Para. 9.15	Initial Measurements			1		
ļ	Temperature		Resonance Frequency	Table 2 Item 1	f	3	9.14.4.2	
			Resonance Resistance	B)	R	Final Mea	asurements	
			Final Measurements	After minimum				
				Recovery of 2 hours				10-6
			Resonance Frequency Drift	Table 2 Item 1	$\frac{\Delta f}{f}$	-2.0	+ 2.0	10-6
			Resonance Resistance	Table 2 Item 2	ΔR	-10	+ 10	%
			Drift	1 and 2 Rolli 2	R	or (2)	. 10	~
					ΔR	-1.0	+ 1.0	Ω
12	Robustness of	Para. 9.16	Tensile Strength	Gen. 3501				
	Terminations			Para. 9.16.1				
}	į		Visual Examination	No visible damage				
			Bending	Gen. 3501				
		1	l.c	Para. 9.16.2				
l			Visual Examination	No visible damage				

- 1. The tests in this table refer to either Chart IV or V, and shall be used as applicable.
- 2. Whichever is the highest value.



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TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING (Cont.)

	ESA/SCC GENERIC SPEC. NO. 3501		MEASUREMENTS AND IN	MEASUREMENTS AND INSPECTIONS			ITS	UNIT
NO.	ENVIRONMENTAL AND ENDURANCE TESTS (1)			CONDITIONS	SYMBOL	Min.	Max.	ONT
13	Life Test		Initial Measurements Resonance Frequency Resonance Resistance Intermediate Measurements	Table 2 Item 1 Table 2 Item 2	f R	Table 2 Table 2		
			Resonance Frequency Drift	Table 2 Item 1	<u>∆ f</u> f	-2.0	+ 2.0	10-6
		l	Resonance Resistance Drift	Table 2 Item 2	<u>∆ R</u> R	-10 or (2)	+ 10	%
			Intermediate Measurements (Chart IV) and Final Measurements (Chart V)	At 1000 hours	ΔR	- 1.0	+1.0	Ω
			Resonance Frequency	Table 2 Item 1	∆f f	-2.5	+ 2.5	10-6
			Resonance Resitance Drift	Table 2 Item 2	<u>∆ R</u> R	-10 or (2)	+10	%
			Final Measurements (Chart IV)	At 2000 hours	ΔR	-1.0	+1.0	Ω
			Resonance Frequency	Table 2 Item 1	∆ f f	-3.0	+3.0	10-6
			Resonance Resistance Drift	Table 2 Item 2	<u>∆ R</u> R	-10 or (2)	+10	%
				<u> </u>	ΔR	-1.0	+1.0	Ω

- The tests in this table refer to either Chart IV or V, and shall be used as applicable.
 Whichever is the highest value.

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	4.194	4.194304		
2	Reference Temperature	T _o	+ 28	+ 32	,°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	C_L	-	30	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10-6	At T _o °C
7	Resonance Resistance	R_L	1	10	Ω	Over T _{op} °C
8	Frequency Variation with Temperature over Top	<u>∆</u> f f	-10	+ 10	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation	ΔR R	-20	+ 20	%	
	with Temperature over Top	К	-2.0	r +2.0	Ω	If R ≤ 10Ω
10	Operating Temperature Range	T _{op}	-10	+ 80	°C	
11	Frequency Variation with Drive Level	<u>∆</u> f	Not ap	plicable	10-6	
12	Resistance Variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	0	4.0	pF	
16	Q Factor	Q	200 000	-		
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R or IZpI/R	2:1	-		In the frequency range: f _L -200kHz to f _L +200kHz
18	Ageing	$\frac{\Delta f}{f}$	-10	+ 10	10-6	5 years after Burn-in
19	Lead Finish		Туг	Type 2		
20	Intended Application		Not ap	plicable		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	8.1	8.192		
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	CL	5	0	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ</u> f	-10	+ 10	10 ⁻⁶	At To °C
7	Resonance Resistance	RL	-	13	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	Δf f	-15	+ 15	10 ⁻⁶	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	<u>ΔR</u> R	Not applicable		%	
10	Operating Temperature Range	T _{op}	-25	+ 80	°C	
11	Frequency Variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	olicable	10 ⁻⁶	
12	Resistance Variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	36.5	49.5	mΗ	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	0	4.0	pF	
16	Q Factor	Q	50 000	-	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p l/R	3:1	-		In the frequency range: fL -100kHz to fL +100kHz
18	Ageing	∆ f f	-30	+30	10-6	
19	Lead Finish		Type '	Type '3 or 4'		
20	Intended Application		Not ap	plicable		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks			
1	Resonance Frequency	f _r	26	26.0					
2	Reference Temperature	То	+20	+ 30	°C				
3	Overtone Order	-	9	3					
4	Load Capacitance	CL	٥	0	рF				
5	Rated Drive Level	Po	0.	.1	mW				
6	Frequency Adjustment Tolerance	∆ f f	-10	+ 10	10-6	At To °C			
7	Resonance Resistance	R _r	_	40	Ω	At To °C			
8	Frequency Variation with Temperature over Top	<u>Δ f</u> f	0 -10 -10	+ 10 + 10 0	10 ⁻⁶	From T -20 to +10 °C From T +10 to +50 °C From T +50 to +80 °C			
9	Resistance Variation with Temperature over Top	ΔR R	-20	+20	%				
10	Operating Temperature Range	T _{op}	-25	+80	°C				
11	Frequency Variation with Drive Level	$\frac{\Delta f}{f}$	0.5	0.5	10 ⁻⁶	From $P_{S1} = 0$ mW to $P_{S2} = 0.1$ mW			
12	Resistance Variation with Drive Level	AR R	-10	+10	%	From $P_{S1} = 0$ mW to $P_{S2} = 0.1$ mW			
13	Motional Inductance	L ₁	20	-	mH				
14	Motional Capacitance	C ₁	Not ap	plicable	fF				
15	Static Capacitance	Co	0	7.0	pF				
16	Q Factor	Q	100 000	-	-				
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	10:1	-		In the frequency range: f _r -2600kHz to f _r +2600kHz			
18	Ageing	$\frac{\Delta f}{f}$	-2.0	+2.0	10 ⁻⁶	10 years after Burn-in and ageing			
19	Lead Finish		Type 2			-			
20	Intended Application		Not ap	plicable					

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	7.1	98	MHz	
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	C _L	29.7	30.3	рF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	Δf f	-50	+ 50	10 ⁻⁶	At T _o °C
7	Resonance Resistance	R_L	-	30	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	∆f f	-50	+50	10 ⁻⁶	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R	Not applicable		%	
10	Operating Temperature Range	T _{op}	-55	+ 105	°C	
11	Frequency Variation with Drive Level	<u>Δ f</u>	Not applicable		10 ⁻⁶	
12	Resistance Variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mΗ	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	0	7.0	pF	
16	Q Factor	Q	Not ap	plicable	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	7:1	-		In the frequency range: f _L -500kHz to f _L +500kHz
18	Ageing	$\frac{\Delta f}{f}$	-7.5	+ 7.5	10-6	Over 5 years after Burn-in
19	Lead Finish		Ту	pe 2		
20	Intended Application		Not ap	plicable		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			7711171141			
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f∟	5.	5.0		
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	_	Funda	mental	-	
4	Load Capacitance	CL	29.7	30.3	рF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	Δf f	-10	+ 10	10 ⁻⁶	At T _o °C
7	Resonance Resistance	RL	_	100	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	$\frac{\Delta f}{f}$	-40	+ 40	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	Not applicable		%	
10	Operating Temperature Range	T _{op}	-40	+ 80	°C	
11	Frequency Variation with Drive Level	<u>∆</u> f	Not ap	Not applicable		
12	Resistance Variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mΗ	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	Not ap	plicable	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	4:1	-		In the frequency range: f _L -500kHz to f _L +500kHz
18	Ageing	$\frac{\Delta f}{f}$	Not ap	Not applicable		
19	Lead Finish		Туг	Type 2		
20	Intended Application		Not ap	plicable		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f∟	18	18.0		
2	Reference Temperature	Τ _o	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	C _L	29.7	30.3	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u> f	-10	+ 10	10 ⁻⁶	At T _o °C
7	Resonance Resistance	RL	-	20	Ω	At To °C
8	Frequency Variation with Temperature over Top	∆ f f	-20	+20	10 ⁻⁶	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	<u>Δ R</u> R	-20 -2.0	+20 or +2.0	% Ω	From resistance measured at T_0 °C If $R \le 10\Omega$
10		-			°C	1111/12/1022
10	Operating Temperature Range	Top	-45	+ 80		
11	Frequency Variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	Not applicable		
12	Resistance Variation with Drive Level	ΔR R	Not ap	olicable	%	
13	Motional Inductance	L ₁	Not ap	olicable	mH	
14	Motional Capacitance	C ₁	Not ap	olicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	70 000	-	1	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	2:1	-		In the frequency range: fL -200kHz to fL +200kHz
18	Ageing	$\frac{\Delta f}{f}$	-3.0	+3.0	10 ⁻⁶	Over 5 years after Burn-in
19	Lead Finish	}	Type 2			
20	Intended Application		Not ap	plicable	_	

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	1	0	MHz	
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	_	
4	Load Capacitance	C _L	3	0	pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10 ⁻⁶	At T _o °C
7	Resonance Resistance	RL	•	20	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	<u>Δ</u> f	-25	+ 25	10 ⁻⁶	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R	Not applicable		%	
10	Operating Temperature Range	T _{op}	-55	+ 100	°C	
11	Frequency Variation with Drive Level	<u>Δ f</u> f	Not applicable		10 ⁻⁶	
12	Resistance Variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	_	7.0	pF	
16	Q Factor	Q	80 000	ı	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	2:1	-		In the frequency range: f _L -500kHz to f _L +500kHz
18	Ageing	<u>Δ f</u>	-5.0	+5.0	10 ⁻⁶	Over 5 years after Burn-in
19	Lead Finish		Type 2			
20	Intended Application		Not ap	plicable		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	10	10.0		
2	Reference Temperature	To	+ 23	+ 27	۰C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	C _L	3	0	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10-6	At To °C
7	Resonance Resistance	RL	-	30	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δf f	-30	+30	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	-10 o -2.0	+ 10 + 2.0	% Ω	From resistance measured at T _o °C If R<10Ω
10	Operating Temperature Range	T _{op}	-55	+ 100	°C	
11	Frequency Variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	Not applicable		
12	Resistance Variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mΗ	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	100 000		_	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	2:1	-		In the frequency range: fL -200kHz to fL +200kHz
18	Ageing	$\frac{\Delta f}{f}$	-2.0	+2.0	10 ⁻⁶	Per year after Burn-in
19	Lead Finish		Туг	oe 2		
20	Intended Application		×	O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			7 11 117 13 14 1			
No.	Characteristics	Symbol	Lin Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f∟	5	50		
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	(3	-	
4	Load Capacitance	CL	11.9	12.1	pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	∆ f f	-2.0	+2.0	10-6	At T _o °C
7	Resonance Resistance	RL	-	40	Ω	Over T _{op} °C
8	Frequency Variation with Temperature over Top	∆ f f	-5.0 -10	+ 5.0 + 10	10-4	From T -20°C to +70°C From T -20°C to +80°C
9	Resistance Variation with Temperature over Top	∆R R	Not applicable		%	
10	Operating Temperature Range	Тор	-20	+ 80	°C	
11	Frequency Variation with Drive Level	∆ f f	Not ap	Not applicable		
12	Resistance Variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	1.7	-	fF	
15	Static Capacitance	Co	-	6.0	pF	
16	Q Factor	Q	50 000	-	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R or IZpI/R	2.5:1	-		In the frequency range: f _L -200kHz to f _L + 200kHz
18	Ageing	$\frac{\Delta f}{f}$	-6.0	+6.0	10-6	Over 5 years
19	Lead Finish		Тур	oe 2		
20	Intended Application		VC	XO		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f∟	4.	4.0		
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	C _L	3	0	pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10-6	At T _o °C
7	Resonance Resistance	R_{L}	-	25	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆</u> f	-30	+ 30	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R	Not applicable		%	
10	Operating Temperature Range	T _{op}	-40	+80	ô	
11	Frequency variation with Drive Level	<u>∆</u> f	Not applicable		10 ⁻⁶	
12	Resistance variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	Not ap	plicable	pF	
16	Q Factor	Q	125 000	_	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p l/R	2:1	-		In the frequency range: f _L -500kHz to f _L +500kHz
18	Ageing	$\frac{\Delta f}{f}$	-3.0	+3.0	10 ⁻⁶	1 year after Burn-in
19	Lead Finish		Туг	pe 2		
20	Intended Application		×	(O		With 54HC04

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			7 (17 (17 (17 (17 (17 (17 (17 (17 (17 (1			
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	10	10.0		
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	CL	3	0	рF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10 ⁻⁶	At T _o °C
7	Resonance Resistance	RL	1	30	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	<u>Δ</u> f f	-30	+30	10 ⁻⁶	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R	-2.0	+ 2.0	Ω	From resistance measured at T _o °C
10	Operating Temperature Range	T _{op}	-55	+ 100	°C	
11	Frequency Variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	Not applicable		
12	Resistance Variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	100 000	-	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p l/R	2:1	-		In the frequency range: f _L -200kHz to f _L +200kHz
18	Ageing	<u>Δ f</u>	-2.0	+2.0	10 ⁻⁶	Per year after Burn-in at To
19	Lead Finish		Тур	oe 2		
20	Intended Application		×	(O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

				т		
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f _r	8.	.0	MHz	
2	Reference Temperature	To	+ 20	+ 30	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	C _L	C	0	pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	<u>Δ</u> f	-10	+ 10	10 ⁻⁶	At T _o °C
7	Resonance Resistance	R _r	-	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δf f	0 -9.0 -9.0	+9.0 +9.0 0	10 ⁻⁶	From T -20 to +10 °C From T +10 to +50 °C From T +50 to +80 °C
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R	-2.0	+2.0	Ω	From resistance measured at T ₀ °C
10	Operating Temperature Range	T _{op}	-20	+ 80	°C	
11	Frequency Variation with Drive Level	Δf f	Not ap	Not applicable		
12	Resistance Variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	2.0	-	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	5.0	рF	
16	Q Factor	Q	70 000	-	•	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p l/R	2:1	-		In the frequency range: f _r -10% to f _r +10%
18	Ageing	<u>∆ f</u>	-5.0	+5.0	10-6	12 years after Burn-in
19	Lead Finish		Туг	oe 2		
20	Intended Application		Х	O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f _r	10	.0	MHz	AT cut
2	Reference Temperature	To	+ 20	+ 30	°C	
3	Overtone Order	-	3	3	-	
4	Load Capacitance	C _L	0	0	pF_	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u> f	-10	+ 10	10-6	At T _o °C
7	Resonance Resistance	R_r	-	40	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	$\frac{\Delta f}{f}$	- 10	+ 10	10-6	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	ΔR R	- 2.0	+ 2.0	Ω	From resistance measured at T ₀ °C
10	Operating Temperature Range	T _{op}	-20	+80	°C	
11	Frequency Variation with Drive Level	$\frac{\Delta f}{f}$	- 0.5	+ 0.5	10 ⁻⁶	From $P_{S1} = 0.01 \text{mW}$ to $P_{S2} = 0.1 \text{mW}$
12	Resistance Variation with Drive Level	ΔR R	-20	+20	%	From $P_{S1} = 0.01 \text{mW}$ to $P_{S2} = 0.1 \text{mW}$
13	Motional Inductance	L ₁	3.0	-	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	5.0	pF	
16	Q Factor	Q	70 000	-	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	3:1	-		In the frequency range: f _r -10% to f _r +10%
18	Ageing	$\frac{\Delta f}{f}$	- 10	+10	10-6	12 years after Burn-in
19	Lead Finish		Тур	oe 2		-
20	Intended Application		TC	XO		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

Γ			Lim		····	
No.	Characteristics	Symbol	Min.	Max.	Unit	Remarks
1	Resonance Frequency	fL	6.	6.4		
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	CL	3	0	pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10 ⁻⁶	At To °C
7	Resonance Resistance	R_L	-	20	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	<u>Δ</u> f	-20	+ 20	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	-20 -2.0	+20 or +2.0	% Ω	From resistance measured at T _o °C If R<10Ω
10	Operating Temperature Range	T _{op}	-45	+80	°C	
11	Frequency Variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	olicable	10 ⁻⁶	
12	Resistance Variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mΗ	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	70 000	-	_	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	2:1	•		In the frequency range: fL -200kHz to fL +200kHz
18	Ageing	<u>Δ f</u>	-3.0	+3.0	10 ⁻⁶	Per year after Burn-in
19	Lead Finish		Ту	oe 4		
20	Intended Application		×	(0		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f _r	12.0	12.605		AT cut
2	Reference Temperature	To	+ 20	+30	°C	
3	Overtone Order	-	Fundai	mental	_	
4	Load Capacitance	CL	٥	0	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	∆ f f	- 10	+10	10-6	At T _o °C
7	Resonance Resistance	R _r	1	40	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	∆f f	- 10	+ 10	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	-20 -2.0	+20 or +2.0	% Ω	From resistance measured at T _o °C
10	Operating Temperature Range	T _{op}	-20	+ 60	°C	
11	Frequency Variation with Drive Level	<u>∆ f</u>	Not ap	plicable	10 ⁻⁶	
12	Resistance Variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	2.0	-	mΗ	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	70 000	-	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p l/R	2:1	-		In the frequency range: f _r - 10% to f _r + 10%
18	Ageing	$\frac{\Delta f}{f}$	-5.0	+5.0	10-6	Operation 12 years
19	Lead Finish		Тур	oe 2		
20	Intended Application		ТС	XO		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			MINATI			
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f∟	7.	.0	MHz	AT cut
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	CL	3	0	pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	∆ f f	- 10	+ 10	10-6	At T _o °C
7	Resonance Resistance	RL	-	20	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	$\frac{\Delta f}{f}$	- 12	+ 12	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	-20 -2.0	+20 or +2.0	% Ω	From resistance measured at T ₀ °C
10	Operating Temperature Range	T _{op}	-35	+70	°C	
11	Frequency Variation with Drive Level	∆ f f	Not ap	plicable	10-6	
12	Resistance Variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	40	-	mΗ	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	100 000		-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p l/R	3:1	-		In the frequency range: f _L -10% to f _L +10%
18	Ageing	$\frac{\Delta f}{f}$	-3.0	+3.0	10 ⁻⁶	Per year after Burn-in
19	Lead Finish		Туг	oe 2		
20	Intended Application		Х	O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f _r	12.6	665	MHz	AT cut
2	Reference Temperature	To	+20	+ 30	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	C _L	٥	0	рF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10-6	At To °C
7	Resonance Resistance	R _r	1	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	∆ f f	- 12	+ 12	10-6	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	<u>Δ R</u> R	-20 o -2.0	+20 r +2.0	% Ω	From resistance measured at T ₀ °C
10	Operating Temperature Range	T _{op}	-20	+ 80	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	plicable	10 ⁻⁶	
12	Resistance variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	2.0		mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	70 000	-	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	2:1	-		In the frequency range: f _r -10% to f _r +10%
18	Ageing	$\frac{\Delta f}{f}$	-5.0	+5.0	10 ⁻⁶	Over 12 years after 240 hours Burn-in
19	Lead Finish		Туг	pe 2		
20	Intended Application		TC	XO		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			7711171111			, , , , , , , , , , , , , , , , , , ,
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f∟	5.7	5.760		AT cut
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	CL	29.5	30.5	pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10 ⁻⁶	At T _o °C
7	Resonance Resistance	RL	4.0	15	Ω	At To °C
8	Frequency Variation with Temperature over Top	$\frac{\Delta f}{f}$	-15	+ 15	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R	Not applicable		%	
10	Operating Temperature Range	T _{op}	-40	+ 90	°C	
11	Frequency Variation with Drive Level	Δf f	Not ap	Not applicable		
12	Resistance Variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	100 000	_	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R or IZpI/R	3:1	-		In the frequency range: fL -200kHz to fL +200kHz
18	Ageing	Δf f	-15	+ 15	10 ⁻⁶	Over 10 years after 240 hours Burn-in
19	Lead Finish		Тур	pe 2		
20	Intended Application		×	(O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	8.602	2893	MHz	AT cut
2	Reference Temperature	To	+ 55	+ 65	°C	
3	Overtone Order	-	Fundar	mental	-	
4	Load Capacitance	C _L	3	0	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10 ⁻⁶	At T _o °C
7	Resonance Resistance	R_L	-	30	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	∆f f	-12	+ 12	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation	$\frac{\Delta R}{R}$	-20	+20	%	From resistance
	with Temperature over Top	H	-2.0	r + 2.0	Ω	measured at To °C
10	Operating Temperature Range	T _{op}	-40	+ 85	°C	
11	Frequency Variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	olicable	10-6	
12	Resistance Variation with Drive Level	<u>Δ R</u> R	-20	+20	%	From $P_{S1} = 0.01 \text{mW}$ to $P_{S2} = 0.1 \text{mW}$
13	Motional Inductance	L ₁	2.0	-	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	5.0	pF	
16	Q Factor	Q	100 000		_	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	2:1	-		In the frequency range: f _L -10% to f _L +10%
18	Ageing	$\frac{\Delta f}{f}$	-5.0	+5.0	10-6	Over 10 years after 240 hours Burn-in
19	Lead Finish		Тур	oe 2		
20	Intended Application		X	0		-

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f _r	15.10	15.104893		AT cut
2	Reference Temperature	To	+ 20	+ 30	°C	
3	Overtone Order	-	Fundar	mental	-	
4	Load Capacitance	CL	0	0	рF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10 ⁻⁶	At T _o °C
7	Resonance Resistance	R _r	1	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ</u> f f	-10	+ 10	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	-20 o -2.0	+20 r +2.0	% Ω	From resistance measured at T ₀ °C
10	Operating Temperature Range	T _{op}	-20	+ 80	ů	
11	Frequency Variation with Drive Level	∆ f f	Not ap	plicable	10 ⁻⁶	
12	Resistance Variation with Drive Level	∆R R	Not ap	plicable	%	
13	Motional Inductance	L ₁	2.0	-	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	70 000	-	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	2:1	-		In the frequency range: f _r -10% to f _r +10%
18	Ageing	$\frac{\Delta f}{f}$	-5.0	+5.0	10 ⁻⁶	Over 12 years after 240 hours Burn-in
19	Lead Finish		Тур	pe 2		
20	Intended Application		×	(0		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			77 11 117 10 17			
No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	fL	20	20.0		AT cut
2	Reference Temperature	To	+23	+ 27	°C	
3	Overtone Order	-	Fundar	nental	-	
4	Load Capacitance	CL	3	0	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10 ⁻⁶	At T _o °C
7	Resonance Resistance	R_{L}	-	30	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	Δf f	- 15	+ 15	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	-20 o	+20 r +2.0	% Ω	From resistance measured at T ₀ °C
10	Operating Temperature Range	T _{op}	-30	+70	°C	
11	Frequency Variation with Drive Level	<u>Δ</u> f	Not app	olicable	10 ⁻⁶	
12	Resistance Variation with Drive Level	ΔR R	Not app	olicable	%	
13	Motional Inductance	L ₁	Not app	olicable	mΗ	
14	Motional Capacitance	C ₁	Not app	olicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	70 000	-	_	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p l/R	2:1	-		In the frequency range: f _L -200kHz to f _L +200kHz
18	Ageing	∆ f f	-1.0	+ 1.0	10-6	Per year after Burn-in
19	Lead Finish		Тур	e 2		
20	Intended Application		X	0		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f∟	13	13.0		AT cut
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	_	
4	Load Capacitance	C _L	3	0	pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	∆ f f	-10	+ 10	10-6	At T _o °C
7	Resonance Resistance	R_{L}		20	Ω	At To °C
8	Frequency Variation with Temperature over Top	∆f f	- 20	+20	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature	ΔR R	-20 +20 or		%	From resistance measured at T _o °C
	over T _{op}		-2.0	+2.0	Ω	
10	Operating Temperature Range	T _{op}	- 40	+ 80	°C	
11	Frequency Variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	Not applicable		
12	Resistance Variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	70 000	-	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p l/R	2:1	-		In the frequency range: fL -200kHz to fL +200kHz
18	Ageing	$\frac{\Delta f}{f}$	-2.0	+2.0	10 ⁻⁶	Per year after Burn-in
19	Lead Finish		Тур	oe 2		
20	Intended Application		Х	O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	10	.0	MHz	AT cut
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Fundai	mental	-	
4	Load Capacitance	C_L	3	0	рF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10-6	At To °C
7	Resonance Resistance	R_{L}	•	30	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	Δf f	-30	+30	10 ⁻⁶	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R	-20 o -2.0	+20 r +2.0	% Ω	From resistance measured at T _o °C
10	Operating Temperature Range	T _{op}	-55	+ 100	°C	
11	Frequency variation with Drive Level	Δ f f	Not ap	plicable	10 ⁻⁶	
12	Resistance variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	100 000	-	_	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p l/R	2:1	-		In the frequency range: fL -200kHz to fL +200kHz
18	Ageing	Δf f	-2.0	+2.0	10 ⁻⁶	Per year after Burn-in
19	Lead Finish		Тур	oe 2		
20	Intended Application		×	O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	5.242	5.242880		AT cut
2	Reference Temperature	T _o	+ 60	+60	°C	
3	Overtone Order	-	Fundai	mental	-	
4	Load Capacitance	CL	3	0	рF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	∆ f f	- 10	+ 10	10 ⁻⁶	At T _o °C
7	Resonance Resistance	R_{L}	1	13	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆ f</u> f	- 15	+ 15	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	Not applicable		%	
10	Operating Temperature Range	T _{op}	-40	+ 85	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not applicable		10 ⁻⁶	
12	Resistance variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	20	_	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	5.0	pF	
16	Q Factor	Q	50 000	<u>.</u>	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	3:1	-		In the frequency range: f _L -525kHz to f _L +525kHz
18	Ageing	<u>Δ f</u>	-3.0	+3.0	10-6	Per year after Burn-in
19	Lead Finish		Тур	e 2		
20	Intended Application		X	O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

	111 = 474 (17441 140. 20									
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks				
1	Resonance Frequency	f∟	5.62	250	MHz	AT cut				
2	Reference Temperature	To	+ 20	+30	°C					
3	Overtone Order	-	Fundai	mental	-					
4	Load Capacitance	CL	3	0	pF					
5	Rated Drive Level	Po	0.	1	mW					
6	Frequency Adjustment Tolerance	∆ f f	- 10	+ 10	10-6	At T _o °C				
7	Resonance Resistance	RL	1	25	Ω	At T _o °C				
8	Frequency Variation with Temperature over Top	<u>∆</u> f f	- 14	+ 14	10 ⁻⁶	From frequency measured at T _o °C				
9	Resistance Variation	ΔR R	-20	+20	%	From resistance				
 	with Temperature over Top	"	-2.0	r +2.0	Ω	measured at To °C				
10	Operating Temperature Range	T _{op}	-40	+ 85	°C					
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	-0.5	+ 0.5	10 ⁻⁶	From P _{S1} = .01mW to P _{S2} = 0.1mW				
12	Resistance variation with Drive Level	ΔR R	-20	+20	%	From P _{S1} = .01mW to P _{S2} = 0.1mW				
13	Motional Inductance	L ₁	2.0	-	mH					
14	Motional Capacitance	C ₁	Not ap	plicable	fF					
15	Static Capacitance	Co	-	5.0	рF					
16	Q Factor	Q	10 000		-					
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	3:1	-		In the frequency range: fL -10% to fL +10%				
18	Ageing	<u>Δ f</u>	-5.0	+5.0	10-6	Over 10 years after Burn-in				
19	Lead Finish		Тур	oe 2		_				
20	Intended Application		×	(O						

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			.,			
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	11.2	250	MHz	AT cut
2	Reference Temperature	То	+ 23	+ 27	°C	
3	Overtone Order	_	Funda	mental	-	
4	Load Capacitance	CL	29.7	30.3	pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u> f	-10	+ 10	10-6	At T _o °C
7	Resonance Resistance	RL	-	20	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	<u>∆ f</u> f	- 20	+ 20	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	Not applicable		%	
10	Operating Temperature Range	T _{op}	-50	+ 100	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	plicable	10 ⁻⁶	
12	Resistance variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co		7.0	pF	
16	Q Factor	Q	50 000	-	<u>-</u>	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	7:1	-		In the frequency range: f _L -200kHz to f _L +200kHz
18	Ageing	$\frac{\Delta f}{f}$	-20	+20	10-6	Over 15 years after 240 hours Burn-in
19	Lead Finish		Тур	pe 2		
20	Intended Application		X	(O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f _r	8.	.0	MHz	AT cut
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	CL		o	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u>	- 10	+ 10	10 ⁻⁶	At T _o °C
7	Resonance Resistance	R_{r}	•	30	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ f</u> f	- 10	+ 10	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	-20 -1.0	+ 20 or + 1.0	% Ω	From resistance measured at T _o °C
10	Operating Temperature Range	T _{op}	-30	+70	°C	
11	Frequency variation with Drive Level	Δf f	Not ap	plicable	10 ⁻⁶	
12	Resistance variation with Drive Level	∆R R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	_	7.0	pF	
16	Q Factor	Q	80 000		-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p l/R	2:1	-		In the frequency range: f _r -200kHz to f _r +200kHz
18	Ageing	$\frac{\Delta f}{f}$	-3.0	+3.0	10 ⁻⁶	Per year after Burn-in
19	Lead Finish		Тур	pe 2		
20	Intended Application		X	O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f∟	3.49	3.494400		AT cut
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	CL	20	50	pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	- 10	+ 10	10-6	At To °C
7	Resonance Resistance	RL	-	12	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δf f	-20	+20	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	Not applicable		%	
10	Operating Temperature Range	T _{op}	- 55	+ 100	°C	
11	Frequency variation with Drive Level	<u>∆</u>	Not applicable		10-6	
12	Resistance variation with Drive Level	∆R R	Not ap	plicable	%	
13	Motional Inductance	L ₁	200	-	mΗ	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	2.7	pF	
16	Q Factor	Q	400 000	_	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	2:1	-		In the frequency range: fL -300kHz to fL +300kHz
18	Ageing	$\frac{\Delta f}{f}$	-5.0	+ 5.0	10-6	Per year after Burn-in
19	Lead Finish		Type 2			
20	Intended Application		X	0		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			ALUANT	10. =0		
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	3.8	3.832		
2	Reference Temperature	T _o	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	C _L	3	0	рF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta}{f}$	- 10	+ 10	10-6	At To °C
7	Resonance Resistance	R_{L}	1	45	Ω	Over T _{op} °C
8	Frequency Variation with Temperature over Top	Δf f	- 17	+ 17	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R	Not applicable		%	
10	Operating Temperature Range	T _{op}	- 40	+80	°C	
11	Frequency Variation with Drive Level	<u>∆ f</u> f	Not applicable		10-6	
12	Resistance Variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	230	-	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	5.0	pF	
16	Q Factor	Q	125 000			
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	2:1	-		In the frequency range: fL -500kHz to fL +500kHz
18	Ageing	Δf f	-3.0	+3.0	10-6	Per year after Burn-in
19	Lead Finish		Type 2			
20	Intended Application		×	(0		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			77 11 117 11 4 1			
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	3.0	3.072		
2	Reference Temperature	To	+23	+ 27	°C	
3	Overtone Order	-	Fundar	nental	-	
4	Load Capacitance	CL	3	0	рF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u> f	- 10	+ 10	10 ⁻⁶	At To °C
7	Resonance Resistance	RL	-	50	Ω	Over T _{op} °C
8	Frequency Variation with Temperature over Top	<u>Δ f</u> f	-20	+20	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	Not applicable		%	
10	Operating Temperature Range	T _{op}	-40	+80	°C	
11	Frequency Variation with Drive Level	<u>∆ f</u> f	Not ap	plicable	10 ⁻⁶	
12	Resistance Variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	230	-	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	5.0	pF	
16	Q Factor	Q	125 000			
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	2:1			In the frequency range: fL -500kHz to fL +500kHz
18	Ageing	$\frac{\Delta f}{f}$	-3.0	+3.0	10 ⁻⁶	Per year after Burn-in
19	Lead Finish		Type 2			
20	Intended Application		X	O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No. Characteristics Symbol Min. Limits Unit Remarks 1 Resonance Frequency f _L 4.0 MHz MHz 2 Reference Temperature T _o +23 +27 °C 3 Overtone Order - Fundammental - 4 Load Capacitance C _L 30 pF 5 Rated Drive Level P _o 0.1 mW 6 Frequency Adjustment Tolerance T _o 10 +10 10-6 At T _o °C 7 Resonance Resistance R _L - 25 Ω Over T _{op} °C 8 Frequency Variation with Temperature over T _{op} T _o -17 +17 10-6 From frequency measured at T _o °C 10 Operating Temperature Parameter T _o -40 +80 °C Promisesured at T _o °C 11 Frequency Variation with Drive Level T _f Not applicable fr % Not applicable fr % 12 Resistance Variation with Drive Level A _f R Not				ANIANI	10.01		
2 Reference Temperature 3 Overtone Order 4 Load Capacitance CL 30 pF 5 Rated Drive Level P _O 0.1 mW 6 Frequency Adjustment Tolerance Resonance Resistance R _L - 25 Ω Over T _{Op} °C 8 Frequency Variation with Temperature over T _{Op} 9 Resistance Variation with Temperature over T _{Op} 10 Operating Temperature Range Resistance Variation with Drive Level Resistance Variation with Drive Level Resistance Variation with Drive Level Resistance Variation with Drive Level Resistance Variation with Drive Level Resistance Variation with Drive Level Resistance Variation Resistance Resistance Resistance Resistance Variation Resistance Resist	No.	Characteristics	Symbol			Unit	Remarks
3 Overtone Order - Fundamental - 4 Load Capacitance C _L 30 pF 5 Rated Drive Level P _O 0.1 mW 6 Frequency Adjustment Tolerance Af f -10 +10 10-6 At T _O °C 7 Resonance Resistance R _L - 25 Ω Over T _{OP} °C 8 Frequency Variation with Temperature over T _{OP} -17 +17 10-6 From frequency measured at T _O °C 9 Resistance Variation with Temperature over T _{OP} -40 +80 °C 10 Operating Temperature Range Af Not applicable with Drive Level f f 12 Resistance Variation with Drive Level Af R Not applicable % 13 Motional Inductance L ₁ 230 - mH 14 Motional Capacitance C ₁ Not applicable fF 15 Static Capacitance C ₁ Not applicable fF 16 Q Factor Q 125 000 - 17 Ratio of Unwanted: Response Resistance to Resonance Resistance Resistance Resistance Resistance Resistance Resistance Resistance Resistance Resistance Res	1	Resonance Frequency	fL	4.	4.0		
Load Capacitance C _L 30 pF	2	Reference Temperature	T _o	+23	+ 27	°C	
5 Rated Drive Level Po 0.1 mW 6 Frequency Adjustment Tolerance Δf f -10 +10 10-6 At To °C 7 Resonance Resistance RL - 25 Ω Over Top °C 8 Frequency Variation with Temperature over Top Δf f -17 +17 10-6 From frequency measured at To °C 9 Resistance Variation with Temperature over Top Top -40 +80 °C 10 Operating Temperature Range Top -40 +80 °C 11 Frequency Variation with Drive Level Δf f Not applicable 10-6 12 Resistance Variation with Drive Level ΔR R Not applicable % 13 Motional Inductance L1 230 - mH 14 Motional Capacitance C1 Not applicable fF 15 Static Capacitance C2 - 5.0 pF 16 Q Factor Q 125 000 - - </td <td>3</td> <td>Overtone Order</td> <td>-</td> <td>Funda</td> <td>mental</td> <td>-</td> <td></td>	3	Overtone Order	-	Funda	mental	-	
6 Frequency Adjustment Tolerance Δ f f -10 +10 10-6 At T₀ °C 7 Resonance Resistance R _L - 25 Ω Over T₀ρ °C 8 Frequency Variation with Temperature over T₀ρ Δ f f -17 +17 10-6 From frequency measured at T₀ °C 9 Resistance Variation with Temperature over T₀ρ Δ f R Not applicable % 10 Operating Temperature Range T₀ρ -40 +80 °C 11 Frequency Variation with Drive Level Δ f R Not applicable 10-6 12 Resistance Variation with Drive Level A R R Not applicable % 13 Motional Inductance L₁ 230 - mH 14 Motional Capacitance C₁ Not applicable fF 15 Static Capacitance C₁ Not applicable fF 15 Static Capacitance C₁ Not applicable fF 16 Q Factor Q 125 000 - - 17 <td>4</td> <td>Load Capacitance</td> <td>C_L</td> <td>3</td> <td>0</td> <td>pF</td> <td></td>	4	Load Capacitance	C _L	3	0	pF	
Tolerance 7 Resonance Resistance R _L - 25 Ω Over T _{op} °C 8 Frequency Variation with Temperature over T _{op} 9 Resistance Variation with Temperature over T _{op} 10 Operating Temperature Range 11 Frequency Variation with Drive Level 12 Resistance Variation with Drive Level 13 Motional Inductance L ₁ 230 - mH 14 Motional Capacitance C ₁ Not applicable FR Not applicable R Not applicable R Not applicable % In the frequency range: f _L - 500kHz to f _L - 500kHz Response Resistance or Response Impedance to Resonance Resistance Resistance Resistance Resistance Resistance Response Impedance to Resonance Resistance Resistance Response Resistance Response Resistance Response Resistance Or Response Impedance to Resonance Resistance Response Resistance Response Resistance Response Resistance Or Resistance Or Resistance Or Resistance Or Resistance Or	5	Rated Drive Level	Po	0.	.1	mW	
8 Frequency Variation with Temperature over T _{op} 9 Resistance Variation with Temperature over T _{op} 10 Operating Temperature Range 11 Frequency Variation with Drive Level 12 Resistance Variation with Drive Level 13 Motional Inductance 14 Motional Capacitance 15 Static Capacitance 16 Q Factor 17 Ratio of Unwanted: Response Resistance to Resonance Resistance 18 Ageing A R R R Not applicable 19 Lead Finish Not applicable 10 -6 Not applicable 10 -6 Not applicable 10 -6 Not applicable 10 -6 Not applicable 11 - 10 -6 Not applicable 12 Resistance Variation with Drive Level 13 Motional Inductance 14 Not applicable 15 Static Capacitance 16 Q Factor 17 Ratio of Unwanted: Response Resistance to Resonance Resistance 18 Ageing Δ f f 1 - 3.0 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10	6		∆ f f	- 10	+ 10	10-6	At To °C
with Temperature over Top f Most applicable % 9 Resistance Variation with Temperature over Top ΔR/R Not applicable % 10 Operating Temperature Range Top −40 +80 °C 11 Frequency Variation with Drive Level Δf/f Not applicable 10-6 12 Resistance Variation with Drive Level ΔR/R Not applicable % 13 Motional Inductance L₁ 230 - mH 14 Motional Capacitance C₁ Not applicable fF 15 Static Capacitance C₀ - 5.0 pF 16 Q Factor Q 125 000 - - 17 Ratio of Unwanted: Response Resistance or Resistance or Resistance or Resistance Resistance or Resistance Resistance or Resonance Resistance Rp/R or IZp//R 2:1 - In the frequency range: fL +500kHz 18 Ageing Δf/f -3.0 +3.0 10-6 Per year after Burn-in 19 Lead Finish Type 2	7	Resonance Resistance	R_{L}	-	25	Ω	Over Top °C
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	with Temperature	Δf f	- 17	+ 17	10 ⁻⁶	From frequency measured at T _o °C
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	9	with Temperature	<u>∆ R</u> R	Not applicable		%	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	10		T _{op}	- 40	+80	°C	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	11		<u>∆</u>	Not applicable		10 ⁻⁶	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	12		<u>Δ R</u> R	Not ap	plicable	%	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	13	Motional Inductance	L ₁	230	-	mH	
16Q FactorQ125 00017Ratio of Unwanted: Response Resistance or Resonance Resistance or Response Impedance to Resonance Resistance R_p/R or IZ_pI/R 2:1-In the frequency range: $f_L - 500kHz$ to $f_L + 500kHz$ 18Ageing Δf f-3.0+3.010-6Per year after Burn-in19Lead FinishType 2	14	Motional Capacitance	C ₁	Not ap	plicable	fF	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	15	Static Capacitance	Co	-	5.0	pF	
Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance 18 Ageing $ \frac{\Delta f}{f} = -3.0 + 3.0 $ Type 2 $ \frac{f_L - 500kHz}{to} $ to $f_L + 500kHz$ $ \frac{f_L + 500kHz}{to} $ To $f_L + 500kHz$ $ \frac{\Delta f}{f} = -3.0 + 3.0 $ Type 2	16	Q Factor	Q	125 000	•	.	
19 Lead Finish Type 2	17	Response Resistance to Resonance Resistance or Response Impedance to	or	2:1	-		f _L -500kHz to
	18	Ageing	$\frac{\Delta f}{f}$	-3.0	+3.0	10-6	Per year after Burn-in
20 Intended Application XO	19	Lead Finish		Type 2			
	20	Intended Application		×	O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		<u> </u>	ANIANI	10.02		
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	16	16.0		AT cut
2	Reference Temperature	To	+23	+ 27	°C	
3	Overtone Order	-	Fundar	mental	-	
4	Load Capacitance	C _L	3	0	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	∆ f f	- 10	+10	10-6	At To °C
7	Resonance Resistance	R_{L}	-	30	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δf f	- 50	+ 50	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>∆R</u> R	Not applicable		%	
10	Operating Temperature Range	T _{op}	- 55	+ 125	°C	
11	Frequency Variation with Drive Level	$\frac{\Delta f}{f}$	Not applicable		10-6	
12	Resistance Variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁ _	Not ap	plicable	fF	
15	Static Capacitance	Co	_	7.0	pF	
16	Q Factor	Q	50 000	_	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p l/R	2:1	-		In the frequency range: fL - 100kHz to fL + 200kHz
18	Ageing	<u>Δ f</u>	-3.0	+3.0	10-6	Per year after Burn-in
19	Lead Finish		Тур	pe 2		
20	Intended Application		×	O		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	11.05	11.059200		AT cut
2	Reference Temperature	Τ _o	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental	-	
4	Load Capacitance	C _L	3	0	рF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u>	- 10	+ 10	10 ⁻⁶	At To °C
7	Resonance Resistance	RL	-	15	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆</u> f	- 25	+ 25	10 ⁻⁶	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	ΔR R	-20 -2.0	+20 or +2.0	% Ω	From resistance measured at T _o °C
10	Operating Temperature Range	T _{op}	- 55	+ 100	°C	
11	Frequency Variation with Drive Level	∆ f f	Not applicable		10 ⁻⁶	
12	Resistance Variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	70 000	-	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	2:1	-		In the frequency range: f _L -200kHz to f _L +200kHz
18	Ageing	$\frac{\Delta f}{f}$	-1.0	+ 1.0	10-6	Per year after Burn-in
19	Lead Finish		Тур	e 2		
20	Intended Application		×	0		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim		Unit	Remarks
			Min.	Max.		
1	Resonance Frequency	fL	12.00	12.007125		AT cut
2	Reference Temperature	To	+20	+ 30	°C	
3	Overtone Order	-	Funda	mental		
4	Load Capacitance	CL	3	0	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>∆</u> f	- 10	+ 10	10-6	At To °C
7	Resonance Resistance	RL	-	15	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δf f	-20	+ 20	10-6	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	ΔR R	-20 -2.0	+20 or +2.0	%	From resistance measured at T _o °C
10	Operating Temperature Range	T _{op}	- 40	+90	°C	
11	Frequency Variation with Drive Level	<u>Δ f</u>	- 0.5	+ 0.5	10-6	
12	Resistance Variation with Drive Level	<u>Δ R</u> R	- 10	+ 10	%	
13	Motional Inductance	L ₁	5.0	-	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	5.5	рF	
16	Q Factor	Q	70 000	-	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	3:1	-		In the frequency range: fL - 10% to fL + 10%
18	Ageing	Δf f	-5.0	+5.0	10-6	Over 10 years after Burn-in
19	Lead Finish		Тур	pe 2		
20	Intended Application		ТС	XO		

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TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lin Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	11.0	11.0592		AT cut
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	-	Funda	mental		
4	Load Capacitance	CL	5	0	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10-6	At T _o °C
7	Resonance Resistance	RL	-	20	Ω	At To °C
8	Frequency Variation with Temperature over Top	∆ f f	-30	+30	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	-20 -2.0	+20 or +2.0	% Ω	From resistance measured at T_0 °C If $R < 10\Omega$
10	Operating Temperature Range	T _{op}	- 55	+ 100	°C	
11	Frequency Variation with Drive Level	Δf f	Not ap	plicable	10-6	
12	Resistance Variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	7.0	-	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	100 000	-	_	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _p /R or IZ _p I/R	2:1	-		In the frequency range: fL -200kHz to fL +200kHz
18	Ageing	$\frac{\Delta f}{f}$	-5.0	+5.0	10-6	Per year after 240 Hour Burn-in
19	Lead Finish		Тур	e 2		
20	Intended Application		Х	O		